



Initial Environmental Examination (IEE)

Project Number: 55148-001
May 2024 (updated May 2025)

BAN: Skills for Industry Competitiveness and Innovation Program (SICIP)

Construction of Narsingdi Auto-Tech Training Institute (NATI)
at Narsingdi Polytechnic Institute (NPI), Narsingdi

Prepared by the Finance Division under the Ministry of Finance for the Asian Development Bank.

Asian Development Bank

ABBREVIATIONS

ADB	-	Asian Development Bank
DoE	-	Department of Environment
EARF	-	Environmental Assessment and Review Framework
ECA	-	Environment Conservation Act
ECOP	-	Environmental Code of Practice
ECR	-	Environment Conservation Rules
EDC	-	Executive Development Centers
EMP	-	Environmental management Plan
FGD	-	Focus Group Discussions
IBA	-	Institute of Business Administration
IEE	-	Initial Environmental Examination
IT	-	Information Technology
MoF	-	Ministry of Finance
MoFCC	-	Ministry of Environment, Forest and Climate Change
MoLE	-	Ministry of Labour and Employment
MoTJ	-	Ministry of Textiles and Jute
NATI	-	Narsingdi Auto-Tech Training Institute
NCS	-	National Conservation Strategy
NEMAP	-	National Environmental Management Action Plan
NEP	-	National Environmental Policy
NHRDF	-	National Human Resource Development Fund
NOC	-	No Objection certificate
NPI	-	Narshingdi Polytechnic Institute
NSDA	-	National Skills Development Authority
R&S	-	Research and Development
RBL	-	Result Based Lending
REA	-	Rapid Environmental Assessment
RMG	-	Ready-Made garments
SDCMU	-	Skills Development Coordination and Management Unit
SICIP	-	Skills for Industry Competitiveness and Innovation Program
SME	-	Small and Medium Enterprises
SPS	-	Safeguard Policy Statement

WEIGHTS AND MEASURES

Ha	hectares
Km	kilometers
M	meters
masl	meters above sea level
MT	metric tons

CURRENCY EQUIVALENTS

(as of 17 September 2023)

Currency unit	–	taka (Tk)
Tk1.00	=	\$0.009
\$1.00	=	Tk 109.57

NOTE

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EXECUTIVE SUMMARY

INTRODUCTION

Background and Project

Aligned with the Bangladesh country partnership strategy 2021–2025 and broader Bangladesh Government Program “Human capital enhanced for sustainable economic development and inclusive growth”, the proposed RBL Result Based Lending (RBL) program ‘Skills for Industry Competitiveness and Innovation Program (SICIP)’ will increase provision of skilled workforce for industry competitiveness and innovation. The key major outputs of the envisaged for the RBL program are: (i) Training for advanced technical skills in priority and emerging sectors improved; (ii) Managerial capabilities and green innovation capacity strengthened; (iii) Socially inclusive skilling and upskilling expanded; and (iv) Institutional capacity for skills monitoring and management enhanced.

Under Output 1 the proposed RBL program aims to cultivate higher-level technical skills and enhance institutional capacity to produce skilled workers to adept with emerging technologies including green technologies. To achieve this aim, under current scope, the RBL program will construct/establish smart textile technology living labs (STTLs) in two textile engineering colleges (Bangabandhu Textile Engineering College in Tangail and Chittagong Textile Engineering College in Chattogram), Narsingdi Auto-Tech Training Institute (NATI) at Narshingdi Polytechnic Institute (NPI) and construct one academic building (10 story) in the East West University. In addition, extension of classrooms and some renovation work will be carried out at the Institute of Business Administration (IBA), Dhaka University.

Implementation arrangement

The Finance Division in MOF will be the executing and implementing agency. The Skills Development Coordination and Management Unit (SDCMU)—established under SEIP—will continue to serve as the program management unit to facilitate, coordinate, and monitor all project activities. The key implementing partner agencies include the Technical and Madrasa Education Division in the Ministry of Education; Ministry of Expatriate Welfare and Overseas Employment; Ministry of Industries; and Ministry of Textiles and Jute. An inter-ministerial project steering committee, chaired by the Secretary of Finance Division, will provide overall policy advice and oversight, approval of annual operation plans, review of achievements against targets, and ensuring compliance with fiduciary oversight arrangements.

The Initial Environmental Examination (IEE)

This Initial Environmental Examination (IEE) has been prepared, in accordance with the environmental assessment requirements of the Asian Development Bank (ADB) and the Government of Bangladesh, as well as the guidance provided by the EARF developed for guiding the environmental safeguards principles adopted for SICIP, to help ensure that the infrastructure proposed under the Investment Project part of the Program meets a high standard for environmental and social responsibility. As proposed investments are dispersed across many locations within Bangladesh, it is considered appropriate for each location to be covered by a context-specific IEE. This IEE report is applicable to “Construction of Narsingdi Auto-Tech Training Institute (NATI) at Narsingdi Polytechnic Institute (NPI), Narsingdi”.

LEGAL AND POLICY FRAMEWORK

Institutional framework

The lead environmental agency in Bangladesh is the Department of Environment (DOE), under the Ministry of Environment, Forests and Climate Change (MOEFCC). DOE is charged with furthering environmental conservation, improvement of environmental standards, and control and mitigation of environmental pollution. This mandate positions DOE as a key regulator of a broad range of developments in the infrastructure, industrial and commercial sectors, including both publicly and privately funded initiatives. DOE is responsible for administering the country's central environmental law, which provides the framework for environmental impact assessment.

Other agencies with important environmental mandates include the Bangladesh Forests Department (also under MOEFCC), the Ministry of Water Resources, the Ministry of Fisheries, and the Ministry of Land. The laws and regulations administered and enforced by these other agencies do not structure the environmental assessment process directly but may often come into play in the consideration of the suitability and permissibility of proposed infrastructure developments by DOE.

Occupational health and safety are key considerations of the environmental assessment of proposed infrastructure. The Ministry of Labour and Employment (MoLE), particularly its Department of Labour and Department of Factory and Establishment Inspection, is of direct relevance to the environmental assessment process, as it administers and enforces the country's legislation, rules and standards governing industrial workplaces, including construction sites and most industrial facilities where physical labour is undertaken.

National policies, laws and rules applicable to the project

- a. National Environmental policy 1992 (revised in 2018)
- b. National Environmental Management Action Plan (NEMAP), 1995
- c. National Bio-safety Strategy & Action Plan 1995
- d. A Roadmap for Clean Fuels and Vehicles in Bangladesh, 2011
- e. National Action Programme on Desertification, Land Degradation and Drought (DLDD) 2016-2024
- f. Ecologically Critical Area Management Rules, 2016.
- g. Medical Waste (Management and Processing) Rules, 2008
- h. Bangladesh Biosafety Rules, 2012
- i. Bangladesh Biological Diversity Act 2017
- j. Natural Water Reservoir Conservation Act, 2000
- k. National Forestry Policy 2016
- l. National Conservation Strategy 1998 and Draft Update 2013
- m. National 3R (Reduce, Reuse & Recycle) Strategy 2010
- n. Bangladesh Climate Change Strategy & Action Plan (BCCSAP) 2009
- o. Bangladesh Delta Plan 2100
- p. National Disaster Management Plan 2010.
- q. Nationally Determined Contributions (NDCs)
- r. Five Year Plan
- s. Sustainable Development Goals (SDGs)
- t. National Adaptation Program (NAP) 2022
- u. Other Sectoral Policies/Strategies like Industry, Agriculture, Energy, Water, Health, etc.
- v. National Bio-safety Framework and Guidelines
- w. Guidelines on Environmental Management, Waste Treatment and Workers' Occupational Health and Safety for Ship Breaking Yard in Bangladesh

- x. Establishing National Landuse and Land Degradation Profile 2018 (proposed)

Anticipated DoE assessment category. The infrastructure development proposed for the Narshingdi Polytechnic Institute (NPI) under the project will appropriately be considered to fall into the 'Orange' assessment category. The investments do not include any components that would trigger assignment to the 'Red' category, but do encompass components (multi-storied buildings, diagnostic laboratory) included in the 'Orange' list in Schedule 1 of the Environment Conservation Rules 2023. This IEE report will be reviewed by DoE, and the anticipated categorization will be confirmed at that time.

Updated ADB categorization. Based on the findings presented in this IEE, it is confirmed that some of the infrastructure components proposed at NPI will have at least some negative impacts requiring mitigation, but also unlikely that any will generate impacts of a scale, complexity or severity that would warrant detailed environmental research or development of highly novel mitigation strategies. Accordingly, the Category B classification, assigned to the project at the early concept stage based on ADB screening, is considered valid for this investment location. This could change if the design, scale, nature or location of any proposed components undergoes significant modification before or after project approval.

PROJECT DESCRIPTION

The investment proposed for the proposed Narsingdi Auto-Tech Training Institute (NATI) will be located at the Narshingdi Polytechnic Institute (NPI), at Narshindi sadar upazila of Narshindi district.

Project Location

The NPI is located about 54 kilometers from the capital city of Dhaka, by the Dhaka-Sylhet Highway linked road. Narsingdi Polytechnic Institute (NPI) is a government polytechnic institute located in Narsingdi, Bangladesh. It is affiliated with the Bangladesh Technical Education Board (BTEB) and offers four-year Diploma-in-Engineering (D.Eng.) programs in various disciplines.

Proposed Infrastructures

The NPI area is small, approximately 9000sqm. The boundary is surrounded by agricultural lands. The proposed NATI will be located at the eastern barren land belonging to the NPI, along with some other enhancements, extensions, and retrofits of the existing buildings. Building Type: B2. (a) Horizontal and vertical extension project: One-storied existing building having a footprint of 36m x 9.2m and having a foundation for 5-storied building. Three more floors are proposed for vertical extension. On the south side of this building, a one-storied 4m x 36m is proposed for horizontal extension. The newly added total area shall be 1138 sqm; (b) New Automotive Technology Training Center: Three-storied building, having a footprint of 376 sqm. Total area 1130sqm. The design has a provision for one storied future extension. It is located on the northeast corner of the campus and supported by a 3.3m approach road.

BASELINE ENVIRONMENT

Location setting

Siting. The proposed NATI is located within the campus of NPI. The NPI campus is located by the LGED road which offshoots from the Dhaka-Sylhet highway (N2). The campus is bounded by the Shilamandi Jubo unnayan office to the south, Dorren powerplant to the east, and agricultural field to the north and west. The campus boundary does not have any waterbody.

Topographic relief. Narshingdi's topography can be described as predominantly flat with a gentle rolling character due to the scattered hillocks. The relief, which refers to the difference in elevation between two points, is relatively low throughout the district. The most prominent feature is the vast expanse of alluvial plains, formed by the deposition of sediments carried by the mighty Meghna River and its tributaries over millennia. These plains have an average elevation of 5-10 meters above sea level, offering fertile land for agriculture.

Seismicity. According to the GSB, the study area is located within Zone II with seismic coefficient of 0.05g. According to the BNBC (2010) zoning, the project site is located in Zone 3 with $Z = 0.28$ (moderate to high vulnerability zone). Hence, the proposed structure has a high vulnerability to earthquakes, and the design of civil structure needs to comply with relevant provisions on earthquake Bangladesh National Building Code 2020 (latest). Historical record of major earthquakes for the last 450 years from the Department of Disaster Management (2012) show that from 1762 to 2016, earthquakes originating in Bangladesh had a Richter scale magnitude ranging from 4.2 to 8.8. A maximum of about 8.8 originated from Chittagong-Arakan in 1762.

Rivers and channels. Narshingdi is intricately linked to its hydrological system, shaped by the mighty Meghna River and its tributaries. The lifeblood of Narshingdi, the Meghna River, formed by the confluence of the Brahmaputra and Jamuna rivers, bisects the district from north to south. This colossal river carries a vast amount of sediment, shaping the landscape through erosion and deposition, and serves as a vital transportation artery for the region. Numerous tributaries branch out from the Meghna, including the Dhaleswari, Sitalakhya, and Bangshi rivers.

Drainage system and waterlogging. The low-lying alluvial plains flanking the Meghna and its tributaries are prone to seasonal flooding during the monsoon season. While disruptive at times, these floods also deposit fertile sediments on the land, replenishing nutrients and contributing to agricultural productivity. Narshingdi faces a significant challenge: waterlogging. This phenomenon, characterized by the prolonged saturation of soil with water, presents various environmental and socioeconomic concerns, impacting the district's agricultural productivity, infrastructure, and public health. Understanding the causes and consequences of waterlogging is crucial for developing effective mitigation strategies and ensuring sustainable development in Narshingdi. Several factors contribute to waterlogging in Narshingdi: (i) Low-lying Topography: The dominant feature of Narshingdi's landscape is the vast expanse of alluvial plains with an average elevation of 5-10 meters above sea level. This low-lying topography hinders natural drainage, making the area susceptible to waterlogging during heavy rainfall or periods of high

river discharge; (ii) Inadequate Drainage Systems: The lack of efficient drainage infrastructure, such as canals and ditches, further exacerbates the issue. These systems are often insufficient to handle the volume of water, leading to its accumulation on the land surface; (iii) Climate Change: The increasing frequency and intensity of extreme weather events, including heavy rainfall, can overwhelm existing drainage systems and contribute to waterlogging and (iv) Land Use Changes: Urbanization and the conversion of natural drainage channels into built-up areas can significantly reduce water infiltration and exacerbate waterlogging problems.

Flooding. Major River in the study area is Meghna River. According to the 'ThinkHazard!' Tool developed by GFDDR, flood risk at Narshingdi is "High". Urban flood in Narshingdi is common, due to its unplanned development and rapid urbanization through sand filling of lowlands. Due to this practice, Narshingdi region is losing its seasonal waterbodies, risking increasing the potential for severe urban flooding in future.

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION

Approach and Methodology

The IEE study has been conducted following the ADB SPS (2009), World Bank's Environmental and Social Framework (ESF) 2018, EIA Guidelines for Industries, prepared by the DoE in 2021 in accordance with the requirement of the Environment Conservation Rules (ECR 2023). The IEE process adopted in this study involves identification of the key impacts on natural and social environment and evaluation of the significant impacts along with recommendation of initiative measures as well as listing of unresolved environmental issues. The IEE includes collection of baseline information, setting of boundaries, impact assessment, suggestion of mitigation measures and alternative sites providing an environmental management plan.

Findings of Impact Assessment: Pre-construction phase

Climate change, drainage and waterlogging

Impacts. In many infrastructure development scenarios, the siting of quarries and borrow pits is a key determinant of GHG emissions from construction. In this case, bulk materials are likely to be purchased on the open market, so siting will not be an important consideration in this regard. The targeted construction site (i.e., NATI) flood rarely after heavy rains, when the catchment area overflows, since drainage systems are already installed. Yet, considering the climate change projections in Bangladesh predicting more and more intense rainfall over shorter period of time demands the drainage system to be enabled heavy overflow in shorter time. The projected intensifying rainfall over Bangladesh under climate change scenarios, specially under scenario 8.5, drainage system will play a crucial role in future development. In the proposed site, no drainage connection with the municipality was observed. Additionally, the site is adjacent to a shallow valley nearby which drains the surface runoff from nearby infrastructures.

Mitigation: The drainage in the proposed site is non-existent. Given the projection of higher precipitation in Bangladesh due to climate change, additional drains are proposed for construction to remedy the flooding problems. It is assumed that after construction of the drains the flooding problem will be resolved. However, during the design of the drains, it needs to be considered that recent climate change projections suggest higher amount of rainfall in a small window of time in the future. The depth and length of the drains need to be designed accordingly. Adequate smaller drains connecting with the main drains are necessary to manage excess campus water runoff.

Waste management

Impacts: Increased commercial activities around the campus are likely to pose the risk of waste being dumped into the nearby drains. There is no drainage system at the proposed site. Natural low land works as the drainage system in the area. So, there will be a tendency to through waste at these lowlands. This waste stream will grow over time, and if this is not anticipated in monitoring design (the drains should be easily accessible for complete cleaning), waste management problems such as ad-hoc dumping and on-site burning are sure to arise.

Mitigation: Waste management problems can be avoided entirely by correctly anticipating future waste streams and incorporating adequate design features to collect, sort, and dispose of each class of waste. Adequate segregated collection bins should be strategically placed at indoor and outdoor locations of the campus structures where waste generation can be expected. The design of the drainage system also should include the access points where it can be cleaned. The experience from the entrance road reveals that drainage system should have some access points when extreme rainfall events occur, or waste dumping block the entire drainage system so that cleaning can be done when needed.

Site enhancement

Impacts. The proposed NATI is located at the back of the NPI academic building. The proposed site for construction is a barren land which is already raised, and sand filled. The site has a very poor drainage system. Hence the site will need a fully functioning drainage system integrated with the rest of the NPI. As a whole, the plinth height of the entire NPI site needs to be raised above flood level, which is almost a meter according to the local teachers and students estimate.

Enhancement. A rise of about a meter of plinth height along with installment of a drainage system will be necessary to keep the site flood free. Since an integrated drainage system is nonexistent in the entire area (within 5km buffer zone), currently this will be the only sustainable solution.

Findings of Impact Assessment: Construction phase

Water quality

Impacts. The proposed NATI site is located in lowland areas where drainage is inadequate. The surface water quality is liable to deteriorate if the effluents from the Project's offices, housing facilities and labour camp are improperly disposed of directly into nearby water bodies. Another

cause of water quality deterioration may occur due to dredging/excavation activities for sand filling and drain construction. Dredging/excavation itself and the discharge of effluent from the hydraulic fill areas will cause an increase in the suspended sediment load of the stream and increase turbidity, posing a potential threat to aquatic organisms downstream. Increased turbidity in water reduces light penetration, thereby interfering with the photosynthetic process.

Mitigation. Siltation and sedimentation of watercourses and drainage systems can be largely prevented by careful application of erosion control measures. These include: (i) Protecting disturbed soil from rain by keeping exposed areas covered with mulches, fiber mats and other temporary coverings; (ii) Keeping all stockpiles of erodible materials covered with tarpaulins whenever they are not in active use; (iii) Arranging construction site drainage so surface runoff is directed away from exposed soils and materials stockpiles; (iv) Installing and regularly maintaining sediment traps in site runoff channels.

Air quality

Impacts: In any construction site, dust generation is inevitable. Since the location is set in a busy urban premises with lots of pedestrian movement, generation of dust might create havoc. Additionally, a few other constructions are ongoing near the site. This means, during construction when sand and cement are brought in for mixing, dust generation can be elevated.

Mitigation: Dust is easily minimized by implementation of a regular routine of light spraying with water. All dust-generating surfaces, including those on the construction site and the haul road for at least 200 m from the site, should be treated as frequently as is needed to avoid dust reaching nuisance levels. Structures undergoing demolition should also be misted throughout the process. All stockpiles of sand and soil should be kept tightly covered with tarpaulins whenever they are not in active use. All haul trucks should be equipped with tightly fitted tarpaulins to prevent releases of dust from dry materials during transport. Ambient air quality at the perimeters of the two construction sites should meet the standard indicated in Air Pollution (control) Rules 2022.

Traffic Congestion

Impacts. The site is characterized by industries and high traffic volume. The proposed site adjunct to nearby Police Plaza project road. Given the main road's traffic volume, it is expected that during peak construction time when heavy vehicles and machineries will be transported at full scale, the extra traffic movement will disrupt the normal traffic at a moderate significance. The traffic plan needs to be devised before construction goes onboard.

Mitigation. A traffic management plan (TMP) must be devised prior to construction and approved by the environmental specialist from SDCMU and approved from local zilla parishad/police station. A sample TMP has been attached with this IEE as Appendix 4.

Noise and vibration

Impacts. As noted in the baseline section of this report, the proposed site is located in the urban industrial Zone, by the side of semi-busy roads. Therefore, the site is not exposed to high pitch noise. Noise and vibration from construction activity can be a serious nuisance for people living near active construction site, the potential for impacts is quite high due to high population density, and there are in fact residences in close proximity to some parts of the development site. Depending on the particular configuration of the site, construction activity may end up being carried out close to these buildings. People living in nearby structures will experience some measure of nuisance during busy construction periods, particularly if any pile-driving is carried out, or if construction activity is conducted at night.

Mitigation. To minimize noise and vibration impacts for residents living within earshot of the vicinity of construction site, construction activity should be strictly limited to daylight hours. To avoid adding to the traffic noise for roadside residents, all haul trucks must be kept in good repair, and fitted with functional mufflers. Proper maintenance of machinery and trucks shall be done not to cause extra vibration. Emissions of noise from the project construction sites should not be of a level sufficient to cause an exceedance of maximum ambient noise levels as specified in the Noise Pollution Control Rules 2006. Emissions from individual pieces of machinery and vehicles used in construction should not be allowed to exceed the maximum acceptable levels indicated in Noise Pollution Control Rules 2006.

Occupational health and safety

Impacts: Construction activity and construction sites carry inherent risks for workers. These risks include falls, contact with moving machinery, flying and falling objects, dust, burns, cuts, exposure to intense light from arc welding, electric shock and electrocution, and crushing from collapsing earth walls, amongst other things. Where construction is conducted in public rights-of-way, there are also dangers associated with vehicles moving past the work site.

Mitigation. Risks to worker safety on the job site can be successfully minimized through proper worker training, and by strict use of task-appropriate personal protective equipment (PPE). All workers and site supervisors should be provided workplace safety training prior to the start of construction, and at regular intervals thereafter. Training should be repeated whenever new crews are brought on to the site, and whenever monitoring by the primary Contractor or construction supervision consultant reveals declining standards of practice on the site. The primary Contractor should ensure that all workers are provided with adequate PPE suited to any task they may be given, and also strictly enforce its use at all times.

Construction waste

Impacts. Waste generated during construction will consist mainly of packaging, from both construction materials and food products consumed by workers. The volume of waste produced is likely to be relatively small but can easily get strewn and blown across the landscape and end up in local water bodies, if not appropriately managed.

Mitigation. Suitable receptacles should be positioned at strategic locations around the work sites to facilitate containment and collection of solid waste. Construction waste should be sorted to segregate recyclables, and regular pickup of these by a local recycling business should be arranged. Non-recyclable waste should be transported to the nearest legal landfill site, and never burned, buried or dumped on the site. Waste oil and other noxious fluids and associated used containers should be recycled through a reputable business providing this service. The primary Contractor should be required to specify all waste management arrangements - including the identity of recycling enterprises and legal landfill operators able to accept expected wastes - in a site-specific Waste Management Plan embedded within the CEMP. Appropriate contents of a Waste Management Plan are specified in the sample CEMP outline provided in Appendix 9.

Cumulative Impact Assessment

The greatest concern facing the environment in the vicinity of the proposed site that the density of population, growing structural development and economic activities around the NPI site, since Narshingdi city is growing unplanned as a commercial center. The ever-increasing structural development in the target site are likely to generate solid waste, which without being proper awareness are likely to be dumped in the drainage system as well as to the barren lands where drains are discharging. Such activities are already observed at the proposed site. By posing restriction on solid waste dumping, enforcing laws and regulations and improvement of solid waste management system within the NATI authority, such foreseeable problems can be avoided. However, such improvement in the situation is expected as NATI grows with time.

PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

Consultation with officials of the Finance Department, MoF

Consultations with the Finance Department, Ministry of Finance took place in November 2022 at SDCMU established under SEIP. The Project Director (PD) of SEIP who is in charge of SICIP, officials from Finac Departments relevant to the project and ADB project team attended the meeting and discussed various aspects of the proposed NATIs and possible safeguards system. Discussions on possible 'green building' components and locations of establishment of the NATI within the NPI campus were held.

Meetings with Finance department and NPI officials. During the time of field visit to NATI (March 2024) the technical assistance team sat with the teachers and talked to students informally. Discussion took place in various places on the NPI campus. The discussions took place on various educational issues, as well as campus environment issues. This IEE extracted the construction/repair/improvement related activities and environmental concerns from all the discussions. The summary of the discussions is presented in the following Table.

Table: Summary of the point of discussions with NPI teachers and students

Environment-related questions	Summary of salient points of discussion
Is there any environmental problem within the campus or nearby the campus?	Generally, the NPI campus is not flood prone, but due to unplanned development around, highwater drainage has been very slow in recent years. The flood water can come from the north and recede towards the south. The in-campus main drain is not functioning, hence sometime overflow during heavy rains and floods the whole campus.
Our natural surroundings (air, water, trees and other plant life, land, open space) generally affect the quality of our lives, including our ability to make a living. How do you feel about the current quality of the local environment?	Within the NPI campus, the campus has some vegetation, although not so thick. The campus is not that noisy.
Are you aware of any problems having to do with natural resources (air, water, farmland, trees, animals, open space) in this area?	We have a filtering system installed at the campus. The drinking water quality does not meet the health standard, although salinity is not yet an issue in the area. The main problem with potable water is the presence of iron.
Thinking about the construction work that may happen here under the project (list infrastructure that may be built at this campus), how do you think this will affect the quality of the local environment, or your quality of life?	The area is currently barren. The entire campus is on low land. The NATI will not only enhance our education system, but also enhance the campus quality with raised land, proper drainage system, restored waterbodies etc.
Traffic may increase as a result of this project, once construction has been completed. How do you think this will affect the local environment, or the quality of life in the community?	The main road is already busy with vehicles and pedestrians. There are also some construction works nearby. Hence the traffic is already elevated. Anyway, we think during construction work, we need to adopt proper precautions.
What additional considerations can be taken to enhance the quality of NATI and the campus?	- Installing a higher capacity water filtering system, since higher number of students are expected - Installing drainage system and raising overall plinth of the NPI

GRIEVANCE REDRESS MECHANISM

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:

First level of GRM: The first level and most accessible and immediate contact for the fastest resolve of grievances are the Contractors, with assistance from Design Supervision Consultants (DSC) on site. Prior to construction of any works, the 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 DSC can immediately resolve the complaint on site. The Contractor's and DSC'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 work can contact the project to file a complaint. The Contractor may seek the assistance of the DSC safeguards specialists (the environmental specialist or social safeguards specialist) to resolve the issue. The DSC 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.

Second level of GRM: Should the grievance remain unresolved; the Contractor with assistance from DSC will forward the complaint to the PIU safeguards focal person. The person filing the grievance will be notified by DSC 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 the complaint was received; (iii) nature of complaint; (iv) location and (v) how the complaint was resolved.

Third level of GRM: 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, DSC, and affected persons. The GRC will consist of TMED/IA representative as chairperson, 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 TMED/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.

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

Grievance Redress Mechanism for Workers

An additional mechanism shall be set up by the SOU to accept and address complaints from workers employed in the construction works, concerning working conditions, living conditions in construction camps, safety and health issues, labor rights violations, mistreatment, or any other matter. All laborers, skilled workers, and site engineers employed on site by the primary Contractor or by any of its sub-Contractors shall have access to the mechanism. All workers will receive an orientation to the workers' GRM during pre-construction induction training. Workers will be able to lodge grievances with on-site personnel of the CSC, who will record the complainant's name, position, employer, and contact information, as well as a description of the

complaint and the time, date and place at which the complaint was reported. The CSC will inform the SOU, which will record the grievance in a grievance register. The CSC will convene a meeting of the complainant or complainants, the sub-Contractor involved, the Primary Contractor, and any labor syndicate to which the complainant(s) may belong, in an effort to decide on an appropriate resolution of the complaint.

ENVIRONMENTAL MANAGEMENT PLAN

The EMP for the project defines mitigation and monitoring measures and identifies the institutions, responsibilities and mechanisms that will ensure their implementation. Such institutions and mechanisms will seek to ensure continuous improvement of environmental protection activities during the pre-construction, construction, and operation phases of the project, in order to manage adverse impacts.

Responsibilities in EMP Implementation

Each of the entities identified above has multiple responsibilities, the fulfilment of which is required for full and effective implementation of the EMP. These responsibilities are detailed in Table below.

Table: EMP implementation responsibilities

Entity	Responsibilities in EMP Implementation
Skills Development Coordination and Management Unit (SDCMU)	• Prepare operations and maintenance procedures for facilities under construction, ensuring their compliance with the EMP • Work with the SOU to train facility personnel on EHS aspects of facility operation in advance of commissioning, to ensure effective EMP implementation during the operation period
Project Implementation Unit (PIU) at NPI	• Ensure that EMP implementation is recognized as a critical element of overall project implementation • Enable and adequately staff SOU • Oversee rigorous review of bids and prioritize selection of Contractors with strong environmental compliance track records • Coordinate with SDCMU as needed to ensure smooth implementation of EMP
Safeguards Oversight Unit (SOU) under SDCMU	• Ensure EMP provisions are fully reflected in civil works bid documents • Advise and support PIU on Contractor selection and other procurement decisions • Guide and support ESFP and EHSOs to ensure timely and competent execution of site-level oversight activity • Collect and collate progress reports and environmental monitoring reports for each location to assemble comprehensive quarterly monitoring reports for submission to ADB. • Work with CSCs and primary Contractors to develop and deliver periodic EHS training for sub-Contractors and their workers • Work with CSCs to train facility managers or their EHS personnel in advance of commissioning, to ensure effective EMP implementation during the operation period • Administer the GRM • Support PMUs in obtaining environmental clearances and renewals

Entity	Responsibilities in EMP Implementation
Environmental Safeguards Focal Person (ESFP) under SDCMU	- Oversee the safeguards compliance process for all Investment Project sites under the PMU's control, liaising with the PIU-appointed Project Manager and with support from SOU and EHSO - Prepare and submit quarterly progress reports for the sites owned by their home agencies to the PIU and SOU - Chair LGRC when needed to address Level 2 grievances regarding project implementation activities
Environmental coordinator/manager at NPI	- Oversee the safeguards compliance process for the investment site at NPI - Liaison with the ESFP for monthly report and day to day update - Supervise the EHSO
Environment, Health and Safety Officer (EHSO)	- Conduct regular monitoring of conditions on site, including compliance with prescribed mitigation strategies, and submit EHS monitoring reports on a monthly basis to the Environmental Coordinator at PIU - Identify worker training needs and support SOU and CSC in development and delivery of training
Construction Supervision Consultants (CSC)	- Review and approve CEMPs and quarterly environmental monitoring reports submitted by Contractors - Guide and assist PMUs, through ESFPs, in monitoring of CEMP implementation and site conditions, including preparation of quarterly progress reports for submission to SOU - Direct and supervise corrective action by Contractors as needed - Collaborate with SOU on development of safeguards training for sub-Contractors and workers
Contractors	- Prepare and implement CEMP for each site, based on EMP prescriptions and international best practices - Conduct quarterly EHS monitoring on all sites under their control and submit quarterly monitoring reports to CSC for review - Implement corrective actions as directed by CSC and/or ESFP
Department of Environment (DOE)	- Review environmental clearance applications, including IEE and EMP - Review annual environmental monitoring reports submitted by SOU during construction phase - Review applications for environmental clearance renewals
ADB	- Review and approve IEE and EMP - Publicly disclose IEE on ADB website - Review quarterly environmental monitoring reports prepared by PMU and publicly disclose them on ADB website

Environmental Impacts and Prescribed Mitigation and Enhancement Measures

The findings of the environmental impact analysis are presented in Section VI of the IEE report. The potential impacts and corresponding measures that are prescribed in order to mitigate the negative impacts or enhance positive ones are collected in Table IX 3. The measures prescribed apply to the pre-construction, construction and operations phases of the infrastructure development at the NPI NATI site. All measures listed in Table IX 3 are requirements, based on the infrastructure plan as proposed at the time of preparation, whose fulfillment is assigned. All measures assigned to Contractors should be reflected in bidding documents, and serve as the basis for the CEMPs, which must be prepared to cover all sites at this investment location.

Environmental Monitoring and Reporting

Environmental monitoring consists of assessing both the degree to which Contractors and facility operators are fulfilling their responsibilities to implement measures specified in the EMP to manage impacts (compliance monitoring), and the degree to which their impact management efforts are successful in preventing harmful environmental conditions from arising (effects monitoring). Compliance monitoring typically makes use of checklists to confirm or disconfirm that prescribed measures are being properly implemented, while effects monitoring involves quantitative and/or qualitative sampling at designated locations. Both types of monitoring need to be conducted on a regular and consistent basis, to ensure the comparability of results across monitoring periods. Monitoring should begin before site clearing, so an environmental baseline (i.e., pre-project conditions) can be established for key environmental parameters.

Monitoring parameters for each prescribed mitigation and enhancement measure are identified in Table IX 3. Specific monitoring responsibilities, including the monitoring and reporting timetable for each, are detailed in Table IX 4.

As will be noted from the preceding table and figures, several entities are expected to submit regular monitoring reports as a fundamental contribution to effective implementation of the EMP. These reporting processes are summarized in Table IX 5 for clarity. A sample outline of a semi-annual monitoring report as must be prepared by the SOU for submission to ADB (which can also be adapted for quarterly monitoring reports as must be prepared for DOE) is provided in Appendix 18.

Institutional strengthening and training requirements

A capacity building program for EHS units within SDCMU and NPI should be developed and delivered in the interval between the project's approval and the end of construction on the first round of investments. The capacity development program should aim to establish stable, sustainable EHS units capable of (i) proactively and professionally driving compliance with national and multilateral-mandated environmental clearance and environmental assessment requirements in relation to proposed, under-construction and operational infrastructure investments; (ii) collaborating productively with specialists hired under the auspices of major investment projects; (iii) carrying out long-term EHS monitoring for all agency facilities; and (iv) building a culture of sustainability and safety across their home agencies through awareness-raising and educational campaigns.

Capacity investments should include support for hiring and resourcing adequate staff commensurate with the needs of the agency, and staff training. The capacity building program should include the following elements: (i) needs assessment; (ii) capacity-building plan including recommendations for staffing and resources; and (iii) training program for each EA's EHS unit. Design, development and delivery of the capacity building program is appropriately included in the mandate of the CSC engaged to oversee implementation of the project works. The CSC should be supported in this work by the SOU, and the ESPFs of SDCMU and NPI.

EMP Implementation cost

Cost estimates for mitigation measures, environmental monitoring, public consultations, and capacity building are summarized in Table IX 8. Contractors will bear the direct costs of all mitigation measures during construction, which will be included in the tender and contract documents; this includes features built into facility designs in order to prevent environmental impacts from arising. The MoF SDCMU and NPI will bear the costs related to mitigation measures during operation. Costs related to environmental supervision during construction will be borne by the SDCMU (for hiring a licensed laboratory to conduct quarterly monitoring), the PMU (for the activities of the environmental consultants) and by the contractors (for monitoring work carried out by the EHSOs). During the operation phase and monitoring costs will be borne by the SDCMU and NPI (for regular monitoring activity of their site EHSOs). The EMP cost shall be included in the BOQ as a provisional sum (non-competitive) item.

CONCLUSION AND RECOMMENDATION

Minor negative impacts of the project will be felt during the construction phases which may involve minor sand erosion, water and waste pollution. The major significant impacts can come from disrupting local hydrological system and waste pollution. The impacts of noise and increase in traffic are expected to be within the existing level experienced by the local people. The contractor will be under specific orders for providing PPE to the workers engaged in the job. Strict site and labour camp health and safety regulation will be forced as per government and ADB guidelines.

The monitoring plan, if properly implemented during the pre-construction, construction and post-construction and operation phases will ensure taking corrective measures. The proposed project will have no residual adverse impact on the environment or the eco-system if mitigation measures are properly followed. MoF and NPI are required to take clearance from the DoE for implementing the construction works and other ancillary works. The IEE report has been prepared with this end in view.

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I. INTRODUCTION

A. Background

1. Aligned with the Bangladesh country partnership strategy 2021–2025 and broader Bangladesh Government Program “Human capital enhanced for sustainable economic development and inclusive growth”, the proposed Result Based Lending (RBL) Program ‘Skills for Industry Competitiveness and Innovation Program (SICIP)’ will increase provision of skilled workforce for industry competitiveness and innovation. The key major outputs of the envisaged for the RBL program are: (i) Training for advanced technical skills in priority and emerging sectors improved; (ii) Managerial capabilities and green innovation capacity strengthened; (iii) Socially inclusive skilling and upskilling expanded; and (iv) Institutional capacity for skills monitoring and management enhanced. The Result Based Lending (RBL) contributes to ADB’s Strategy 2030 operational priorities: (i) addressing remaining poverty and reducing inequalities; (ii) accelerating progress in gender equality; (iii) tackling climate change, and building climate and disaster resilience, and enhancing environmental sustainability; and (iv) strengthening governance and institutional capacity.

2. The country’s priority industries for growth continue to center on ready-made garments (RMG), textiles, light engineering, leather goods and footwear, information technology (IT), construction, etc. as identified under the ongoing Skills for Employment Investment Program (SEIP). With rapid technological advances such as IR 4.0, skills requirements in these priority industries are evolving quickly. While major industries like RMG and textile sectors account for more than 80% of the country’s exports, these industries still occupy the low-end of the global value chain. To move up the global value chain, skilled workforce equipped with technological capabilities is becoming crucial to produce value-added goods and services. The RBL program will support the Ministry of Finance (MOF) strategic framework by financing the implementation of selective interventions, in coordination with other development partners.

B. The project

1. Project aim

3. The impact of the program is aligned with increased technology-ready workforce for diversified and innovation-driven economy. The outcome will be equitable access to skills training in priority and emerging industries expanded across skill levels. The outcome will be measured by (i) the number of men and women trained from basic to advanced skill levels in priority industries; (ii) share of trainees placed in jobs within 6 months of training completion; and (iii) number of skills courses implemented specifically for women across skill levels. The program is expected to benefit at least 250,000 men and women over 5-year implementation.

2. Outputs and outcomes of SICIP

4. The outputs of the proposed RBL are:

5. **Output 1: Training for advanced technical skills improved.** This output will cultivate higher-level technical skills for existing priority and newly emerging sectors, through partnerships between industries and education/training institutes. The skill requirements will be identified by leading industries, particularly for high-demand technology-related skills. Industries will be involved in developing the curriculum and instructors as well. The Finance Division is setting up

an Industry Advisory Board consisting of leading industries to advise on the program. Some polytechnics—including women polytechnics—in industrial areas will be converted into specialized polytechnics to offer customized skills courses for emerging industries (e.g., automobiles, electronics)¹. This output will also enhance the institutional capacity to produce skilled workers adept at emerging technologies including green technologies, by establishing smart textile technology living labs (NATIs) in two textile engineering colleges², setting up high-demand technology-based courses in garments universities, and delivering higher-level technical courses in a renovated light engineering institute. All these technical courses will have international partnerships for transfer of knowledge and training of instructors³.

6. Output 2: Managerial capabilities and green innovation capacity strengthened. Building on SEIP's introduction of Executive Development Centers (EDCs) that impart customized mid-level managerial training through university-industry partnerships, the government will further institutionalize the EDCs in partnering universities (e.g., Dhaka University, BRAC University, East West University, and Bangladesh University of Textiles)⁴. EDC courses will be updated to align with industry's technology trends and global environmental standards, including green technologies and business practices. This output will also support selected universities to promote applied R&D for industry solutions, especially small and medium enterprises (SMEs), as well as incubation opportunities. R&D activities to help SMEs develop climate resilient products or services will be prioritized. The government will bring overseas scientists and engineers of Bangladesh origin to contribute to the transfer of knowledge and skills, while connecting local industries and academies to the global network.

7. Output 3: Socially inclusive skilling and upskilling expanded. This output will continue to support basic- and mid-level skills training of new entrants or existing workers, following on SEIP's sector-focused skills training models. These programs will be implemented in close coordination with the National Skills Development Authority (NSDA) and the National Human Resource Development Fund (NHRDF). It will also create specially targeted skills programs for socially disadvantaged groups (e.g., people with disabilities, minorities, other marginalized groups), women garment sector workers who are at high risk of job loss due to automation, and those who may be negatively affected by transition to low-carbon economy. For women, upskilling and multi-skilling for future garment work or alternative livelihoods, community-based support for empowerment, and green entrepreneurship skills will be provided in partnership with the H&M Foundation and the Asia Foundation. The government will also expand skills courses with international certification, which enable Bangladesh migrant workers to gain better employment opportunities overseas and increase remittance flows.

8. Output 4: Institutional capacity for skills monitoring and management enhanced. This output will support the capacity development of core skill systems such as NSDA and NHRDF for the future sustainability of skills initiatives and partnership modalities. It will also support the functioning of a new Industry Advisory Board for output 1 activities. The output will continue enhancing monitoring mechanisms, such as the trainee management system (TMS) created

¹ A polytechnic in Narsingdi, where automobile production plant is being established, will become a specialized center of excellence for automotive technical skills. Another women's polytechnic is being planned for skills in electronics.

² Smart textile technology labs (NATIs) provide hands-on learning environments with technology applications, from yarn manufacturing to fabric/garments production, using global standards in testing and production. It aims to strengthen capabilities of textile industry workforce and promote R&D, especially in manmade fabrics

³ International partnerships include Hanyang University and the Korea Institute of Textiles for NATIs; the Fashion Institute of Technology in New York for the Bangladesh University of Fashion and Technology; and the Korea University of Technology and Education for the Bangladesh Industrial Technical Assistance Center.

⁴ The current EDCs focus on the following four industries: garments, textiles, knitwear, leather goods and footwear.

under SEIP to monitor training and track its outcomes. Analytic studies, such as a tracer study and industry skills trends analysis, will be undertaken to assess the effectiveness of new skills programs and to build effective training partnership models. The output will ensure effective management and governance of skills development systems overall.

9. **ADB's value addition.** ADB has been a trusted partner for nationwide skills programs with an innovative approach in public-private training partnerships. In the proposed RBL, ADB adds value in: (i) expanding training partnerships to advanced-level, technology-oriented skills, including customized training for emerging industries to support economic diversification; (ii) reorienting existing polytechnics and universities with strong industry linkages; (iii) facilitating international partnerships to develop stronger institutional capacity for skills in emerging IR4.0 and green technologies for climate resilient, green growth; (iv) strengthening gender and social inclusion dimensions with dedicated skills programs, including for those at risk of job loss due to low-carbon economy transition; (iv) strengthening the broader government program with innovative results-oriented program designs; and (v) bringing ADB's expertise with international good practices. The RBL program builds on the ongoing SEIP and complements ADB-financed TVET Teachers for the Future Program and other skills projects by the World Bank.

C. Project interventions

10. Under Output 1 the proposed RBL program aims to cultivate higher-level technical skills and enhance institutional capacity to produce skilled workers to adept with emerging technologies including green technologies. To achieve this aim, under current scope, the RBL program will construct/establish smart textile technology living labs (STTLs) in two textile engineering colleges (Bangabandhu Textile Engineering College in Tangail and Chittagong Textile Engineering College in Chattogram⁵), Narsingdi Auto-Tech Training Institute (NATI) at Narshingdi Polytechnic Institute (NPI) and construct one academic building (10 story) in the East West University. In addition, extension of classrooms and some renovation work will be carried out at the Institute of Business Administration (IBA), Dhaka University.

11. Additionally, civil work of Kumudini Nursing dormitory at Tangail, which commenced during the implementation of SEIP, will be taken over by SICIP. There are also a few scopes of civil works under SICIP under consideration but to be finalized. The scopes are following:

- (i) Automotive training at Narsingdi Auto-Tech Training Institute (NATI) at Narsingdi Polytechnic Institute, Narsingdi (i.e., a. new three storied building; b. one storied vertical extension of north block; c. vertical & horizontal extension of south block)
- (ii) Kumudini academic building at Tangail – site is identified but the scope of work soon to be identified (ground floor building vs. 3 story building)
- (iii) At 1-2 universities or polytechnics, training centers may be established; the land yet to be identified.

12. 1-2 small upgrading works may be supported during implementation.

D. Implementation arrangement

13. The Finance Division in MOF will be the executing and implementing agency. The Skills Development Coordination and Management Unit (SDCMU)—established under SEIP—will continue to serve as the program management unit to facilitate, coordinate, and monitor all project

⁵ Bangladesh Government Gazette notification to change the name of five district is effective from 10. September. 2018. The names were changed to be consistent with their original Bangla spelling. However, despite of the name changes of the 5 districts, the associated polytechnic name was not changed.

activities. The key implementing partner agencies include the Technical and Madrasa Education Division in the Ministry of Education; Ministry of Expatriate Welfare and Overseas Employment; Ministry of Industries; and Ministry of Textiles and Jute (MoTJ). An inter-ministerial project steering committee, chaired by the Secretary of Finance Division, will provide overall policy advice and oversight, approval of annual operation plans, review of achievements against targets, and ensuring compliance with fiduciary oversight arrangements.



Figure I-1 Locations of the proposed structural investments under SICIP.

Figure I-2 Location Clearance Certificate (LCC) and Environmental Clearance certificate (ECC) application and awarding process from DoE

Figure I-3 Locations of the proposed structural investments under SICIP.

E. The Initial Environmental Examination (IEE)

14. This Initial Environmental Examination (IEE) has been prepared, in accordance with the environmental assessment requirements of the Asian Development Bank (ADB) and the Government of Bangladesh, as well as the guidance provided by the EARF developed for guiding the environmental safeguards principles adopted for SICIP, to help ensure that the infrastructure proposed under the Investment Project part of the Program meets a high standard for environmental and social responsibility. As proposed investments are dispersed across many locations within Bangladesh, it is considered appropriate for each location to be covered by a context-specific IEE. **This IEE report is applicable to “Construction of Narsingdi Auto-Tech Training Institute (NATI) at Narsingdi Polytechnic Institute, Narsingdi”.**

15. The findings presented in the IEE report are based on (i) desktop studies; (ii) discussions with NATI staff, (iii) detailed architectural design, (iv) local knowledge of the consultants engaged

in this project; (v) primary information collected from visits to NATI and the surrounding area; and (vi) consultations with local stakeholders in March 2024.

1. Objective, purpose and limitations of this report

16. This report describes the assessment results of environmental and social impacts caused by the subprojects as described in para. 11-12 which are likely to be categorized as Orange (building construction and repairs/retrofitting) according to the Environmental Conservation Rules (ECR) 2023 adopted by the Bangladesh Government and specifies measures to address such impacts. This IEE is guided by the Environmental Assessment and Review Framework (EARF) prepared during the ADB preparatory site visits in 2022/23 that focused on all subprojects. This IEE is developed based on the subproject site plans and information obtained during the field visits conducted by the environmental consultant; and secondary data, which characterize the environment and identify potential impacts. It contains the results of interviews and consultations with stakeholders in February-March 2024. The IEE includes an environmental management plan (EMP) outlining mitigation measures and monitoring requirements. Detailed Architectural Drawings are done for the proposed site which is reflected in the IEE.

2. Scope

17. The scope of the report covers the existing environmental condition in the project site, assessment of potential environmental impacts during design and/or pre-construction, construction, and operation stages; description of the environmental management plan (EMP) and environmental monitoring plan; stakeholders' consultation, grievance redress mechanism, and description of the legal and administrative framework. This IEE does not provide assessment for any other/future developments or activities at the location or anywhere else within the area concern reported in this IEE document. Should any further development be planned as a result of either this Project or other related works, additional planning and assessment following the requirements of the government shall be carried out separately.

18. In general, this IEE intends to:

- (i) Examine and describe the existing status of the various ecological, physical and human related components surrounding the project area;
- (ii) Predict the potential significant impacts of the project on the surrounding environment during the pre-construction, construction, operations and maintenance stages, and recommend appropriate mitigation and abatement measures; and,
- (iii) Identify residual impacts of the project and recommend appropriate short-term and long-term management plans.

3. Structure of this IEE report

19. The structure of this report follows the general guidelines of the Environmental Assessment and Review Framework (EARF) developed for SICIP. The structure of this report maintains the following sequence:

Executive Summary

Chapter 1	Introduction provides the background on the project, the project's impacts and expected outcomes, administrative structure of the project, purpose and limitation of this report.
Chapter 2	Legal and Policy Framework presents a review of relevant national laws and policies, international environmental obligations, ADB's environmental requirements, procedure of environmental clearance, environmental categorization.
Chapter 3	Description of the Proposed Infrastructures provides a brief description of the Project, the location, size and need, description of project components.
Chapter 4	Description of the Environment includes details on the baseline data of the environmental conditions in the project area (current features and conditions)
Chapter 5	Analysis of Alternatives presents the alternatives considered during the feasibility study in order to arrive at the best option.
Chapter 6	Anticipated Environmental Impacts and Mitigation Measures identifies the potential environmental, economic and social impacts from pre-construction, construction, and operation phase.
Chapter 7	Public Consultation and Information Disclosure discusses the issues raised during the consultations, proposed actions to address them, and the information needed to be disclosed to the public.
Chapter 8	Grievance Redress Mechanism describes the process of addressing complaints.
Chapter 9	Environmental Monitoring Plan outlines the environmental monitoring program, institutional responsibilities including the cost of implementing the EMP.
Chapter 10	Conclusion and Recommendation
Appendices	

II. LEGAL AND POLICY FRAMEWORK

A. Introduction

20. 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. The environmental assessment requirements of both the Government of Bangladesh and ADB are outlined as well.

B. Institutional framework

21. The lead environmental agency in Bangladesh is the Department of Environment (DOE), under the Ministry of Environment, Forests and Climate Change (MOEFCC). DOE is charged with furthering environmental conservation, improvement of environmental standards, and control and mitigation of environmental pollution. This mandate positions DOE as a key regulator of a broad range of developments in the infrastructure, industrial and commercial sectors, including both publicly and privately funded initiatives. DOE is responsible for administering the country's central environmental law, which provides the framework for environmental impact assessment.

22. Other agencies with important environmental mandates include the Bangladesh Forests Department (also under MOEFCC), the Ministry of Water Resources, the Ministry of Fisheries, and the Ministry of Land. The laws and regulations administered and enforced by these other agencies do not structure the environmental assessment process directly but may often come into play in the consideration of the suitability and permissibility of proposed infrastructure developments by DOE.

23. Occupational health and safety are key considerations of the environmental assessment of proposed infrastructure. The Ministry of Labour and Employment (MoLE), particularly its Department of Labour and Department of Factory and Establishment Inspection, is of direct relevance to the environmental assessment process, as it administers and enforces the country's legislation, rules and standards governing industrial workplaces, including construction sites and most industrial facilities where physical labour is undertaken.

C. National policies, laws and rules applicable to the project

1. Central policy instruments

a. National Environmental policy 1992 (revised in 2018)

24. Bangladesh adopted the National Environmental Policy (NEP) in 1992 to chart a path towards the country's sustainable development. The NEP 2018 is a revision of the NEP 1992 in the context of the new reality of climate change. The NEP 2018 also outlines a more up to date understanding of the extent and magnitude of environmental degradation that has become a fact of life in the world in general, and in Bangladesh in particular. The NEP 2018 outlines the problems of population growth, poverty, illiteracy, lack of awareness and healthcare services, limitation of arable land, unplanned development and urbanization, and industrialization as the major impediments to the conservation of the environment. The NEP sets out the basic framework for

environmental action together with a set of broad sectoral guidelines for action. Major elements of the policy are:

- (i) maintaining the ecological balance for ensuring sustainable development;
- (ii) protection against natural disasters;
- (iii) identifying and controlling activities which are polluting and/or destroying the environment;
- (iv) ensuring environment-friendly development in all sectors;
- (v) promoting sustainable and sound management of natural resources; and
- (vi) active collaboration with international initiatives related to the environment.

25. The NEP, amongst other aims, seeks to ensure that transport systems, including roads and inland water transport, do not pollute the environment or degrade resources. The policy states that environmental impact assessment should be conducted before projects are undertaken. The NEP 2018 includes additional elements addressing climate change mitigation and adaptation as key environmental issues facing the country and integrating a comprehensive 3R approach to the massive and growing problem of industrial and household waste that has swelled along with the country's urbanization.

26. Following are the key subject matters covered under the National Environment Policy, 2018:

- (i) Ensuring sustainable development through reducing human pressure on nature and natural resources;
- (ii) Considering environment protection as integral part of the development programs planned to meet the need of the present and future generation;
- (iii) Making natural resources extraction, use, environmental conservation etc. to be based on science;
- (iv) Considering environmental impacts and risks in extracting and using natural resources;
- (v) Evaluating economic contribution of ecosystem services simultaneously to that of natural resources;
- (vi) Giving priority to poor and under privileged group of people in order to ensure their participation, equity, justice, accessibility to the use of natural resources and getting ecosystem services on which, they are dependent;
- (vii) Taking initiatives to prevent misuse and ensure optimum of water, land, natural gas and other natural resources in the production process as well as day-to-day purposes;
- (viii) Encouraging sustainable use of new and renewable resources;
- (ix) Enhancing long term poverty alleviation and food security through conserving biological diversity;
- (x) Realizing compensation from persons and institutes those who are liable to environmental pollution through applying polluter pay principle;
- (xi) Including environmental conservation and preservation in all national policies and ensuring implementation of the environment policy at both government and non-government level;
- (xii) Giving priority to preventive measures over curative measures in environmental conservation;
- (xiii) Including adaptation and mitigation program in all development projects in order to address adverse impacts of climate change;
- (xiv) Ensure sustainable utilization of ecosystem goods and services;
- (xv) Implementation of 3R principle in utilization of resources;
- (xvi) Strengthening institutional and legal capacity of institution (Government, local, private and technical) relevant to the enforcing and implementation of rules and regulation relating to environment policy and environment conservation;

- (xvii) Ensuring considerations of climate change and challenges of calamities in all kinds of infrastructure projects;
- (xviii) Reducing of all SLCP (Short-Lived climate pollutants) which are harmful to health and environment;
- (xix) Taking development programs considering sustainable production and consumption as integral part of environmental conservation to meet the need of present and future generation;
- (xx) Allocating necessary funds to all areas of environmental conservation, preservation and control;
- (xxi) Taking up programs in favor of flourishing environment friendly economy; and
- (xxii) Including environmental and ecological conservation particularly to introduce the environment and ecological concept in the environmental academic curriculum and textbooks of schools and colleges.

27. During environmental categorization and environmental impact assessment process in this project, provisions of NEP 2018 have been considered, especially the clauses mentioned in para. 26.

b. National Environmental Management Action Plan (NEMAP), 1995

28. The NEMAP built on the NEP to address specific issues and management requirements during the period 1995-2005 and remains a backbone of efforts to articulate national sustainability strategies. The plan includes a framework within which the recommendations of a National Conservation Strategy (NCS) are to be implemented. The NEMAP was developed with the following objectives:

- (i) Identify key environmental issues affecting Bangladesh;
- (ii) Identify actions to halt or reduce the rate of environmental degradation;
- (iii) Improve management of the natural environment;
- (iv) Conserve and protect habitats and biodiversity;
- (v) Promote sustainable development; and
- (vi) Improve the quality of life.

29. To this end, the NEMAP grouped all the relevant necessary actions under four heads: institutional, sectoral, location-specific and long-term issues. The institutional aspects reflect the need for inter-sectoral cooperation to tackle environmental problems requiring new institutional mechanisms at national and local levels. The sectoral aspects reflect the way the ministries and agencies are organized and make it easier to identify the agency to carry out the recommended actions. The location-specific aspect focuses on particularly acute environmental problems at local levels. And the long-term issues include environmental degradation trends that threaten to emerge as serious threats to the country's environmental quality and well-being if not proactively addressed.

c. Other Environment-Related Plan and Policies

30. In addition to the central environmental policy instruments, a number of other national policy efforts have significant environmental content. Prominent policy documents include the following National Plans, Policies Guidelines that confirm, compliment and support the National Environmental Policy:

- (i) National Bio-safety Strategy & Action Plan 1995
- (ii) National Biodiversity Strategy & Action Plan of Bangladesh 2016-2021
- (iii) A Roadmap for Clean Fuels and Vehicles in Bangladesh, 2011
- (iv) National Action Programme on Desertification, Land Degradation and Drought (DLDD) 2016-2024
- (v) Ecologically Critical Area Management Rules, 2016.
- (vi) Medical Waste (Management and Processing) Rules, 2008
- (vii) Hazardous Waste and Ship Breaking Waste Management Rules, 2011
- (viii) Bangladesh Biosafety Rules, 2012
- (ix) Bangladesh Biological Diversity Act 2017
- (x) Natural Water Reservoir Conservation Act, 2000
- (xi) National Forestry Policy 2016
- (xii) National Conservation Strategy 1998 and Draft Update 2013
- (xiii) National 3R (Reduce, Reuse & Recycle) Strategy 2010
- (xiv) Bangladesh Climate Change Strategy & Action Plan (BCCSAP) 2009
- (xv) Bangladesh Delta Plan 2100
- (xvi) National Disaster Management Plan 2010.
- (xvii) Nationally Determined Contributions (NDCs)
- (xviii) Five Year Plan
- (xix) Sustainable Development Goals (SDGs)
- (xx) National Adaptation Program (NAP) 2022
- (xxi) Other Sectoral Policies/Strategies like Industry, Agriculture, Energy, Water, Health, etc.
- (xxii) National Bio-safety Framework and Guidelines
- (xxiii) Guidelines on Environmental Management, Waste Treatment and Workers' Occupational Health and Safety for Ship Breaking Yard in Bangladesh
- (xxiv) Establishing National Landuse and Land Degradation Profile 2018 (proposed)
- (xxv) EIA Guidelines for Industry 2021
- (xxvi) Bangladesh Fire Prevention and Extinction Act, 2003
- (xxvii) Fire Prevention and Extinction Rules, 2014
- (xxviii) National Plan for Disaster Management, 2021-2025
- (xxix) National Industrial Policy, 2022
- (xxx) Hazardous Waste (E-Waste) Management Rules 2021
- (xxxi) Balumohal and Soil Management Act 2010

31. During environmental assessment of this project, Ecologically Critical Area Management Rules, 2016; Natural Water Reservoir Conservation Act, 2000; Bangladesh Climate Change Strategy & Action Plan (BCCSAP) 2009; Bangladesh Delta Plan 2100; National Disaster Management Plan 2010; Nationally Determined Contributions (NDCs); Five Year Plan; Sustainable Development Goals (SDGs) and National Adaptation Program (NAP) 2022 have been considered.

2. Legislations

a. **Bangladesh Environment Conservation Act (BECA), 1995 (as amended in 2000, 2002 & 2010)**

32. The Bangladesh Environmental Conservation Act (BECA), 1995 is the main legislation for conservation of the environment, improvement of environmental standards, and control and mitigation of environmental pollution. The enabling powers of the BECA are wide ranging. Wide-ranging powers (Section 4) are given to the Director General (DG) to take various actions or

measures to enforce the BECA (Table). The Environment Conservation Act authorizes the DOE to undertake any activity to conserve and enhance the quality of the environment and to control, prevent and mitigate pollution. The DOE is designated as the regulatory body and enforcement agency for all environment-related activities. The Act enables the following critical components of DOE's remit:

- (i) declaration of Ecologically Critical Areas;
- (ii) administration of the procedure for obtaining Environmental Clearance Certificates for new industrial projects;
- (iii) regulation with respect to vehicles emitting smoke harmful to the environment;
- (iv) environmental regulations for development activities;
- (v) standards for quality of air, water, noise, and soils (including riverbed materials) for different areas and for different purposes;
- (vi) acceptable limits for discharging and emitting waste; and
- (vii) formulation of environmental guidelines to control and mitigate environmental pollution, conservation, and improvement of the environment.

33. Provision of BECA 1995 has been describes in Table II-1. Amendments to the ECA in 2000, 2002 and 2010 added significant substantive and procedural scope, defining the following new areas of authority:

- (i) ascertaining responsibility for compensation in cases of damage to ecosystems;
- (ii) increased provision of preventive measures, including fines and imprisonment, and the authority to take cognizance of offences;
- (iii) restrictions on polluting automobiles;
- (iv) restrictions on the production and sale of environmentally harmful items like polythene bags;
- (v) obtaining assistance from law enforcement agencies for environmental actions;
- (vi) definition and enforcement of punitive measures;
- (vii) authority to try environmental cases;
- (viii) prohibition on hill cutting except where established to be in the national interest;
- (ix) authority to regulate management of hazardous waste produced by ship breaking yards;
- (x) prohibition of filling or alteration of waterways except when judged to be in the national interest; and
- (xi) additional powers to compel compliance with emissions standards.

Table II-1 Provisions of the BECA, 1995

Section	Provision Under Section
Section 4	Powers of the DG to enforce various provisions of the Act including setting rules and regulations for environmental conservation and protection.
Section 4A	Powers given to the DG to seek the assistance of other enforcement authority (or authorities) in its enforcement. Done indirectly by way of disconnecting power, gas, or water supply to the user.
Section 7	Allows the DG to seek compensation in cases of damage to the ecosystem or injury to person(s), whether directly or indirectly caused by a person or persons. He may also require that corrective or remedial action be taken to mitigate or ameliorate the situation.
Section 8	Allows any person affected or likely to be affected as a result of pollution or degradation of the environment to apply to the DG for remedy of the damage or apprehended damage.
Section 9	DG can require the person responsible and the person in charge of the place of occurrence of an accidental pollution take measures to control or mitigate the environmental pollution.
Section 12	Requires that an Environmental Clearance Certificate be obtained before an industrial unit or project can be established or undertaken.

BAN: Skills for Industry Competitiveness and
Innovation Program (SICIP)

(IEE for NATI at NPI)

Section	Provision Under Section
Section 13	Formulate and publish environmental guidelines relating to the control and mitigation of environmental pollution, conservation and improvement of the environment.
Section 14	Allows appeal against grievances to the Appellate Authority. [Note: The Appellate Authority was constituted by MoEFCC by a notification dated 03/11/1997.
Section 15	Allows the imposition of penalties for various offences.
Section 20	Power to make rules for various purposes including the setting of EIA procedures.

Source: Compiled by TA consultant

34. Section 12, requiring an Environmental Clearance Certificate, is effectively enforced by way of The Environmental Conservation Rules, 2023, which is made pursuant to the powers provided under Section 20 of the BECA.

b. Environment Conservation Rules, 2023

35. The Ministry of Environment, Forest and Climate Change of Bangladesh enacted the Environmental Conservation Rules (ECR) 2023 to implement the Environmental Conservation Act 1995. The rules have been effective from March 5, 2023, by repealing the Environmental Conservation Rules 1997. ECR 2023 is the most important set of regulations giving procedural substance and tools of enforcement to the aims articulated in the BECA 1995 and its amendments. The Rules specify the categorization of projects or industrial establishments by judging the severity of the project's (or industry's) impact on environment and human health.

36. ECR 2023 replaces all the old schedules stipulated in ECR 1997 and replaces the old four environmental categories i.e., 'green', 'orange A', 'orange B' and 'red' by new four categories i.e., 'green', 'yellow', 'orange' and 'red'. The new ECR also shades more lights on the determinants of environmental categorization of projects or industrial establishments, sets guideline for environmental impact assessment process and report preparation along with the qualification of environmental consultants and subject matter experts responsible for preparing environmental impact assessment reports. There are 14 schedules in the ECR 2023 which are described in Table II-2. The most highlighted changes in the ECR 2023 from 1997 edition is the inclusion of stakeholder engagement in the EIA process, adoption of impact of human health, setting qualification of environmental consultants for EIA study, setting standards for wastewater quality, inclusion of a comprehensive indicative list of categorized project/industries according to its impact on environment and human health, guidelines for location setting of a project or industry, guideline for ToR preparation for EIA study, indicative buffer distance between project/industry and sensitive area, indicative EIA reporting guideline and guidelines for inclusion of environmental consultants within EIA study team.

Table II-2 Environmental standards specified in the Environment Conservation Rules 2023

ECR Schedule	Standard name
Schedule 1	Indicative list of projects/industrial establishment under four categories of environmental impacts
Schedule 2	Standards for water quality a. ground water, coastal waters, b. drinking water
Schedule 3	Standards for wastewater
Schedule 4	Standards for industrial wastewater
Schedule 5	Standards for category based industrial wastewater
Schedule 6	Fees for application for location clearance or environmental clearance certificates
Schedule 7	Fees for location clearance or environmental clearance certificates and renewal
Schedule 8	Fees for information collection/sample analysis from Department of Environment (DoE)
Schedule 9	Guideline for location setting of industrial establishments
Schedule 10	Guideline for ToR preparation for environmental impact assessment
Schedule 11	Guideline for environmental impact assessment report preparation

ECR Schedule	Standard name
Schedule 12	Guideline for establishment and operation of industrial effluent treatment
Schedule 13	Guideline for inclusion of environmental consultants or subject matter specialists
Schedule 14	Determinants environmental categorization of industries

c. The Environment Court Act 2010

37. The Environment Court Act 2010 was passed with a view to ensuring the expedited disposal of environmental cases. The Act, consisting of 24 sections, amends and consolidates the existing law in establishing courts and related matters to expedite the trial of environmental crimes. It establishes administrative and legal proceedings of the above-mentioned Environment Court, as well requirements to be met by said court, which may direct the investigating officer or person for further investigation into a criminal case related to a case pending against him and may determine the deadline for reporting the report. The court may impose any power environment passed by this Act or the Environment Law. A lawyer appointed by the Director General shall conduct all the cases related to the trial in the Environment Court and the prosecuted lawyer shall be deemed to be a special public prosecutor in the case of a special public prosecutor and civil nature case, in case of prosecution: Provided that empowered by the Inspector or the Director General Any officer to assist the lawyer in managing the case. Subject to the provisions of this Act, in relation to the trial and settlement of compensation cases, the provisions of the Code of Civil Procedure shall apply, and, in that case, the Court of the Environment shall be deemed to be a civil court and enforce all the powers of the Civil Court in the trial of any compensation suit under this Act.

d. Air Pollution (Control) Rules 2022

38. Aiming to protect environmental health, the government has published a new rule based on section 20 of The Bangladesh Environment Conservation Act, 1995. The main objectives of this rule are to prevent, control, and reduce air pollution. The government will appoint a director general who will be responsible for managing and maintaining the environmental issue. The Rule specified several types of pollution such as pollution caused by factories, vehicles, construction, garbage, etc. According to the new rule, there will be a committee that will impose damages and punishment for such pollution. As stated by the rule, the government will give rewards to those who will protest against pollution and do not cause any type of pollution.

e. Noise Pollution (control) Rules, 2006

39. This rule has been promulgated under the provision of clause 20 of BECA, 1995. The rules provide for standard limits of noise level of vehicles and designated areas. According to the Rules, motor honking within a 100-meter radius of a hospital, school and office is prohibited. The rules also do not allow use of brick crushers and cement mixers within 500-meter radius of a residential area. Besides, prior permission is mandatory for using loudspeakers or megaphones. The rules stipulate safety and precautionary measures in workplaces, designated authorities for allowing noise generating appliances.

f. Solid Waste Management Rules 2021

40. The Solid Waste Management Regulations 2021 were published in Bangladesh on December 23, 2021, under the Bangladesh Environmental Protection Act, 1995. The Regulations define the responsibilities of businesses involved in solid waste management and impose

collection, recycling, and disposal obligations according to Extended Producer Responsibility (EPR) on manufacturers of non-biodegradable products such as glass, plastic, and bottles. The Regulations also include provisions for the treatment of solid waste such as composting and energy recovery.

g. Environmentally Critical Areas Management Rules, 2016

41. Under the Ecologically Critical Area Rule 2016, a National Committee is to be formed which will consider the prevailing naturalness and biodiversity status of the threatened area and identify causes of deterioration and potential threat. It shall recommend to the government about alternative livelihood for the dependent population of the ECAs. This committee is also directed to supervise or provide guidance and directives to the nationally executed government development projects.

h. Other environment related rules and legislations

42. In addition to the ECA and ECR, numerous laws and supporting rules have been passed and developed to regulate the use of natural resources and protect the natural environment from deleterious activity. A summary of environment-related laws and rules, any of which may be relevant or applicable to proposed infrastructure development, is provided in Table II-3. Depending on the nature of project activities and infrastructure, No Objection Certificates (NOCs) may need to be obtained from the agencies overseeing environment-related laws and regulations as part of the environmental clearance process directed by DOE, to ensure compliance with all relevant national laws.

Table II-3 Summary of Environmental Legislations Applicable to the Proposed Project (resources protection)

No.	Environmental Legislation / Act	Objective	Relevance to the Project	Responsible Institution
1	National Forestry Policy (2016) Draft	The National Forestry Policy (NFP) provides the framework for the protection of the remaining forests in the country and the restoration of about 20% of the country's land under the afforestation programs. The priority protection areas are the habitats which encompass representative flora and fauna in the core area of national parks, wildlife sanctuaries and game reserves. Multiple-use of forest, water and fish of the Sundarbans through sustained management will be ensured, keeping the bio-environment of the area intact.	Protected areas within the forest cannot be encroached by any project construction activities. No felling, cutting within protected or reserved forest is permitted. Not triggered by the project as the project area is outside designated forest areas declared by GoB	Department of Forests
2	The Forest Act (1927) and Forest (Amendment) Act (2000)	An act to control trespassing, illegal resource extraction and provide a framework for the forestry revenue collection system. To accommodate social forestry, the act was amended in 2000.	Requires clearances for any project within forest areas and clearances for any felling, extraction, and transport of forest produce. Not triggered by the project as the project area is outside designated forest areas declared by GoB	Department of Forests

No.	Environmental Legislation / Act	Objective	Relevance to the Project	Responsible Institution
7	The Bangladesh Wildlife (Conservation & Security) Act, 2012	To conserve and protect wildlife in Bangladesh including designation of protected areas. Protection of wildlife is provided with lists of species with four schedules: first, second, third and fourth schedule. The fourth schedule species have the highest level of protection.	Consultation and necessary permits required if the project would pass through the wildlife sanctuaries and other protected areas. Not triggered by this project. No wildlife or endangered species were found within the project boundaries.	Department of Forests
8	Bangladesh Protected Area Management Rules 2017	The rules portray the engagement process of the government authorities and local communities on how to be engaged in protected area management declared by the government. The rules cover protective activities such as regular inspections, security maintenance, annual planning of protection, actions against illegal activities, declaration of special reservation area etc.	No activity inside a declared PA is prohibited. Not triggered by the project. The project boundaries selected are outside the designated PAs, national parks and Sanctuaries.	Department of Forests
9	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. Triggered by the project. The EMP section will layout the plan for supplying safe drinking water for the construction workers and communities.	Ministry of Local Government, Rural Development, and Cooperatives
10	National Water Act 2013 Bangladesh Water Rules 2018	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. Triggered by the project. The water extraction for construction purposes and operation of the building will be sustainable and clearance will be taken from adjacent pourashavas or unions.	Ministry of Water Resources
11	Wetland Protection Act 2000	Advocates protection against degradation and resuscitation of natural waterbodies such as lakes, ponds, beels ⁶ , khals, tanks, etc. affected by man-made	In case of diversion of water from any lake, a detailed assessment needs to be done. Not triggered. No wetlands	Ministry of Water Resources

⁶ A beel is a billabong or a lake-like wetland with static water (as opposed to moving water in rivers and canals - typically called khals), 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
		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.	are nearby, as per project prerequisite. The prosed site is within the polytechnic boundary.	
13	The Pourashava Act 2009 / Ordinance issued for the amendment of local government (municipality) ordinance, 2009 and 2010; The Pourashava Ordinance, 1977; Municipal Administration Ordinance, 1960	Provides guidance for subproject integrated community and workers health and hygiene at the construction and operation and maintenance stages of the project	Coordinate with pourashava committees on disaster management measures, water and sanitation and waste management. Triggered. During building design, construction and operation the acts were considered and applied.	Local Authorities
14	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. Triggered. The BCCSAP 2009 has been considered in building design and also in the entire project consideration.	Ministry of Environment, Forests and Climate Change
15	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. Triggered. BNBC has been considered during building design.	Ministry of Housing and Public Works
16	Electricity Act 2018	Requires compensation for any damage, detriment or inconvenience caused by the project; Requires precautionary measures in laying down electricity supply lines near or where any metallic substance or line crosses to avoid electrocution; directs in powerline laying construction related activities to avoid public nuisance.	Triggered. The following are ensured: Secure permission to supply energy and lay down or place electricity supply lines for the conveyance and transmission of electricity from respective authorities prior to any works. Give full compensation for any damage, detriment or inconvenience caused by him or by anyone employed by him/her. Take precautions in laying down electricity supply lines near or where any metallic substance or line crosses in order to avoid electrocution.	Ministry of Power, Energy and Mineral Resources

No.	Environmental Legislation / Act	Objective	Relevance to the Project	Responsible Institution
17	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 energy subprojects. Provides guidelines for renewable energy subprojects. Triggered. Renewable energy provisions are considered in the building design process.	Ministry of Power, Energy and Mineral Resources
18	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	Triggered. All building structures and labs are designed to cope with local disasters accordingly.	Ministry of Disaster Management and Relief
19	National Disaster Management Act of 2012	Establishes a framework for managing disasters in a comprehensive way.	Setting-up emergency response procedures. Triggered. The project structure is to follow the setup of the Act.	Ministry of Disaster and Relief
20	East Bengal Protection and Conservation of Fish Act 1950 (1982)	Protection and conservation of fishes in inland water bodies of Bangladesh	No wetland or canal should be encroached or obstructed due to construction and operation of the projects. Not triggered. No fishpond or fisheries entities are nearby. Criteria selection for project are ensured of that.	Department of Fisheries
21	Public Procurement Rule (2008)	Applies to the procurement of goods, works or services by any government, semi-government or any statutory body established under any law; includes measures regarding the safety, security and protection of the environment in construction works; requires Contractors to take all reasonable steps to safeguard the health and safety of all workers on site, protect the environment on and off the site, and avoid damage or nuisance to persons or to property of the public or others	Triggered. The PPR (2008) will be followed during procurement process of the subprojects	Ministry of Public Works
22	Bangladesh Fire Prevention and Extinction Act, 2003 Fire Prevention and Extinction Rules, 2014	The Bangladesh Fire Prevention and Extinction Act, 2003 (Act No. 7 of 2003) and Rules 2014 are crucial legislation aimed at safeguarding lives, property, and valuable assets from fire hazards. The key considerations are: (i) fundamental requirements for fire safety. It covers aspects such as fire prevention, preparedness, and response; (ii) emphasizes the need for fire protection measures in buildings, public spaces, and other areas susceptible to fire incidents; (iii) adherence to safety protocols,	Triggered. During construction and operation, fire safety protocols that stipulated in the Act 2003 and Ruled 2014 will be followed.	Department of Fire Service and civil Defense

No.	Environmental Legislation / Act	Objective	Relevance to the Project	Responsible Institution
		regular inspections, and maintenance of fire extinguishers, alarms, and other firefighting tools		
23	National Plan for Disaster Management, 2021-2025	The National Plan for Disaster Management (NPDM) 2021-2025 outlines the strategic vision and mission of the Government of Bangladesh in collaboration with the Ministry of Disaster Management and Relief (MoDMR). This comprehensive plan aims to build a resilient nation by addressing the challenges posed by natural and man-made disasters. The plan emphasizes on: (i) Investments for building resilience against chronic disasters; (ii) Social protection; (iii) Resilient post-disaster response and recovery	Triggered. During construction and operation, the NPDM will be considered.	Ministry of Disaster Management and Relief (MoDMR)
24	Balumohal and Soil Management Act 2010	The Balumohal and Soil Management Act 2010 (Act No. 62 of 2010) deals with the provision of leasing Balumohal, extraction of sand and soil, soil management, and other related matters. This law specifies regulations regarding the leasing of Balumohal, exchange of money for sand or soil extraction, Balumohal management, and other relevant issues.	Triggered. During construction contractor will be carrying sand, silt from government approved balu mohal, as per the Act 2010	District Commissioner

i. Other environment related rules and legislations

43. During construction, the subproject will conform to the occupational and health related rules as outlined in the Table II-4 below.

Table II-4 Occupational and health safety related rules in Bangladesh

Title of Laws and Rules	Descriptions
Social Security under the Act, 1923 and an amendment in 1980	According to the Act social impact assessment includes the processes of analyzing, monitoring and managing the intended and unintended social consequences, both positive and negative of planned interventions (policies, programs, plans, projects) and any social change processes invoked by those interventions.
Bangladesh Labour (Amendment) Law, 2018	Compliance to the provisions on employment standards, occupational safety and health, welfare and social protection, labor relations and social dialogue, and enforcement Prohibition of employment of children and adolescent
Labour Rules 2015	The Labor Rules give substantial practical heft to the Labor Act, specifying standards for workplace dimensions and features, responsibilities of employers and facility owners, limits on working hours, special rules for young workers, and many other workplace safety and worker protection matters. The Rules provide the basis for inspections of construction sites and industrial facilities by the Department of Inspection for Factories and Establishments (DIFE) under Ministry of Labour and Employment (MoLE).

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

D. International commitments

44. Bangladesh has signed many international treaties, conventions and protocols that pertain to environmental conservation, pollution control, and working conditions, and these need to be considered alongside national laws and regulations in the context of infrastructure planning. A list of the most relevant international treaties and conventions to which Bangladesh is a party is presented in Table II-5.

Table II-5 Treaties and conventions joined by Bangladesh and applicable to this project

Treaty or Convention	Brief description
International Plant Protection Convention (Rome, 1951) & Plant Protection Agreement for SE Asia and Pacific (1999 Revision)	Aims to ensure that construction work and construction materials do not introduce plant pests
Conservation of Wetlands of International Importance specially as waterfowl Habitat ("Ramsar Convention": Iran, 1971)	Conservation and proper use of wetlands and their resources; protection of significant wetlands and prevention of draining or filling during construction
Convention Concerning the Protection of the World Cultural and Natural Heritage (Paris, 1972)	Prevention of damage or destruction of culturally and/or historically significant sites, monuments, etc.
CITES Convention (Convention on International Trade in Endangered Species)	Aims to ensure that international trade in specimens of wild animals and plants does not threaten their survival
Occupational hazards due to air pollution, noise & vibration (Geneva)	Aims to protect workers against occupational hazards in the working environment
Occupational safety and health in working environment (Geneva)	Prevent accidents and injury to health by minimizing hazards in the working environment
Occupational health services (Geneva)	To promote a safe and healthy working environment
Convention on Biological Diversity, (Rio de Janeiro, 1992)	Protection of biodiversity during construction and operation; underpins the value of natural resources that provide food and livelihoods throughout the world
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1992)	Aims to protect human health and the environment against the adverse effects of hazardous wastes

Treaty or Convention	Brief description
International (United Nations Framework) Convention on Climate Change (Kyoto Protocol, 1997)	International treaty on climate change and emission of greenhouse gases, reduce greenhouse gas concentrations in the atmosphere to a level that would prevent dangerous anthropogenic interference with the climate system
Convention on Persistent Organic Pollutants, Stockholm, 2001	Restriction of use of pesticides and herbicides
Minamata Convention on Mercury, 2017	Global treaty to protect human health and the environment from the adverse effects of mercury, by addressing interim storage and disposal, sites contaminated by mercury, and mercury-related health issues

E. Environmental Assessment Process and Requirements

45. This project is subject to the environmental safeguards requirements of both the Government of Bangladesh and ADB. These requirements share some concepts and terminology and are non-contradictory. The two procedural frameworks for environmental impact assessment are described in turn below.

1. National Environmental Clearance Process

46. **Categorization schemes.** The Environment Conservation Rules 2023 stipulate a four-level color-coded typology of impact potential as the basis for determining the environmental clearance process for different types of proposed projects, and the extent of environmental assessment work that must be done in support of clearance applications submitted by proponents. The categorization framework is outlined in Table II-6.

Table II-6 Categorization scheme for determining environmental clearance requirements posed by DoE

Category	General Environmental Assessment Requirement
Green	No environmental assessment required to support application for environmental clearance
Yellow	No environmental assessment required, but detailed project information, including process flow diagrams and effluent treatment arrangement, must accompany application for environmental clearance
Orange	Initial Environmental Examination (IEE) required, and project can proceed to environmental clearance application once IEE is approved by DOE
Red	Brief IEE required to establish ToR for comprehensive Environmental Impact Assessment (EIA), and project can proceed to environmental clearance application after EIA and Environmental Management Plan (EMP) have been approved by DOE, often subject to conditions

47. The Environment Conservation Rules (Schedule I) provide indicative lists of types of projects, facilities and infrastructure that would normally fall into each of the four assessment categories. Although these lists are quite comprehensive, the listed types may in many cases not apply unambiguously to a given proposed infrastructure element or project activity. Further, the matters of scale and context, which determine so much of impact potential, are not strongly addressed by the indicative lists. Assigning an assessment category thus must be informed by

expert judgement, based on the initial specifications of the planned project infrastructure and activities, and basic details of the project environment. DoE has noticed this. Hence the ECR 2023 includes the process of engaging experts in the environmental impact assessment process. DoE reviews preliminary infrastructure plans for proposed infrastructure investments and decides regarding the categorization on a case-by-case basis.

48. **Environmental clearance process.** According to the ECR 2023, all projects/industries must apply for a Location Clearance certificate (LCC) prior to the application for Environmental Clearance certificate (ECC) (Figure II-1 Location Clearance Certificate (LCC) and Environmental Clearance certificate (ECC) application and awarding process from DoE

49.). The DoE is responsible for awarding both certificates. Regardless of the assessment category assigned, all applications for environmental clearance must be accompanied by a NOC obtained from local authorities (Union Parishad Chairman or Upazila Nirbahi Officer in rural polytechnic locations, and from several entities in urban locations such as Chattogram), and by an application fee. NOCs may also be required from key agencies (e.g., Water Resources Planning Organization, Forests Department, Ministry of Fisheries) if the proposed project has any potential relevance for the natural resources under their remit. The proponent is responsible for obtaining the NOCs and paying the application fee. The proponent is also responsible for renewing the clearance certificate, once obtained, on a yearly/2 yearly/5 yearly basis, paying a

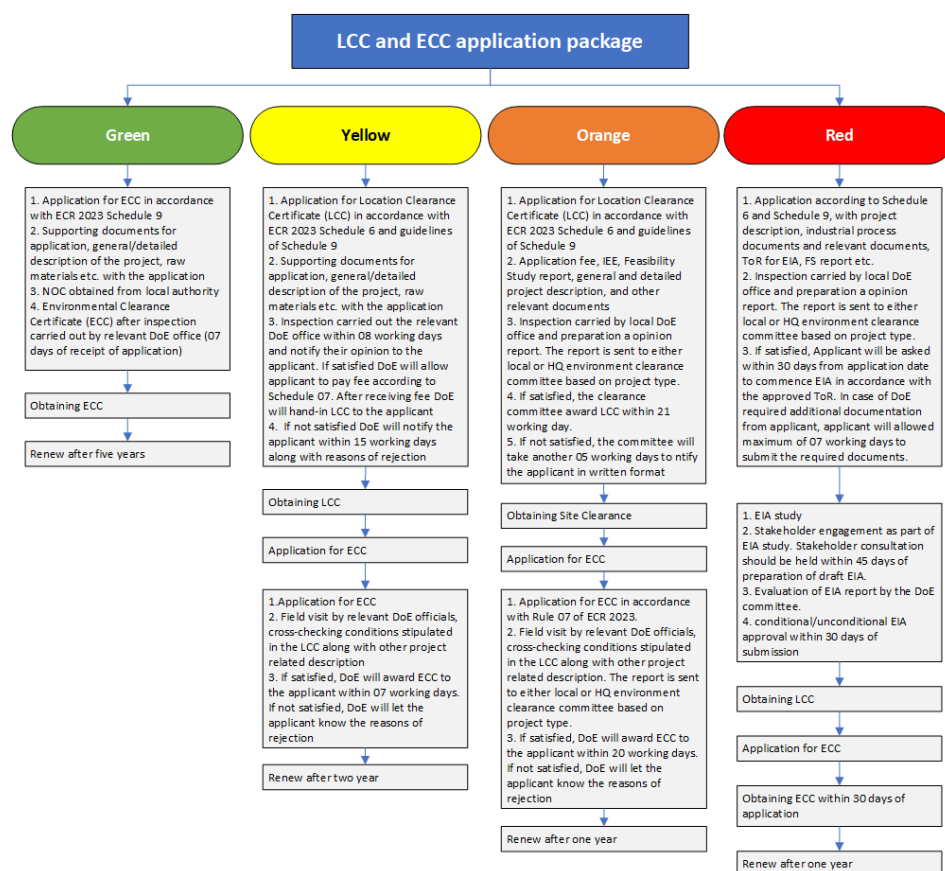


Figure II-1 Location Clearance Certificate (LCC) and Environmental Clearance certificate (ECC) application and awarding process from DoE

fee for each renewal. Fines are levied when the proponent allows the clearance certificate to lapse.

50. For investments that require an environmental assessment report (Orange and Red projects), DoE reviews and approves the report (either an IEE or more detailed EIA) before approving the clearance application. The approval may be subject to certain conditions, which the proponent is bound to meet to keep the clearance certificate current. Review time of clearance applications by DoE varies with project category. Environmental Review and clearance process of SICIP is shown below (Figure II-1).

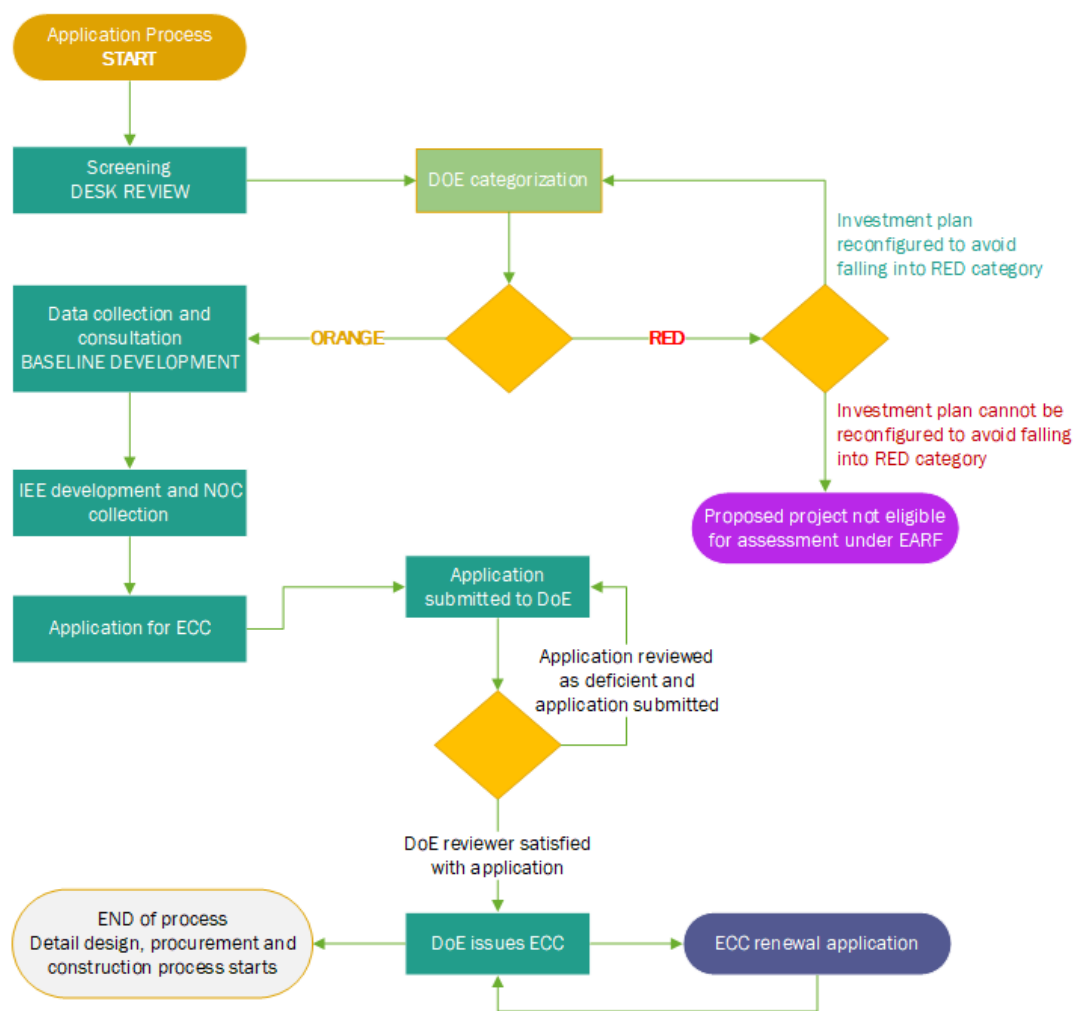


Figure II-2 Flowchart of national clearance process as applicable to SICIP

51. **Anticipated DoE assessment category.** The infrastructure development proposed for the NATI structures and associated polytechnic structures under the project will appropriately be considered to fall into the 'Orange' assessment category. The investments do not include any components that would trigger assignment to the 'Red' category, but do encompass components (multi-storied buildings, diagnostic laboratory) included in the 'Orange' list in Schedule 1 of the Environment Conservation Rules 2023. This IEE report will be reviewed by DoE, and the anticipated categorization will be confirmed at that time.

Table II-7 Anticipated project category according to the ECR 2023

Project description	Similar category (as per ECR 2023)	Likely category	Comments
Construction, repair and retrofitting of academic and administrative multistorey buildings and labs	Item no. 25: Residential and commercial buildings (5000 – 20000 sqm built-up area)	Orange	Construction will take place within NPI campus

Source: Information taken from ECR 2023 and interpreted by the consultant

2. ADB Environmental Assessment Requirements

52. Safeguard requirements for all projects funded by the ADB are defined in the ADB Safeguard Policy Statement, 2009 (ADB SPS). This document establishes an environmental review process to ensure that projects undertaken as part of programs funded through ADB loans are environmentally sound, are designed to operate in compliance with applicable regulatory requirements, and are not likely to cause significant environmental, health, or safety hazards. The SPS is one of the key Bank Policies collected in the ADB Operations Manual. The policy promotes good practice as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines.

53. The SPS 2009 provides a framework of expectations for environmental analysis, engagement with stakeholders and communities potentially affected by projects, reporting, and follow-up implementation. Key prescriptions include the following:

- (i) At an early stage of project preparation, the borrower/client will identify potential direct, indirect, cumulative, and induced environmental impacts on and risks to physical, biological, socioeconomic, and cultural resources and determine their significance and scope, in consultation with stakeholders, including affected people and concerned NGOs. If potentially adverse environmental impacts and risks are identified, the borrower/client will undertake an environmental assessment as early as possible in the project cycle. For projects with potentially significant adverse impacts that are diverse, irreversible, or unprecedented, the borrower/client will examine alternatives to the project's location, design, technology, and components that would avoid, and, if avoidance is not possible, minimize adverse environmental impacts and risks.
- (ii) The assessment process will be based on current information, including an accurate project description, and appropriate environmental and social baseline data;
- (iii) Impacts and risks will be analyzed in the context of the project's area of influence.
- (iv) Environmental impacts and risks will be analyzed for all relevant stages of the project cycle, including preconstruction, construction, operations, decommissioning, and post-closure activities such as rehabilitation or restoration.
- (v) The assessment will identify potential trans-boundary effects as well as global impacts; and
- (vi) Depending on the significance of project impacts and risks, the assessment may comprise a full-scale environmental impact assessment (EIA) for Category A projects, an initial environmental examination (IEE) or equivalent process for Category B projects, or a desk review.

54. Screening for potential social and environmental impacts is a critical early step in the preparation of a proposed ADB-funded project. Preliminary project conceptual designs and sites are evaluated using a standard checklist, and assigned to one of four categories, as follows:

- (i) **Category A.** A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An Environmental Impact Assessment is required.

- (ii) **Category B.** A proposed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An Initial Environmental Examination is required.
- (iii) **Category C.** A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. No environmental assessment is required, although environmental implications need to be reviewed.
- (iv) **Category FI.** A proposed project is classified as category FI if it involves investment of ADB funds to or through a financial intermediary.

55. Based on initial screening of components proposed, the project was assigned to **Category B**, pending further study. Accordingly, IEEs were deemed the appropriate mode of assessment for subprojects, unless early analysis based on conceptual design specifications and field reconnaissance were to reveal potential for impacts that require study and mitigation planning of a scale and complexity better addressed through the more detailed and exhaustive EIA. IEEs and EIAs are similar in terms of procedural steps and the structure of reports, but an EIA typically requires (i) more detailed investigation of impact linkages; (ii) collection of more and higher quality baseline data regarding key impact areas; (iii) often a longer and multi-phased study period; and (iv) deeper engagement and consultation with potentially affected people.

56. Important tools and outputs specified by the SPS 2009 for IEEs and EIAs include the following:

- (i) **Environmental Audit report on existing facilities:** Since SSTL will use the existing facilities of CTEC, as per ADB SPS 2009 an environmental audit report will be required.
- (ii) **Environmental Management Plan.** The borrower/client will prepare an environmental management plan (EMP) that addresses the potential impacts and risks identified by the environmental assessment and prescribes appropriate mitigation measures to address them effectively.
- (iii) **Consultation and Participation.** The borrower/client will carry out meaningful consultation with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation.
- (iv) **Information disclosure.** The borrower/client will submit to ADB the following documents for disclosure on ADB's website: (i) a draft full IEE (including the EMP); (ii) a new or updated IEE and corrective action plan prepared during project implementation, if any.
- (v) **Grievance Redress Mechanism.** The borrower/client will establish a mechanism to receive and facilitate resolution of affected people's concerns, complaints, and grievances about the project's environmental performance.
- (vi) **Monitoring reports.** Results from monitoring of the implementation of a project's EMP are reported semi-annually to the ADB, based on internal monitoring activity carried out more frequently (quarterly, monthly, weekly or daily) as appropriate to different project activities and impacts. Monitoring assesses compliance with the measures detailed in the EMP, as well as measurable effects of project activities on the environment.
- (vii) **Unanticipated impact.** If unanticipated involuntary resettlement impacts are found during project implementation, the borrower/client will conduct a social impact assessment and update the resettlement plan or formulate a new resettlement plan covering all applicable requirements specified in this document.
- (viii) **Occupational Health and Safety.** The borrower/client will provide workers with a safe and healthy working environment, taking into account risks inherent to the particular sector and specific classes of hazards in the borrower's/client's work areas, including physical, chemical, biological, and radiological hazards.

- (ix) **Community Health and Safety.** The borrower/client will inform affected communities of significant potential hazards in a culturally appropriate manner. The borrower/client will be prepared to respond to accidental and emergency situations. This preparation will include response planning document(s) that addresses the training, resources, responsibilities, communications, procedures, and other aspects required to respond effectively to emergencies associated with project hazards.
- (x) **Physical Cultural Resources.** The borrower/client is responsible for siting and designing the project to avoid significant damage to physical cultural resources.¹³ Such resources likely to be affected by the project will be identified, and qualified and experienced experts will assess the project's potential impacts on these resources using field-based surveys as an integral part of the environmental assessment process.
- (xi) **Harmonizing with Other MFIs' Safeguard Policies.** Harmonizing ADB's safeguard policy principles and requirements with those of other MFIs is also required to enhance development impacts, reduce transaction costs, and encourage collaborative behavior. ADB believes that it should harmonize its safeguard policies with those of other MFIs, especially in relation to key policy principles, whereas procedures across MFIs need to cater to a variety of clients and situations.
- (xii) **Bidding and contract documents.** To ensure that contractors appropriately implement the agreed measures, the borrower/client will include the safeguard requirements in bidding documents and civil works contracts. Where national safeguard policies and regulations differ from ADB's safeguard policy statement including Safeguard Requirements, ADB and the borrower/client will formulate and agree on specific measures to ensure that ADB's safeguard policy principles and requirements are fully complied with.

57. Each of the key elements listed above is addressed in this IEE report.

58. **Updated ADB categorization.** Based on the findings presented in this IEE, it is confirmed that some of the infrastructure components proposed for IBA additional building will have at least some negative impacts requiring mitigation, but also unlikely that any will generate impacts of a scale, complexity or severity that would warrant detailed environmental research or development of highly novel mitigation strategies. Accordingly, the **Category B** classification, assigned to the project at the early concept stage based on ADB screening, is considered valid for this investment location. This could change if the design, scale, nature or location of any proposed components undergoes significant modification before or after project approval.

III. PROJECT DESCRIPTION

59. The investment proposed for the proposed Narsingdi Auto-Tech Training Institute (NATI) will be located at the Narshingdi Polytechnic Institute (NPI), at Narshindi sadar upazila of Narshindi district.

A. Project Location

60. The NPI is located about 54 kilometers from the capital city of Dhaka, by the Dhaka-Sylhet Highway liked road (Figure III-1 Location map of the proposed infrastructure at NATI, Narshingdi, Bangladesh. Red dotted rectangle indicated the NPI area. Courtesy: Google maps

61.

62. Figure III-1). Narsingdi Polytechnic Institute (NPI) is a government polytechnic institute located in Narsingdi, Bangladesh. It is affiliated with the Bangladesh Technical Education Board (BTEB) and offers four-year Diploma-in-Engineering (D.Eng.) programs in various disciplines.

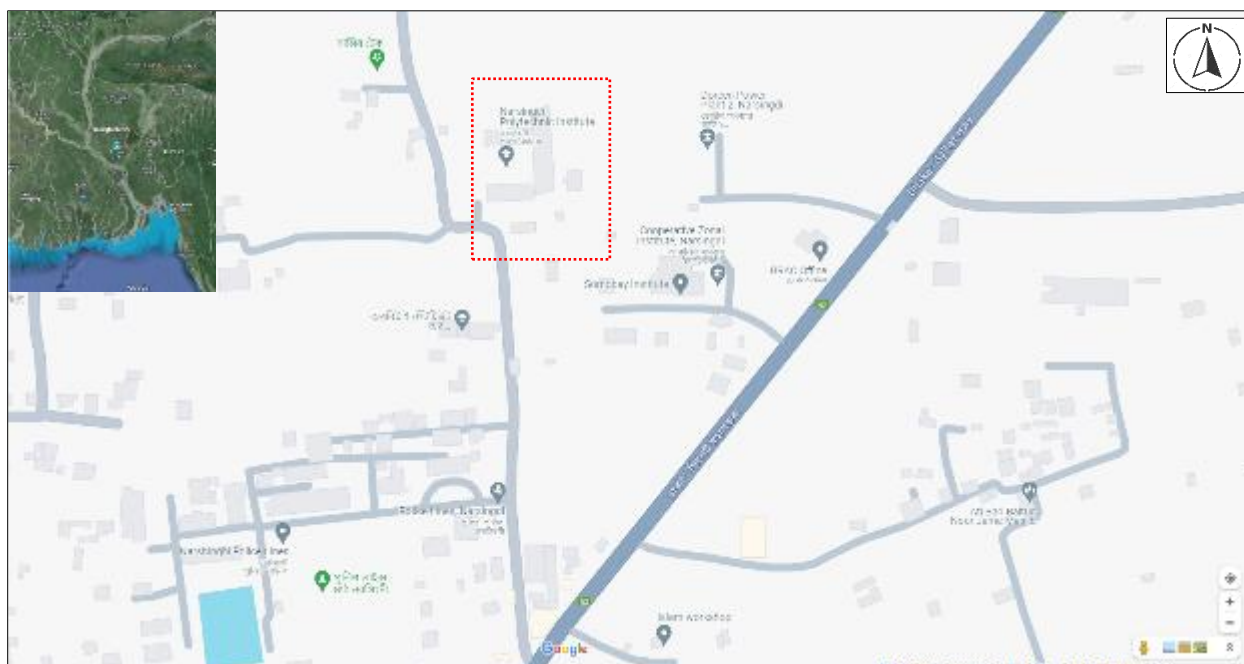


Figure III-2 Location map of the proposed infrastructure at NATI, Narshingdi, Bangladesh. Red dotted rectangle indicated the NPI area. Courtesy: Google maps

Image courtesy: Google maps. Prepared by: TA consultants.

63. The NPI area is small, approximately 9000sqm. The boundary is surrounded by agricultural lands. The proposed NATI will be located at the eastern barren land belonging to the NPI (Figure III-2 Proposed location of the NATI and its physical surroundings. Image courtesy: Google Earth

64.

65.), along with some other enhancements, extensions, and retrofits of the existing buildings as described in the later sections. However the proposed three storied building is only 840sqm with a ground coverage of 372sqm.



Figure III-5 Proposed location of the NATI and its physical surroundings. Image courtesy: Google Earth

Image courtesy: Google earth. Prepared by: TA consultants.

66. Narsingdi District located 50 kilometers north-east of Dhaka, the capital of Bangladesh, cradled by neighboring districts: Kishoreganj (north and north-east), Brahmanbaria (east and south-east), Narayanganj (south and south-west), and Gazipur (west). The district spans 1,150.14 square kilometers of fertile land, where rivers weave intricate patterns across the landscape. Narsingdi enjoys connectivity through a network of roads and highways. The Dhaka-Sylhet highway passes through Shibpur Upazila, linking the district to the capital. The mighty Meghna River is only within 3 km east of the NPI. The other major river is Shitalakhya, which is ~7km west to the proposed location.

B. Existing Infrastructure

67. Currently NATI does not exist. The proposed site is NPI owned area which is currently barren (Figure III-2 Proposed location of the NATI and its physical surroundings. Image courtesy: Google Earth

68.

69.). Agricultural lands and newly constructed buildings surround the proposed site. The footprint of the NPI area is small. East to NPI, there is a powerplant (Figure III-2 Proposed location of the NATI and its physical surroundings. Image courtesy: Google Earth

70.

71.).



Figure III-7 Natural setting of the proposed NATI at NPI.

Image courtesy: Google earth. Prepared by: TA consultants.

72. There is no drainage system installed at the proposed site. The proposed site is barren land behind the NPI structures (**Error! Reference source not found.**). Overall, the NPI has a non-functioning drainage system and outlet. Given that the NPI is not located within the municipality, no main drainage system is in existence that NPI can construct and connect an outlet. Because of the rapid urbanization around NPI, traditional drainage system, drainage stormwater towards a low land is not functional anymore. Hence, drainage system will be a major concern for the construction of NATI.

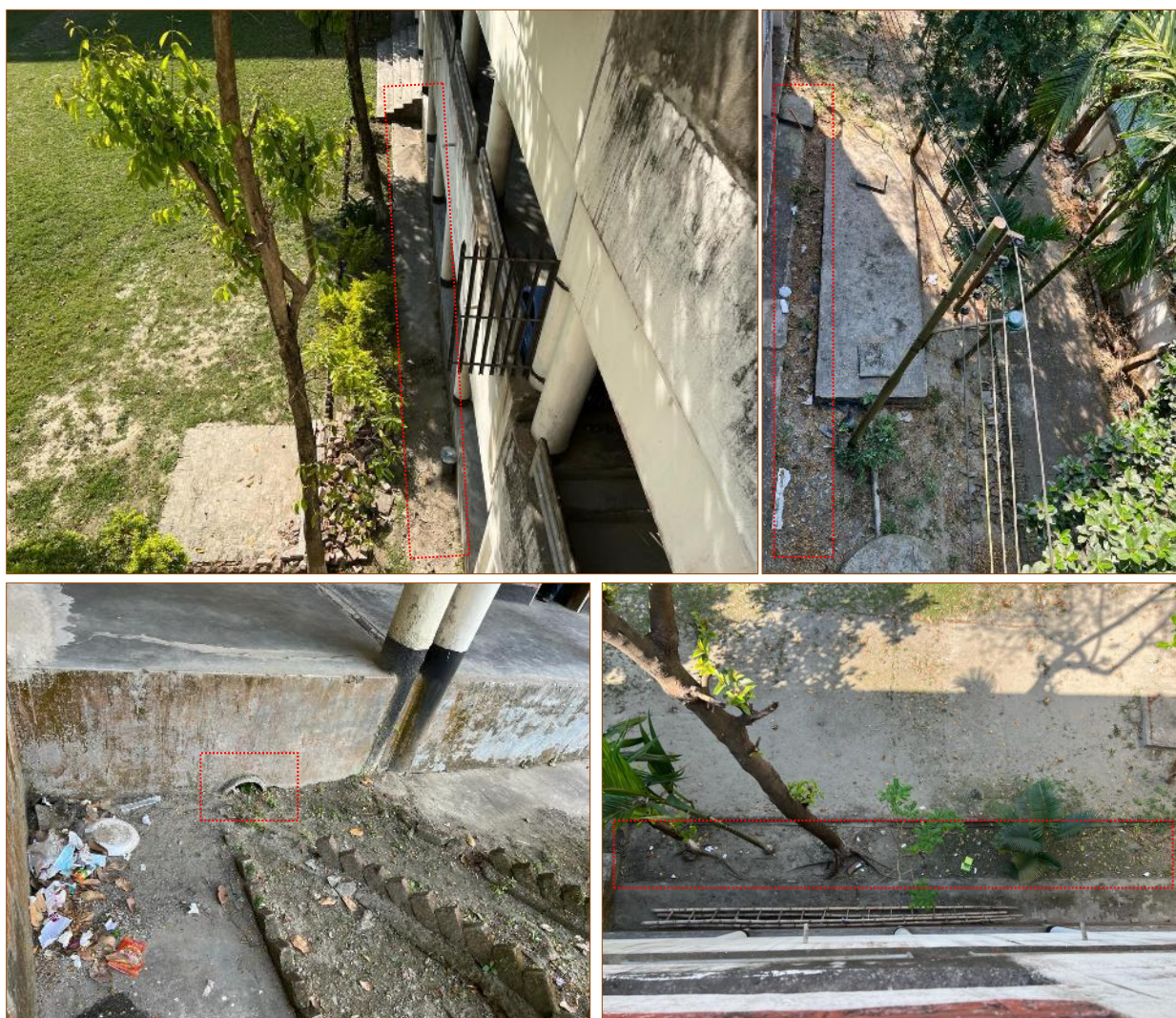


Figure III-9 Drainage system is either non-existing or non-functioning within the NPI campus.

Source: TA consultant

C. Proposed Infrastructures

73. **Location.** The project is on the Narsingdi Polytechnic Institute campus, at Narsingdi Sadar.

74. **Building Type: B2.** (a) Horizontal and vertical extension project: One-storied existing building (36m x 9.2m footprint) with foundation for a 5-storied building; three more floors proposed for vertical extension. A one-storied 4m x 36m horizontal extension is proposed on the south side. Newly added total area: 1,138 sqm. (b) New Automotive Technology Training Center: Three-storied steel building, footprint 376 sqm, total floor area 1,495 sqm (DED breakdown: Ground floor 372 sqm, First floor 379 sqm, Second floor 372 sqm, Roof floor 372 sqm), with provision for one-storied future extension. Located at the northeast corner, supported by a 3.3m approach road.

75. **Land Area.** DED specifies approximately 770 sqm (22m x 35m) of available plain land for the new three-storied NATI building a revision from the 840 sqm cited in the IEE located at the northeast corner, supported by a 3.3m approach road.

76. **Major Functions.** Four functions: Assembly and Maintenance, Bodywork, Painting, and Classwork. Existing building houses Assembly/Maintenance; new building houses Bodywork and Painting. Both buildings include classrooms and supporting facilities. Design Code: BNBC 2020.

77. **Preliminary layout.** Preliminary architectural design developed by Korean architects appointed by ADB.

78. **Specific design criteria.** The proposed design follows all compliance and safety measures required for establishing such workshop and academic facilities. Height: The veritable floor height area proposed depends on functional requirements. The plinth is proposed 0.6m above the finished road level and the total building height is 17.5m. Ventilation: The academic portion is designed naturally lighted and ventilated. The workshop portion is a combination of natural and mechanical ventilation systems. Materials considerations: Horizontal and vertical extensions are designed as RCC construction. Brick partition. The new Automotive Technology Training Center is designed as a steel building. The partitions are glass, lover, sandwich panel, brick wall, etc. Locally available brick and concrete are proposed as primary building materials. Glass with aluminum frame, wooden doors, metal doors, glass doors, etc. area proposed depends on functional requirements. The exposed brick and brick tiles are proposed as exterior cladding materials. Concrete floors, clay/brick tiles, ceramic tiles, and heavy-duty tiles are proposed as floor finished.

79. **Specific consideration for gender-specific/toilets/childcare etc.** Equal facilities are proposed for male and female users on these premises. Universal access in most functional spaces is ensured through lifts/ramps. The approval authority (Building) may be the Directorate of Technical Education and Local Municipality.

AREA CALCULATION:

A. NEW THREE STORIED BUILDING:

LAND AREA:	840SQM
GROUND COVERAGE	: 372 SQM
OPEN SPACE	: 468 SQM (55%)
PAVED AREA	: 290 SQM (34%)
GREEN AREA	: 178 SQM (21%)
NOS OF FLOORS	: 3
ROAD	: 7M (FRONT)

SETBACKS/ SEPARATION:

• NORTH	: 1.6M
• SOUTH	: 6M SEPARATION
• EAST	: 1.8M
• WEST	: 8M SEPARATION

FLOOR AREA:

• GROUND FLOOR AREA	: 372 SQM
• FIRST FLOOR AREA	: 379 SQM
• SECOND FLOOR AREA	: 372 SQM
• THIRD/ROOF FLOOR AREA	: 372 SQM
• TOTAL FLOOR AREA	: 1495 SQM

B. AREA OF NORTH BLOCK :

ONE STORIED(2nd) VERTICAL EXTENSION
2ND FLOOR AREA: 434 SQM

C. AREA OF SOUTH BLOCK:

TWO STORIED(2ND & 3RD) VERTICAL EXTENSIC
2ND FLOOR AREA: 435 SQM
3RD FLOOR AREA: 435 SQM
ONE STORIED HORIZONTAL EXTENSION
GROUND FLOOR AREA: 145 SQM

80. The key layout plan is shown in Figure III-5 The key plan for the proposed NATI
- 81.
82. Figure III-6Figure III-5. The proposed vertical extension (north block) is shown in Figure
- III-6 Proposed North Block extension plan
83. and south block is shown in Figure III-7 Proposed south block extension plan
- 84.
85. .



Figure III-10 The key plan for the proposed NATI

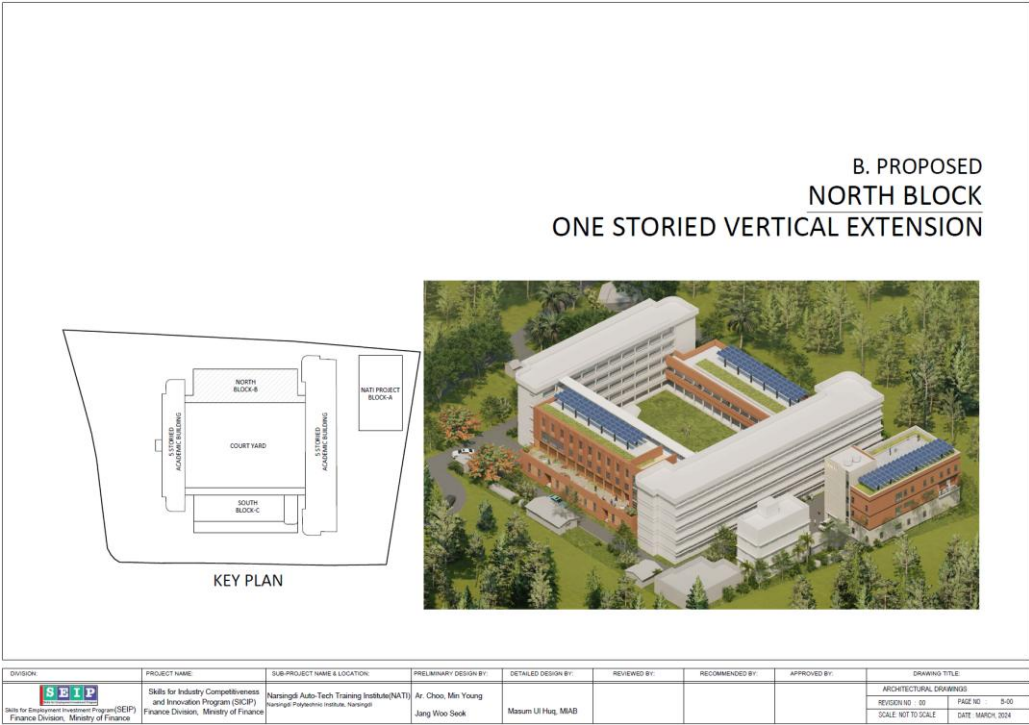


Figure III-13 Proposed North Block extension plan



Figure III-14 Proposed south block extension plan

86. **Specific considerations for green building /criteria as per DED.** (i) Natural light/ventilation maximized; ~15% exterior surface allows natural light in all rooms; (ii) Roof gardening covers 25% of roof area; (iii) Extra louvers on west side; Low-E glass for all windows; (iv) Rainwater harvesting: 5,000-litre capacity tank; (v) Solar panels: 10kW rooftop capacity; (vi) Energy-efficient electrical fixtures and water-efficient plumbing fixtures; (vii) Site designated as a flood-free and salinity-free zone.

87. For the proposed new three-story building (i.e., NATI) 178 sqm (21%) of the total land area (840 sqm) is designed as 'Green Area'. This Green Area includes roof garden and terrace gardens. Alongside gardens, tree plantation is also included. The entire 'green area' plan is shown in Figure III-8 Proposal 'green area' for NATI structures.

88.

89.



Figure III-15 Proposal 'green area' for NATI structures.

Source: Detailed Engineering Drawings of NATI

90. **Overhead Tanks.** One Overhead Tank (OHT) with 15000 Ltr capacity will be installed for NATI and NPI to meet future water demand. Currently a water purification system for drinking water is installed, which is of 4000 ltr/day capacity. An additional water purification system is proposed. However, the calculations and proposals were not finalized during the preparation of this IEE.

91. **Solar panels.** As part of the green building criteria, solar panels have been proposed to use in common and dormitory areas. Detailed specifications are to be determined during procurement of the solar panels. The proposed design is shown in Figure III-9 Rooftop solar panels proposed in NATI building.

92.

93. .

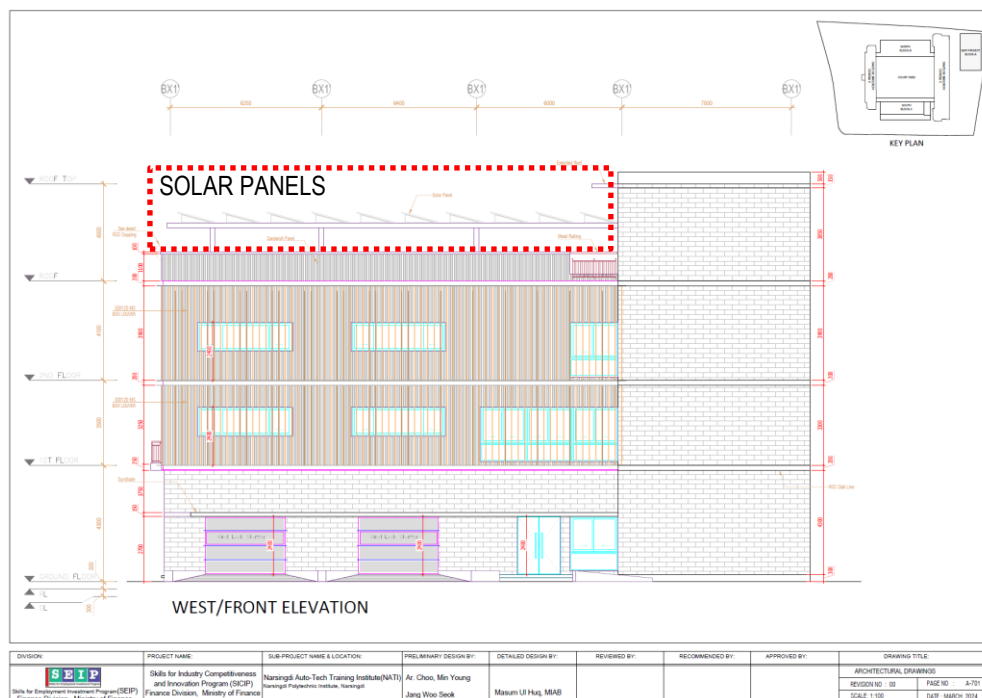


Figure III-17 Rooftop solar panels proposed in NATI building.

D. Construction schedule

94. Construction schedule depends on the methodology adopted for construction. In general, the time period will also depend on the resources put in place by the contractor. Designs were finalized in April 2024. The sub-project may take about 24 months for construction. The estimated Construction Schedule is shown in Figure III-10 Construction schedule of NATI and associated NPI structures.

95.

96. Figure III-11 3D view of the proposed two storied vertical extension. Figure III-10 including pre-construction and post construction activities. The post construction will also include a defect liability period of 12 months.

Name of work: Renovation of Narsingdi Polytechnic Institute, Narsingdi									
Work Plan									
SL No	Works	2024		2025				2026	
		July-Sep	Oct-Dec	Jan-Mar	April-June	July-Sep	Oct-Dec	Jan-March	April-June
1	Part - A Renovation & Extension Work - Training buildings								
2	Part- B. Construction of NATI Workshops								
3	Part - C. Construction of Substation building								
4	Part - D. Sanitary & Water Supply Work								
6	Part - E. General Electrical Work								
7	Part - F. Supply and Installation of 1X800KVA Substation & 1X300KVA								
8	Part - G. Supply and Installation of 1X3500 KG capacity Car lift								
9	Part - H. Fire Detection System work								
10	Part - I. Fire Protection work								
11	Part - J. HVAC Work								
12	Part - K. Road & Footpath upgradation Work								
13	Part - L. Drainage work								
14	Part - M. 20 Kwp Solar panel Work								
15	Part - N. Rain water harvesting Work(2000L)								
16	Part - O. Ancillary works								
17	Part-P: CCTV and surveillance								
18	Part-Q: Others cost for Climate Change Adaptation & Green Building								
19	Handover								

Figure III-18 Construction schedule of NATI and associated NPI structures.

Source: TA consultants

C. PROPOSED
SOUTH BLOCK
TWO STORIED VERTICAL EXTENSION



Figure III-21 3D view of the proposed two storied vertical extension.

Source: TA consultants



Figure III-22 Side elevation of the proposed NATI structure. Source: TA consultants

IV. BASELINE ENVIRONMENT

A. Location setting

97. **Siting.** The proposed NATI is located within the campus of NPI. The NPI campus is located by the LGED road which offshoots from the Dhaka-Sylhet highway (N2) (Figure IV-1 Location of the proposed NATI at NPI in Narshingdi Sadar, Narshingdi. Areal image taken from Google Earth. Map collected from Banglapedia

98.

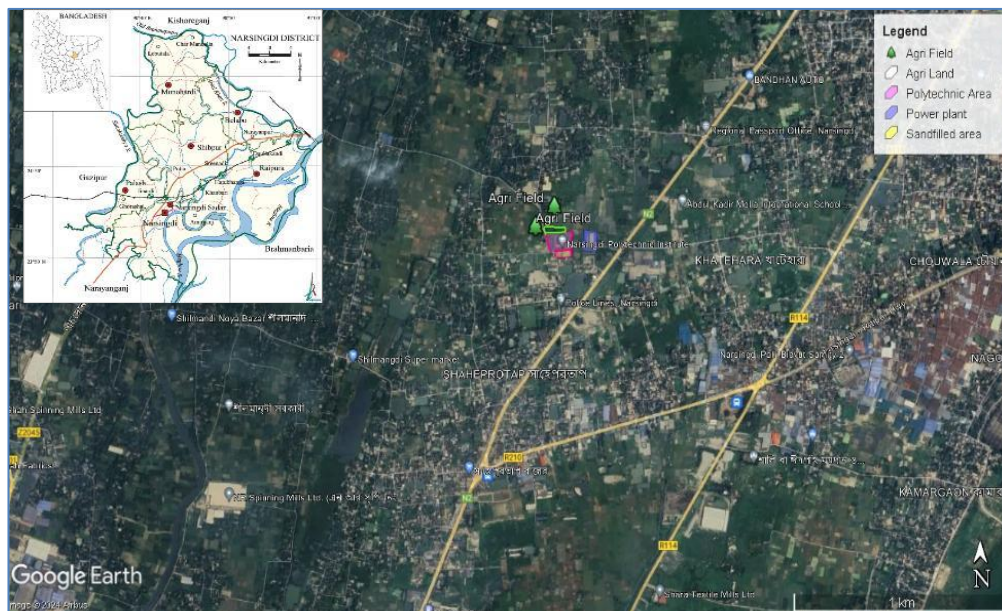


Figure IV-1 Location of the proposed NATI at NPI in Narshingdi Sadar, Narshingdi. Areal image taken from Google Earth. Map collected from Banglapedia

99.). The campus is bounded by the Shilamandi Jubo unnyan office to the south, Dorren powerplant to the east, and agricultural field to the north and west. The campus boundary does not have any waterbody.

100. **Connectivity.** The Dhaka-Sylhet highway links Narsingdi with Dhaka, the Bangladeshi capital, and other significant urban centers. This highway facilitates transportation and trade, contributing to the district's economic growth. Travel time between Dhaka and Narsingdi has significantly reduced in recent years due to improved road infrastructure, taking less than an hour and a half. Narsingdi Railway Station is located in the town center and offers train connections to various parts of Bangladesh, including Dhaka, Chittagong, and Sylhet.

B. Physical Environment

1. Physiography

101. Narshingdi district, nestled in the Dhaka Division of Bangladesh, presents a diverse and dynamic landscape shaped by the interplay of rivers, alluvial plains, and gentle hillocks. This region, encompassing an area of approximately 2,223 square kilometers⁷, offers a unique blend of fertile agricultural land, vibrant ecosystems, and a distinctive geological history.

102. **The Meghna River and Alluvial Plains.** The most striking physiographic feature of Narshingdi is the mighty Meghna River, a vital artery that bisects the district from north to south⁸. This colossal river, formed by the confluence of the Brahmaputra and Jamuna rivers, carries a vast amount of sediment, shaping the landscape through erosion and deposition. The fertile alluvial plains flanking the Meghna and its tributaries, formed by the accumulated sediments over millennia, constitute the dominant landform of Narsingdi. These low-lying plains, with an average elevation of 5-10 meters above sea level⁹, are ideal for agriculture, supporting the cultivation of rice, jute, and various vegetables.

103. **The Madhupur Tract and Gentle Hills.** While the alluvial plains dominate the landscape, Narshingdi's physiography exhibits subtle variations in the western part. The Madhupur Tract (Figure IV-2 Physiographic units of Bangladesh. Project area is in Ganges tidal flat plains. Source: Banglapedia

104.), a vast 'sal' forest extending beyond Narshingdi's borders, fringes the western edge of the

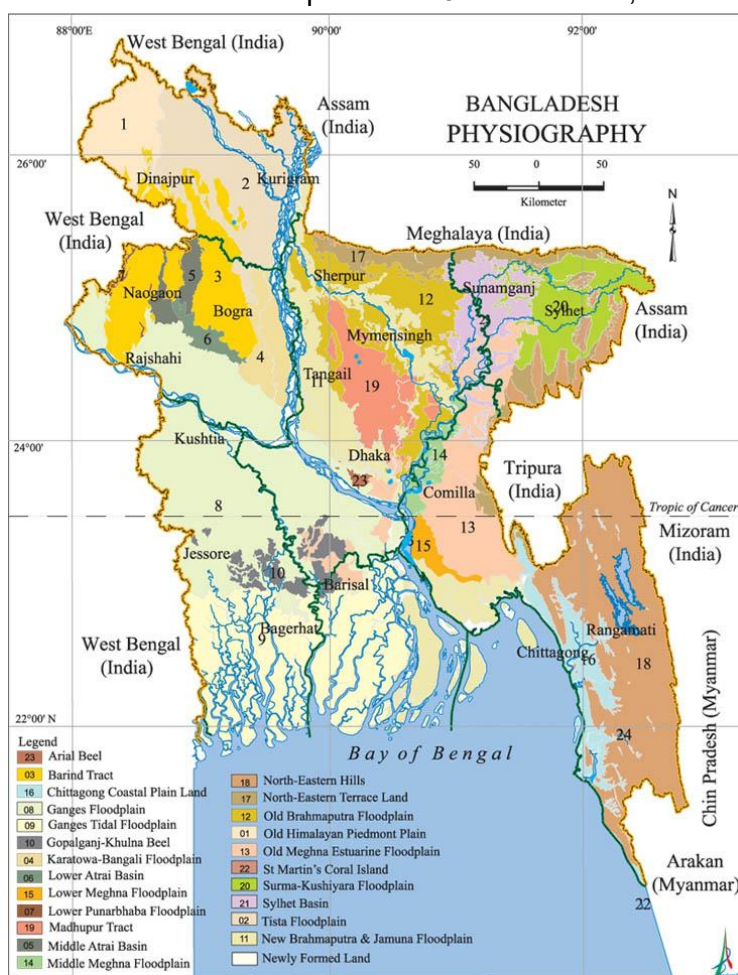


Figure IV-3 Physiographic units of Bangladesh. Project area is in Ganges tidal flat plains. Source: Banglapedia

⁷ Bangladesh Bureau of Statistics (BBS), Population & Housing Census 2011, <https://bbs.gov.bd/>.

⁸ Islam, M. M. (2010). Hydrogeological characteristics of Narsingdi district, Bangladesh. *Journal of Bangladesh Geological Society*, 34(2), 37-50.

⁹ Bangladesh Water Development Board (BWDB), National Water Resources Strategy, <http://www.bwdb.gov.bd/>.

district¹⁰. This unique ecological zone, characterized by lateritic soil and slightly higher elevations (up to 30 meters), provides a habitat for diverse flora and fauna, adding a distinct ecological flavor to the region. Additionally, scattered hillocks dot the landscape, particularly in the north-western and south-eastern corners of the district. These gentle elevations, typically reaching no higher than 20 meters above the surrounding plains, offer a break in the monotony of the flat landscape and contribute to the region's natural beauty.

105. **Fluvial Dynamics and Riverine Islands.** The dynamic nature of the Meghna and its tributaries plays a crucial role in shaping Narshingdi's physiography. The constant process of erosion and deposition by these rivers leads to the formation and subsequent disappearance of char lands, also known as riverine islands. These temporary landmasses, formed by the accumulation of sediments on sandbars, are prone to erosion and flooding, making them unsuitable for permanent settlements but offering fertile land for seasonal cultivation¹¹.

2. Topographic relief, land use and soils

106. **Topographic relief.** Narshingdi's topography can be described as predominantly flat with a gentle rolling character due to the scattered hillocks. The relief, which refers to the difference in elevation between two points, is relatively low throughout the district. The most prominent feature is the vast expanse of alluvial plains, formed by the deposition of sediments carried by the mighty Meghna River and its tributaries over millennia. These plains have an average elevation of 5-10

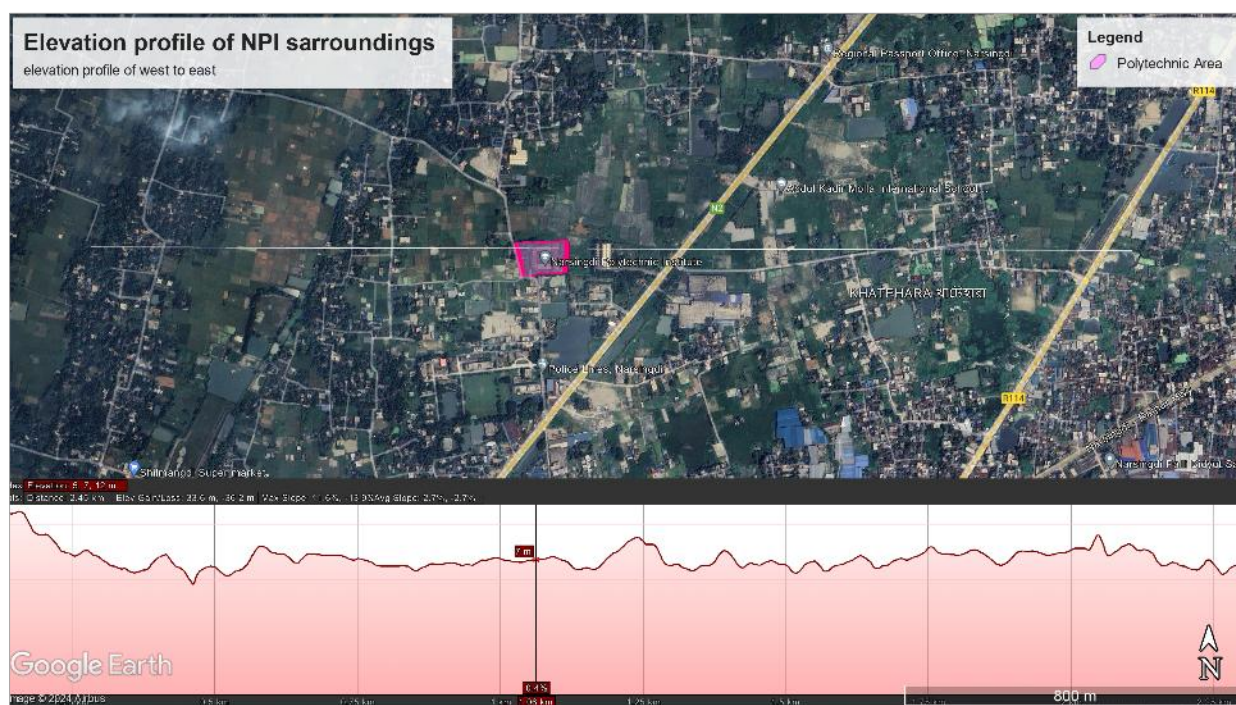


Figure IV-4 Topographic relief of the project area.

Source: Google earth pro

¹⁰ IUCN Bangladesh (2015). The state of biodiversity in Bangladesh: Report of the 5th national report to the convention on biological diversity. <https://www.iucn.org/our-work/region/asia/countries/bangladesh>

¹¹ Ahmed, M. F. (2014). Char Land Management in Bangladesh: Challenges and Opportunities. *Journal of Disaster Research*, 9(2), 181-190.

meters above sea level, offering fertile land for agriculture (Figure IV-3 Topographic relief of the project area).

107. Source: Google earth pro

108.

109. Figure IV-4 Bangladesh general soil regions and Soil textures. Chattagram regions predominantly belong to deep brown terrace soils featuring loamy sand texture. Map source: banglapediaFigure IV-3).

110. **Soils.** Narshingdi's soil profile is primarily dominated by two major types (Figure IV-4 Bangladesh general soil regions and Soil textures. Chattagram regions predominantly belong to deep brown terrace soils featuring loamy sand texture. Map source: banglapedia

111.

112. Figure IV-5 Geological map of Narshingdi indicating the project area. Figure IV-4): (i) Alluvial Soils: These soils, covering the vast majority of the district, are the result of the Meghna and its tributaries' continuous deposition of sediments over millennia. They are characterized by: (a) *Texture*: Ranging from silty loam to clay loam, with varying proportions of sand, silt, and clay particles¹². This textural variation influences drainage, water holding capacity, and nutrient availability; (b) *Class*: Primarily classified as Aquic Inceptisols and Aeris Fluvisols within the World Reference Base for Soil Resources (WRB) classification system¹³. These classes represent young, developing soils with good drainage (Aeris Fluvisols) or seasonally waterlogged conditions (Aquic Inceptisols); (c) *Fertility*: Alluvial soils in Narshingdi exhibit moderate to high fertility due to their inherent nutrient content derived from the transported sediments. However, continuous cropping practices and inadequate replenishment of essential nutrients can lead to depletion of soil fertility over time¹⁴; (ii) Lateritic Soils: These soils, found primarily in the western fringes of Narshingdi bordering the Madhupur Tract, are formed from the weathering of parent rock rich in aluminum and iron oxides. They are characterized by: (a) *Texture*: Generally sandy loam to loamy sand, with a higher proportion of sand particles compared to alluvial soils¹⁵. This coarser texture often results in lower water holding capacity and poorer nutrient retention. (b) *Class*: Classified as Acrisols or Ferralsols within the WRB system¹⁶. These classes represent soils with significant leaching of nutrients and often require specific management practices to improve fertility. (c)

¹² Bangladesh Agricultural Research Institute (BARI) (2014). Soil Fertility Management Guide (7th Ed.). <https://bari.gov.bd/>

¹³ Food and Agriculture Organization of the United Nations (FAO) (2014). World reference base for soil resources 2014, update 2015. <https://www.fao.org/soils-portal/data-hub/soil-classification/world-reference-base/en/>

¹⁴ Alam, M. J., & Islam, M. J. (2015). Spatial distribution of soil fertility in the Old Brahmaputra Floodplain of Bangladesh. Environmental Earth Sciences, 74(4), 2321-2332. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6471472/>

¹⁵ Hassan, A. E., & Shamsuddin, Z. H. (1996). Characteristics of some soils developed on laterite in Bangladesh. Soil Science and Plant Nutrition, 42(4), 449-457.

¹⁶ Food and Agriculture Organization of the United Nations (FAO) (2014). World reference base for soil resources 2014, update 2015. <https://www.fao.org/soils-portal/data-hub/soil-classification/world-reference-base/en/>

Fertility: Lateritic soils in Narshingdi are generally considered less fertile than their alluvial counterparts due to their inherent properties and susceptibility to erosion.

3. Geology and geomorphology

113. Narshingdi lies within the Bengal Basin, a vast sedimentary basin formed over millions of years through the subduction of the Indian Plate beneath the Eurasian Plate¹⁷. This subduction process resulted in the accumulation of thick layers of sediments, primarily sands, silts, and clays, derived from the erosion of the Himalayas and the Indian Peninsula¹⁸. These sediments eventually consolidated into sedimentary rocks, forming the bedrock underlying Narshingdi.

114. **Geomorphological Features:** The interplay between geological formations and ongoing processes has shaped Narshingdi's geomorphology, resulting in the following key features: (i) **Alluvial Plains:** As mentioned earlier, these low-lying, flat plains formed by the deposition of alluvium are the dominant landform, with an average elevation of 5-10 meters above sea level¹⁹; (ii) **Riverine Islands (Char lands):** The dynamic nature of the Meghna and its tributaries leads to the formation and subsequent disappearance of char lands. These temporary islands are

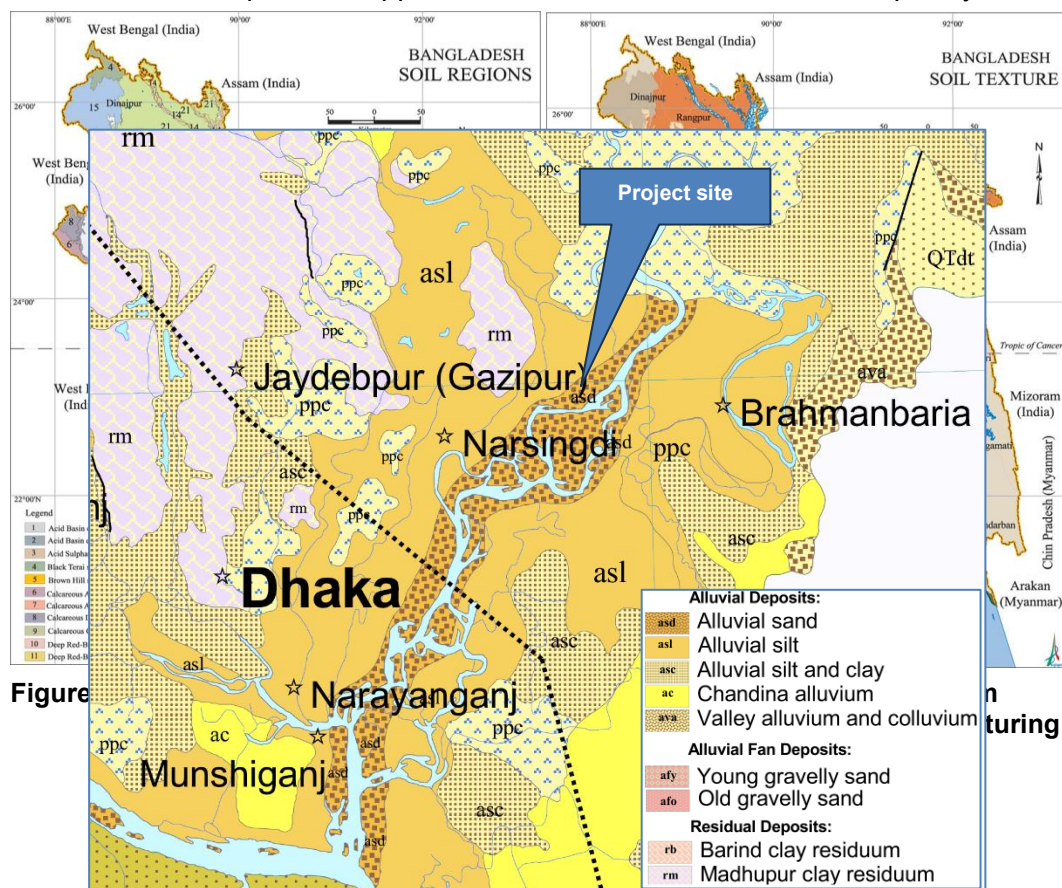


Figure IV-11 Geological map of Narshingdi indicating the project area.

¹⁷ Alam, M., & Islam, M. M. (2012). Geological setting and hydrochemical characteristics of groundwater in Narsingdi district, Bangladesh. *Journal of the Geological Society of India*, 80(4), 381-388.

¹⁸ Haq, B. U. (2014). *The Bengal Basin: geology, stratigraphy, and hydrocarbon potential*. Springer.

¹⁹ Islam, M. M. (2010). Hydrogeological characteristics of Narsingdi district, Bangladesh. *Journal of Bangladesh Geological Society*, 34(2), 37-50.

composed of alluvial sediments deposited on sandbars and are prone to erosion and flooding²⁰; (iii) Scattered Hills: Occasional gentle hillocks, typically no higher than 20 meters above the surrounding plains, dot the landscape, particularly in the north-western and south-eastern corners. These hillocks are remnants of older geological formations that have been subjected to erosion²¹.

4. Seismicity

115. The Bangladesh Geological Survey has published an Earthquake Zoning Map based on seismic intensity. They have divided the country into three zones depending on the seismic intensity namely Zone I, Zone II and Zone III. The North and eastern regions of Bangladesh belong to Zone I (seismically most active); the Lalmai, Barind, Madhupur Tracts, Dhaka, Comilla, Noakhali and western part of Chittagong Folded belt belongs to Zone II (moderately active) while Jessore, Khulna, Barisal, Faridpur, Patuakhali, and Noakhali belong to Zone III (seismically relatively quiet). According to the GSB, the study area is located within Zone II with seismic coefficient of 0.05g (Figure IV-6 Seismic zoning map of Bangladesh (Source: GSB, URL: <http://www.gsb.gov.bd/>) and BNBC 2010

116.). According to the BNBC (2010) zoning²², the project site is located in Zone 3 with $Z = 0.28$ (moderate to high vulnerability zone). Hence, the proposed structure has a high vulnerability to earthquakes, and the design of civil structure needs to comply with relevant provisions on earthquake Bangladesh National Building Code 2020 (latest). Historical record of major earthquakes for the last 450 years from the Department of Disaster

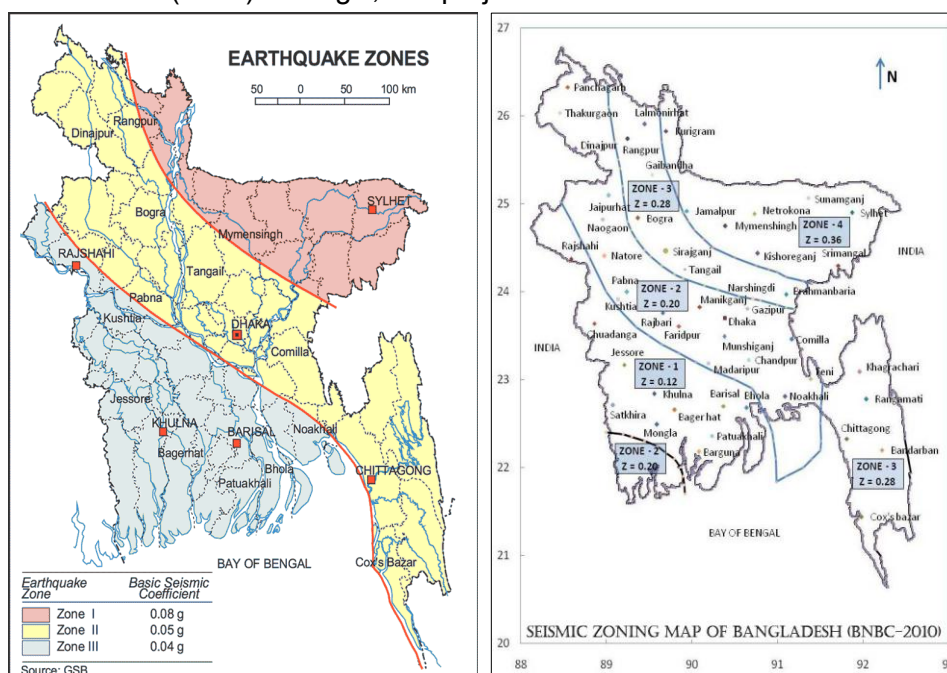


Figure IV-12 Seismic zoning map of Bangladesh (Source: GSB, URL: <http://www.gsb.gov.bd/>) and BNBC 2010

Management (2012) show that from 1762 to 2016, earthquakes originating in Bangladesh had a Richter scale magnitude ranging from 4.2 to 8.8. A maximum of about 8.8 originated from Chittagong-Arakan in 1762.

²⁰ Ahmed, M. F. (2014). Char Land Management in Bangladesh: Challenges and Opportunities. Journal of Disaster Research, 9(2), 181-190.

²¹ BBS (Bangladesh Bureau of Statistics) (2011). Population & Housing Census 2011. <https://bbs.gov.bd/>

²² BNBC (2010) has been replaced by BNBC 2020. However, the seismic zone map remains the same.

5. Hydrology and drainage system

117. **Rivers and channels.** Narshingdi is intricately linked to its hydrological system, shaped by the mighty Meghna River and its tributaries. The lifeblood of Narshingdi, the Meghna River, formed by the confluence of the Brahmaputra and Jamuna rivers, bisects the district from north to south²³. This colossal river carries a vast amount of sediment, shaping the landscape through erosion and deposition, and serves as a vital transportation artery for the region. Numerous tributaries branch out from the Meghna, including the Dhaleswari, Sitalakhya, and Bangshi rivers²⁴. These smaller rivers play a crucial role in draining excess water from the surrounding plains, preventing flooding, and contributing to the overall hydrological balance of the region.

118. **Drainage system and waterlogging.** The low-lying alluvial plains flanking the Meghna and its tributaries are prone to seasonal flooding during the monsoon season. While disruptive at times, these floods also deposit fertile sediments on the land, replenishing nutrients and contributing to agricultural productivity²⁵. Narshingdi faces a significant challenge: waterlogging. This phenomenon, characterized by the prolonged saturation of soil with water, presents various environmental and socioeconomic concerns, impacting the district's agricultural productivity, infrastructure, and public health. Understanding the causes and consequences of waterlogging is crucial for developing effective mitigation strategies and ensuring sustainable development in Narshingdi. Several factors contribute to waterlogging in Narshingdi: (i) Low-lying Topography: The dominant feature of Narshingdi's landscape is the vast expanse of alluvial plains with an average elevation of 5-10 meters above sea level²⁶. This low-lying topography hinders natural drainage, making the area susceptible to waterlogging during heavy rainfall or periods of high river discharge; (ii) Inadequate Drainage Systems: The lack of efficient drainage infrastructure, such as canals and ditches, further exacerbates the issue. These systems are often insufficient to handle the volume of water, leading to its accumulation on the land surface²⁷; (iii) Climate Change: The increasing frequency and intensity of extreme weather events, including heavy rainfall, can overwhelm existing drainage systems and contribute to waterlogging²⁸ and (iv) Land Use Changes: Urbanization and the conversion of natural drainage channels into built-up areas can significantly reduce water infiltration and exacerbate waterlogging problems²⁹.

6. Ground water

119. Groundwater is abundant in Bangladesh. Water tables are generally shallow and aquifers are productive. The water table at Narsingdi Upazilla is shallow. However, the main aquifer, which is the source of water supply, is found at a depth of greater than 50 m. Arsenic contamination is generally not present in the project area. The baseline ground water quality of the subproject area will be tested before the commencement of the work, and this is included in the environmental management plan hereof.

²³ Islam, M. M. (2010). Hydrogeological characteristics of Narsingdi district, Bangladesh. *Journal of Bangladesh Geological Society*, 34(2), 37-50.

²⁴ BBS (Bangladesh Bureau of Statistics) (2011). Population & Housing Census 2011. <https://bbs.gov.bd/>

²⁵ Bangladesh Agricultural Research Institute (BARI) (2014). Soil Fertility Management Guide (7th Ed.). <https://bari.gov.bd/>

²⁶ Islam, M. M. (2010). Hydrogeological characteristics of Narsingdi district, Bangladesh. *Journal of Bangladesh Geological Society*, 34(2), 37-50.

²⁷ Bangladesh Institute of Water Resources Research (BWDB) (2019). National Water Resources Strategy. <http://www.bwdb.gov.bd/>

²⁸ World Bank (2018). World Development Report 2018: The Changing Nature of Work.

²⁹ Rahman, M. M., & Paul, S. K. (2012). Riverbank erosion in Bangladesh: Causes, consequences and management strategies. *Journal of Environmental Management*, 95(1), 74-84

7. Flooding

120. Major River in the study area is Meghna River. According to the 'ThinkHazard!' Tool developed by GFDDR, flood risk at Narshingdi is "High". Urban flood in Narshingdi is common, due to its unplanned development and rapid urbanization through sand filling of lowlands. Due to this practice, Narshingdi region is losing its seasonal waterbodies (Figure IV-7 Global Surface Water - Transitions 2000-2018 around Narshingdi region. Indicators showing seasonal water is disappearing from the region. Date Source: Pekel et al. (2016)

121.), risking increasing the potential for severe urban flooding in future.

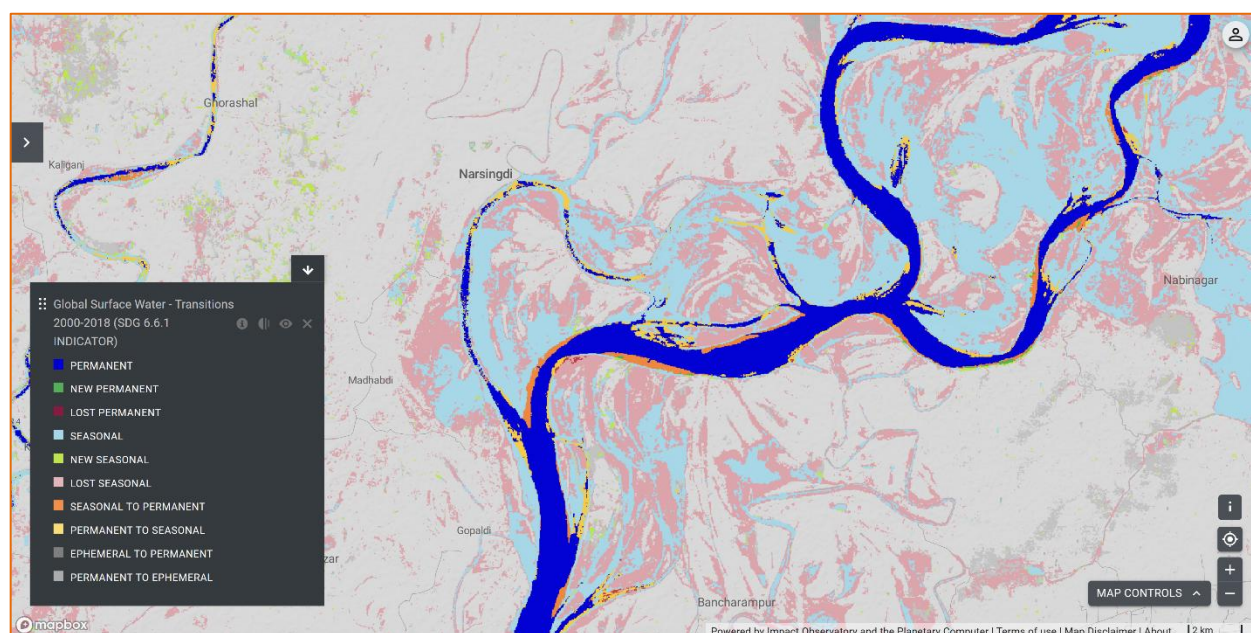


Figure IV-13 Global Surface Water - Transitions 2000-2018 around Narshingdi region. Indicators showing seasonal water is disappearing from the region. Date Source: Pekel et al. (2016)

122. The Aqueduct is an effective tool developed by World Resources Institute (WRI) to predict flooding occurrences in a specific geographic area under various future climate scenarios. The tools map the present scenario of flooding in the Narshingdi region () which reveals riverine flooding. Flood occurrences have been projected using the Aqueduct tool for Narshingdi region under RCP 8.5, SSP3 scenario for 2050 with a 50-year return period setting using GFDL-ESM2M model. The results are given in Figure IV-9 2050 flood inundation scenario of Narshingdi region using Aqueduct tool with 25-year return period, under RCP 8.5, SSP 3 scenario.

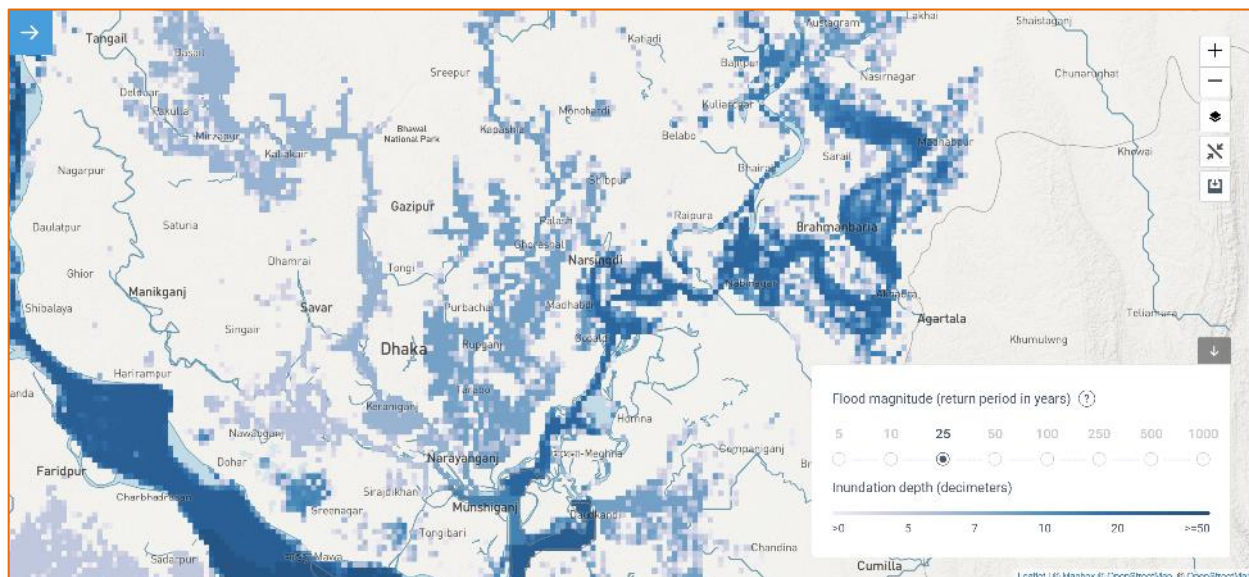


Figure IV-14 Baseline scenario of flooding in the Narshingdi region mapped by Aqueduct tool.

123.

124. Figure IV-9. The projection suggests there is high risk of flooding in the project site in future.

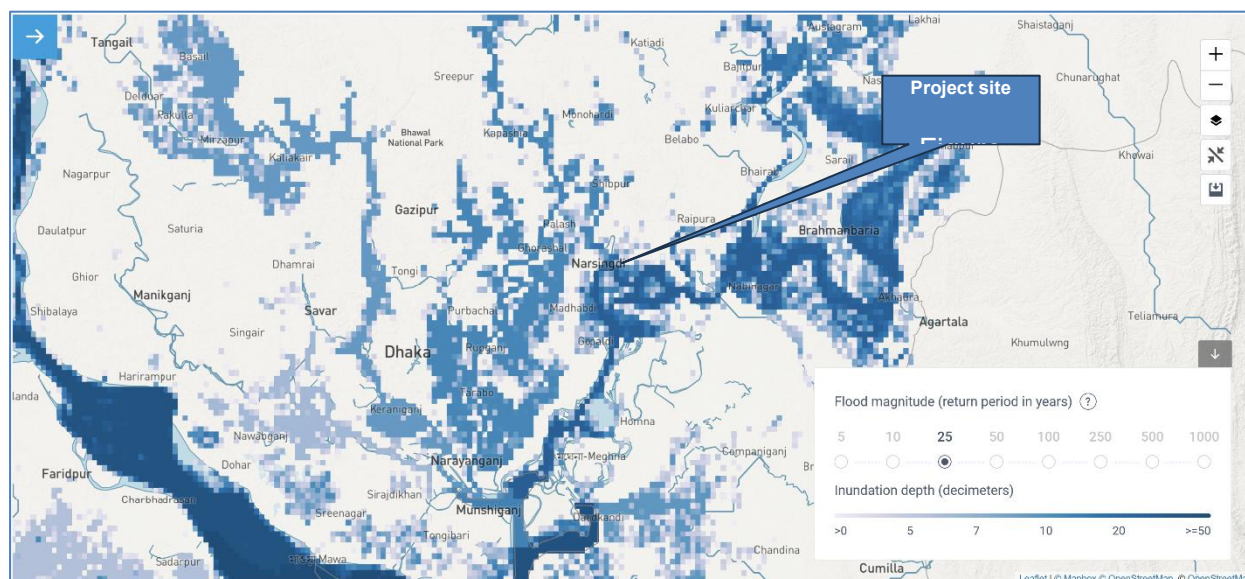


Figure IV-16 2050 flood inundation scenario of Narshingdi region using Aqeduct tool with 25-year return period, under RCP 8.5, SSP 3 scenario.

8. Climate

125. Although less than half of Bangladesh lies within the tropics, the presence of the Himalaya Mountain range has created a tropical macroclimate across most of the east Bengal land mass. Bangladesh can be divided into seven climatic zones (Rashid 1991). According to the classification, Chattagram is located in the South-central Zone climatic zone (Zone G, Figure IV-10). Climatic zones of Bangladesh. Project site belongs to Zone G.

126.

127. Figure IV-11 Meteogram of Narshingdi region. (Figure IV-10). This is a transitory zone between the southeastern, northwestern, and southwestern zones. This zone is characterized with high rainfall as well as high temperature. Throughout the year, Narshingdi experiences consistently high temperatures with an average annual temperature around 25°C (77°F). The hottest months are typically from March to May, with average highs exceeding 30°C (86°F). In this

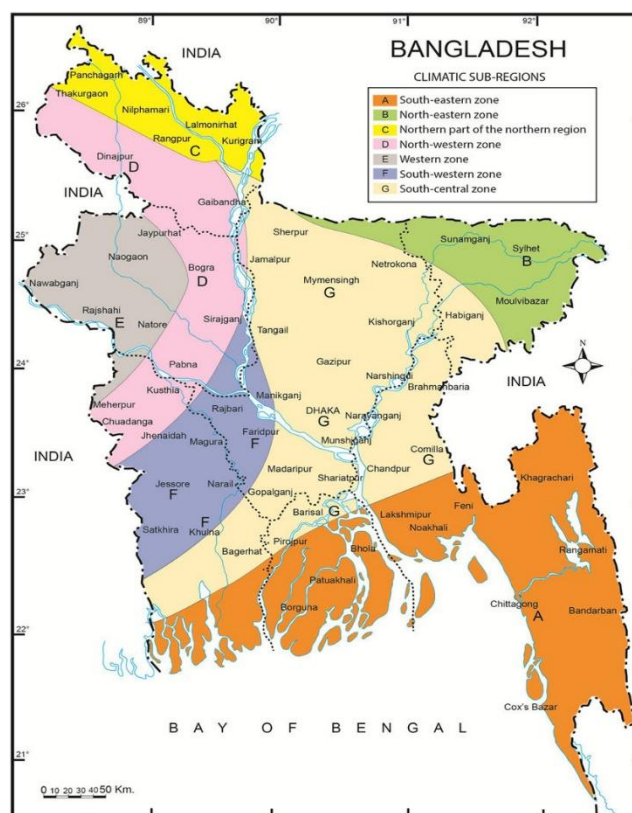


Figure IV-18 Climatic zones of Bangladesh. Project site belongs to Zone G.

zone rainfall is abundant, being above 1,900 mm. this zone also experience severe hailstorms, nor'westers, and tornadoes.

128. In the Köppen climate classification, Chittagong has a tropical monsoon climate (Am). Tropical monsoon climates have monthly mean temperatures above 18 °C (64 °F) in every month of the year and a dry season.

129. The climate of the district is relatively mild both in the summer and the winter. The maximum and minimum mean temperatures during the winter vary from 19°C to 23.7°C. During the summer maximum and minimum mean temperatures vary from 26°C to 29°C. The dry winter season starts in November and continues up to the end of February. Summer comes from mid-March and continues up to mid-June. The rainfall is generally heavy during July and August. Heavy rainfall occurs during the monsoon. The annual average rainfall of this district is 2376 millimeters. (Figure IV-11 Meteogram of Narshingdi region.

130.

131. Figure IV-12 (Left) Cyclone risk Zone map of Bangladesh (PC and ADB 2021); (Right) Cyclonic Strom Track map of Bangladesh (Islam et al. 2014).Figure IV-11).

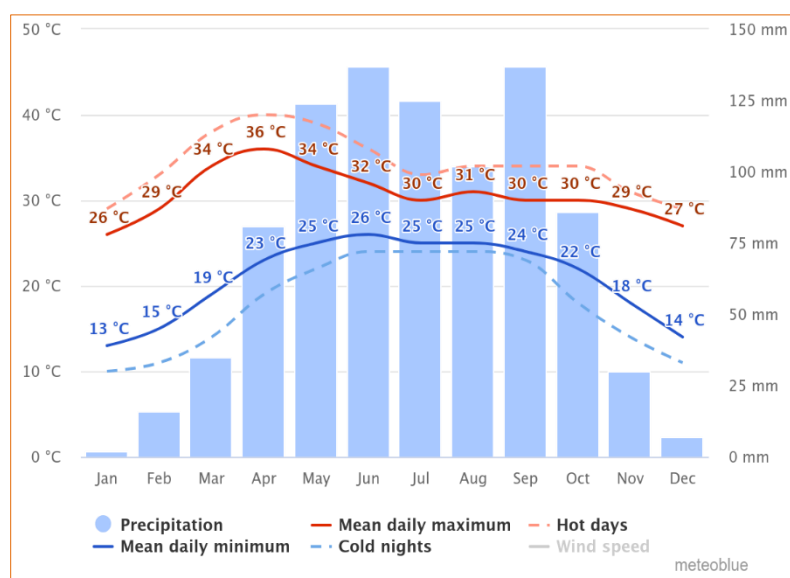


Figure IV-21 Meteogram of Narshingdi region.

9. Cyclones and other disasters

132. **Cyclones.** Cyclones are not common in Narshingdi district. As per the cyclone risk zone map prepared by PC and ADB (2021)³⁰ (Figure IV-12 (Left) Cyclone risk Zone map of Bangladesh (PC and ADB 2021); (Right) Cyclonic Strom Track map of Bangladesh (Islam et al. 2014).

³⁰ Planning Commission, Ministry of Planning and Asian Development Bank. 2021. Bangladesh Climate and Disaster Risk Atlas: Hazards—Volume I. Dhaka, Bangladesh and Manila, Philippines.

133.

134. Figure IV-13 Agroecological zones of Bangladesh. Project site belongs to old Brahmaputra floodplain (item no. 23 in map). Source: Banglapedia. Figure IV-12) project site is in the moderate-risk area of Bangladesh. Cyclone risk zone map and track map of Bangladesh is given in Figure IV-12 (Left) Cyclone risk Zone map of Bangladesh (PC and ADB 2021); (Right) Cyclonic Storm Track map of Bangladesh (Islam et al. 2014).

135.

136. Figure IV-13 Agroecological zones of Bangladesh. Project site belongs to old Brahmaputra floodplain (item no. 23 in map). Source: Banglapedia. Figure IV-12 below. Only 02 cyclones are recorded in last 56 years that had hit the Narshingdi District of Bangladesh.

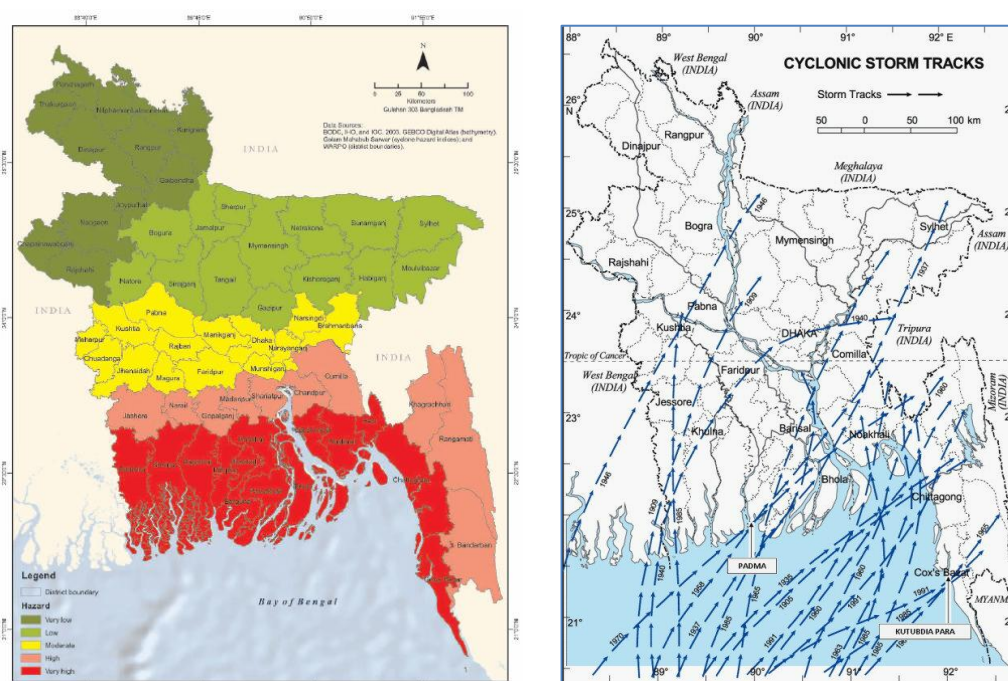


Figure IV-24 (Left) Cyclone risk Zone map of Bangladesh (PC and ADB 2021); (Right) Cyclonic Storm Track map of Bangladesh (Islam et al. 2014).

10. Environmental quality

137. Baseline air, water and noise quality data is unavailable around the NPI area of Narshingdi. Literatures are also inadequate on this issue. Hence it has been proposed in this IEE that the construction contractor will establish a baseline quality survey to monitor the site's environmental quality during construction period.

C. Biological environment

138. Agroecological zone. According to the 30 agroecological zones of Bangladesh classified by FAO and UNDP³¹ the project site belongs to Old Brahmaputra floodplain (Figure IV-13 Agroecological zones of Bangladesh. Project site belongs to old Brahmaputra floodplain (item no. 23 in map). Source: Banglapedia.

139.

140. Figure IV-13). Old Brahmaputra Floodplain (7,230 sq km) region occupies a large area of Brahmaputra sediments before the river shifted to its present Jamuna channel about 200 years ago. The region has broad ridges and basins. Relief is irregular, especially near the old and present river channels. Soils of the area are predominantly silt loams to silty clay loams on the ridges and clay in the basins. Organic matter content is low on the ridges and moderate in the basins, topsoils moderately acidic but subsoils neutral in reaction. General fertility level is low.

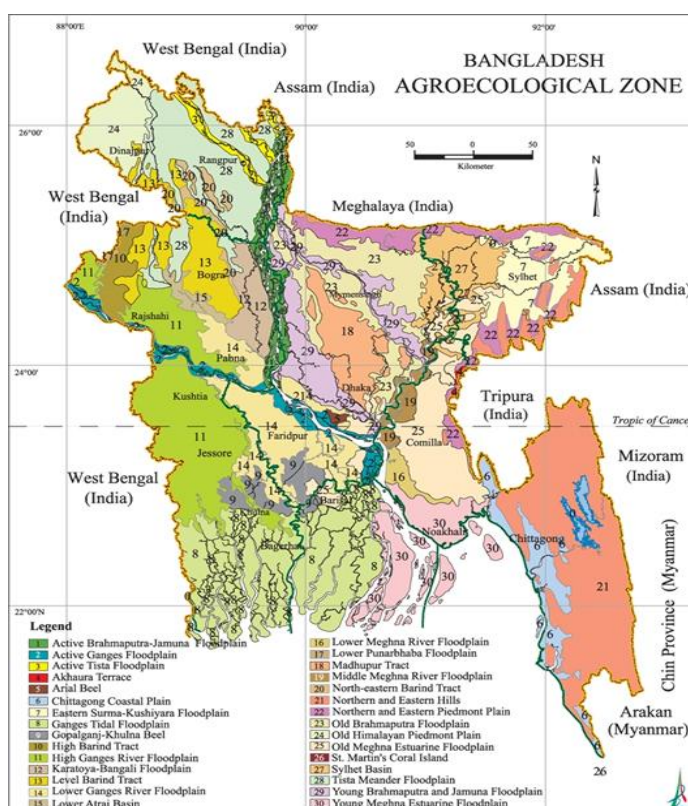


Figure IV-27 Agroecological zones of Bangladesh. Project site belongs to old Brahmaputra floodplain (item no. 23 in map). Source: Banglapedia.

³¹ FAO/UNDP, Land Resources Appraisal of Bangladesh for Agricultural Development Report 2: Agroecological Regions of Bangladesh, FAO/UNDP, 1988

141. **Protected areas and reserve forests.** There is no protected area (PA) or reserved forest within 20 km of the project boundary. The nearest PA from the proposed subproject area is Bhawal Protected Forest, which is located roughly 25km from the project boundary (Figure IV-14

Protected areas of Bangladesh and location of the proposed project. The nearest PA is Bhawal national Park, located about 25km from the proposed site.

142.).

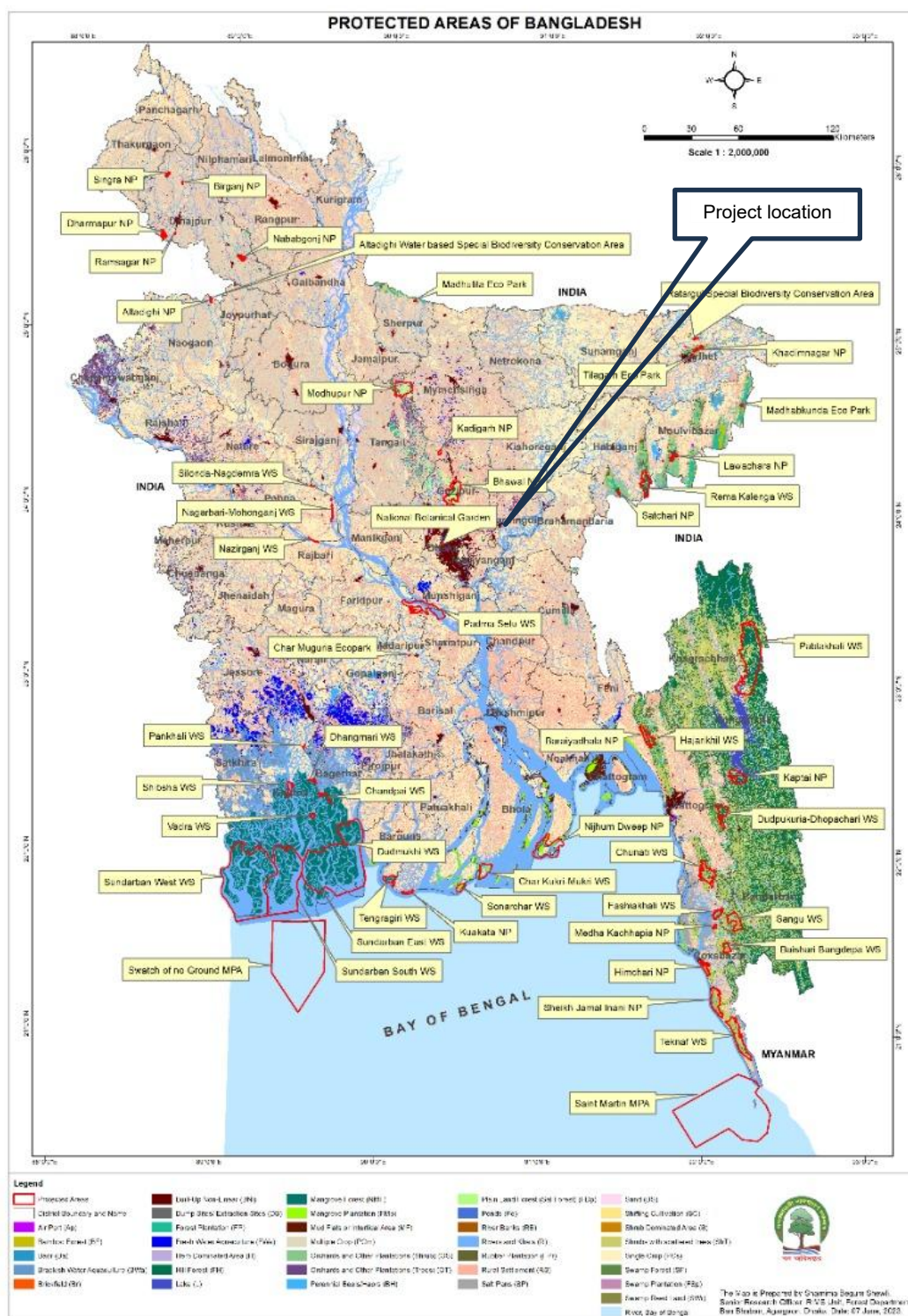


Figure IV-30 Protected areas of Bangladesh and location of the proposed project. The nearest PA is Bhawal national Park, located about 25km from the proposed site.

Source: MAP collected from Forest Department website

143. **Flora and fauna.** The proposed project location is located within the NPI campus where some vegetation is present but devoid of any wild animals. The sites proposed are barren (with wild grass) and devoid of vegetation (Figure IV-15 Vegetation at proposed site. Photo: TA consultants



Figure IV-31 Vegetation at proposed site. Photo: TA consultants

Figure IV-32 IEE process adopted for this study
Photo: TA consultants

144.

145. Figure VI-1 IEE process adopted for this study (Figure IV-15). No tree will be cut down due to the construction NATI as seen in Figure IV-15 Vegetation at proposed site. Photo: TA consultants

146.

147. Figure VI-1 IEE process adopted for this study (Figure IV-15).

D. Socio-Economic Environment

148. **Demography.** According to the 2022 Census of Bangladesh, Narsingdi District had 621,511 households and a population of 2,584,452. 520,051 (20.12%) were under 10 years of age. The population density was 2247 people per km². Narsingdi district had a literacy rate (age 7 and over) of 74.81%, compared to the national average of 74.80%, and a sex ratio of 1041 females per 1000 males. 24.92% of the population lived in urban areas.

149. **Land Use.** As per information collected from Narsingdi Upazila, the total area of Narsingdi Upazila is 213.44 sq.km of which 54.85% is residential, 4.56% is commercial, 2.08% industrial, 24.55% is agricultural, 2.93% is institutional, 0.67% road network and others is 10.36% e.g. open space and water bodies. Main sources of income Agriculture 55.47%, nonagricultural labourer 2.92%, industry 2.21%, commerce 12.74%, transport and communication 3.01%, service 11.39%, construction 1.67%, religious service 0.22%, rent and remittance 2.55% and others 7.82%. Ownership of agricultural land Landowner 45.38%, landless 54.62%; agricultural landowner: urban 37.20% and rural 49%.

150. **Industry and Agriculture.** As per Narsingdi Upazila statistics, there are a mix of small, medium and big industries of different types (namely Ricemill, flourmill, Jutemill, cottonmill, papermill, hosiery industry, bakery, bidifactory etc.) and cottage industries (Goldsmith, blacksmith, weaving, woodwork, embroidery etc.) in operation in the Upazila area. As observed from field visit at proposed subproject site, no industries were found to encroach the ROW for the proposed development. Main crops grown in the area are Paddy, wheat, mustard, jute, potato, garlic, vegetables. Extinct or nearly extinct crops are Sesame, linseed, tobacco.

151. **Infrastructure, Transport and Communications.** As per the information collected from Narsingdi Upazila, existing infrastructure in Narsingdi Upazila includes many roads that are poorly maintained, degraded in condition and often impassable except at very slow speeds. Itemized these include about Pucca road 244.11 km, semi-pucca road 170.50 km, mud road 270 km; railway 7.5 km; waterway 28 nautical miles. Regular bus services are available to travel other areas of Bangladesh. Internal movement is met by rickshaw, auto-rickshaw, easybike, maxi (laguna) and rickshaw van.

152. **Source of Drinking Water.** According to the BBS (2015) tube-well is the major source of drinking water in the zila as well as urban and rural areas. Tube-well as a source of drinking water of the general households has increased from 91.28% to 94.36% and from 92.36% to 96.64% in zila and rural area respectively during the decade. The facilities of tap water are found basically confined to urban area only. It is seen that the facility of tap water in urban area has increased to 3.19% in 2011 from 2.50% in 2001 in consequence of which the use of tube-well possibly has gone down to 85.41 % in 2011 from 86.48% in 2001. Others as a source of drinking water have declined in 2011 in the zila as well as in urban and rural areas compared to 2001 (BBS 2015).

153. **Toilet Facilities.** According to BBS (2015) general households availing sanitary facility in the zila have increased from 40.84% in 2001 to 61.10% in 2011 with an increase of 20.76 percent point and change in rural area from 33.07% in 2001 to 56.82% in 2011 with an increase of 23. 75 percent point during the same period.

154. **Electricity Connection.** A significant progress has taken place in case of electricity connection in the zila. General households reported to have electricity connection in Narsindi zila are 72.83% in 2011 compared to 44.89% in 2001 which shows an increase of 27.94 percent point during the decade 2001-2011. A rapid progress is also observed in the urban and rural areas which reflects 11.63 and 31.03 percent points increase in urban and rural areas respectively during the same decade (BBS 2015).

V. ANALYSIS OF ALTERNATIVES

A. Need of analysis of alternatives

155. The primary objective of the “analysis of alternatives” is to identify the location/technology for a particular sub-project that would generate the least adverse impact and maximize the positive impacts. The preliminary assessment of the project included an analysis of alternatives, addressing the optimal match between required technical specifications and site conditions, as well as addressing any concerns for environmental, social, and economic features in each location.

B. Current proposal

156. Currently there is no NATI at NPI in existence. Proposal for space for the potential NATI at NPI campus has been already discussed in the earlier chapters. The proposed location is barren. A summary of the impacts of the current proposal is given in Table V-1.

Table V-1 Summary of potential negative impacts of the current proposal

Sector	Negative Impact
Presence of important features within or around the land	Agricultural field, outside boundary area of NPI
Land (Government-owned land are to be given priority)	NO. The land is owned by NPI
Presence Agricultural/cropped land	None.
Village affected	None.
Families affected	None.
Loss of structures	None.
Impact on Common properties	None.
Trees to be chopped down	None.
Presence of sensitive ecosystem	None.
Presence of waterbody	None.
Tribal population affected	None.

Source: TA consultants

C. The preferred alternative

157. Adopting “Without option” (option in which the actions considered in the Project are not implemented (business-as-usual option) and “Zero option” (option in which the project purpose is met by methods/businesses that are not subject to environmental impact assessment) will keep hampering the training process of teachers. Since the proposed subproject will have the minimum environmental and social impact but enhance the teaching condition and reduce waterlogging, better management of solid waste during construction though enforcing of Environmental Management Plan (EMP) implementation, and during operation stage by serving better transportation services, the subprojects are preferred for implementation.

VI. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION

A. Approach and methodology

158. The IEE commenced with the review of legal requirements for the project followed by collection of technical details, and discussions with SDCMU and DTE to reconfirm the data and information.

159. 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. Additional tools and methods used are described in the following:

1. Approach

160. The IEE study has been conducted following the ADB SPS (2009), World Bank's Environmental and Social Framework (ESF) 2018, EIA Guidelines for Industries, prepared by the DoE in 2021³² in accordance with the requirement of the Environment Conservation Rules (ECR 2023). The IEE process adopted in this study involves identification of the key impacts on natural and social environment and evaluation of the significant impacts along with recommendation of initiative measures as well as listing of unresolved environmental issues. The IEE includes collection of baseline information, setting of boundaries, impact assessment, suggestion of mitigation measures and alternative sites providing an environmental management plan.

161. This IEE study adopted a scoping of environmental assessment comprising of seven dimensions that explains the direction, magnitude, spatial extent, duration of impact, timing of impact, nature of impact and cumulativity of the possible impacts, if they are not mitigated. This was done to capture the complex environmental impact pathway of construction projects. The steps of impact analysis and their methods are described in the later sections (VI-A- 2 to VI-A-3). Results of Impact assessment and possible remedies are described in Section VI-B and onwards. Finally, the summary results of the final assessment ratings have been presented in the form of matrix in later sections.

2. Methods of physical environmental assessment

162. The issues of physical environment have been investigated through professional observation of the study team members backed up by feedback from the local people during field visits. The base of the physical environmental assessment was data from secondary sources and field observation in combination with google earth images. In general, the physical environmental data collection and survey was carried out by a composite method of investigation including observation, satellite image analysis and public consultation. Every analysis was done with world standardized tools and the result presented with Geographical Information System (GIS) interface. The geological and seismic issues have been taken care of through secondary information and field observations. The general geological features and the seismicity of the project and its surrounding areas were collected from available secondary literature and Geological Survey of Bangladesh.

³² DoE (2021) EIA Guidelines for Industries, Department of Environment (DoE), Ministry of Environment, Forest and Climate Change, Government of the People's Republic of Bangladesh. Dhaka, February 2021.

163. Meteorological data such as rainfall, evapotranspiration, temperature, sunshine hours, humidity, wind speed and wind direction have been collected and analyzed for assessing local climate that are directly related to water resources of the study area and the project area. Meteorological data for selected stations have been collected from the Bangladesh Meteorological Department (BMD). The methods of physical assessment that has been implemented in this study is presented in later sections.

a. Primary data collection

164. Primary data sources include site visit impressions and interviews of relevant stakeholders such as local communities and polytechnic teachers. The information collected includes local topography, environmental condition, flooding condition, traffic situation, local hydrological information etc.

b. Secondary data collection

165. The secondary Information sources include published literatures, statistics, maps and reports collected from various government and non-government organizations, such as the Bangladesh Meteorological Department (BMD), Bangladesh Water Development Board (BWDB), Soil Resource Development Institute (SRDI), Geological Survey of Bangladesh (GSB) and the International Union for Conservation and Nature (IUCN), Bangladesh Bureau of Statistics (BBS) Population and Housing Census 2011, Community Reports of BBS. The information collected in such ways were categorized and added to the database of the baseline condition.

c. Socio-economic Survey

166. The social and economic data collection and review involved fact-finding from field, collection of data, tabulation of data, database entry, data compilation and review and the presentation of data. Secondary information including data, maps and reports have been collected from various sources. The data analyzed as part of this process has been collected from a number of secondary sources.

- **Primary data collection:** The socio-economic data especially for the social features of the Project affected area were collected through visual observation, focus group discussion and public consultations.
- **Secondary data collection:** Key secondary sources include Information on socio-economic profiles of the Project affected educational institutes which covers demographic profiles, education, coverage of health and sanitation facilities, use of power, agricultural land etc.
- **Public Consultations:** Focused Group discussions (FGDs) and Key Informant Interviews (KIIs) were arranged at subproject site for public consultation. The stakeholders for the project were the teachers of NPI and students, since all the interventions will be implemented within the boundary of the polytechnic. In the consultations stakeholders were made aware of the project activities and consultants as well as consultants answered their queries, questions and took note of their suggestions. In addition, several informal group discussions as well one-on-one discussions were held with local people, project affected people and community representatives at the different locations of the Project sites. The team recorded their perception of the proposed work and sought their suggestions on implementation of EMP with mitigation measures on how to reduce any potential impacts on natural and social environments and mainly centered on drainages congestion, flood,

local landscape, removal of tress, loss of agricultural lands, and community cohesion problems.

d. GIS and Remote sensing

167. The Geographical Information Systems (GIS) and Remote Sensing (RS) played crucial role in development and modelling of the spatial extension of environmental problems in the target city corporations such as extension of flooding, waterlogging, topography, population etc. Further, the GIS and RS technologies were used for investigations and detailed on-ground validation of spatial information on land use by using a hand-held, non-differential GPS in this IEE study. The Project alignment maps as Keyhole Markup Language zipped, Compressed Version of KML (KMZ) and Keyhole Markup Language zipped Google Earth (KML) produced during spatial modelling analysis were studied prior to field investigations, spatial analysis of satellite imagery was also used to identify land use boundaries. Based on spatial data acquisition and validated land use, the sensitive areas for sampling locations identified for biophysical survey of the Project. In addition, the GIS based maps of existing environment are produced for this IEE report from the collected information from field and acquisition of spatial data.

3. Impact assessment methodology

a. Impact categorization

168. **Significance of Impacts:** Generation of environmental and social impacts from infrastructure development is a function of the activities that take place during construction and operation of the infrastructure, on the one hand, and the particular environmental and social attributes of the local setting on the other. The people, communities and ecosystems that may be affected by a project (receptors) are variable in terms of their proximity to the infrastructure; their sensitivity to influences such as noise, disturbance and emissions; and their ability to adapt to change. The activities involved in construction and operation of infrastructure also vary based on the nature of the project, the noisiness and dirtiness of the construction works required, and how long different activities are carried out in one place. The significance of impacts depends on the particular juxtaposition of activities and receptors in specific locations.

169. **Typology of impacts:** The impacts that arise from particular configurations of infrastructure development activities and landscape features may emerge in different forms and through various pathways. It is useful to consider the types of impacts that may come into play - some of which may be more immediately obvious than others - when assessing the potential effects of a project on people and nature in the surrounding environment.

170. Table VI-1 below explains the Impact categorization and typology adopted for this study. Figure VI-1 explains the impact assessment process that has been adopted in this study.

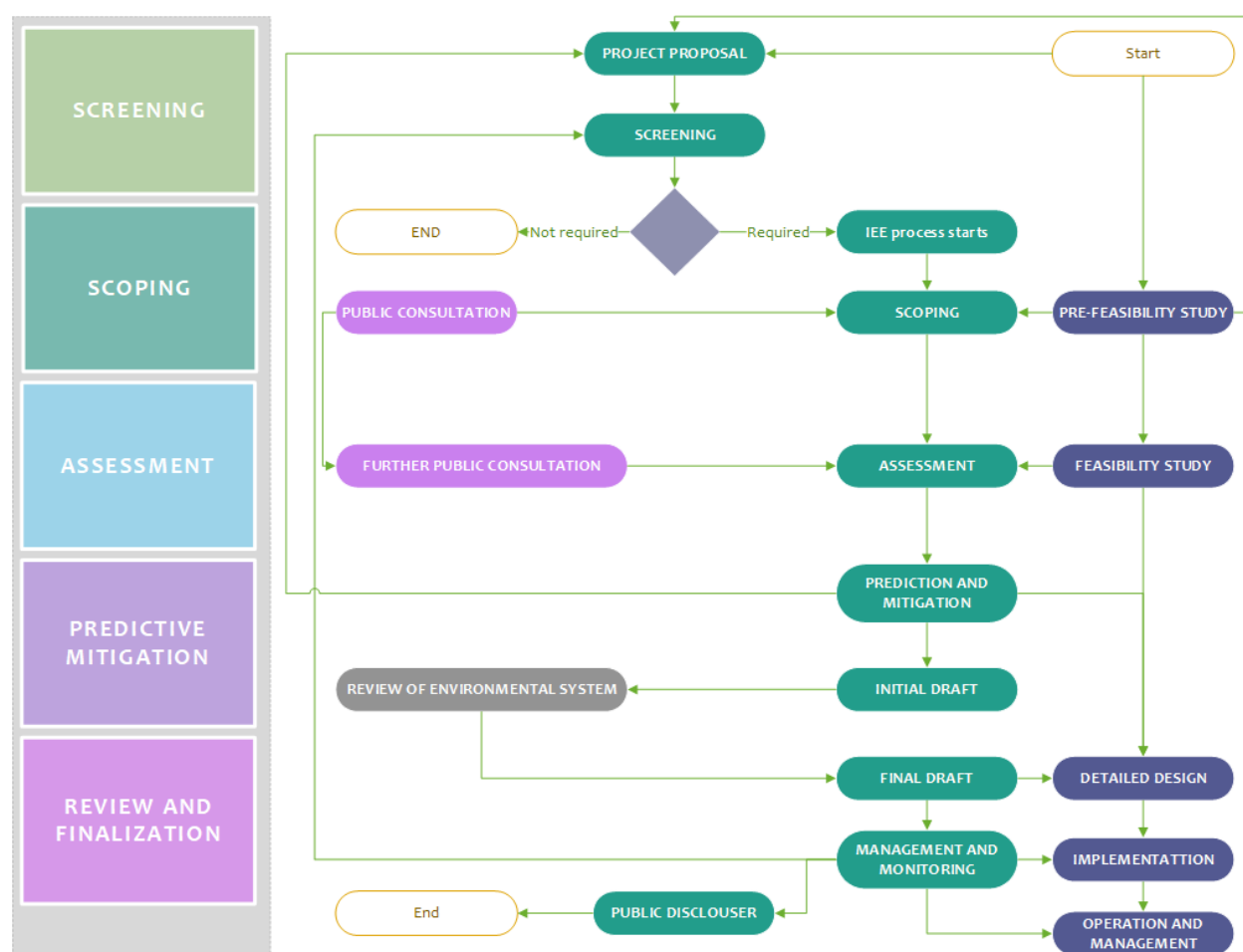


Figure VI-1 IEE process adopted for this study

Table VI-1 Impact categorization and typology adopted for this study

Impact parameter	Types of impact				Sign
Direction of change relative to baseline conditions	POSITIVE		NEGATIVE		+/-
Magnitude of impact in relation to ability of people and ecosystem to cope with change	NONE	MINOR	MAJOR	SEVERE	D/C/B/A
Spatial extent of effects	LOCALIZED		WIDESPREAD		Loc/Wid
Duration of effects experienced	TEMPORARY		PERSISTENT		Tem/Per
Timing of effects experienced	INTERMITTENT		CONTINUOUS		Int/Con
Nature of cause-and-effect linkage between project activity and impact experienced by receptors	DIRECT		INDIRECT		Dir/Ind
Relationship of project activities to impacts from other sources in landscape	ISOLATED		CUMULATIVE		Iso/Cum

b. Spatial Scope of Analysis

87. The area of influence of an infrastructure project is defined in the SPS 2009 (p. 31) as follows:

- (i) The primary project site(s) and related facilities that the borrower/client (including its Contractors) develops or controls, such as power transmission corridors, pipelines, canals, tunnels, access roads, borrow pits and disposal areas, and construction camps;
- (ii) Associated facilities that are not funded as part of the project (funding may be provided separately by the borrower/client or by third parties), and whose viability and existence depend exclusively on the project and whose goods or services are essential for successful operation of the project;
- (iii) Areas and communities potentially affected by cumulative impacts from further planned development of the project, other sources of similar impacts in the geographical area, any existing project or condition, and other project-related developments that are realistically defined at the time the assessment is undertaken; and
- (iv) Areas and communities potentially affected by impacts from unplanned but predictable developments caused by the project that may occur later or at a different location. The area of influence does not include potential impacts that might occur without the project or independently of the project.

171. The project activities at the NPI campus where physical works will take place; these include a full-fledged NATI including office, some accommodation and laboratories, access roads and possibly a construction camp at site. It is expected that materials like sand and gravel will be purchased on the open market, rather than obtained from project-specific borrow pits or quarries.

172. With respect to cumulative impacts, the proposed development does need to be understood as a single piece of investment in urban structures only affecting the vicinity of the respective polytechnic.

173. The last category to consider as being part of the area of influence - areas and communities potentially affected by developments that can be expected to result from the development of the project - is certainly relevant. The proposed developments at the NPI are likely to facilitate and perhaps even be a significant driver of the local environmental development trajectory, especially in the field of water congestion and drainage. The infrastructure improvements can be expected to contribute to lessening the waterlogging and drainage congestion in the vicinity thus less disrupting the local life, commerce and trade. The scale of induced development is difficult to forecast at the time of writing, but the general nature of the anticipated change in the local economy is nevertheless taken into consideration as part of impact analysis.

174. At the site level, defining the area of influence for the purposes of assessing impact potential is a subjective, context-dependent exercise. Noise and dust from construction activity, for example, are localized impacts likely to be experienced mostly within about 100 m of the construction site boundary.

c. Substantive Scope of Analysis

175. This IEE development considers the following parameters for scope of analysis:

- (i) biodiversity, species of concern and critical habitat areas including forests, wetlands, and protected areas;

- (ii) surface water bodies and groundwater;
- (iii) air quality, including dust and emissions;
- (iv) agriculture and fertile soils;
- (v) tree cutting;
- (vi) local acoustic environment;
- (vii) drainage and waterlogging;
- (viii) waste management (construction waste and operation phase waste);
- (ix) climate change mitigation and adaptation;
- (x) land use and livelihoods;
- (xi) traffic congestion;
- (xii) community life and interaction;
- (xiii) private property and public utilities;
- (xiv) public health and safety;
- (xv) occupational health and safety, including as they relate to the COVID-19 pandemic unfolding during implementation of the Investment Project;
- (xvi) physical cultural resources;
- (xvii) possible transboundary impacts, including transmission of disease vectors, spread of invasive species, and harmful patterns of natural resource exploitation; and
- (xviii) induced development effects and cumulative impacts.

176. The degree of emphasis placed on the key parameters identified here depends on their particular relevance, given the nature of the planned infrastructure and the characteristics of sites and receptors.

d. Temporal Scope of Analysis

177. Analysis of impacts and definition of suitable mitigation measures should be taken in all phases of the project infrastructure's development. Impacts may arise most obviously and visibly during construction, but the impacts of design and siting decisions made in the pre-construction phase, as well as the effects of intended and unintended activity at facility sites over the entire duration of the infrastructure's operating period, also need to be considered.

178. **Pre-construction phase (design impacts):** The design process offers considerable opportunities to reduce environmental impacts, through appropriate choice of materials, equipment and physical systems and features. For example, equipment and climate-control systems with the lowest associated greenhouse gas emissions (e.g., high-efficiency electric motors and lighting) shall be used during construction as much as possible so that the project inserts minimum of carbon footprint. A well-designed hydrological model set-up for 100 years may suggest the dimensions of the drainage passage to design. Incorporating such elements will help to maximize climate change mitigation as a feature of the project.

179. **Pre-construction phase (siting impacts):** The selection of a facility site has the potential to generate environmental impacts based on:

- (i) the physical characteristics of the site itself (e.g., topography, soils, drainage, exposure to natural hazards, past and present land uses);
- (ii) the proximity of the site to impact receptors (e.g., water bodies, sensitive habitats, residences, schools, hospitals, public spaces);
- (iii) the amount and type of work required to connect the facility to transport networks and service infrastructure; and
- (iv) the distance between the facility and other facilities to which it is functionally linked.

180. **Pre-construction phase (procurement impacts):** Procurement decisions with negative impact potential during the construction and operation periods are related to both materials and service providers. Construction materials obtained from afar, especially those that are heavy and needed in very large quantities, can generally be expected to have a large carbon footprint due to increased emissions associated with their transport. Materials obtained from unsustainable sources contribute to environmental problems elsewhere. Use of construction and maintenance Contractors with a poor record of environmental and social safeguards compliance significantly increases the probability of all manner of negative impacts during the construction period, as well as the creation of problems whose effects will be felt far into the future. And hiring mainly or exclusively local workers accrues substantial project benefits to the local economy, while hiring workers from outside the project area may create social strife and requires establishment of construction camps, which typically have significant potential for negative environmental impacts.

181. **Construction phase impacts:** Impacts likely to arise during the construction phase relate to the physical activities that take place both at construction sites and at locations where related activity occurs, such as access roads, haul roads, and any borrow pits, quarries or spoil dumps established specifically to support construction of the site or sites in question. Although infrastructure construction is an inherently disruptive activity, many impacts of construction activity are well understood and amenable to minimization with appropriate construction site management.

182. **Operation phase impacts:** Impacts during use of infrastructure are generally of lesser magnitude and severity than construction impacts, and arise from regular operations and maintenance activity, but also from things that go wrong with these activities, such as accidents, fires, explosions and releases of harmful substances. Proper preparation and use of operations and maintenance manuals and protocols, as well as training of personnel and regular monitoring, are key means of preventing and minimizing operation phase impacts.

e. **Impact Mitigation and Enhancement**

183. **Objectives of mitigation:** The central goal of impact assessment is to determine how best to mitigate (make less serious, severe, or damaging) potential negative effects before they arise, and to identify opportunities for enhancing potential positive impacts, which may or may not be part of the project rationale. The IEE considers the specific activities that implementation will involve, from site selection through to operation, and defines the impacts that can be expected to arise in view of the particular features of the receiving environment. The analysis and discussion of impacts uses an integrated approach, in which environmental and social impacts are considered together in relation to each set of road development activities.

184. **Mitigation hierarchy:** Identification of an appropriate proactive approach for each expected impact in this IEE makes use of the standard mitigation hierarchy advocated by the ADB and other multilateral donors. In the mitigation hierarchy, top priority is given to measures that enable outright prevention or avoidance of impacts. Where prevention or avoidance is not possible, the next most preferred option is to minimize impacts to the greatest extent possible, within reasonable limits of feasibility. Finally, and only once it has been confirmed that there is no feasible way to reduce an impact below a reasonable threshold of social acceptability, it will be appropriate to consider measures to compensate for the loss or damage caused to people and nature through reimbursement, replacement or some other means.

185. **Impact enhancement:** For positive impacts, there is no hierarchy as for mitigation, only one objective: to adopt measures to enhance or reinforce positive effects whenever possible, through thoughtful adaptation during site selection, design and implementation.

186. **Environmental Management Plan (EMP):** Measures will be prescribed for mitigation or enhancement of each predicted impact. Such prescriptions do not carry any weight unless they are made part of an obligatory implementation plan. The EMP translates the measures prescribed in this section of the IEE into costed action items assigned to specific actors and makes implementation of the action items subject to regular monitoring of compliance and effectiveness. The EMP is presented in Chapter 9 of this IEE report.

B. Findings of Impact Assessment: Pre-construction phase

1. Siting related impacts

187. Impacts related to siting of the infrastructure at the NPI are partly locked in by the established location of the already existing drains and roads owned by the institute, which will be redeveloped with some expansion (i.e., widening). Some location-related impact areas are discussed below.

a. Climate change, drainage and waterlogging

188. **Impacts:** As seen from Figure VI-2 Temperature and precipitation anomalies (1980-2010 avg.) at Chattagram over the period of 1979 - 2023. data modeled by meteoblue.com.

189.

190. Figure VI-3 Spatial distribution daily mean rainfall (PR; unit: mm/day) annually (a-c) and during the monsoon season (June to September; JJAS, d-f) using MRCM ensemble for the period of 2021-2050 under RCP 8.5 scenario. Area-averaged value over land is given on the bottom left corner of each plot (unit: mm/day). Source: reproduced from Choi et al., 2021 Figure VI-2, the trend of precipitation in Narshingdi does not show any consistent trend in precipitation although it shows a steep trend of increasing temperature since the early 2000s. The main threat of flooding in Narshingdi is due to its poor drainage system and heavy rainfall up north.

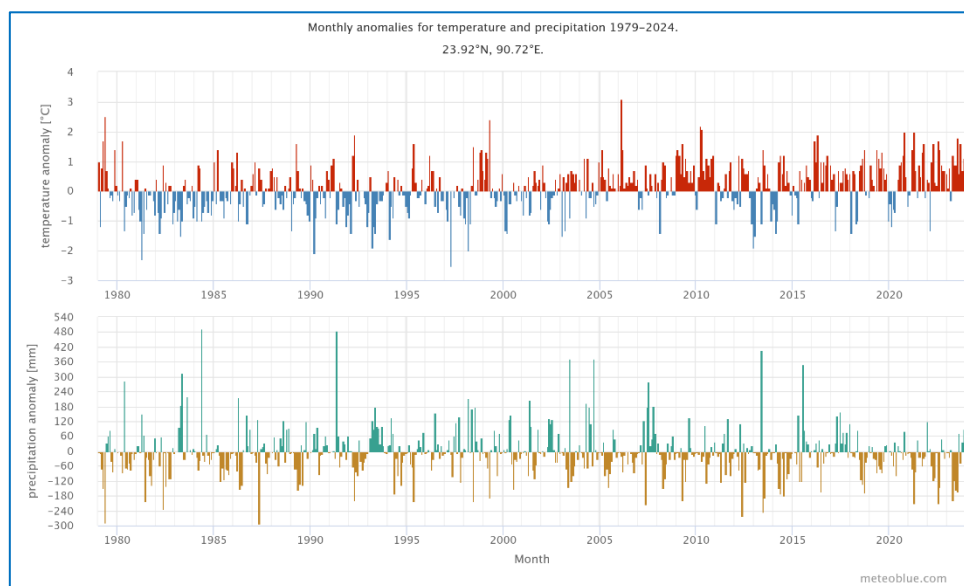


Figure VI-2 Temperature and precipitation anomalies (1980-2010 avg.) at Chattagram over the period of 1979 - 2023. data modeled by meteoblue.com.

191. In many infrastructure development scenarios, the siting of quarries and borrow pits is a key determinant of GHG emissions from construction. In this case, bulk materials are likely to be purchased on the open market, so siting will not be an important consideration in this regard. The targeted construction site (i.e., NATI) flood rarely after heavy rains, when the catchment area overflows, since drainage systems are already installed. Yet, considering the climate change projections in Bangladesh predicting more and more intense rainfall over shorter period of time demands the drainage system to be enabled heavy overflow in shorter time. The projected intensifying rainfall over Bangladesh under climate change scenarios, specially under scenario 8.5 (Figure VI-3 Spatial distribution daily mean rainfall (PR; unit: mm/day) annually (a-c) and during the monsoon season (June to September; JJAS, d-f) using MRCM ensemble for the period of 2021-2050 under RCP 8.5 scenario. Area-averaged value over land is given on the bottom left corner of each plot (unit: mm/day). Source: reproduced from Choi et al., 2021

192.)³³, drainage system will play a crucial role in future development. In the proposed site, no drainage connection with the municipality was observed. Additionally, the site is adjacent to a shallow valley nearby which drains the surface runoff from nearby infrastructures.

³³ Choi, YW., Campbell, D.J., Aldridge, J.C. et al. Near-term regional climate change over Bangladesh. *Clim Dyn* 57, 3055–3073 (2021). <https://doi.org/10.1007/s00382-021-05856-z>

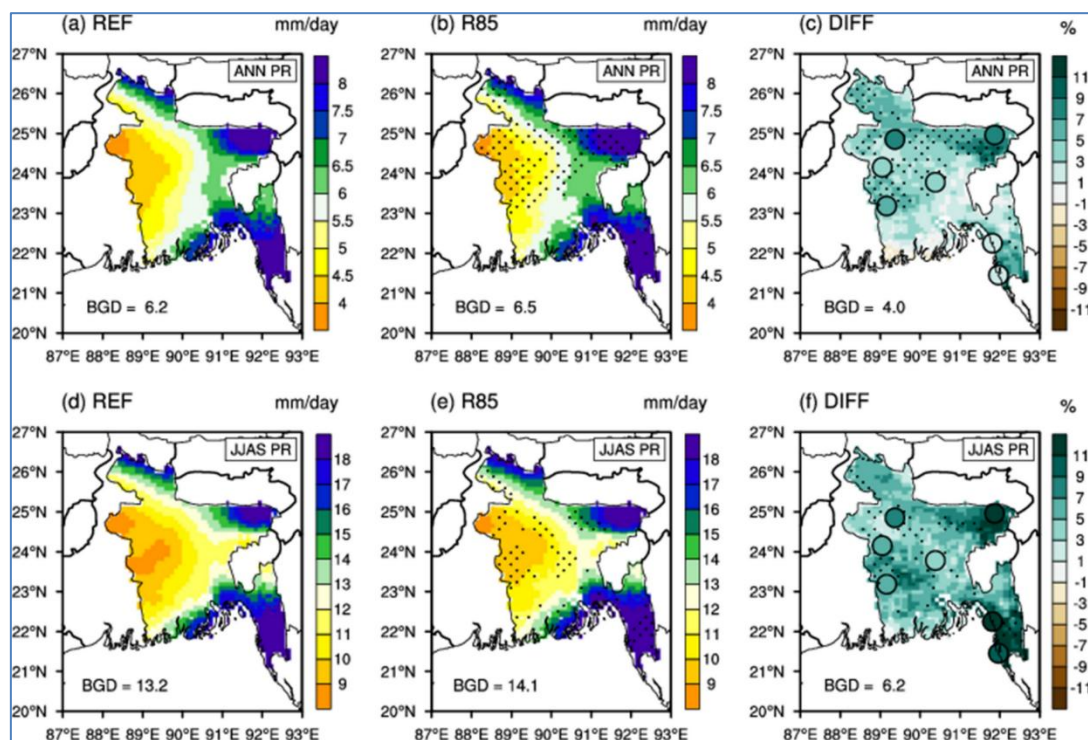


Figure VI-5 Spatial distribution daily mean rainfall (PR; unit: mm/day) annually (a-c) and during the monsoon season (June to September; JJAS, d-f) using MRCM ensemble for the period of 2021-2050 under RCP 8.5 scenario. Area-averaged value over land is given on the bottom left corner of each plot (unit: mm/day). Source: reproduced from Choi et al., 2021

193. **Mitigation:** The drainage in the proposed site is non-existent. Given the projection of higher precipitation in Bangladesh due to climate change, additional drains are proposed for construction to remedy the flooding problems. It is assumed that after construction of the drains the flooding problem will be resolved. However, during the design of the drains, it needs to be considered that recent climate change projections suggest higher amount of rainfall in a small window of time in the future (Figure VI-4 Multimodel ensemble projected precipitation in Dhaka region under SSP 5 - 8.5 scenario. Although projected increase in precipitation is not quite high under SSP 5-8.5 by the year of 2050, the monthly distribution of precipitation project suggests, the window of high rainfall will be narrow, hence increasing the risk of flooding. Projection was taken from the World Bank's Climate Change Knowledge Portal (CCKP) available at: <https://climateknowledgeportal.worldbank.org/country/bangladesh/climate-data-projections>

194.). The depth and length of the drains need to be designed accordingly. Adequate smaller drains connecting with the main drains are necessary to manage excess campus water runoff.

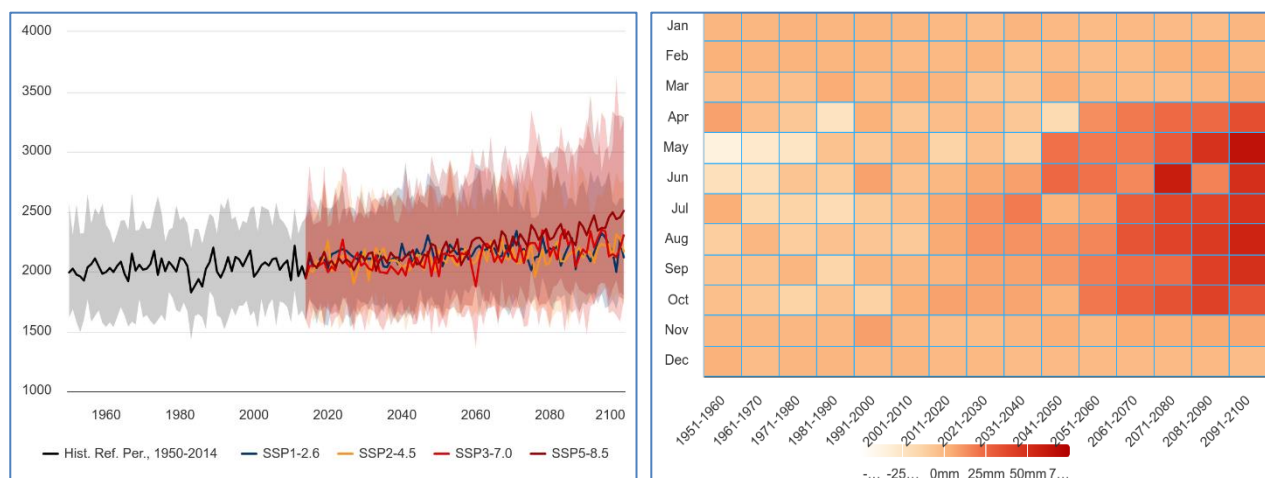


Figure VI-6 Multimodel ensemble projected precipitation in Dhaka region under SSP 5 - 8.5 scenario. Although projected increase in precipitation is not quite high under SSP 5-8.5 by the year of 2050, the monthly distribution of precipitation project suggests, the window of high rainfall will be narrow, hence increasing the risk of flooding. Projection was taken from the World Bank's Climate Change Knowledge Portal (CCKP) available at: <https://climateknowledgeportal.worldbank.org/country/bangladesh/climate-data-projections>

195. Managing energy efficiently is the most effective mitigation measure for climate change. Effective mitigation of higher average temperatures and extreme heat events—without increasing use of energy-hungry air conditioning—can be achieved using some of the measures including:

- (i) According to IPCC sixth assessment report, installing solar panels for electricity is the best possible option to contribute into carbon reduction. Hence, install solar panels to reduce electricity as much as possible.
- (ii) installing green roofs where feasible (recognizing that some roof space may be needed for solar panels);
- (iii) maximizing use of wide-crowned shade trees in the site landscaping plan, including in parking area medians; and
- (iv) maximizing cross-ventilation.

196. The proposed NATI building structure has adopted a 'green building' approach to respond to climate change. Several court yards with green spaces have been proposed within the building. Natural lighting and ventilation have been maximized to reduce energy consumption (Figure VI-5 Green building initiatives undertaken for the proposed NATI. Source: TA consultants

197.). NATI design process used national light and ventilation as much as possible, locally available building materials area were used, minimizing space and materials waste to reduce carbon footprint were also proposed. Small scale STP and WTP proposed to make sure to recycle water, although these proposals are still not in the design and construction scopes. Solar-powered energy use is designed in common and dormitory areas (Figure VI-5 Green building initiatives undertaken for the proposed NATI. Source: TA consultants

198.). Roof gardening and gardening inside floor space are proposed to increase interior air quality. Energy-efficient lighting and plumbing fixtures are proposed. Almost 30% of the buildings have been dedicated to 'green spaces. Moreover, energy saving lighting, rainwater harvesting, and rooftop solar panels are designed to conserve energy.

- Refrigerant With Low Global Warming Potential (GWP) and Ozone Depletion Potential (ODP)
- Provision For Inverter-Driven VRF System
- VRF Systems Integrated with Energy Recovery Ventilation Units and Demand-Controlled Ventilation System
- Designed Ventilation System ensures that occupants have access to fresh and clean air.

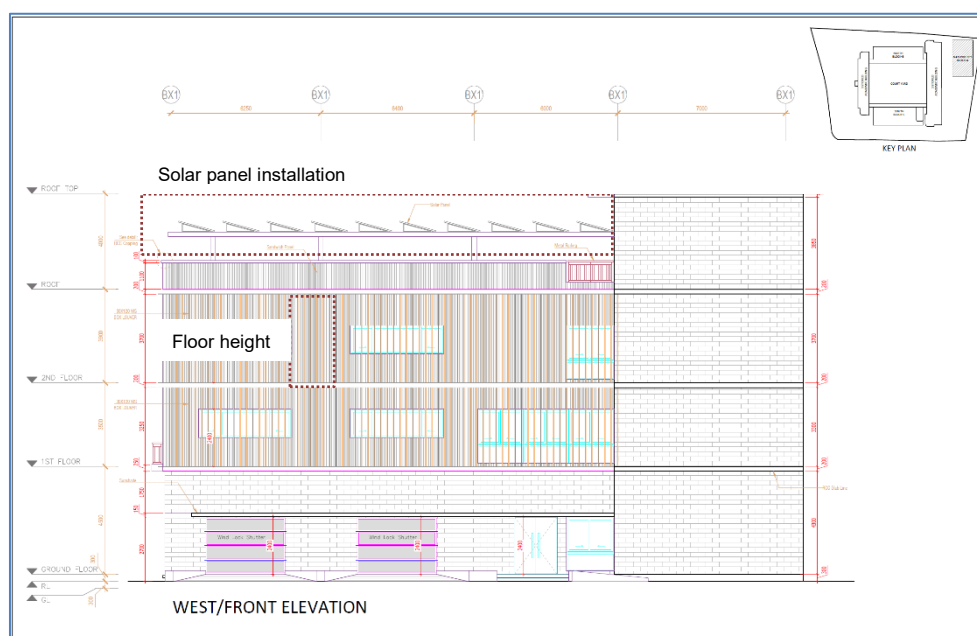


Figure VI-8 Green building initiatives undertaken for the proposed NATI.
Source: TA consultants

b. Flora and fauna

199. **Impacts.** As pointed out in the baseline section of this report, the proposed site within the NPI is located in inside the campus which are barren areas which are devoid of vegetation and fauna. Therefore, no impact is expected.

200. **Mitigation.** Although no impact is envisaged for the proposed construction of NATI, a green area is suggested to develop in the NATI campus area.

201. **Enhancement.** Tropical forests help cool the average global temperature by more than reducing carbon dioxide levels alone³⁴. Tropical trees pull in and store 95% of all tree-based CO₂ sequestration on the planet³⁵. However, a pair of recent studies show that rising temperatures are

³⁴ Forests help reduce global warming in more ways than one - Science News. <https://www.sciencenews.org/article/forest-trees-reduce-global-warming-climate-cooling-carbon> Accessed 4/11/2023.

³⁵ <https://www.communitycarbontrees.org/climate-change-solutions> Accessed 4/11/2022

shortening the lives of trees in tropical forests and reducing their capacity to absorb carbon dioxide². The NPI campus does not have plenty of space for afforestation. Afforestation with tropical trees can help in reducing CO₂. Hence, a small afforestation program is suggested within the campus (Figure VI-6 Planation suggested at the NATI site. Source: TA consultants

202.).

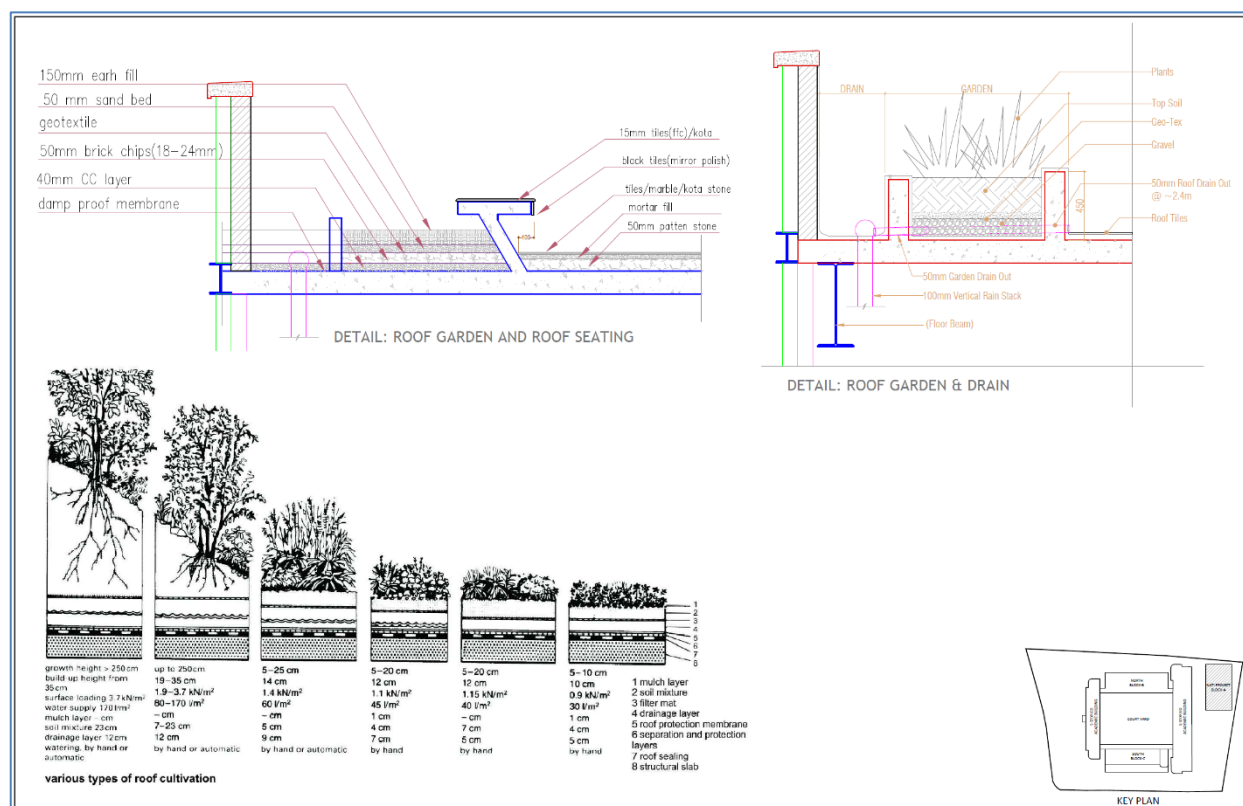


Figure VI-9 Planation suggested at the NATI site. Source: TA consultants

2. Design related impacts

a. Climate change

203. **Impacts:** Development of the NATI at NPI will unavoidably generate greenhouse gas emissions. Although it is not possible at this point in the design process to credibly calculate an impact in tons CO₂ equivalent, it is nevertheless useful to consider design elements that can make the facility's contribution to climate change greater or smaller. Certain materials have much higher embodied emissions than others; concrete is a particularly carbon-intensive material. Materials that are not available locally—particularly very heavy materials—also drive up the emissions associated with building. Installed equipment that is not modern and efficient represents a missed opportunity to lower the carbon footprint of facilities, as does failure to integrate design measures that allow for natural cooling, natural light, and reduced water pumping needs.

204. **Mitigation:** Integration of GHG-mitigating design elements in the new NATI facilities is an opportunity to enhance the facilities' contribution to climate change mitigation, relative to existing standards of construction for public infrastructure in Bangladesh. Key strategies for reducing emissions, and that should be considered for incorporation in the NATI infrastructure are outlined in Table VI-2. A number of the general design innovations recommended are considered useful and feasible for at least some of the buildings planned for NATI at NPI and are already reflected in the preliminary designs.

Table VI-2 Possible design phase measures for climate change mitigation

Climate change mitigation measure	Rationale
1. Substitute other materials for concrete where feasible	- Concrete is among the most carbon-intensive of building materials
2. Use low-carbon concrete as much as possible	- Using a lower proportion of cement (and longer cure time to compensate) can reduce the carbon intensity of concrete
3. Create designs that maximize use of building materials that are available locally	- Reduced transport emissions
5. Integrate photovoltaic generation into the electrical plan	- Reduce reliance on coal-generated electricity - Reduce reliance on back-up diesel generator - Possibly reduce size of generator needed
6. Specify only high-efficiency electrical and mechanical equipment	- Reduce reliance on coal-generated electricity - Reduce reliance on back-up diesel generator - Possibly reduce size of generator needed
7. Specify most fuel-efficient backup generator available	- Reduce diesel consumption
8. Maximize cross-ventilation by use of courtyards, openable windows and favorable building orientation	- Reduce demand for air conditioning
9. Prioritize shade in the landscaping plan, with plentiful wide-crowned shade trees on all parts of site	
10. Incorporate hollow wall structures	
11. Use overhangs above large windows to prevent excessive solar penetration	
12. Maximize interior natural light by use of favorable building orientation and courtyards	- Reduce use of electrical lighting during daytime
13. Specify water-saving toilets, faucets and showerheads	- Reduce need for pumping and treating water
14. Design dedicated plumbing system for drinking and cooking water	- Reduce volume of water requiring energy-intensive water treatment
15. Aim to meet all water heating needs with solar heaters	- Eliminate use of electricity for heating water
16. Specify high-intensity, full-time lighting only where strictly necessary	- Reduce consumption of energy for lighting spaces that don't need it (e.g., parking lots that are only used at peak times)
17. Specify solar-powered lighting for outdoor applications	- Reduce energy used by lighting
18. Base landscape plan around drought-tolerant perennial native species	- Reduce the need for pumping water
19. Design site layout and inspection process to minimize the length of time vehicles have their engines running during their passage on Love Road	- Reduce direct greenhouse gas emissions
20. Incorporate green roofs wherever roof area is not needed for solar panels and solar water heaters	- Reduce cooling needs

Climate change mitigation measure	Rationale
21. Incorporate lightning arrester in the structural design	- Lightning has been a critical source of infrastructure and economic recently.

b. Public health and safety

205. **Impacts:** NPI is located in the industrial and commercial area of Narshingdi. The road is quite busy with transportation of commercial goods, especially lots of structures are being established in the region. While the campus under construction, the already busy premises of the NPI site will be an increasingly busy commercial area with heavy traffic and pedestrians, and this will elevate the risk of collisions between vehicles and pedestrians, and between any of the several kinds of vehicles. Accidents involving pedestrians are also made more likely by a lack of sidewalks, which forces pedestrians and all vehicles, including large trucks, to share the roadway.

206. With regards to public health, the COVID-19 pandemic has highlighted vulnerabilities related to human proximity that were previously under-appreciated. To the extent that public facilities such as commercial areas cause people to be packed closely together in indoor spaces, they facilitate the spread of communicable disease. Although the COVID-19 pandemic seems likely to have abated well before the new campus comes into service, it may just be a matter of time before another viral agent causes a similar crisis.

207. **Mitigation:** A Traffic Management Plan (TMP) must be developed by the Contractor under the supervision of the Construction Supervision Consultants (CSC) and have to be approved by the Local police Authority concerned city corporation. The surrounding of the police road (i.e., road of the polytechnic) was found quite busy with traffic at any given time of the day. Along with vehicles, pedestrians equally share the road footpath. Hence, the top slab/cover of the proposed drains need to be designed in a manner that pedestrians can use them as footpath. The top cover also needs to be wheelchair friendly, so that baby strollers, wheelchairs for elderly people may stroll smoothly. If the top covers are more than six inches higher than the road, putting some lower areas in the design will be required so that the wheelchairs and baby strollers can easily ascend and descend from the footpath.

c. Waste management

208. **Impacts:** Increased commercial activities around the campus are likely to pose the risk of waste being dumped into the nearby drains. There is no drainage system at the proposed site. Natural low land works as the drainage system in the area. So, there will be a tendency to through waste at these lowlands. This waste stream will grow over time, and if this is not anticipated in monitoring design (the drains should be easily accessible for complete cleaning), waste management problems such as ad-hoc dumping and on-site burning are sure to arise.

209. **Mitigation:** Waste management problems can be avoided entirely by correctly anticipating future waste streams and incorporating adequate design features to collect, sort, and dispose of each class of waste. Adequate segregated collection bins should be strategically placed at indoor and outdoor locations of the campus structures where waste generation can be expected. The design of the drainage system also should include the access points where it can be cleaned. The experience from the entrance road reveals that drainage system should have some access

points when extreme rainfall events occur, or waste dumping block the entire drainage system so that cleaning can be done when needed.

d. Site enhancement

210. **Impacts.** The proposed NATI is located at the back of the NPI academic building. The proposed site for construction is a barren land which is already raised, and sand filled. The site has a very poor drainage system, (Figure VI-7 Images of the current drainage system at the proposed NATI site. Photo: TA consultants

211.). Hence the site will need a fully functioning drainage system integrated with the rest of the NPI. As a whole, the plinth height of the entire NPI site needs to be raised above flood level, which is almost a meter according to the local teachers and students estimate.

212. **Enhancement.** A rise of about a meter of plinth height along with installment of a drainage system will be necessary to keep the site flood free. Since an integrated drainage system is nonexistent in the entire area (within 5km buffer zone), currently this will be the only sustainable solution.



Figure VI-10 Images of the current drainage system at the proposed NATI site. Photo: TA consultants

3. Procurement related impacts

a. Contractor selection

213. **Impacts:** The success or failure of environmental mitigation in infrastructure development hinges to a significant degree on the primary Contractor's sense of environmental responsibility and commitment to compliance with prescribed safeguards measures. If Contractors with a poor track record of compliance are hired, it is more likely that environmental impacts that can be easily prevented or minimized will become more serious than they reasonably should. It is expected that the investments at the NATI and NPI will be implemented through a contract, so the choice of primary Contractor is doubly critical.

214. Upon award of the contract, the Contractor will be required to prepare a detailed Contractor Environmental Management Plan (CEMP) to demonstrate how it will meet its obligations under the EMP in relation to the investment site at the NATI. The plan will be reviewed

and approved by the construction supervision consultant (CSC) and the safeguards oversight unit (SOU) within the PIU; this review process is a critical opportunity to ensure that the selected Contractor understands and is committed to full implementation of its safeguards' responsibilities. A sample outline of a CEMP is provided in Appendix 11.

215. **Mitigation:** Only Contractors with a demonstrated commitment to safeguards implementation - as can be confirmed by previous construction supervision consultants and monitoring reports from past projects - should be hired. Bidding documents should stress safeguards requirements, and the documentation provided by bidding firms should be carefully scrutinized, including by following up on references to recent works completed. All Contractors and sub-Contractors must be registered with the Ministry of Labor and Employment.

216. Contractor candidates should be required to provide details of the age and fuel efficiency of their equipment and vehicle fleets in bids, and this information should be scrutinized and weighed in the selection process as a means of helping to limit the greenhouse gas generation potential of the investments. Construction contracts should require the primary Contractor and all of its sub-Contractors to use only modern, fuel-efficient machinery, and the employer (most likely the PIU) should have the reserved right to require removal and replacement of machinery it deems unacceptable in this regard at any time during the construction phase.

b. Labour sourcing

217. **Impacts:** Procurement of labor has two main potential impacts, which can be either positive or negative, depending on where most workers come from. First, use of mostly or exclusively non-local labor means that a construction camp will be needed, and this has significant potential for environmental and social impacts, including water pollution of local surface waters with untreated sewage and grey water; social discord due to worker behavior off-site, cultural misunderstanding and resentment about jobs going to outsiders; spread of communicable diseases including sexually transmitted ones; and occupational health and safety risks due to contractor failure to provide decent facilities. Hiring all local workers, by contrast, may mean that the need for a construction camp is eliminated.

218. Second, hiring mostly non-local workers is a missed opportunity for the project to bring benefits to the local community. The people who live in nearby areas will bear the brunt of any negative impacts that arise during the construction and operation phases, and employment opportunities will go some way in compensating for inconveniences and discomforts experienced. When all the jobs go to workers from other regions, wages do not stay in the local community. It is not uncommon in Bangladesh for progress on project works to be frustrated by deliberate actions of local factions angered by the use of non-local labor.

219. **Mitigation and enhancement:** In order to minimize and prevent construction camp impacts and maximize the project's benefits to the local community, the primary Contractor and all of its sub-Contractors should be contractually required to hire mostly or exclusively local residents for construction jobs. This should be stipulated in the bidding documents and contracts.

c. Material sourcing

220. **Impacts:** Generally speaking, materials that come from afar - especially very heavy materials - will have more significant environmental impacts associated with them, because of the extra energy used in transport. Transport often accounts for the greatest proportion of GHG emissions embedded in earthworks. Materials sourced from suppliers who obtain their wares by

illegal and unsustainable means, such as hill-cutting, coercive farmland mining or riverbed mining (all notable problems in Bangladesh) effectively expand the environmental footprint of the infrastructure that is built with them.

221. **Mitigation:** Contractors should be required to prioritize proximity in sourcing materials such as gravel, sand and cement, provided that proximate sources are also not illegally or unsustainably obtained. The supplier is required under national law to furnish a Certificate of No Objection from the District Commissioner or Local Upazila Nirbahi Officer (UNO); Contractors should be contractually prohibited from purchasing materials from any supplier who is unable to show such a certificate and should be required to secure copies of the certificate for inspection by the construction supervision consultant.

C. Findings of Impact Assessment: Construction phase

1. Biophysical impacts

a. Water quality

222. **Impacts:** The proposed NATI site is located in lowland areas where drainage is inadequate. The surface water quality is liable to deteriorate if the effluents from the Project's offices, housing facilities and labour camp are improperly disposed of directly into nearby water bodies. Another cause of water quality deterioration may occur due to dredging/excavation activities for sand filling and drain construction. Dredging/excavation itself and the discharge of effluent from the hydraulic fill areas will cause an increase in the suspended sediment load of the stream and increase turbidity, posing a potential threat to aquatic organisms downstream. Increased turbidity in water reduces light penetration, thereby interfering with the photosynthetic process. Excavation disturbs the thin layer of oxidized sediments at the stream bottom; it will expose and disturb the deeper non oxidized layers. The removal of the un-oxidized material may result in high values for chemical and biological oxygen demand in the surrounding waters.

223. Construction activity involving excavation and earthworks inevitably exposes loose soil to the elements. If soils and stockpiles of erodible materials are inadequately protected from rain and surface runoff, sediment will make its way to local surface waters, and the result will be siltation and sedimentation. These processes will degrade the quality of local waters as habitat for aquatic species, and also lead to clogging of channels and culverts with sediment. In general, the site and its surroundings of 500m do contain several open water bodies, but the area contains a non-existing drainage network. Therefore, if the worksite is not properly controlled, processing water from concrete mixing and pouring can also carry large amounts of fine silt to local drainage system, especially where the paved drains are leading. The proposed construction of the NATI is likely to contaminate the stream water which is discharging into the nearby lowland of the road near the entrance.

224. During construction, both surface water and groundwater are at risk of contamination with noxious fluids used in the construction process, including fuels, lubricants, hydraulic fluid and coolants, as well as paints and solvents. Spills and leaks soak into the soil and make their way to the groundwater table. Construction camps are a common source of surface water contamination, as toilet facilities are typically rudimentary and likely to leak raw or virtually untreated effluent. This may significantly exacerbate existing surface water quality problems.

225. **Mitigation:** Siltation and sedimentation of watercourses and drainage systems can be largely prevented by careful application of erosion control measures. These include:

- (i) Protecting disturbed soil from rain by keeping exposed areas covered with mulches, fiber mats and other temporary coverings;
- (ii) Keeping all stockpiles of erodible materials covered with tarpaulins whenever they are not in active use;
- (iii) Arranging construction site drainage so surface runoff is directed away from exposed soils and materials stockpiles;
- (iv) Installing and regularly maintaining sediment traps in site runoff channels; and
- (v) Promptly establishing protective vegetative cover on soil surfaces (especially sloped ones) in locations where construction activity has been completed.

226. Contamination of surface waters and groundwater can be avoided by good construction site management, including implementation of such measures as:

- (i) Storing fuels and other noxious fluids within roofed, rain-exclusive containment structures with capacity at least 110% of the volume of the largest container stored;
- (ii) Strictly requiring use of drip mats during refueling and equipment repairs and servicing;
- (iii) Maintaining a regimen of systematic daily checks of all motorized equipment and tanks to detect leaks, so they can be promptly repaired; and
- (iv) Training all workers involved in refueling, equipment servicing and moving containers on proper spill prevention and response.

227. An Emergency Response Plan encompassing spill response should be a required element of the Contractor Environmental Management Plan (CEMP). Appropriate contents of an Emergency Response Plan are listed on the sample outline of a CEMP provided in Appendix 9.

228. Surface water pollution from construction camps can be effectively controlled by requiring the responsible Contractor to install appropriately sized septic systems to accommodate effluent from all on-site toilets, and to maintain them properly. This should be one set of specifications in a broader Construction Camp Management Plan, which the primary Contractor should be contractually required to produce. The primary Contractor should be held responsible for ensuring the plan is effectively implemented, even if the camp is occupied exclusively by workers hired by one or more sub-contractors. A sample outline of a Construction Camp Management Plan is provided in Appendix 11.

229. Runoff from active construction sites should be of sufficient quality to prevent violation of minimum water quality standards in the receiving water body, as specified in the Environment Conservation Rules, 2023.

b. Air quality

230. **Impacts:** In any construction site, dust generation is inevitable. Since the location is set in a busy urban premises with lots of pedestrian movement, generation of dust might create havoc. Additionally, a few other constructions are ongoing near the site. This means, during construction when sand and cement are brought in for mixing, dust generation can be elevated.

231. Again, emissions from construction equipment and haul trucks are sometimes a significant issue at urban construction sites, where there are many human receptors living and working in proximity to large scale active works. The proposed NATI site is located in the industrial zone

characterized by relatively moderate traffic, hence air quality in and around the proposed site is relatively better.

232. **Mitigation:** Dust is easily minimized by implementation of a regular routine of light spraying with water. All dust-generating surfaces, including those on the construction site and the haul road for at least 200 m from the site, should be treated as frequently as is needed to avoid dust reaching nuisance levels. Structures undergoing demolition should also be misted throughout the process. All stockpiles of sand and soil should be kept tightly covered with tarpaulins whenever they are not in active use. All haul trucks should be equipped with tightly fitted tarpaulins to prevent releases of dust from dry materials during transport. Ambient air quality at the perimeters of the two construction sites should meet the standard indicated in Air Pollution (control) Rules 2022.

233. Although emissions impacts are expected to be negligible, all motorized construction equipment and all haul trucks should, as a later of good practice, be maintained to a high standard, most particularly their fuel and exhaust systems. Emissions from motorized machinery used in construction should meet the standard indicated in Air Pollution (control) Rules 2022.

c. Soil quality

234. **Impacts:** The chief threat to soil during construction is erosion, especially during extreme rainfall events and flash floods. Valuable topsoil may be lost to nearby surface water bodies if not properly protected from rain and overland flow. The site in NATI and NPI is flat in nature and only half a meter higher than the adjacent land, so the risk of erosion is low. Also, the location is sand filled used for waste dumping in most of the area. This might have already deteriorated the quality of soil.

235. **Mitigation:** As discussed above in relation to water quality, soil erosion can be greatly minimized by ensuring that areas of soil not protected by vegetation should be kept covered with mulches, fiber mats and other protective coverings like semi-permeable fabrics. Exposed soil should be promptly revegetated as soon as works are completed in each area of the site.

d. Flora and fauna

236. **Impacts.** The effects of construction work on species of conservation concern - and on local wildlife and habitats in general - will be negligible, provided that the location is in an industrial setting, devoid of any vegetation nearby. Soil is effectively kept out of site runoff and construction activity is kept away from water bodies. Therefore, as described in the baseline section, the sites are located in urban areas which are devoid of flora and fauna nearby. Therefore, no impact is envisaged.

237. **Mitigation.** No special mitigation is needed to address potential wildlife impacts.

238. **Enhancement.** Tree plantation, especially fruit bearing native trees, are suggested around the NATI. Trees are to be planted so that their root expansion does not cause damage to the building of plaza area. The trees will help is carbon sequestration, provide necessary shade during summer, as well as play an important role in campus aesthetics.

2. Socioeconomic impacts

a. Traffic Congestion

239. **Impacts.** The site is characterized by industries and high traffic volume. The proposed site adjunct to nearby Police Plaza project road. Given the main road's traffic volume, it is expected that during peak construction time when heavy vehicles and machineries will be transported at full scale, the extra traffic movement will disrupt the normal traffic at a moderate significance. The traffic plan needs to be devised before construction goes onboard.

240. **Mitigation.** A traffic management plan (TMP) must be devised prior to construction and approved by the environmental specialist from SDCMU and approved from local zilla parishad/police station. A sample TMP has been attached with this IEE as Appendix 4.

b. Noise and vibration

241. **Impacts.** As noted in the baseline section of this report, the proposed site is located in the urban industrial Zone, by the side of semi-busy roads. Therefore, the site is not exposed to high pitch noise. Noise and vibration from construction activity can be a serious nuisance for people living near active construction site, the potential for impacts is quite high due to high population density, and there are in fact residences in close proximity to some parts of the development site. Depending on the particular configuration of the site, construction activity may end up being carried out close to these buildings. People living in nearby structures will experience some measure of nuisance during busy construction periods, particularly if any pile-driving is carried out, or if construction activity is conducted at night. People living along the roads, that will inevitably be used to bring bulk materials to the building sites, may notice an increase in noise from haul trucks and construction activities such as mixing, hammering etc.

242. **Mitigation.** To minimize noise and vibration impacts for residents living within earshot of the vicinity of construction site, construction activity should be strictly limited to daylight hours. To avoid adding to the traffic noise for roadside residents, all haul trucks must be kept in good repair, and fitted with functional mufflers. Proper maintenance of machinery and trucks shall be done not to cause extra vibration. Emissions of noise from the project construction sites should not be of a level sufficient to cause an exceedance of maximum ambient noise levels as specified in the Noise Pollution Control Rules 2006. Emissions from individual pieces of machinery and vehicles used in construction should not be allowed to exceed the maximum acceptable levels indicated in Noise Pollution Control Rules 2006.

c. Occupational health and safety

243. **Impacts:** Construction activity and construction sites carry inherent risks for workers. These risks include falls, contact with moving machinery, flying and falling objects, dust, burns, cuts, exposure to intense light from arc welding, electric shock and electrocution, and crushing from collapsing earth walls, amongst other things. Where construction is conducted in public rights-of-way, there are also dangers associated with vehicles moving past the work site.

244. The ongoing COVID-19 pandemic has heightened concern about workplaces as transmission points for viral illnesses. Although much construction work is conducted in the open air and thus can be considered relatively low risk, this is not always the case, especially as the construction process advances and doors and windows are installed. Whether it is COVID-19 or the next serious viral threat to come along, construction sites are potential trouble spots.

245. Construction camps are problematic in terms of occupational health and safety because Contractors tend to invest as little as possible in their construction, operation and upkeep, partly on the assumption that camps are by nature temporary, and also based on a characterization of construction workers as rough people accustomed to rough living conditions. This lack of investment in camps usually results in crowded and unsanitary living conditions, inadequate toilets and washing facilities, low-quality water supplied for drinking, cooking and bathing, and various dangers such as single exit sleeping sheds, lack of fire extinguishers, and exposed wires. The health risks for residents of construction camps are heightened dramatically when viral illnesses are circulating in the general population, as has been the case in 2020/2021 with COVID-19. In Bangladesh, it is not uncommon for construction workers to sleep in rows in poorly ventilated sheds, with less than 1 m between them and less than 2 m² space per person overall; workers also often gather to eat in the same sheds, for lack of dedicated mess halls or other eating space.

246. **Mitigation.** Risks to worker safety on the job site can be successfully minimized through proper worker training, and by strict use of task-appropriate personal protective equipment (PPE). All workers and site supervisors should be provided workplace safety training prior to the start of construction, and at regular intervals thereafter. Training should be repeated whenever new crews are brought on to the site, and whenever monitoring by the primary Contractor or construction supervision consultant reveals declining standards of practice on the site. The primary Contractor should ensure that all workers are provided with adequate PPE suited to any task they may be given, and also strictly enforce its use at all times.

247. In order to limit the spread of COVID-19 or other future viral threats on the project construction sites, preventive measures must become standard practice. All workers must undergo temperature checks at least once per day. Suitable face masks must be supplied to all workers and replaced daily; use of masks should be required at all times except when using other types of masks required for particular work activities, or when eating, bathing and sleeping. Hand washing and sanitizing stations should be positioned at any site location where workers may eat or drink, including at canteens, camp kitchens and eating spaces, and also near toilets. Data on temperature checks, mask provision and re-stocking of sanitizing soaps and sprays should be collected by the Contractor and reported in monthly compliance reporting to the supervision consultant.

248. Risks to workers from poor conditions in construction camps can be greatly minimized by full implementation of a site-specific Construction Camp Management Plan for each camp that will be established. The Construction Camp Management Plan will be appended to the CEMP. The Construction Camp Management Plan should specify, at minimum,

- (i) dormitories with good cross-ventilation at least 4 m² living space per person;
- (ii) two or more working exits and at least one high-capacity fire extinguisher maintained in good working order for all residential structures;
- (iii) indoor eating space separate from sleeping areas;
- (iv) kitchens with off-floor food storage, raised working surfaces of a material that can be easily sanitized, and a ready supply of clean water;
- (v) toilet facilities with at least one functional toilet (protected from the elements and affording full visual privacy to the user) per ten resident workers, with a ready water source for washing;
- (vi) roofed and partitioned wash-up areas with floors and proper drainage;
- (vii) physical separation between sleeping spaces on the one hand, and kitchens and storerooms on the other;

- (viii) wiring that meets the requirements of the Bangladesh National Building Code; and
- (ix) provision of unlimited drinking water that meets the standards indicated in the Environment Conservation Rules, 2023.

d. Public health and safety

249. **Impacts.** Public safety risks associated with construction activity are primarily related to proximity; works carried out in densely populated localities offer many more opportunities for members of the public to come into contact with heavy machinery, fall into holes, and get injured by unstable stockpiles of materials. All the sites will offer heightened risk in this regard, given the high density of residents nearby. During heavy hauling periods, safety risks may be slightly elevated for people using the two road corridors serving sites, although construction traffic will represent a small incremental increase relative to the steady flow of trucks heading to and from the outer NPI area, especially Police Plaza area.

250. Public safety - especially the safety of women and girls - can also be threatened by operation of construction camps in proximity to local settlements, especially when camps house many non-local workers who may feel unencumbered by the norms and mores of their faraway home communities. Camps may become a locus for prostitution, and the violence that often accompanies it. Sometimes, local resentment over the hiring of non-local workers, perhaps exacerbated by cultural misunderstanding or racial and religious animus, can lead to violent conflict between resident workers and local people.

251. Public health is most often affected by construction activity when dust levels are very high for long periods, and also when poorly managed construction camps are situated near existing settlements. Especially when camps house large numbers of workers from other regions, their presence near communities may lead to elevated incidence and spread of communicable diseases, particularly sexually transmitted ones, in the local population. This is especially true if the camp is allowed to become a hub for prostitution.

252. **Mitigation.** The construction sites must be adequately fenced, and security should be provided at all times to keep curious people from entering. The construction site at the NPI and NATI site should be planned in such a way that protected means of access are provided for users and staff of the existing facilities even as new ones are under construction. A low-speed limit should be imposed on haul trucks.

253. The best means of limiting construction camp-related public safety impacts is to avoid the need for camps at all, by hiring only local workers; given the high local unemployment rate and workforce accustomed to heavy work in the stone-crushing works around the area, it seems likely it will be feasible to hire mostly local workers. If a camp must be established, resident workers should be given awareness training, and subject to strict controls on off-site travel and behavior. The Contractor responsible for the camp should work proactively with local community leaders - including female leaders - to monitor interaction between the resident worker population and the local public, and promptly address emerging problems such as prostitution and bad worker behavior off-site. These measures should be included in the Construction Camp Management Plan, which will be appended to the CEMP (see Appendix 9).

254. Elevated dust levels can be effectively mitigated with regular light spraying of dust-generating surfaces with water, as noted above in relation to air quality impacts. Again, it should be emphasized that impacts from construction camps can be most effectively prevented by hiring only local workers. If this is not feasible, the Contractor in charge of the camp should provide

regular sexually transmitted disease awareness training, and also work with local community leaders to proactively curb development of prostitution at and around the camp. These and other measures for managing construction camp impacts should be specified in the Construction Camp Management Plan, appended to the CEMP.

e. Livelihoods

255. **Impacts.** Construction activity typically affects livelihoods in a few ways. On the negative side, poor management of the construction site can lead to property damage in adjacent areas. In particular, crops in nearby areas may get trampled or damaged by operation and parking of machinery without regard to the site boundary, or by materials stockpiles spreading across the property line. Careless management of the construction process can also sometimes impair access to nearby businesses, leading to loss of revenue; this is also not expected to be relevant at either site. In addition to such negative impacts, construction activity can also have a strong positive impact for local communities, especially if all or most workers are hired from amongst the local population. However, the proposed site is within the NPI campus area. Hence no disruption of nearby livelihoods is expected.

256. **Mitigation.** To prevent damage to adjacent properties, all construction site boundaries should be fenced, and no construction-related activity of any kind allowed to damage the fence or overflow onto adjacent land. Workers should be prohibited from crossing the fence for any reason, including lounging and relieving themselves. If the boundary fence is inadvertently breached, the responsible Contractor should immediately remedy the situation and compensate the landowner, even if no formal grievance is filed.

257. **Enhancement.** To maximize the positive impact of the construction process for the local community, the primary Contractor and all sub-Contractors should be contractually obliged to give local workers first priority in hiring. Bringing in crews from other areas should only be permitted once the contractor has demonstrated that the local labor pool cannot supply sufficient numbers of appropriately skilled workers.

3. Waste management related impacts

a. Construction waste

258. **Impacts.** Waste generated during construction will consist mainly of packaging, from both construction materials and food products consumed by workers. The volume of waste produced is likely to be relatively small but can easily get strewn and blown across the landscape and end up in local water bodies, if not appropriately managed.

259. **Mitigation.** Suitable receptacles should be positioned at strategic locations around the work sites to facilitate containment and collection of solid waste. Construction waste should be sorted to segregate recyclables, and regular pickup of these by a local recycling business should be arranged. Non-recyclable waste should be transported to the nearest legal landfill site, and never burned, buried or dumped on the site. Waste oil and other noxious fluids and associated used containers should be recycled through a reputable business providing this service. The primary Contractor should be required to specify all waste management arrangements - including the identity of recycling enterprises and legal landfill operators able to accept expected wastes - in a site-specific Waste Management Plan embedded within the CEMP. Appropriate contents of a Waste Management Plan are specified in the sample CEMP outline provided in Appendix 9.

D. Findings of Impact Assessment: Operation phase

1. Socioeconomic impacts

a. Public safety

260. **Impacts.** It is to be hoped that some public safety impacts related to the campus facilities like open drain (without top slab), unsafe cleaning areas inside the drain, lack of gas/odor release vents from drains, large height difference between footpath and road etc. will be addressed during design phase. Yet, damage to the top slab, clogging of gas vents etc. may threaten the pedestrians that are walking by the gate close to road in front of the NPI area near the NATI site.

261. **Mitigation.** Facility operations should be monitored, and any emerging public safety issues should be addressed as needed.

b. Waste management related impacts

262. **Impacts.** Given that the NATI and NPI will be a large students facility along with existence of some laboratories, it is expected that during operation the facility will generate a substantial amount of solid waste. If not managed properly, this solid waste can clog the adjacent drains, and pollute the soil surface.

263. **Mitigation.** The drains need to be monitored on a regular basis. Aware the people using the drainage facilities to not put solid waste into the drains. Relevant rules/laws of municipality should be posed and enforced strictly by the NATI authority.

E. Cumulative Impact Assessment

264. The proposed NPI NATI site is busy premises with industrial and commercial setup, high traffic volume and population density. These activities have already heightened the noise and dust level of the urban areas, which has been discussed in the baseline section of this report. Alongside these activities, the proposed activities by NPI are expected to contribute to noise and dust generation in the sites. However, given all the activities are already ongoing, this effect seems likely to be moderate, and possible to be negotiated if mitigations measures discussed in the earlier sections are taken in a timely manner.

F. Summary of Impact Assessment

265. This section of the IEE analyzes the negative and positive impacts that are likely to arise from development of the NATI and NPI facilities, based on preliminary details of the infrastructure plan and knowledge gathered on the physical, environmental and social characteristics of the site. All potential impacts during the construction phase are considered amenable to substantial mitigation with measures that are both available and feasible. Similarly, many operation-phase impacts can be avoided or greatly minimized by sensible design decisions.

266. Some impacts, such as emissions and noise that will keep increasing through the construction period despite some mitigation will have residual impacts for which mitigation will inevitably be less than fully satisfactory. These residual impacts will be significantly compensated for by positive impacts such as increased employment and business opportunities, as well as enhanced integration in the regional economy after implementation of the project.

267. The greatest concern facing the environment in the vicinity of the proposed site that the density of population, growing structural development and economic activities around the NPI site, since Narshingdi city is growing unplanned as a commercial center. The ever-increasing structural development in the target site are likely to generate solid waste, which without being proper awareness are likely to be dumped in the drainage system as well as to the barren lands where drains are discharging. Such activities are already observed at the proposed site. By posing restriction on solid waste dumping, enforcing laws and regulations and improvement of solid waste management system within the NATI authority, such foreseeable problems can be avoided. However, such improvement in the situation is expected as NATI grows with time.

268. Taking into the account all the foregoing, it is considered that the impacts expected from this component of the Investment Project do not rise to a level of magnitude, severity or complexity that would justify further detailed study and development of novel or specialized mitigation strategies. The investments at this location are appropriately assigned to Category B for the Environment.

G. Summary Impact Matrix

Given the assessed level of impacts for the NPI NATI construction project discussed in the earlier sections, the following Tables give a summary assessment based on the method explained in Table VI-3.

Table VI-3 Summary Impact assessment matrix of NATI at NPI construction project

KEY: +/-: positive/negative impact; D/C/B/A: none/minor/major/severe; Loc/Wid: localized/widespread; Tem/Per: temporary/persistent; Int/con: intermittent/continuous; Dir/Ind: direct/indirect; Iso/Cum: isolated/cumulative. Please refer to Table VI-1 for detail methodology.

Item	Impact		Ratings (when not mitigated)										Discussions		
			Construction phase					Operation phase							
			Magnitude	Spatial extent	Duration	Timing	Nature	Relationship	Magnitude	Spatial extent	Duration	Timing		Nature	Relationship
Pollution	1	Air Quality	B-	Loc	Tem	Con	Dir	Iso	D	-	-	-	-	-	Construction phase: Air quality is already deteriorated in the target site due to heavy traffic and other construction activities. Construction machineries and vehicles will be used during the construction works which will cause the degradation of ambient air quality (dust, SOx, NOx, etc.). It depends on the current road traffic volume, but road blockage will deteriorate the traffic congestion temporarily, which may worsen air quality too. Operation phase: Ambient air quality may improve when construction is done.
	2	Water Quality	B-	Loc	Tem	Con	Dir	Iso	D	-	-	-	-	-	Construction phase: Runoff water from construction site may include suspended materials or contaminants. Domestic wastewater of workers can be discharged without proper treatment. Further, contaminated water can runoff from mixing areas, fuel reserve areas and sewage from construction camps. Operation phase: No water contamination is anticipated.
	3	Soil Quality	C-	Loc	Tem	Con	Dir	Iso	D	-	-	-	-	-	Construction phase: Soil pollution will possibly be caused by leakage of lubricants and fuel oil from construction vehicles and machinery. However, given the magnitude of construction the impacts are assessed minor and manageable by mitigation measures. Operation phase: Drain facilities within the NATI are all paved and they will not likely pollute soil, so that no specific negative impact is anticipated.
	4	Noise and vibration	A-	Loc	Tem	Con	Dir	Cum	C-	Loc	Per	Con	Dir	Cum	Construction phase: Noise and vibration will be increased and their impact level will become significant due to the operation of heavy machinery, trucks and vehicles. Given the target site is beside a urban busy road, the noise pollution is anticipated to be severe. Operation phase: Noise and vibration will be decreased if the subprojects achieve improvement in traffic flow and traffic congestions around the road intersections. However, due to drainage improvement, traffic is expected to be faster with less honking, thus producing less noise but more vibration. Given that the target sites are already urbanized with elevated noise level, the impact, therefore, is anticipated to be minor.
	5	Offensive odors	D	-	-	-	-	-	D	-	-	-	-	-	Construction phase: There is no specific negative impact anticipated as the construction of drainage will not likely generate odors. Operation phase: There is no occurrence of odor from domestic waste anticipated.
	6	Waste	B-	Loc	Tem	Int	Dir	Iso	C-	Loc	Tem	Int	Ind	Cum	Construction phase: Construction wastes will be generated, which will be recycled for backfilling. They remain small-scale. The construction camps are also likely to produce waste, both in the forms of liquid and solid. Since the waste is generated, but is possible to mitigate, the impact is assessed as moderate. Operation phase: There is no specific negative impact anticipated as no waste is generated once the construction is done. Post construction demobilization will also be expected to produce a lot of waste, which if not managed, can create local nuisance. Therefore, the expected impact rating has been put as moderate.

Item	Impact		Ratings (when not mitigated)										Discussions		
			Construction phase						Operation phase						
			Magnitude	Spatial extent	Duration	Timing	Nature	Relationship	Magnitude	Spatial extent	Duration	Timing		Nature	Relationship
Natural Environment	7	Protected Area	D	-	-	-	-	-	D	-	-	-	-	-	There is no any protected area designated by Bangladesh's laws or international treaties and conventions around the subproject sites, so that no specific negative impact is anticipated.
	8	Cultural heritage	D	-	-	-	-	-	D	-	-	-	-	-	There is no cultural heritage within 5km of the proposed sites. So, impact is expected.
	9	Ecosystem	C-	Loc	Tem	Con	Dir	Iso	D	-	-	-	-	-	Construction phase: The subproject site is planned in the developed areas, so that they will not likely cause extensive losses of natural environment. Moreover, the planned developments are along the existing structures. The extension of structures, such as extension of the drainage line or new drainage line are not expected to intrude to any sensitive ecosystem. However, during construction, contaminated water from the construction sites may run though the current drainage channels to the discharge points which may pollute the ecosystem. Thys the impact has been assessed as minor. Operation phase: There is no specific negative impact anticipated.
	10	Surface hydrology	A-	Loc	Tem	Int	Dir	Iso	C-	Loc	Tem	Int	Ind	Cum	Construction phase: Site located adjacent to shallow valley that drains agricultural surface runoff can be quite problematic during rainy season. Drainage congestion can flood the site if not well managed. However, this impact is only prominent during peak rainy season, over the period of June – October.
	11	Topography and Geology	C-	Loc	Tem	Con	Dir	Iso	D	-	-	-	-	-	Construction phase: Soil erosion may occur at the waste soil disposal sites, if proper prevention measures are not taken. However, given the scale of construction, the impact has been assessed as minor. Operation phase: Slope failures or landslides are not expected as the subprojects are planned in the flat area.
Social Environment	12	Land acquisition	D	-	-	-	-	-	D	-	-	-	-	-	Since the NATI will be constructed within its (NPI's) own land no land acquisition is needed
	13	Disturbance to livelihoods	C-	Loc	Tem	Con	Dir	Iso	D	-	-	-	-	-	Construction phase: There are some subprojects which require relocation / setbacks of structures. Their profiles shall be identified in the detailed survey. Operation phase: No major impact is anticipated since no land acquisition or resettlement will likely occur.
	14	Disturbance to Ethnic Minority Groups and Indigenous People	D	-	-	-	-	-	D	-	-	-	-	-	There are no ethnic minorities and indigenous peoples living around the project sites, so that no specific negative impact is anticipated.
	15	Deterioration of Local Economy	C-	Loc	Tem	Con	Dir	Iso	D	Loc	Per	Con	Dir	Cum	Construction phases: Shops might be relocated or shut down during construction period if they are among those structures that require setback or temporary relocation. The degree of impacts is unknown. On the other hand, the project implementation may create local employment and commercial opportunities Operation phase: Once the NATI is constructed, it is likely that the temporary shops are not allowed near the structures. However, it is expected that the temporary shop will resume somewhere near the NATI to attract its large number of workers and service providers.
	16	Land Use and Utilization of Local Resources	C-	Loc	Tem	Con	Dir	Iso	D	Loc	Per	Con	Dir	Cum	Construction phase: During construction the local playground might be blocked for few months during piling operation. Operation phase: Once construction is done, playground will be open with much improved grass plantation (as per deign).

Item	Impact		Ratings (when not mitigated)										Discussions		
			Construction phase					Operation phase							
			Magnitude	Spatial extent	Duration	Timing	Nature	Relationship	Magnitude	Spatial extent	Duration	Timing		Nature	Relationship
	17	Disturbance to Water Usage, Water Rights, etc.	D	-	-	-	-	-	D	-	-	-	-	-	Construction phase: No major impact is anticipated since the subproject does not affect water usage or water rights. Operation phase: No major impact is anticipated as the subprojects are nothing to do with water use.
	18	Disturbance to the Existing Social Infrastructure and Services	B-	Loc	Tem	Con	Dir	Iso	D	-	-	-	-	-	Construction phase: Traffic increase may occur mainly due to road blockages, but it remains temporary and insignificant. Operation phase: During operation, the NATI is not expected to generate a significant traffic volume.
	19	Traffic congestion	B-	Loc	Tem	Con	Dir	Iso	D	-	-	-	-	-	Construction phase: during construction, traffic blockage and havoc are anticipated, especially given that the drain side roads are narrow except of Love Road. The impact is assessed as severe. Operation phase: Once the construction is over, no project related traffic increase is expected.
	20	Misdistribution of Benefits and Losses	D	-	-	-	-	-	D	-	-	-	-	-	No specific impacts to the local communities are anticipated both in construction period and operation period.
	21	Local Conflicts of Interest	D	-	-	-	-	-	D	-	-	-	-	-	No specific impacts to the local communities are anticipated both in construction period and operation period.
	22	Cultural Heritage	D	-	-	-	-	-	D	-	-	-	-	-	Construction phase: The subprojects are planned at the existing sites away from heritage sites so that possibilities that the subprojects damage local archeological, historical, cultural, or religious heritage sites are not anticipated. Operation period: No major impact is anticipated as the projects are away from heritage sites.
	23	Landscape	D	-	-	-	-	-	D	-	-	-	-	-	Almost all subprojects are planned at the existing site so that no specific impact on the surrounding landscape is anticipated.
24	Gender	B-	Loc	Tem	Con	Dir	Iso	D	-	-	-	-	-	Construction phase: Construction camps often seen as a potential disturbance to the local culture. This also affects local men and women, mostly when workers are hired from outside of the locality. Sometimes, uncontrolled workers can introduce local prostitution, conflicts with communities, etc. Since all these potential offenses to local community, especially to women can me manageable by enforcing strict regulation at workers camp, the impact is assessed as moderate. Operation phase: The NATI will facilitate equal opportunity to male-female teachers to access highest level of training and modern equipment.	

Item	Impact		Ratings (when not mitigated)										Discussions		
			Construction phase					Operation phase							
			Magnitude	Spatial extent	Duration	Timing	Nature	Relationship	Magnitude	Spatial extent	Duration	Timing		Nature	Relationship
	25	Children's Rights	D	-	-	-	-	-	D	-	-	-	-	-	Construction phase: No specific impacts are anticipated both in construction period and operation period. Operation phase: None.
	26	Infectious Diseases	B-	Loc	Tem	Int	Dir	Iso	D	-	-	-	-	-	Construction phase: Infectious diseases among construction workers may occur, although the subprojects are small-scale and construction works would take only a short time if proper prevention measures are not taken. Operation phase: No major impact is anticipated.
	27	Work Environment (Including Work Safety)	B-	Loc	Tem	Con	Dir	Iso	C-	Loc	Tem	Int	Ind	Iso	Construction phase: Occupational safety and health may not be well maintained, and accidents may occur through the construction work if 1) Contractors do not abide the law, and 2) no proper prevention measures are taken. Operation phase: Accidents may occur during maintenance work.
Other	28	Accidents	B-	Loc	Tem	Int	Dir	Iso	C-	Loc	Tem	Int	Ind	Iso	Construction phase: Accidents may occur due to the construction work, and traffic accidents may occur due to the increase of traffic volume. Operation phase: Accidents can occur and increase during maintenance work.
	29	Cross-boundary Impact and Climate Change	D	-	-	-	-	-	D	-	-	-	-	-	Deterioration of traffic congestion will increase CO ₂ emission. However, no major impacts are anticipated as subprojects remain small-scale

VII. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

A. Rationale and Requirements for Disclosure and Consultation

269. It is considered necessary and useful for the interests and concerns of the people and institutions who will be affected by infrastructure projects (stakeholders) to be taken into account in planning and design from the earliest stages. Effective communication between the proponents of a project and the people whose lives will be affected by it (i) helps to ensure that positive impacts of the infrastructure are maximized while negative ones are prevented or minimized; (ii) honors basic democratic principles; and (iii) aids in forestalling development of social and political conflict surrounding allocation of public resources.

270. Consultation and information disclosure require that stakeholders of all kinds both have an opportunity to learn about infrastructure proposals and are given an effective means of providing their knowledge and voicing their concerns as inputs to project planning and implementation. The SPS mandates timely disclosure of project information and consultation with people and institutions that stand to be affected by their implementation throughout the project cycle.

271. **Disclosure.** The SPS requires that project information is made publicly available at key stages of project development and implementation. At a minimum, basic details of the project rationale, objectives, preliminary infrastructure proposals and operation-phase activity need to be disseminated as part of consultations during the project preparatory phase, and the IEE needs to be disclosed on ADB's website.

272. **Consultation.** The SPS mandates that consultations should be carried out, at a depth commensurate with the significance of the expected impacts of the infrastructure, as an integral part of the environmental and social assessment process. The particular form that consultation may take is appropriately tailored to the cultural and social context, as well as the types of infrastructure and project activities that are proposed. Consultations often involve some combination of interviews with key informants, public meetings, and focus group discussions.

B. Stakeholder Identification

273. Given the nature of the project that the NATI is going to be constructed within the existing campus areas, the stakeholders identified for the proposed infrastructure development include officials from Finance Ministry and relevant polytechnic teachers and students whose lives may be affected—positively or negatively—by implementation of the investments. Project stakeholders were initially identified on a theoretical level through a series of scoping discussions amongst the multi-disciplinary Technical Assistance study team, encompassing such matters as physical proximity, land use, resource flows, traffic composition, local employment, and business. The understanding of stakeholder groups was further refined in cooperation with the locally stationed polytechnic Principals who understand the project very well and are aware of the local socio-economic and environmental setting.

C. Stakeholder consultation history

1. Consultation with officials of the Finance Department, MoF

274. Consultations with the Finance Department, Ministry of Finance took place in November 2022 at SDCMU established under SEIP. The Project Director (PD) of SEIP who is in charge of SICIP, officials from Finance Department relevant to the project and ADB project team attended the meeting and discussed various aspects of the proposed NATI and possible safeguards system. Discussions on possible 'green building' components and locations of establishment of the NATI within the NPI campus were held.

2. Consultation with the NPI teachers and students

275. During the time of field visit to NATI (March 2024) the technical assistance team sat with the teachers and talked to students informally. Discussion took place in various places on the NPI campus. The discussions took place on various educational issues, as well as campus environment issues.



Figure VII-1 Consultation at NPI in March 2024. Photo: TA consultants

D. Outcomes of stakeholder consultation

276. **Meetings with Finance department and NPI officials.** The technical assistance (TA) team met the MoF and NPI several times during project preparation. Apart from the possibilities and process of implementation of the whole project, the points of discussions also included the need assessment of construction of NPI facilities with the polytechnic campuses. The technical assessment team was comprised of an architect, TVET specialist, economist, environment specialist, gender specialist, social specialist and an education reform and implementation expert. Hence the discussions took on many dimensions. This IEE extracted the construction/repair/improvement related activities and environmental concerns from all the discussions. The summary of the discussions is presented in the following Table.

Table VII-1 Summary of the point of discussions with NPI teachers and students

Environment-related questions	Summary of salient points of discussion
Is there any environmental problem within the campus or nearby the campus?	Generally, the NPI campus is not flood prone, but due to unplanned development around, highwater drainage has been very slow in recent years. The flood water can come from the north and recede towards the south. The in-campus drain sometime overflow during heavy rains and floods the whole campus.
Our natural surroundings (air, water, trees and other plant life, land, open space) generally affect the quality of our lives, including our ability to make a living. How do you feel about the current quality of the local environment?	Within the NPI campus, the campus has some vegetation, although not so thick. The campus is not that noisy.
Are you aware of any problems having to do with natural resources (air, water, farmland, trees, animals, open space) in this area?	We have a filtering system installed at the campus. The drinking water quality does not meet the health standard, although salinity is not yet an issue in the area. The main problem with potable water is the presence of iron.
Thinking about the construction work that may happen here under the project (list infrastructure that may be built at this campus), how do you think this will affect the quality of the local environment, or your quality of life?	The area is currently barren. The entire campus is on low land. The NATI will not only enhance our education system, but also enhance the campus quality with raised land, proper drainage system, restored waterbodies etc.
Traffic may increase as a result of this project, once construction has been completed. How do you think this will affect the local environment, or the quality of life in the community?	The main road is already busy with vehicles and pedestrians. There are also some construction works nearby. Hence the traffic is already elevated. Anyway, we think during construction work, we need to adopt proper precautions.
What additional considerations can be taken to enhance the quality of NATI and the campus?	- Installing a higher capacity water filtering system, since higher number of students are expected - Installing drainage system and raising overall plinth of the NPI

E. Future Stakeholder Engagement and disclosure

277. **Disclosure.** Once the IEE has been approved, ADB will, in accordance with its Public Information Policy, disclose the document on its website, from where it can be accessed and downloaded by any interested person at no cost. This should be repeated in the event that significant site or design changes require the formal updating of the IEE and EMP. As the approved project's implementation proceeds, details of key implementation stages—most notably the start of construction—should be publicly disclosed in advance by the proponent. Monitoring reports submitted by the proponent on a twice-yearly basis to ADB will be disclosed on the ADB website.

278. **Consultations.** The SPS indicates that consultation should be understood as an ongoing and iterative process that takes place throughout the project cycle. Consultations are considered especially necessary and appropriate at key inflection points after the project preparatory phase, including (i) following any major design changes, up-scaling or site changes introduced during the detailed design phase, especially ones that may change the nature, scale or severity of potential environmental and social impacts; (ii) prior to the start of construction, with a special focus on safety and quality of life impacts during the construction phase; (iii) prior to the start of facility operations; and (iv) following any significant emergency or accident involving construction sites. Additional rounds of consultations in all of the contexts mentioned above should be organized

and conducted by NPI, with the support and guidance of the Safeguards Oversight Unit (SOU) within the Project Implementation Unit (PMU).

279. As pointed out by the teachers during discussions, local residents are close by the proposed site and there is a gate beside the residential area which can be used by the NATI users. But to be able to use the gate, a high priority should be placed on engaging a local stakeholder who are currently using the area and project-affected people in the next rounds of stakeholder engagement. Depending on the public health circumstances surrounding the next rounds, this could fruitfully incorporate both (i) larger-format events to capture the participation of people from more sectors (e.g., truck drivers, residents, laborers, local traders etc.); and (ii) targeted outreach tools (e.g., community walks, door-to-door surveys, in-community focus group discussions).

280. The EAs/IAs will send a written endorsement to ADB for disclosing these documents on the ADB website. The PIU 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, 2011³⁶.

³⁶ <https://www.adb.org/sites/default/files/institutional-document/32904/files/pcp-2011.pdf>

VIII. GRIEVANCE REDRESS MECHANISM

A. Grievance Redress Mechanism

281. The objective of 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:

282. **First level of GRM:** The first level and most accessible and immediate contact for the fastest resolve of grievances are the Contractors, with assistance from Design Supervision Consultants (DSC) on site. Prior to construction of any works, the 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 DSC can immediately resolve the complaint on site. The Contractor's and DSC'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 work can contact the project to file a complaint. The Contractor may seek the assistance of the DSC safeguards specialists (the environmental specialist or social safeguards specialist) to resolve the issue. The DSC 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.

283. **Second level of GRM:** Should the grievance remain unresolved; the Contractor with assistance from DSC will forward the complaint to the PIU safeguards focal person. The person filing the grievance will be notified by DSC 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 the complaint was received; (iii) nature of complaint; (iv) location and (v) how the complaint was resolved.

284. **Third level of GRM:** 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, DSC, and affected persons. The GRC will consist of TMED/IA representative as chairperson, 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 TMED/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.

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

286. 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). ADB's Accountability Mechanism, including information on how to file a complaint, will also be explained to affected households.

287. The grievance redress mechanism and procedure are depicted in Figure VIII-1
Grievance Redress Mechanism (GRM) adopted for SICIP

288. .

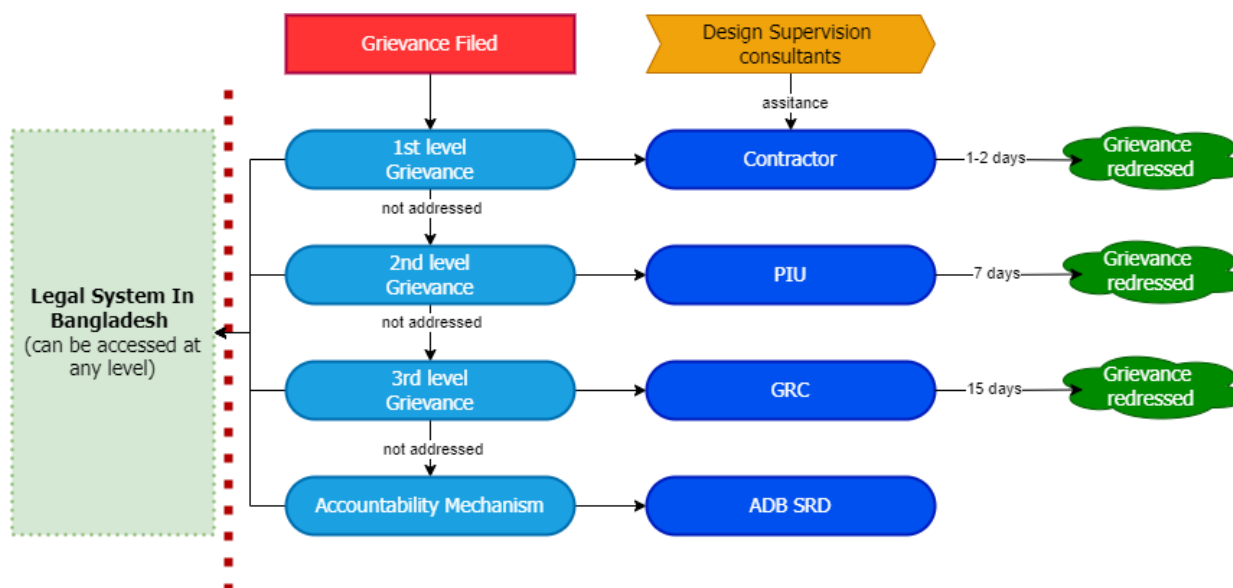


Figure VIII-1 Grievance Redress Mechanism (GRM) adopted for SICIP

289. **Access to Country's legal system.** An aggrieved person shall have access to the country's legal system at any stage, and accessing the country's legal system can run parallel to accessing the GRM and is not dependent on the negative outcome of the GRM.

B. Administration of Grievance Redress Mechanism

290. The SOU shall be responsible for making the public aware of the GRM in all project locations, explaining how it works and how to use it, and maintaining its accessibility and operability for the full duration of the construction phase and the defects period. Public awareness campaigns should be carried out at the local level in advance of the start of civil works. Contact information, including for written, telephone and in-person filing of grievances, shall be firmly established at the GRM's inception, and kept up to date and publicly available through the end of the defects period.

291. Records of grievances received, corrective actions taken, and their outcomes will be properly maintained by the SOU in a central grievance redress database. Grievances and resolutions will be included in the EAs' quarterly progress reports and the semi-annual environmental monitoring reports submitted to ADB. Any fatal accidents involving the project's implementation or project sites should be reported to the GRC and ADB immediately. The costs of operating the GRM will be very modest, and will be covered by the operating budget of the SOU.

C. Grievance Redress Mechanism for Workers

292. An additional mechanism shall be set up by the SOU to accept and address complaints from workers employed in the construction works, concerning working conditions, living conditions in construction camps, safety and health issues, labor rights violations, mistreatment, or any other matter. All laborers, skilled workers, and site engineers employed on site by the primary Contractor or by any of its sub-Contractors shall have access to the mechanism. All workers will receive an orientation to the workers' GRM during pre-construction induction training. Workers will be able to lodge grievances with on-site personnel of the CSC, who will record the complainant's name, position, employer, and contact information, as well as a description of the complaint and the time, date and place at which the complaint was reported. The CSC will inform the SOU, which will record the grievance in a grievance register. The CSC will convene a meeting of the complainant or complainants, the sub-Contractor involved, the Primary Contractor, and any labor syndicate to which the complainant(s) may belong, in an effort to decide on an appropriate resolution of the complaint. The CSC will work with the relevant Ministry, Environmental Safeguards Focal Person at SDCMU and on-site Environment, Health and Safety Officer to monitor implementation of the proposed resolution and confirm absence of retaliation on the part of the Contractor involved. If the complaint cannot be resolved to the satisfaction of the complainant(s), the CSC will provide the complainant(s) with the necessary contact information to file a complaint with MOLE. The CSC will compile a complete record of the grievance, including measures taken for resolution and follow-up checks by the ESFP and EHSO, as well as any referral to MOLE and subsequent evolution of the case, and provide the record to the SOU for preservation in its grievance register.

IX. ENVIRONMENTAL MANAGEMENT PLAN

A. Objectives of The Environmental Management Plan

293. This environmental management plan (EMP) has been prepared for the ADB supported SICIP in accordance with the ADB SPS (2009). Specific measures are developed in relation to the design, construction and operation of each project component, to address the physical, biological, cultural and socio-economic impacts identified and discussed in the chapter on Anticipated Impacts and Mitigation Measures of the Initial Environment Examination (IEE) report.

294. The EMP for the project defines mitigation and monitoring measures and identifies the institutions, responsibilities and mechanisms that will ensure their implementation. Such institutions and mechanisms will seek to ensure continuous improvement of environmental protection activities during the pre-construction, construction, and operation phases of the project, in order to manage adverse impacts.

295. The EMP's purpose is served by fulfilment of several key objectives:

- (i) To present a comprehensive and systematic list of measures for mitigating and enhancing anticipated environmental and social impacts, as discussed and prescribed in Chapter 6 of the IEE;
- (ii) To define and specify institutional arrangements to support implementation of the prescribed measures;
- (iii) To clearly assign responsibility for implementation of each prescribed measure;
- (iv) To clearly assign responsibility for systematic monitoring of implementation of the prescribed measures and overseeing corrective action as needed;
- (v) To establish a system for regular reporting on EMP implementation;
- (vi) To identify training and capacity-building needed to enable effective implementation of the EMP; and
- (vii) To provide sound estimates of the costs that will have to be budgeted by various entities to enable full and effective implementation of all prescribed measures to address likely impacts.

B. Roles and Responsibilities in EMP Implementation

296. Effective implementation of the EMP relies on inputs from multiple entities, spanning the pre-construction, construction and operation phases of the project. Specific tasks are identified and assigned in the next section of the EMP, but the roles and responsibilities are explained in general terms below, beginning with an outline of the entities that are to be involved.

1. Key Institutional Entities

a. Skills Development Coordination and Management Unit (SDCMU)

297. The Skills Development Coordination and Management Unit (SDCMU)—established under SEIP will act as the Project Management Unit (PMU) for the Ministry of Finance. The SDCMU will host the Safeguards Oversight Unit (SOU) in charge of implementing the EMP. The SDCMU will consist of the Project Director (PD) as overall coordinator, Assistant Project Direction (APD) heading the SOU, an Environmental Specialist, A gender Specialist and a Social Specialist.

b. Project Implementation Unit (PIU) at NPI

298. A PIU will be established at NPI to enable coordinated management of the Investment Project, including implementation of the EMP. The PIU is a vital mechanism for ensuring coordination and cooperation between the SDCMU and the Implementing Partner agencies participating in infrastructure development at each investment location. The PIU will appoint a Project Manager to drive successful implementation of the works, including meeting all safeguards requirements. The PIU can be established under SDCMU.

c. Safeguards Oversight Unit (SOU) at SDCMU

299. A central safeguards implementation function is considered critical to effective implementation of the EMP, including monitoring of compliance with all safeguard's requirements of the ADB and national government at multiple locations, most of which will see infrastructure development activities carried out by the SDCMU at Ministry of Finance (MoF). The central SOU will be established under the SDCMU, and the location specific SOU will be established at NPI. While the central SDCMU should be staffed by at least one senior environmental professional known as the Environmental Safeguards Focal Person (ESFP), the PIU at NPI should be staffed with at least 2 environmental professionals, one for overall coordination at site, one specially dedicated to day-to-days site supervision known as the Environment, Health and Safety Officer (EHSO).

d. Environmental Safeguards Focal Person (ESFP)

300. The SDCMU will have a designated Environmental Safeguards Focal Person (ESFP), whose role will be to oversee the safeguards compliance process for all Investment Project sites under the SDCMU's control, heading the central SOU and liaising with the other SOUs at all investment sites while supported by Environment, Health and Safety Officers (EHSOs) working in the field. The ESFP may appropriately be a Deputy Project Director (DPD) or other senior managers or engineers within the SDCMU and will answer directly to the SDCMU's Project Director (PD). The ESFP will work closely with the SDCMU, DOE and ADB Safeguards team to ensure that safeguards requirements are included and effectively addressed as part of Project implementation at this location.

e. Environment, Health and Safety Officer (EHSO)

301. The PIU at NPI will designate an EHSO, answering to and supporting the ESFP as well as the designated coordinator from the ETEC itself, to oversee EMP implementation at the proposed NATI site. The EHSO may appropriately be assistant engineers with other duties in the case of PIU with only small investments under the Investment Project, but where this is the case, it is critical that adequate time and resource allocations for its EHS responsibilities are firmly established in their job descriptions. In most cases it will be preferable for the EHSO to be a dedicated staff position or consultant. A proposed Terms of Reference (ToR) for the EHSO position is presented in Appendix 17. The EHSO may be appointed to cover more than one location, where this is deemed feasible in view of proximity and the scale of works in each location.

f. Construction Supervision Consultants (CSCs)

302. One or more Construction Supervision Consultants (CSCs) will be engaged by the PMU to monitor, guide and support the work of construction Contractors carrying out the works under

the Investment Project. The CSC(s) will have environmental specialists on staff to assist SDCMU with environmental matters and ensure strong environmental compliance. The CSC should be required to maintain a site office at each investment location, to enable its inspectors and site engineers to maintain a daily presence at each active construction site.

g. Contractors

303. The planned works are to be packaged and tendered as contracts. As the planned infrastructure components are each of relatively limited scale, work at multiple locations may be grouped under single contracts. Primary Contractors will be required to develop a Contractor Environmental Management Plan (CEMP) covering the construction works under their control, including work carried out by their sub-Contractors. Each primary civil works Contractor will designate an EHS Representative, who will oversee the implementation of the CEMP at all sites under the Contractor's control, including regular monitoring of site conditions and effective implementation of prescribed mitigation measures by both the primary Contractor and all sub-Contractors.

h. Department of Environment

304. As a key regulator of industry, the DOE is mandated to review and approve infrastructure proposals based on consideration of possible environmental effects. The agency remains involved throughout a project's life cycle, during which environmental clearances must be annually renewed, with environmental monitoring results being a key reference point in renewal decisions.

i. ADB

305. As the financing institution, ADB will exercise its due diligence and oversight functions, and maintain strong interaction with the PSC, SDCMU and SOU.

2. Responsibilities in EMP Implementation

306. Each of the entities identified above has multiple responsibilities, the fulfilment of which is required for full and effective implementation of the EMP. These responsibilities are detailed in Table IX-1 below.

Table IX-1 EMP implementation responsibilities

Entity	Responsibilities in EMP Implementation
Skills Development Coordination and Management Unit (SDCMU)	• Prepare operations and maintenance procedures for facilities under construction, ensuring their compliance with the EMP • Work with the SOU to train facility personnel on EHS aspects of facility operation in advance of commissioning, to ensure effective EMP implementation during the operation period
Project Implementation Unit (PIU) at NPI	• Ensure that EMP implementation is recognized as a critical element of overall project implementation • Enable and adequately staff SOU • Oversee rigorous review of bids and prioritize selection of Contractors with strong environmental compliance track records • Coordinate with SDCMU as needed to ensure smooth implementation of EMP

Entity	Responsibilities in EMP Implementation
Safeguards Oversight Unit (SOU) under SDCMU	• Ensure EMP provisions are fully reflected in civil works bid documents • Advise and support PIU on Contractor selection and other procurement decisions • Guide and support ESFP and EHSOs to ensure timely and competent execution of site-level oversight activity • Collect and collate progress reports and environmental monitoring reports for each location to assemble comprehensive quarterly monitoring reports for submission to ADB. • Work with CSCs and primary Contractors to develop and deliver periodic EHS training for sub-Contractors and their workers • Work with CSCs to train facility managers or their EHS personnel in advance of commissioning, to ensure effective EMP implementation during the operation period • Administer the GRM • Support PMUs in obtaining environmental clearances and renewals
Environmental Safeguards Focal Person (ESFP) under SDCMU	• Oversee the safeguards compliance process for all Investment Project sites under the PMU's control, liaising with the PIU-appointed Project Manager and with support from SOU and EHSO • Prepare and submit quarterly progress reports for the sites owned by their home agencies to the PIU and SOU • Chair LGRC when needed to address Level 2 grievances regarding project implementation activities
Environmental coordinator/manager at NPI	• Oversee the safeguards compliance process for the investment site at NPI • Liaison with the ESFP for monthly report and day to day update • Supervise the EHSO
Environment, Health and Safety Officer (EHSO)	• Conduct regular monitoring of conditions on site, including compliance with prescribed mitigation strategies, and submit EHS monitoring reports on a monthly basis to the Environmental Coordinator at PIU • Identify worker training needs and support SOU and CSC in development and delivery of training
Construction Supervision Consultants (CSC)	• Review and approve CEMPs and quarterly environmental monitoring reports submitted by Contractors • Guide and assist PMUs, through ESFPs, in monitoring of CEMP implementation and site conditions, including preparation of quarterly progress reports for submission to SOU • Direct and supervise corrective action by Contractors as needed • Collaborate with SOU on development of safeguards training for sub-Contractors and workers
Contractors	• Prepare and implement CEMP for each site, based on EMP prescriptions and international best practices • Conduct quarterly EHS monitoring on all sites under their control and submit quarterly monitoring reports to CSC for review • Implement corrective actions as directed by CSC and/or ESFP
Department of Environment (DOE)	• Review environmental clearance applications, including IEE and EMP • Review annual environmental monitoring reports submitted by SOU during construction phase • Review applications for environmental clearance renewals
ADB	• Review and approve IEE and EMP • Publicly disclose IEE on ADB website • Review quarterly environmental monitoring reports prepared by PMU and publicly disclose them on ADB website

307. The intersecting roles and responsibilities in EMP implementation during the construction phase - including monitoring of implementation - are further illuminated in Figure IX-1 below. During the operation phase, EMP implementation is simplified considerably, as the temporary entities formed or engaged to carry out and oversee the construction process are wound down or move on to other projects, and permanent entities assume responsibility for ensuring that the EMP continues to guide infrastructure operations and maintenance. Responsibilities for EMP implementation in the operation phase are also shown in Figure IX-1.

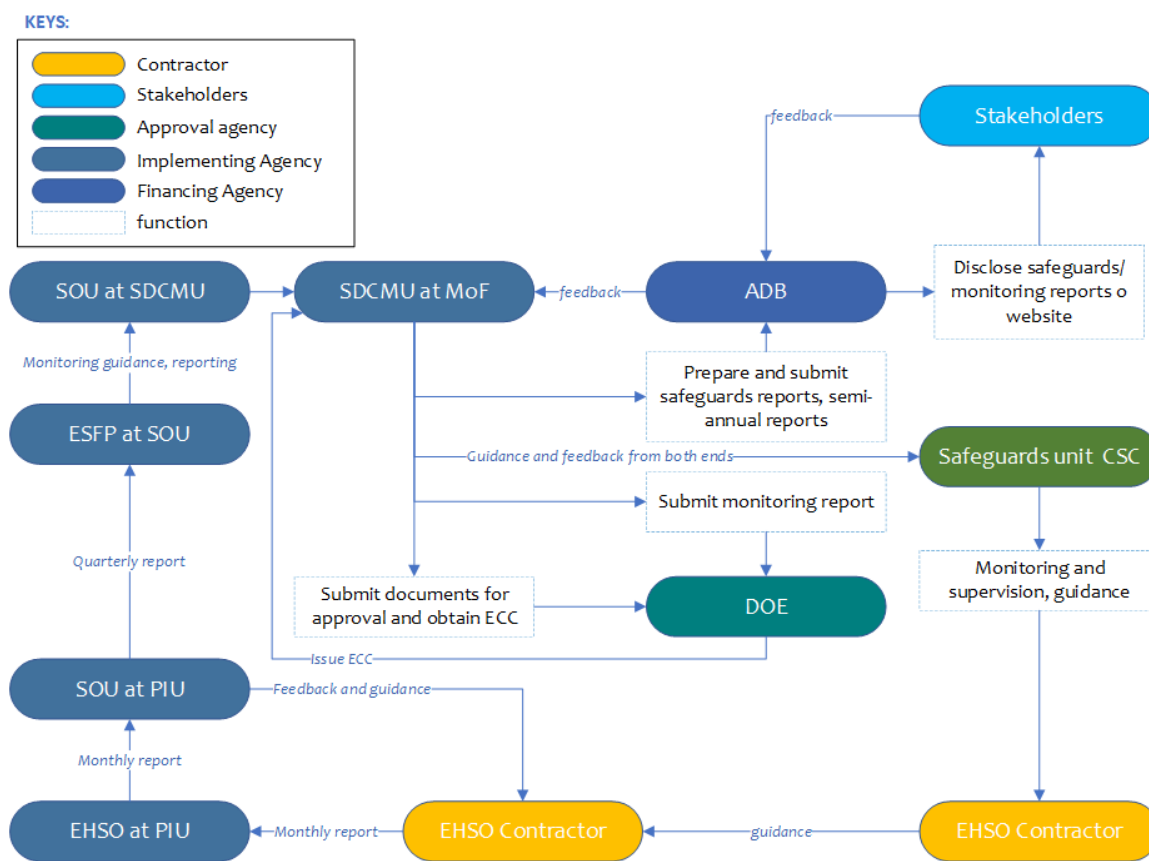


Figure IX-1 EMP implementation responsibilities during construction and operation phase adopted for SICIP

3. Assessment of Project Readiness

308. Before construction, the ESFP will assess the project's readiness in terms of environmental management based on a set of indicators (Table IX-2) and report it to the ADB and the SDCMU. This assessment will verify that environmental commitments are being carried out and environmental management systems are in place before construction starts, or if this is not the case, propose corrective actions to ensure that all requirements are met.

Table IX-2 Indicators of project readiness in relation to environmental management

Indicator	Criteria	Assessment	
DoE approval	DoE approves the IEE and ECC is being obtained	Yes	No
EMP update	The EMP is updated after detailed designs are approved, and approved by ADB and DoE	Yes	No
Compliance with loan covenants	The borrower complies with loan covenants related to project design and environmental management planning	Yes	No
Public involvement effectiveness	- Meaningful consultation completed - GRM established at entry point	Yes	No
Environmental supervision in place	PIU supervision in place	Yes	No
Bidding documents and contracts with environmental safeguards	- Bidding documents and contracts incorporating the environmental activities and safeguards listed as loan assurances - Bidding documents and contracts incorporating the impact mitigation and environmental management provisions of the EMP	Yes	No
Contractor readiness	- Contractor EMPs (CEMPs) have been prepared and approved by PIU and PMU - Environmental, Health and Safety Management Plans (EHSMP) established for construction sites - Environment, Health and Safety Officers appointed - Assessment of potential disruption to utilities services conducted - Stakeholder interviews conducted to confirm issues if services are disrupted	Yes	No
EMP financial support	Required funds have been set aside to support the EMP implementation according to the financial plan	Yes	No

C. Environmental Impacts and Prescribed Mitigation and Enhancement Measures

309. The findings of the environmental impact analysis are presented in Section VI of the IEE report. The potential impacts and corresponding measures that are prescribed in order to mitigate the negative impacts or enhance positive ones are collected in Table IX-3 below. The measures prescribed apply to the pre-construction, construction and operations phases of the infrastructure development at the NPI NATI site. All measures listed in Table IX-3 are requirements, based on the infrastructure plan as proposed at the time of preparation, whose fulfillment is assigned. All measures assigned to Contractors should be reflected in bidding documents, and serve as the basis for the CEMPs, which must be prepared to cover all sites at this investment location.

Table IX-3 Prescribed environmental mitigation and enhancement measures

KEYS: ADB: Asian Development Bank; CSC: Construction Supervision Consultant; Con: Contractor; DOE: Department of Environment; EAs: Executing Agencies; EHSO: Environment, Health and Safety Officer; ESFP: Environmental Safeguards Focal Person; NQC: No Quantifiable Cost; PIU: Project Implementation Unit; SOU: Safeguards Oversight Unit; TMED: Technical and Madrasa Education Division; xzz: Narshingdi Polytechnic Institute, EMP: Environmental Management Plan, EMoP: Environmental Monitoring Plan.

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
A. PRE-CONSTRUCTION PHASE						
(i) IMPLEMENTATION READINESS						
1. IEE and EMP update	Impacts not accounted for due to post-approval modifications in alignment, design or local conditions	- Review IEE and EMP to ensure any post-approval changes are properly accounted for and addressed, by addition of mitigation measures if necessary - EMP copied in the bid document and part of legal contract of the contractor	SDCM U	SDCM U/PIU	- IEE and EMP confirmed still fully applicable - New measures added to EMP if needed to cover any changes in alignment, design or local conditions	NQC (Included in SDCMU budget)
2. Confirmation of NOCs from local agencies and authorities	Project works will not be granted clearances by DOE if NOCs are not obtained from relevant national and local authorities	- Confirm NOC has been obtained from NPI itself - Declare site clearance from NPI itself so that no conflict occurs in future, and DOE has legal documents that the site is owned by NPI	SDCM U	SDCM U/PIU	- NOCs granted by local municipal authorities - Self-declaration of ownership of land by the NPI	NQC (Included in SDCMU budget)
3. Verification of environmental clearances	Project works will not be in compliance with national environmental laws if clearances are not obtained prior to site clearing	- Confirm Site Clearance Certificate (SCC) and Environmental Clearance Certificate (ECC) have been granted, and that any conditions imposed by DOE on approval have been reflected in EMP and EMoP, as well as CEMP as applicable	SDCM U	SDCM U/PIU	- SCC and ECC granted - New measures added to EMP, EMoP and CEMP if needed to meet any condition of approval specified by DOE	NQC (Included in SDCMU budget)
4. CEMP verification	Mitigation will be inadequate if the CEMP is not fully specified	- Review CEMP to ensure all primary Contractor responsibilities are fully reflected, including monitoring and reporting	SDCM U/CSC	SDCM U/PIU	- Any necessary changes requested, and made by Contractor - CEMP confirmed adequate by reviewers	NQC (Included in SDCMU budget and CSC amount)
5. Specialized plans verification	Mitigation will be inadequate if specialized plans have not been	- Confirm that the following specialized plans have been prepared by the Contractor: - site-specific Construction Camp Management Plan(s)	SDCM U/CSC	SDCM U/PIU	- All required specialized plans prepared to adequate standard and approved by relevant	NQC (Included in SDCMU budget and CSC amount)

BAN: Skills for Industry Competitiveness and Innovation Program (SICIP)

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
	formulated to manage key impacts	- site-specific Waste Management Plans (embedded within CEMP) - site-specific Emergency Response Plans (embedded within CEMP) - Compensatory Tree Planting Plan - Construction Traffic Management Plan - Soil Erosion Prevention Plan - Site Reinstatement Plan - Occupational Health and Safety Plan (including COVID-19 measures stipulated by ADB and Government of Bangladesh Guidance for Social and Institutional Containment and Prevention) - Waste Management Plan			authority (as required in some cases)	
6. Grievance Redress Mechanisms	Members of the public and workers require a fair and transparent means of getting resolution to complaints about some aspect of the project's implementation	- Confirm that a central GRM and workers' GRM have been established and publicized	SDCM U/CSC	SDCM U/PIU	- Central GRM established and publicized - Workers' GRM established and explained to workers before the start of construction	NQC (Included in SDCMU budget)
7. EMP training	Without proper EMP implementation training, EMP monitoring might be delayed or hampered	- Confirm that EMP implantation training has been arranged before commencement of construction. - Involve contractor's high officials/management part, EHS specialist, construction project managers and workforce overseer in the EMP training - Quarterly Refreshers training on EMP implementation	SDCM U/CSC	SDCM U/PIU	- The EMP implementation training being conducted before the construction starts - Record of quarterly refresher's training	EMP training included in the EMP as contractor's cost. See Table IX-8. Refresher's training shall be within contractor's cost
(ii) DESIGN						
8. Climate change mitigation	Generation of GHG from construction and operations contributes to global climate change problem	- Integrate GHG-limiting measures into facility designs, including: - substitute other materials for concrete where feasible - use low-carbon concrete as much as possible - maximize use of building materials available locally - integrate photovoltaic generation into the electrical plan - specify only high-efficiency electrical and mechanical equipment - Specify most fuel-efficient backup generator available	CSC Con	MoF, SDCM U-ESFP	- All feasible GHG-reduction design measures incorporated in facility detailed designs - Soft landscaping plan (covering all site areas not occupied by structures, roadways or walkways, and including ample shade trees and dense ground cover) included in detailed site	NQC (included in CSC + Con costs)

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
		- Maximize cross-ventilation by use of courtyards, openable windows and favorable building orientation - Prioritize shade in the landscaping plan, with plentiful wide-crowned shade trees on all parts of site - Incorporate hollow wall structures where feasible - Use overhangs above large windows to prevent excessive sun penetration - Maximize interior natural light by use favorable building orientation and courtyards - Specify water-saving toilets, faucets and showerheads - Design dedicated plumbing system for drinking and cooking water - Aim to meet all water heating needs with solar heaters - Specify high-intensity, full-time lighting only where strictly necessary - Specify solar-powered lighting in outdoor applications - Base landscape plan around drought-tolerant perennial native species - Design site layout and inspection process to minimize the length of time vehicles have their engines running - Incorporate green roofs wherever roof area is not needed for solar panels and solar water heaters - Maximize carbon sequestration potential, micro-climatic cooling and runoff retention by specifying a landscaping plan covering all site areas not occupied by structures, roadways or walkways, including ample shade trees (especially near buildings) and dense ground cover in open areas			design, with plantings specified in Bill of Quantities	
9. Climate change adaptation	Infrastructure use limitations, damage, and environmental hazards due to changing conditions	- Integrate lightning arrester in building design - Design facilities so that critical components (including laboratory, backup generator and fuel tanks) are well above maximum flood level foreseen under climate change projections specified in Climate Risk and Adaptation Assessment (CRA) report and detailed hydrological study - Incorporate temperature-moderating features in NATI facility designs, including: - green roofs where feasible - maximize use of wide-crowned shade trees in site landscaping plans, including around buildings and parking area medians	CSC Con	MoF, SDCM U- ESFP	- All critical facility components above maximum expected flood level - All feasible temperature-moderating features incorporated in facility designs	NQC (included in CSC + Con costs)

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
		- maximize cross-ventilation by use of courtyards, openable windows and favorable building orientation				
10. Flora and fauna	Unnecessary loss of trees during site development	- Incorporate existing trees into site designs to the greatest extent possible, including them in design drawings so they are protected during clearing and construction - When trees must be removed, specify planting of compensatory trees elsewhere on site, including these in drawings and in the Bill of Quantities, in accordance with the approved Compensatory Tree Planting Plan	CSC Con	MoF, SDCM U- ESFP	- Existing trees incorporated in designs to extent possible - Compensatory trees specified in design drawings and Bill of Quantities, in accordance with the approved Compensatory Tree Planting Plan	NQC (included in CSC + Con costs)
11. Groundwater resources	Lack of effective water conservation contributes to local groundwater issues	- Maximize opportunities to limit water consumption and increase groundwater recharge, including adoption of: (i) rain capture on all roofs and use of stored water for non-potable uses in and around facilities (ii) high-efficiency faucets and toilets throughout the facilities (iii) plant species with low water needs in site landscaping plans (iv) stormwater infiltration swales for all runoff from paved and impervious surfaces (objective: zero site runoff)	CSC Con	MoF, SDCM U- ESFP	- All feasible and applicable water conservation measures incorporated in detailed designs for NATI facilities	NQC (included in CSC + Con costs)
12. Surface water quality	Siltation, sedimentation and contamination of water bodies receiving runoff from the NATI	- Slightly raise surface of minerals storage area above level of rest of site to prevent runoff from other site areas from washing through stockpiles - Include sediment traps and porous drainage channels in final drainage design for minerals storage area, to limit discharge of sediments	CSC Con	MoF, SDCM U- ESFP	- Surface of minerals storage area designed to be slightly higher than rest of site - Adequately sized sediment traps and porous drainage channels included in detailed design for minerals storage area	NQC (included in CSC + Con costs)
13. Air quality	Elevated dust in minerals storage area	- Include water supply to minerals storage area, with hose spigots in several locations around the perimeter to enable use of mobile misting apparatus	CSC Con	MoF, SDCM U- ESFP	- Detailed design includes water supply to minerals storage area, with multiple hose spigots spaced around perimeter	NQC (included in CSC + Con costs)
14. Public health and safety	Elevated risk of viral infection in NATI area	- Design internal layout of the NATI building to maximize space between users and prevent the formation of long lines in indoor spaces - Design NATI building ventilation system for maximum feasible turnover of indoor air	CSC Con	MoF, SDCM U- ESFP	- NATI building designed to maximize space between users and prevent formation of long indoor lines - NATI building ventilation system designed for maximum feasible turnover of indoor air	NQC (included in CSC + Con costs)

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
15. Occupational health and safety	Chronic exposure of facility staff to elevated engine emissions	- Design canopies over areas used by vehicles with extra headroom and good cross ventilation or fans to evacuate emissions efficiently	CSC Con	MoF, SDCM U- ESFP	- Canopy designs enable efficient exhaust removal - site check booths designed with remote air intake and positive pressure ventilation	NQC (included in CSC + Con costs)
16. Occupational health and safety	Elevated staff exposure to viral threats	- Design interior layout of the NATI building to maximize space between users and prevent the formation of long lines in indoor spaces - Design NATI building ventilation system for maximum feasible turnover of indoor air	CSC Con	MoF, SDCM U- ESFP	- NATI building internal layout designed to maximize space between users and prevent formation of long indoor lines - NATI building ventilation system designed for maximum feasible turnover of indoor air	NQC (included in CSC + Con costs)
17. Occupational health and safety	Exposure to hazardous releases in laboratory	- Engage qualified laboratory specialist to contribute to design of laboratory and associated structures, as well as preparation of operation protocols including waste management plans, to adhere to international laboratory design standards and best practices	CSC Con	MoF, SDCM U- ESFP	- Suitable laboratory design specialist engaged to ensure design and operations of laboratory adhere to international laboratory design and operation standards and best practice	NQC (included in CSC + Con costs)
18. Waste management	Pollution from inadequately managed wastes	- Anticipate waste streams and incorporate design features to collect, sort and safely dispose of each class of waste - Specify segregated collection bins in strategic indoor and outdoor locations where wastes are generated - Include waste storage and sorting areas in facility designs - Incorporate easy access for waste and recyclables collection vehicles - Designate outdoor space for thermophilic composting of organic waste from kitchens and canteens - Design laboratory for appropriate segregation of hazardous and non-hazardous waste streams	CSC Con	MoF, SDCM U- ESFP	- Facility designs include spaces and features for waste management, including collection, sorting, composting, storage and out-shipment - Laboratory design provides for at-source segregation of hazardous liquid and solid wastes	NQC (included in CSC + Con costs)
(iii) PROCUREMENT						
19. Selection of CSC and Contractor, EMP training	Contractors with low commitment to safeguards compliance limit success of EMP implementation	- Prioritize selection of Contractor with strong compliance track record, as verified by references from previous CSCs - Select only Contractors registered with MOLE - Conduct EMP training with the contractor and implementing staff/officers	SDCM U	MoF	- Selected CSC and Contractor has verified track record of good performance on safeguards compliance - EMP training arranged	NQC (Included in SDCMU costs) EMP training cost is included in the EMP implementation cost

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
20. Labor	Use of non-local labor reduces positive impact of project on local livelihoods and triggers social conflict	- Hire exclusively or mostly local workers	Con	MoF, SDCM U-ESFP, PIU	- Workers from outside Chattogram represent less than 10% of total workforce	NQC (Included in Con costs)
21. Materials sourcing	Gravel and sand obtained from environmentally damaging riverbed mining, hill cutting or farmland strip-mining	- Obtain valid Certificate of BSTI from suppliers of bulk materials	Con	MoF, SDCM U-ESFP, PIU	- Certificate of BSTI obtained and filed for each purchase of bulk materials	NQC (Included in Con costs)
22. Materials sourcing	Undue GHG emissions from transport of materials sourced far from point of use	- Prioritize bulk materials suppliers using less distant sources	Con	MoF, SDCM U-ESFP, PIU	- Materials sourced from within reasonable distance	NQC (Included in Con costs)
23. Materials Sourcing	Knock-on environmental effects of sourcing from unsustainable suppliers	- Select suppliers with strong green credentials (verified by review of certifications received)	Con	MoF, SDCM U-ESFP, PIU	- International suppliers of materials have favorable environmental certifications	NQC (Included in Con costs)

B. CONSTRUCTION PHASE

(i) BIOPHYSICAL ENVIRONMENT

24. Surface water	Siltation and sedimentation of watercourses from soil erosion and entrainment of fine materials, blockage of the surface drains near the NATI site	Implement approved Soil Erosion Prevention Plan, including (inter alia): - Protect disturbed soil from rain by keeping exposed areas covered with mulches, fiber mats and other temporary coverings - Keep all stockpiles of erodible materials covered with tarpaulins whenever they are not in active use - Arrange work site drainage to prevent concentration of surface runoff in the vicinity of exposed soils and materials stockpiles - Install and regularly maintain sediment traps in site runoff channels - Promptly establish vegetative cover on soil surfaces in locations where construction activity has been completed - Deploy silt curtains and sediment traps when earthworks are carried out near watercourses	Con	MoF, SDCM U-ESFP, PIU, CSC	- Prescribed soil protection measures effectively implemented at all work sites - Sediment traps installed in appropriate places, and maintained properly - Lack of evidence of elevated turbidity in water draining to adjacent water bodies - Vegetative cover promptly established when construction activity complete on each part of work sites - Silt curtains and sediment traps properly deployed where appropriate	BDT 30,000 for tarpaulins; BDT 200,000 for bulk organic material for temporary soil protection (Included in Con costs)
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Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
25. Surface water, groundwater and soils	Contamination from leaks and spills of noxious fluids used in construction process	- Keep all motorized equipment in good repair - Maintain a regiment of systematic daily checks to detect leaks, following up with prompt repair as needed - Strictly require use of drip mats and pans during refueling and servicing to catch spills and drips - Store fuels and other noxious fluids within roofed, rain-exclusive containment structures with capacity at least 115% of the volume of the largest container stored, constructed only in locations with zero probability of flooding during heavy rains - Provide training in spill prevention and spill response to all workers involved in refueling or equipment servicing	Con	MoF, SDCM U-ESFP, PIU, CSC	- Fuels, lubricants and other noxious fluids stored in appropriate structure - Lack of evidence of leaks from construction equipment - Lack of oil patches on soil surface - Lack of oily sheen on site runoff water	BDT 180,000 for drip mats (Included in Con costs)
26. Surface water	Excessive enrichment of surface waters from raw sewage discharged by construction camps lacking adequate septic systems	- Install an adequate number of toilets to accommodate all workers, and septic systems of sufficient capacity for the expected effluent volume, in accordance with Construction Camp Management Plan	Con	MoF, SDCM U-ESFP, PIU, CSC	- At least one working toilet per 10 resident workers installed - Absence of visual evidence of enrichment	TBD (Included in Con costs)
27. Air quality	Dust from construction works create nuisance and health hazard for residents near work sites and roads	- Implement a regimen of misting all dust-generating surfaces throughout the workday during dry weather - Tightly cover stockpiles of fine materials with tarpaulins whenever they are not in active use to prevent wind erosion - Equip all haul trucks with tightly fitting tarpaulins and enforce their use	Con	MoF, SDCM U-ESFP, PIU, CSC	- Levels of airborne dust are below nuisance level in roadside communities - No significant dust accumulation observed on roadside crops and structures - No complaints from public registered - Ambient air quality at perimeter of work sites and on main road near the NATI site meet the standard indicated in the Air Pollution (control) Rules 2022.	BDT 200,000 for sprayer unit (Included in Con cost)
28. Air quality	Emissions from equipment and vehicles used in construction degrades local air quality	- Maintain all motorized equipment used in construction to a high standard - Use only fuel-efficient equipment	Con	MoF, SDCM U-ESFP, PIU, CSC	- Absence of black smoke in construction equipment exhaust - No complaints from public - Ambient air quality at perimeter of work sites and on the Police Plaza Road near NATI site meet the standard indicated in the Air Pollution (control) Rules 2022.	NQC (Included in Con cost)

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
					- Emissions from motorized machinery used in construction should meet the standard indicated in the Air Pollution (control) Rules 2022.	
29. Soil	Loss of topsoil to erosion	- Implement approved Soil Erosion Prevention Plan, including (inter alia): - o Protect disturbed soil from rain by keeping exposed areas covered with mulches, fiber mats and other temporary coverings - o Arrange work site drainage to prevent concentration of surface runoff in the vicinity of exposed soils - o Promptly establish vegetative cover on soil surfaces in locations where construction activity has been completed - Implement approved Site Reinstatement Plan, including (inter alia): - o Reserve topsoil and store separately for later use - o Promptly prepare soil surfaces for plantings once construction work has been completed in each part of site - o Establish vegetative cover in accordance with landscaping plan in detailed site design, Bill of Quantities and Compensatory Tree Planting Plan - o Implement a watering and tending regimen to help ensure success of plantings - o Monitor progress of vegetation establishment until end of defects period, and implement infill planting as necessary to achieve full coverage	Con	MoF, SDCM U-ESFP, PIU, CSC	- Prescribed soil protection measures effectively implemented at all work sites - Lack of evidence of soil erosion - Vegetative cover promptly established when construction activity complete on each part of work sites	NQC (Included in Con costs specified in relation surface water protection above)
30. Flora and fauna	Damage to trees	- Clearly mark trees that are to be preserved prior to clearing - Establish a fenced buffer around trees that are to be preserved to protect them from damage by equipment, excavation and materials stockpiles	Con	MoF, SDCM U-ESFP, PIU, CSC	- Trees clearly marked prior to site clearing - Fenced buffers established, maintained and observed around preserved trees for duration of works	BDT 50,000 for fencing (Included in Con costs)
31. Flora and fauna	Aquatic habitat in on-site watercourses degraded	- There is natural water course near the site. The deep ditch adjacent to the site drains toward the main drainage system which is actually a canal. - Establish a 10-m buffer with temporary fencing along any permanent or seasonal watercourses found on site,	Con	MoF, SDCM U-ESFP, PIU,	- 10-m buffer established with temporary fencing along any permanent or seasonal watercourses on site	BDT 30,000 (Included in Con costs)

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
		and enforce a prohibition on any construction-related activity within the buffer for the duration of the works - Deploy silt curtains and temporary sediment traps where runoff from active work areas is directed to creeks		CSC	- Prohibition on construction-related activities within the buffer enforced - Silt curtains and sediment traps deployed as appropriate to limit silt delivery to on-site watercourses	
32. Flora and fauna	Loss of trees	- Initiate a tree plantation plan. It is possible that within the NPI campus, more than one hundred trees can be planted. In this case native species should be chosen. - Implement approved Compensatory Tree Planting Plan as soon as schedule of works permits	Con	MoF, SDCM U-ESFP, PIU, CSC	Compensatory Tree Planting Plan implemented as approved	BDT 10,000 (Included in Con costs)
(ii) SOCIOECONOMIC AND CULTURAL ENVIRONMENT						
33. Acoustic environment	Noise and vibration from earthworks, pile-driving and materials hauling degrade quality of life for local residents	- Conduct work only during daylight hours - Impose and enforce low speed limits on haul trucks through the Police Plaza Road - Maintain all motorized equipment and haul trucks to a high standard, and inspect exhaust systems regularly	Con	MoF, SDCM U-ESFP, PIU, CSC	- Noise and vibration are below nuisance level for residents and tourism businesses along Police Plaza Road - No construction work or hauling is conducted between dusk and dawn - No complaints from the public registered - Ambient noise levels outside the work sites meet the standard indicated in the Noise Pollution (control) Rules 2006. - Noise emissions from individual pieces of machinery and vehicles meet the standard indicated in the Noise Pollution (control) Rules 2006.	NQC (Included in Con costs)
34. Public safety	Elevated risks to pedestrians on approach road and in the site	- Ensure that the construction sites are adequately fenced and security is provided to prevent members of the public from entering the sites - Establish safe, marked routes for staff and facility users to continue to use the NPI facilities without having to cross active construction zones - Implement approved Construction Traffic Management Plan during hauling periods, including (inter alia):	Con	MoF, SDCM U-ESFP, PIU, CSC	- Adequate fencing and security maintained at construction sites - Construction zone is configured to maintain safe access for NATI staff during construction works - Construction Traffic Management Plan prepared and observed to be implemented as appropriate	NQC (Included in Con costs)

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
		- Impose and enforce low speed limits on haul trucks through Police Plaza Road			- Haul trucks not observed or reported to speed through NATI site or elsewhere along Police Plaza Road near the work site	
35. Public safety	Construction camps are locus of violence against women and girls	- Give preference to local laborers to avoid the need for, or limit the size of, a construction camp - Implement approved Construction Camp Management Plan, including (inter alia): - Conduct proactive outreach with leaders of nearby communities to educate women and girls about the risks posed by an all-male camp in the neighborhood. - Give resident workers regular training on appropriate behavior in and around the camp - Adopt a zero-tolerance policy around aggression or violence against local women and girls - When women must enter the camp for employment or selling produce, limit their entry to times when resident workers are out at the work site - Prohibit prostitution on the site, and monitor activity in this regard and work with community leaders to address the problem as needed	Con	MoF, SDCM U-ESFP, PIU, CSC	- Lack of reports of worker-involved abuse or harassment - Lack of complaints from public about violence or prostitution at camp - Female access to camp for employment allowed only when workers are out at work sites	NQC (Included in each entity's costs)
36. Public safety	Construction camps serve as source of social conflict, possibly leading to violence	- Implement approved Construction Camp Management Plan, including (inter alia): - Provide regular training and enforcement to minimize bad worker behavior off site, including public drunkenness, sexual harassment, and theft of crops/foods	Con	MoF, SDCM U-ESFP, PIU, CSC	- Lack of complaints from public about behavior of resident workers	NQC (Included in Con costs)
37. Public health	Construction camps act as vectors for spread of pathogens and disease	- Implement approved Construction Camp Management Plan, including (inter alia): - Install and maintain adequate toilet and septic systems to prevent discharge of raw sewage from camps to local water bodies or fields - Educate resident workers about sexually transmitted diseases and responsible sexual behavior - Work with local community leaders to prohibit prostitution in and around construction camps	Con	MoF, SDCM U-ESFP, PIU, CSC	- At least one working toilet per 10 resident workers installed, with septic treatment - Absence of visual evidence of raw sewage discharge - Lack of reports of prostitution around camp - Lack of concerns expressed by local community leaders about workers' off-site behavior	BDT 200,000 for toilets and septic systems (Included in Con costs)
38. Worker health and safety	Risks to worker health and safety from improper work site practices	- Implement approved Occupational Health and Safety Plan, including (inter alia): - Provide regular safety training for all workers	Con	MoF, SDCM U-ESFP,	- Low incidence of workplace injuries - Workers observed using appropriate PPE	NQC (Included in Con costs)

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
		- Provide task-appropriate PPE to all workers and enforce its use - Closely monitor works at all times to ensure strong worker compliance with safety practices		PIU, CSC		
39. Worker health	Risks to workers from viral illness	- Implement approved Occupational Health and Safety Plan, including (inter alia): - Institute temperature checks (at least daily) for all workers and supervisory personnel on site - Provide each worker with appropriate face mask daily or as needed, and require mask use at all times - Position hand washing and sanitizing stations at canteens and other eating areas, kitchens, and near toilets	Con	MoF, SDCM U-ESFP, PIU, CSC	- Temperature check regimen implemented consistently - Workers supplied with facemasks - Workers consistently use facemasks - Hand washing and sanitizing stations provided in appropriate locations and kept stocked at all times	NQC (Included in Con costs)
40. Worker health and safety	Risks to worker health and safety from poor conditions in construction camps	- Implement approved Occupational Health and Safety Plan, including (inter alia): - Conduct monthly safety audit of camp to identify fire risks, electrocution hazards and other unsafe conditions, and assess adequacy of fire extinguishers and first aid provisions - Institute a regular cleaning and disinfection regimen for camp kitchens, latrines, wash-up areas, eating areas and sleeping sheds - Provide adequate sleeping space for the number of workers to avoid overcrowding and consequent spread of communicable illnesses and infestations - Provide each worker with a raised sleeping platform with mattress or mat, bedding and mosquito netting - Test drinking water supplied to workers on a quarterly basis to ensure safety - Ensure adequate ventilation and light in all camp structures	Con	MoF, SDCM U-ESFP, PIU, CSC	- Safety audit results included in monthly progress reports and quarterly monitoring reports - Lack of outbreaks of infectious illnesses (e.g., influenza, pneumonia, tuberculosis) and ailments associated with unsanitary conditions (e.g., dysentery, lice, scabies) - Living conditions meet standards specified in Construction Camp Management Plan - Drinking water test results meet standards indicated in the Environment Conservation Rules, 2023	BDT 100,000 for drinking water procurement or treatment (Included in Con costs)
41. Livelihoods	Damage to property and livelihoods	- Fence perimeter of each work site prior to the start of construction and ensure maintenance of fencing for the duration of works - Prohibit all construction-related activity outside the site fences - Promptly remedy any property damage caused in consultation with the affected landowner(s), even if not formal grievance files	Con	MoF, SDCM U-ESFP, PIU, CSC	- Perimeter of each work site properly fenced prior to the start of construction, and fence maintained for duration of works	NQC (Included in Con cost)

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
42. Livelihoods	Employment for local people	- Hire mostly or exclusively local workers on construction sites	Con	MoF, SDCM U-ESFP, PIU, CSC	- Workers from outside Narshingdi represent less than 10% of total workforce on site	NQC (Included in Con cost)
43. Physical cultural resources	Damage to cultural heritage due to inappropriate treatment of unearthed artifacts	- Train all workers and site managers in the use of the chance find procedure specified in the CEMP	Con	MoF, SDCM U-ESFP, PIU, CSC	- Workers are aware of the chance find procedure	NQC (Included in Con cost)
(iii) WASTE MANAGEMENT						
44. Demolition waste	Impacts from improper removal, processing and disposal of demolished structures	- If there is any reason to suspect presence of asbestos-containing materials (ACM), implement approved ACM Removal and Disposal Plan - Ensure salvage of recyclable and reusable items - Use rubble in site development or dispose of in a site identified and approved in accordance with the Waste Management Plan embedded within the CEMP	Con	MoF, SDCM U-ESFP, PIU, CSC	- Any ACM assessed and removed and disposed of according to approved ACM Removal and Disposal Plan - Recyclable materials salvaged. - Rubble appropriately used as fill on site, or disposed of in accordance with Waste Management Plan embedded in CEMP	BDT 100,000 (contingency for ACM assessment services) (Included in Con costs)
45. Construction waste	Pollution from improper management of solid waste generated at work sites and construction camp	- Implement all provisions in the Waste Management Plan embedded in CEMP, including (inter alia): - Provide waste receptacles on the work sites and collect their contents daily or weekly as needed - Recycle all recyclables through local providers of this service - Compost organic wastes generated by construction camp kitchens - Dispose of non-recyclable and non-organic wastes based on locally available and approved disposal options	Con	MoF, SDCM U-ESFP, PIU, CSC	- All classes of waste managed in accordance with Waste Management Plan	NQC (included in Con costs)
46. Waste oils	Water pollution from waste oils and other fluids generated in maintenance yards	- Recycle waste oils through a reputable business providing this service, as identified in the Waste Management Plan embedded in the CEMP	Con	MoF, SDCM U-ESFP, PIU,	- No evidence of waste oil dumping or burning - Documentation of transfers to identified service provider available	NQC (Included in Con costs)

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
				CSC		
C. OPERATION PHASE						
(i) BIOPHYSICAL ENVIRONMENT						
47. Water quality	Contamination by noxious fluids used in facility operations and maintenance	- Store fluids only within dedicated indoor storage spaces with secondary containment capacity equaling or exceeding 115% of the volume of the largest container stored - Routinely inspect storage spaces and tanks for leakage, and take immediate corrective action as needed	SOU at NPI	SDCM U at MoF	- Proper storage observed. - Absence of evidence of spills and leaks	NQC (Included in SDCMU and NATI operating costs)
48. Water quality	Reduced effectiveness of wastewater treatment	- Remove sludge at least once per year from all septic tanks installed, and worked into the soil around on-site tree plantations for fertilization	SOU at NPI	SDCM U at MoF	- Sludge removed from all septic tanks at least annually, and appropriately used to fertilize on-site tree plantations	NQC (Included in SDCMU and NATI operating costs)
49. Water quality	Spills of hazardous and noxious cargos in the site	- Prepare a Spill Prevention and Response Plan for the site prior to the start of operations. - Provide personnel training necessary for effective implementation of the plan before the start of operations and annually during operations	SOU at NPI	SDCM U at MoF	- Spill Prevention and Response Plan prepared for the site prior to the start of operations. - Personnel training necessary for effective implementation of the Spill Prevention and Response Plan delivered before start of operations and repeated annually during operation phase	NQC (Included in SDCMU and NATI operating costs)
50. Water quality	Siltation, sedimentation and contamination of local water bodies by runoff from minerals storage area in the site	- Purchase sufficient tarpaulins based on expected stockpiling activity, and make budgetary provision for regular replacement as needed. - Strictly require the use of tarpaulins on all piles of mineral materials at all times, except during active handling of materials - Train personnel assigned to the minerals storage area in competent tarpaulin use - Regularly monitor tarpaulin condition and use	SOU at NPI	SDCM U at MoF	- Thorough, competent use of tarpaulins on all materials stockpiles in minerals storage area observed to be standard procedure - Runoff from minerals storage area is of sufficient quality not to cause violation of surface water standard, as indicated in the Environment Conservation Rules, 2023	NQC (Included in SDCMU and NATI operating costs)
51. Drinking water quality	Drinking water quality may deteriorate during operation due to various reasons, for instance due to decline of groundwater table,	- Ensure regular monitoring of the drinking water quality provided by the purification system - Ensure regular monitoring of the purification machine by the installation company	NPI authority	NPI authority	- Regular water quality maintenance log - Regular machine maintenance log	NPI and NATI operation cost

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
	pesticide leachates from nearby agri-field etc.					
52. Air quality	Emissions from vehicles using the site	- Ensure adequate staffing at peak times to help ensure that incoming trucks are processed efficiently, and lines do not form - Enforce a strict no-idling policy	SOU at NPI	SDCM U at MoF	- Ambient air quality on site meets standards indicated in the Air Pollution (control) Rules 2022.	NQC (Included in SDCMU and NATI operating costs)
53. Air quality	Dust from handling of materials in minerals storage area	- Purchase sufficient tarpaulins based on expected stockpiling activity and make budgetary provision for regular replacement as needed. - Strictly require the use of tarpaulins on all piles of mineral materials at all times, except during active handling of materials - Train personnel assigned to the minerals storage area in competent tarpaulin use - Regularly monitor tarpaulin condition and use - Ensure that appropriate basic misting equipment is purchased or purpose-built and kept in good working condition. - Train personnel assigned to the minerals storage area in proper procedure for misting during materials handling - Strictly require misting as standard procedure during handling of dusty materials - Strictly prohibit stone crushing activity on the site, including the minerals storage area	SOU at NPI	SDCM U at MoF	- Ambient air quality on site meets standards indicated in the Air Pollution (control) Rules 2022.	NQC (Included in SDCMU and NATI operating costs)
54. Air quality	Dust from uncovered or improperly covered trucks hauling dusty materials such as stone, sand and coal	- Strictly require all trucks entering site to be equipped with tightly fitting tarpaulins. - Sweep and spray roadways within site as needed to limit dust	SOU at NPI	SDCM U at MoF	- All trucks entering site observed to be appropriately covered. - Roadways within NATI site swept and sprayed as needed to suppress dust. - Ambient air quality on site meets standards indicated in the Air Pollution (control) Rules 2022	NQC (Included in SDCMU and NATI operating costs)
55. Soils	Erosion of soils during maintenance works involving excavation and/or deteriorated ground cover	- Protect soils exposed by maintenance works with mulches and other protective coverings during works, and promptly re-establish vegetative cover when works have been completed. - Regularly inspect site vegetation for loss of coverage and evidence of emerging gully erosion	SOU at NPI	SDCM U at MoF	- Lack of evidence of gully erosion	NQC (Included in SDCMU and NATI operating costs)

(ii) SOCIOECONOMIC AND CULTURAL ENVIRONMENT

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
56. Acoustic environment	Excessive noise due to increasing traffic	- Convene a workshop with participation of people living and operating businesses along polytechnic road, local council representatives, WASA, police and other government agencies to discuss feasibility of limiting vehicle horn use in the NPI zone and formulate action as appropriate	SOU at NPI	SDCM U at MoF	- Workshop convened and action plan formulated if consensus for action found	NQC (Included in SDCMU and NATI operating costs)
57. Acoustic environment	Excessive noise due to stone processing activity within the site	- Strictly prohibit stone crushing activity within the site, including in the minerals storage area	SOU at NPI	SDCM U at MoF	- No stone crushers or crushing activity observed anywhere within the site	NQC (Included in SDCMU and NATI operating costs)
58. Public safety	Elevated accident risk due to increased truck traffic and inadequate road safety provisions	- Regularly monitor facility operations for emerging public safety issues, and devise appropriate corrective action, as needed. - Proactively coordinate with RHD to ensure that safety features including sidewalks, pullout and turn lanes, road markings, signage and other safety features are planned for and implemented in future approach road upgrades	SOU at NPI	SDCM U at MoF	- Safety features implemented. - Accident risk low	NQC (Included in SDCMU and NATI operating costs)
59. Public safety	Elevated accident risk due to community and commercial encroachment on approach road Right of Way (RoW) and road surface	- Pursue collaboration with RHD/LGED and local community leaders regarding durable solutions to safety risks from on-road and road-adjacent commerce, such as provision of alternative spaces outside the RoW for commercial and community activity	SOU at NPI	SDCM U at MoF	- Low incidence of encroachment - Smooth traffic flow through settled areas - Low incidence of vehicle-pedestrian collisions	NQC (Included in SDCMU and NATI operating costs)
60. Worker health and safety	Chronic exposure to vehicle emissions	- Enforce a strict policy against engine idling by trucks within NATI area	SOU at NPI	SDCM U at MoF	- Low incidence of staff complaints about emissions exposure - Ambient air quality on NATI station site meets standards indicated in the Air Pollution (control) Rules 2022	NQC (Included in SDCMU and NATI operating costs)
61. Worker health and safety	Elevated risk of contracting dangerous viral illnesses	- Integrate pandemic response measures in operations and maintenance manuals and operating protocols for the NATI station, to ensure prompt implementation when emerging threats are identified	SOU at NPI	SDCM U at MoF	- Pandemic response measures integrated in operations and maintenance manuals	NQC (Included in SDCMU and NATI operating costs)
62. Worker health and safety	Exposure of laboratory technicians and support staff to	- Incorporate Emergency Response Plan in laboratory operating protocols, and provide regular training for technicians and support staff on its activation	SOU at NPI	SDCM U at MoF	- Emergency Response Plan included in laboratory operating protocols.	NQC (Included in SDCMU and NATI operating costs)

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
	accidental hazardous releases				- Regular training provided on activation of Emergency Response Plan	
63. Livelihoods	Opportunities for employment in facility operations and maintenance	- Give priority to local people and firms in selecting Contractors for maintenance works and selected permanent positions in operations and maintenance	SOU at NPI	SDCM U at MoF	- Local people well represented in local NATI workforce	NQC (Included in SDCMU and NATI operating costs)
(iii) WASTE MANAGEMENT						
64. Laboratory waste	Environmental contamination and public health risks from improperly managed hazardous wastes	- Integrate detailed laboratory waste management plan (developed by laboratory design specialist engaged during detailed design) into laboratory operations and maintenance manuals. - Provide training to laboratory technicians and maintenance staff on correct implementation of waste management protocols, before the laboratory becomes operational and on an annual basis thereafter. - Specify parameters, measurement, and reporting for annual waste audit in laboratory waste management protocols. - Conduct an annual waste management audit and implement corrective action as needed to address problematic trends	SOU at NPI	SDCM U at MoF	- Discharges of liquid waste from laboratory meet standards indicated in the Environment Conservation Rules, 2023 (only if applicable)	NQC (Included in SDCMU and NATI operating costs)
65. Solid waste	Pollution from improper management of solid waste from NPI facility operations	- Ensure that appropriate waste management procedures for all components of the solid waste stream are specified in each facility's operations and maintenance manual	SOU at NPI	SDCM U at MoF	- Recyclable solid waste is consistently segregated and picked up by a reputable recycling business. - Non-recyclable solid waste is consistently taken to a legal landfill for disposal. - Lack of evidence of waste dumping or burning on site	NQC (Included in SDCMU and NATI operating costs)

D. Environmental Monitoring and Reporting

310. The purpose of environmental monitoring is to ensure that the EMP is fully and competently implemented across all phases of the project's development, and to provide a basis for appropriate and timely corrective action when it is found not to be. The environmental monitoring process should be understood not only as a means of supervision and enforcement, but also as a vehicle for organizational learning and progress towards mainstream international best practice in construction site and facility management. Effective monitoring can also be a vital tool in forestalling conflict with the communities most likely to suffer the consequences of negative environmental impacts, as problems can be identified and corrected in a timely manner, before they grow to nuisance or dangerous levels.

311. Environmental monitoring consists of assessing both the degree to which Contractors and facility operators are fulfilling their responsibilities to implement measures specified in the EMP to manage impacts (compliance monitoring), and the degree to which their impact management efforts are successful in preventing harmful environmental conditions from arising (effects monitoring). Compliance monitoring typically makes use of checklists to confirm or disconfirm that prescribed measures are being properly implemented, while effects monitoring involves quantitative and/or qualitative sampling at designated locations. Both types of monitoring need to be conducted on a regular and consistent basis, to ensure the comparability of results across monitoring periods. Monitoring should begin before site clearing, so an environmental baseline (i.e., pre-project conditions) can be established for key environmental parameters.

312. Monitoring parameters for each prescribed mitigation and enhancement measure are identified in Table IX-3 above. Specific monitoring responsibilities, including the monitoring and reporting timetable for each, are detailed in Table IX-4.

Table IX-4 Environmental Monitoring Plan

KEYS: ADB: Asian Development Bank; CSC: Construction Supervision Consultant; Con: Contractor; DOE: Department of Environment; EAs: Executing Agencies; EHSO: Environment, Health and Safety Officer; ESFP: Environmental Safeguards Focal Person; NQC: No Quantifiable Cost; PIU: Project Implementation Unit; SOU: Safeguards Oversight Unit; MoF: Ministry of Finance; NATI: Narsingdi Auto-Tech Training Institute; NPI: Narshingdi Polytechnic Institute

Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
A. PRE-CONSTRUCTION PHASE					
(i) IMPLEMENTATION READINESS					
1. Environmental baseline	- Collect and analyze samples for key environmental parameters to establish a pre-project environmental baseline for development site	ESFP SDCMU ESFP NPI	- Ambient air quality (PM_{2.5}, PM₁₀, SO₂, CO, NO₂); compare to the Air Pollution (control) Rules 2022 (minimum 8 hr sampling period) - Adjacent surface waters (pH, BOD₅, COD, DO, SS, total coliform, Total P, Total N, turbidity); compare to the Environment Conservation Rules, 2023 - Groundwater in wells on site or nearby (pH, TDS, EC, DO, BOD₅, COD, Chloride, SS, As, Fe, Total-N, Total-P, Total coliform, turbidity, temperature); compare to the Environment Conservation Rules, 2023 - Ambient noise (dBa daytime, dBa night); compare to the Noise Pollution (control) Rules 2006	One sample prior to start of site clearing Sampling locations: to be set by the environmental specialist employed by CSC and TMED SOU	BDT 760,000 for sampling and laboratory analysis. See Table IX-8 for details.
2. IEE and EMP update	- Review IEE and EMP to ensure any post-approval changes are properly accounted for and addressed, by addition of mitigation measures if necessary	ESFP SDCMU	- IEE and EMP confirmed still fully applicable - New measures added to EMP if needed to cover any changes in alignment, design or local conditions	Once before start of procurement	NQC (Included in SDCMU budget)
3. Verification of environmental clearances	- Confirm Site Clearance Certificate (SCC) and Environmental Clearance Certificate (ECC) have been granted, and that any conditions imposed by DOE on approval have been reflected in EMP and EMoP, as well as CEMP as applicable	ESFP SDCMU	- SCC and ECC granted. - New measures added to EMP, EMoP and CEMP if needed to meet any condition of approval specified by DOE	Once before start of procurement	NQC (Included in SDCMU budget)
4. CEMP verification	- Review CEMP to ensure all primary Contractor responsibilities are fully reflected, including monitoring and reporting	CSC	- Any necessary changes requested and made by Contractor. - CEMP confirmed adequate by reviewers	Once before start of construction	NQC (Included in CSC amount)
5. Specialized plans verification	- Confirm that the following specialized plans have been prepared by the Contractor: - site-specific Construction Camp Management Plan(s)	CSC	- All required specialized plans prepared to adequate standard and approved by relevant authority (as required in some cases)	Once before start of construction	NQC (Included in CSC amount)

BAN: Skills for Industry Competitiveness and Innovation Program (SICIP)

(IEE for NATI at NPI)

Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
	- site-specific Waste Management Plans (embedded within CEMP) - site-specific Emergency Response Plans (embedded within CEMP) - Compensatory Tree Planting Plan - Construction Traffic Management Plan - Asbestos-Containing Materials Removal and Disposal Plan - Soil Erosion Prevention Plan - Site Reinstatement Plan - Occupational Health and Safety Plan (including COVID-19 measures stipulated by ADB and Government of Bangladesh Guidance for Social and Institutional Containment and Prevention) - Laboratory Waste Management Plan				
6. Grievance Redress Mechanisms	- Confirm that a central GRM and workers' GRM have been established and publicized	ESFP SDCMU	- Central GRM established and publicized - Workers' GRM established and explained to workers before the start of construction	Once before start of construction	NQC (Included in PIU budget)
7. Acoustic environment	- Convene a workshop with participation of people living and operating businesses along polytechnic Road, local ward Council representatives, RHD/LGED, police and other government agencies to discuss feasibility of limiting vehicle horn use in the NATI zone and formulate action as appropriate	ESFP SDCMU	- Workshop convened and action plan formulated if consensus for action found	Once before end of design phase, quarterly thereafter until action confirmed	NQC (Included in PIU budget)
8. Induced development and cumulative impacts	- Arrange multi-stakeholder workshop at Police Plaza Road with participation of local, upazila and district governments, all relevant government agencies, and concerned business interests (from gravel, trading, agricultural and tourism sectors, at a minimum) to initiate a broad-based public dialogue regarding the livelihoods of the local people and the people living near the site.	ESFP SDCMU	- Multi-stakeholder workshop with suitable broad participation convened by MoF through SDCMU	Once before end of design phase, quarterly thereafter until action confirmed	NQC (Included in PIU budget)
9. EMP training	- Without proper EMP implementation training, EMP monitoring might be delayed or hampered	- Confirm that EMP implantation training has been arranged before commencement of construction. - Involve contractor's high	- The EMP implementation training being conducted before the construction starts	SDCMU/PIU	Record of quarterly refresher's training

Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
		officials/management part, EHS specialist, construction project managers and workforce overseer in the EMP training Quarterly Refreshers training on EMP implementation			
(ii) DESIGN					
10. Climate change mitigation	- Integrate GHG-limiting measures into facility designs, including: - substitute other materials for concrete where feasible - use low-carbon concrete as much as possible - maximize use of building materials available locally - integrate photovoltaic generation into the electrical plan - specify only high-efficiency electrical and mechanical equipment - specify most fuel-efficient backup generator available - maximize cross-ventilation by use of courtyards, openable windows and favorable building orientation - incorporate hollow wall structures where feasible - Use overhangs above large windows to prevent excessive solar penetration - Prioritize shade in the landscaping plan, with plentiful wide-crowned shade trees on all parts of site - Maximize interior natural light by use of favorable building orientation and courtyards - Specify water-saving toilets, faucets and showerheads - Design dedicated plumbing system for drinking and cooking water - Aim to meet all water heating needs with solar heaters - Specify high-intensity, full-time lighting only where strictly necessary - Specify solar-powered lighting for outdoor applications	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- All feasible GHG-reduction design measures incorporated in facility designs - Soft landscaping plan (covering all site areas not occupied by structures, roadways or walkways, and including ample shade trees and dense ground cover) included in detailed site design, with plantings specified in Bill of Quantities	Once before approval of detailed designs	NQC (included in SDCMU budget)

Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
	- Base landscape plan around drought-tolerant perennial native species - Design site layout and inspection process to minimize the length of time vehicles have their engines running during the border-crossing process - Incorporate green roofs wherever roof area is not needed for solar panels and solar water heaters - Maximize carbon sequestration potential, micro-climatic cooling and runoff retention by specifying a landscaping plan covering all site areas not occupied by structures, roadways or walkways, including ample shade trees (especially near buildings) and dense ground cover in open areas				
11. Climate change adaptation	- Design facilities so that critical components (including laboratory, backup generator and fuel tanks) are well above maximum flood level foreseen under climate change projections specified in Climate Risk and Adaptation Assessment (CRA) report and detailed hydrological study - Incorporate temperature-moderating features in NPI facility designs, including: - green roofs where feasible - maximize use of wide-crowned shade trees in site landscaping plans, including around buildings and parking area medians - maximize cross-ventilation by use of courtyards, openable windows and favorable building orientation	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- All critical facility components above maximum expected flood level - All feasible temperature-moderating features incorporated in facility designs	Once before approval of detailed designs	NQC (included in SDCMU budget)
12. Flora and fauna	- Avoid removal of trees to the greatest extent possible - Incorporate existing trees as site features whenever possible, and include them in site designs - When trees must be removed, compensatory trees should be planned elsewhere on site and marked in the design drawings, and included in the Bill of Quantities, in accordance with	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- Existing trees preserved in site designs to the greatest extent feasible - Compensatory trees included in design drawings and Bill of Quantities, in accordance with Compensatory Tree Planting Plan	Once before approval of detailed designs	NQC (included in SDCMU budget)

Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
	approved Compensatory Tree Planting Plan				
13. Groundwater resources	- Maximize opportunities to limit water consumption and increase groundwater recharge, including adoption of: - rain capture on all roofs and use of stored water for non-potable uses in and around facilities - high-efficiency faucets and toilets throughout the facilities - plant species with low water needs in site landscaping plans - stormwater infiltration swales for all runoff from paved and impervious surfaces (objective: zero site runoff)	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- All feasible and applicable water conservation measures incorporated in detailed designs for NATI facilities	Once before approval of detailed designs	NQC (included in SDCMU budget)
14. Public health	- Design NATI building internal layout to maintain adequate space between individual users and prevent formation of long lines in indoor spaces - Design NATI building ventilation system to maximize turnover of indoor air	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- NATI building design enables social distancing - NATI building ventilation system designed to maximize turnover of indoor air	Once before approval of detailed designs	NQC (included in SDCMU budget)
15. Water quality	- Include designated storage with secondary containment for noxious substances (fuels, lubricants, paints, etc.) used in NATI operations in detailed design - Slightly raise surface of site minerals storage area above level of rest of site to prevent runoff from other site areas from washing through stockpiles - Include sediment traps and porous drainage channels in final drainage design for minerals storage area, to limit discharge of sediments	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- Storage spaces with secondary containment for noxious substances included in detailed designs for NATI - Surface of NATI site's minerals storage area slightly raised above rest of site in detailed design - Sediment traps and porous drainage channels included in detailed design of site minerals storage area	Once before approval of detailed designs	NQC (included in SDCMU budget)
16. Air quality	- Include water supply to minerals storage area, with hose spigots in several locations around the perimeter to enable use of mobile misting apparatus	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- Detailed design includes water supply to minerals storage area, with multiple hose spigots spaced around perimeter	Once before approval of detailed designs	NQC (included in SDCMU budget)
17. Occupational health and safety	- Design canopies over areas used by heavy laboratory machineries designed with extra headroom and good cross ventilation or fans to evacuate emissions efficiently	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- Canopies over areas used by heavy laboratory machineries designed with extra headroom and good cross ventilation or fans to evacuate emissions efficiently	Once before approval of detailed designs	NQC (included in SDCMU budget)
18. Occupational health and safety	- Design interior layout of the NATI building to maximize space between users and prevent the formation of long lines in indoor spaces.	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- Internal layout of the NATI building is designed to maximize space between users and prevent the formation of long lines in indoor spaces		

Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
	- Design NATI building ventilation system for maximum feasible turnover of indoor air		- NATI building ventilation system is designed for maximum feasible turnover of indoor air		
19. Occupational health and safety	- Engage qualified laboratory specialist to contribute to design of laboratory and associated structures, as well as preparation of operation protocols including waste management plans, to adhere to international laboratory design standards and best practices	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- Suitable laboratory design specialist engaged to ensure design and operations of laboratory adhere to international laboratory design and operation standards and best practice	At beginning of detailed design work	NQC (included in SDCMU budget)
20. Waste management	- Anticipate waste streams and incorporate design features to collect, sort and safely dispose of each class of waste - Specify segregated collection bins in strategic indoor and outdoor locations where wastes are generated - Include waste storage and sorting areas in facility designs - Incorporate easy access for waste and recyclables collection vehicles - Designate outdoor space for thermophilic composting of organic waste from kitchens and canteens - Design laboratory for appropriate segregation of hazardous and non-hazardous waste streams - Engage qualified laboratory specialist to contribute to design of laboratory and associated structures, as well as preparation of operation protocols including waste management plans, to adhere to international laboratory design standards and best practices	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- Facility designs include spaces and features for waste management, including collection, sorting, composting, storage and out-shipment - Suitable laboratory design specialist engaged to ensure design and operations of laboratory adhere to international laboratory design and operation standards and best practice laboratory - Laboratory design provides for at-source segregation of hazardous liquid and solid wastes	Once before approval of detailed designs	NQC (included in SDCMU budget)
(ii) PROCUREMENT					
21. Selection of Contractor	- Prioritize selection of Contractor with strong compliance track record, as verified by references from previous CSCs - Select only Contractors registered with MOLE	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- Selected Contractor has verified track record of good performance on safeguards compliance	Once during procurement	NQC (included in SDCMU budget)
22. Selection of Contractor	- Require prospective Contractors to provide information on the age, condition and fuel-efficiency of their machinery and vehicle fleets in their bids, and consider this in the selection process	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- Detailed machinery and fleet information required in bids - Emissions potential of fleets considered in Contractor selection - Provision included in contract giving the employer the right to require removal of	Once during procurement	NQC (included in SDCMU budget)

Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
	- Include provision in contract giving the employer the right to require removal of equipment and vehicles it deems to be unacceptably polluting from work sites at any time during construction, even if these are the property of sub-Contractors		equipment and vehicles it deems to be unacceptably polluting from work sites at any time during construction, even if these are the property of sub-Contractors		
23. Labor	- Hire exclusively or mostly local workers	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- Workers from Narshingdi and around Chattergram given first priority in hiring for construction jobs	Once prior to start of construction	NQC (included in SDCMU budget)
24. Materials sourcing	- Obtain valid Certificate of BSTI from suppliers of bulk materials	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- Certificate of BSTI obtained and filed for each purchase of bulk materials	Prior to approval of each purchase order	NQC (included in SDCMU budget)
25. Materials sourcing	- Prioritize bulk materials suppliers using less distant sources	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- Materials sourced from within reasonable distance	Prior to approval of each purchase order	NQC (included in SDCMU budget)
26. Materials Sourcing	- Select suppliers with strong green credentials (verified by review of certifications received)	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- International suppliers of materials have favorable environmental certifications	Prior to approval of each purchase order	NQC (included in SDCMU budget)

B. CONSTRUCTION PHASE

(i) BIOPHYSICAL ENVIRONMENT

27. Surface water	- Implement approved Soil Erosion Prevention Plan, including (inter alia): - Protect disturbed soil from rain by keeping exposed areas covered with mulches, fiber mats and other temporary coverings - Keep all stockpiles of erodible materials covered with tarpaulins whenever they are not in active use - Arrange work site drainage to prevent concentration of surface runoff in the vicinity of exposed soils and materials stockpiles - Install and regularly maintain sediment traps in site runoff channels - Promptly reinstate disturbed ground surfaces and establish vegetative cover in locations where construction activity has been completed - Deploy silt curtains and sediment traps when earthworks are carried out near ponds and other standing water	EHSO CSC Contractor	- Prescribed soil protection measures effectively implemented at all work sites in accordance with approved Soil Erosion Prevention Plan - Daily inspection of the existing drainage system at NATI and other drainage channels constructed during construction and take cleaning actions when necessary. - Sediment traps installed in appropriate places, and maintained properly - Lack of evidence of elevated turbidity in water draining to adjacent water bodies - Vegetative cover promptly established when construction activity complete on each part of work sites - Silt curtains properly deployed where appropriate - Adjacent surface water quality (pH, BOD₅, COD, DO, SS, total coliform, Total P, Total N, turbidity) meets standard in the Environment Conservation Rules, 2023	Monthly (soil protection measures) for duration of construction Daily inspections for drainage congestion Quarterly surface water quality monitoring by EHSO at locations dictated by work activity	NQC (included in SDCMU budget) For Surface water quality: BDT 30,000 per sample, Total 8 samples over two years = 8 x BDT 30,000 = BDT 240,000
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Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
	- During construction wastewater and sediment laden water from construction site may clog the existing drainage which are already malfunctioning.				
28. Surface water, groundwater and soils	- Keep all motorized equipment in good repair - Maintain a regiment of systematic daily checks to detect leaks, following up with prompt repair as needed - Strictly require use of drip mats and pans during refueling and servicing to catch spills and drips - Store fuels and other noxious fluids within roofed, rain-exclusive containment structures with capacity at least 115% of the volume of the largest container stored, constructed only in locations with zero probability of flooding during heavy rains - Provide training in spill prevention and spill response to all workers involved in refueling or equipment servicing	EHSO CSC Contractor	- Fuels, lubricants and other noxious fluids stored in appropriate structure - Lack of evidence of leaks from construction equipment - Lack of oil patches on soil surface - Lack of oily sheen on site runoff water	Monthly for duration of construction	NQC (included in SDCMU budget)
29. Surface water	- Install an adequate number of toilets to accommodate all workers, and septic systems of sufficient capacity for the expected effluent volume, in accordance with Construction Camp Management Plan	EHSO CSC Contractor	- At least one working toilet per 10 resident workers installed - Absence of visual evidence of enrichment	Once at beginning of construction, and monthly for duration of construction	NQC (included in SDCMU budget + Contractor costs)
30. Air quality	- Implement a regimen of misting all dust-generating surfaces throughout the work day during dry weather - Tightly cover stockpiles of fine materials with tarpaulins whenever they are not in active use to prevent wind erosion - Equip all haul trucks with tightly-fitting tarpaulins and enforce their use	EHSO CSC Contractor	- Levels of airborne dust are below nuisance level in roadside communities - No significant dust accumulation observed on roadside crops and structures - No complaints from public registered - Ambient air quality (PM_{2.5}, PM₁₀, SO₂, CO, NO₂) meets standards indicated in the Air Pollution (control) Rules 2022.	Weekly for duration of construction (observation) (Quantitative measurement quarterly by EHSO at locations dictated by work activity)	NQC (EMP cost stipulated in Table IX-8)
31. Air quality	- Maintain all motorized equipment used in construction to a high standard - Use only fuel-efficient equipment	EHSO CSC Contractor	- Absence of black smoke in construction equipment exhaust - No complaints from public	Weekly for duration of construction (Quantitative measurement)	NQC (observation)

Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
				quarterly by EHSO)	
32. Soil	- Implement approved Soil Erosion Prevention Plan, including (inter alia): - Protect disturbed soil from rain by keeping exposed areas covered with mulches, fiber mats and other temporary coverings - Arrange work site drainage to prevent concentration of surface runoff in the vicinity of exposed soils - Promptly establish vegetative cover on soil surfaces in locations where construction activity has been completed - Implement approved Site Reinstatement Plan, including (inter alia): - Reserve topsoil and store separately for later use - Promptly prepare soil surfaces for plantings once construction work has been completed in each part of site - Establish vegetative cover in accordance with landscaping plan in detailed site design, Bill of Quantities and Compensatory Tree Planting Plan - Implement a watering and tending regimen to help ensure success of plantings - Monitor progress of vegetation establishment until end of defects period, and implement infill planting as necessary to achieve full coverage	EHSO CSC Contractor	- Prescribed soil protection measures effectively implemented at all work sites, in accordance with Soil erosion Prevention Plan - Lack of evidence of soil erosion - Vegetative cover promptly established when construction activity complete on each part of work sites	Weekly for duration of construction	NQC (Method: visual inspection)
33. Flora and fauna	- Clearly mark trees that are to be preserved prior to clearing - Establish a fenced buffer around trees that are to be preserved to protect them from damage by equipment, excavation and materials stockpiles	EHSO CSC Contractor	- Trees clearly marked prior to site clearing - Fenced buffers established, maintained and observed around preserved trees for duration of works	Once before site clearing, and monthly for duration of construction	NQC (included in SDCMU, CSC, and Contractor costs)
34. Flora and fauna	- Establish a 10-m buffer with temporary fencing along any permanent or seasonal watercourses found on site, and enforce a prohibition on any construction-related activity within the buffer for the duration of the works - Deploy silt curtains and temporary sediment traps where runoff from active work areas is directed to creeks	EHSO CSC Contractor	- 10-m buffer established with temporary fencing along any permanent or seasonal watercourses on site - Prohibition on construction-related activities within the buffer enforced - Silt curtains and sediment traps deployed as appropriate to limit silt delivery to on-site watercourses	Weekly for duration of construction	NQC (included in SDCMU, CSC, and Contractor costs)

Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
35. Flora and fauna	- Implement approved Compensatory Tree Planting Plan as soon as schedule of works permits	EHSO CSC Contractor	- Compensatory trees planted and tended in conformance with the approved Compensatory Tree Planting Plan - Planted trees healthy and seem assured of long-term survival	Twice during final 3 months of construction phase	NQC (included in SDCMU budget)
(ii) SOCIOECONOMIC AND CULTURAL ENVIRONMENT					
36. Acoustic environment	- Conduct work only during daylight hours - Impose and enforce low speed limits on haul trucks through the roads nearby the site - Maintain all motorized equipment and haul trucks to a high standard, and inspect exhaust systems regularly	EHSO CSC Contractor	- Noise and vibration are below nuisance level for local residents and roadside small businesses - No construction work or hauling is conducted between dusk and dawn - No complaints from the public registered - Noise levels at roadside around the site meets standard indicated in the Noise Pollution (control) Rules 2006 (during heavy haul periods)	Weekly for duration of construction (observation) (Quantitative measurement by EHSO only during heavy haul periods)	NQC (observation) For quantitative sampling: Included in Contractor cost as EMP cost provided in Table IX-8
37. Public safety	- Ensure that the construction sites are adequately fenced and security is provided to prevent members of the public from entering the sites - Establish safe, marked routes for staff and facility users to continue to use the NATI facilities without having to cross active construction zones - Impose and enforce low speed limits on haul trucks through roads near the site area - Prepare Construction Traffic Management Plan, and implement as appropriate during hauling periods (Contractor)	EHSO CSC Contractor	- Adequate fencing and security maintained at construction site. - Construction zone is configured to maintain safe access for NATI/NPI staff. - Construction Traffic Management Plan prepared and observed to be implemented as appropriate. - Haul trucks not observed or reported to speed through the nearby roads of the site	Weekly for duration of construction	NQC (included in SDCMU, CSC, Contractor costs)
38. Public safety	- Give preference to local laborers to avoid the need for, or limit the size of, a construction camp - Conduct proactive outreach with leaders of nearby communities to educate women and girls about the risks posed by an all-male camp in the neighborhood - Give resident workers regular training on appropriate behavior in and around the camp - Adopt a zero-tolerance policy around aggression or violence against local women and girls	EHSO CSC Contractor	- Lack of reports of worker-involved abuse or harassment - Lack of complaints from public about violence or prostitution at camp - Female access to camp for employment allowed only when workers are out at work sites - Construction Camp Management Plan implemented as approved	Monthly for duration of construction	NQC (included in SDCMU, CSC, Contractor costs)

Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
	- When women must enter the camp for employment or selling produce, limit their entry to times when resident workers are out at the work site - Prohibit prostitution on the site, and monitor activity in this regard and work with community leaders to address the problem as needed				
39. Public safety	- Provide regular training and enforcement to minimize bad worker behavior off site, including public drunkenness, sexual harassment, and theft of crops	EHSO CSC Contractor	- Construction Camp Management Plan implemented as approved - Lack of complaints from public about behavior of resident workers	Monthly for duration of construction	NQC (included in SDCMU, CSC, Contractor costs)
40. Public health	- Install and maintain adequate toilet and septic systems to prevent discharge of raw sewage from camps to local water bodies or fields - Educate resident workers about sexually transmitted diseases and responsible sexual behavior - Work with local community leaders to prohibit prostitution in and around construction camps	EHSO CSC Contractor	- Construction Camp Management Plan implemented as approved - At least one working toilet per 10 resident workers installed, with septic treatment - Absence of visual evidence of raw sewage discharge - Lack of reports of prostitution around camp - Lack of concerns expressed by local community leaders about workers' off-site behavior	Once at start of construction (toilets) Monthly for duration of construction (other items)	NQC (included in SDCMU, CSC, Contractor costs)
41. Worker health and safety	- Implement approved Occupational Health and Safety Plan - Provide regular safety training for all workers - Provide task-appropriate PPE to all workers and enforce its use - Closely monitor works at all times to ensure strong worker compliance with safety practices	EHSO CSC Contractor	- Low incidence of workplace injuries - Workers observed using appropriate PPE - All aspects of Occupational Health and Safety Plan implemented as approved	Weekly for duration of construction	NQC (included in SDCMU, CSC, Contractor costs)
42. Worker health	- Implement approved Occupational Health and Safety Plan - Institute temperature checks (at least daily) for all workers and supervisory personnel on site - Provide each worker with an appropriate face mask daily or as needed and require mask use at all times. - Position hand washing and sanitizing stations at canteens and other eating areas, kitchens, and near toilets	EHSO CSC Contractor	- Temperature check regimen implemented consistently. - Workers supplied facemasks. - Workers consistently use facemasks. - Hand washing and sanitizing stations provided in appropriate locations and kept stocked at all times. - All aspects of Occupational Health and Safety Plan implemented as approved	Weekly for duration of construction	NQC (included in SDCMU, CSC, Contractor costs)
43. Worker health and safety	- Implement approved Construction Camp Management Plan	EHSO CSC Contractor	- Safety audit results included in monthly progress reports and quarterly monitoring reports	Monthly for duration of	NQC (observation)

Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
	- Conduct monthly safety audit of camp to identify fire risks, electrocution hazards and other unsafe conditions, and assess adequacy of fire extinguishers and first aid provisions - Institute a regular cleaning and disinfection regimen for camp kitchens, latrines, wash-up areas, eating areas and sleeping sheds - Provide adequate sleeping space with good cross-ventilation to avoid overcrowding and consequent spread of communicable illnesses and infestations (at least 4m² per worker) - Provide each worker with a raised sleeping platform with mattress or mat, bedding and mosquito netting - Ensure that each sleeping space has at least two working exits that remain functional at all times - Provide unlimited drinking water that meets the standards indicated in the Environment Conservation Rules, 2023 - Provide indoor eating space separate from sleeping areas; - Provide kitchens with off-floor food storage, raised working surfaces of a material that can be easily sanitized, and a ready supply of clean water; - Provide toilet facilities with at least one functional toilet (protected from the elements and affording full visual privacy to the user) per ten resident workers, with a ready water source for washing; - Provide roofed and partitioned wash-up areas with floors and proper drainage		- Lack of outbreaks of infectious illnesses (e.g., influenza, pneumonia, tuberculosis) and ailments associated with unsanitary conditions (e.g., dysentery, lice, scabies) - Living conditions meet standards specified in Construction Camp Management Plan - Drinking water quality (pH, TDS, EC, DO, BOD₅, COD, Chloride, SS, As, Fe, Total-N, Total-P, Total coliform, turbidity, temperature) meets standards indicated in the Environment Conservation Rules, 2023	construction (observation) Quantitative measurement quarterly by Contractor at source well	Quantifiable costs: Temporary disposal facilities BDT 100,000; Medical supplies: BDT 100,000; Drinking Water Quality: BDT 30,000 per sample = 8 times over construction period = BDT 30,000 x 8 = 240,000
44. Livelihoods	- Hire mostly or exclusively local workers on construction sites	EHSO CSC Contractor	- Workers from Narshingdi or nearby area given priority in hiring for construction jobs	In advance of any new crews or subcontractors being brought on site	NQC (included in SDCMU, CSC, Contractor costs)
45. Physical cultural resources	- Establish a chance find procedure and provide training to all workers regarding its triggering conditions, and to site engineers on its implementation	CSC	- Chance finds procedure included in CEMP and training provided to workers and site engineers	Once before start of construction	NQC (included in SDCMU costs)

(iii) WASTE MANAGEMENT

Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
46. Demolition waste	- If there is any reason to suspect presence of asbestos-containing materials (ACM), implement approved ACM Removal and Disposal Plan - Ensure salvage of recyclable and reusable items - Use rubble in site development or dispose of in a site identified and approved in accordance with the Waste Management Plan embedded within the CEMP	EHSO CSC Contractor	- Any ACM assessed and removed and disposed of in accordance with approved ACM Removal and Disposal Plan - Recyclable materials salvaged - Rubble appropriately used as fill on site, or disposed of in accordance with Waste Management Plan embedded in CEMP	Before and during site clearing	NQC (included in SDCMU, CSC, Contractor costs)
47. Construction waste	- Implement all provisions in the Waste Management Plan embedded in CEMP, including: - Provide waste receptacles on the work sites and collect their contents daily or weekly as needed - Recycle all recyclables through local providers of this service - Compost organic wastes generated by construction camp kitchens - Dispose of non-recyclable and non-organic wastes as directed in the Waste Management Plan embedded within the CEMP, as based on locally available and approved disposal options	EHSO CSC Contractor	- All classes of waste managed in accordance with Waste Management Plan embedded in CEMP	Monthly for duration of construction	NQC (included in SDCMU, CSC, Contractor costs)
48. Waste oils	- Recycle waste oils through a reputable business providing this service, as identified in the Waste Management Plan	EHSO CSC Contractor	- No evidence of waste oil dumping or burning - Documentation of transfers to identified service provider available	Monthly for duration of construction	NQC (included in SDCMU, CSC, Contractor costs)
C. OPERATION PHASE					
(i) BIOPHYSICAL ENVIRONMENT					
49. Water quality	- Store fluids only within dedicated indoor storage spaces with secondary containment capacity equaling or exceeding 115% of the volume of the largest container stored - Routinely inspect storage spaces and tanks for leakage, and take immediate corrective action as needed - Remove sludge at least once per year from all septic tanks installed, and work into the soil around on-site tree plantations for fertilization	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- Proper storage observed - Absence of evidence of spills and leaks - Sludge removed from all septic tanks at least annually, and appropriately used to fertilize on-site tree plantations	Quarterly (fluid storage) Routine inspection - Once prior to start of operations (Spill Prevention and Response Plan), then once per year	NQC (Included in SDCMU and NPI budgets)

Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
50. Drinking Water quality	- Install purification system for drinking water supply for the students and teachers	NPI	- Water quality tests of pH, DO, NO₃⁻, PO₄⁻ and E.Coli and compare to the ECR 2023 - Observe for colour and odor	Water quality test annually Observation and record keeping every month	NQC (Included in SDCMU and NPI budgets)
51. Water quality	- Prepare and implement Spill Prevention and Response Plan for the site. - Provide personnel training necessary for effective implementation of the plan prior to start of operations and annually thereafter	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- Spill Prevention and Response Plan prepared for the site prior to the start of operations. - Personnel training necessary for effective implementation of the Spill Prevention and Response Plan delivered before start of operations and repeated annually during operation phase	Once before start of operations, annually thereafter	NQC (Included in SDCMU and NPI budgets)
52. Water quality	- Purchase sufficient tarpaulins based on expected stockpiling activity, and make budgetary provision for regular replacement as needed - Strictly require the use of tarpaulins on all piles of mineral materials at all times, except during active handling of materials - Train personnel assigned to the minerals storage area in competent tarpaulin use - Regularly monitor tarpaulin condition and use - Regularly check and clean out sediment traps in minerals storage area	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- Thorough, competent use of tarpaulins on all materials stockpiles in minerals storage area observed to be standard procedure - Sediment traps in minerals storage area well maintained and functional - Runoff from minerals storage area is of sufficient quality not to cause violation of surface water standard (pH, BOD₅, COD, DO, SS, total coliform, Total P, Total N, turbidity) in receiving water body; compare to the Environment Conservation Rules, 2023	Quarterly	(Proportion of NPI EHS Unit costs for sampling/equipment over 20 years)
53. Air quality	- Ensure adequate staffing at peak times to help ensure that incoming trucks are processed efficiently and lines do not form - Enforce a strict no-idling policy	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- Ambient air quality (PM_{2.5}, PM₁₀, SO₂, CO, NO₂) meets standards indicated in the Air Pollution (control) Rules 2022.	Quarterly	(Proportion of NPI EHS Unit costs for sampling/equipment over 20 years)
54. Air quality	- Purchase sufficient tarpaulins based on expected stockpiling activity, and make budgetary provision for regular replacement as needed - Strictly require the use of tarpaulins on all piles of mineral materials at all times, except during active handling of materials - Train personnel assigned to the minerals storage area in competent tarpaulin use - Regularly monitor tarpaulin condition and use	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- Thorough, competent use of tarpaulins on all materials stockpiles in minerals storage area observed to be standard procedure - Ambient air quality (PM_{2.5}, PM₁₀, SO₂, CO, NO₂) meets standards indicated in the Air Pollution (control) Rules 2022.	Quarterly	NQC (air sampling cost accounted for in previous line)

Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
	- Ensure that appropriate basic misting equipment is purchased or purpose-built and kept in good working condition - Train personnel assigned to the minerals storage area in proper procedure for misting during materials handling - Strictly require misting as standard procedure during handling of dusty materials - Strictly prohibit stone crushing activity on the site, including the minerals storage area				
55. Air quality	- Strictly require all trucks entering the site to be equipped with tightly fitting tarpaulins - Sweep and spray roadways within the site as needed to limit dust	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- All trucks entering site observed to be appropriately covered - Roadways within the site swept and sprayed as needed to suppress dust - Ambient air quality (PM_{2.5}, PM₁₀, SO₂, CO, NO₂) meets standards indicated in the Air Pollution (control) Rules 2022	Quarterly	NQC (air sampling cost accounted for in previous line)
56. Soils	- Protect soils exposed by maintenance works with mulches and other protective coverings during works, and promptly re-establish vegetative cover when works have been completed - Regularly inspect site vegetation for loss of coverage and evidence of emerging gully erosion	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- Lack of evidence of gully erosion	Quarterly	NQC (Included in SDCMU and NPI budgets)
(ii) SOCIOECONOMIC AND CULTURAL ENVIRONMENT					
57. Public safety	- Regularly monitor facility operations for emerging public safety issues, and devise appropriate corrective action, as needed - Proactively coordinate with RHD/LGED to ensure that safety features including sidewalks, pullout and turn lanes, road markings, signage and other safety features are planned for and implemented in future approach road upgrades	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- Safety features implemented - Accident risk low	Quarterly	NQC (Included in SDCMU and NPI budget)
58. Public safety	- Pursue collaboration with RHD/LGED and local community leaders regarding durable solutions to safety risks from on-road and road-adjacent commerce, such as provision of alternative spaces outside the RoW for commercial and community activity	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- Low incidence of encroachment - Smooth traffic flow through settled areas - Low incidence of vehicle-pedestrian collisions	Quarterly	NQC (Included in SDCMU and NPI budget)

Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
59. Worker health and safety	- Enforce a strict policy against engine idling	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- Low incidence of staff complaints about emissions exposure	Quarterly	NQC (Included in SDCMU and NPI budget)
60. Worker health and safety	- Integrate pandemic response measures in operations and maintenance manuals and operating protocols for the NPI site, to ensure prompt implementation when emerging threats are identified	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- Pandemic response measures integrated in operations and maintenance manuals	Once prior to start of operations	NQC (Included in SDCMU and NPI budget)
61. Worker health and safety	- Incorporate Emergency Response Plan in laboratory operating protocols, and provide regular training for technicians and support staff on its activation	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- Emergency Response Plan included in laboratory operating protocols - Regular training provided on activation of Emergency Response Plan	Once prior to start of operations (protocols) Annually (training)	NQC (Included in SDCMU and NPI budget)
62. Livelihoods	- Give priority to local people and firms in selecting Contractors for maintenance works and selected permanent positions in operations and maintenance	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- Local people well represented in construction workforce	Annually	NQC (Included in SDCMU and NPI budget)
(iii) WASTE MANAGEMENT					
63. Laboratory waste	- Integrate detailed Laboratory Waste Management Plan (developed by laboratory design specialist engaged during detailed design) into laboratory operations and maintenance manual - Develop detailed protocols for waste classification, documentation, segregation, temporary storage and safe transport of hazardous wastes, and integrate these protocols into operations and maintenance manuals (laboratory design specialist to be engaged by Contractor during detailed design) - Provide training to laboratory technicians and maintenance staff on correct implementation of waste management protocols, before the laboratory becomes operational and on an annual basis thereafter - Specify parameters, measurement, and reporting for annual waste audit in laboratory waste management protocols - Conduct an annual waste management audit and implement corrective action as needed to address problematic trends	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- Detailed hazardous waste handling protocols specified in laboratory operations and maintenance manuals - Specifications for annual waste management audit integrated into laboratory waste management protocols - Annual waste management audit performed and reported - Discharges of liquid waste from laboratory meet standards indicated in Schedule 10 (Inland Surface Water) of the Environment Conservation Rules, 2023 (only if full-service lab)	Once prior to start of operations (protocols including waste management plans) Annually (waste audit) Quarterly (discharge)	NQC (Included in NPI budget for O&M)
64. Solid waste	- Ensure that appropriate waste management procedures for all components of the solid waste stream	SOU-SDCMU, ESFP-SDCMU, ESFP-NPI	- Recyclable solid waste is consistently segregated and picked up by a reputable recycling business	Quarterly	NQC (Included in

Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
	are specified in each facility's operations and maintenance manual		- Non-recyclable solid waste is consistently taken to a legal landfill for disposal - Lack of evidence of waste dumping or burning on site		NPI O&M budget)

313. As will be noted from the preceding table and figures, several entities are expected to submit regular monitoring reports as a fundamental contribution to effective implementation of the EMP. These reporting processes are summarized in Table IX-5 for clarity. A sample outline of a semi-annual monitoring report as must be prepared by the SOU for submission to ADB (which can also be adapted for quarterly monitoring reports as must be prepared for DOE) is provided in Appendix 18.

Table IX-5 Monitoring reporting requirements

Report type	Prepared by	Submitted to	Frequency
Construction phase			
Contractor EHS monitoring reports	Contractor	ESFP	Monthly
Site EHS monitoring reports	EHSO	ESFP	Monthly
Progress reports (safeguards sections)	ESFP	PIU/SOU	Quarterly
Environmental monitoring reports	SOU	DOE	Quarterly
Environmental monitoring reports	SOU	ADB	Semi-annually
Operation phase			
Environmental monitoring reports	NPI units and SDCMU	DOE	Quarterly

E. Institutional strengthening and training requirements

314. Implementation of environmental safeguards on infrastructure projects in Bangladesh has tended to be weak, as is often evident even to the casual observer passing by poorly fenced construction sites where few workers can be seen using appropriate personal protective equipment. Incomplete EMP compliance is largely a function of two factors: (i) inadequate capacity in institutions charged with oversight; and (ii) a low level of awareness and knowledge on the part of local subcontractors and their workers.

1. Institutional capacity

315. **Project-specific oversight entities.** Oversight of EMP implementation rests in large part on the PIU (at NPI) and its SOU. The SOU should, as a matter of course, be staffed by environmental professionals with strong prior knowledge of safeguards requirements and solid understanding of environmental and social impact analysis in relation to infrastructure and be supported with resources adequate to carry out its duties. Site-level oversight is to be provided by the SDCMU and NPI and their EHSOs during the construction period. The EHSOs should have prior environmental training and be adequately supported by SDCMU and NPI³⁷. Assuming professionals with appropriate qualifications and experience are engaged for environmental positions within the SOU, institutional capacity for implementing the EMP should be sufficient.

316. **EA EHS units.** Neither SDCMU nor NPI has a functioning permanent internal unit with capacity sufficient to oversee implementation of environment, health and safety safeguards at agency-owned sites and facilities. This means that implementation of the EMP during the operation phase—including monitoring of compliance and effects—have almost no likelihood of being properly carried out. This applies not only to the investments at Chattagram NPI, but to all infrastructure owned and operated by these agencies. The capacity to carry out the operation phase elements of the EMP needs to be established in both agencies. It bears emphasis that SDCMU and NPI should have this kind of in-house capacity to carry out operation-phase EMP

³⁷ As has been discussed above, it will be acceptable for there to be just one EHSO for the works at the NPI, given the limited scale of works and proximity of sites. SDCMU and NPI will decide how to share cost and supervision responsibility for the EHSO.

implementation tasks for all of their infrastructure development projects, not just this one. The proposed capacity building program should be seen as an opportunity to develop capacity with wider application; capacity building efforts mandated under future projects can build upon the foundation established under this project.

317. A capacity building program for EHS units within SDCMU and NPI should be developed and delivered in the interval between the project's approval and the end of construction on the first round of investments. The capacity development program should aim to establish stable, sustainable EHS units capable of (i) proactively and professionally driving compliance with national and multilateral-mandated environmental clearance and environmental assessment requirements in relation to proposed, under-construction and operational infrastructure investments; (ii) collaborating productively with specialists hired under the auspices of major investment projects; (iii) carrying out long-term EHS monitoring for all agency facilities; and (iv) building a culture of sustainability and safety across their home agencies through awareness-raising and educational campaigns.

318. Capacity investments should include support for hiring and resourcing adequate staff commensurate with the needs of the agency, and staff training. The capacity building program should include the following elements: (i) needs assessment; (ii) capacity-building plan including recommendations for staffing and resources; and (iii) training program for each EA's EHS unit. Design, development and delivery of the capacity building program is appropriately included in the mandate of the CSC engaged to oversee implementation of the project works. The CSC should be supported in this work by the SOU, and the ESPFs of SDCMU and NPI.

2. Training needs

319. **Contractors.** International construction contractors working in Bangladesh are well aware of safeguards requirements, and knowledgeable on global best practices in impact mitigation and site management. Effective oversight and enforcement, not training, is needed to ensure strong EMP performance from these firms. However, the local firms acting as contractor or sub-contractors, which will undertake most of the physical work of infrastructure development, can in most cases be expected to be less aware and less experienced regarding safeguards requirements, and minimally concerned with international standards of practice. Local firms will benefit from training to strengthen their knowledge and awareness and help ensure strong compliance on this project and other projects in the future.

320. Training for contractors/sub-contractors should be developed by the SOU in collaboration with the CSCs and be delivered by the CSC prior to the start of construction, and whenever weak compliance warrants refresher training. Training for contractors/sub-contractors should cover the following topics:

- (i) rationale for safeguards requirements in infrastructure development;
- (ii) ADB safeguards requirements;
- (iii) national safeguards requirements;
- (iv) primary contractors' legal and contractual responsibilities with respect to compliance with national environmental and labor rules;
- (v) sub-contractors' legal and contractual responsibilities with respect to compliance with national environmental and labor rules;
- (vi) environmental monitoring processes and enforcement;
- (vii) best practices in construction site management and environmental mitigation; and
- (viii) emergency response plans and their implementation.

321. **Workers.** Primary contractors and their sub-contractors should provide adequate training to workers in their employ to ensure safe and sanitary workplaces and full compliance with all prescriptions of the EMP, but often fall short in this regard. It is therefore usually necessary and appropriate for the PIU to implement supplemental worker training. Such training should be designed by the SOU in collaboration with the CSC and implemented by the SOU through the site-level EHSOs. Worker training should be provided prior to the start of construction, and whenever new sub-contractors and crews of workers are brought onstream; refresher training should be given any time site monitoring reveals recurrent patterns of non-compliance that can be attributed to lack of worker knowledge or awareness.

322. Training for workers should encompass the following topics:

- (i) rationale for EHS requirements on construction sites;
- (ii) workplace safety practices, including, but not limited to, proper use of task-appropriate personal protective equipment;
- (iii) safe handling of noxious substances used in construction;
- (iv) proper procedure for avoiding spills during refueling and equipment maintenance;
- (v) fire safety, including fire prevention and use of fire extinguishers;
- (vi) reporting observed spills, leaks, physical hazards and other potentially urgent matters to site managers;
- (vii) proper solid waste management practices;
- (viii) sanitation and personal cleanliness in toilets, cooking and eating areas, wash-up facilities and employer-provided accommodations; and
- (ix) existence and use of the Grievance Redress Mechanism.

323. **Facility managers.** During the operation phase, ongoing mitigation of potential impacts is subsumed within regular facility operations, guided by operations and maintenance manuals, as well as protocols for workplace safety, emergency response and routine monitoring of buildings and equipment. Work carried out at operational facilities by external maintenance contractors also needs to be monitored for compliance with the EMP by the facilities' regular personnel. Accordingly, it is appropriate for facility managers, their designated EHS personnel, and other staff to receive training to allow them to undertake such work with confidence.

324. Training for facility operators should address the following:

- (i) the EMP and its relevance to operations;
- (ii) linkages between the EMP and operations and maintenance manuals;
- (iii) best EHS practices in facility management;
- (iv) emergency response plans and their implementation;
- (v) monitoring maintenance contractors; and
- (vi) EMP reporting requirements.

325. Facility personnel should be given training prior to the end of construction, as soon as operations and maintenance manuals and emergency response plans have been finalized and approved by the SOU and CSC. Training should be designed by the CSC and organized and delivered by the new SDCMU and NPI EHS units. Periodic refresher training may be appropriate throughout the operation phase, especially following turnover of key personnel positions or if monitoring carried out by the SDCMU and NPI EHS units indicates recurrent compliance issues.

326. **Institutional strengthening.** The PMU will lead the implementation of the EMP assisted by the consultants, with responsibility for such key tasks as ensuring project readiness; reviewing and approving designs and plans; ensuring that environmental information in bid documents and environmental clauses in construction contracts are on target; providing training on environmental

mitigation measures; supervising and directing environmental monitoring; and providing guidance on environmental matters whenever needed. The work and leadership of the environmental consultants will strengthen environmental management and supervision capacity of the EA, IAs, PMU and contractors, and ensure the project's full compliance with the ADB's SPS.

327. In addition to the activity of the environmental consultants, the project's environmental management and supervision will be enhanced by engagement of a licensed laboratory to undertake quarterly site monitoring, including quantitative measurement of air quality and noise levels at all active construction sites; this importation of technical monitoring expertise will ensure adherence to DoE standards. Finally, all contractors will be required to hire an Environment, Health and Safety Officer (EHSO) for each site under their control and empower that officer to manage the implementation of an Environment, Health and Safety Management Plan (EHSMP) for the site. With the guidance, support and supervision of the environmental consultants, the EHSOs will play a key role in ensuring sound implementation of environmental mitigation measures prescribed by the EMP. It is believed that these institutional strengthening measures will enable competent and efficient environmental management of the project. The institutional strengthening plan is summarized in Table IX-6.

Table IX-6 Institutional Strengthening Measures

Target Agencies	Institutional strengthening measures	Timing
MoF	Define institutional arrangements for environmental management, monitoring and supervision Define positions and responsibilities	During project preparation
SDCMU	Recruit and contract one national environmental consultant for environmental management, environmental training, EMP compliance review, and reporting	At start of pre-construction phase
CSC / NPI	Recruit and contract licensed laboratory for quarterly environmental monitoring before and during construction phase	Prior to start of construction
Contractors	Hire Environment, Health and Safety Officers for each construction site	Prior to start of construction
Contractor / Workers	Work Health and Safety training on periodic basis	Before start of the construction and quarterly until end of construction

328. **Training.** Selected personnel of the MoF, NPI, SDCMU and contractors will receive training in environmental management, environmental monitoring and supervision, mitigation planning, emergency response, public consultation and use of the GRM, occupational and community health and safety, and other environmental management topics. The topics, methods, and estimated costs of the training are outlined in Table IX-7. Training sessions will use a workshop format. Training will be developed and provided by the environmental consultants with the support of other experts engaged under the grant implementation consultant services.

Table IX-7 Training requirements and estimated cost

Training target	Developed by	Delivered by	Timing	Estimated cost for this location
Contractor	SOU/CSC	SOU/EHSO	Once before start of construction, periodically during construction on quarterly basis	BDT 30,000 per session 9 sessions over 2 years = BDT 30,000*9 = 2,70,000
Workers	SOU/CSC	SOU/EHSO	Once before start of construction, weekly toolbox meeting at site	BDT 50,000 for first session, arrange toolbox meeting on site at Contractor cost
Facility managers	SOU	TMED EHS Unit	Before start of operations	BDT 100,000

Training Topics.

EMP Implementation: Roles and Responsibilities, Monitoring, Supervision and Reporting Procedures
 Grievance Redress Mechanism: Roles and Responsibilities, Procedures, Occupational and Community Health and Safety, Emergency Preparedness and Response, Pollution Control and Environmental Monitoring, Inspection and Reporting, Public Consultation, Contractor Engagement and Management, including EMP Enforcement, Operation-Phase Environmental Management and Monitoring

F. EMP Implementation cost

329. Cost estimates for mitigation measures, environmental monitoring, public consultations, and capacity building are summarized in Table IX-8. Contractors will bear the direct costs of all mitigation measures during construction, which will be included in the tender and contract documents; this includes features built into facility designs in order to prevent environmental impacts from arising. The MoF SDCMU and NPI will bear the costs related to mitigation measures during operation. Costs related to environmental supervision during construction will be borne by the SDCMU (for hiring a licensed laboratory to conduct quarterly monitoring), the PMU (for the activities of the environmental consultants) and by the contractors (for monitoring work carried out by the EHSOs). During the operation phase and monitoring costs will be borne by the SDCMU and NPI (for regular monitoring activity of their site EHSOs).

Table IX-8 EMP implementation cost

Note: The EMP cost will be included in the BOQ as a provisional sum (non-competitive) item				
Sl. No	Description of activity	Unit cost (BDT)	Calculation	Cost (BDT)
1	Recruit and appoint EHSO as site for 24 months by the contractor (verified by CTEC ESHO)		Refer to tender data sheet (personnel cost)	-
2	Tree plantation at site and maintenance for 2 years as required and as per direction of the E.I.C. Plantation should be following the suggestion in the EMP table. The payment is to be made only when trees are fully grown)	BDT 500 per sapling (sapling, fencing, mulching, watering etc)	100 trees x BDT 500	50,000
3	Debris disposal and waste management on camp site. Temporary camp site waste disposal facility improvement 2 nos (1 no of organic waste and 1 no of inorganic waste disposal facility) Site cleaning, Removal and disposal activities	lump sum	BDT 100,000	100,000

Note: The EMP cost will be included in the BOQ as a provisional sum (non-competitive) item				
Sl. No	Description of activity	Unit cost (BDT)	Calculation	Cost (BDT)
4	Traffic management during construction, equipment for traffic management (traffic controller employment)	lump sum	BDT 50,000	50,000
6	Medical supplies (First Aid box), other medical requirements, note, equipment, kits, dress etc.	lump sum	BDT 100,000	100,000
7	Waste collection facilities with collection bins, scheduled disposal, carry to designated places, waste separation process etc	lump sum	BDT 100,000	100,000
8	Health safety warning signs and log maintenance, COVID-19 response as identified in the EMP	lump sum	BDT 50,000	50,000
9	Personal Protection equipment, EMP implementation briefings (monthly)	lump sum	BDT 100,000	100,000
10	Conduct environmental baseline: - Ambient air quality (PM _{2.5} , PM ₁₀ , SO ₂ , CO, NO ₂); compare to the Air Pollution Control Rules 2022 (minimum 8 hr sampling period) - Adjacent surface waters (pH, BOD ₅ , COD, DO, SS, total coliform, Total P, Total N, turbidity); compare to the Environment Conservation Rules, 2023 - Groundwater in wells on site or nearby (pH, TDS, EC, DO, BOD ₅ , COD, Chloride, SS, As, Fe, Total-N, Total-P, Total coliform, turbidity, temperature); compare to the Environment Conservation Rules, 2023 - Ambient noise (dBa daytime, dBa night); compare to Noise Pollution Control Rules 2006	Air quality: BDT 25000; Water quality: BDT 30000; Groundwater quality: BDT 30000; noise measurement: BDT 10000 per sampling time	BDT 95,000	95,000
11	Monitoring: - Ambient air quality (PM _{2.5} , PM ₁₀ , SO ₂ , CO, NO ₂) - Adjacent surface waters (pH, BOD ₅ , COD, DO, SS, total coliform, Total P, Total N, turbidity) - Groundwater in wells on site or nearby (pH, TDS, EC, DO, BOD ₅ , COD, Chloride, SS, As, Fe, Total-N, Total-P, Total coliform, turbidity, temperature) - Ambient noise (dBa daytime, dBa night)	Air quality: BDT 25000; Water quality: BDT 30000; Groundwater quality: BDT 30000; noise measurement: BDT 10,000 per sampling time	Over 2 years of construction period total 8 samples = BDT 95000 x 8 =	760,000
12	Construction of male female toilets (adequate quantities as per satisfaction of the ESFP)	Lump sum		200,000
13	Worker shed	Lump sum		200,000
14	Training cost (as described in Table IX-7)	Lump sum		420,000
15	Dust suppression, drainage management, community health & safety management etc.	Contractor cost		-
Total cost				2,225,000

X. CONCLUSION AND RECOMMENDATION

A. Conclusion

330. This IEE report on investments planned for Narshingdi NATI inside the NPI campus has been prepared based on desktop study, field reconnaissance of the planned building site and surrounding areas, and consultations with institutional stakeholders and members of the public in the projected area of influence. The report comprises a comprehensive consideration of the environmental, health and safety impacts that can be anticipated to arise from the project. The EMP has been prepared in line with the ADB's Safeguards Policy Statement (SPS) and DoE environmental assessment requirements, and the mitigation strategies prescribed within it reflect current international best practices, as exemplified by the World Bank Group's Environment, Health and Safety Guidelines.

331. Minor negative impacts of the project will be felt during the construction phases which may involve minor sand erosion, water and waste pollution. The major significant impacts can come from disrupting local hydrological system and waste pollution. The impacts of noise and increase in traffic are expected to be within the existing level experienced by the local people. The contractor will be under specific orders for providing PPE to the workers engaged in the job. Strict site and labour camp health and safety regulation will be forced as per government and ADB guidelines.

332. The monitoring plan, if properly implemented during the pre-construction, construction and post-construction and operation phases will ensure taking corrective measures. The proposed project will have no residual adverse impact on the environment or the eco-system if mitigation measures are properly followed. MoF and NPI are required to take clearance from the DoE for implementing the construction projects and other ancillary works. The IEE report has been prepared with this end in view.

B. Recommendations

333. While residual negative impacts have been identified, it is also acknowledged that the investments are expected to have significant positive economic impacts for local communities, and these are to be weighed against the residual negative impacts. Generally, very positive perceptions and expectations were expressed about the planned investments during consultations carried out as part of IEE preparation, and while the local communities are clearly concerned about noise and dust from the construction project, they expect that some minor problems can be faced by the local communities for the greater good. It seems clear that local community leaders see investment in

334. The major recommendations made in the IEE are as follows:

- (i) Some medium negative impacts like increased noise level, air and water pollution at the pre-construction and construction phases should be taken care of by taking proper mitigation measures as suggested in the EMP section of this IEE.
- (ii) The Site specific EMPs should be verified by the MoF/ADB appointed Environmental Specialist.
- (iii) The EMP and EMP cost must be included in the bid documents prepared by SDCMU.
- (iv) The contractor needs to prepare the site-specific CEMP prior construction works start. The CEMP must be approved by SDCMU and ADB.
- (v) MoF and NPI should get clearance from DoE before the start of the construction. This IEE is prepared in the view that this document belongs to MoF and NPI and should be used for obtaining ECC from DoE. Any further instruction conveyed from DoE prior obtaining the ECC,

MoF is responsible to update this IEE accordingly. An Environmental Specialist should be appointed by MoF at SDCMU prior construction works to develop and update the EMP.

APPENDICES

- APPENDIX 1 – Relevant National Environmental Standards
- APPENDIX 2 – Environmental Categorization
- APPENDIX 3 – Environmental and Social Screening Checklist
- APPENDIX 4 – Sample Traffic Management Plan (TMP)
- APPENDIX 5 – COVID-19 Health and Safety Guidance for the Construction Workforce
- APPENDIX 6 – Emergency response team
- APPENDIX 7 – Sample EHS Monitoring and reporting template
- APPENDIX 8 – Sample Outline of Compensatory Tree Planting Plan
- APPENDIX 9 – Sample Outline of Contractor Environmental Management Plan
- APPENDIX 10 – Sample Outline of Soil Erosion Prevention Plan
- APPENDIX 11 – Sample Outline of Construction Camp Management Plan
- APPENDIX 12 – Sample Outline of Site Reinstatement Plan
- APPENDIX 13 – Sample Outline of Occupational Health and Safety Plan
- APPENDIX 14 – Sample Outline of Asbestos-Containing Materials Removal and Disposal Plan
- APPENDIX 15 - Sample Outline of Spill Prevention and Response Plan
- APPENDIX 16 – Consultation Records
- APPENDIX 17 – Proposed Terms of Reference for Environment, Health and Safety Officers
- APPENDIX 18 – Outline of Semi-Annual Environmental Monitoring Report
- APPENDIX 19 – Sample Grievance Registration form
- APPENDIX 20 – Outline of chance finds protocols

Appendix 1 – Relevant National Environmental Standards

Bangladesh Ambient Air Quality Standard as adopted in 2022.

Pollutant	Objective	Average
CO	05 mg/m ³	8 hours ^a
	20 mg/m ³	1 hour ^a
Pb	0.25 µg/m ³	Annual ^b
	0.50 µg/m ³	24 hours ^a
NOx	40 µg/m ³	Annual ^b
	80 µg/m ³	24 hours ^a
PM ₁₀	50 µg/m ³	Annual ^b
	150 µg/m ³	24 hours ^a
PM _{2.5}	35 µg/m ³	Annual ^b
	65 µg/m ³	24 hours ^a
O ₃	180 µg/m ³	1 hour ^a
	100 µg/m ³	8 hours ^a
SO ₂	250 µg/m ³	1 hour ^a
	80 µg/m ³	24 hours ^a
NH ₃	100 µg/m ³	Annual ^b
	400 µg/m ³	24 hours ^a

Notes:

(a) Not to be exceeded more than once per year

(b) The objective is attained when the annual arithmetic mean is within the standard

Standard for Water

(A) Standard for inland surface water

Best Practice based classification	Parameter					
	pH	BOD mg/l	DO Mg/l	Total Coliform CFU/100	TDS (mg/l)	COD (mg/l)
a. Source of drinking water for supply only after disinfecting:	6.5-8.5	≤2	≥6	≤100	1000	10
b. Water usable for recreational activity:	6.5-8.5	≤3	≥5	≤50	1000	10
c. Source of drinking water for supply after conventional treatment:	6.0-9.0	≤3	≥5	≤5000	1000	25
d. Water usable for fish culture	6.0-9.0	≤6	≥5	≤5000	1000	50
e. Water usable by various process and cooling industries:	6.5-8.5	12	≥1	-	1000	100
g. Water used for irrigation	6.5-8.5	≤12	-	≤50,000	1000	100

Notes:

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

(B) Standard for drinking water

Sl. No.	Parameter	Unit	Standards
1	2	3	4
1	Fecal Coliform	CFU/100ml	0
2	Total Coliform	CFU/100ml	0
3	NO ₃ ⁻	Mg/l	45
4	As	Mg/l	0.05
5	Turbidity	NTU	5
6	NH ₃	Mg/l	1.5
7	Chloride	Mg/l	250
8	pH		6.5-8.5
9	K	Mg/l	12
10	Mg	Mg/l	30-35
11	Hg	Mg/l	0.001
12	NO ₂	Mg/l	1.0
13	Na	Mg/l	200
14	SO ₄ ⁻²	Mg/l	250
15	TDS	Mg/l	1000

SCHEDULE - 4
Standard for Sound
(as adopted 2006)

Sl. No.	Category of areas	Standards determined at dBa unit	
		Day	Night
a.	Silent zone	50	40
b.	Residential area	55	45
c.	Mixed area (mainly residential area, and also simultaneously used for commercial and industrial purposes)	60	50
d.	Commercial area	70	60
e.	Industrial area	75	70

Notes:

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

The time from 9 p.m. to 6 a.m. is counted as nighttime.

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

Standards for Sound originating from Motor Vehicles or Mechanized Vessels

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

* All the time of taking measurement, the motor vehicle shall not be in motion and its engine conditions shall be as follows: -

- (a) Diesel engine – maximum rotating speed
- (b) Gasoline engine – at two thirds of its maximum rotating speed and without any load.
- (c) Motorcycle – If maximum rotating speed is above 5000 rpm; two-thirds of the speed, and if maximum rotating speed is less than 5000 rpm, three-fourth of the speed.

Standard for Emission from Motor Vehicles

Parameter	Unit	Standard Unit
Black Smoke	Hartridge Smoke Unit (HSU)	65
Carbon Monoxide	gm/km Percent area	24 04
Hydrocarbon	gm/km ppm	02 180
Oxides of Nitrogen	gm/km ppm	02 600

* As measured at two thirds of maximum rotating speed.

Appendix 2 – ENVIRONMENTAL AUDIT REPORT

A. INTRODUCTION

ADB SPS, 2009 requires an environmental audit, if a project involves facilities and/or activities that already exist or under construction, including an on-site assessment to identify past or present concerns related to impact on the environment. As per the subprojects' proposal, The investment proposed for the proposed Narsingdi Auto-Tech Training Institute (NATI) will be located at the Narshindi Polytechnic Institute (NPI), at Narshindi sadar upazila of Narshindi district, utilizing existing infrastructures such as land, drainage, roads etc. Consequently, an environmental audit has been conducted to find out the safeguards concern within the subproject boundary. The NPI area is small, approximately 9000sqm.

B. SUBPROJECT SETTING

The project is on the Narsingdi Polytechnic Institute campus, at Narsingdi Sadar. Proposed structures are:

Building Type: B2. (a) Horizontal and vertical extension project: One-storied existing building having a footprint of 36m x 9.2m and having a foundation for 5-storied building. Three more floors are proposed for vertical extension. On the south side of this building, a one-storied 4m x 36m is proposed for horizontal extension. The newly added total area shall be 1138 sqm; (b) New Automotive Technology Training Center: Three-storied building, having a footprint of 376 sqm. Total area 1130sqm. The design has a provision for one storied future extension. It is located on the northeast corner of the campus and supported by a 3.3m approach road.

Land Area. Approximate 770 sqm (22m x 35m) available land (plain land) area is proposed for this project located on the northeast corner of the campus and supported by a 3.3m approach road. Currently NATI does not exist. The proposed site is NPI owned area which is currently barren (Figure 1). Agricultural lands and newly constructed buildings surround the proposed site. The footprint of the NPI area is small. East to the NPI, there is a powerplant.

There is no drainage system installed at the proposed site. The proposed site is barren land behind the NPI structures. Overall, the NPI has a non-functioning drainage system and outlet. Given that the NPI is not located within the municipality, no main drainage system is in existence that NPI can construct and connect an outlet. Because of the rapid urbanization around NPI, traditional drainage system, drainage stormwater towards a low land is not functional anymore. Hence, drainage system will be a major concern for the construction of NATI.



Figure 1: Proposed construction site for NATI at NPI

C. ENVIRONMENTAL ISSUES

(i) Flooding and drainage

The major issue of the NPI area is the flooding and drainage issue. The NPI site is above the normal flood level as the campus is sand filled and raised from the surrounding lowlands. However, due to fast land development around NPI and sand filling going on, NPI is facing the issue of slow drainage and waterlogging during monsoon. The installed drainage system at NPI is old and non-functional (see Figure below). The proposed site for NATI is located at the eastern end of NPI without any drainage facility. Hence, if not proper drainage facility is not installed, the proposed site might suffer from waterlogging and flooding in future.

Recommendations: (i) considering the local topography installment of a drainage system and proposed landscaping will be necessary to reduce the occurrence and impact of flooding and waterlogging; (ii) raise plinth size of the proposed buildings; and (iii) clean and maintain existing narrow drainage systems within the campus.

(ii) Waste

No proper solid waste system was observed within the NPI campus. Currently, only few bins were found through out the campus, which are not well used. Solid waste was found to be thrown in few specific areas of the campus which is collected and thrown to a temporary waste collection system outside the campus walls by the NPI authority. Increased commercial activities around the campus are likely to pose the risk of waste being dumped into the nearby drains. There is a drainage system at the proposed site. The entire region is being urbanized in a rapid rate by sand filling the lowlands. So, there will be a tendency to through waste at these lowlands. This waste stream will grow over time and create havoc in the local livelihoods.

Recommendations: (i) Adequate segregated collection bins should be strategically placed at indoor and outdoor locations of the campus structures where waste generation can be expected. The design of the drainage system also should include the access points where it can be cleaned.

(iii) Surrounding site

The NPI campus is surrounded by lowlands, specially used for agriculture. However, all the surrounding lands are being converted to sand filled land to be used of construction. However, there is no municipal drainage system in the region. All the construction sites are targeting their drainage discharge towards the nearby lowland. But these lowlands are being also converted for further construction projects. This would

mean, waterlogging is eminent in this area. Given no municipal drainage installed nearby, the scenario of waterlogging may exacerbate in future.

Recommendation: (i) Design a central drainage system in the NPI area depending on the topography and make the discharge area at the southern part of the NPI area where a barren low land is currently exiting. In future, it is possible that a roadside drain might be constructed by the local authority.

(iv) Energy and Green House gas emission

Certain materials have much higher embodied emissions than others; concrete is a particularly carbon-intensive material. Materials that are not available locally—particularly very heavy materials—also drive up the emissions associated with building. Installed equipment that is not modern and efficient represents a missed opportunity to lower the carbon footprint of facilities, as does failure to integrate design measures that allow for natural cooling, natural light, and reduced water pumping needs.

Recommendations: (i) Key strategies for reducing emissions, and that should be considered for incorporation in the NATI infrastructure are outlined in the Table below.

Table: Possible design phase measures for climate change mitigation

Climate change mitigation measure	Rationale
1. Substitute other materials for concrete where feasible	- Concrete is among the most carbon-intensive of building materials
2. Use low-carbon concrete as much as possible	- Using a lower proportion of cement (and longer cure time to compensate) can reduce the carbon intensity of concrete
3. Create designs that maximize use of building materials that are available locally	- Reduced transport emissions
5. Integrate photovoltaic generation into the electrical plan	- Reduce reliance on coal-generated electricity - Reduce reliance on back-up diesel generator - Possibly reduce size of generator needed
6. Specify only high-efficiency electrical and mechanical equipment	- Reduce reliance on coal-generated electricity - Reduce reliance on back-up diesel generator - Possibly reduce size of generator needed
7. Specify most fuel-efficient backup generator available	- Reduce diesel consumption
8. Maximize cross-ventilation by use of courtyards, openable windows and favorable building orientation	- Reduce demand for air conditioning
9. Prioritize shade in the landscaping plan, with plentiful wide-crowned shade trees on all parts of site	
10. Incorporate hollow wall structures	
11. Use overhangs above large windows to prevent excessive solar penetration	
12. Maximize interior natural light by use of favorable building orientation and courtyards	- Reduce use of electrical lighting during daytime
13. Specify water-saving toilets, faucets and showerheads	- Reduce need for pumping and treating water
14. Design dedicated plumbing system for drinking and cooking water	- Reduce volume of water requiring energy-intensive water treatment
15. Aim to meet all water heating needs with solar heaters	- Eliminate use of electricity for heating water
16. Specify high-intensity, full-time lighting only where strictly necessary	- Reduce consumption of energy for lighting spaces that don't need it (e.g., parking lots that are only used at peak times)

Climate change mitigation measure	Rationale
17. Specify solar-powered lighting for outdoor applications	- Reduce energy used by lighting
18. Base landscape plan around drought-tolerant perennial native species	- Reduce the need for pumping water
19. Design site layout and inspection process to minimize the length of time vehicles have their engines running during their passage on Love Road	- Reduce direct greenhouse gas emissions
20. Incorporate green roofs wherever roof area is not needed for solar panels and solar water heaters	- Reduce cooling needs
21. Incorporate lightning arrester in the structural design	- Lightning has been a critical source of infrastructure and economic recently.

(v) Flora and fauna

The NPI campus is devoid of any wild animal. However, there are some vegetation within the campus. Most of these trees are ornamental. The proposed site was found with only wild grass and bushes.

Recommendations: (i) the proposed site does not have much space for plantation, hence at only 10-15 trees can be planted; (ii) a tree plantation plan can be proposed in the IEE report.

D. ACTION PLAN

Time frame	Action
Design stage	- Consider flooding and drainage pattern in and around the site in design stage - Consider climate change and lightning issues in building design - Consider campus wide drainage plan to drain out excess water during storm and heavy rains event - Design designated waste management (disposal and collection system) within the NATI area and overall NPI campus
Construction phase	- Drain construction should be done only during drain season, since the entire area is a lowland and stays under water for 4-6 months - Since the campus area is mainly low land, disposal of construction waste should not be contained at the NPI campus. The waste should be immediately disposed of to a designated area approved by the local municipality or authority (i.e., Narhsingdi Sadar upazila) - During construction energy saving and green certified machineries should be used
Operation phase	- Place bins for solid waste disposal at strategic points of the campus - Use the ETP at the proposed structure to treat waste water specially from painting workshop - Maintain lightning arrester at the NATI building to improve machine life - Properly maintain the solar panels and rainwater harvesting on regular basis

Appendix 3 – Environmental and Social Screening Checklist

Results Based Lending Environmental and Social Screening Checklist for Bangladesh: Skills for Industry Competitiveness and Innovation Program (SICIP)

Screening for eligible activities: *This checklist will be used for screening activities that would be eligible for RBL financing. The RBL program will be categorized according to the Safeguard Policy Statement and the relevant operation manual definitions. At the concept stage, program team is required to submit the environment, involuntary resettlement and indigenous peoples categorization form to SDSS (standard template) for review and CCO's concurrence. The project team shall complete this screening checklist and include as a supplementary document to the Categorization form to be submitted to SDSS for confirmation of eligible activities under the RBL program. During preparation of the PSSA, program team is encouraged to update SDSS on the type of activities likely to be considered for funding under the RBL program.*

	Risk	Assessment
1.	Likely Environment and Social Impacts	
<i>Describe the potential environmental and social benefits, impacts and risks that are likely to be associated with the Program component activities?</i>		
Type, sensitivity of location, scale and magnitude of potential adverse impacts and risks;		Aligned with the Bangladesh country partnership strategy 2021–2025 and broader Bangladesh Government Program “Human capital enhanced for sustainable economic development and inclusive growth”, the proposed RBL program will increase provision of skilled workforce for industry competitiveness and innovation. The key major outputs envisaged for the RBL programme are: (i) Training for advanced technical skills in priority and emerging sectors improved; (ii) Managerial capabilities and green innovation capacity strengthened; (iii) Socially inclusive skilling and upskilling expanded; and (iv) Institutional capacity for skills monitoring and management enhanced.
- Describe the RBL program scope, the nature and type of activities, benefits and risks associated with the program - What will be the scale, severity/significance of adverse environmental and social impacts (past present and future, direct, indirect, cumulative, site specific characteristics, impact on critical habitat, potential loss or conversion of natural habitats, changes in land use, nature and scale of involuntary resettlement, changes in access to resources). - What will be the impact on indigenous peoples/ communities? - Where are the activities sited? Whether they are in an environmentally or socially sensitive location? - Whether there will be damages to cultural heritage, indigenous knowledge and livelihood systems? - What would be the extent of impact on vulnerable groups? - Will there be issues related to community safety and workers occupational health and safety?	- Initial risk assessment for Environment:	Under “Output 1: Training for advanced technical skills improved” the proposed RBL program aims to cultivate higher-level technical skills and enhance institutional capacity to produce skilled workers to adept with emerging technologies including green technologies. To achieve this aim, along with other activities like setting up high-demand technology-based courses in garments universities, the RBL program will construct/establish smart textile technology living labs (NATIs) in two textile engineering colleges (Bangabandhu Textile Engineering College in Tangail and Chittagong Textile Engineering College in Chittogram) and construct one academic building (10th story) in

	the East West University. In addition, extension of classroom and some renovation work will be carried out at the Institute of Business Administration (IBA), Dhaka University. These activities will involve civil works and have potential to pose adverse social and environmental impacts. The scopes of civil works might be widened in future. From environmental perspective, the benefits from the civil works include disaster resilient and climate friendly academic campuses which include construction of academic buildings and laboratories. The co-benefits include promotion of green technologies in the industries through the courses offered by the engineering colleges and laboratories which will foster the development of environment friendly industries in Bangladesh. The possible adverse environmental impacts from construction and renovation activities are site-specific, restricted within existing engineering college/campus premises and are not expected to take place in environmentally sensitive locations. At this phase, it is envisaged that 2 new SSTLs (7 storied) will take place in within the campuses of engineering colleges, while one of academic building (10 storied) will be constructed within East West University campus with some minor renovation works in Dhaka University campus. New construction may create large carbon footprint on the local ecology and contribute to carbon emission. High pitch construction noise, high volume dust generation and local ponding of water and construction sludge are expected to impact local environment and communities. It is likely that the construction work will pose threat on workers' health safety and sanitation, potentially on the work camp hygiene and workplace injury. Traffic congestion due to construction vehicles are also expected, specially at Dhaka University and East West university. Some worker occupational health safety issues might be observed during construction. However, given the in-campus nature of construction, occurrence of community health safety issues is not envisaged. To reduce carbon footprints, Constructions will be done using modern construction methods which use less water and more weather durable materials. Rainwater Harvesting (RWH) systems and Solar Panels will be installed to conserve water resources and energy. Energy saving technologies will be used to minimize carbon footprint of the construction and operation.
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	Plantation and rooftop green area creation will be done within the respective campuses to enhance carbon sequestration. Insulation and high efficiency thermal bridge window construction will be applied to increase cooling efficiency, thus reducing energy consumption. The Environmental Assessment and Review Framework (EARF) will be developed by the ADB safeguards team to set out the procedures, guidelines and standards related to environmental screening of the physical infrastructures and preparation of comprehensive environmental management and mitigation plan. The EARF seeks to ensure environmentally friendly design and mitigate environmental risks associated with in-campus civil works, construction of laboratory and academic building facilities in consistent with the environmental regulations of the Government of Bangladesh. The EARF is based on a combination of country systems and elements to address gaps with ADB policies. The EARF will be approved by the ADB Safeguards team and will agree by the Executing Agency. As per preliminary assessment and the guidelines and procedures set out by the EARF, initial Environmental Examination (IEE) reports will be prepared targeting construction sites over different geographical regions. The IEEs will identify site specific environmental impacts and prepare site specific Environmental Management Plans (EMPs). IEEs formulate the overall mitigation plan and will be applied to ensure avoiding environmentally sensitive areas for construction and guide the adaptation and mitigative measures. The IEEs set out procedures of environmental assessment within project boundary, identify specific impacts and provide management plans, prepare guidelines for monitoring and corrective actions. These documents also set out the procedure of Grievance Redress Mechanism (GRM).. The IEEs will seek to ensure environment-friendly design and mitigate environmental and health safety risks associated with construction of labs and academic building facilities in consistent with the environmental features of the targeted sites. To date, given the sites, specific nature of construction activities and size of the physical infrastructures, the environmental risks of the project has been assessed as 'moderate'³⁸ and
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³⁸ For description of 'risk rating' categories, please see last page of this document

	categorized as “B” which will require to prepare site specific IEE as per ADB SPS 2009. According to the ECR 97 and its amendments by the Department of Environment (DoE), the project might be categorized as ‘Orange B’ which will require to obtain Site Clearance Certificate (SSC) and Environmental Clearance Certificate (ECC) from the DoE by submitting the site-specific Environmental Impact Assessment. - Initial risk assessment for Involuntary Resettlement: No involuntary resettlement impacts under the program has been envisaged since minor civil works will be within the existing campuses. Social safeguards screening for Involuntary Resettlement impact assessment has been completed by ADB consultant team, which indicated no additional land or involuntary resettlement impacts to be anticipated for the proposed schemes. The project will continue screening during implementation stage and initiate measures according to guidance from SPS 2009. Given no involuntary resettlement impacts expected, this RBL program is categorised as “C” as per ADB SPS 2009. - Initial risk assessment for Indigenous peoples All program construction activities are within boundaries of existing campus. Negative impacts on IPs are not expected. The program activities will exclude activities that adversely affect the dignity, human rights, livelihood systems, or culture of indigenous peoples, or affect the territories or natural or cultural resources that indigenous peoples own, use, occupy, or claim as ancestral domain or an asset. On further note, activities like advanced environment friendly curriculum development and deployment, industrial linkage development, skill development etc. will inclusively benefit the labour force including SEC/IP³⁹ communities. The Chattogram Hill Tracts-one of the most high density IP inhabited areas in Bangladesh have been included as one of the proposed location for project facilitated training initiatives Given this positive impact, this RBL program is categorized as “B” as per ADB SPS 2009.
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³⁹ According to the guidance of Bangladesh constitution, the term IPs in ADB SPS will be referred as Small Ethnic Communities (SEC) in this program documents.

2. Likely programmatic risks	
<i>This section identifies the factors that may impede successful program management and sustainability.</i>	
Program management and sustainability - Are program activities likely to interact with other planned activities that may further increase adverse impacts? - Are there risk factors that may impede successful achievement of program outcomes overtime or whose outcomes are not known (disaster risk, climate change, social conflict/fragility) - Does the borrower have adequate trained staff and capacity to manage the E&S implementation of overall govt program (not just the ADB financed portion)? - Are there governance, corruption issues and political risks associated with the proposed sector or program? - Are there any other potential roadblocks to ensuring the environmental and social sustainability of the Program?	- Initial risk assessment for Environment: Major activities under the RBL program are aimed to develop skills in the industrial sector of Bangladesh. Programmatic risks associated with adverse environmental impacts are not expected to be significant. The RBL program activities, specifically under output 1, will involve civil works in selected campuses within existing premises. Site-specific, temporary and reversible environmental impacts are anticipated during construction. Construction and operational activities are not expected to increase the risk of increasing environmental impacts through interaction with other activities. Natural disasters and climate change impacts may affect outcomes of the program. The program will ensure that climate changes risks and natural hazards are considered in finalizing building designs. The Department of Finance under MOF have been involved in the environmental and social safeguards implementation in the past ADB-supported project such as SEIP. However, with the involvement of local governments for implementation of the RBL program, staff capacity building and hiring safeguards specialists will be needed for effective management of E&S implementation. This will be confirmed during due diligence. - Initial risk assessment for Involuntary Resettlement: No programmatic risks are expected. Minor civil works will be within existing college (and university campus) premises. Land required for construction is already available to the authorities and the land exist within the campus premises. Hence there is no risk envisaged regarding involuntary resettlement issues. - Initial risk assessment for Indigenous peoples: No programmatic risks are expected on SEC/IPs. The program schemes will include sites in Chattogram Hill Tracts as well, the area has 50% inhabitants from small ethnic communities (SEC). The SEC/IP communities are expected to be included as beneficiaries in schemes under the program, which will increase their participation and improve their learning outcomes. The program will ensure affirmative actions are relevant, culturally appropriate and inclusive.

3. Likely institutional Risks	
<i>This section describes the institutional complexity and capacity with regard to environment and social impact/risk assessment, planning, implementation and management.</i>	
Institutional complexity and capacity - Describe borrowers organizational, administrative and regulatory structures related to environmental and social safeguards. - Whether borrower has the capacity to assess, plan and manage E&S safeguards/risks. - Whether the borrower has commitment and implementation experience with regard to assessment, planning and management of environment and social safeguards/risks. - Are there factors (for example complex institutional set up, involvement of multiple agencies at national, sub-national and local level agencies) that might impede borrower's capacity to effectively implement E&S safeguards/risks. - Are there other institutional barriers that might prevent the borrower from implementation of the RBL program. - Does the borrower have a system or proven track record of managing complaints related to E&S and others?	- Initial risk assessment for Environment: Institutional risks are not expected to be significant. The program activities, specifically under Output 1, will involve civil works in selected campuses within existing premises. Site-specific, temporary and reversible environmental impacts are anticipated during construction which are possible to mitigate by ensuring environmental management plan (EMP). Construction and operational activities are not expected to increase the cumulative risk through interaction with other activities. Natural disasters and climate change impacts may affect outcomes of the program, especially at Chottogram, given that Chottogram is located in cyclone risk area. The RBL program will ensure that climate changes risks and natural hazards are considered in finalizing building designs. The Finance Division in MOF will be the executing and implementing agency. The Skills Development Coordination and Management Unit (SDCMU) – established under ADB funded SEIP – will continue to serve as the program management unit to facilitate, coordinate, and monitor all project activities. The key implementing partner agencies include the Technical and Madrasa Education, Division in the Ministry of Education; Ministry of Expatriate Welfare and Overseas Employment; Ministry of Industries; and Ministry of Textiles and Jute. An inter-ministerial project steering committee, chaired by the Secretary of Finance Division, will provide overall policy advice and oversight, approval of annual operation plans, review of achievements against targets, and ensuring compliance with fiduciary oversight arrangements. There is a possibility of poor coordination and lack of alignment among the key implementing agencies, which can be a major 'roadblock' for this RBL program. Another major issue regarding the safeguards is that the EA and IA of this RBL program, Finance Division of the MOF, do not have in-house trained safeguards staff, although the institution has been executing the ADB funded SEIP for about five years. To mitigate, a central Safeguards Unit will be established under the SDCMU consisting of an Environmental Specialist, Social and Resettlement Specialist and a construction

	supervision engineer, who will supervise and monitor the safeguards issues during construction work. The team will be led by the Deputy Project Director who will monitor and support the implementation to ensure adherence to timelines and report to the SDCMU chief. The organization and functioning of the team will be adopted from the ongoing ADB funded SEIP which is executed by the Finance Division. The terms of reference for staff and unit will include close monitoring and good coordination to mitigate the social and environmental risks. Over the top, capacity strengthening training to ensure environmental safeguards will be required by the project for the environmental focal persons to ensure quality and effectiveness of implementation of environmental measures. This will be confirmed during due diligence. - Initial risk assessment for Involuntary Resettlement: Proposed Civil works under this RBL program are mainly confined to the existing campus premises without any requirement for additional land. Hence ADB SPS requirement or involuntary resettlement will not be triggered. - Initial risk assessment for Indigenous peoples: No institutional risk for SEC/IP is expected. The IA/EA of the RBL program works for the overall wellbeing of all communities. This RBL program is no exception. Hence this program will offer equal opportunities for the SEC/IP communities and enjoy the benefit of the project. The Institutional arrangement of the Finance Department does not restrict SEC/IP involvement, therefore no risk is assumed. The program will select a focal person for SEC/IP issues to ensure better coordination.
4.	Likely contextual risks
<i>This section refers to environment and social conditions in the program area that might influence the performance of the RBL program.</i>	
E&S conditions in the program area - Is the program working in sensitive E&S settings that may intensify the likely impacts? - Are there legacy issues or unresolved issues that might affect the commitment and the performance of the program? - Are there recent or ongoing social conflict or social fragility in the program area?	- Initial risk assessment for Environment: As indicated earlier, the construction and renovation will take place within the targeted campuses. The sites are located within urban to semiurban setting which are not within 10km buffer zone of any environmentally sensitive areas declared by the Bangladesh Government (e.g., Ecologically Critical Areas (ECA), Protected Area (PA), Sanctuary, Forest etc.). Hence, the program activities are not proposed in sensitive

- Are there factors that may cause ADB to be exposed to significant reputational risks? - Are there any known complaints by individuals or advocacy groups with regard to the components of the program or the performance of the EA/IA with regard to E&S implementation?	E&S settings where likely impacts may be intensified. There are no known legacy or unresolved issues that might affect the commitment and the performance of the program. However, this will be confirmed during due diligence. - Initial risk assessment for Involuntary Resettlement: Minor civil works will be within the existing campus premises, hence, not expected to fuel any social conflict or community unrest. Also, no involuntary resettlement issues are expected. - Initial risk assessment for Indigenous peoples: There are no reported ongoing or recent social conflicts or social fragility issues. The Program's impact will be economic and social transformation of Bangladesh industrial sector by development of workforce skills and promotion of green technology. The outcome will be high quality, resilient, skilled workforce in a sustainable environment and is not expected to result in any reputational risks.
5. Overall Assessment	
<i>This section describes the overall risk profile of the program. Environmental and social risks should be summarized separately.</i> - Overall environment risk assessment: The overall environmental risk is <i>moderate</i>. The potential environmental risks in the program are moderate as the activities may have some site-specific and reversible adverse environmental impacts from construction works and impacts related to waste and health, sanitation and safety from the operation SSTLs and Academic buildings. The impacts during the construction stage are likely to be temporary and will be confined within the existing campus premises. There may also be risks from noncompliance due to lack of monitoring and lack of adequate human resources. An EARF is under development by the ADB safeguards team which will set out the procedures and guidelines for environmental assessment and requirement for IEEs to prepare site specific impact assessment, mitigation measures and EMPs. Staff capacity building may be strengthened to ensure sustainability of E&S management. The program is categorized as "B" for environment due to the construction impacts which are site specific, temporary and reversible through implementation of appropriate mitigation measures. Impacts related to waste and health, sanitation and safety during operational stage can be minimized by Standard Operating Plan (SOP) for SSTLs. - Overall involuntary resettlement risk assessment:	

The program is classified as category 'C' for involuntary resettlement as there will be no involuntary resettlement impacts under the program since the civil works will be within the existing campus premises. - Overall indigenous peoples risk assessment: The program is categorized as category 'B' for Indigenous People as SEC/IP communities are anticipated to be included as project beneficiaries, which will increase participation and enhance skills of the SEC/IP communities who are engaged as national workforce. Negative impacts on SEC/IPs are not expected. The program activities will exclude activities that adversely affect the dignity, human rights, livelihood systems, or culture of indigenous peoples, or affect the territories or natural or cultural resources that indigenous peoples own, use, occupy, or claim as ancestral domain or an asset. The program will ensure safeguards focal to ensure monitoring and coordination for safeguards monitoring and reporting as agreed with the EA.	
6.	Is the RBL suitable for proposed program?
	Yes x
	No
7.	Program Teams' Comments
The overall safeguard risk is <i>moderate</i> because (i) there is a moderate likelihood of program activities leading to some adverse impacts on environment although they are reversible by environmental measures; (ii) the adverse impacts tend not to be in environmentally or socially sensitive areas; (iii) the program operation is unlikely to have significant adverse impacts on GHG (although the construction activities will pose large carbon footprint) and would not be at risk of natural disasters; (iv) program activities are small scale, well known and manageable with existing processes/procedures; (v) the institutional, contextual and programmatic risks are well understood and limited in impact; (vi) Finance Division under the ministry of Finance have some experience in managing risks (not perfect) and capacity building/training measures may be needed; and (vii) Risk management measures are more predictable and readily available. The program activities are unlikely to result in significant impacts or risks for environment. The Program Safeguards System Assessment (PSSA) will assess any existing gaps between the current program safeguard system and GoB safeguards policies, likely impact, institutional risks, programmatic risks, and contextual risks and identify any areas for further improvement. Environmental impacts during construction and operations phase will be managed through the IEEs that are prepared for this program. EMPs stipulated within the IEEs will guide the environmental management and monitoring procedure. Civil works will be limited within the existing engineering college premises. The institutional, contextual, and programmatic risks are well understood and are limited in manageable impacts.	
8.	SDSS Comments

(see next page for guidance on risk rating)

Risk Rating

The descriptions below provide guidance on the risk rating for safeguards in RBL. The program team will provide an overall risk rating for the proposed RBL program. This approach provides an opportunity to the program team, borrower and relevant stakeholders to identify the potential risks and allocate adequate resources for elements that need in depth analysis and stronger risk management measures.

High	- There is a strong likelihood of program activities leading to significant adverse impacts on environment and affected people. - The significant adverse impacts, cumulative impacts and/or synergistic effects with other initiatives needs complex mitigation and management plans that are not readily available or unproven. - The program operation might have significant adverse impacts on emissions resulting from changes in the intensity or efficiency of emissions generation and controls. - There is large scale land acquisition, physical and economic displacement of APs. - There are significant adverse social impacts on gender, IPs, the poor and other vulnerable groups with potential to contribute directly to increased social fragility or conflict. - The program area has large geographical footprint with different implementation agencies/jurisdictions and varying implementation capacities. - The program design and institutional arrangements are complex. - The program needs direct management intervention to deal with programmatic, contextual and institutional risks which are diverse and complex. - Borrower may have the demonstrated capacity to manage E&S impacts but its performance is not consistent and some E&S risks are beyond its direct control and needs a dedicated capacity building measures. - There is a likelihood that program activities might lead to huge number of grievances - There are ongoing national or international advocacy and complaints in the program area with regard to the government program or the borrower/implementing agency.
Substantial	- There is still a strong likelihood of program activities leading to significant adverse impacts on environment and affected people. - The program operation might have adverse impacts on emissions resulting from changes in the intensity or efficiency of emissions generation and controls. - The significant adverse impacts are less severe and site specific and there are less chances of strong cumulative impacts - There is still large scale land acquisition, physical and economic displacement of APs - There is a potential for adverse social impacts on gender, IPs, the poor and other vulnerable groups and may contribute to existing social fragility or conflict - The program area has a smaller geographical footprint; institutional, contextual and programmatic risks are less complex and diverse - Risk management measures are more predictable and readily available. - Borrower may have the demonstrated capacity to manage E&S impacts, but its performance is not consistent and some E&S risks are beyond its direct control and still needs some dedicated capacity building measures. - The program is less subject to national or international advocacy and complaints, but poor performance may lead to large number of grievances
Moderate	- There is a moderate likelihood of program activities leading to some adverse impacts on environment and affected people. - The adverse impacts tend not to be in environmentally or socially sensitive areas - The program operation is unlikely to have significant adverse impacts on GHG and would not be at risk of natural disasters - Program activities are small scale, well known and manageable with existing processes/procedures. - There is limited likelihood of adverse social impacts on IPs, gender, the poor and other vulnerable groups.

	- The institutional, contextual and programmatic risks are well understood and limited in impact. - The borrower/implementing agencies have a proven track record in managing risks (not perfect) and limited capacity building/training measures are needed. - Risk management measures are more predictable and readily available.
Low	- There is low likelihood of program activities leading to any adverse impacts on environment and affected people. - The program operation is unlikely to have significant adverse impacts on GHG and would not be at risk of natural disasters - The borrower/implementing agencies have a proven track record in managing safeguard risks.

Appendix 4 – Sample Traffic Management Plan (TMP)

A. Principles

One of the prime objectives of the Contractor's **TMP** is to ensure the safety of all the road users along the work zone, and to address the following issues:

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

B. Operating Policies for TMP

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.

Figure A1 to Figure A6 illustrates the operating policy for TMP for the construction of water pipes and the sewers along various types of roads.

C. Analyze the Impact Due to Street Closure

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

- a) Approval from the ULB/CMC/Public Works Department (PWD) to use the local streets as detours;
- b) consultation with businesses, community members, traffic police, PWD, etc, regarding the mitigation measures necessary at the detours where the road is diverted during the construction;
- c) Determining of the maximum number of days allowed for road closure, and incorporation of such provisions into the contract documents;
- d) Determining if additional traffic control or temporary improvements are needed along the detour route;
- e) Considering how access will be provided to the worksite;
- f) Contacting emergency service, school officials, and transit authorities to determine if there are impacts to their operations; and
- g) Developing a notification program to the public so that the closure is not a surprise. As part of this program, the public should be advised of alternate routes that commuters can take or will have to take as result of the traffic diversion.

If full road-closure of certain roads within the area is not possible, due to inadequate capacity of the detour arrangements, the full closure can be restricted to weekends with the construction commencing on Thursday night and ending on Sunday morning prior to the morning peak period.

The traffic management guidelines are as follows:

- Review construction schedule and methods;
- Identify initial traffic recirculation and control policy;
- Identify routes for traffic diversions;
- Analyze adverse impact & mitigation at the detours;
- Begin community consultation for consensus;
- Finalize or determine alternate detours;
- Identify temporary parking (on and off -street);
- Discuss with CMC, owner, community for use;
- Coordinate with the Traffic Police to enforce traffic and diversions;
- Install traffic control devices (traffic cones, signs, lightings, etc);
- Conduct campaigns, publicity, and notify public about street closure; and
- Develop a mechanism to address public grievances regarding disruptors of traffic, utilities, etc.

D. Public Awareness and Notifications

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

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.

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

- a) Explain why the brochure was prepared, along with a brief description of the project;
- b) Advise the public to expect the unexpected;
- c) Educate the public about the various traffic control devices and safety measures adopted at the work zones;

- d) Educate the public about the safe road user behavior to emulate at the work zones;
- e) Tell the public how to stay informed or where to inquire about road safety issues at the work zones (name, telephone, mobile number of the contact person; and
- f) Indicate the office hours of relevant offices.

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

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

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”).

The Contractor would need to consider such Traffic Management situations for these typical arrangements and others that may occur during road construction works. The Contractor would need to coordinate closely with the road management and road police authorities and submit their Traffic Management proposals, with not less than a month’s prior notice, to the PIU for obtaining prior approval, before any closure of roads are considered.

- Work on Shoulder or Parking Area;
- Work with Land Closure: Low Traffic;
- Work on Lane Closure With Yield Sign on Two Lane: Low Volume;
- Work on Lane Closure With Single Flag Operator on Two Lane : Low Volume;
- Lane Closure: Two Flag Operators on Two Lane Road; and
- Street Closure with Detour.

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

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

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

Appendix 5 – COVID-19 Health and Safety Guidance for the Construction Workforce

COVID-19 Health and Safety Guidance for the Construction Workforce

INSTRUCTIONS

Contractors are required to ensure health and safety of the workers and employees in accordance with environmental health and safety (EHS) provisions of the contract which is in line with ADB SPS 2009 and Bangladesh Labor Law 2006 (Chapter VIII). A supplementary EHS guidelines was prepared to ensure that workers and employees are safe from Pandemic COVID-19 infection while working at the construction sites. This guideline should be used as a supplement to the project's Environmental Health and Safety (EHS) guidelines for the workers. Contractors are encouraged to prepare a site-specific Environmental Health and Safety (EHS) guidelines for reopening the sites and mobilizing labor and resources and get it approved by Executing Agency. The EHS guidelines and COVID-19 EHS guidelines should be available at worksite all the time with no exception.

Prerequisites for Reopening Worksite

1. Consider reopening at limited scale by identifying and engaging essential labor force
2. Avoid worker intensive works as much as possible; encourage use of equipment
3. Engage fulltime EHS professional to oversee the implementation of EHS guidelines
4. Engage a medical professional to prepare health record of the workers and daily health checkup
5. Ensure coverall Personal Protective Equipment (PPE) for medical professional
6. Prepare a list of equipment and vehicles to be used frequently and ensure routine disinfection
7. Make available thermometer, soap, hand sanitizer, disinfectant, and PPE (mask, gloves, boot) at worksite and camp
8. Place adequate number of washbasins, disinfectant tub, dispenser for sanitizer
9. Establish electronic payment system (e.g., BKash, Nagad, Rocket) to pay the daily wage
10. Follow the guidance as provided below.



Locate the closest medical facility equipped with COVID -19 and contact them.



Place washbasins and disinfectant tub for shoes.



Engage EHS professional. Engage Medical professional (fulltime/ part-time).



Place a few COVID-19 signed covered trash bin for disposal of used PPEs.



Supply soap and sanitizer to labor and staff for after office for disinfection.

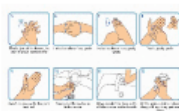
Worksite Entrance Protocol



Everyone entering the worksite must wear a mask and gloves.



During worksite entry que, maintain physical distance of minimum 1m (3ft).



Every personnel should wash their hands with soap for 20 seconds. Display hand washing protocol at entrance.



Spray bottom of shoes of every personnel entering worksite/campsite with disinfectant. Disinfect all vehicles entering site.



use thermometer gun to check temperature. If body temperature found $> 37^{\circ}\text{C}$ send to the designated medical facility.

Worksite Management



Frequently clean and disinfect highly used tools, machineries and surfaces (e.g. tables, toilets) by workers.



Mandatory morning briefing on COVID awareness at site maintaining physical distance.



Use alcohol-based wipe to clean tools, equipment, vehicle before and after use.



Discourage gathering at site. Discourage unnecessary entrance and exit at site.

Camp Management

1. Provide soap, sanitizer, washing facility and safe water at the workers' dwelling. Encourage frequent hand washing.
2. Ensure separate covered bin for disposal of used PPEs.
3. Protect against heat, cold, damp, noise, fire, and disease-carrying animals.
4. Maintain good housekeeping and social distancing in kitchens, meal rooms, canteens.
5. Ensure personal distance at least 1 meter (3 feet), preferably 2m (6ft) during lunch, dinner and prayer.
6. Ensure ample ventilation at the camp.



Place covered waste bins at worksite
Do not forget to dispose your used PPEs in the bins!!

Work at Site Awareness



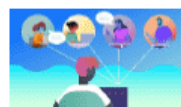
Inform the designated ESH/Medical personnel immediately if any person starts showing the symptoms of COVID-19.



Encourage respiratory etiquette, including covering coughs and sneezes. Don't touch nose/eye/mouth if not washed recently, do not spit.



Encourage the workers at camp to go out for supplies not more than once a week.



Shorten toolbox meetings. Initiate remote meeting protocol to avoid physical contact.



Stay informed. Get news from WHO and Government news outlets. Ask your EAs. Ask ADB.

Appendix 6 – Emergency response team

EMERGENCY/CRISIS RESPONSE TEAM (Roles and Responsibilities)

A. Overview

An integrated approach to emergency response involves a range of stakeholders, including the primary responder (i.e. the contractor), supervision consultants, the secondary responder (i.e. EA/IAs) and the tertiary responder (i.e. Donor agencies (e.g. ADB)) along with the local authorities, regulatory agencies and the general public. Such a system therefore requires robust processes regarding information dissemination, training, and designation of responsibility, management actions, monitoring, control, and corrective actions. The Emergency/Crisis Response Team therefore needs to be fully equipped and well communicated.

B. Organization chart of crisis response team

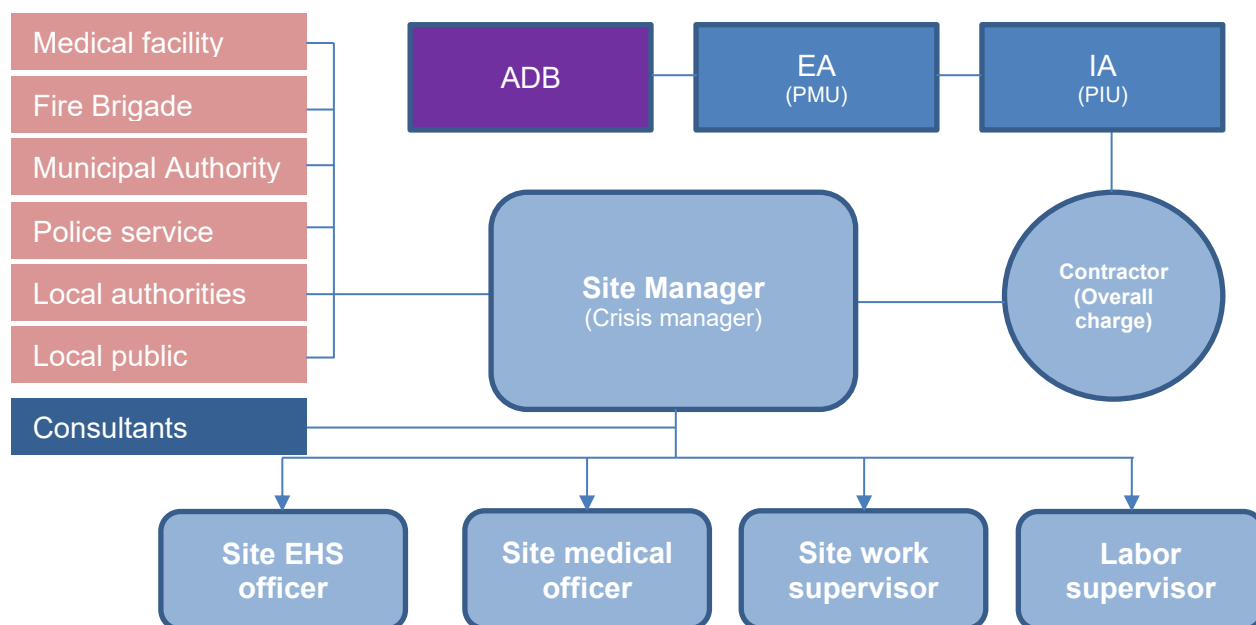


Figure: Organization chart of the crisis management team

Explanation of color code:

Work site body
Executive body
Donor body
External services team
Consultants

Table: Crisis response team

No.	Name	Designation	Mobile no.
1		Site Manager	
2		EHS officer	
3		Medical officer	
4		Worksite supervisor	
5		Labor supervisor	
6		Contractor	
7		Local hospital	
8		Local police station	
9		Local fire brigade	
..			

Appendix 7 – Sample EHS Monitoring and reporting template

Monitoring and Reporting Template

Environmental Health and Safety Monitoring

A. Environmental Health and Safety Checklist

Sl no.	Item	Exist in the worksite?		Recommendation And/ or Remarks	Time frame to comply
		Yes ☐	No ☐		
1	Site readiness (e.g. is worksite fenced and can be distinguished from general establishment? Is the an EHS professional at site? Has he/she been fulltime professional? Has he/she been present at site every day?)				
2	Site access (e.g., is site access road wide and easily accessible?)				
3	Signboard with safety warnings (e.g. with general EHS safety signboards, are COVID 19 response signboards visible at every corner of worksite?)				
4	Lighting (e.g. is every corner of the worksite is well lit?)				
5	Appropriate PPEs (Helmet, Safety Shoe, Vest, Ear plug, Musk etc.) e.g. Is every person in site is wearing appropriate PPEs?				
6	Fall protection measures (e.g. is the fall protection measures at worksite appropriate and adequate?)				
7	Fire extinguishers (e.g. are they at site? How many? Are they placed at vulnerable/most accessible places?)				
8	House keeping (e.g. are all workers health records kept? Is the EMP and EHS manual at site? Has the morning briefing on EHS conducted? Is there any vehicle record/material register/attendance register/complain register kept?)				
9	Garbage bins (e.g. are there garbage bins at site? Are the numbers adequate? Is waste thrown to bins? Are the bins well places?)				
10	Drinking water supply (e.g. safe drinking water for worksite been supplied? Is drinking water adequate?)				
11	Sanitation facilities (e.g. is there separate male and female toilets established? Are they adequate? Hand wash materials and water being provided at toilets? Are those toilets sanitary?)				
12	Dust protection measures (e.g. is mask provided for worksite personnel? Is water sprayed frequently as needed to suppress dust? Are sand class materials covered with plastic sheets?)				
13	Noise barrier and reduction equipment (e.g. how much noise is generated by site? Does it exceed maximum human exposure limit? Are workers provided with noise reduction gears such as ear mufflers?)				
14	Shelter (e.g. is there a site office or shelter good enough to take shelter during rain or storm event?)				
15	First aid box (e.g. is there a first aid box at site? Are the contents of the first aid box adequate for primary treatment? Is the first aid box handled by at EHS/medical professional)				

Sl no.	Item	Exist in the worksite?		Recommendation And/ or Remarks	Time frame to comply
		Yes ☐	No ☐		
16	Toolbox meetings (e.g. are toolbox meeting regularly arranged? Are records kept?)				
17	Others (many other checklists can be formulated by the EHS professional on board)				
COVID -19 protocols on top of usual EHS checklist (this applied to campsite also)					
18	COVID-19 posters/signboards (e.g. are COVID-19 awareness/protocol posters are showing all visible corners of the site?)				
19	Entrance protocol (e.g. Is the COVID-19 worksite entrance protocol been followed as stipulated in the COVID -19 response guidance? Are adequate soaps, water has been kept at site entry? Are workers at entrance que using mask, hand gloves and hard shoes? Are disinfectant spray kept at site entry to disinfect underneath the boots of entering persons?)				
20	Vehicle entry protocol (e.g. has the vehicle disinfection protocol has been initiated?)				
21	Social distancing (e.g. are the workers maintaining social distancing all the time?)				
22	Sharing tools/machineries (e.g. are the tools and machineries are wiped to disinfect before sharing/working?)				
23	Disinfecting work area (e.g. is the worksite/ common surfaces, toilets etc. are disinfected before worksite opened in the morning? Has record being kept? Has the worksite been disinfected yesterday after closing for the day?)				
24	Restriction on worksite entry and exit (e.g. has workers being discouraged to travel frequently out of worksite or entering? Has records being kept?)				
25	Stock of disinfectant (e.g. is the stock of disinfectants, soap, PPEs are adequate at worksite?)				

*Attach photos

**Enter additional criteria as required for site specific measures

Reported by (ESC)	Checked by (TL)	Approved by (EA/IA)
Name Designation Signature Date	Name Designation Signature Date	Name Designation Signature Date
Received and agreed to comply by the representative of the contractor	Name Designation Signature Date	

B. Accident/ Incident Investigation Report

Class of Incident		Reported	
☐ Injure	☐ Property/ Plant Damage	Yes ☐ No ☐ Details:	
☐ Near Miss	☐ Environmental	Further Action Required	
		☐ Report to Authorities ☐ Other	
Details of Incident			
Date of Incident		Time of Incident	am ☐ pm ☐
Witness Name		Witness Contact	
Nature of Incident			
Location of Incident			
Description of Incident			
Details of damage to equipment/property			
Injured Person/s (if applicable)			
Name			
Address			
Date of Birth			
Occupation		Employer	
Referred/transferred to			
Recommended Preventive Action			
Details			
Completed by			
Name		Position	
Signature		Date	

C. Safety patrol/inspection report form

SITE SAFETY PATROL REPORT AND INSTRUCTION						
Date						
Inspector						
No	Location	Comment/instruction	Photo	Corrective action	Deadline	Responsible person

Reported by (ESC)	Checked by (TL)	Approved by (EA/IA)
Name Designation Signature Date	Name Designation Signature Date	Name Designation Signature Date
Received and agreed to comply by the representative of the contractor	Name Designation Signature Date	

Appendix 8 – Sample Outline of Compensatory Tree Planting Plan

COMPENSATORY TREE PLANTING PLAN

Note: The purpose of the planting plan is to fully assess the existing tree resources on the development site and specify an implementable strategy for ensuring that the net medium-term effect of the site's development on local arboreal resources is at least neutral relative to existing conditions. The planting plan is to be developed by the design-build contractor and approved by the Forest Department and local Union Parishad authorities prior to issuance of the Site Clearance Certificate.

1. Plan Rationale and Requirements

- Objective of plan
- Brief description of planned development producing need for plan
- Forest Department requirements for compensatory planting plans
- Roles and responsibilities for plan development and implementation
- Required approvals

2. Baseline Profile of Tree Resources on the Development Site

A. General description of tree cover

- Proportion of site covered
- Historical trends of tree cover and surrounding areas
- Hydrological, soil and site use factors influencing distribution of tree cover on site
- Notable species assemblages
- Ecological functions of existing trees and groups of trees
- Micro-climatic functions of existing trees and groups of trees
- Existing uses of on-site trees
- Values associated with on-site trees by local people

B. Inventory of existing trees on site

- Full inventory of all trees over 2 m height, tabulated by species and size (height, crown width) and native/introduced status
- List of identified significant specimens (trees that are highly valued for any reason, e.g., religious or spiritual; very large size; serve as a social meeting place; historically high yield of fruits, nuts or other products; medicinal importance; use by popular wildlife)

3. Trees Designated for Preservation, Removal and Planting

A. Inventory of trees to be preserved, based on site master plan

- List of trees by species and location
- Map of preserved trees
- Planned method of protecting trees during site clearing and construction

B. Inventory of trees to be removed, based on site master plan

- List of trees by species and location
- Map of clearance areas
- Planned method of removing trees and disbursing timber

C. Inventory of spaces for compensatory planting

- Number of trees to be planted, based on anticipated removals
- List and description of suitable on-site areas, including soil and moisture constraints
- List and description of possibly suitable off-site areas, including soil, moisture and land use constraints
- Map of potentially suitable on-site and off-site planting areas

4. Report on Consultation with Local Stakeholders

A. Stakeholders

- List of institutional stakeholders

- List of existing users of trees on site
- List of residents in the vicinity of the site

B. Summary of consultation events and formats

C. Findings of consultations

- Non-monetary values attached to site trees by stakeholders
- Monetary values of existing tree uses
- Location preferences for compensatory planting
- Species preferences for compensatory planting

5. Compensatory Planting Plan

A. Constraints and opportunities

- Survey of suitable sapling sources (saplings at least 2 m tall, in sufficient number to have at least two trees planted for each tree removed)
- Estimation of sapling costs by species
- Seasonal factors affecting planting
- Minimum and optimal spacing requirements for different species

B. Selected species and locations

- Identification of priority species based on site conditions and consultation findings
- Identification of priority planting locations based on site conditions and consultation findings
- Master planting plan map

C. Planting strategy

- Timing of planting activity
- Procurement of saplings, soil amendments and mulches
- Procurement of labor for planting
- Stakeholder participation in planting

D. Plantation maintenance strategy

- Identification of maintenance needs by species and location (watering, mulching, fertilization, trimming, weeding)
- Maintenance schedule
- Arrangement of labor and responsibility for on-site plantation maintenance
- Arrangement of labor and responsibility for off-site plantation maintenance
- Procurement of tools for plantation maintenance

6. Cost Estimates

- Estimated initial costs for planting
- Estimated recurring costs for plantation maintenance

7. Monitoring of Implementation

- monitoring parameters (e.g., tree survival rate, maintenance performance)
- method and frequency of monitoring
- public participation in monitoring plantations
- definition of feasible corrective actions in the case of poor performance

Appendix 9 – Sample Outline of Contractor Environmental Management Plan

CONTRACTOR ENVIRONMENTAL MANAGEMENT PLAN (CEMP)

1. Purpose of the Plan

- Objectives
- Relationship to subproject/component EMP
- Relationship to specialized mitigation plans
- Performance indicators

2. Roles and Responsibilities in Plan Implementation

- Contractor's Environment, Health and Safety Representative
- Site engineers
- Emergency response focal persons
- Skilled workers
- Laborers

3. Legal Requirements

- Laws and regulations pertinent to the works
- Licenses and permits required

4. Special Contextual Issues

- Environmental (if any)
- Social (if any)
- Cultural (if any)

5. Scope of Works

- Description of infrastructure plan
- List of work locations and sites
- Applicable standards

6. Work Plan

- Resources (facilities, equipment, human resources)
- Coordination and phasing
- Timetable

7. Environmental Method Statements

- Boundary establishment and site clearing
- Soil protection and erosion prevention
- Runoff management
- Sediment control
- Dust prevention and suppression
- Noise and vibration impact management
- Storage of fuels, lubricants, coolants and other fluids
 - maintenance yard
 - construction sites
- Refueling and servicing equipment at the job site
- Monitoring of equipment condition
- Construction site safety management
- Materials stockpiles at the job site
- Chance Find Procedure for physical cultural resources

8. Waste Management

- Classes of waste produced by type of site

- work sites
- maintenance yards
- construction camp
- Solid waste collection
 - collection methodology
 - collection frequency
 - responsibility for collection
- Solid waste recycling
 - recyclable materials
 - entities capable of accepting recyclable materials
 - recycling plan
- Solid waste disposal
 - composition of non-recyclable waste stream
 - legal and available disposal options in local area
 - disposal plan
- Waste oil and other hazardous wastes
 - types of hazardous liquids
 - methods of storage
 - collection methodology
 - collection frequency
 - legal and feasible treatment and disposal options
 - entities capable of accepting waste oil and other hazardous fluids and their containers
 - waste oil disposal plan

9. Emergency Response Plan

- Characterization of possible emergency situations for sites
 - spills and accidental releases
 - fires and explosions
 - serious accidents
 - other foreseeable situations
- Key actors (including names and contact information, to be updated regularly)
- Chain of command and process steps in emergency situations
- Documentation and reporting of incidents

10. Monitoring and Reporting Framework

- Purpose of monitoring
- Compliance monitoring parameters and methods
- Effects monitoring parameters and methods
- Responsibilities in monitoring
- Mechanism for corrective actions
- Monitoring schedule
- Reporting requirements

11. Training Needs and Plans

- Training needs assessment
- Training targets and content
- Training plan

Appendix 10 – Outline of Soil Erosion Prevention Plan

SOIL EROSION PREVENTION PLAN

1. Plan Rationale and Requirements

- Objective of plan
- Description of work sites and earthworks
- Roles and responsibilities for plan development, approval, implementation and supervision

2. Identification of Erosion Risks Specific to Site and Materials

- Erodibility of natural site soils
- Erodibility of fill materials
- Erodibility of stockpiled building materials
- Erosion by rainfall
- Erosion by running water (site runoff, flash floods, fluvial flooding)
- Erosion by wind
- Types of erosion (e.g., sheet, rill, gully, mass)

3. Method Statements

- Timing of earthworks to limit erosion risk (seasonal and weather-related)
- Mulching
- Temporary ground covers (e.g., jute mats)
- Permanent slope protection measures (e.g., terracing, geocells)
- Temporary drainage arrangements to avoid concentration of flow
- Check dams and sediment traps
- Temporary armored runoff channels
- Runoff infiltration swales
- Stockpile covers (tarpaulins)
- Stockpile containment dams

4. Monitoring and Correction

- Method of site monitoring for active erosion and erosion risk
- Frequency of site monitoring for active erosion and erosion risk
- Practices for correcting different types of erosion

Follow-up to corrective actions

Appendix 11 – Sample Outline of Construction Camp Management Plan

CONSTRUCTION CAMP MANAGEMENT PLAN

1. Purpose of the Plan

- Objectives
- Relationship to subproject EMP
- Performance indicators

2. Environmental and Social Context of Construction Camp

- Location
- Road access and distance to road sites
- Service infrastructure
- Local topography
- Prevailing wind
- Drainage
- Nearby water bodies
- Surrounding land use
- Local communities
 - proximity
 - population
 - ethnic makeup
 - employment and livelihoods

3. Camp Capacity and Resident Profile

- Projected number of resident workers during different phases of work
- Expected number of accompanying family members
- Expected number of support staff living on site
- Expected ethnic makeup of camp residents

4. Camp Infrastructure

- Kitchens
- Eating facilities
- Toilets and septic system(s)
- Wash-up facilities
- Accommodations
- Storage
- Water supply and water heating
- Electricity
- Cooking fuel
- Backup generators
- Firefighting equipment
- Parking
- Fencing
- Site layout
- Camp construction schedule

5. Cleaning and Maintenance Plan

- Cleaning and sanitation
 - responsibilities
 - methods
 - schedule
- Facility inspection and maintenance
 - responsibilities
 - inspection methodology
 - inspection schedule
 - maintenance schedule

6. Wastes and Waste Management

- Solid waste
 - expected composition of solid waste stream
 - collection and management of recyclables
 - collection and management of non-recyclables
 - collection and composting of organic waste
- Liquid waste
 - expected composition of liquid waste stream
 - management of gray water
 - management of sewage

7. Rules Governing Resident Behavior

- Rules for conduct when in camp
- Rules for conduct outside camp
- Family members policy
- Visitor policy
- Rules regarding alcohol and illegal drugs
- Procedure for adjudicating disputes among residents

8. Training

- good practices for disease prevention
- camp safety and fire suppression

9. Monitoring and Reporting

- Purpose of monitoring
- Monitoring responsibilities
- Monitoring methodology
- Monitoring frequency
- Reporting schedule

10. Camp decommissioning

- Responsibility for decommissioning
- Procedure for decommissioning
- Timing of decommissioning

Appendix 12 – Sample Outline of Site Reinstatement Plan

SITE REINSTATEMENT PLAN

1. Plan Rationale and Requirements

- Objective of plan
- Description of work sites and earthworks
- Roles and responsibilities for plan development, approval, implementation and supervision

2. Schedule of works

- Construction schedule by building and area
- 'Reinstatement-ready' schedule by site area
- Seasonal constraints on vegetation establishment
- Reinstatement and planting schedule by site area
- Post-planting monitoring and maintenance schedule (through end of defects period)

3. Vegetation specifications

- New tree plantings indicated in detailed design (landscaping plan)
 - number
 - preferred species
 - planting locations
- New tree plantings required under Compensatory Tree Planting Plan
 - number
 - preferred species
 - planting locations
- Ground cover specified for infiltration areas
 - total planting area
 - locations of infiltration areas
 - preferred species
- Ground cover specified for recreational use areas
 - total planting area
 - locations of recreational use areas
 - preferred species
- Ground cover specified for ornamental displays
 - total planting area
 - locations of ornamental displays
 - preferred species

4. Sourcing of key materials

- Saplings
- Root stock
- Seed
- Soil amendments
- Mulches and other protective materials (e.g., jute mats)

5. Method statements

- Removal, storage and replacement of topsoil
- Slopes (maximum slope and stabilizing measures)
- Pre-planting soil suitability assessment and soil amendment
- Tree planting
- Bare root planting
- Seeding
- Use of mulches and other protective materials
- Watering (by vegetation type)
- Fertilization (by vegetation type)
- Weeding, thinning and trimming (by vegetation type)

6. Monitoring and Follow-up

- Metrics and methods for measurement of vegetation establishment success (e.g., vigor, survival rate by time period, density, coverage)
- Frequency of site monitoring
- Documentation and reporting of vegetation monitoring results
- Criteria for replanting and infill planting

Appendix 13 – Sample Outline of Occupational Health and Safety Plan

OCCUPATIONAL HEALTH AND SAFETY PLAN

1. Plan Rationale and Requirements

- Objective of plan
- Description of work sites and major work activities
- Roles and responsibilities for plan development, approval, implementation and supervision

2. Identification of Health and Safety Risks Specific to Site and Activities

- Inventory of hazards inherent to work site
- Inventory of dangerous activities
- Inventory of hazardous materials used and stored on site
- Inventory of health risks for workers

3. Method Statements for Risk Reduction Practices

- Task-appropriate PPE and its proper use
- Operating heavy machinery
- Working in proximity to mobile heavy machinery
- Working at height
- Working in trenches and holes
- Working in underground enclosed spaces
- Electrical work
- Handling hazardous materials
- Handling and storing explosive and flammable materials
- Use of cranes
- Lifting
- Arc welding
- Power cutting and grinding
- Dust suppression
- Spill prevention and response
- Fire suppression
- Personal hygiene on the work site

4. Work Site Setup and Maintenance Specifications

- Provision and placement of fire suppression equipment
- Provision and placement of spill containment and cleanup supplies
- Safe storage spaces for hazardous, flammable and explosive materials
- Barriers and fencing
- Provision of adequate toilets based on worker population
- Provision of adequate wash-up facilities based on worker population
- Provision of unlimited drinking water meeting national standard for drinking water
- Provision of shaded break areas
- Food preparation and eating facilities

5. COVID-19 Containment and Prevention

- Practices as specified in ADB and GOB's Technical Guidance for Social and Institutional Containment and Prevention

6. Emergency Response Plan

- Designation of focal persons and 24/7 contact details
- Definition of chain of command
- Flowchart of response actions
- Identification, placement, labeling and upkeep of emergency response equipment
- Materials for use in training
- Emergency drill procedure and schedule

7. Training

- Induction training (content and timing)
- Refresher training (content and timing)
- Health and safety meetings
- Specialized tasks training (e.g., for heavy equipment operators and at-height workers)
- Emergency response training

8. Monitoring

- Site health and safety audits (methods, parameters, frequency, documentation)
- Spot check system
- Framework for follow-up and corrective action

Appendix 14 – Sample Outline of Asbestos-Containing Materials Removal and Disposal Plan

ASBESTOS-CONTAINING MATERIALS (ACM) REMOVAL AND DISPOSAL PLAN

1. Plan Rationale and Requirements

- Objective of plan
- Description of demolition needs at site and reasons for suspecting presence of ACMs
- Bangladesh National Building Code specifications for ACM handling
- Roles and responsibilities for plan development, approval, implementation and supervision

2. Assessment of ACM Presence

- Inventory of suspected ACMs by structure
- Inventory of suspected ACMs by material type
- Engagement of accredited testing firm for sampling and analysis
- Estimated volume of non-friable ACMs
- Estimated volume of friable ACMs

3. ACM Removal Methodology

- Risk-reduction training for workers involved in removal and handling
- PPE provision (P100 respirators, full hazmat suits including hoods)
- Exclusion of non-essential workers from removal site
- Wetting and constant misting system for removal site
- Complete containment system for transportation
- Low-breakage removal and handling methods
- Temporary on-site containment and storage methods
- Post-removal inspection method

4. ACM Disposal Option Selection

- Assessment of on-site deep burial options (including identification of locations likely never to be disturbed by people or natural processes, either during construction or afterwards)
- Survey of locally available and legally sanctioned off-site disposal options (e.g., landfill equipped and accredited for ACM disposal)
- Rationale for chosen disposal solution

5. ACM Transport and Disposal Methodology

- Risk-reduction training for workers involved in handling and transport
- Complete containment system for transportation
- Deep burial specifications (on-site disposal)
- Low-breakage placement methods (on-site disposal)
- Misting system for disposal site (on-site disposal)

Appendix 15 – Sample Outline of Spill Prevention and Response Plan

SPILL PREVENTION AND RESPONSE PLAN

1. Plan Rationale and Requirements

- Objective of plan
- Description of storage spaces and transshipment activity
- Roles and responsibilities for plan development, approval, implementation and supervision

2. Characterization of Hazardous and Noxious Cargo Risks

- Fuels
- Oils
- Bagged chemical substances
- Containerized dry chemicals
- Containerized liquid chemicals
- Bulk dry chemicals
- Bulk liquid chemicals
- Flammable materials
- Explosive materials
- Non-compatibility between classes of substances

3. Scoping of Spill Scenarios

- Truck rollovers and collisions on site
- Leaks from cargo on trucks
- Leaks from stored materials (in warehouses)
- Leaks from stored materials (outside)
- Spills during transshipment handling
- Explosions
- Fires
- Penetration of storage arrangements by flash flood

3. Method Statements for Spill Prevention

- System for identification of potentially hazardous and noxious incoming cargos
- Characterization of spill risk at time of entry
- Hazardous and noxious cargos registry
- Safe handling and transfer procedures (for each class of hazardous and noxious materials)
- Safe indoor storage requirements (for each class of material, taking account of non-compatibilities)
- Raised platforms for outdoor storage
- Temporary canopies for outdoor storage
- Collision and rollover prevention

4. Spill Response and Cleanup Plan

- Designation of point persons for response, including 24/7 contact details
- Definition of chain of command for response
- Flowchart of spill response actions
- Method statement: containment
- Method statement: cleanup
- Method statement: treatment and disposal
- Placement and upkeep of spill response and cleanup equipment and supplies
- Materials for use in training
- Notification protocols (people on site, authorities and public)
- Protocol for when to seek guidance from DOE or other agencies

5. Training

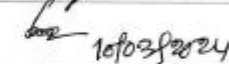
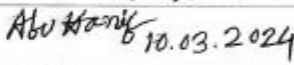
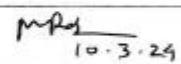
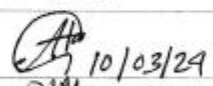
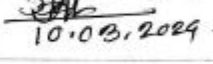
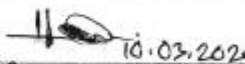
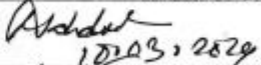
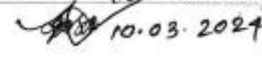
- Training for spill response leaders (content, frequency, outside expertise needed)
- Training for other site personnel (content, frequency)
- Training for laborers involved in transshipment activity (content, frequency)

Appendix 16 – Consultation Records

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
অধ্যক্ষের কার্যালয়
নরসিংদী পলিটেকনিক ইন্সটিটিউট
নরসিংদী-১৬০০
ফোন: ০২-৯৪৫১৬৬২

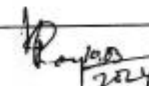
Email: nrspoly@gmail.com
Website: www.nrspoly.gov.bd

অদ্য ১০/০৩/২০২৪খ্রি. তারিখে ADB এর পরিবেশ বিষয়ক কনসালটেন্ট এর আগমন উপলক্ষ্যে সভায় উপস্থিত সদস্যদের হাজিরা:

ক্র. নং	নাম ও পদবী	টেকনোলজী ও মোবাইল নম্বর	স্বাক্ষর
০১	জনাব প্রকৌশলী মোঃ রেজাউল করিম অধ্যক্ষ (অতিরিক্ত দায়িত্ব)	০১৯৯২-০০৮০০২	
০২	জনাব মো: হাবিজ উদ্দিন চিফ ইন্সট্রাক্টর (নন-টেক)	নন-টেক ০১৭১৫-৪৫৭২১৮	
০৩	জনাব আবু হানিফ চিফ ইন্সট্রাক্টর (নন-টেক)	নন-টেক ০১৭১২-৮০৬৪৭৬	
০৪	জনাব মোহাম্মদ মসফিকুর রহমান চিফ ইন্সট্রাক্টর (টেক)	কম্পিউটার সাইন্স এন্ড টেকনোলজী ০১৭১৬৪৫৩৭৯০	
০৫	জনাব মোহাম্মদ আলমগীর হোসেন চিফ ইন্সট্রাক্টর (টেক)	আরএসি ০১৯১৭৫৭৩৩৫২	
০৬	জনাব হাফিজা সুলতানা আশা চিফ ইন্সট্রাক্টর (টেক)	ফুড ০১৭২৪৪২০৪৩৫	
০৭	জনাব মোহাম্মদ আলাউদ্দিন চিফ ইন্সট্রাক্টর (টেক)	কম্পিউটার সাইন্স এন্ড টেকনোলজী ০১৭১২৬১৮৫৮৮	
০৮	জনাব মাহমুদুল হাসান ওয়ার্কশপ সুপারিনটেনডেন্ট	সিভিল ০১৭১০-৩৮৩১৭৪	
০৯	জনাব মো: আব্দুল্লাহ আল-মুন্সির (কে/৩০৬)	০১৭২৭০৭০৬০৬	

১০. ইশান রায়

০১৮৬২৬৪৫২



Appendix 17 – Proposed Terms of Reference for Environment, Health and Safety Officers

The Environment, Health and Safety Officers (EHSOs) are critical to the timely and effective implementation of the EMP/EMoP, as they will be responsible for executing all compliance activities pertaining to the works and operations of the EA. The EHSOs will answer the Environmental Safeguards Focal Person (ESFP). The responsibilities of each EHSO are as follows:

- (i) Prepare site-specific monitoring checklists for assigned investment sites under the control of the EA, based on the contents of the EMP/EMoP, to assess site-level compliance with prescribed mitigation measures and effectiveness in meeting relevant national standards for key environmental parameters;
- (ii) Conduct compliance and effects monitoring on at least a monthly basis (including both regular inspections and spot checks) at all assigned investment sites under the control of the EA, and compile monitoring results in quarterly monitoring reports to the EA's ESFP;
- (iii) Support and collaborate with any outside entities contracted to conduct sampling, testing and analysis of environmental parameters, as identified in the EMP/EMoP, and incorporate their results into quarterly monitoring reports;
- (iv) Engage directly with site engineers to propose and ensure effective implementation of corrective actions needed to address emerging and recurrent problems, including both compliance issues and environmental effects that violate relevant national standards;
- (v) Design and orchestrate training for workers and site engineers as may be needed to forestall, correct or lessen emerging and recurrent problems with compliance and deleterious environmental effects derived from site activity;
- (vi) Facilitate and participate in any site visits conducted by officials of DOE, DIFE or other relevant regulatory agencies;
- (vii) Assist the ESFP with preparation of the EA's environmental reporting, including but not limited to its submissions to the PIU and/or SOU; and
- (viii) Prepare a Notification of Environmental Harm for immediate submission to DOE in the event of any serious release or other deleterious event occurring on any site under the EA's control, ensure rapid appropriate action by the Contractor, and coordinate follow-up with DOE as needed.

Appendix 18 – Outline of Semi-Annual Environmental Monitoring Report

The Program Steering Committee is required to submit semi-annual environmental monitoring reports to ADB, for review and public disclosure on the ADB website. The semi-annual reports will be produced by the Safeguards Oversight Unit. A sample report outline, which can be adapted as necessary, is provided below.

1. Introduction

- Report purpose
- Overview of subproject components and sites subject to monitoring
- Summary of project implementation progress

2. Review and Verification of Clearance History

- Clearances required and obtained
- Clearances due for renewal in upcoming monitoring period
- Clearance lapses and plans for reinstatement

3. Review of Contractor Environmental Monitoring Reports (CEMRs)

- Reports submitted/outstanding
- Quality of reports received and comments issued
- Issues of note from CEMRs, and contractor follow-up

4. Summary of Works and Prescribed Mitigation

- Major work activities by site
- Mitigation measures prescribed
- Ongoing corrective actions from previous monitoring period

5. Summary of Monitoring Activity

- number and dates of site visits
- monitoring methodology used

6. Monitoring Results

- instances of non-compliance
- violations of standards and observed negative environmental effects
- on-site communication with contractor personnel
- photographs

7. Corrective Action Required

- description and explanation of non-compliance or concerns noted
- required actions with timeframe and responsibility
- corrective actions undertaken in the current period
- corrective actions to continue into the next period

8. Attachments

- Notices of Non-Compliance issued
- Additional photographs

Appendix 19 – Sample Grievance Registration form

(Bangla translation to be available)

The **SICIP** welcomes complaints, suggestions, queries and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback.

Should you choose to include your personal details but want the information to remain confidential, please inform us by writing/typing ***(CONFIDENTIAL)*** above your name.

Date		Place of Registration			
Contact Information/Personal Details					
Name		Gender	* Male * Female	Age	
Home Address					
Place					
Phone no.					
E-mail					
Complaint/Suggestion/Comment/Question Please provide the details (who, what, where, and how) of your grievance below: If included as attachment/note/letter, please tick here:					
How do you want us to reach you for feedback or update on your comment/grievance?					
FOR OFFICIAL USE ONLY					
Registered by: (Name of Official Registering Grievance)					
Mode of Communication: Note/Letter E-mail Verbal/Telephonic					
Reviewed by: (Names/Positions of Officials Reviewing Grievance)					
Action Taken:					
Whether Action Taken Disclosed:	Yes No				
Means of Disclosure:					

Appendix 20 – Outline of chance finds protocols

Scope of the chance find procedure

This procedure is applicable to all activities conducted by the personnel, including contractors, that have the potential to uncover a heritage item/site. The procedure details the actions to be taken when a previously unidentified and potential heritage item/site is found during construction activities. Procedure outlines the roles and responsibilities and the response times required from both project staff, and any relevant heritage authority.

Induction/Training

All personnel, especially those working on earth movements and excavations, are to be inducted on the identification of potential heritage items/sites and the relevant actions for them with regards to this procedure during the Project induction and regular toolbox talks.

Chance find procedure

If any person discovers a physical cultural resource, such as (but not limited to) archaeological sites, historical sites, remains and objects, or a cemetery and/or individual graves during excavation or construction, the following steps shall be taken:

1. Stop all works in the vicinity of the find, until a solution is found for the preservation of these artefacts, or advice from the relevant authorities is obtained;
2. Immediately notify a foreman. The foreman will then notify the Construction Manager and the Environment Officer (EO)/Environmental Manager (EM);
3. Record details in Incident Report and take photos of the find;
4. Delineate the discovered site or area; secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be arranged until the responsible local authorities take over;
5. Preliminary evaluation of the findings by archaeologists. The archaeologist must make a rapid assessment of the site or find to determine its importance. Based on this assessment the appropriate strategy can be implemented. The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage such as aesthetic, historic, scientific or research, social and economic values of the find;
6. Sites of minor significance (such as isolated or unclear features, and isolated finds) should be recorded immediately by the archaeologist, thus causing a minimum disruption to the work schedule of the Contractor. The results of all archaeological work must be reported to the Ministry/Agency, once completed.
7. In case of significant find the Agency/Ministry should be informed immediately and in writing within 7 days from the find;
8. The onsite archaeologist provides the Heritage team with photos and other information as relevant for identification and assessment of the significance of heritage items.
9. The Ministry must investigate the fact within 2 weeks from the date of notification and provide response in writing.
10. Decisions on how to handle the finding shall be taken by the responsible authorities. This could include changes in the layout (such as when finding an irremovable remain of cultural or archaeological importance) conservation, preservation, restoration and salvage;
11. Construction works could resume only after permission is granted from the responsible authorities.
12. In case no response received within the 2 weeks period mentioned above, this is considered as authorization to proceed with suspended construction works.

One of the main requirements of the procedure is record keeping. All finds must be registered. Photolog, copies of communication with decision making authorities, conclusions and recommendations/guidance, implementation reports kept.

Appendix 21 – Drainage management plan for NATI

Site Drainage Issues

The NATI site has no functioning drainage system or municipal outlet, and previously relied on natural lowland areas that have since been sand-filled by surrounding urbanization. The area is flat (5–10m elevation), flood-prone (High risk per ThinkHazard!), and expected to face more intense short-duration rainfall under climate change (RCP/SSP8.5)

Core Plan Components

Component	Action
Plinth raising	Raise site plinth by ~1m above local flood level before construction
Primary drains	Construct new campus drains sized for high-intensity, short-duration rainfall (climate-adjusted depth/length)
Secondary drains	Install smaller feeder drains connecting rooftops/paved areas to main drains to manage runoff
Outlet	Route drains toward the adjacent shallow valley used for natural runoff, since no municipal outlet exists
Access/maintenance	Build accessible manholes/cleanout points along drains for desilting and clearing waste blockages
Waste control	Place segregated bins near drainage-prone zones to prevent dumping and blockage
Green/retention measures	Use proposed green areas (roof/terrace gardens, 21% of NATI land) to reduce runoff volume and aid infiltration
Water reuse	Integrate proposed STP/WTP to recycle water and reduce discharge load

Implementation Priority

- Raise plinth level (pre-construction).
- Build main drainage network with maintenance access points.
- Connect secondary drains from buildings/paved surfaces.
- Establish waste bin placement and periodic cleaning schedule.
- Monitor drain performance during first monsoon post-construction and adjust capacity if needed.