

# Initial Environmental Examination

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## **CURRENCY EQUIVALENTS**

(as of 3 June 2024)

|               |   |                       |
|---------------|---|-----------------------|
| Currency unit | – | Bangladesh Taka (BDT) |
| BDT1.00       | = | \$0.01                |
| \$1.00        | = | BDT 117.30            |

## **ABBREVIATIONS**

|      |   |                                     |
|------|---|-------------------------------------|
| ADB  | – | Asian Development Bank              |
| AAQ  | – | ambient air quality                 |
| BDT  | – | Bangladesh Taka                     |
| BNBC | – | Bangladesh National Building Code   |
| BOD  | – | biochemical oxygen demand           |
| BOQ  | – | bill of quantities                  |
| COD  | – | chemical oxygen demand              |
| DO   | – | dissolved oxygen                    |
| DOE  | – | Department of Environment           |
| EA   | – | executing agency                    |
| EIA  | – | environmental impact assessment     |
| ECA  | – | Environmental Conservation Act      |
| ECR  | – | Environmental Conservation Rules    |
| ECC  | – | environmental clearance certificate |
| EMP  | – | environmental management plan       |
| GOB  | – | Government of Bangladesh            |
| GRC  | – | grievance redress committee         |
| GRM  | – | grievance redress mechanism         |
| IEE  | – | initial environmental examination   |
| NGO  | – | nongovernment organization          |
| NOC  | – | no objection certificate            |
| O&M  | – | operation and maintenance           |
| PMU  | – | project management unit             |
| REA  | – | rapid environmental assessment      |
| ROW  | – | right of way                        |
| SPS  | – | safeguard policy statement          |

## WEIGHTS AND MEASURES

|      |   |                        |
|------|---|------------------------|
| ha   | – | hectare                |
| km   | – | kilometer              |
| m    | – | meter                  |
| mg/l | – | milligram per liter    |
| MLD  | – | million liters per day |
| mm   | – | millimeter             |
| km/h | – | kilometer per hour     |

## NOTE

In this report, "\$" refers to United States dollars.

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## EXECUTIVE SUMMARY

The Government of Bangladesh (GOB), under its Eighth Five-Year Plan targets to provide 100% of the urban population with access to an improved water source, and 80% of city dwellers with safely managed sanitation services by 2026. Narayanganj is the fourth most populated city in Bangladesh and economically important because it is adjacent to Dhaka City. However, capacity and quality of infrastructures necessary to keep pace with the economic development need to be improved, ranging from reliable piped water supply, drainage system and public spaces. Thus, with ADB loan support, Narayanganj City Corporation (NCC) is proposing the Narayanganj Green and Resilient Urban Development Project (NGRUDP or project or overall project) which comprises subprojects on water supply, drainage, and community parks overlooking Shitalakhya River.

The project is aligned with the following impacts: (i) sustainable and inclusive urban development achieved, and (ii) safe and climate-resilient delta area achieved. The project will have the following outcome: NCC's resilience, and access to inclusive, reliable, and sustainable urban services improved. An output of the project will be a climate-resilient and inclusive infrastructure developed and/or improved for NCC. The project will improve and expand the existing water supply system for inclusive, resilient, and safely managed continuous drinking water supply services in the priority area in NCC to serve 0.4 million people. These will include improvements to the existing WTP, an upgrade and expansion of the network with DMA approaches for reducing nonrevenue water, and installation of deep tube wells (DTWs) in selected areas including low-income communities, for supply augmentation. The project will also establish and improve stormwater drainage system in the priority area to reduce water logging and flood risk with climate and disaster-resilient design and nature-based solutions such as introducing soil and vegetation. Further, the project will develop green public parks to improve quality of life of the citizens, with features responsive to women and vulnerable, to provide recreational spaces and reduce urban heat. The public parks will be attached with walkway along the eastern side of the Shitalakhya river that also function as embankment.

**Scope of the Subproject.** The Parks Improvement Subproject (subproject) is designed to improve existing public spaces, particularly the existing community parks near the Shitalakhya river which are important gathering points for the people of Narayanganj City. The following are the scope of the subproject:

The subproject will develop about a total of 7.42 hectares of green public parks to improve quality of life of the citizens, with features responsive to women and vulnerable, to provide recreational spaces and reduce urban heat.<sup>1</sup> Subproject components are summarized as follows:

| S.N. | Components                                    | Area<br>(in<br>hectare) | Subcomponents                                                                                                                                                                                                                                                                                                                 |
|------|-----------------------------------------------|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.   | Development of Park A Public Space in ward 25 | 3.76                    | <ul style="list-style-type: none"><li>• Land levelling by ensuring low-lying parts are elevated to the same level as the roads and the rest of the park area;</li><li>• Multipurpose public space;</li><li>• Solid boundary walls with secured entrances;</li><li>• Paved footpaths or walkways;</li><li>• Lighting</li></ul> |

<sup>1</sup> The western side of the river has an ongoing World Bank- and government-funded project to construct embankment protection with pedestrian walkway.

| S.N. | Components                                                      | Area<br>(in<br>hectare) | Subcomponents                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------|-----------------------------------------------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |                                                                 |                         | <ul style="list-style-type: none"> <li>• Accessible public toilets with baby facilities;</li> <li>• Children's soft play areas;</li> <li>• Women's/Girls' play areas;</li> <li>• Rain shelters;</li> <li>• Seats and benches made of RCC;</li> <li>• Cricket and basketball playing areas; and</li> <li>• Greenery areas.</li> </ul>                                                                                                                                                                                                                                                     |
| 2.   | Development of Park B with Community Center Building in Ward 25 | 0.66                    | <ul style="list-style-type: none"> <li>• Land levelling by ensuring low-lying parts are elevated to the same level as the roads and the rest of the park area;</li> <li>• Two-floor community center building;</li> <li>• Solid boundary walls with secured entrances;</li> <li>• Paved footpaths or walkways;</li> <li>• Lighting</li> <li>• Accessible public toilets with baby facilities;</li> <li>• Children's soft play areas;</li> <li>• Women's/Girls' play areas;</li> <li>• Rain shelters;</li> <li>• Seats and benches made of RCC; and</li> <li>• Greenery areas.</li> </ul> |
| 3.   | Improvement of Existing Playground in Ward 24                   | 0.43                    | <ul style="list-style-type: none"> <li>• Open football field with goal posts;</li> <li>• Children's playground;</li> <li>• Paved footpaths or walkways;</li> <li>• Lighting;</li> <li>• Rain shelters;</li> <li>• Seats and benches made of RCC; and</li> <li>• Greenery areas.</li> </ul>                                                                                                                                                                                                                                                                                               |
| 4.   | Improvement of Park C in Ward 19                                | 2.57                    | <ul style="list-style-type: none"> <li>• Land levelling by ensuring low-lying parts are elevated to the same level as the roads and the rest of the park area;</li> <li>• Solid boundary walls with secured entrances;</li> <li>• Open football field;</li> <li>• Paved footpaths or walkways;</li> <li>• Lighting</li> <li>• Children's play areas;</li> <li>• Women's/Girls' play areas;</li> <li>• Rain shelters;</li> <li>• Seats and benches made of RCC; and</li> <li>• Greenery areas.</li> </ul>                                                                                 |

These preliminary designs and features will be finalized during the detailed design wherein measurements and boundaries will be validated, including quantification of all construction materials to be utilized.

**Categorization.** In accordance with ADB Safeguard Policy Statement (SPS) 2009, an initial screening using ADB rapid environmental assessment (REA) checklist was conducted for the sites (Appendix 1). Result of this initial assessment reveals that there are no environmentally sensitive areas near the sites and that the subproject is unlikely to cause significant adverse impacts to the environment and people. The subproject sites are near the Shitalakhya river, a

major navigational route in Bangladesh. With this close proximity to the river, the assessment reveals that the subproject may still pose likely negative impacts related to both construction phase and operations phase of the subproject. However, these impacts are deemed manageable and can be mitigated through proper design and engineering measures. Therefore, per ADB SPS, the project has been classified as Category B for environment. Consequently, an initial environmental examination (IEE) has been undertaken in accordance with ADB SPS requirements for Category B projects. Alongside, the assessment was also carried out within the policy, legal, and administrative frameworks of the government, in particular Bangladesh Environment Conservation Act, 1995 (ECA, 1995) and Environment Conservation Rules (ECR, 2023). While the subproject is included under the Yellow Category per ECR 2023 classification, the overall project, which encompasses water supply and drainage, is categorized as Red, which would require a Location Certificate and Environmental Clearance Certificate (ECC) from the Department of Environment (DOE).

This IEE report aims to (i) provide facts, findings, and recommended actions from environmental assessment; (ii) present the national and local legal and institutional framework within which the environmental assessment has been carried out; (iii) provide information on existing geographic, ecological, social and temporal context including associated facilities within the subproject's area of influence; (iv) assess the subproject's likely positive and negative direct and indirect impacts to physical, biological, socioeconomic, and physical cultural resources in the subproject's area of influence; (v) identify mitigation measures and any residual negative impacts that cannot be mitigated; (vi) describe the process undertaken during subproject design to engage stakeholders and the planned information disclosure measures and the process for carrying out consultation with affected people and facilitating their participation during subproject implementation; (vii) describe the overall project's grievance redress mechanism (GRM) for resolving complaints about environmental performance; (viii) present the set of mitigation measures to be undertaken to avoid, reduce, mitigate, or compensate for adverse environmental impacts; (ix) describe the monitoring measures and reporting procedures to ensure early detection of conditions that necessitate particular mitigation measures; and (x) identify who is responsible for carrying out the mitigation and monitoring measures.

**Description of the Environment.** The subproject is located within the NCC area with urban setting. The topography in the whole of NCC is relatively flat. Satellite images show that the subproject area is generally higher than the level of Shitalakhya river by 3 – 5 m. Shitalakhya river is not protected water body and is generally used as vital navigational route and storm water/drainage catchment in central Bangladesh including NCC. There are no known agricultural activities along this river. There are no land-based or aquatic natural habitats and environmentally sensitive areas (forest area, protected area, wetlands, mangroves, or estuaries) within and immediate vicinities of the proposed subproject sites. The sites are open spaces and owned by the government.

Primary and secondary data on baseline environmental quality reveal mixed results. Ambient air quality shows general compliance with most standard parameters except for particulate matters. Noise level is generally high all around Narayanganj city compared to the standards, primarily due to the traffic noise that is inherent in urban setting in Bangladesh. Water quality of the Shitalakhya river shows seasonal variation, but generally above the standards due to its use as a major navigational route and discharge point of drains from all over the city conveying combination of storm water, and residential and commercial/industrial discharges. Groundwater quality registered general elevated concentrations in terms of some parameters such as manganese, BOD, COD and coliform, among others.

**Assessment of Environmental Impacts and Proposed Mitigation Measures.** Potential environmental impacts were identified based on review and analysis of the primary and secondary data or information, stakeholder consultations, and visits to the sites and their vicinities. Impacts were identified in relation to the different phases of subproject implementation — design/pre-construction, construction, and operation of the built infrastructure. In consultation with various experts, including the design team, evaluation of the likely degree of impacts has been done on each of identified potential impacts. Based on this evaluation, mitigation measures have been developed to reduce all negative impacts to acceptable levels based on national and/or internationally accepted standards.

**Potential impacts to the physical environment.** Impacts to air quality, acoustic environment, surface water and groundwater quality, waste disposal, and other forms of nuisance during construction phase are similar to impacts expected from other construction activities elsewhere, which can be mitigated through good international construction and engineering practices. Mitigation measures to avoid all potential impacts are included in the EMP. During the detailed design phase, the DB Contractor will support the PMU in updating the IEE with EMP, and separately develop its site-specific EMP (SEMP) and other allied work plans (e.g. method statement for site development, traffic management plan, etc.), following applicable international best practices that will include World Bank's EHS Guidelines on Construction and Decommissioning Activities.<sup>2</sup> Potential impacts during operation phase include discharge of effluents from toilets and indiscriminate disposal of solid wastes from the parks. The design of the toilets will ensure to follow internationally accepted standards to mitigate the possible discharge of effluent that is not in compliance with the standards. NCC will provide all the necessary resources so that the parks and their facilities are managed effectively and maintain their efficiency.

**Potential impacts to biodiversity.** Despite being located in a built-up and developed urban area, the subproject sites have been assessed in terms of biodiversity. The Integrated Biodiversity Assessment Tool was used to screen and assess potential risks on the protected areas or critical habitat that may exist around the project sites (default area of analysis of 50 km radius). Results show that there are no protected areas or key biodiversity areas around the vicinities of the subproject sites. The results also show biodiversity species of concern that could potentially occur within the default 50-km radius. However, the subproject sites are already in a built-up area and the probability of these species of concern being found at the sites is very low. Site visits have also been conducted which confirmed that none of these species are found or sighted at the subproject sites.

**Other potential impacts.** Consultations have been conducted throughout the study to ensure that the knowledge, experience, and views of stakeholders and the general public are taken into account during the IEE work. Initial consultations conducted were well participated in by the different stakeholders, such as the ward officials, community-based groups, professional groups (teachers, medical practitioners), labor groups (fishermen, hawkers, drivers), representatives from the Bangladesh Inland Waterways and Transport Authority, and ward residents. All findings from the consultations were considered in the development of environmental management plans (EMPs), especially in identifying the potential impacts of the proposed subproject and developing the corresponding mitigation measures to address these impacts. Overall, wide public acceptance of the subproject has been earned out of these consultation activities. During the detailed design

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<sup>2</sup> IFC World Bank Group. 2007. [Environmental, Health, and Safety \(EHS\) Guidelines – General EHS Guidelines: Construction and Decommissioning](#).

phase, new rounds of consultations will be scheduled to present the final components and designs, and other subproject-related developments to all stakeholders.

**Environmental Management Plan.** The EMP will guide the environmentally sound construction of the subproject and ensure efficient lines of communication among stakeholders, including the NCC as implementing agency, the project management unit (PMU), consultants, DB Contractor, and the general public. The EMP will (i) ensure that the activities are undertaken in a responsible non-detrimental manner; (ii) provide a pro-active, feasible, and practical working tool to enable the measurement and monitoring of environmental performance on site; (iii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the subproject; (iv) detail specific actions deemed necessary to assist in mitigating the environmental impact of the subproject; and (v) ensure that safety recommendations are complied with. With the various sites of the subproject, the DB Contractor will be required to develop corresponding site-specific environmental management plans (SEMPs) based on the EMP of this IEE, including other work plans necessary to fulfil related environmental mitigation measures in the EMP (i.e. Method Statement for Site Development, Traffic Management Plan, Spoil Management Plan, Waste Management Plan, and Health and Safety Plan). The DB Contractor will submit its SEMP and other work plans to the PMU through the MDSC for approval. The SEMP and work plans will be able to elaborate further on the environmental impacts specific to each of the subproject sites.

A copy of the EMP and SEMP, including the other work plans, shall be always kept by DB Contractor on-site during the construction phase. The DB Contractor appointed will be responsible for the organization, direction, and execution of environmental management related activities during construction of the proposed subprojects. The DB Contractor will undertake all activities in accordance with the relevant environmental requirements, including consent documentation and other regulatory and/or statutory and contractual requirements. As the ultimate administrator of the subproject, NCC through the PMU shall likewise keep copy of the EMP and SEMP, including the other work plans, during construction phase, and during the operation phase or when the subproject infrastructures are completed and used for the purposes.

**Implementation Arrangement.** The Local Government Division (LGD) of the Ministry of Local Government, Rural Development and Cooperatives (MLGRDC) will be the executing agency and NCC will be the implementing agency for the overall project. A Project Coordination Committee (PCC) will be formed within the NCC to engage with policymakers, obtain guidance on key policy issues and oversee overall project implementation. A Project Management Unit (PMU) will be created under the overall supervision of PCC. The PMU will ensure that the subproject will be implemented in accordance with the ADB SPS and relevant government laws, rules and regulations, including the recently Environmental Conservation Rules, 2023, among others. The PMU will be supported by a Management, Design and Supervision Consultant (MDSC) team, comprising individual consultants that will provide all necessary management and supervision expertise in implementing the project. The management and supervision will come at varying degrees during design phase and pre-construction phase, construction phase, and operation phase.

PMU will be established within NCC to oversee the day-to-day activities of the project and corresponding subprojects. The PMU will be supported by the MDSC team, which will comprise various individual consultants with distinct areas of specialization necessary to support the implementation of the overall project, and thus to all subprojects. MDSC will be responsible for: (i) support to project management and administration by PMU; (ii) contract documents preparation; (iii) review of designs by the DB contractor; (iv) supervision and monitoring of safeguards implementation; (v) assistance in supervising construction; (vi) support in the conduct

of continuing meaningful consultations for the project; (vii) support PMU to ensure that the current investment project is implemented to time and budget constraints, and to provide a clear path for the development of a long-term water supply solution in Narayanganj; (viii) ensure significant improvement in the institutional capacity of NCC in such areas as sustainable O&M and DMA management, revenue enhancement, public awareness, GESI implementation, management system digitization; and (ix) develop service improvement plans including financial aspects for sustainable O&M; among others.

**Consultation, Disclosure and Grievance Redress.** The stakeholders were involved in undertaking the IEE through on-site discussions and public consultation. Their views were incorporated into the IEE process and in the planning and development of the subproject. Two public consultation meetings have been held. These were participated in by different stakeholders. A total of 87 people participated in these consultation activities, consisting of 80 males and 7 females. Overall, participants were supportive and thankful of the subproject, and recognized the need for improved green public spaces and recreational areas in their communities. They expressed their understanding that the project will improve the environmental condition and aesthetics in the communities and will be very important as part of improving their social life and wellbeing. The participants conveyed their unconditional support to the subproject, and thankful for the government and NCC for taking this initiative.

This IEE report which documents the environmental assessment process, including updated versions as may be needed in the future, will be made available at public locations in the city and will be disclosed to a wider audience via the ADB and project/NCC websites. Meaningful consultation will be a continuing activity during project implementation, including design period, to ensure that stakeholders are fully engaged in the subproject and have the opportunity to participate in its implementation.

A grievance redress mechanism (GRM) is described within this IEE report to ensure that any public grievance is addressed adequately and efficiently. The GRM will provide the citizens with a platform for redress of their grievances and describes the informal and formal channels, time frame and mechanisms for resolving complaints about environmental performance of the overall project and/or each individual subproject. The GRM will be proportionate to the potential risks and impacts of the project or subprojects, and will be accessible and inclusive, and handling of grievances will be done in a culturally appropriate manner and be discreet, objective, sensitive and responsive to the needs and concerns of the project/subproject-affected parties.

**Monitoring and Reporting.** The PMU, with support from MDSC, will be responsible for monitoring and reporting. The DB Contractor will also be responsible for its own monitoring based on the EMP, SEMP and work plan activities, and reporting of status and progress of implementation. The DB Contractor will submit monthly report to PMU through the MDSC. The PMU, with support from MDSC, will conduct its own monitoring of the implementation of the EMP and SEMP by all contractors (both DB/DBO contractors and civil works contractors). MDSC will support PMU in consolidating all monthly reports from contractors. Based on results of its own monitoring activities and consolidated monthly reports from contractors, PMU, with support from MDSC, will prepare semi-annual environmental monitoring reports (SEMRs) to ADB. PMU and ADB will post the cleared SEMRs on project/NCC website and ADB website, respectively. ADB will monitor the project on an ongoing basis until a project completion report is issued.

**Conclusions and Recommendations.** It is envisaged that the proposed subproject will contribute to providing reliable, sustainable, and inclusive urban services in NCC, the fourth most populated city in Bangladesh and one of the major growth engines of the country being adjacent

to Dhaka and a vital transport hub. Once implemented, the subproject will have direct benefits to the people of NCC with improved parks and public spaces. These spaces are important recreational or activity areas where the people could enrich their social connection and interaction with families and community people, foster sports development, and other activities that improve individual and social wellbeing.

This IEE has been prepared based on known general location of the parks and public places, and on preliminary designs that are limited to indicative site layouts. Due to this preliminary nature of the design used in this assessment, re-assessment will be necessary and updating of this IEE will be required once the final detailed design is prepared by the DB Contractor. Nevertheless, the key environmental considerations and analysis during this IEE process and the implementation of environmental control measures of the subproject have been adequately explained in this report. There are no environmentally sensitive areas and cultural heritage sites near the subproject sites. The extent of adverse impacts is expected to be local, confined within the subproject's main areas of influence, waste disposal sites, and the routes to and from these sites. Any other potential negative environmental impacts that are associated with location, preliminary design, nature of construction works, and operation of the subproject can be mitigated to standard levels without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures and procedures following internationally recognized best practices and standards as discussed in the EMP. It is therefore recommended that the subproject be supported, subject to the implementation of the commitments contained in the EMP and allocation of appropriate technical, financial and human resources by NCC.

In addition, during the detailed design phase, the DB Contractor shall prepare the following required work plans and submit to NCC, through the PMU or MDSC, for approval. No works shall commence until any relevant or required work plan is approved.

- Method Statement for Site Development;
- Traffic Management Plan;
- Spoil Management Plan;
- Waste Management Plan; and
- Health and Safety Plan (Community and Occupational).

This IEE report has been prepared in accordance with ADB SPS's requirements for projects classified as Category B for environment. With the above premises considered, the classification of Category B for environment is confirmed. Separately, per ECA, 1995 and ECR, 2023 of Bangladesh, the overall project or NGRUDP is classified under "Red" category. Hence, preparation of an environmental impact assessment (EIA) based on DOE approved terms of reference is mandatory. Upon approval of the submitted EIA, ECC must be obtained from the DOE prior to award of contracts.

## I. INTRODUCTION

### A. Background

1. The Government of Bangladesh (GOB), under its Eighth Five-Year Plan targets to provide 100% of the urban population with access to an improved water source, and 80% of city dwellers with safely managed sanitation services by 2026. In response to this and to design ensuing investment projects in selected secondary towns and city corporations of Bangladesh, ADB under Project Readiness Financing (PRF) has constituted an Urban Infrastructure Improvement Preparatory Facility (UIIPF) for Bangladesh to help manage the technical and implementation issues upfront and secure high readiness of the ensuing investment projects for ADB financing. Under UIIPF, the Department of Public Health Engineering (DPHE) in preparing water supply and sanitation investment projects where development is lagging.

2. Narayanganj City is the fourth most populated city in Bangladesh and economically important because it is adjacent to Dhaka. The UIIPF facility thus aims to build NCC's capacity to ensure the sustainability of urban infrastructure investments, and their operation and management. As part of capacity building, the facility is supporting the NCC in developing Narayanganj Green and Resilient Urban Development Project (hereafter referred to as “project” or “overall project” or “NGRUDP”) comprising preparation of master plans, feasibility studies, detailed design for the proposed infrastructure facilities for water supply, drainage, and river-front development in NCC.

### B. Outcome and Outputs of the Project

3. **Outcome.** The project is aligned with the following impacts: (i) sustainable and inclusive urban development achieved, and (ii) safe and climate-resilient delta area achieved. The project will have the following outcome: NCC's resilience, and access to inclusive, reliable, and sustainable urban services improved.

4. **Output 1: Climate-resilient and inclusive infrastructure developed and/or improved.** The project will improve and expand the existing water supply system for inclusive, resilient, and safely managed continuous drinking water supply services in the priority area in NCC to serve 0.4 million people. These will include improvements to the existing WTP, an upgrade and expansion of the network with DMA approaches for reducing nonrevenue water (NRW),<sup>3</sup> and installation of deep tube wells in selected areas including low-income communities, for supply augmentation.<sup>4</sup> The project will also establish and improve stormwater drainage system in the priority area to reduce water logging and flood risk with climate and disaster-resilient design and nature-based solutions such as introducing soil and vegetation. Further, the project will develop total 15 hectares of green public parks to improve quality of life of the citizens, with features responsive to women and vulnerable, to provide recreational spaces and reduce urban heat.<sup>5</sup> The public parks will be attached with total 6 kilometers (km) walkway along the eastern side of the Shitalakshya river that also function as embankment.

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<sup>3</sup> Improvements in the existing network will be part of long-term strategy to ensure judicious use of existing water supply and prepare for switching from ground to surface water source. The phased shift to surface water resource will be based on Dhaka Water Supply and Sewerage Authority's experience in similar projects. Digital applications such as smart water meters, and online billing and collection will be introduced or strengthened to augment revenue and improve operational efficiency.

<sup>4</sup> Sustainability of the ground water yield was confirmed through survey including water quality and impact to depletion. Selected areas where these were not confirmed were excluded from the project scope. The support would be an interim solution to meet the demand until completion of switching to surface water resource using the Meghna River.

<sup>5</sup> The western side of the river has an ongoing government-funded project to develop a road with embankment.

5. **Output 2: Capacity and awareness of NCC and local community in climate-resilient, sustainable, and inclusive urban services strengthened.** To improve sustainability and quality of services through the facilities developed under output 1, the project will strengthen NCC staff capacity (at least 90% of female staff) in climate-resilient, sustainable, and gender equality and social inclusion (GESI) responsive service delivery. It will develop service improvement plans including financial aspects for sustainable O&M. For water supply, NCC's capacity on O&M will be improved through on-the-job training by the contractor that will be responsible for O&M for the initial five years. DMA management and water quality monitoring will be supported. A water supply master plan will be prepared to improve the services in wider areas in NCC, and to set the longer-term development strategy for transformation toward climate- and disaster-resilience.<sup>6</sup> The project will also support preparation of masterplans for wastewater, solid waste management, and urban planning to improve living environment in an integrated manner, combined with the intervention for drainage, and advance climate and disaster resilience. The project will also support GESI-sensitive community awareness and behavior change campaigns on water, sanitation and hygiene, climate resilience, and sustainable services to maximize the health and economic impact of the investments.<sup>7</sup> This output, together with the infrastructure to be developed under the output 1, is expected to lead to achieving the intended outcome.

6. **Output 3. Institutional capacity and governance of other municipal services strengthened.** To improve other municipal services, the project will support trainings of the NCC staff and elected representatives covering laws, regulations, city planning, and development. An action plan for urban governance and service improvement with monitoring tools will be prepared, involving citizen participation. It will build on NCC's successful past performance in governance improvement. The project will also support establishing a unit within NCC for giving trainings and implementing the action plan. The unit will also function as a data center for assets inventory and digital archiving of documents and records. The project will build capacity of NCC staff to gradually take over full responsibility of these as their routine operation. The project will also strengthen NCC's administrative efficiency through digitalization of management systems in areas such as customers records, asset management, and procurement. For NCC's revenue augmentation including strengthening property tax and municipal fees, a separate technical assistance (TA) by ADB's Office of Markets Development and Public-Private Partnership (OMDP) is under discussion with NCC.<sup>8</sup> Combination of these support is expected to help NCC establish creditworthiness and become an investable city. This output is expected to contribute to achieving the outcome through consolidated financial, administrative, and governance strengthening.

### C. **Overview and Location of the Overall Project (NGRUDP)**

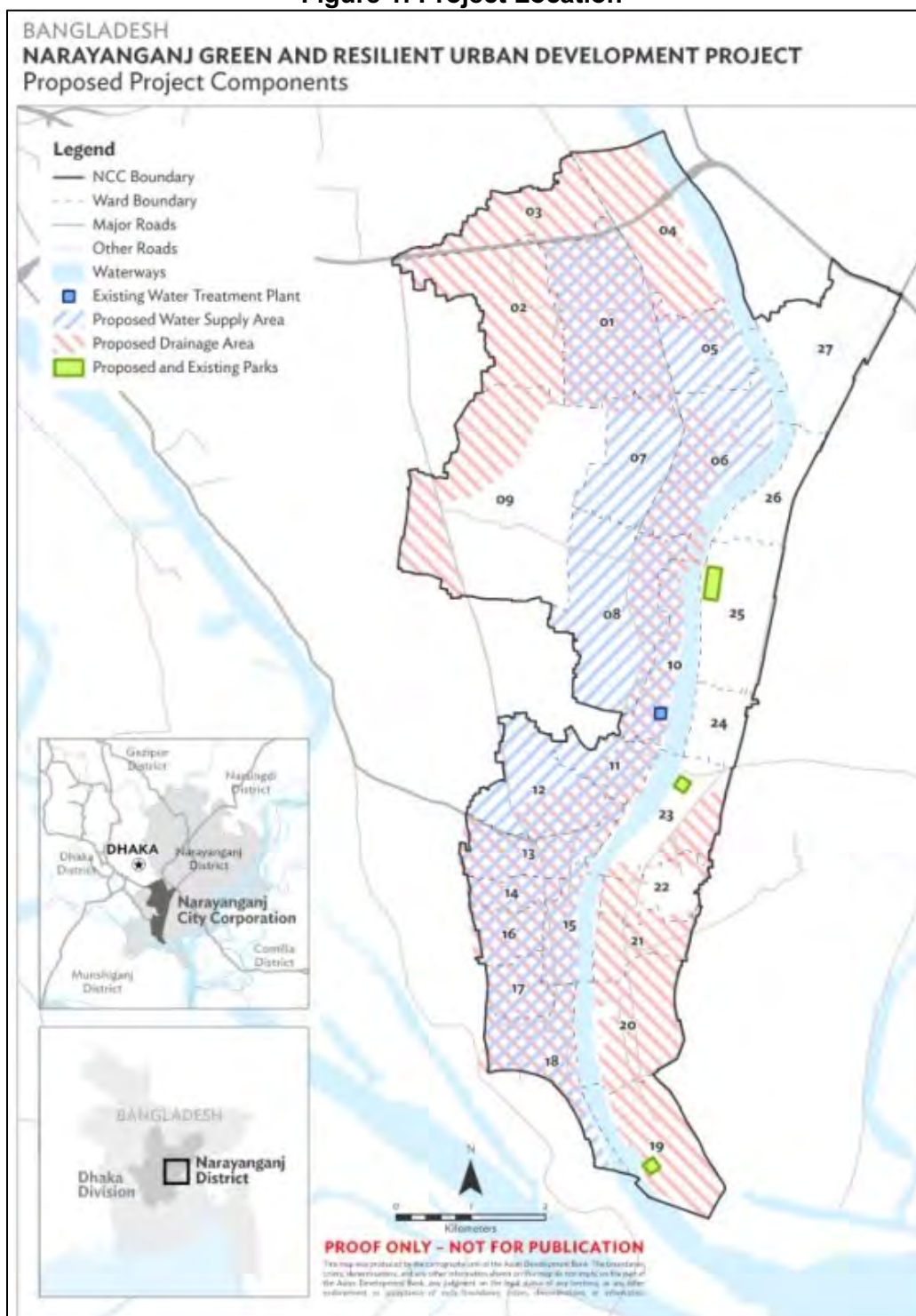
7. The location the overall project (NGRUDP) is within the jurisdiction of Narayanganj City Corporation (NCC), the fourth most populated and sixth largest city in Bangladesh. NCC is about 16 km southeast of the capital city of Dhaka and has a population of about 3,074,038.<sup>9</sup> The location of NCC shown in **Figure 1** below.

<sup>6</sup> The masterplan will also explore wider climate adaptation responses through new technology, policies, and governance. Output 2 will build on ADB's experience in the ADB. 2014. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Administration of Loan Grants to the People's Republic of Bangladesh for the Coastal Towns Environmental Infrastructure Project*. Manila.

<sup>7</sup> For drainage, setting design codes to reduce runoffs, flood risk mapping, and early warning systems will be explored.

<sup>8</sup> The project will support establishing web-based geographic information system mapping and survey to complement the capacity building support through OMDP.

<sup>9</sup> Adjusted Population 2011. Statistical Yearbook of Bangladesh 2022. Bangladesh Bureau of Statistics. June 2023.

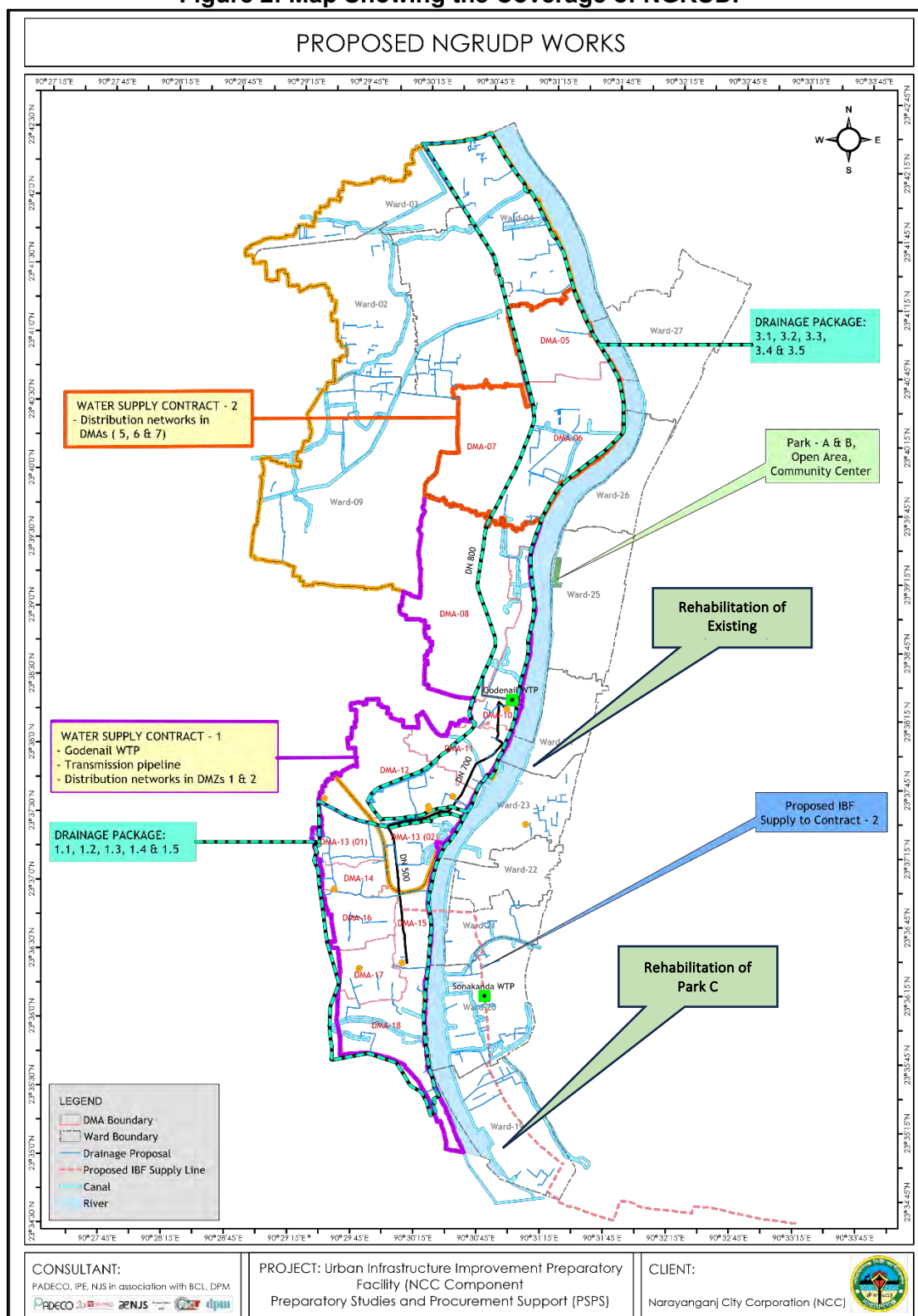
Figure 1: Project Location<sup>a</sup>

<sup>a</sup> Disclaimer: Boundaries, colors, denominations or any other information shown on this map do not imply, on the part of ADB, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries, colors, denominations, or information.

8. NGRUDP will provide reliable, sustainable, and inclusive urban services in NCC. It includes a safely managed drinking water supply, drainage, and public parks; and improved capacity of NCC and local communities which altogether will strengthen climate adaptation and sustainability of urban services. Consistent with Output 1 above, the proposed project will have four subprojects, namely:

- (i) **Water Supply Contract 1 Subproject**, which involves the rehabilitation and upgrading of existing WTP at Godenail, rehabilitation of existing DTWs and OHTs, construction of transmission main, and construction of new distribution network in selected District Metering Zone (DMZs) of NCC;
- (ii) **Water Supply Contract 2 Subproject**, which involves development of new production tube wells (PTWs) using the induced bank filtration (IBF) technology including construction or installation of disinfection units for each PTW, construction of collector pipeline from these PTWs to existing OHTs in the NCC area, construction of river crossing, and construction of new distribution network in selected District Metering Areas (DMAs) of DMZ3 of NCC;
- (iii) **Drainage Subproject**, which involves rehabilitation of existing drainage, rehabilitation of existing natural drainage/canals, and construction of new drainage; and
- (iv) **Parks Development Subproject**, which involves rehabilitation and upgrading of four existing parks and public spaces, and construction of a community center building.

9. Figure 2 below shows the location of NCC and the coverage areas of the four subprojects.

Figure 2: Map Showing the Coverage of NGRUDP<sup>a</sup>

<sup>a</sup> Disclaimer: Boundaries, colors, denominations or any other information shown on this map do not imply, on the part of ADB, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries, colors, denominations, or information.

#### D. Purpose of the Initial Environmental Examination

10. This IEE report covers **Parks Development Subproject**. The overall objective of the IEE undertaken for the subproject is to capture the environmental setting of the proposed subproject components, including physical, biological, and socioeconomic conditions; national and local legal frameworks; as well as international environmental agreements that are relevant to the subproject. Based on these, the IEE further identifies and analyses potential direct, indirect, cumulative, and induced impacts and risks of the subproject to these environmental aspects, in the context of the subproject's areas of influence. Subsequently, measures are formulated to address these impacts by avoiding them, or if total avoidance is not possible, at least reduce them to acceptable levels based on GOB or internationally recognized standards. The IEE also identifies the parties who will monitor and report the implementation of these measures. Thus, this IEE report is a documentation of the IEE process undertaken that will provide guidance to NCC, the contractor and other operators on how to plan, build and operate the subproject in an environmentally responsible manner, ensuring that all negative effects are prevented or mitigated, and positive impacts are enhanced.

#### E. Methodology

11. This IEE report has been prepared on the basis of available preliminary subproject design, field investigations, stakeholder consultations, and literature and online sources to meet the requirements for environmental assessment process and documentation per ADB SPS, 2009. Environmental assessment was conducted through the following:

- (i) Review of the available preliminary subproject designs, in particular to the technology to be employed;
- (ii) Primary data collection during site visits and secondary data from various sources, socio-economic, hydrological, topographic, and engineering surveys at subproject sites, meaningful consultation with the stakeholders, including concerned government officials, project personnel and the general public;
- (iii) Appropriate assessment of impact of the subproject implementation on cultural and heritage assets, including other public- and private-owned structures, that may likely be disturbed or damaged during construction works;
- (iv) Gathering of baseline information from primary and most recent secondary sources on environmental quality such as air quality, noise level, surface water quality, and groundwater quality within the corridor of impact of the subproject, and against which predictions of changes to these environmental media during the construction period will be compared to assess such changes, if any, and their significance; and
- (v) Screening and assessment of potential risks on the biological environment, which include the protected areas or critical habitats that may exist around the subproject sites. The Integrated Biodiversity Assessment Tool (IBAT) was initially used to screen and assess potential risks on the protected areas or critical habitat that may exist around the subproject sites.

12. Field reconnaissance surveys and follow up verification field visits were conducted at subproject sites to establish the potential impacts and categorization of subproject activities. Formal and informal public consultation activities were conducted with the affected stakeholders and communities and kept notes on the impacts of the proposed subproject. The methodology of the IEE study was then conveyed and elaborated to these stakeholders to address all impacts

and for those impacts requiring mitigation measures were proposed to reduce impacts within acceptable limits.

13. **Project Area of Influence.** There are three different sites for the subproject. For each of these locations, a radius of 50 – 100m from the respective boundaries, has been considered as the project area of influence. These distances are approximate and actual corridor of impact may vary depending on the sensitivity of receptors around the different subproject components. The various construction activities under the subproject will have environmental aspects whose impacts may go beyond the distances.

14. **Limitations.** Preliminary design and technology, and sites were provided as basis of the assessment. Final designs, technological specifications and other information such as final cost estimates are not yet finalized. This subproject will be awarded under a design-build (DB) modality. Thus, the IEE has utilized relevant aspects and impacts that could be encountered in conventional public parks and beautification projects, with allied land development and construction of low-rise multi-purpose building of about 1-2 storeys only. The IEE has also utilized results of visual observations during transect walks in the vicinities of these sites, on the spot interviews with the locals, and other primary and secondary information available.

#### F. Structure of the Report

15. The report has been structured in compliance with ADB SPS, 2009.

- (i) **Executive Summary.** This section describes concisely the critical facts, significant findings, and recommended actions.
- (ii) **Introduction.** Presents a brief overview of the overall project along with its background, objectives, and purpose and specific subproject scope of the IEE, among others.
- (iii) **Policy, Legal, and Administrative Framework.** This section discusses both ADB SPS and GOB's national and local legal and institutional framework within which the environmental assessment is carried out. It also identifies project-relevant international environmental agreements to which GOB is a party.
- (iv) **Description of the Subproject.** This section describes the proposed subproject in terms of its major components, geographic location, and interaction with the environment in terms of ecological, socio-cultural, and economic standpoint, etc., including any associated facility required by and for the subproject.
- (v) **Description of the Environment.** This section describes relevant physical, biological, and socio-economic conditions within the subproject area. It also looks at current and proposed development activities within the subproject's area of influence, including those not directly connected to the subproject. It indicates the accuracy, reliability, and sources of the data.
- (vi) **Anticipated Environmental Impacts and Mitigation Measures.** This section predicts and assesses the subproject's likely positive and negative direct and indirect impacts to physical, biological, socioeconomic (including occupational health and safety, community health and safety, and impacts on livelihoods through environmental media), and physical cultural resources in the subproject's area of influence, in quantitative terms to the extent possible; identifies mitigation measures and any residual negative impacts that cannot be mitigated; explores opportunities for enhancement; identifies and estimates the extent and quality of available data, key data gaps, and uncertainties associated with predictions and

specifies topics that do not require further attention; and examines global, transboundary, and cumulative impacts as appropriate.

- (vii) **Information Disclosure, Consultation, and Participation.** This section (i) describes the process undertaken during subproject design and preparation for engaging stakeholders, including information disclosure and consultation with affected people and other stakeholders; (ii) summarizes comments and concerns received from affected people and other stakeholders and how these comments have been addressed in subproject design and mitigation measures, with special attention paid to the needs and concerns of vulnerable groups, including women; and (iii) describes the planned information disclosure measures (including the type of information to be disseminated and the method of dissemination) and the process for carrying out consultation with affected people and facilitating their participation during subproject implementation.
- (viii) **Grievance Redress Mechanism.** This section describes the grievance redress mechanism (both formal and informal channels), setting out the timeframe and mechanisms for resolving complaints about environmental performance.
- (ix) **Environmental Management Plan.** This section deals with the set of mitigation and management measures to be taken during subproject implementation to avoid, reduce, mitigate, or compensate for adverse environmental impacts (in that order of priority). It may include multiple management plans and actions (mitigation, monitoring and performance indicators).
- (x) **Monitoring and Reporting.** Outlines the environmental monitoring program and reporting system including the cost of implementing the EMP.
- (xi) **Conclusion and Recommendations.** Presents the conclusion and recommendations of the IEE study.

## II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

16. Alongside ADB Safeguard Policy Statement (SPS, 2009), each component of the project must comply with the relevant legal and policy framework of Government of Bangladesh, such as the Environment Conservation Act 1995 (ECA, 1995) with amendments in 2000, 2002 and 2010, and the Environment Conservation Rules 2023 (ECR, 2023), which are the primary environmental law and rules of the country.

### A. ADB Safeguard Policy Statement 2009

17. The ADB Safeguards Policy Statement (SPS, 2009) provides guidance on the environment category of projects based on the degree of anticipated environmental impacts. ADB environmental safeguards objectives are: (i) to ensure the environmental soundness and sustainability of projects; and (ii) to support the integration of environmental considerations into the project decision-making process. ADB environmental safeguards are triggered if a project is likely to have potential environmental risks and impacts. The initial process of categorization involves filling out a sectoral rapid environmental assessment (REA) checklist. A project is classified to be under any of the four environmental categories (A, B, C, or FI) based on the most environmentally sensitive component. Categories are as follows:

- (i) **Category A:** Project that is likely to have significant adverse environmental impacts which 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 (EIA), including an environmental management plan (EMP), is required.

- (ii) **Category B:** Project with potential adverse environmental impacts that 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 (IEE), including an EMP, is required.
- (iii) **Category C:** Project that is likely to have minimal or no adverse environmental impacts. An EIA or IEE is not required, although environmental implications need to be reviewed.
- (iv) **Category FI:** Project is classified as category FI if it involves the investment of ADB funds to, or through, a financial intermediary.

18. Initial screening using ADB REA checklist for general and urban development (Appendix) was conducted, and results of the rapid assessment show that the subproject is unlikely to cause any significant adverse impacts, and therefore classified under Category B per ADB SPS. Thus, this IEE report has been prepared in accordance with ADB SPS requirements for project with Category B classification.

19. **Environmental Management Plan.** An EMP, which addresses the potential impacts and risks identified by the environmental assessment, shall be prepared. The level of detail and complexity of the EMP and the priority of the identified measures and actions will be commensurate with the subproject's impact and risks.

20. **Public Disclosure.** Upon review and confirmation that a safeguard document complies with the requirements of ADB SPS, ADB will post such safeguard document on its website as well as disclose relevant information in accessible manner in local communities:

- (i) for environmental category A projects, draft EIA report at least 120 days before ADB Board consideration;
- (ii) final or updated EIA and/or IEE upon receipt; and
- (iii) environmental monitoring reports submitted by the PMU during project implementation upon receipt.

21. **Consultation and Participation.** The PMU, with support from MDSC, shall carry out meaningful consultation<sup>10</sup> with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation. The consultation process and its results are to be documented and reflected in the environmental assessment report.

22. **Grievance Redress Mechanism.** NCC, through PMU, shall establish a mechanism to receive and facilitate resolution of affected peoples' concerns, complaints, and grievances about the subproject's environmental performance. The grievance mechanism shall be scaled to the risks and adverse impacts of the subproject. As of the ADB loan processing for the overall project, a grievance redress mechanism (GRM) has been established and discussed in detail in Section VIII below. This GRM applies to all subprojects.

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<sup>10</sup> Per ADB SPS, 2009, meaningful consultation means a process that (i) begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle; (ii) provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people; (iii) is undertaken in an atmosphere free of intimidation or coercion; (iv) is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and (v) enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues.

23. **Monitoring and Reporting.** PMU, with support from MDSC, shall monitor, measure and document the progress of implementation of the EMP and SEMP. If necessary, PMU will identify the necessary corrective actions, and reflect them in a corrective action plan. PMU will prepare and submit to ADB semi-annual environmental monitoring reports that describe progress with implementation of the EMP and SEMP, and compliance issues and corrective actions, if any. Reporting will continue until ADB issues a project completion report.

24. **Unanticipated Environmental Impacts.** Where unanticipated environmental impacts become apparent during implementation, PMU shall update the environmental assessment and EMP or prepare a new environmental assessment and EMP to assess the potential impacts, evaluate the alternatives, and outline mitigation measures and resources to address those impacts.

25. **Pollution Prevention and Control Technologies.** During the design, construction, and operation of the subproject, the PMU will apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environment, Health and Safety Guidelines.<sup>11</sup> These standards contain performance levels and measures that are normally acceptable and applicable to projects. When Government of Bangladesh regulations differ from these levels and measures, the PMU will achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific subproject circumstances, the PMU will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS.

26. **Occupational Health and Safety.** PMU<sup>12</sup> shall ensure that workers<sup>13</sup> are provided with a safe and healthy working environment, considering risks inherent to the sector and specific classes of hazards in the subproject work areas, including physical, chemical, biological, and radiological hazards. PMU shall ensure to take steps to prevent accidents, injury, and disease arising from, associated with, or occurring during the course of work by (i) identifying and minimizing, as far as reasonably practicable, the causes of potential hazards to workers; (ii) providing preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances; (iii) providing appropriate equipment to minimize risks and requiring and enforcing its use; (iv) training workers and providing them with appropriate incentives to use and comply with health and safety procedures and protective equipment; (v) documenting and reporting occupational accidents, diseases, and incidents; and (vi) having emergency prevention, preparedness, and response arrangements in place.

27. **Community Health and Safety.** The PMU shall ensure to identify and assess the risks to, and potential impacts on, the safety of affected communities during the design, construction, operation, and decommissioning (if applicable) of the subproject, and will establish preventive measures and plans to address them in a manner commensurate with the identified risks and impacts.

28. PMU shall ensure to apply preventive and protective measures for both occupational and community health and safety consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environment, Health and

<sup>11</sup> [World Bank Group Environmental, Health, and Safety Guidelines \(ifc.org\)](http://www.ifc.org/World-Bank-Group-Environmental-Health-and-Safety-Guidelines)

<sup>12</sup> In case where responsibility is delegated to subproject contractors during construction phase, PMU shall ensure that the responsibilities on occupational health and safety as described herein are included in the contract documents.

<sup>13</sup> Including nonemployee workers engaged by NCC through contractors or other intermediaries to work on project sites or perform work directly related to the project's core functions.

Safety Guidelines.<sup>14</sup> PMU shall also adhere to necessary protocols in response to infectious diseases such as COVID-19 and any other new diseases that may emerge in the future, consistent with the guidelines of relevant government healthcare agencies and the World Health Organization.

29. **Physical Cultural Resources.** PMU is responsible for siting and designing the subproject to avoid significant damage to physical cultural resources. Such resources likely to be affected by the subproject will be identified, and qualified and experienced experts will assess the subproject's potential impacts on these resources using field-based surveys as an integral part of the environmental assessment process. The chance finds procedure or protocol included in this IEE shall be used as mandatory guide for the Contractor.

30. **Environmental Audit.** When the subproject involves existing activities or facilities, PMU is responsible to ensure that relevant external experts will perform environmental audits to determine the existence of any areas where such subproject may cause or is causing environmental risks or impacts. If the subproject does not foresee any new major expansion, the audit constitutes the environmental assessment for the subproject.

31. **Bidding and Contract Documents.** This IEE report, which contains the EMP, shall be included in bidding and contract documents and verified by PMU. The PMU shall also ensure that bidding and contract documents include specific provisions requiring the Contractor to (i) comply with all other conditions required by ADB,<sup>15</sup> and (ii) to submit to PMU, for review and approval, site-specific environmental management plans (SEMPs), including (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; (iii) monitoring program per EMP; and (iv) budget for SEMP implementation, among others as may be required. No works can commence prior to approval of relevant SEMP. A copy of the EMP and/or approved SEMP will be kept on site during the construction period at all times. Non-compliance with, or any deviation from, the conditions set out in the EMP and/or SEMP constitutes a failure in compliance and shall require corrective actions.

32. **Conditions for Award of Contract and Commencement of Work.** PMU shall not award any works contract under the subproject until (i) relevant provisions from the EMP are incorporated into the works contract; (ii) this IEE report is updated to reflect subproject's final detailed design and PMU has obtained ADB's clearance of such updated IEE report; and (iii) DOE-approved EIA (i.e. EIA in compliance with ECR, 2023) and other necessary permits from relevant government agencies have been obtained. For "design, build, and operate" type contracts, PMU shall ensure no works for a subproject which involves environmental impacts shall commence until (i) relevant provisions from the EMP are incorporated into the works contract; and (ii) this IEE report is updated to reflect subproject's detailed design and PMU has obtained ADB's clearance for such updated IEE.

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<sup>14</sup> World Bank Group, 2007. *Environmental, Health, and Safety General Guidelines*. Washington, DC. [Final - General EHS Guidelines APRIL 29.doc \(ifc.org\)](#)

<sup>15</sup> Contractors to comply with (i) all applicable labor laws and core labor standards on (a) prohibition of child labor as defined in national legislation for construction and maintenance activities; (b) equal pay for equal work of equal value regardless of gender, ethnicity, or caste; and (c) elimination of forced labor; and with (ii) the requirement to disseminate information on sexually transmitted diseases, including HIV/AIDS, to employees and local communities surrounding the project sites.

## B. Environmental Legislation Framework

### 1. Overview of the Project Approval Process

33. Key legislation governing the environmental approvals process for the proposed overall project (and hence the subproject) is the Bangladesh Environmental Conservation Act, 1995 (ECA, 1995) and the Environmental Conservation Rules (ECR, 2023).

34. According to Rule 5 of the ECR, 2023 proposed developments within Bangladesh are classified as one of four categories, as follows:

- (i) Green;
- (ii) Yellow;
- (iii) Orange; and
- (iv) Red.

35. The categorization of a project determines the procedure for issuance of an Environmental Clearance Certificate (ECC). All proposed industrial units and projects that are considered to be low polluting are categorized under "Green" and shall be granted Environmental Clearance. For proposed industrial units and projects falling in the Yellow, Orange and Red Categories, firstly, a Location Clearance Certificate (LCC) and thereafter an ECC will be required from the DOE depending on geographical location of project, extent of project activities and possible pollution load, human health and possible adverse impacts on environment. A detailed description of those four categories of industry/projects are documented in Rules 9 – 19 of ECR (2023).

Key milestones in the approvals process are outlined in **Figure 3**. These comprise:

- (i) **Location Clearance Certificate:** An LCC will be issued by DOE upon approval of all requirements, including compliance with the site selection requirements as minimum for Yellow category projects. In addition to this compliance with site selection requirements, IEE study is required for Orange category projects and EIA study for Red category projects.
- (ii) **Environmental Clearance Certificate:** The ECC will be issued by DOE upon approval of requirements. ECC is issued to Green category project upon approval of the General Description of project; and to Yellow, Orange and Red category projects after issuance of LCC.

### 2. Procedure for Obtaining Location Clearance Certificate and Environmental Clearance Certificate

36. The environmental assessment process consists of three stages: screening, IEE, and detailed EIA per ECR, 2023. The ECR also contains the procedures for obtaining the LCC and ECC from the DOE for different categories of proposed industrial units or projects. Any person or organization wishing to establish an industrial unit or project must obtain an LCC and ECC from the Director General of DOE. The application for such certificate must be in the prescribed forms provided together with the prescribed fees laid down in Schedule 6 and Schedule 7, through the deposit of a Treasury *Chalan* in favor of the Director General of DOE. The procedure of getting the LCC and ECC of four categories of project are briefly described as follows and the process flow outlined in Figure below.

- (i) **Green:** Projects categorized as Green projects are listed in Schedule 1. The proponent has to submit an application in a prescribed format Form 3: Location Clearance / Environmental Clearance Certificate Application, Rule 9 Sub-Rule (1),

Rule 10 Sub-Rule (1), Rule 11 Sub-Rule (1), Rule 12 Sub-Rule (1), Rule 14 Sub-Rule (1), and Rule 23 Sub-Rule (4) along with specified documents;

In addition, as per Schedule 9: Industry or Project Site Selection Guideline, Rule 8 Sub-Rule (kha), Rule 9 Sub-Rule (2), Rule 10 Sub-Rule (2), Rule 12 Sub-Rule (2), and Rule 14 Sub-Rule (2) must be followed by the proponent; and

The Client must Deposit/Pay the mentioned amount of fees to DOE per Schedule 7: Location Clearance or Environmental Clearance Certificate Received and its Renewal Fee; Rule 9 Sub-Rule (3), Rule 10 Sub-Rule (3), Rule 12 Sub-Rule (6), Rule 84 Sub-Rule (3), Rule 21 Sub-Rule (14), Rule 22 Sub-Rule (1), and Rule 23 Sub-Rule (4).

DOE will provide the ECC to the applicant within seven (7) days of application subject to their site investigation and satisfaction on the submitted documents. The ECC needs to be renewed every 5 years.

- (ii) **Yellow:** Projects categorized as Yellow are listed in Schedule 1. The proponent has to submit an application in a prescribed format Form 3: Location Clearance / Environmental Clearance Certificate Application, Rule 9 Sub-Rule (1), Rule 10 Sub-Rule (1), Rule 11 Sub-Rule (1), Rule 12 Sub-Rule (1), Rule 14 Sub-Rule (1), and Rule 23 Sub-Rule (4) along with specified documents;

Deposit/pay the mentioned amount of application processing fee to DOE per Schedule 6: Location Clearance or Environmental Clearance Certificate Application Process Fee, Rule 10 Sub-Rule (2), Rule 12 Sub-Rule (2), Rule 14 Sub-Rule (2), and related documents and detail information per Schedule 9: Industry or Project Site Selection Guideline, which shall be followed;

The relevant DOE office will conduct a site visit to the project and prepare a report with justification and opinion. Within 8 working days of receiving the application, the concerned DOE office will notify the applicant to pay the fee specified in Schedule-7, provided the information in the application is satisfactory and the on-site inspection is completed;

The Client must Deposit/Pay the mentioned amount of location clearance fee to DOE per Schedule 7: Location Clearance or Environmental Clearance Certificate Received and its Renewal Fee; Rule 9 Sub-Rule (3), Rule 10 Sub-Rule (3), Rule 12 Sub-Rule (6), Rule 84 Sub-Rule (3), Rule 21 Sub-Rule (14), Rule 22 Sub-Rule (1), and Rule 23 Sub-Rule (4); and

After issuance of LCC, the Client submits its application for issuance of ECC to DOE. DOE will provide the ECC to the applicant within seven (7) days of application subject to their site investigation and satisfaction on the submitted documents. The ECC needs to be renewed every 2 years.

- (iii) **Orange:** Projects categorized as Orange require proponents to submit an application in a prescribed format Form 3: Location Clearance / Environmental Clearance Certificate Application for Location Clearance, along with Deposit /Payment of the mentioned amount of fees for the project to DOE per Schedule 6, submission of related documents and detailed information, an Initial Environmental

Examination (IEE) Study report, and compliance with Schedule 9: Industry or Project Site Selection Guideline. After approval from the Authority, the Client must Deposit/Pay the mentioned amount of fees for the project to DOE per Schedule 7 for obtaining the Location Clearance for the project.

The relevant DOE office will visit the project site and prepare a report. This report, along with the application, will be sent to the appropriate ECC committee based on the project's serial number listed in Schedule 1. The ECC committee will review the application and the report and make a decision. The applicant will then be notified to pay the fee listed in Schedule 7 for the LCC issuance;

Within 21 days from payment of fees per Schedule 7, DOE issues the LCC. Upon obtaining the LCC, the Proponent/Client will apply for an ECC from the DOE. The DOE office will then perform a site visit to ensure LCC compliance and review relevant issues. A report justifying the issuance or rejection of the ECC will be prepared and forwarded, along with the application, to the appropriate ECC committee. The committee will make a decision within 20 working days of the application date and issue the ECC. If an initial environmental examination of an Orange Category project reveals significant pollution impacts, the ECC Committee may recommend an Environmental Impact Assessment (EIA). With approval from the Director General, the proponent must conduct the EIA. The ECC needs to be renewed every year.

- (iv) **Red:** Projects categorized as Red Projects require proponents to submit an application in a prescribed format Form 3: Location Clearance / Environmental Clearance Certificate Application for Location Clearance, along with Deposit /Payment of the mentioned amount of fees for the project to DOE per Schedule 6, related documents, detail information, draft Terms of Reference (ToR) of Environmental Impact Assessment (EIA) and compliance with Schedule 9: Industry or Project Site Selection Guideline;

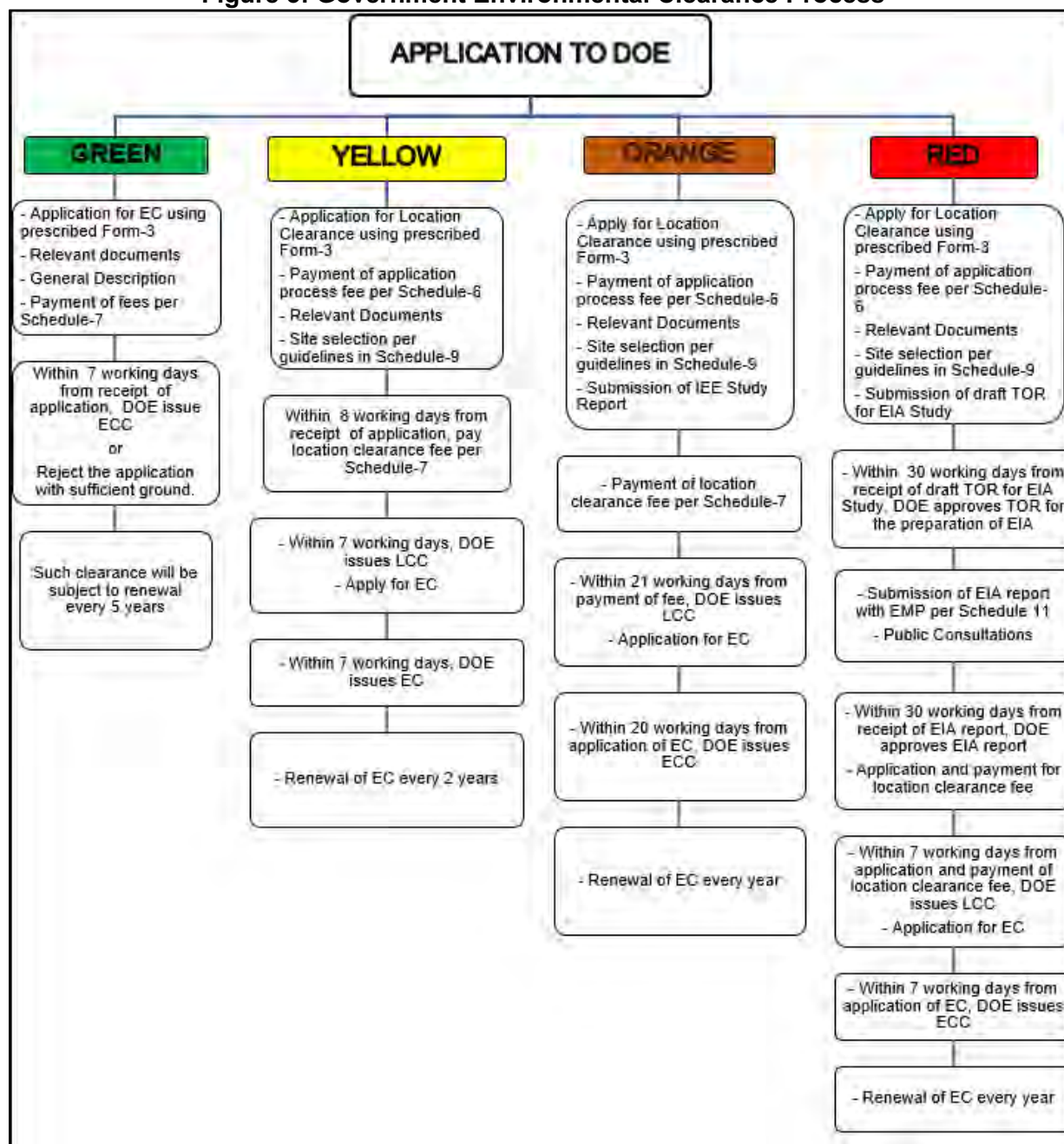
Per Schedule 10: Environmental Impact Assessment Scope of Works Guidelines, Rule 14 Sub-Rule (3), a draft Terms of Reference (TOR) will be prepared for the conduct of an Environmental Impact Assessment and submitted to the DOE for approval;

The relevant DOE office will visit the project site to review the documents and all pertinent issues. A report with justifications and findings on the rationale for issuing the location clearance certificate and draft ToR for the EIA will be forwarded to the ECC Committee. Upon receiving the documents, the ECC Committee will review and evaluate them, then submit a report to the Director General (DG) for approval. With the DG's approval, the concerned office will approve the ToR for the EIA within 30 working days;

An EIA study shall be prepared based on DOE's approved TOR. An Environmental Management Plan should be prepared as an integral part of the EIA study according to Schedule 11: Industry or Project Environmental Impact Assessment study Preparation Guidelines, and Rule15 Sub-Rule (3). Public consultations for the EIA study shall be carried out;

The proponent has to submit the EIA report to the ECC Committee as per Schedule 11. If the EIA is approved by the DG, the proponent has to pay the fee specified in Schedule-7 within a maximum of 7 working days and the LCC will be issued within 7 working days of submission of fee to the concerned DOE office; and

After issuance of the LCC, proponent/client will submit the application for issuance of ECC. The relevant DOE office will conduct a site visit to verify the conditions of the LCC and the recommendations of the EIA etc. A report will be prepared and forwarded to the ECC committee. Upon reviewing the reports and documents, the ECC Committee will make recommendations to the DG regarding the issuance of the ECC. Once the DG approves these recommendations, the concerned office will issue the ECC within 30 working days. The ECC needs to be renewed every year.

**Figure 3: Government Environmental Clearance Process**

DOE = Department of Environment, EC = Environmental Clearance, ECC = Environmental Compliance Certificate, EIA = environmental impact assessment, EMP = environmental management plan, IEE = initial environmental examination, LCC = Location Clearance Certificate, TOR = terms of reference.

### 3. Government Environmental Categorization

37. Environmental Conservation Rules, 2023 clearly defines the classification of all industrial and project schemes into four broad categories. The categorization considers all the physical interventions in implementation of those project or industries and operational procedures and risk associated therein. Susceptibility of the location where the projects would be implemented also

determines the categories; sometimes stringent management issues are levied on the project implementation and operation.

38. Large projects are likely to have different segments and types of interventions under a single project umbrella, where each part of larger interventions are taken into consideration and categorization are made individually for each segments and highest category among those are set for the overall project in order to keep the environment safer and reduce the risk of adverse consequences. While the nature of works under the subproject falls within the Yellow Category, the overall project includes other subproject components that are identified to be within the Red Category. Thus, the overall project needs to comply with the requirements of the stricter classification of Red Category. NCC will obtain one ECC for the entire project (covering all subprojects). Currently, NCC is coordinating with the DOE, and preparing for activities necessary to comply with the requirements under the Red Category classification including the completion of the required EIA. Application for ECC will be submitted once the EIA is approved and LCC is issued by DOE.

**Table 1: Categorization of the Project**

| Subproject/ Component                                           | Interventions                                                                                                                                                                                 | ECR Category |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Construction and Rehabilitation of Drinking Water Supply System | Rehabilitation of Water Treatment Plant, Deep Tube Wells, Overhead Tanks, and laying of water pipelines along the existing road network, including crossing water bodies and railway systems. | Red          |
| Construction and Rehabilitation of Drainage System              | Construction and/or rehabilitation of drainage canals                                                                                                                                         | Red          |
| Improvement of Parks and Public Spaces                          | Rehabilitation of existing parks and public spaces                                                                                                                                            | Yellow       |

### C. National Environmental Act and Laws

39. The table below provides a summary of policies, plans and strategies which deal with urban development sector, including climate change.

**Table 2: Summary of Relevant National Environmental Acts and Laws**

| Laws, Regulations, and Standards                        | Details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Relevance to the Subproject                                                                                                                                                                                                                                                                                                |
|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The Constitution of the People's Republic of Bangladesh | The constitution of the country was adopted in 1972, but the 15th amendment to this constitution made in 2011 included the concept of the protection and improvement of environment and biodiversity under fundamental principles of state policy (part II). To this end, Article 18A clearly states that the state shall endeavor to protect and improve the environment and to preserve and safeguard the natural resources, biodiversity, wetlands, forests and wildlife for the present and future citizens. Inclusion of this clause | The clauses stated in the constitution clearly put directives to protection and improvement of natural environment and biodiversity, social justice and conservation of monuments, objects or places having special artistic or historical importance, during the planning, construction and O&M phases of the subproject. |

| Laws, Regulations, and Standards                                              | Details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Relevance to the Subproject                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                               | <p>into the constitution underscores the requirement for the protection and improvement of environment and biodiversity, and also has influenced to develop and promulgate further environmental laws, rules and directives in Bangladesh. The constitution also proclaims that the state shall adopt effective measures to remove social and economic inequality between man woman and to ensure the equitable distribution of wealth among citizens endeavor to ensure equality of opportunity and participation of women in all spheres of national life. The same also emphasizes to adopt measures for the protection against disfigurement, damage or removal of all monuments, objects or places of special artistic or historic importance or interest.</p>                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p>Environmental Conservation Act (ECA), 1995 (and subsequent amendments)</p> | <p>Provides for the conservation of environment, improvement of environmental standards and control and mitigation of environmental pollution. In line with these provisions of the Act, the Environmental Conservation Rules have been framed with various amendments. This Act provides for (i) remedial measures for injury to ecosystem; (ii) provides for any affected person due to environmental pollution to apply to Department of Environment (DOE) for remediation of the damage; (iii) discharge of excessive environmental pollutants; (iv) inspection of any activity for testing any equipment or plant for compliance to the environment act, including power to take samples for compliance; (v) power to make rules and standards with reference to environment; and (vi) penalty for non-conformance to environment act under the various sections.</p> <p>The main strategies of the Act can be summarized as:</p> <ul style="list-style-type: none"> <li>• Declaration of ecologically critical areas (ECAs), and restriction on the operation and process, which can be carried, out or cannot be initiated in the ecologically critical areas.</li> </ul> | <p>According to this law, no industrial unit or project shall be established or undertaken without obtaining, in the manner prescribed by rules, an Environmental Clearance Certificate (ECC) from the Director General. The subproject forms part of the overall project that is required to obtain ECC. Additionally, Shitalakhya river is also declared by the Department of Environment as an ECA due to its deteriorating water quality. Therefore, no activity should be allowed that could further pollute this river. This ECA declaration is very relevant to the subproject because the sites are near Shitalakhya river and will have the potential to pollute the said river during construction phase due to runoff or siltation and during operation phase due to possible discharges from public toilets that are to be built as part of the public park development.</p> |

| Laws, Regulations, and Standards     | Details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Relevance to the Subproject                                                                                                                                                                                                                      |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                      | <ul style="list-style-type: none"> <li>• Regulation in respect of vehicles emitting smoke harmful for the environment.</li> <li>• Environmental clearance.</li> <li>• Regulation of the industries and other development activities – discharge permit.</li> <li>• Promulgation of standards for quality of air, water, noise and soil for different areas for different purposes</li> <li>• Promulgation of standard limit for discharging and emitting waste.</li> <li>• Formulation and declaration of environmental guidelines.</li> </ul> <p>Amendment 2000 of the Bangladesh Environmental Conservation Act focuses on: (i) ascertaining responsibility for Compensation in cases of damage to ecosystems, (ii) increased provision of punitive measures both for fines and imprisonment, and (iii) fixing authority on cognizance of offences. The next amendment in 2002 emphasizes on: (i) restriction on polluting automobiles, (ii) restriction on the sale and production of environmentally harmful items like polythene bags, (iii) assistance from law enforcement agencies for environmental actions, (iv) break up of punitive measures, and (v) authority to try environmental cases. The latest amendment in 2010 declares demarcation of wetlands and water bodies, and imposes restrictions on hazardous waste import, transportation, storage etc.; and activities on cutting of hills and/or mountains along with Ecologically Critical Areas. Failure to comply with any part of the Environment Conservation Act 1995 may result in punishment to a maximum of 5 years' imprisonment or a maximum fine of BDT 100,000, or both.</p> |                                                                                                                                                                                                                                                  |
| Environment Conservation Rules, 2023 | <p>The Environment Conservation Rules, 2023 (ECR, 2023) provide the set of rules under the Environment Conservation Act, 1995. These provide, amongst other items, standards and guidelines for:</p> <ul style="list-style-type: none"> <li>• Categorization of industries and development projects;</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <p>In accordance with the ECR, 2023, the overall project is classified under Red Category, requiring an EIA for the issuance of ECC from DOE. This ECC has to be obtained prior to commencement of the project and thus with the subproject.</p> |

| Laws, Regulations, and Standards                        | Details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Relevance to the Subproject                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                         | <ul style="list-style-type: none"> <li>• Procedure for obtaining environmental clearance; and</li> <li>• Environmental quality standards in relation to inland surface water, coastal water, drinking water, sewage water and industrial waste water quality parameters are mentioned under schedule 2, 3, 4 and 5. Whereas, standards for air pollution and noise, are referenced to the Air Pollution Control Rules, 2022 and Noise Pollution Control Rules, 2006, respectively.</li> </ul> <p>ECR, 2023 classifies industrial units and development projects into four categories for the purpose of issuance of Environmental Clearance Certificate (ECC). These categories are: Green; Yellow; Orange; and Red. Per ECR 2023, all existing and new industries and projects in Orange and Red category require an Environmental Management Plan (EMP) to be prepared (after conducting an IEE or EIA) and submitted along with other necessary papers while applying for environmental clearance.</p> |                                                                                                                                                                                                                                                                                                                                                                                                   |
| Bangladesh Climate Change Strategy and Action Plan 2009 | <p>The Government of Bangladesh prepared the Bangladesh Climate Change Strategy and Action Plan (BCCSAP) in 2008 and revised in 2009. This is a comprehensive strategy to address climate change challenges in Bangladesh. It is built around the following six themes:</p> <ul style="list-style-type: none"> <li>• Food security, social protection and health to ensure that the poorest and most vulnerable in society, including women and children, are protected from climate change. All programs focus on the needs of this group for food security, safe housing, employment and access to basic services, including health.</li> <li>• Comprehensive disaster management to further strengthen the country's already proven disaster management systems to deal with increasingly frequent and severe natural calamities.</li> <li>• Infrastructure to ensure that existing assets (e.g., coastal and river embankments) are well maintained and</li> </ul>                                    | <p>This strategy and action plan is relevant to the subproject. The subproject is required to consider in its design mitigation measures that will ensure the infrastructures (e.g. community center building, lawn pavements) can withstand the impact of climate change in the future. This, in turn, will contribute to the realization of the objectives of the strategy and action plan.</p> |

| <b>Laws, Regulations, and Standards</b>                        | <b>Details</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Relevance to the Subproject</b>                                                                                                                                                                                                                                                                               |
|----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                | <p>fit for purpose and that urgently needed infrastructures (cyclone shelters and urban drainage) is put in place to deal with the likely impacts of climate change.</p> <ul style="list-style-type: none"> <li>• Research and knowledge management to predict that the likely scale and timing of climate change impacts on different sectors of economy and socioeconomic groups; to underpin future investment strategies; and to ensure that Bangladesh is networked into the latest global thinking on climate change.</li> <li>• Mitigation and low carbon development to evolve low carbon development options and implement these as the country's economy grows over the coming decades.</li> <li>• Capacity building and Institutional strengthening to enhance the capacity government ministries, civil society and private sector to meet the challenge of climate change.</li> </ul>                                                                          |                                                                                                                                                                                                                                                                                                                  |
| National Safe Drinking Water Supply and Sanitation Policy 1998 | <p>The National Safe Drinking Water Supply and Sanitation Policy was adopted in 1998 and sets out the basic framework for the improvement of public health quality and to ensure an improved environment, together with a set of broad sectoral action guidelines. The policy has the following objectives: (i) To manage water supply and sanitation related basic needs for all; (ii) To bring about a positive change of peoples' attitude towards water and sanitation; (iii) To reduce the outbreak of water-borne diseases; (iv) To increase the efficiency of the Local Government and associated communities for handling the problems related to water supply and sanitation; (v) To improve sustainable water supply and sanitation system; (vi) To promote proper conservation, management and use of surface water and to control water pollution in light of the scarcity of groundwater; and (vii) To take necessary steps to capture and use rain water.</p> | <p>This policy covers the subproject as far as the protection of surface waters and groundwater is concerned. The subproject will have to ensure that its operations from all phases of implementation will not cause negative impacts to these water supply resources, in particular the Shitalakhya river.</p> |
| National Water Policy 1999                                     | <p>The National Water Policy was promulgated in 1999 with the intention of guiding both public and private actions to ensure optimal development and</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <p>Clause 4.6b of this policy states that natural depressions and water bodies in major urban areas must be preserved in order to recharge</p>                                                                                                                                                                   |

| <b>Laws, Regulations, and Standards</b>                            | <b>Details</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Relevance to the Subproject</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                    | <p>management of water in order to benefit both individuals and the society at large. The policy aims to ensure progress towards fulfilling national goals of economic development, poverty alleviation, food security, public health and safety, a decent standard of living for the people and protection of the natural environment. According to the policy, all agencies and departments entrusted with water resource management responsibilities (regulation, planning, construction, operation, and maintenance) will have to enhance environmental amenities and ensure that environmental resources are protected and restored while executing their activities. Environmental needs and objectives will be treated equally with the resources management needs. The policy has several clauses related to the protection and conservation of the natural environment to ensure sustainable development.</p> | <p>underground aquifers and rainwater management. Moreover, measures must be taken to minimize disruption to the natural aquatic environment in streams and water channels (Clause 4.9b). In addition, this policy requires each water resources development project or rehabilitation program to give full consideration to environmental protection, restoration and enhancement measures consistent with National Environmental Management Action Plan and the National Water Management Plan and adhere to a formal environment impact assessment process, if required by the Government (Clause 4.12a and clause 4.12b). All these elements are directly associated with the nature of the subproject. The policy also applies to the subproject due to the subproject's potential to pollute surface water bodies and groundwater during construction and operation phases. Therefore, the subproject is bound to comply with the requirements under this policy in its design.</p> |
| <p>The Forest Act (1927) and the Forest (Amendment) Act (2000)</p> | <p>The Forest Act (1927) was enacted to control trespass, illegal resources extraction from forests and to provide a framework for the forestry revenue collection system. It is the main legislative context for forestry protection and management in Bangladesh. The Act allows for the notification of forest reserves in which the government, through the Forest Department, regulates the felling, extraction and transport of forestry produce in Bangladesh. The Act grants the government several basic powers, largely for conservation and protection of government forests, and limited powers for private forests.</p>                                                                                                                                                                                                                                                                                   | <p>Although there are no forests around the subproject areas the relevance of this Act is only on the potential cutting of trees in the vicinity of the sites. The subproject will be required to obtain permits on cutting of any trees prior to start of civil works.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <p>Bangladesh Public Procurement Rule (PPR), 2008</p>              | <p>This rule applies to the Procurement of Goods, Works or Services by any government, semi-government or any statutory body established under any law. The rule includes the adequate measure regarding the "Safety, Security and Protection of the Environment" in the</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <p>NCC is a government entity that needs to comply with the environment-related requirements under this Rule, as explicitly specified herein.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

| <b>Laws, Regulations, and Standards</b>                       | <b>Details</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Relevance to the Subproject</b>                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                               | construction works. This clause includes contractor responsibility to take all reasonable steps to (i) safeguard the health and safety of all workers working on the site and other persons entitled to be on it, and to keep the site in an orderly state and (ii) protect the environment on and off the site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequence of the Contractors methods of operation. |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| National Environmental Policy, 2018                           | The central theme of the policy is to ensure protection and improvement in environment. The policy gives a thrust to sustainable development and long-term use of natural resources. The National Environment Policy contains policy statements and strategic options with regard to population and land-use management, management and utilization of natural resources and other socio-economic sectors, as well as the necessary arrangements for the implementation of the policy.                              | Subproject will have site-specific impacts and will require implementation of mitigation measures to ensure protection and improvement of the environment.                                                                                                                                                                                                                                                                                       |
| Environment Court Act, 2000 and subsequent amendments in 2003 | The Environment Court Act, 2000 has been enacted in order to establish environmental courts in each administrative division of Bangladesh. This Act sets out policy for effective pursuance and completion of legal proceedings related to environmental crimes. Under this Act the Director General of the DOE has the power to impose heavy penalties to industrial polluters who are dumping untreated wastewater into the environment or not operating their legally mandated effluent treatment plants.        | This Act covers the subproject because design includes the provision of water treatment technology or process, from which waste may be generated and discharged to the environment. Therefore, the operation phase of the subproject may have the potential to release untreated wastewater into the environment. According to this Act, government can take legal actions if any environmental problem occurs due to the subproject operations. |
| National Water Act 2013<br>National 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.                                                                                                                                                                                                                                  | The subproject is required to implement measures to ensure that water source pollution is avoided, in particular to the Shitalakhya river.                                                                                                                                                                                                                                                                                                       |
| Wetland Protection Act 2000                                   | Advocates protection against degradation and resuscitation of natural waterbodies such as lakes, ponds, beels, khals, tanks, etc. affected by man-made interventions or other causes. Prevents                                                                                                                                                                                                                                                                                                                      | The subproject is required to implement measures to ensure that water bodies around the subproject sites are not impacted.                                                                                                                                                                                                                                                                                                                       |

| <b>Laws, Regulations, and Standards</b>                                                                                                                                                            | <b>Details</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Relevance to the Subproject</b>                                                                                                                                                                                                                                                                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                    | 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.                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                    |
| National Land Use Policy, 2001                                                                                                                                                                     | Sets out guidelines for improved land-use and zoning regulations. The main objective of this policy is to ensure criteria-based uses of land and to provide guidelines for usage of land for the purpose of agriculture, housing, afforestation, commercial and industrial establishments, rail and highway and for tea and rubber gardens.                                                                                                                                                                                                                                     | Siting of subproject components need to comply with land use and zoning regulations                                                                                                                                                                                                                                |
| 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.                                                                                                                                                                                                                                                                                                                                                                                                                   | Mandated coordination with pourashava committees on disaster management measures, water and sanitation and waste management.                                                                                                                                                                                       |
| 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Subproject designs for any building structures need to comply with the Act and Rules.                                                                                                                                                                                                                              |
| Bangladesh National Building Code (BNBC)                                                                                                                                                           | In order to ensure optimum return of substantial portion of national resource invested in building construction, in both public and private sectors and to achieve satisfactory performance of any building, construction needs to be controlled and regulated. The purpose of Bangladesh National Building Code is to establish minimum standards for design, construction, quality of materials, use and occupancy, location and maintenance of buildings within Bangladesh in order to safeguard, within achievable limits, life, limb, health, property and public welfare. | This building code is relevant to the subproject. There are various infrastructures that will be included in the improvement of the parks and public spaces, such as toilets and community center, with designs of which must follow the specifications of the building code to ensure their structural integrity. |

| <b>Laws, Regulations, and Standards</b> | <b>Details</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Relevance to the Subproject</b>                                                                                                                                                 |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Air Pollution Control Rules, 2022       | APCR, 2022 contains air quality standards based on WHO Guidelines (Interim Goals); emissions limits and technical specifications for key sectors; mandates and coordination mechanisms among relevant line ministries to control both household and outdoor air pollution. The rules elevated the air quality management dialogue and leadership beyond the environment sector, by establishing the National Committee on Air Pollution Control, a multi-sector decision-making body presided by the Cabinet Secretary to coordinate the APCR implementation and instruct relevant agencies on specific interventions to comply with the new rules. | Subproject construction activities will potentially generate air pollution (dust and smoke emissions), and thus need to comply with the emission standards specified in the Rules. |
| Noise Pollution (Control) Rules, 2006   | The Noise Pollution Rules, 2006 addresses that the sound levels to be no more than 50dB in Silent Zones <sup>a</sup> during daytime (6 am to 9 pm) and 40 dB at night-time (9 pm to 6 am). In residential areas these levels are 55 dB and 45 dB, in mixed area <sup>b</sup> 60 dB and 50 dB, in commercial and industrial areas 70 dB and 60 dB and in industrial areas 75 dB and 70 dB for daytime and night-time respectively.                                                                                                                                                                                                                   | Subproject activities will involve works that generate noise that could disturb neighboring communities. These subproject activities need to comply with the noise standards..     |
| Solid Waste Management Rules 2021       | The Rules provides a comprehensive set of rules based on national 3R strategy and other national and international policies and guidelines pertaining to solid waste management. It defines the roles and responsibilities of relevant government ministries and agencies, including local government authorities and other stakeholders in implementing solid waste management undertakings. It also includes the environmental requirements necessary for these undertakings, provision of incentives for the promotion of sustainable waste management practices, etc.                                                                           | The subproject will generate solid wastes and will be required to implement measures to comply with the integrated waste management rules.                                         |

<sup>a</sup> The area within 100 meters from hospital, academic institutions or places identified/identifiable by the government

<sup>b</sup> An area, which is primarily a residential area with either or both commercial and industrial parts in it

#### **4. Legislation Relating to Occupational Health and Safety**

40. Relevance of occupational health and safety are presented in the below Table.

**Table 3: Relevance of Occupational Health and Safety Legislation**

| <b>Title of Laws and Rules</b>                               | <b>Relevance</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 Labor Law of 2006                                 | - Compliance to the provisions on employment standards, occupational safety and health, welfare and social protection, labor relations and social dialogue, and enforcement<br>- Prohibition of employment of children and adolescent.                                                                                                                                                                                                                                       |
| Bangladesh Labor Rules, 2015                                 | Contractor to implement occupational health and safety measures.<br><br>Contractor will be liable for compensation for work-related injuries.                                                                                                                                                                                                                                                                                                                                |
| 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 if 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.                                                                                                                                               |

**D. Relevant International Conventions, Treaties**

41. Relevant International Conventions, Treaties and Protocols (ICTPs) are given in the following Table.

**Table 4: International Environmental Conventions Relevant to the Subproject Activities**

| <b>Sl. No.</b> | <b>International Treaties</b>                                                                                               | <b>Ratified/ Accessed (AC)/ Accepted (AT)/ Adaptation (AD)</b> | <b>Relevance</b>                                                                             |
|----------------|-----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| 1              | International Plant Protection Convention (Rome, 1951) & Plant Protection Agreement for SE Asia and Pacific (1999 Revision) | 01.09.1978<br>04.12.1974 (AC)                                  | Ensures that component work or construction materials do not introduce plant pests.          |
| 2              | Convention on Wetlands of International Importance, 1971 (Ramsar Convention)                                                | 20.04.1992 (ratified)                                          | Protection of significant wetland and prevention of draining or filling during construction. |

| Sl. No. | International Treaties                                                                    | Ratified/<br>Accessed (AC)/<br>Accepted (AT)/<br>Adaptation (AD) | Relevance                                                                                                                                          |
|---------|-------------------------------------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| 3       | Convention Concerning the Protection of World Cultural and Natural Heritage (Paris, 1972) | 03.11.1983 (ratified)                                            | Prevention of damage or destruction of culturally and/or historically significant sites, monuments, etc.                                           |
| 4       | Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal 1987)              | 02.08.90<br>31.10.90 (AC)<br>(entry into force)                  | Use of equipment or facilities (e.g., refrigeration and air-conditioning units) that utilize ozone friendly chemicals or substances.               |
| 5       | Convention on Biological Diversity, 1992 (Rio de Janeiro)                                 | 03.05.1994                                                       | Protection of biodiversity during construction.                                                                                                    |
| 6       | Cartagena protocol on Biosafety to the Convention on Biological Diversity                 | In the process of Ratification                                   | Protection of biodiversity during construction.                                                                                                    |
| 7       | Convention on Persistent Organic Pollutants, 2001                                         | In process                                                       | Restriction of use of pesticides and herbicides.                                                                                                   |
| 8       | United Nations Framework Convention on Climate Change, 1997                               | 22.10.2001<br>13.11.2003<br>(amended)                            | Reduce greenhouse gas concentrations in the atmosphere to a level that would prevent dangerous anthropogenic interference with the climate system. |

#### E. Gaps in Legal and Guiding Instruments

42. Comparative analysis of Environmental Safeguard principles is shown in the following Table.

**Table 5: Comparative Analysis of Environmental Safeguard Policy**

| Sl. No. | ADB SPS, 2009                                                                  |                                                                                                                                                                                                                                                                                                                                                             | GOB Principles                                                                                                                                                                                                                                                                                                                                                                         | Gaps (if any)                                                                                                            |
|---------|--------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
|         | Principles                                                                     | Delivery Process                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                          |
| 1       | Use of screening process to determine the appropriate environmental assessment | Uses sector-specific rapid environmental assessment checklist for screening and assigns categories based on potential impacts:<br>A- EIA required (irreversible, diverse or unprecedented adverse environmental impacts);<br>B- IEE required;<br>C- No environmental assessment required but a review of environmental implications;<br>FI - ESMS required. | ECA 1995 and ECR 2023 set screening criteria to classify industries/ projects based on potential environmental impacts as follows: Green, Yellow, Orange and Red (cause significant environmental impacts). The screening criteria is based on the project or industry type and do not consider the scale and location. The category determines the level of environmental assessment. | No major gaps                                                                                                            |
| 2       | Conduct an environmental assessment                                            | EIA and IEE - Identify potential impacts on physical, biological and socioeconomic aspects in the context of project's area of influence (i.e., primary project site and associated facilities)<br>ESMS for FIs                                                                                                                                             | Industry/project category<br>Green- no environmental assessment required.<br>Yellow – compliance with site selection criteria.<br>Orange – compliance with site selection criteria and conduct of IEE required;<br>Red – compliance with site selection criteria, and both IEE and EIA required.                                                                                       | No major gaps                                                                                                            |
| 3       | Examine alternatives                                                           | Analyze alternatives to the project's location, design, and technology<br>Document rationale for selecting the particular project location, design, and technology<br>Consider "no project" alternative                                                                                                                                                     | Regulations (i.e., ECA 1995 and ECR 2023) do not require specifically the identification and analysis of alternatives                                                                                                                                                                                                                                                                  | Not required by law but the ToR for EIA to be approved by the DOE now includes a discussion on analysis of alternatives. |
| 4       | Prepare an environmental management plan (EMP)                                 | EMP to include monitoring, budget and implementation arrangements.                                                                                                                                                                                                                                                                                          | EMP and procedures for monitoring included in the IEE and EIA (i.e., Yellow, Orange, and Red category projects)                                                                                                                                                                                                                                                                        | No major gaps                                                                                                            |
| 5       | Carry out meaningful Consultation                                              | Starts early and continue during implementation;<br>Undertaken in an atmosphere of free intimidation<br>Gender inclusive and responsive tailored to the needs of vulnerable groups<br>Allows for the incorporation of all relevant views of stakeholders                                                                                                    | For projects classified under Yellow, Orange or Red Categories, public consultation and participation is required based on ECR 2023<br>Grievance redress mechanism is not mentioned in ECA 1995 and ECR 2023;                                                                                                                                                                          | Approval of the ToR of EIA by DOE includes mandatory consultation with stakeholders.                                     |

| Sl. No. | ADB SPS, 2009                                                                                                                          |                                                                                                                                                                                                                                                                                                                                               | GOB Principles                                                                                                                                                                                                                                                    | Gaps (if any)                                                          |
|---------|----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
|         | Principles                                                                                                                             | Delivery Process                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                   |                                                                        |
|         |                                                                                                                                        | Establish a grievance redress mechanism                                                                                                                                                                                                                                                                                                       | EIA format required by DOE includes stakeholders' consultation.                                                                                                                                                                                                   |                                                                        |
| 6       | Timely disclosure of draft environmental assessment (including the EMP)                                                                | Draft EIA report posted on ADB website at least 120 days prior to Board consideration;<br>Draft EA/EARF prior to appraisal<br>Final or updated EIA/IEE upon receipt<br>Environmental monitoring report submitted by borrowers upon receipt.                                                                                                   | No requirement for public disclosure of environmental reports but DOE posts the minutes of the meeting on the application for environmental clearance certificate to its website, <a href="http://www.doebd.org/minutes.php">http://www.doebd.org/minutes.php</a> | Still no requirement for public disclosure of environmental assessment |
| 7       | Implement EMP and monitor effectiveness                                                                                                | Prepare monitoring reports on the progress of EMP<br>Retain qualified and experienced external experts or NGOs to verify monitoring information for Category A projects<br>Prepare and implement corrective action plan if noncompliance is identified<br>Requires submission of quarterly, semi-annual, and annual reports to ADB for review | For project classified under Orange and Red Categories, ECC is subject to annual renewal based on compliance of the conditions set by DOE .                                                                                                                       | No major gaps                                                          |
| 8       | Avoid areas of critical habitats (use of precautionary approach to the use, development and management of renewable natural resources) | Provides guidance on critical habitats.                                                                                                                                                                                                                                                                                                       | ECA 1995 and ECR 2023 identifies ecologically-critical areas and the rules to protect them.                                                                                                                                                                       | No major gaps                                                          |
| 9       | Use pollution prevention and control technologies and practices consistent with international good practices                           | Refers to World Bank's Environmental Health and Safety (EHS) General Guidelines 2007 (or any update)<br>If national regulations differ, more stringent will be followed.<br>If less stringent levels are appropriate in view of specific project circumstances, provide full and detailed justification                                       | Effluent standards, ambient and emission standards included in ECA 1995 and ECR 2023.<br>Ambient noise levels included in Noise Pollution Control Rules 2006.                                                                                                     | No major gaps                                                          |

| Sl. No. | ADB SPS, 2009                                                                    |                                                                                                                                                       | GOB Principles                                                                                                                       | Gaps (if any) |
|---------|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|---------------|
|         | Principles                                                                       | Delivery Process                                                                                                                                      |                                                                                                                                      |               |
| 10      | Provide workers with safe and healthy working conditions                         | Refers to WB EHS General Guidelines 2007 (or any update).                                                                                             | Occupational health and safety standards included in the Factories Act 1965, the Bangladesh Labour Act 2006, and its 2013 amendment. | No major gaps |
| 11      | Conserve physical cultural resources (PCR) and avoid destroying or damaging them | Use of field-based surveys and experts in the assessment.<br>Consult affected communities on PCR findings<br>Use chance find procedures for Guidance. | Preservation and protection of cultural resources are within the Antiquities Act 1968.                                               | No major gaps |

## F. Permits and Clearance

43. Per ECA, 1995 (amended 2010) and ECR, 2023, it is mandatory for each and every type of industry and project to obtain ECC from the DOE. For the issuance of ECC, any proponent should follow the steps described above in part B of this section.

44. The application and requirement for issuance of ECC are described in the ECR, 2023 and summarized in Part B above. This involves the completion and submission of an application using a form available from the DOE website,<sup>16</sup> which is revised from time to time. The accomplished application form is submitted to DOE together with requirements as enumerated in Part B above. The proponent is also required to pay equivalent application fee prescribed in ECR, 2023.

45. The ECC is issued within 30 working days from receipt of the application by DOE, provided that SCC has been issued prior. LCC is normally issued within approximately within 7 working days from receipt of DOE of the EIA report, provided that such report is approved by DOE. Once issued, ECC is required to be renewed every year from the date of its effectivity for orange and red category projects. For the overall project, NCC, through PMU, is responsible for application for ECC. This ECC will cover all subprojects identified under the overall project. Completion of the EIA is ongoing and application for ECC will be submitted once the EIA is approved and SCC is issued by DOE.

## G. Applicable Environmental Standards

46. ECR, 2023 also provides the environmental standards applicable to the subproject. The ECR presents the national standards as presented in this chapter. Following requirements of ADB SPS, the subproject shall apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in EHS Guidelines. When the government regulations differ from these levels and measures, the subproject shall achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, NCC through PMU will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS. The tables below show the comparison of the national standards and internationally recognized standards, including the applicable standards to be followed under the subproject per ADB SPS requirements.

<sup>16</sup> Government of Bangladesh. [Department of Environment](#).

**Table 6: Bangladesh National Drinking Water Quality Standards**

| SI No | Parameter                                                               | Unit       | Standard |
|-------|-------------------------------------------------------------------------|------------|----------|
| 1.    | 1,1 Dichloroethane (1,1 C <sub>2</sub> H <sub>4</sub> C <sub>12</sub> ) | mg/l       | 0.030    |
| 2.    | 1,2 Dichloroethane (1,2 C <sub>2</sub> H <sub>4</sub> C <sub>12</sub> ) | mg/l       | 0.030    |
| 3.    | 2,4,6 Trichlorophenol                                                   | mg/l       | 0.200    |
| 4.    | Aldrin/Dieldrin                                                         | mg/l       | 0.030    |
| 5.    | Aluminium (Al)                                                          | mg/l       | 0.200    |
| 6.    | Ammonia (NH <sub>3</sub> )                                              | mg/l       | 1.500    |
| 7.    | Anionic Detergents                                                      | mg/l       | 0.200    |
| 8.    | Arsenic (As)                                                            | mg/l       | 0.050    |
| 9.    | Barium (Ba)                                                             | mg/l       | 0.700    |
| 10.   | Benzene (C <sub>6</sub> H <sub>6</sub> )                                | µS/cm      | 0.010    |
| 11.   | Boron (B)                                                               | mg/l       | 1.000    |
| 12.   | Cadmium (Cd)                                                            | mg/l       | 0.003    |
| 13.   | Calcium (Ca)                                                            | mg/l       | 75.000   |
| 14.   | Carbon Tetra Chloride (CCl <sub>4</sub> )                               | mg/l       | 0.005    |
| 15.   | Chloride                                                                | mg/l       | 250.000* |
| 16.   | Chloroform (CHCl <sub>3</sub> )                                         | mg/l       | 0.090    |
| 17.   | Color                                                                   | Hazen Unit | 15.000   |
| 18.   | Copper (Cu)                                                             | mg/l       | 1.500    |
| 19.   | Cyanide (CN)                                                            | mg/l       | 0.050    |
| 20.   | Fecal Coliform                                                          | NFU/100ml  | 0        |
| 21.   | Fluoride (F <sup>-</sup> )                                              | mg/l       | 1.000    |
| 22.   | Free Residual Chlorine                                                  | mg/l       | 0.20     |
| 23.   | Hardness as CaCO <sub>3</sub>                                           | mg/l       | 500.000  |
| 24.   | Iron (Fe)                                                               | mg/l       | 0.3-1.0  |
| 25.   | Lead (Pb)                                                               | mg/l       | 0.010    |
| 26.   | Magnesium (Mg)                                                          | mg/l       | 30-35    |
| 27.   | Manganese (Mn)                                                          | mg/l       | 0.400    |
| 28.   | Mercury (Hg)                                                            | mg/l       | 0.001    |
| 29.   | Nickel (Ni)                                                             | mg/l       | 0.050    |
| 30.   | Nitrate (NO <sub>3</sub> <sup>-</sup> )                                 | mg/l       | 45       |
| 31.   | Nitrite (NO <sub>2</sub> <sup>-</sup> )                                 | mg/l       | 1.000    |
| 32.   | Odor                                                                    | ---        | Odorless |
| 33.   | Oil and Grease                                                          | mg/l       | 0.010    |
| 34.   | Overall Beta variance                                                   | BQU/L      | 1.000    |
| 35.   | Pentachlorophenol                                                       | mg/l       | 0.009    |
| 36.   | pH                                                                      | ---        | 6.5-8.5  |
| 37.   | Phenols                                                                 | mg/l       | 0.002    |
| 38.   | Potassium                                                               | mg/l       | 12.000   |
| 39.   | Radioactive Materials Emitting Alpha Radiation                          | BQU/L      | 0.100    |
| 40.   | Selenium (Se)                                                           | mg/l       | 0.010    |
| 41.   | Silver (Ag)                                                             | mg/l       | 0.020    |
| 42.   | Sodium (Na)                                                             | mg/l       | 200.000  |
| 43.   | Sulfate (SO <sub>4</sub> <sup>-2</sup> )                                | mg/l       | 250.000  |
| 44.   | Sulfide as H <sub>2</sub> S                                             | mg/l       | 0.050    |
| 45.   | Suspended Solid (SS)                                                    | mg/l       | 10.000   |
| 46.   | Temperature                                                             | °C         | 20-30    |
| 47.   | Tetrachloroethane (C <sub>2</sub> H <sub>4</sub> C <sub>14</sub> )      | mg/l       | 0.040    |

| SI No | Parameter                                                        | Unit      | Standard |
|-------|------------------------------------------------------------------|-----------|----------|
| 48.   | Tin (Sn)                                                         | mg/l      | 2.000    |
| 49.   | Total Chromium (Total Cr)                                        | mg/l      | 0.050    |
| 50.   | Total Coliform                                                   | NFU/100ml | 0        |
| 51.   | Total Dissolved Solids (TDS)                                     | mg/l      | 1000.000 |
| 52.   | Total Kjeldal Nitrogen                                           | mg/l      | 1.000    |
| 53.   | Trichloroethane (C <sub>2</sub> H <sub>3</sub> Cl <sub>3</sub> ) | mg/l      | 0.020    |
| 54.   | Turbidity                                                        | NTU       | 5.000    |
| 55.   | Zinc (Zn)                                                        | mg/l      | 5.000    |

Source: ECR, 2023

**Table 7: Bangladesh Inland Surface Water Standards**

| Best Practice Based classification                                  | pH      | DO mg/l | BOD mg/l | NO <sub>3</sub> -N mg/l | NH <sub>4</sub> -N mg/l | PO <sub>4</sub> -P mg/l | Total Cr mg/l | Pb mg/l | Hg mg/l | Total Coliform cfu/100mg | TDS mg/l | COD mg/l |
|---------------------------------------------------------------------|---------|---------|----------|-------------------------|-------------------------|-------------------------|---------------|---------|---------|--------------------------|----------|----------|
| a. Source of drinking water for supply only after disinfecting:     | 6.5-8.5 | ≥6      | ≤2       | 7.0                     | 0.1                     | 0.1                     | 0.02          | 0.03    | 0.001   | ≤100                     | 1000     | 10       |
| b. Water usable for recreational activity                           | 6.5-8.5 | ≥5      | ≤3       | 7.0                     | 0.3                     | 0.5                     | 0.2           | 0.05    | 0.001   | ≤50                      | 1000     | 10       |
| c. Source of drinking water for supply after conventional treatment | 6-9     | ≥5      | ≤3       | 7.0                     | 0.3                     | 0.5                     | 0.02          | 0.03    | 0.001   | ≤5000                    | 1000     | 25       |
| d. Water usable by fisheries                                        | 6-9     | ≥5      | ≤6       | 7.0                     | 0.3                     | 0.5                     | 0.05          | 0.1     | 0.004   | ≤5000                    | 1000     | 50       |
| e. Water usable by various process and cooling industries           | 6.5-8.5 | ≥1      | 12       | -                       | 2.7                     | -                       | 0.1           | 0.1     | 0.05    | -                        | 1000     | 100      |
| f. Water usable for irrigation                                      | 6.5-8.5 | -       | ≤12      | 5.0                     | 1.5                     | 2.0                     | 0.1           | 0.1     | 0.002   | ≤50000                   | 1000     | 100      |

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

Source: ECR, 2023

**Table 8: Applicable Ambient Air Quality Standards for Bangladesh Projects**

| Parameter         | Bangladesh Ambient Air Quality Standard (µg/m <sup>3</sup> ) and Averaging Time <sup>a</sup> | WHO Air Quality Guidelines (µg/m <sup>3</sup> )<br>Global Update <sup>b</sup> 2021 |
|-------------------|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| PM <sub>10</sub>  | 50 (1-year)<br>150 (24-h)                                                                    | 15 (1-year)<br>45 (24-h)                                                           |
| PM <sub>2.5</sub> | 35 (1-year)<br>65 (24-h)                                                                     | 5 (1-year)<br>15 (24-h)                                                            |

| Parameter               | Bangladesh Ambient Air Quality Standard ( $\mu\text{g}/\text{m}^3$ ) and Averaging Time <sup>a</sup> | WHO Air Quality Guidelines ( $\mu\text{g}/\text{m}^3$ ) |
|-------------------------|------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|                         |                                                                                                      | Global Update <sup>b</sup> 2021                         |
| SO <sub>2</sub>         | 80 (24-h)<br>250 (1-h)                                                                               | 40 (24-h)                                               |
| NO <sub>x</sub>         | 40 (1-year)<br>80 (24-h)                                                                             | 10 (1-year)<br>25 (24-h)                                |
| CO                      | 5,000 (8-h)<br>20,000 (1-h)                                                                          | 4 (24-h)                                                |
| Lead                    | 0.25 (1-year)<br>0.50 (24-h)                                                                         |                                                         |
| Ozone (O <sub>3</sub> ) | 180 (1-h)<br>100 (8-h)                                                                               | 60 (peak season)<br>100 (8-h)                           |
| NH <sub>3</sub>         | 100 (1-year)<br>400 (24-h)                                                                           |                                                         |

ADB = Asian Development Bank, CO = carbon oxide, h = hour,  $\mu\text{g}/\text{m}^3$  = microgram per cubic meter, min = minute, NO<sub>x</sub> = oxides of nitrogen, PM<sub>2.5</sub> = particulate matter 2.5, PM<sub>10</sub> = particulate matter 10, SO<sub>2</sub> = sulfur dioxide, WHO = World Health Organization.

<sup>a</sup> Air Pollution Control Rules 2022

<sup>b</sup> Recommended 2021 WHO Global Air Quality Guidelines. <https://www.who.int/>

**Table 9: Applicable Noise Levels for Bangladesh Projects**

| Receptor/ Source         | National Noise Standard Guidelines <sup>a</sup><br>(dB) |                       | WHO Guidelines Value<br>For Noise Levels Measured Out of<br>Doors <sup>b</sup><br>(One Hour LA <sub>q</sub> in dBA) |               |
|--------------------------|---------------------------------------------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------|---------------|
|                          | Day<br>(06:00-21:00)                                    | Night<br>(21:00-6:00) | 07:00 – 22:00                                                                                                       | 22:00 – 07:00 |
| Industrial area          | 75                                                      | 70                    | 70                                                                                                                  | 70            |
| Commercial area          | 70                                                      | 60                    | 70                                                                                                                  | 70            |
| Mixed Area               | 60                                                      | 50                    | 55                                                                                                                  | 45            |
| Residential Area         | 55                                                      | 45                    | 55                                                                                                                  | 45            |
| Silent Zone <sup>c</sup> | 50                                                      | 40                    | 55                                                                                                                  | 45            |

<sup>a</sup> Noise Pollution Control Rules 2006<sup>b</sup> WHO. 1999. Guidelines for Community Noise; World Bank Group. 2007. Environmental, Health and Safety General Guidelines. Washington, D.C.<sup>c</sup> 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.**Table 10: Applicable Effluent Discharge Standards**

| Sl. No | Parameter                                                     | Unit          | Maximum Tolerable Limit at Discharge point<br>except pH      |                                                         |               |
|--------|---------------------------------------------------------------|---------------|--------------------------------------------------------------|---------------------------------------------------------|---------------|
|        |                                                               |               | Internal Surface<br>Water                                    | 2 <sup>nd</sup> Stage<br>process of<br>public<br>sewage | Coastal Areas |
| 1.     | Nitrogen (N)                                                  | mg/l          | 50                                                           | 50                                                      | 50            |
| 2.     | Ammonia (NH <sub>3</sub> )                                    | mg/l          | 5                                                            | 5                                                       | 5             |
| 3.     | Arsenic (As)                                                  | mg/l          | 0.2                                                          | 0.2                                                     | 0.2           |
| 4.     | BOD <sub>5</sub> at 20°C                                      | mg/l          | 30                                                           | 250                                                     | 100           |
| 5.     | Boron (B)                                                     | mg/l          | 2                                                            | 2                                                       | 4             |
| 6.     | Cadmium (Cd)                                                  | mg/l          | 2                                                            | 1                                                       | 2             |
| 7.     | Chlorine (Cl <sup>-</sup> )                                   | mg/l          | 600                                                          | 600                                                     | ---           |
| 8.     | Total Chromium                                                | mg/l          | 0.5                                                          | 1                                                       | 1             |
| 9.     | COD                                                           | mg/l          | 200                                                          | 400                                                     | 250           |
| 10.    | Hexavalent Cr                                                 | mg/l          | 0.1                                                          | 2                                                       | 1             |
| 11.    | Copper (Cu)                                                   | mg/l          | 3                                                            | 3                                                       | 3             |
| 12.    | Fluoride (F)                                                  | mg/l          | 2                                                            | 15                                                      | 15            |
| 13.    | Sulphide (S)                                                  | mg/l          | 1                                                            | --                                                      | 5             |
| 14.    | Iron (Fe)                                                     | mg/l          | 3                                                            | 3                                                       | 3             |
| 15.    | Total Kjeldal nitrogen                                        | mg/l          | 100                                                          | --                                                      | 100           |
| 16.    | Lead (Pb)                                                     | mg/l          | 0.1                                                          | 1                                                       | 2             |
| 17.    | Manganese (Mn)                                                | mg/l          | 2                                                            | 2                                                       | 2             |
| 18.    | Mercury (Hg)                                                  | mg/l          | 0.01                                                         | 0.01                                                    | 0.01          |
| 19.    | Nickel (Ni)                                                   | mg/l          | 1                                                            | 2                                                       | 5             |
| 20.    | Nitrite (N)                                                   | mg/l          | 10                                                           | --                                                      | 20            |
| 21.    | Oil & Grease                                                  | mg/l          | 10                                                           | 20                                                      | 20            |
| 22.    | Phenol (C <sub>6</sub> H <sub>5</sub> OH)                     | mg/l          | 1                                                            | 5                                                       | 5             |
| 23.    | Phosphorus (P)                                                | mg/l          | 5                                                            | --                                                      | --            |
| 24.    | Radioactive Material<br>a) Alpha Particle<br>b) Beta Particle | Micro Curie/L | Standard Set by<br>Bangladesh<br>Atomic Energy<br>Commission | ---                                                     | ----          |
| 25.    | pH                                                            | ---           | 6-9                                                          | 6-9                                                     | 6-9           |

| Sl. No | Parameter               | Unit | Maximum Tolerable Limit at Discharge point except pH               |                                                                    |                                                                    |
|--------|-------------------------|------|--------------------------------------------------------------------|--------------------------------------------------------------------|--------------------------------------------------------------------|
|        |                         |      | Internal Surface Water                                             | 2 <sup>nd</sup> Stage process of public sewage                     | Coastal Areas                                                      |
| 26.    | Selenium (Se)           | mg/l | 0.05                                                               | 0.05                                                               | 0.05                                                               |
| 27.    | Zinc (Zn)               | mg/l | 5                                                                  | 15                                                                 | 15                                                                 |
| 28.    | Temperature             | °C   | Not more than 5°C of reservoir water temperature                   | --                                                                 | Not more than 5° C of reservoir water temperature                  |
| 29.    | Suspended Solids        | mg/l | 100                                                                | 500                                                                | 100                                                                |
| 30.    | Cyanide                 | mg/l | 0.1                                                                | 2.0                                                                | 0.2                                                                |
| 31.    | Total Residual Chlorine | mg/l | 1.0                                                                | --                                                                 | 1.2                                                                |
| 32.    | Bio Assay Test          |      | 90% fishes remain alive after 96 hours in the treated liquid waste | 90% fishes remain alive after 96 hours in the treated liquid waste | 90% fishes remain alive after 96 hours in the treated liquid waste |

Source: ECR, 2023.

### III. DESCRIPTION OF THE SUBPROJECT

#### A. Subproject Location and Area

47. The location the Public Parks Development Subproject is within the jurisdiction of Narayanganj City Corporation (NCC), the fourth most populated and sixth largest city in Bangladesh. NCC is about 16 km southeast of the capital city of Dhaka and has a population of about 3,074,038.<sup>17</sup> The location of NCC and the sites of the subproject components is shown in **Figure 2**.

#### B. Subproject Rationale

48. Bangladesh, despite its many economic advancements, has been facing several challenges in urban basic services. Population increase in cities and towns is rapid, reaching 64 million (38%) in 2020 from 39 million (26%) in 2010.<sup>18</sup> This scenario has caused extreme congestions in city centers exacerbating restricted mobility that eventually results to psychological, physical and social strains among the population. Green and recreational spaces are limited, leading to poor environmental quality and health of the people. NCC, being the fourth most populated city in the country, is just one of the cities approaching this level.

49. In order to achieve a sustainable urban development in NCC, heavy infrastructure investments should be complemented alongside with investments geared towards improving the quality of social life of the urban dwellers and the urbanized society as a whole. Under the overall project, this goal can be achieved through improving selected green and recreational spaces within the NCC area. These areas are chosen on urgent need-based priority by NCC, and which areas are regarded as strategically important congregation points in the city. Developing these

<sup>17</sup> Adjusted Population 2011. Statistical Yearbook of Bangladesh 2022. Bangladesh Bureau of Statistics. June 2023.

<sup>18</sup> Asian Development Bank (ADB). 2021. [Key Indicators for Asia and the Pacific 2021](#). Manila.

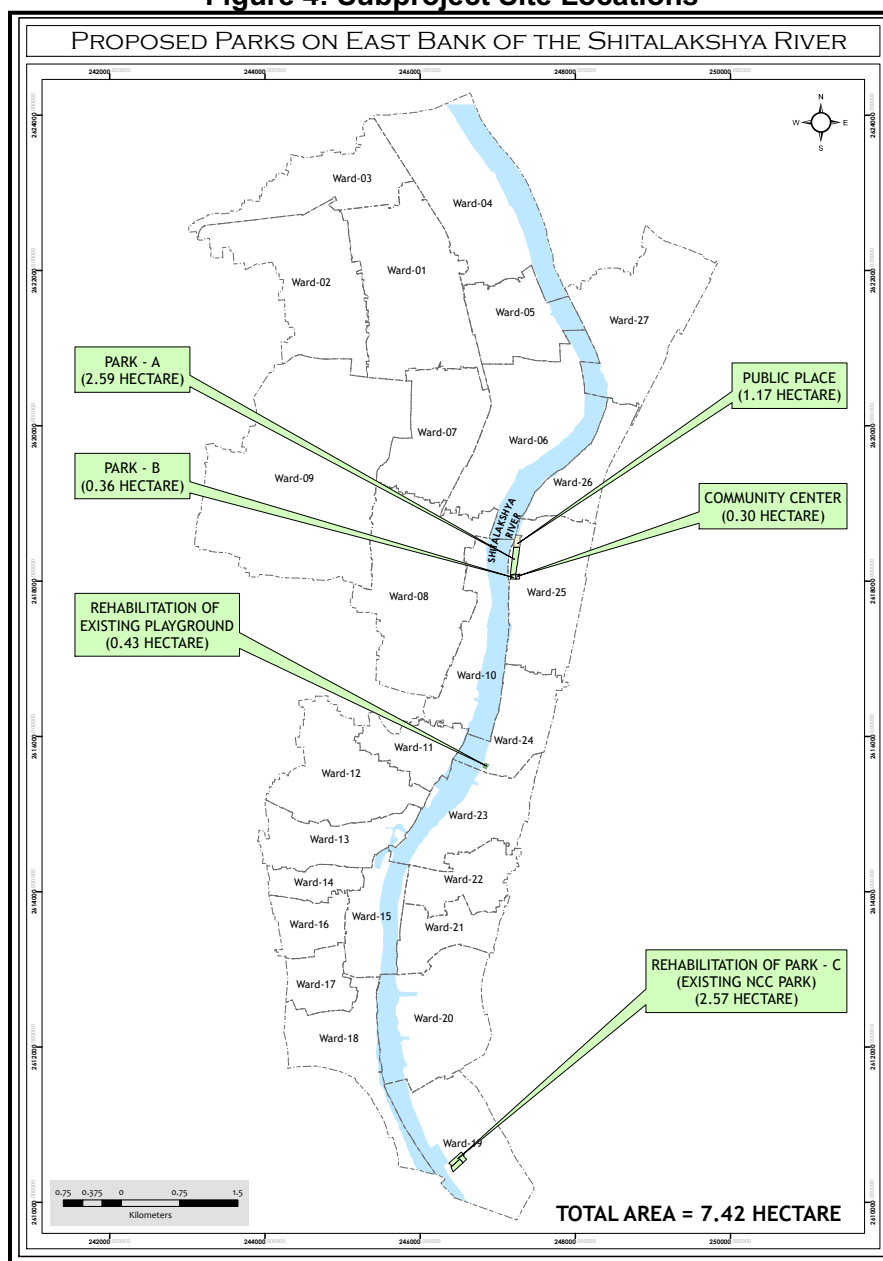
green and recreational spaces could provide venues for the city population to promote and develop social ties, promote sports development, relax and reduce stresses inherent with the city lifestyle. Thus, bringing a positive impact over the general wellbeing of the people of NCC.

### **C. Subproject Components**

50. The subproject will develop about a total of 7.42 hectares of green public parks to improve quality of life of the citizens, with features responsive to women and vulnerable, to provide recreational spaces and reduce urban heat.<sup>19</sup> The overall map showing the locations of all the components is shown in Figure 4 below.

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<sup>19</sup> The western side of the river has an ongoing World Bank- and government-funded project to construct embankment protection with pedestrian walkway.

**Figure 4: Subproject Site Locations**

<sup>a</sup> Disclaimer: Boundaries, colors, denominations or any other information shown on this map do not imply, on the part of ADB, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries, colors, denominations, or information.

51. While all proposed sites for the subproject are located on the eastern side of Shitalakshya river, these are not contiguous and distributed in three wards. The public parks are envisioned to be interconnected through a walkway along the eastern side of the Shitalakshya river that also function as embankment. This walkway is currently being constructed by the Bangladesh Inland Waterways and Transport Authority. Maps below shows these locations and the aerial view and boundary layouts. All trees found in these areas will not be cut and will form part of the greenery areas of the parks to be developed or improved.

52. Description of subproject components are as follows:

- (i) Development of Park A with Public Space in Ward 25 with aggregate area of 3.76 hectares. The maps and preliminary layouts are shown in Figure 5, Figure 6, Figure 7, and Figure 8. Subcomponents include the following:
- a. Land levelling by ensuring low-lying parts are elevated to the same level as the roads and the rest of the park area;
  - b. Multipurpose public space;
  - c. Solid boundary walls with secured entrances;
  - d. Paved footpaths or walkways;
  - e. Lighting
  - f. Accessible public toilets with baby facilities;
  - g. Children's soft play areas;
  - h. Women's/Girls' play areas;
  - i. Rain shelters;
  - j. Seats and benches made of reinforced concrete cement (RCC);
  - k. Cricket and basketball playing areas; and
  - l. Greenery areas.
- (ii) Development of Park B with Community Center Building in Ward 25 with aggregate area of 0.66 hectare. The maps and preliminary layouts are shown in Figure 9, Figure 10 and Figure 11. Subcomponents include the following:
- a. Land levelling by ensuring low-lying parts are elevated to the same level as the roads and the rest of the park area;
  - b. Two-floor community center building;
  - c. Solid boundary walls with secured entrances;
  - d. Paved footpaths or walkways;
  - e. Lighting
  - f. Accessible public toilets with baby facilities;
  - g. Children's soft play areas;
  - h. Women's/Girls' play areas;
  - i. Rain shelters;
  - j. Seats and benches made of RCC; and
  - k. Greenery areas.
- (iii) Improvement of Existing Playground in Ward 24 with an area of 0.43 hectare. The maps and preliminary layouts are shown in Figure 14 and Figure 15. Subcomponents include the following:
- a. Open football field with goal posts;
  - b. Children's playground;
  - c. Paved footpaths or walkways;
  - d. Lighting;
  - e. Rain shelters;
  - f. Seats and benches made of RCC; and
  - g. Greenery areas.

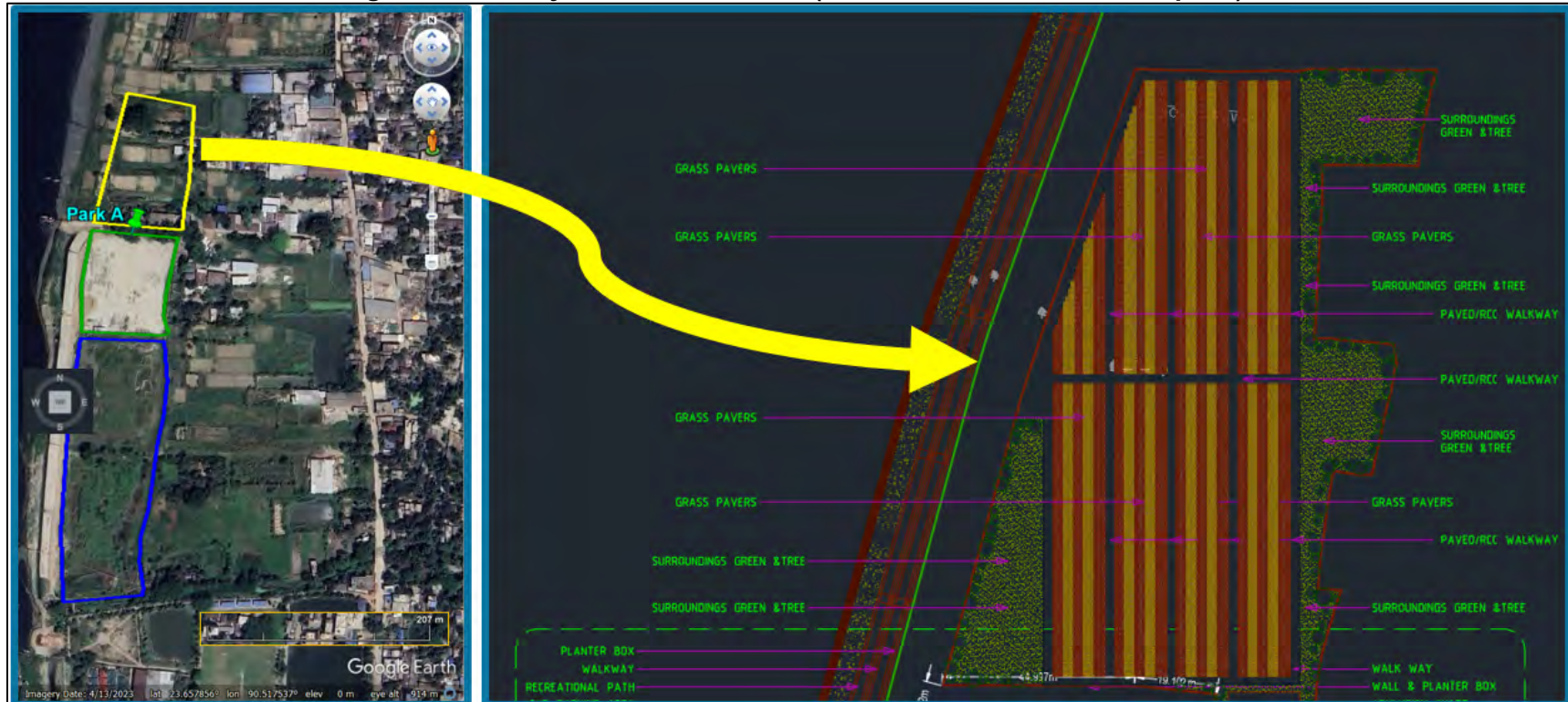
- (iv) Improvement of Park C in Ward 19 with an area of 2.57 hectares. The maps and preliminary layouts are shown in Figure 12 and Figure 13. Subcomponents include the following:
- a. Land levelling by ensuring low-lying parts are elevated to the same level as the roads and the rest of the park area;
  - b. Solid boundary walls with secured entrances;
  - c. Open football field;
  - d. Paved footpaths or walkways;
  - e. Lighting
  - f. Children's play areas;
  - g. Women's/Girls' play areas;
  - h. Rain shelters;
  - i. Seats and benches made of RCC; and
  - j. Greenery areas.

53. These preliminary designs and features will be finalized during the detailed design wherein measurements and boundaries will be validated, including quantification of all construction materials to be utilized.

Figure 5: Park A Site Location as Seen on Google Earth



Figure 6: Site Layout Plan for Park A (Northern Section – Public Space)



**Figure 7: Site Layout Plan for Park A (Mid Section – Cricket Field)**

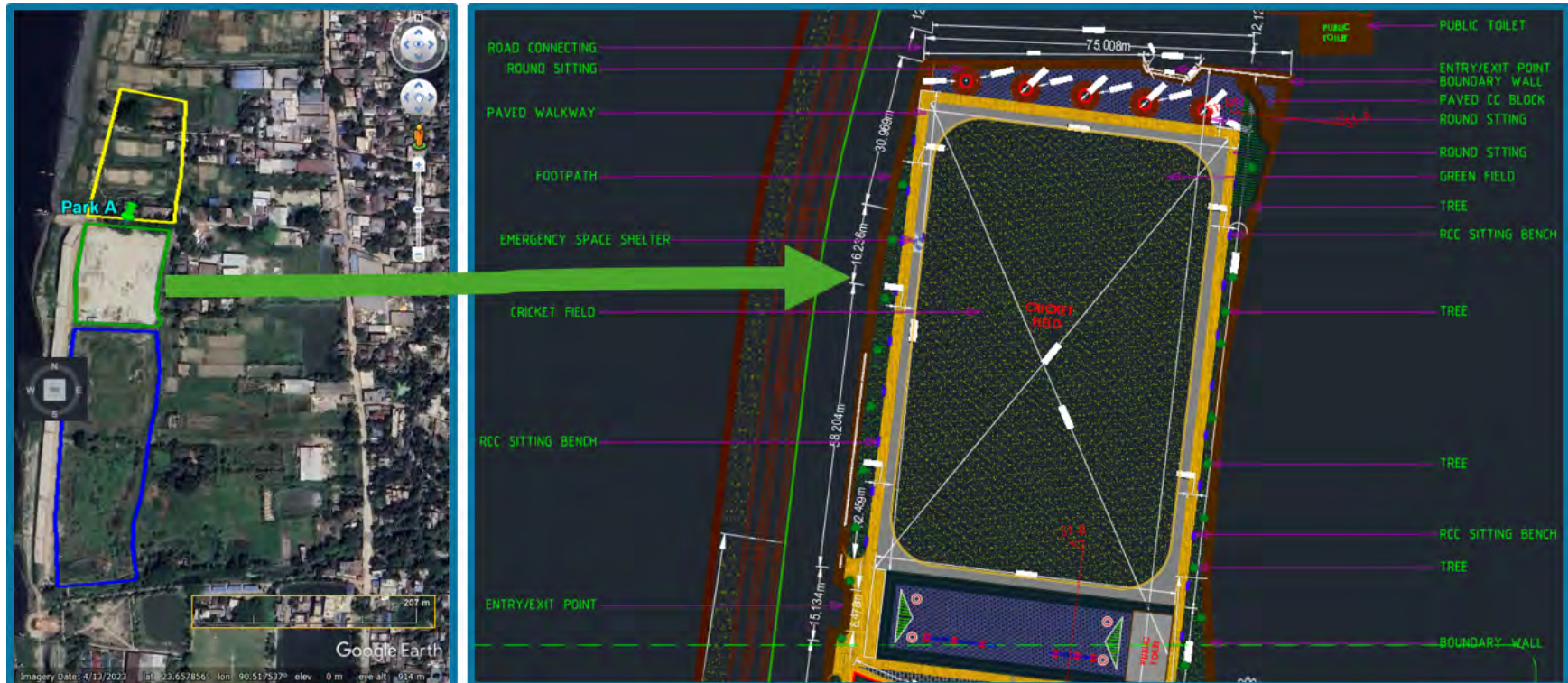




Figure 9: Park B Site Location as Seen on Google Earth

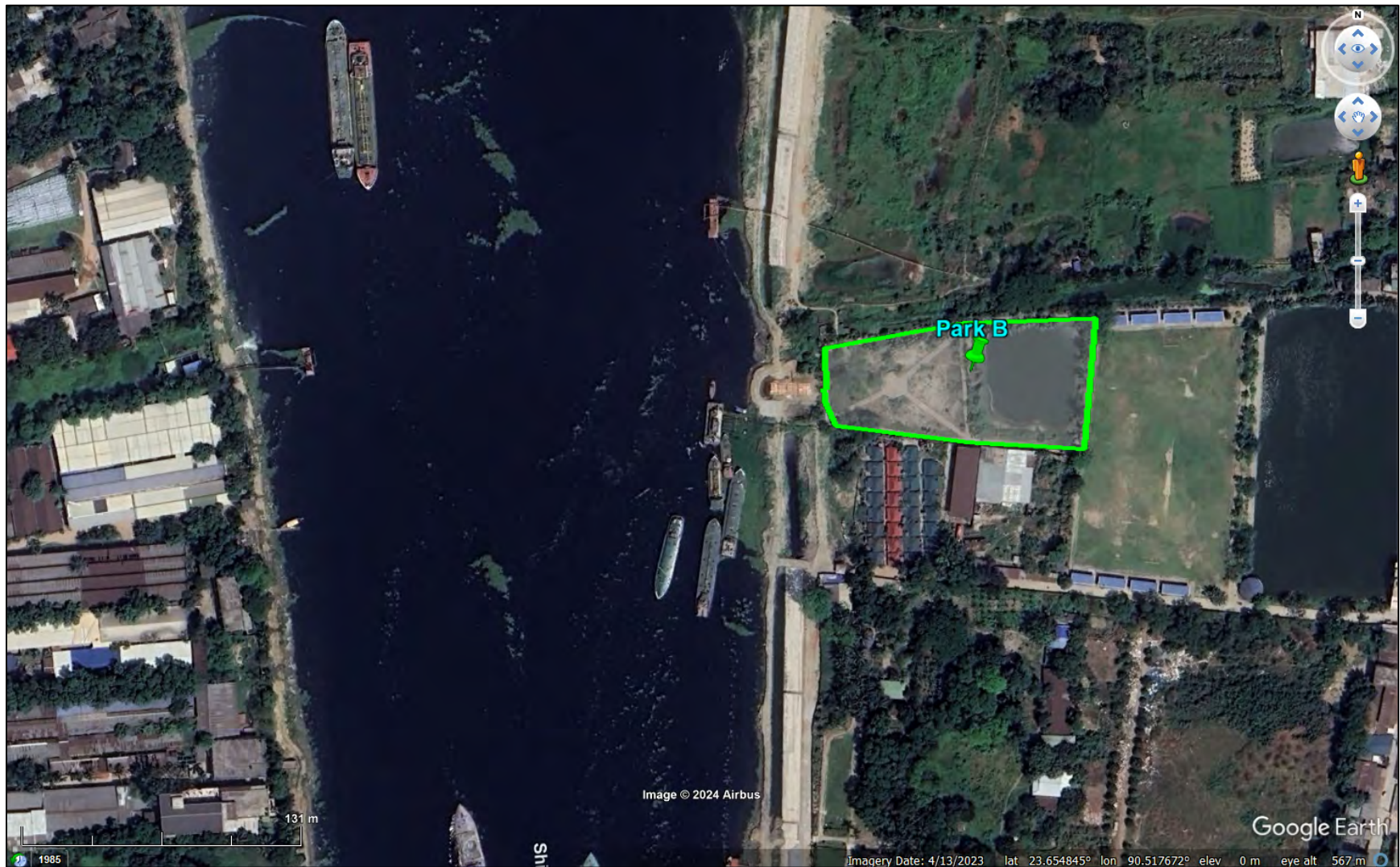
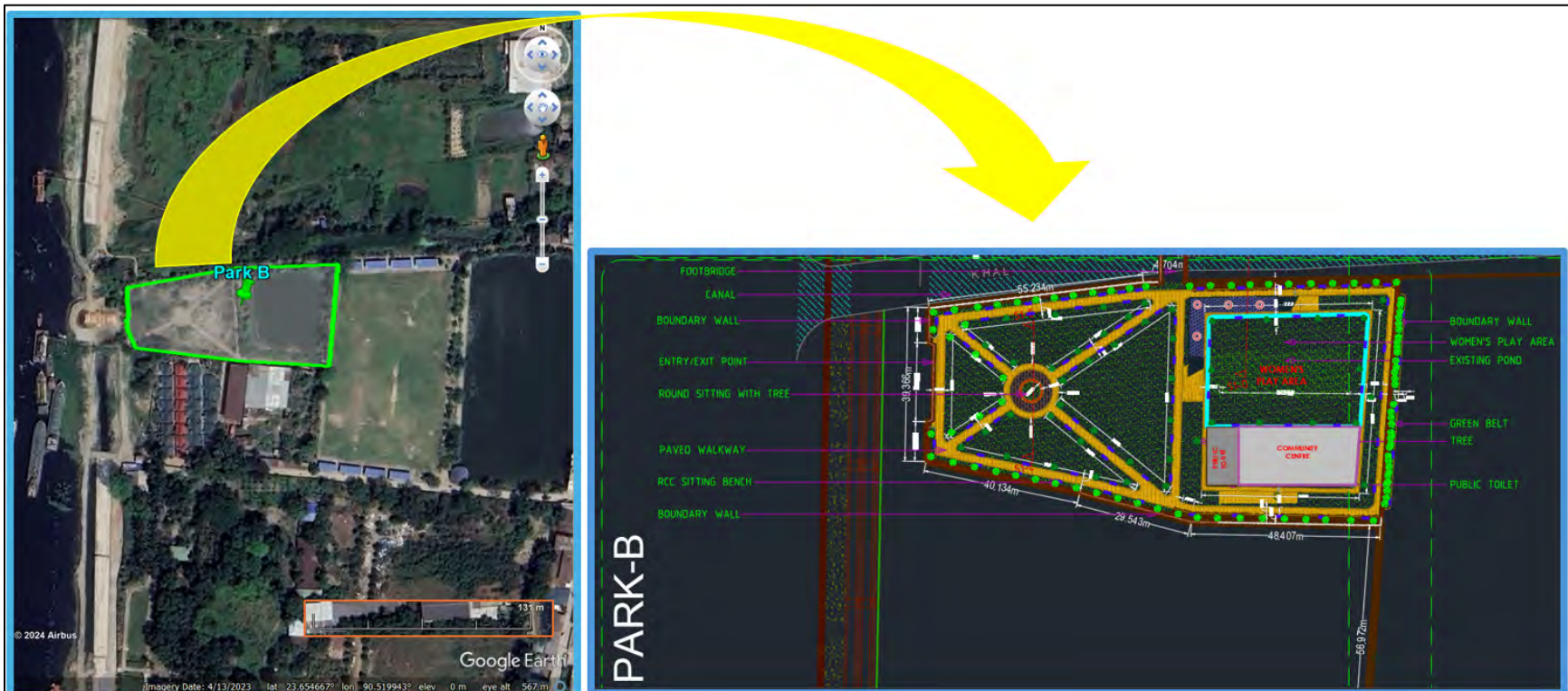
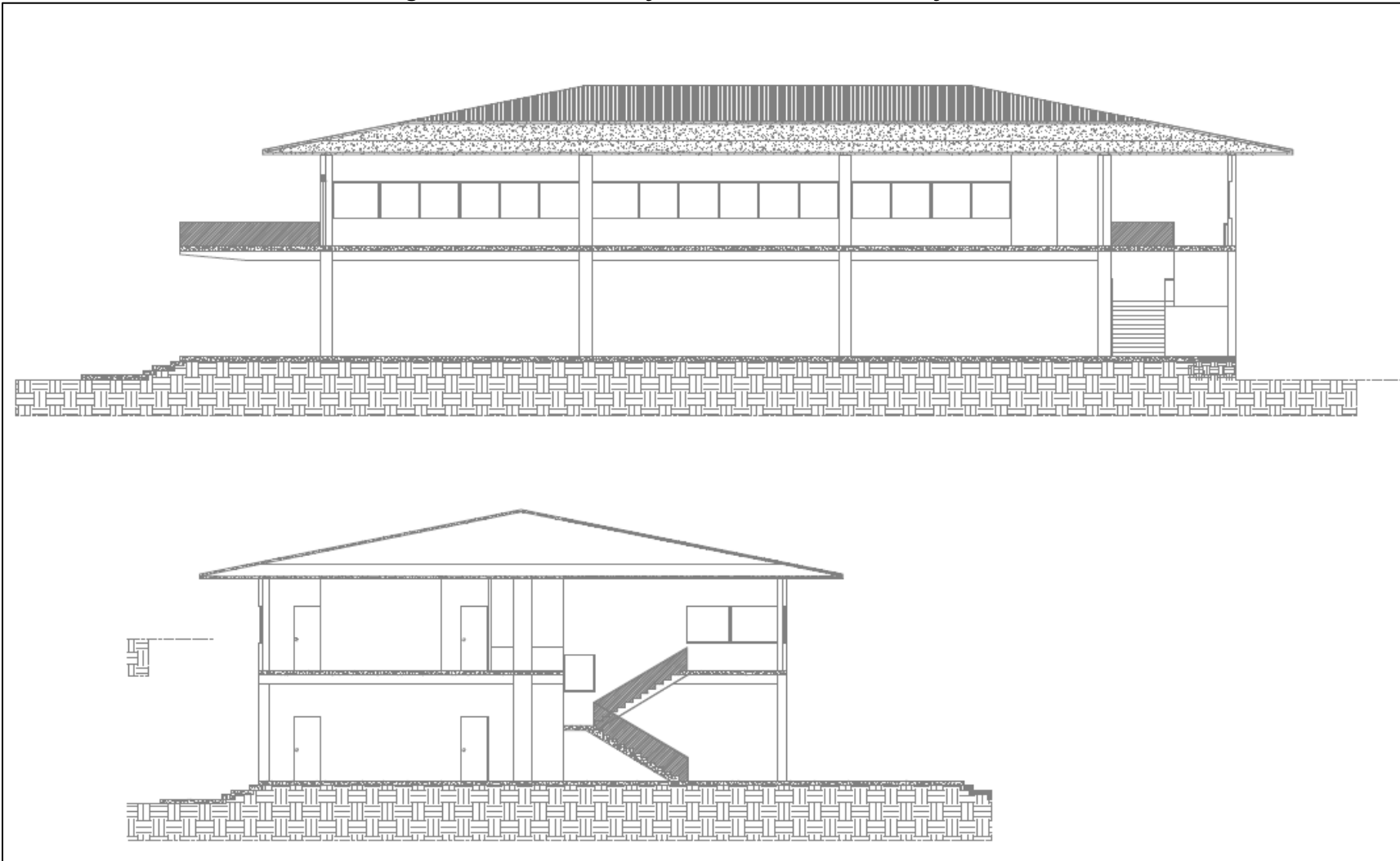


Figure 10: Site Layout Plan for Park B



**Figure 11: Sectional Layout of Park B Community Center**



Floor plan and other detailed design will be prepared during detailed design stage.

Figure 12: Park C Site Location As Seen On Google Earth



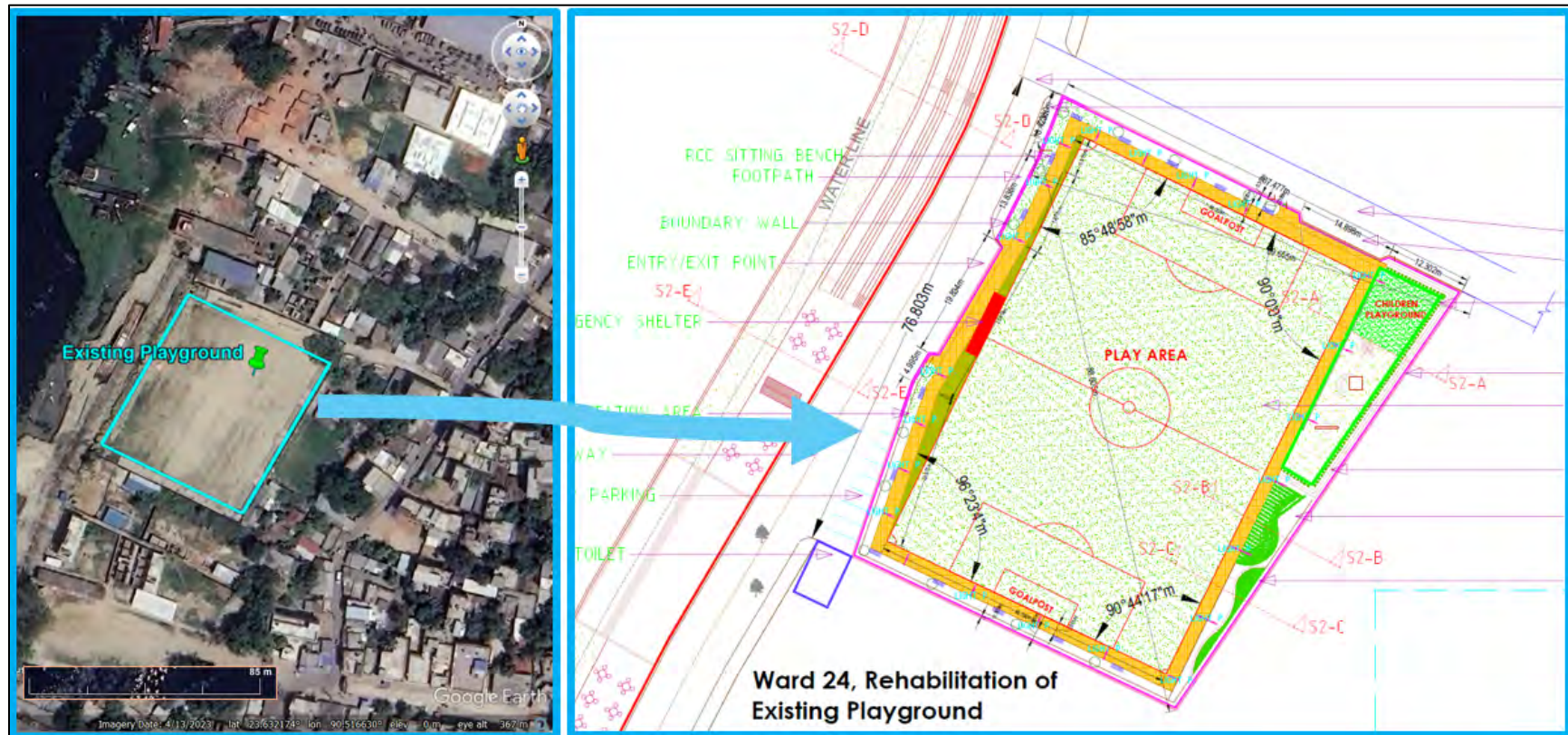
Figure 13: Site Layout Plan for Park C



Figure 14: Existing Playground Site Location As Seen On Google Earth

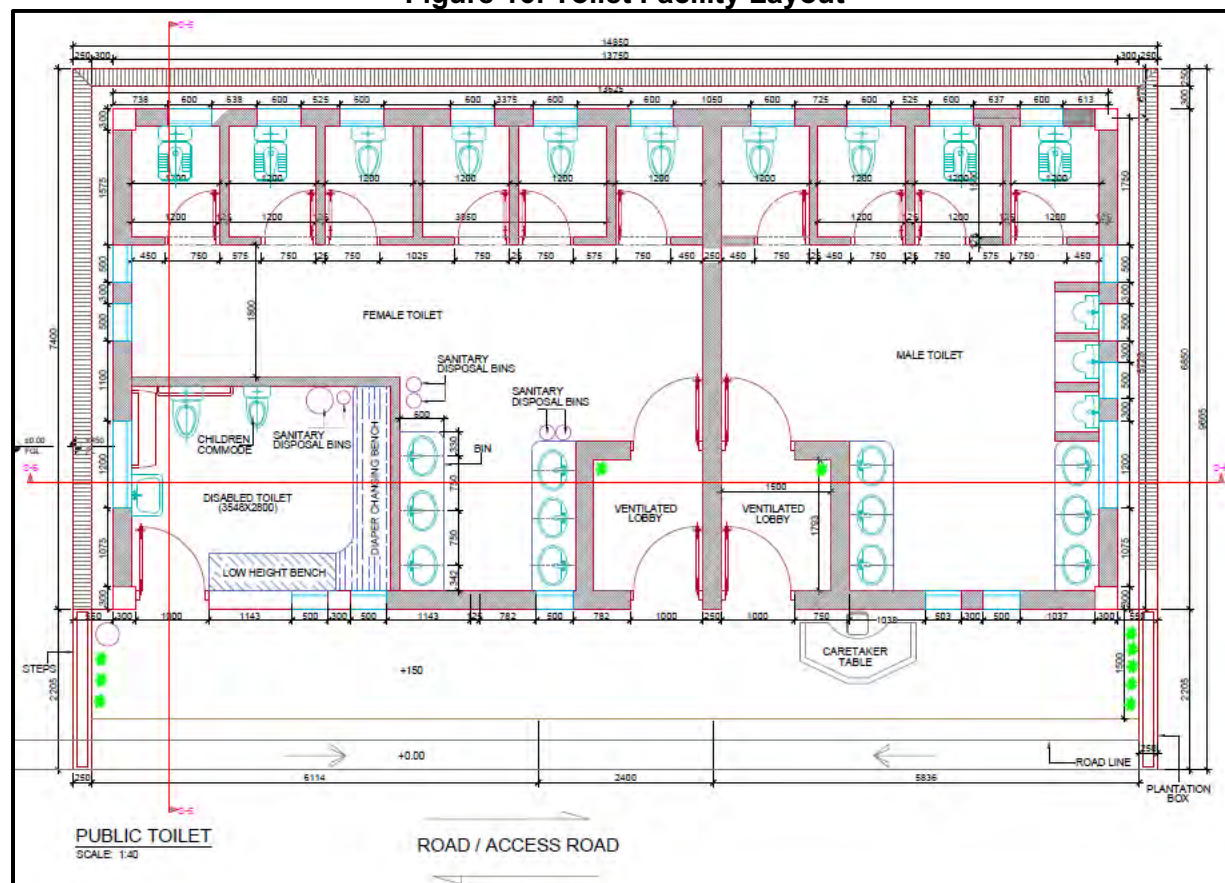


Figure 15: Site Layout Plan for Improvement of Existing Playground



54. The parks will also be provided with corresponding toilet facilities that comply with the internationally accepted standards. Following figure shows the layout of the toilet infrastructures.

**Figure 16: Toilet Facility Layout**



#### D. Resource Utilization

55. Land preparation and development at the sites will require significant earth-based resources. Low lying areas will need to be filled with earthen materials in order to elevate these areas to the level of the general level of the park area. Accordingly, this filling material will be sourced from government-permitted sites and. Likewise, gravel, sand and aggregate, will be required for civil construction part of the subproject, most of which are available in Bangladesh, which may, however, need to be transported over distances. Stones are also imported from across the national boundary. Cement is produced in the country. Reinforcing steel (both mild and high grade) is also produced in the country. However, a guarantee of quality, quantity and delivery schedule is important. All of these materials, and other construction materials will be sourced from legitimate entities authorized by the government. Quantification of all these construction materials and resources will be finalized during the detailed design, which will be used in finalizing the bill of quantities for the bidding and contract documents.

#### E. Implementation Schedule

56. The overall project is to be implemented over a period of 7 years. The detailed design stage has to be completed for a period of 6 months, and the construction period will cover about

18 months. The operation period for the contractor would be for 5 years, thereafter the asset(s) will be transferred to NCC.

#### **IV. DESCRIPTION OF THE ENVIRONMENT**

##### **A. Introduction**

57. This chapter provides the environmental baseline of the proposed subproject. Baseline data includes an inventory of parameters describing physical environment, ecological or biological environment, socio-economic environment, and physical cultural resources. Covering these environmental domains, data has been compiled for the following specific sub-domains:

- (i) Land Environment;
- (ii) Water Environment;
- (iii) Atmospheric Environment;
- (iv) Acoustic Environment;
- (v) Ecological Environment;
- (vi) Socio-economic Environment; and
- (vii) Physical Cultural Resources.

58. Baseline environmental data gathering used both primary and secondary sources. The Integrated Biodiversity Assessment Tool (IBAT) was used to screen and assess potential risks on the protected areas or critical habitat that may exist around the subproject sites. Results of the screening were validated at the subproject sites and with relevant government agencies.

59. Statistical data on socio-economic environment used in this IEE report are the latest data available from official and published records of the government. The recency of some sets of data are as of previous years because these are the most recent data officially published or released so far. Nevertheless, the sources of data are indicated in the respective illustrations or tabulations.

##### **B. Subproject Influence Area**

60. The subproject influence area or impact zone varies per the type of interventions and the environmental and socio-economic settings of the area where the subproject is to be implemented. For the subproject which involves linear works for drainage systems and canals, the area of influence may be 10 – 15m on each side especially if these are located along the existing road alignment. However, in alignments nearby residential or busy areas, the areas of influence may extend beyond 15m due to access issues.

##### **C. Land Environment**

###### **1. Topography**

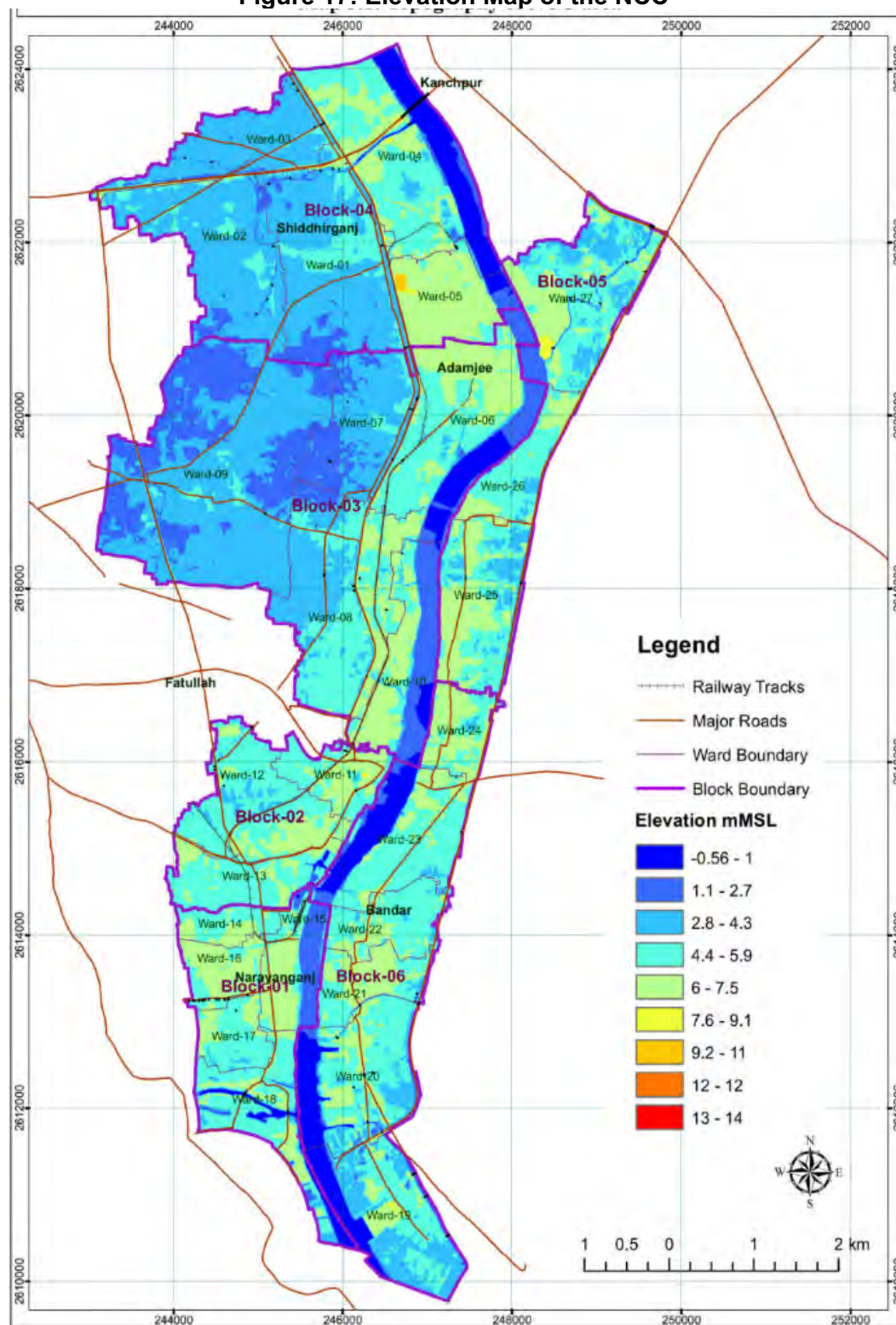
61. Block-wise elevation of NCC is prepared in the NCC Action Area Plan in 2016. Table and Figure below show a summary of the findings. It is revealed that Block 3 has comparatively lower elevation than all other blocks with an average elevation of 3.71m and the land slope of Block 1, Block 2, Block 3 and Block 4 are to the opposite direction of Shitalakhya River. It is noted that the outfall of some runoff of these blocks is Buriganga River, which is located at the South-West of the subproject area. Block 2 has comparatively higher elevation than other blocks with an average

elevation of 5.43m. The subproject area overlaps all these blocks. All drains within the subproject area flow down to the Shitalakhya river on the eastern side.

**Table 11: Elevation of NCC as Block wise spot height**

| <b>Values</b>                     | <b>Block-01</b> | <b>Block-02</b> | <b>Block-03</b> | <b>Block-04</b> | <b>Block-05</b> | <b>Block-06</b> |
|-----------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Maximum Elevation (m, MSL)        | 8.711           | 8.802           | 8.144           | 13.954          | 10.115          | 9.224           |
| Minimum Elevation (m, MSL)        | -0.102          | -0.292          | -0.369          | 0.151           | 0.433           | -0.561          |
| <b>Average Elevation (m, MSL)</b> | <b>5.031</b>    | <b>5.430</b>    | <b>3.711</b>    | <b>4.093</b>    | <b>5.249</b>    | <b>4.584</b>    |
| Standard Deviation                | 1.664           | 0.788           | 1.604           | 1.623           | 1.212           | 1.910           |
| Variance                          | 2.769           | 0.620           | 2.572           | 2.633           | 1.469           | 3.648           |

Source: Topographic Survey, NCC Action Area Plan, 2016

Figure 17: Elevation Map of the NCC<sup>a</sup>

Source: Topographic Survey, NCC Action Area Plan, 2016

<sup>a</sup> Disclaimer: Boundaries, colors, denominations or any other information shown on this map do not imply, on the part of ADB, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries, colors, denominations, or information.

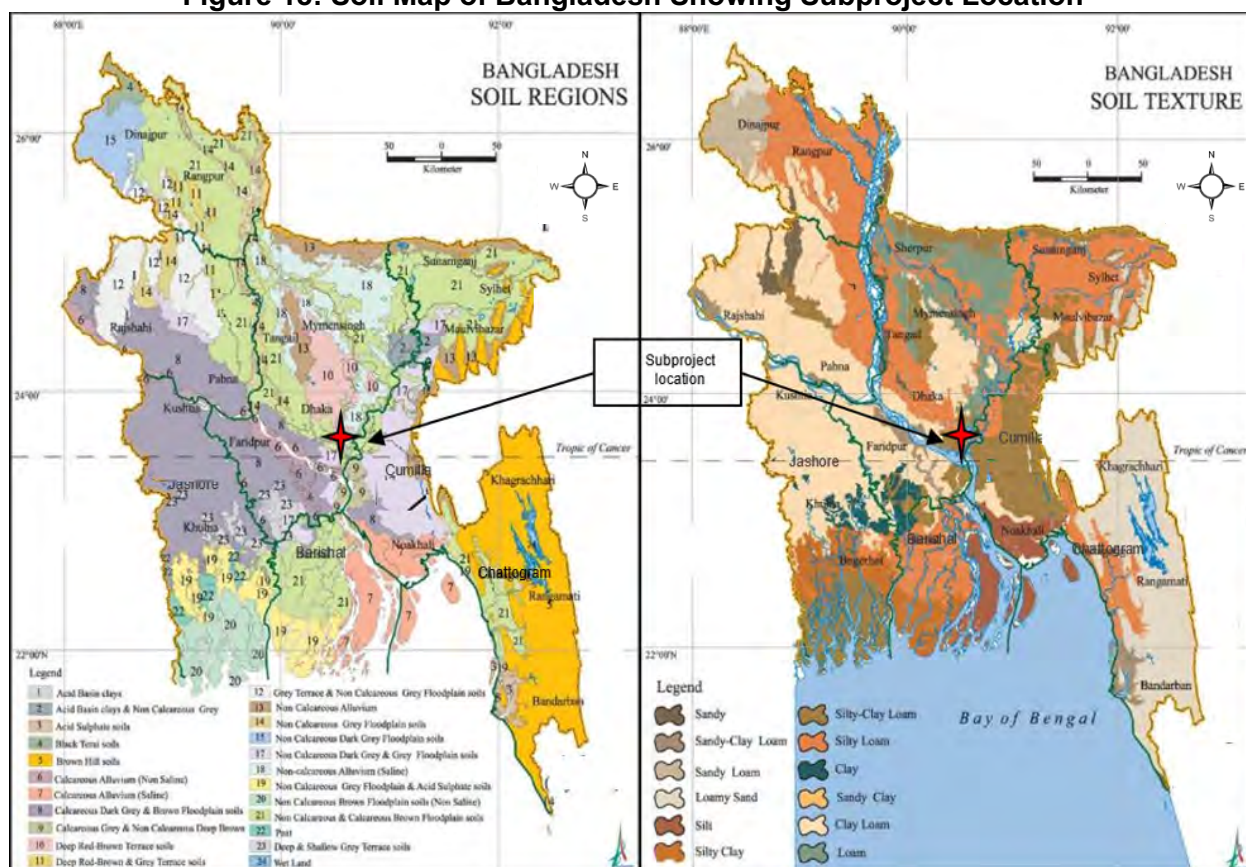
## 2. Geology and Soil

62. Dhaka region, where NCC is located, is situated on the southern tip of a Pleistocene terrace, the Madhupur Tract. Two characteristic geological units cover the region and surrounding areas; the Madhupur Clay of the Pleistocene age and alluvial deposits of recent age. The Madhupur Clay is the oldest sediment exposed in and around the area and characterized by reddish plastic clay with silt and very fine sand particles. This Madhupur Clay unconformable overlies the Dupi Tila Sand of Plio Pleistocene age, which is composed of medium to coarse yellowish-brown sand and occasional gravel.

63. The channels and depressions within the city are floored by recent alluvial floodplain deposits and are subdivided into Lowland Alluvium and Highland Alluvium. The alluvial deposits are composed of fine sand, silt and clay in different combinations.

64. The alluvial soils of these floodplains mainly consist of ridges of loamy material like silty clays and silty sands with large areas of shallow clays in the basins. The soil pattern can become more irregular close to river channels due to more recent deposits. With regard to the youngest activities (natural as well as anthropogenic) organic soils of swamps may be found locally as well as areas where the ground level has been raised using loose sands (hydraulic sand filling) dredged and pumped from nearby rivers.

**Figure 18: Soil Map of Bangladesh Showing Subproject Location**



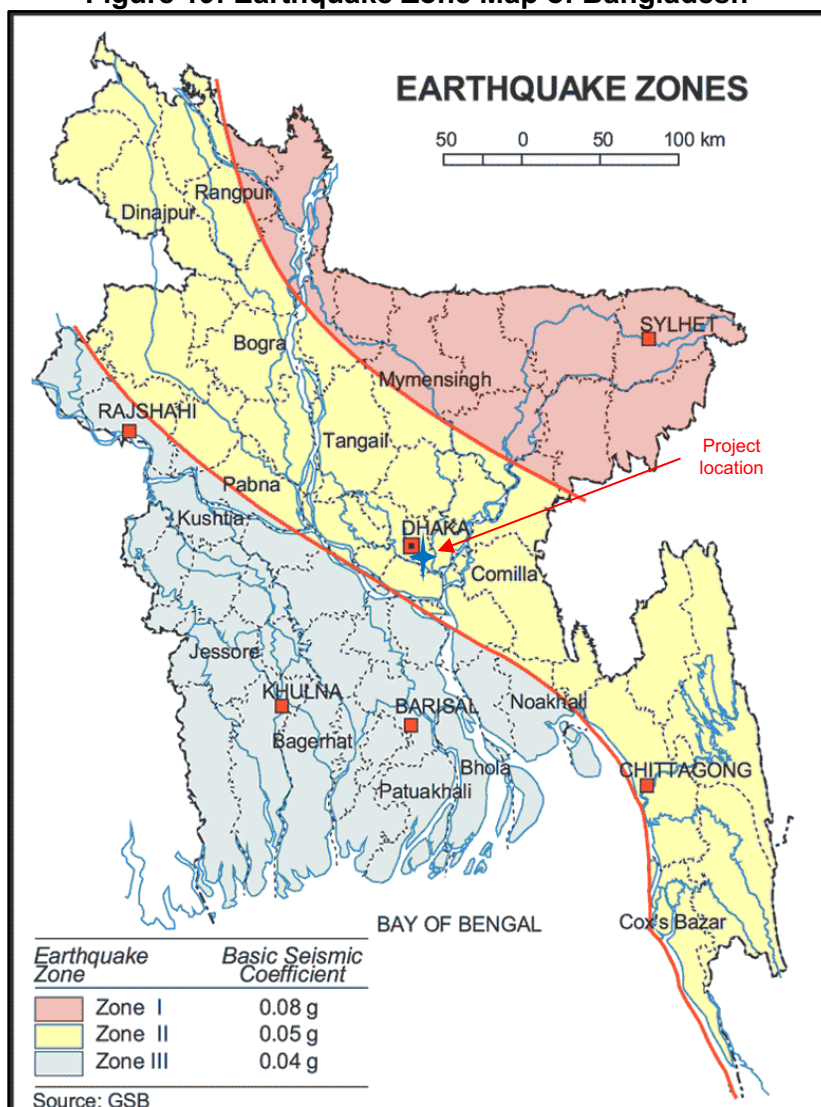
Source: FAO 1988 and Banglapedia

<sup>a</sup> Disclaimer: Boundaries, colors, denominations or any other information shown on this map do not imply, on the part of ADB, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries, colors, denominations, or information.

### **3. Seismicity**

65. Narayanganj lies in central Bangladesh it does not lie in risk area and high wind area. The seismicity map of Bangladesh shows that Narayanganj lies in Zone-2 which shows intermediate level of seismic activity. As per tectonic classification, the area falls under Faridpur trough of Western platform flank which is adjacent to the hinge line. Tectonically this area is inactive and no apparent major structure like fault or fold exists in the region that might be geologically significant.

**Figure 19: Earthquake Zone Map of Bangladesh<sup>a</sup>**



Source: Geological Survey of Bangladesh. <https://gsb.portal.gov.bd/>

<sup>a</sup> Disclaimer: Boundaries, colors, denominations or any other information shown on this map do not imply, on the part of ADB, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries, colors, denominations, or information.

#### 4. Land Use

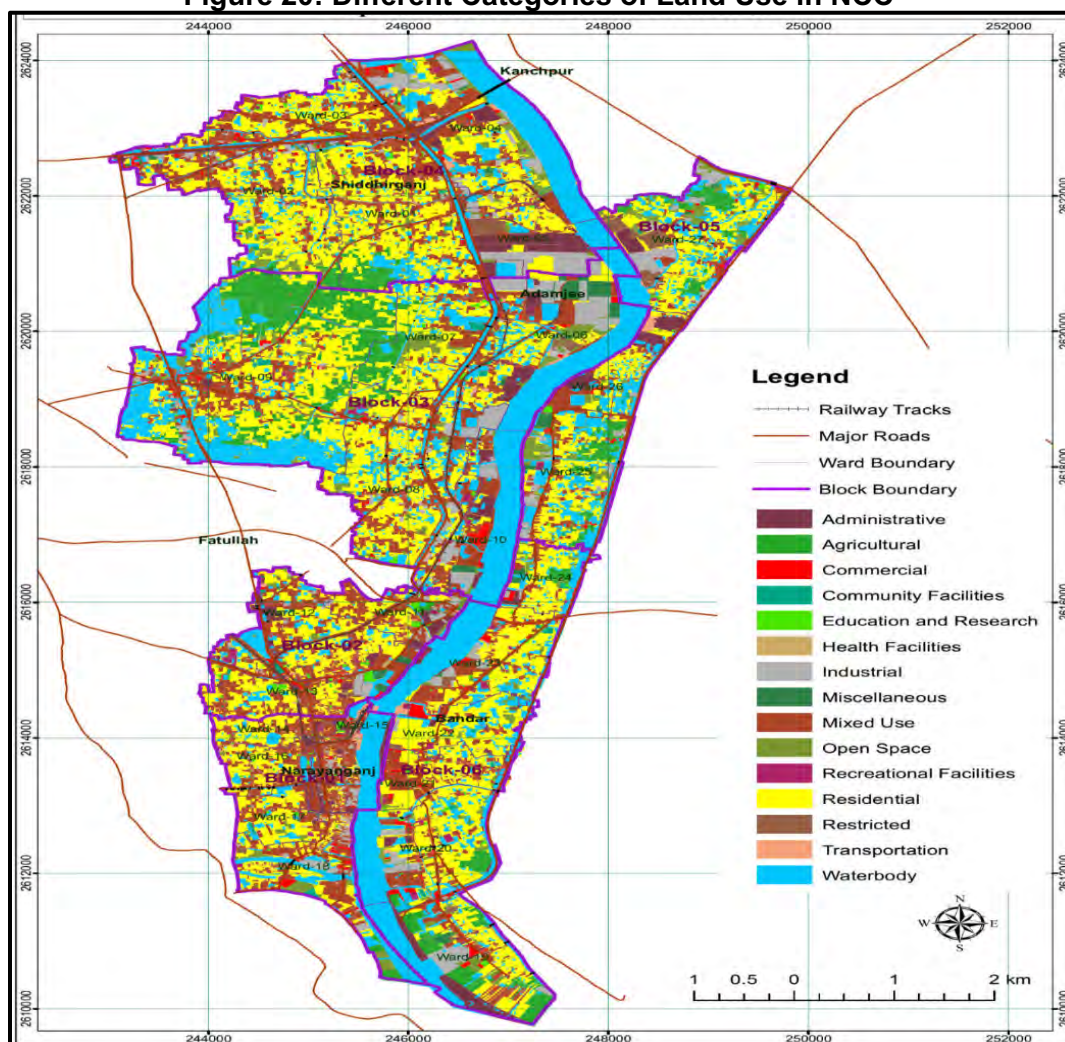
66. The main uses of land of the city comprised administrative, agricultural, residential, commercial, educational, research, health facilities, community facilities, industrial, mixed use, open space, recreational facilities, restricted, transportation and communication water body and miscellaneous. Table below shows that the residential area is highest (30.65%) followed by water bodies, (23.4) mixed use (20.19), etc. in the NCC area. Whereas agricultural and industrial setting are about 5.7 and 5.04 %, respectively. Recreational facilities establishment is lowest.

**Table 12: Distribution Land Uses in NCC**

| <b>Land Use</b>                  | <b>Area in acre</b> |            |
|----------------------------------|---------------------|------------|
|                                  | <b>Total</b>        | <b>%</b>   |
| Administrative                   | 525.59              | 4.51       |
| Agricultural                     | 658.90              | 5.66       |
| Commercial                       | 174.68              | 1.5        |
| Community Facilities             | 55.18               | 0.47       |
| Education and Research           | 74.58               | 0.64       |
| Health Facilities                | 4.47                | 0.04       |
| Industrial                       | 586.43              | 5.04       |
| Miscellaneous                    | 131.16              | 1.13       |
| Mixed Use                        | 2350.21             | 20.19      |
| Open Space                       | 587.64              | 5.05       |
| Recreational Facilities          | 45.47               | 0.39       |
| Residential                      | 3568.51             | 30.65      |
| Restricted                       | 85.52               | 0.73       |
| Transportation and Communication | 69.09               | 0.59       |
| Water body                       | 2723.68             | 23.4       |
| <b>Grand Total</b>               | <b>11641.11</b>     | <b>100</b> |

Source: NCC Action Area Plan, 2016

**Figure 20: Different Categories of Land Use in NCC<sup>a</sup>**

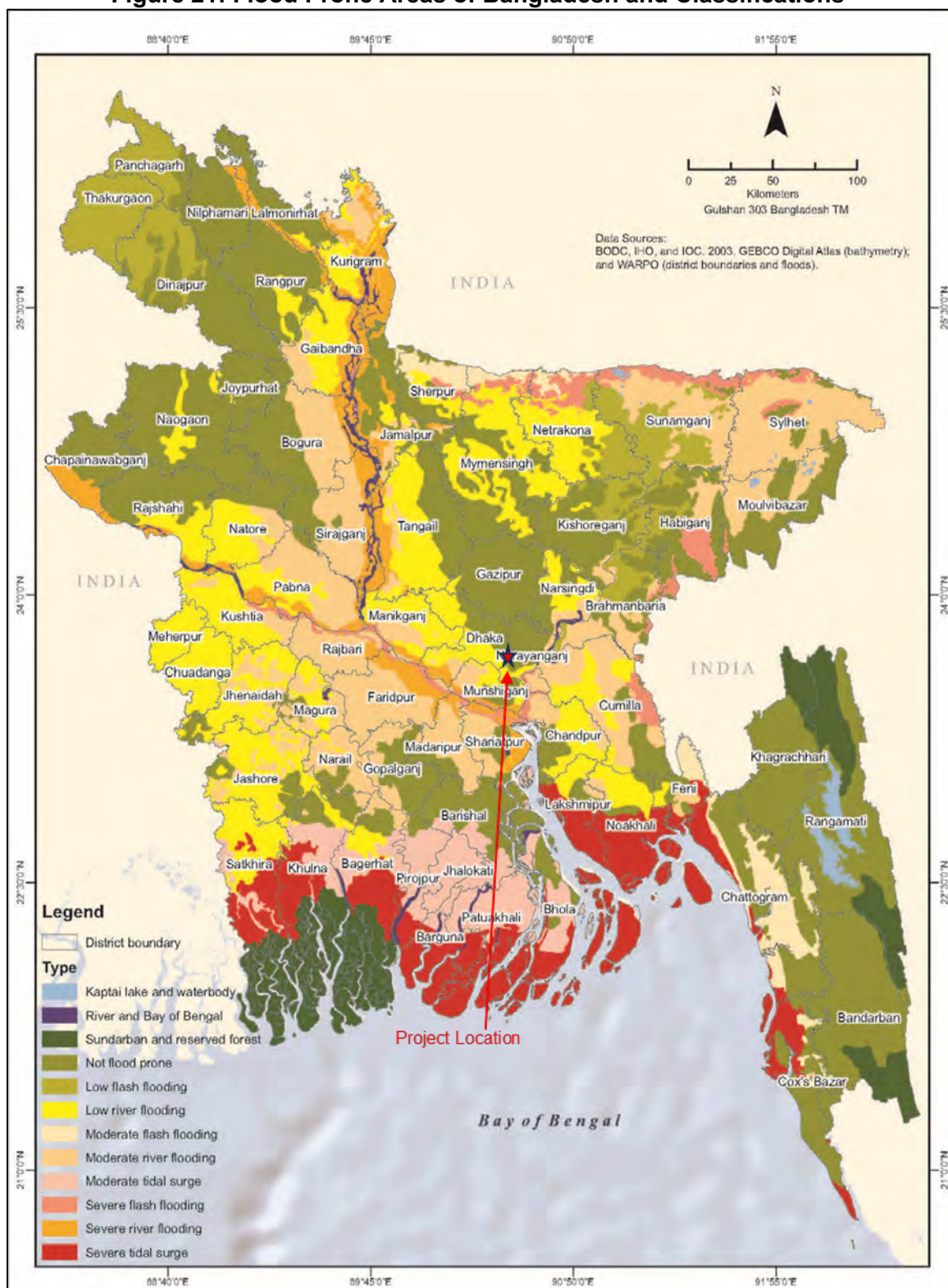


<sup>a</sup> Disclaimer: Boundaries, colors, denominations or any other information shown on this map do not imply, on the part of ADB, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries, colors, denominations, or information.

## 5. Other Natural Hazards

67. Flooding is a common phenomenon in Bangladesh. The major cause of flood is monsoon rainfall runoff from upstream catchments, with more than 90 percent from outside Bangladesh. A flood season in Bangladesh may start as early as May and can continue until November. Five floods during the last fifty years were extensive and devastating and these are the floods of 1955, 1974, 1987, 1988, and 1998. Figure below shows that NCC generally falls within a no flood zone, but low river/flash flooding is likely in the southern part of the NCC which is near the subproject sites.

**Figure 21: Flood Prone Areas of Bangladesh and Classifications<sup>a</sup>**



Source: Bangladesh Climate and Disaster Risk Atlas. ADB. December 2021

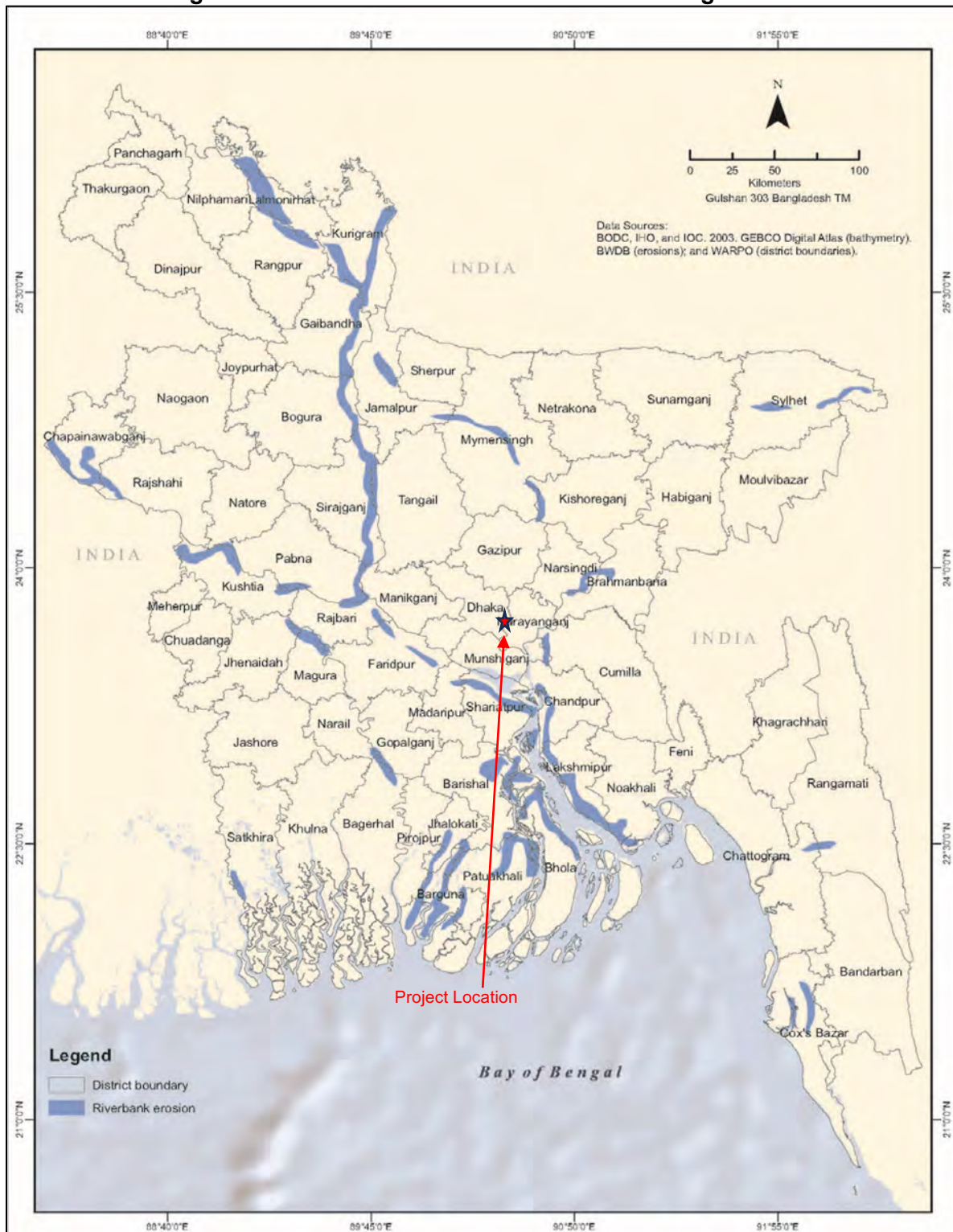
<sup>a</sup> Disclaimer: Boundaries, colors, denominations or any other information shown on this map do not imply, on the part of ADB, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries, colors, denominations, or information.

68. Although the subproject sites are located near the Shitalakhya river, areas adjacent to the river have no historical record of riverbank erosion.<sup>20</sup> Figure below shows the maps confirming that the subproject area is not within erosion-prone landscape.

---

<sup>20</sup> Studies undertaken by ADB that led to the publication of Bangladesh Climate and Disaster Risk Atlas dated December 2021.

**Figure 22: Areas with Riverbank Erosion in Bangladesh<sup>a</sup>**



Source: Bangladesh Climate and Disaster Risk Atlas. ADB. December 2021

<sup>a</sup> Disclaimer: Boundaries, colors, denominations or any other information shown on this map do not imply, on the part of ADB, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries, colors, denominations, or information.

## D. Water Environment

### 1. Surface Water Quality

69. Shitalakhya River is the major channel in the Narayanganj City, which are the ultimate discharge points of smaller streams. Shitalakshya River is about 110 km in length, which originates from the northern part of central Bangladesh, and traverses various towns and cities down to the southern tip of NCC where it meets with Daleshwari, Brahmaputra and Meghna rivers. The width of this river varies from about 100m in the upper reach and to about 300m near Narayanganj. Its highest discharge in the last 10 years has been measured at 1,638.31 m<sup>3</sup>/s. The river is navigable throughout the year and shows little erosional tendency. Several heavy industries, such as manufacturing companies and factories, jute mills, navigational vessel ports, etc., stand on the banks of Shitalakshya river. Shitalakhya River passes through the NCC jurisdiction, and practically separating the city into two areas (Siddhirganj Pourashava and Narayanganj Pourashava on the west, and Kadam Rasul Pourashava on the east). Majority of canals in NCC end towards Shitalakhya River. Meanwhile, Daleshwari river is on the western side of NCC, while Bahmaputra river and Meghna River are on the eastern side of NCC. Other canals and streams flowing through the different Upazilas (sub-districts) end towards these rivers, depending on the terrain allowing natural hydraulic or gravity flows. Narayanganj lies in monsoon flood affected area. The approximate flooding is about 5 – 6 feet at certain places.<sup>21,22</sup>

### 2. Surface Water Quality

70. Surface water quality testing was done along the Shitalakhya river at Demra ghat in 2020. Water quality parameters used were pH, BOD, DO and SS. Results show that Shitalakhya river has relatively high level of pollutants based on the standard values for sources per ECR, 2023. However, technical assessment revealed that Shitalakhya river water can still be considered as a source of drinking water, provided that properly designed treatment plant or facility is in place.<sup>23</sup>

**Table 13: Water Quality of Shitalakhya River**

| Parameter<br>s    | River<br>Quality<br>Standard<br>s <sup>a</sup> | Year 2020 |          |          |          |          |          |          |         |         |          |          |          |
|-------------------|------------------------------------------------|-----------|----------|----------|----------|----------|----------|----------|---------|---------|----------|----------|----------|
|                   |                                                | Jan       | Feb      | Mar      | Apr      | Ma<br>y  | Jun      | Jul      | Au<br>g | Se<br>p | Oct      | No<br>v  | De<br>c  |
| BOD, mg/l         | ≤3                                             | 10        | 19       | 49       | 9.6      | 9.6      | 9.6      | 10       |         |         | 14       | 8        | 18       |
| pH, units         | 6-9                                            | 7.8       | 7.2<br>9 | 7.1<br>9 | 7.4      | 7.1<br>2 | 7.8<br>8 | 7.3<br>2 | -       | -       | 6.9<br>9 | 7.2<br>3 | 7.4<br>8 |
| SS, mg/l          | -                                              | 38.<br>8  | 4.5      | 24       | 14       | 14       | 20       | 24       |         |         | 21       | 15       | 15       |
| DO, mg/l          | ≥5                                             | 0         | 0        | 0        | 1.3      | 1.9      | 3.5      | 4.5      |         |         | 2.9      | 1.6      | 0.8      |
| Turbidity,<br>NTU | -                                              | 12        | 16       | 34.<br>2 | 23.<br>6 | 23.<br>4 | 21.<br>1 | 20.<br>1 |         |         | 16.<br>6 | 37       | 86.<br>9 |

Source: Feasibility Report on Rehabilitation and Expansion Existing Water Supply Infrastructure, 2022

<sup>a</sup> Standards per ECR 2023 on Sources of Drinking Water for Supply after Conventional Treatment.

71. Primary data was gathered for Shitalakhya river water quality in December 2022 to determine the level of pollution in terms of heavy metal parameters. Samples were taken at about 100 m upstream of the intake point of the WTP and at the vicinity of the intake point. Results show

<sup>21</sup> Banglapedia: National Encyclopedia of Bangladesh. <https://en.banglapedia.org/>.

<sup>22</sup> Feasibility Report on Rehabilitation and Expansion Existing Water Supply Infrastructure, 2022

<sup>23</sup> Design Report For Rehabilitation of Godenail Water Treatment Plant. October 2022.

that the quality of river is within the standards for the tested parameters, as tabulated below. However, when compared with the national drinking water quality standards, the values for lead concentration appear to be marginally above the limit.

**Table 14: Water Quality of Shitalakhya River on Heavy Metals**

|                        |                                            |              | <b>Date of Sampling: 21 December 2022</b> |         |
|------------------------|--------------------------------------------|--------------|-------------------------------------------|---------|
| <b>Parameters</b>      | <b>River Quality Standards<sup>a</sup></b> | <b>NDWQS</b> | Upstream of Intake                        | Intake  |
| Arsenic, mg/l          | -                                          | 0.05         | 0.002                                     | 0.003   |
| Cadmium                | -                                          | 0.003        | 0.00015                                   | 0.00015 |
| Copper, mg/l           | -                                          | 1.5          | 0.03                                      | 0.03    |
| Chromium (Total), mg/l | 0.02                                       | 0.05         | 0.005                                     | 0.005   |
| Lead, mg/l             | 0.03                                       | 0.01         | 0.014                                     | 0.027   |
| Nickel, mg/l           | -                                          | 0.05         | 0.03                                      | 0.03    |
| Zinc, mg/l             | -                                          | 5.0          | 0.03                                      | 0.02    |

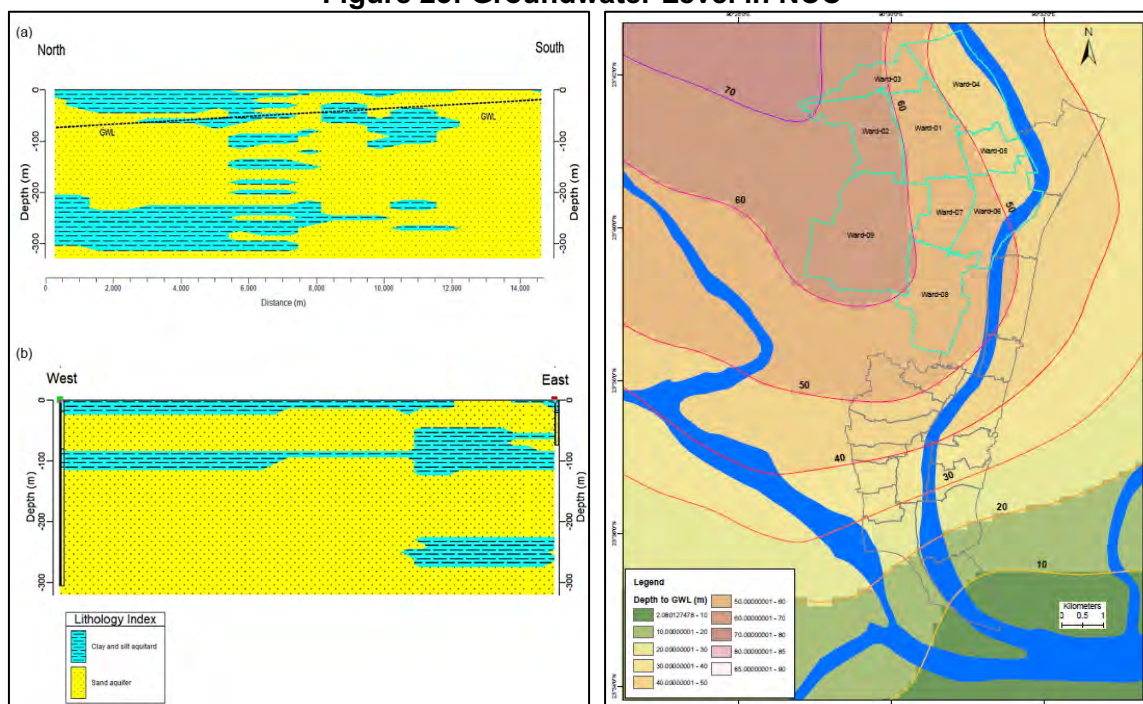
<sup>a</sup> Standards per ECR 2023 for surface water sources of drinking water supply but requiring conventional treatment.

### 3. Groundwater Level and Quality

72. **Groundwater Level.** Groundwater is abundant in Bangladesh. Water tables are generally shallow and aquifers are productive. The main aquifer, which is the source of water supply, is found at a depth of greater than 50m. The ground water level (GWL) of shallow aquifer is decreasing day by day and safe drinking water is not accessible to a great extent in the NCC area. The water table depth map of Narayanganj area below shows that the groundwater is flowing from the south to the northern part of Narayanganj area. In the southern part of Narayanganj area adjacent to the Dhaleswari river, the maximum depth of GWL is about 6m below ground level (bgl) in the upper aquifer and about 15m bgl in the lower aquifer. But in the northern part of the NCC area the depth of GWL is more than 70m bgl.<sup>24</sup>

<sup>24</sup> Feasibility Study for Setting Up IBF System on Bank fo Dhaleswari-Shitalakhya Rivers in Southern Narayanganj. Bangladesh. 2022.

Figure 23: Groundwater Level in NCC



Source: Feasibility Study for Setting Up IBF System on Bank fo Dhaleswari-Shitalakhya Rivers in Southern Narayanganj. Bangladesh. 2022.

73. **Groundwater Quality.** To establish the baseline groundwater quality data in the vicinity of the subproject locations, groundwater sampling was carried out on 21 December 2022 from the existing DTWs that are to be rehabilitated under the subproject. The locations of these DTWs are in Figure 24 and Table 15 below, and corresponding results are presented in Table 16 below. Compared with the NDWQS, the quality of groundwater registered general elevated concentrations in terms of manganese, BOD and COD parameters. There are other parameters that are also exceeding the standards such as hardness, turbidity, iron, TDS, and coliform.

**Figure 24: Map Showing Locations of Groundwater Quality Sampling****Table 15: Groundwater Quality Sampling Location Details**

| Serial ID | Name of DTW         | Latitude  | Longitude | DMZ   | DMA        | Ward_No |
|-----------|---------------------|-----------|-----------|-------|------------|---------|
| DTW No. 1 | Bhuiyar Bagh DTW    | 23.623491 | 90.493359 | DMZ-1 | DMA-13 (1) | Ward-13 |
| DTW No. 2 | Dewbhog DTW         | 23.615912 | 90.493136 |       | DMA-14     | Ward-14 |
| DTW No. 3 | Golachipa DTW       | 23.619355 | 90.499503 |       | DMA-14     | Ward-14 |
| DTW No. 4 | Paikpara DTW        | 23.606409 | 90.496788 |       | DMA-17     | Ward-17 |
| DTW No. 5 | Nitaigonj DTW       | 23.606927 | 90.502371 |       | DMA-15     | Ward-15 |
| DTW No. 6 | Shitalakhya DTW     | 23.605805 | 90.503575 |       | DMA-18     | Ward-18 |
| DTW No. 7 | Bag E Jannat DTW    | 23.624874 | 90.500696 | DMZ-2 | DMA-12     | Ward-12 |
| DTW No. 8 | Killarpul Mazar DTW | 23.635464 | 90.509369 |       | DMA-11     | Ward-10 |
| DTW No. 9 | Poschim Tolla DTW   | 23.633488 | 90.507432 |       | DMA-11     | Ward-11 |

| Serial ID  | Name of DTW             | Latitude  | Longitude | DMZ | DMA        | Ward_No |
|------------|-------------------------|-----------|-----------|-----|------------|---------|
| DTW No. 10 | Chowdhuri Bari DTW      | 23.653133 | 90.510961 |     | DMA-8      | Ward-08 |
| DTW No. 11 | Pathan Tuli DTW         | 23.640273 | 90.508659 |     | DMA-8      | Ward-08 |
| DTW No. 12 | Masdair DTW             | 23.62695  | 90.49177  |     | DMA-13 (1) | Ward-12 |
| DTW No. 13 | Arambag DTW             | 23.648791 | 90.514342 |     | DMA-8      | Ward-08 |
| DTW No. 14 | Dhanokunda DTW          | 23.659238 | 90.510637 |     | DMA-8      | Ward-08 |
| DTW No. 15 | Khanpur Bank Colony DTW | 23.628438 | 90.504303 |     | DMA-12     | Ward-12 |
| DTW No. 16 | DC Bungalow DTW         | 23.627625 | 90.508614 |     | DMA-12     | Ward-12 |
| DTW No. 17 | Godenail DTW            | 23.639668 | 90.514887 |     | DMA-10     | Ward-10 |

**Table 16: Groundwater Quality in NCC**

| Parameters                   | Ammonia | BOD              | COD            | Coliform (Fecal) | Colour | Cr (Total) | EC    | Hardness | Fe      | Mn   | Nitrogen (Nitrate) | pH      | Phosphate | Salinity | (TDS) | Turbidity |
|------------------------------|---------|------------------|----------------|------------------|--------|------------|-------|----------|---------|------|--------------------|---------|-----------|----------|-------|-----------|
| Unit                         | mg/L    | mg/L             | mg/L           | N/100ml          | Hazen  | mg/L       | µS/cm | mg/L     | mg/L    | mg/L | mg/L               |         | mg/L      | %        | mg/L  | NTU       |
| GW1                          | 0.12    | 2                | 12             | 0                | 0.9    | 0.009      | 420   | 165      | 0.8     | 0.03 | 0.8                | 7.4     | 0.8       | 0.21     | 210   | 0.79      |
| GW2                          | 0.1     | 11               | 48             | 45               | 0.85   | 0.009      | 325   | 120      | 0.44    | 0.03 | 0.2                | 7.4     | 0.94      | 0.16     | 162   | 0.82      |
| GW3                          | 0.14    | 3                | 12             | 0                | 0.91   | 0.007      | 370   | 130      | 0.8     | 0.06 | 1.2                | 7.3     | 0.37      | 0.18     | 185   | 1.4       |
| GW4                          | 0.14    | 1                | 4              | 2                | 1      | 0.01       | 471   | 225      | 1.4     | 0.53 | 1.3                | 7.2     | 1.1       | 0.21     | 208   | 9.2       |
| GW5                          | 0.1     | 11               | 40             | 0                | 1.2    | 0.008      | 366   | 140      | 0.37    | 0.48 | 1.9                | 7.2     | 0.20      | 0.18     | 183   | 2         |
| GW6                          | 0.12    | 5                | 24             | 0                | 0.96   | 0.01       | 1550  | 2100     | 0.2     | 2.04 | 0.1                | 6.3     | 0.26      | 0.78     | 776   | 1.1       |
| GW7                          | 0.11    | 2                | 8              | 0                | 0.9    | 0.009      | 415   | 160      | 0.26    | 0.08 | 0.1                | 7.1     | 0.27      | 0.21     | 207   | 0.8       |
| GW8                          | 0.12    | 1                | 4              | 0                | 0.97   | 0.011      | 410   | 205      | 0.64    | 0.24 | 0.7                | 7.1     | 0.38      | 0.21     | 205   | 1.1       |
| GW9                          | 0.1     | 2                | 8              | 20               | 0.92   | 0.006      | 510   | 140      | 0.31    | 0.17 | 1.5                | 7       | 0.46      | 0.26     | 255   | 0.8       |
| GW10                         | 0.1     | 1                | 4              | 2                | 0.9    | 0.016      | 1840  | 2350     | 0.23    | 1.97 | 0.8                | 6.5     | 0.4       | 0.92     | 920   | 1.3       |
| GW11                         | 0.1     | 2                | 8              | 0                | 0.98   | 0.008      | 1245  | 1300     | 0.42    | 2.06 | 0.7                | 7.1     | 0.17      | 0.62     | 622   | 1         |
| GW12                         | 0.12    | 7                | 24             | 0                | 0.97   | 0.012      | 320   | 195      | 0.46    | 0.06 | 2.3                | 7.1     | 0.13      | 0.16     | 160   | 1         |
| GW13                         | 0.1     | 3                | 8              | 0                | 1      | 0.006      | 460   | 215      | 0.66    | 0.31 | 1                  | 7       | 0.24      | 0.23     | 230   | 5.1       |
| GW14                         | 0.1     | 2                | 8              | 2                | 0.96   | 0.007      | 760   | 230      | 0.6     | 1.31 | 1.1                | 6.8     | 0.25      | 0.38     | 380   | 1.7       |
| GW15                         | 0.14    | 1                | 4              | 0                | 1.1    | 0.009      | 980   | 307      | 0.76    | 1.35 | 0.4                | 6.7     | 0.13      | 0.49     | 490   | 6.5       |
| GW16                         | 0.12    | 1                | 4              | 0                | 0.98   | 0.006      | 350   | 180      | 0.55    | 0.5  | 0.7                | 7.1     | 0.19      | 0.18     | 175   | 2.1       |
| GW17                         | 0.19    | 7                | 32             | 0                | 2.3    | 0.014      | 2750  | 2600     | 3.6     | 5.21 | 0.1                | 6.5     | 0.44      | 1.38     | 1375  | 35.2      |
| <u>Standards (ECR, 2023)</u> | 1.5     | 0.4 <sup>a</sup> | 4 <sup>a</sup> | 0                | 15     | 0.05       | -     | 500      | 0.3-1.0 | 0.04 | 45                 | 6.5-8.5 | -         | -        | 1000  | 5         |

<sup>a</sup> Values for BOD and COD are taken from ECR, 1997. The ECR, 2023 does not have standards for BOD and COD.

## E. Atmospheric Environment

### 1. Climate and Meteorology

74. Bangladesh is located in a sub-tropical monsoon zone and has four main seasons namely pre-monsoon or summer (March to May), monsoon (June to September) and post-monsoon (October to November) and lean or winter (November to February). Climatic variations on temperature, rainfall, humidity and wind speed are recorded in the nearest meteorological station at Narayanganj, Bangladesh Meteorological Department (BMD).

75. In subproject area, temperature varies from 28.8 to 29.5°C during April to September. Temperature ranges from 7.2 to 14.8 °C during winter from November to February. Pre-monsoon or summer is hot and humid from March to May with annual average temperature ranging from 18.9 to 29.5°C. Long periods of steady rainfall persisting over several days are common during the monsoon, but sometimes, local high intensity rainfall of short duration is also occurring during other seasons of the year. About seventy (75%) percent of rainfall over Bangladesh occurs between the months from June to September. Climatic variations on temperature, rainfall, humidity and wind speed of the meteorological stations are presented in table below.

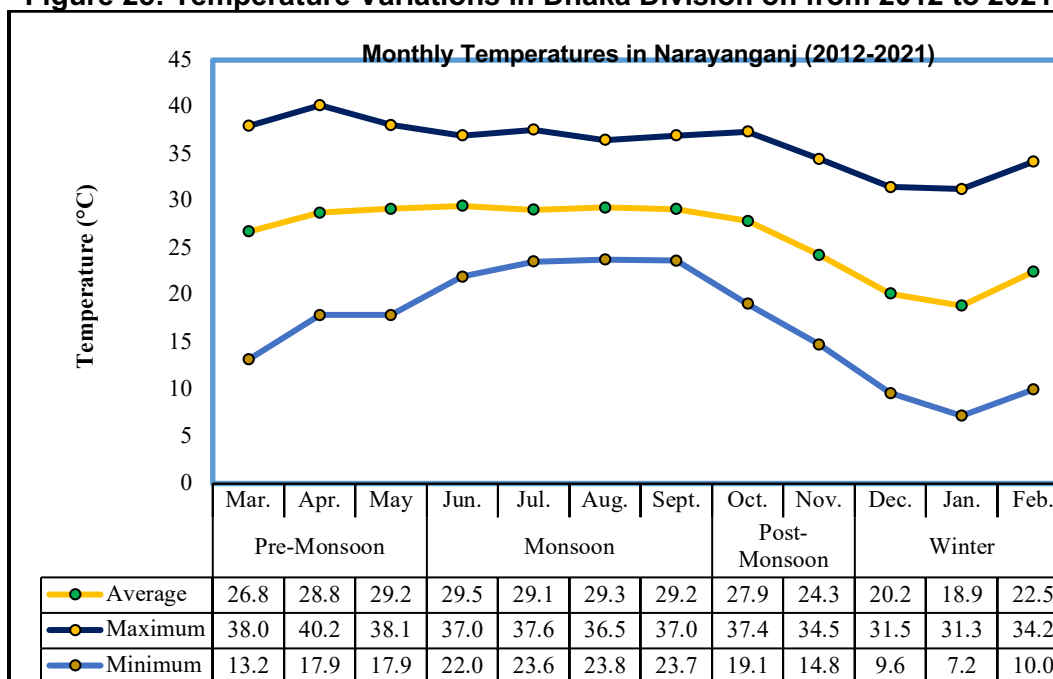
**Table 17: Monthly Average of Climate Variables of Narayanganj City, 2012-2021**

| Seasons            | Pre-Monsoon/Summer |      |      | Monsoon |      |      | Post-Monsoon |      |      | Lean/Winter |      |      |
|--------------------|--------------------|------|------|---------|------|------|--------------|------|------|-------------|------|------|
| Months             | Mar.               | Apr. | May  | Jun.    | Jul. | Aug. | Sept.        | Oct. | Nov. | Dec.        | Jan. | Feb. |
| Average Temp °C    | 26.8               | 28.8 | 29.2 | 29.5    | 29.1 | 29.3 | 29.2         | 27.9 | 24.3 | 20.2        | 18.9 | 22.5 |
| Avg. Max Temp °C   | 32.6               | 34.2 | 33.9 | 33.3    | 32.6 | 32.9 | 33.2         | 32.4 | 30.1 | 25.9        | 24.9 | 28.7 |
| Avg. Min Temp °C   | 21.6               | 24.3 | 25.4 | 26.6    | 26.7 | 26.8 | 26.7         | 24.6 | 19.8 | 16.0        | 14.0 | 17.1 |
| Maximum Temp °C    | 38.0               | 40.2 | 38.1 | 37.0    | 37.6 | 36.5 | 37.0         | 37.4 | 34.5 | 31.5        | 31.3 | 34.2 |
| Minimum Temp °C    | 13.2               | 17.9 | 17.9 | 22.0    | 23.6 | 23.8 | 23.7         | 19.1 | 14.8 | 9.6         | 7.2  | 10.0 |
| Avg. Rainfall (mm) | 0.78               | 3.89 | 4.75 | 6.70    | 9.27 | 5.77 | 4.19         | 3.21 | 0.35 | 0.19        | 0.04 | 0.63 |
| Avg. Humidity (%)  | 63.4               | 70.3 | 75.9 | 78.6    | 77.9 | 76.9 | 78.9         | 76.7 | 72.4 | 78.5        | 71.6 | 65.0 |

Source: Dhaka Meteorological Station, Bangladesh Meteorological Department (2012-2021)

### 2. Temperature

76. The meteorological data on temperature as monthly highest maximum, monthly lowest minimum, monthly and annual mean temperature were collected for the period of 2012 to 2021 from meteorological station at Dhaka. Temperature varies from 28.8 to 29.5°C during April to September and from 18.9 to 24.3°C during November to January. Summary data on highest maximum and lowest minimum temperatures from 2012 to 2022 are presented in Figure 25. Annual average temperatures range from 18.9 to 29.5°C.

**Figure 25: Temperature Variations in Dhaka Division on from 2012 to 2021**

Source: Dhaka Meteorological Station. Bangladesh Meteorological Department. 2022

### 3. Ambient Air Quality

77. Narayanganj City is one of the congested cities of Bangladesh with high concentrated population, busy marketplaces and heavy traffic on the main arteries of the city. There are cement plants and power plants at the west-side of the Shitalakhya river which crosses through the city. Additionally, there are many jute mills along the side of the river, which emissions contribute to the air pollutants in the city.

78. To establish the baseline air quality data in the vicinity of the subproject locations, ambient air quality monitoring was carried out during the period 25 January – 4 February 2023. The locations of monitoring are in **Figure 26** and **Table 18** below and corresponding results are presented in **Table 19** below. Copies of laboratory analysis is in **Appendix 2**. In general, the particulate matter (PM10 and PM2.5) is relatively high in subproject area.

Figure 26: Map Showing Ambient Air Sampling Locations

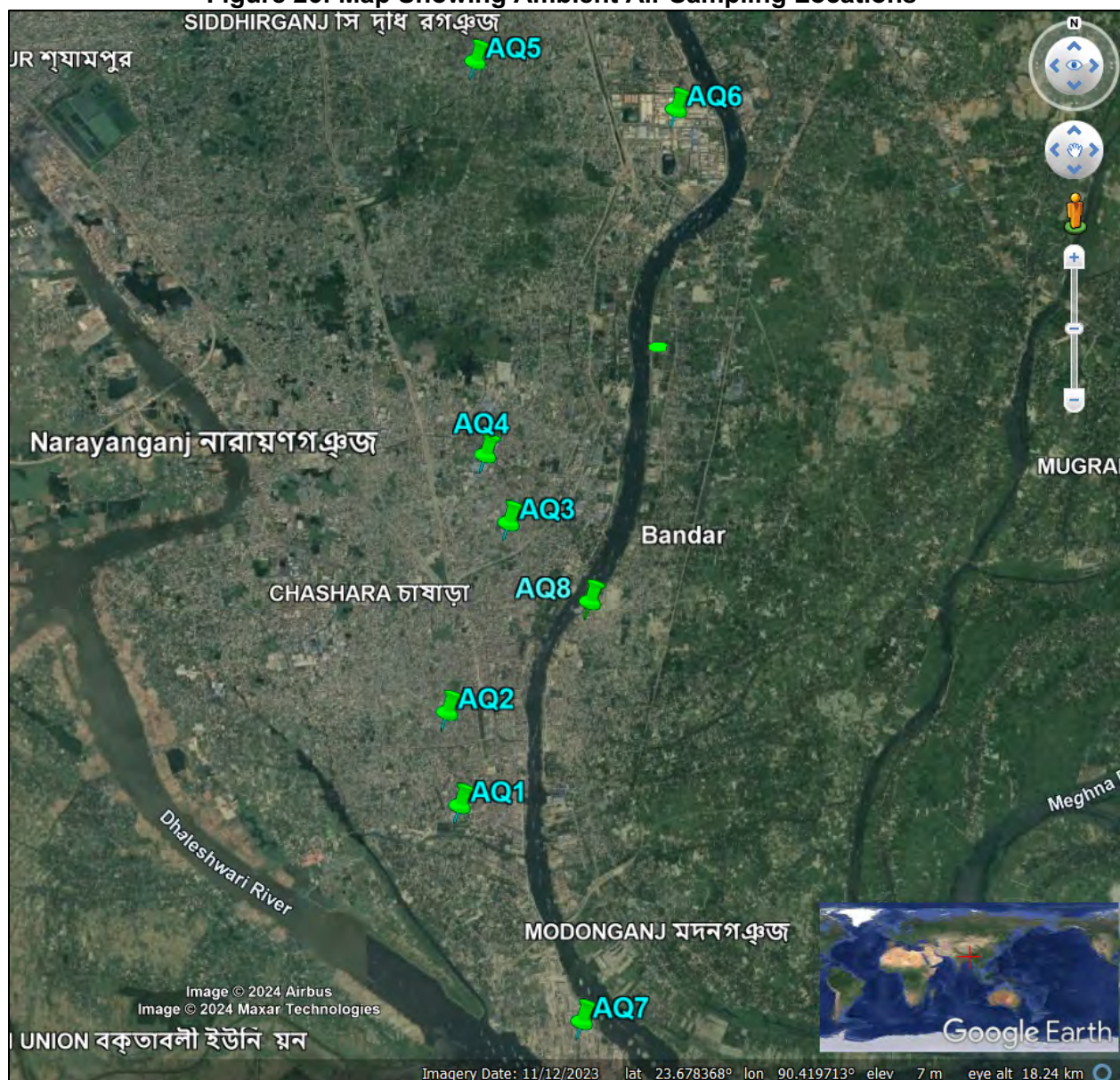


Table 18: Ambient Air Quality Within NCC (Working Day)

| Location | Sampling Date | Ambient Air Pollutants' Concentration in $\mu\text{g}/\text{m}^3$ |                   |                 |                 |       |                 |                | CO<br>$\text{mg}/\text{m}^3$ |
|----------|---------------|-------------------------------------------------------------------|-------------------|-----------------|-----------------|-------|-----------------|----------------|------------------------------|
|          |               | PM <sub>10</sub>                                                  | PM <sub>2.5</sub> | SO <sub>2</sub> | NO <sub>2</sub> | Pb    | NH <sub>3</sub> | O <sub>3</sub> |                              |
| AQ1      | 25.01.2023    | 353.87                                                            | 177.43            | 30.25           | 61.79           | 0.031 | 2.48            | 41.39          | 2.33                         |
| AQ2      | 25.01.2023    | 133.28                                                            | 101.35            | 30.19           | 33.98           | BDL   | 0.00            | 21.71          | 0.15                         |
| AQ3      | 26.01.2023    | 182.85                                                            | 122.97            | 27.68           | 52.24           | 0.070 | 0.00            | 13.02          | 0.20                         |
| AQ4      | -             | -                                                                 | -                 | -               | -               | -     | -               | -              | -                            |
| AQ5      | 01.02.2023    | 108.18                                                            | 68.33             | 14.49           | 22.18           | 0.068 | 0.00            | 42.90          | 0.31                         |
| AQ6      | 01.02.2023    | 190.75                                                            | 98.89             | 105.67          | 75.63           | 0.059 | 6.04            | 29.11          | 1.80                         |
| AQ7      | 02.02.2023    | 205.97                                                            | 94.61             | 43.24           | 47.88           | 0.034 | 6.04            | 29.12          | 1.80                         |
| AQ8      | 02.02.2023    | 93.78                                                             | 59.89             | 16.07           | 19.66           | BDL   | 0.00            | 18.44          | 0.14                         |

| Location                            | Sampling Date | Ambient Air Pollutants' Concentration in µg/m³ |                               |                                  |                                  |                                  |                                  |                   | CO mg/m³                         |
|-------------------------------------|---------------|------------------------------------------------|-------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-------------------|----------------------------------|
|                                     |               | PM <sub>10</sub>                               | PM <sub>2.5</sub>             | SO <sub>2</sub>                  | NO <sub>2</sub>                  | Pb                               | NH3                              | O3                |                                  |
| Durations, hr                       |               | 24                                             | 24                            | 24                               | 24                               | 24                               | 24                               | 8                 | 8                                |
| Air Pollution (Control) Rules, 2022 |               | 150                                            | 65                            | 80                               | 80                               | 0.50                             | 400                              | 100               | 05                               |
| Method of Analysis                  |               | Light Scattering Nephotometer                  | Light Scattering Nephotometer | High Sensitivity Electrochemical | High Sensitivity Electrochemical | High Sensitivity Electrochemical | High Sensitivity Electrochemical | Mixed Metal Oxide | High Sensitivity Electrochemical |

Note: \* Air Pollution (Control) Rules, 2022, Legend: PM<sub>10</sub> -Particulate Matter of a diameter of 10 microns or less. PM<sub>2.5</sub> -Particulate Matter of a diameter of 2.5 microns or less, SO<sub>2</sub> –Sulphur Dioxide; NO<sub>2</sub> –Nitrogen Dioxide; NH<sub>3</sub> (ammonia); O<sub>3</sub> –Ozone; CO –Carbon Monoxide, BDL – Below detection limit

**Table 19: Ambient Air Quality Within NCC (Non-Working Day)**

| Location                            | Sampling Date | Ambient Air Pollutants' Concentration          |                                               |                                             |                                             |                                     |                                             |                                            |                                     |
|-------------------------------------|---------------|------------------------------------------------|-----------------------------------------------|---------------------------------------------|---------------------------------------------|-------------------------------------|---------------------------------------------|--------------------------------------------|-------------------------------------|
|                                     |               | PM <sub>10</sub> '<br>$\mu\text{g}/\text{m}^3$ | PM <sub>2.5</sub><br>$\mu\text{g}/\text{m}^3$ | SO <sub>2</sub><br>$\mu\text{g}/\text{m}^3$ | NO <sub>2</sub><br>$\mu\text{g}/\text{m}^3$ | Pb<br>$\mu\text{g}/\text{m}^3$      | NH <sub>3</sub><br>$\mu\text{g}/\text{m}^3$ | O <sub>3</sub><br>$\mu\text{g}/\text{m}^3$ | CO<br>$\text{mg}/\text{m}^3$        |
| AQ1                                 | 25.01.2023    | 256.59                                         | 159.58                                        | 66.24                                       | 39.65                                       | 0.032                               | 4.39                                        | 38.93                                      | 1.19                                |
| AQ2                                 | 25.01.2023    | 128.72                                         | 96.72                                         | 27.20                                       | 45.67                                       | BDL                                 | 0.00                                        | 14.36                                      | 0.20                                |
| AQ3                                 | 26.01.2023    | 147.53                                         | 106.85                                        | 20.81                                       | 24.15                                       | 0.021                               | 0.00                                        | 51.97                                      | 0.17                                |
| AQ4                                 | -             | -                                              | -                                             | -                                           | -                                           | -                                   | -                                           | -                                          | -                                   |
| AQ5                                 | 01.02.2023    | 113.99                                         | 82.42                                         | 26.67                                       | 13.21                                       | 0.065                               | 0.00                                        | 37.78                                      | 0.18                                |
| AQ6                                 | 01.02.2023    | 226.16                                         | 133.19                                        | 89.03                                       | 73.79                                       | 0.060                               | 5.27                                        | 33.06                                      | 2.03                                |
| AQ7                                 | 02.02.2023    | 335.70                                         | 131.59                                        | 59.84                                       | 66.04                                       | 0.052                               | 4.85                                        | 42.28                                      | 1.61                                |
| AQ8                                 | 02.02.2023    | 116.76                                         | 84.29                                         | 37.99                                       | 26.67                                       | BDL                                 | 0.00                                        | 9.15                                       | 0.21                                |
| Durations, hr                       |               | 24                                             | 24                                            | 24                                          | 24                                          | 24                                  | 24                                          | 8                                          | 8                                   |
| Air Pollution (Control) Rules, 2022 |               | 150                                            | 65                                            | 80                                          | 80                                          | 0.50                                | 400                                         | 100                                        | 05                                  |
| Method of Analysis                  |               | Light Scattering<br>Nephelometer               | Light Scattering<br>Nephelometer              | High Sensitivity<br>Electrochemical         | High Sensitivity<br>Electrochemical         | High Sensitivity<br>Electrochemical | High Sensitivity<br>Electrochemical         | Mixed Metal Oxide                          | High Sensitivity<br>Electrochemical |

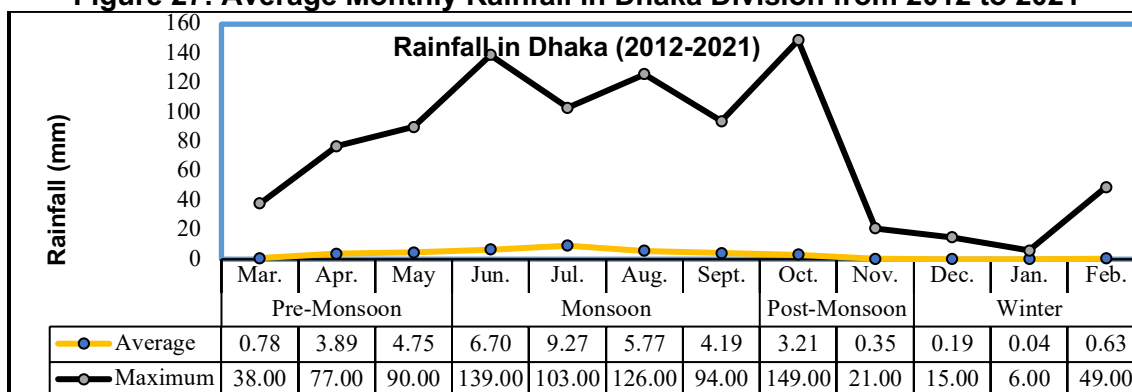
Note: \* Air Pollution (Control) Rules, 2022, Legend: PM<sub>10</sub> -Particulate Matter of a diameter of 10 microns or less. PM<sub>2.5</sub> -Particulate Matter of a diameter of 2.5 microns or less, SO<sub>2</sub> –Sulphur Dioxide; NO<sub>2</sub> –Nitrogen Dioxide; NH<sub>3</sub> (ammonia); O<sub>3</sub> –Ozone; CO –Carbon Monoxide, BDL – Below detection limit

#### 4. Rainfall

79. The rainfall data on daily, monthly and annual total for the 10-years from 2012 to 2022 of Dhaka meteorological station were collected. About 15% of the annual rainfall occurs in the pre-monsoon season. About 80% occur in the wet season and only 5% during the winter months. Monthly highest maximum and average monthly rainfall is illustrated in **Figure 27** below, and the annual total rainfall is illustrated in **Figure 28** below. Long periods of steady rainfall persisting over several days are common during the monsoon, but sometimes, local high intensity rainfall of short

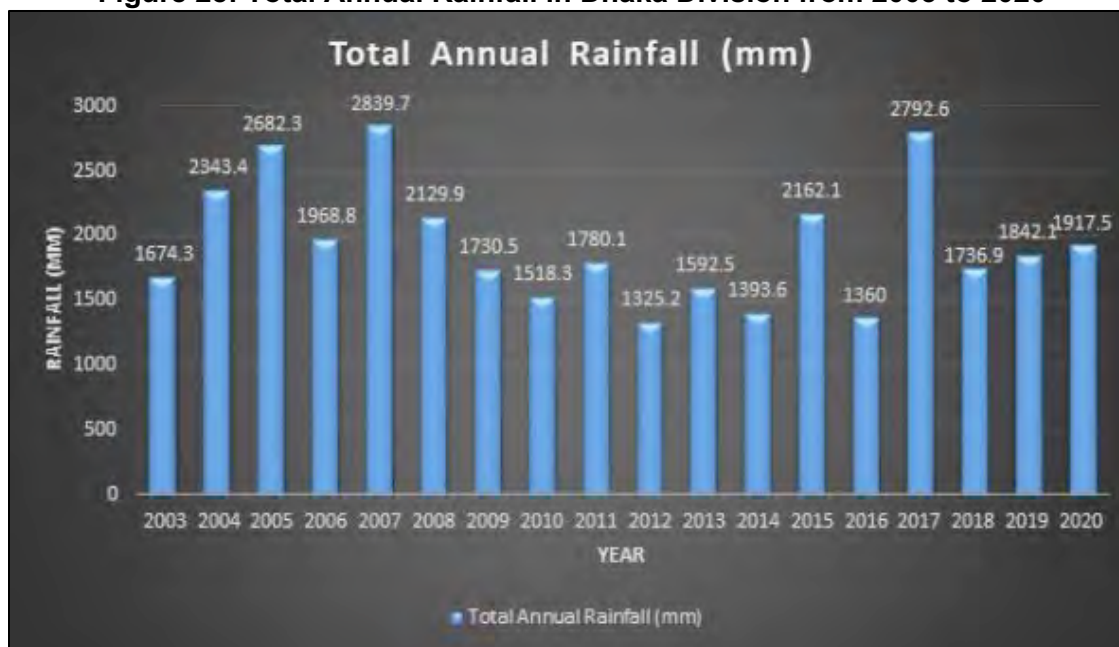
duration is also occurring. About seventy five percent of rainfall over Bangladesh occurs between the months from June to September.

**Figure 27: Average Monthly Rainfall in Dhaka Division from 2012 to 2021**



Source: Dhaka Meteorological Station. Bangladesh Meteorological Department. 2022

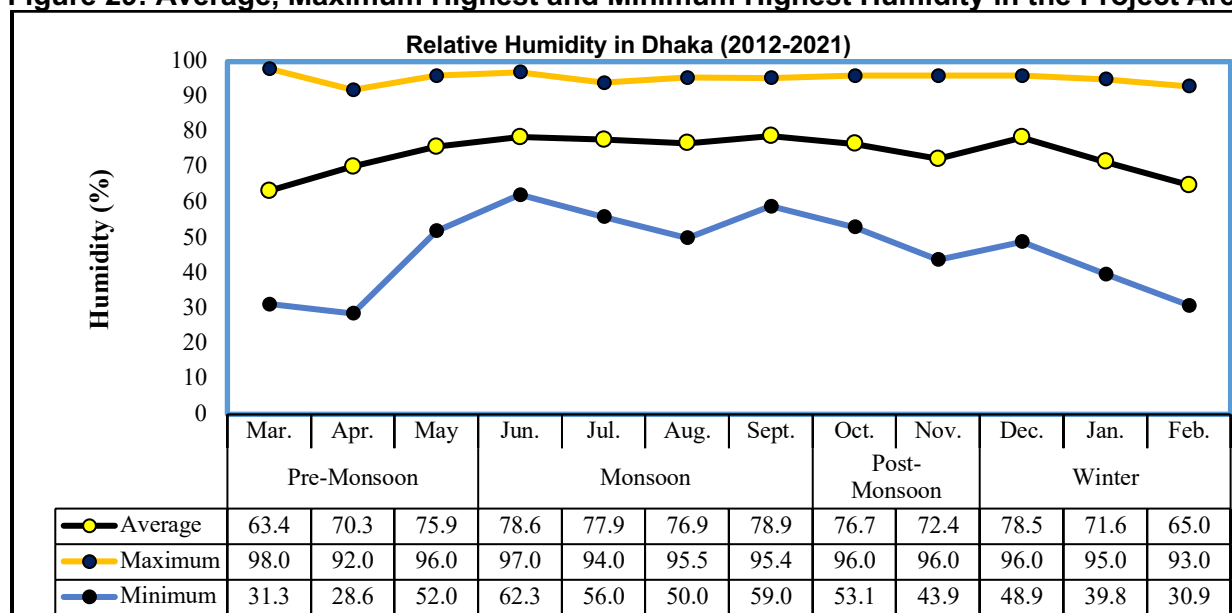
**Figure 28: Total Annual Rainfall in Dhaka Division from 2003 to 2020**



Source: Drainage Masterplan for Narayanganj City Corporation. 2023. Data taken from Bangladesh Meteorological Department.

## 5. Humidity

80. The humidity data on monthly maximum and minimum, monthly and average over the 10 years shows that, 80-85 percent humidity in the hot season is common and the humidity remains high year-round, producing thick fogs in winter in the study area of the project. Based on the collected data, a summary on highest maximum, lowest minimum and average humidity in percentage is given in figure below.

**Figure 29: Average, Maximum Highest and Minimum Highest Humidity in the Project Area**

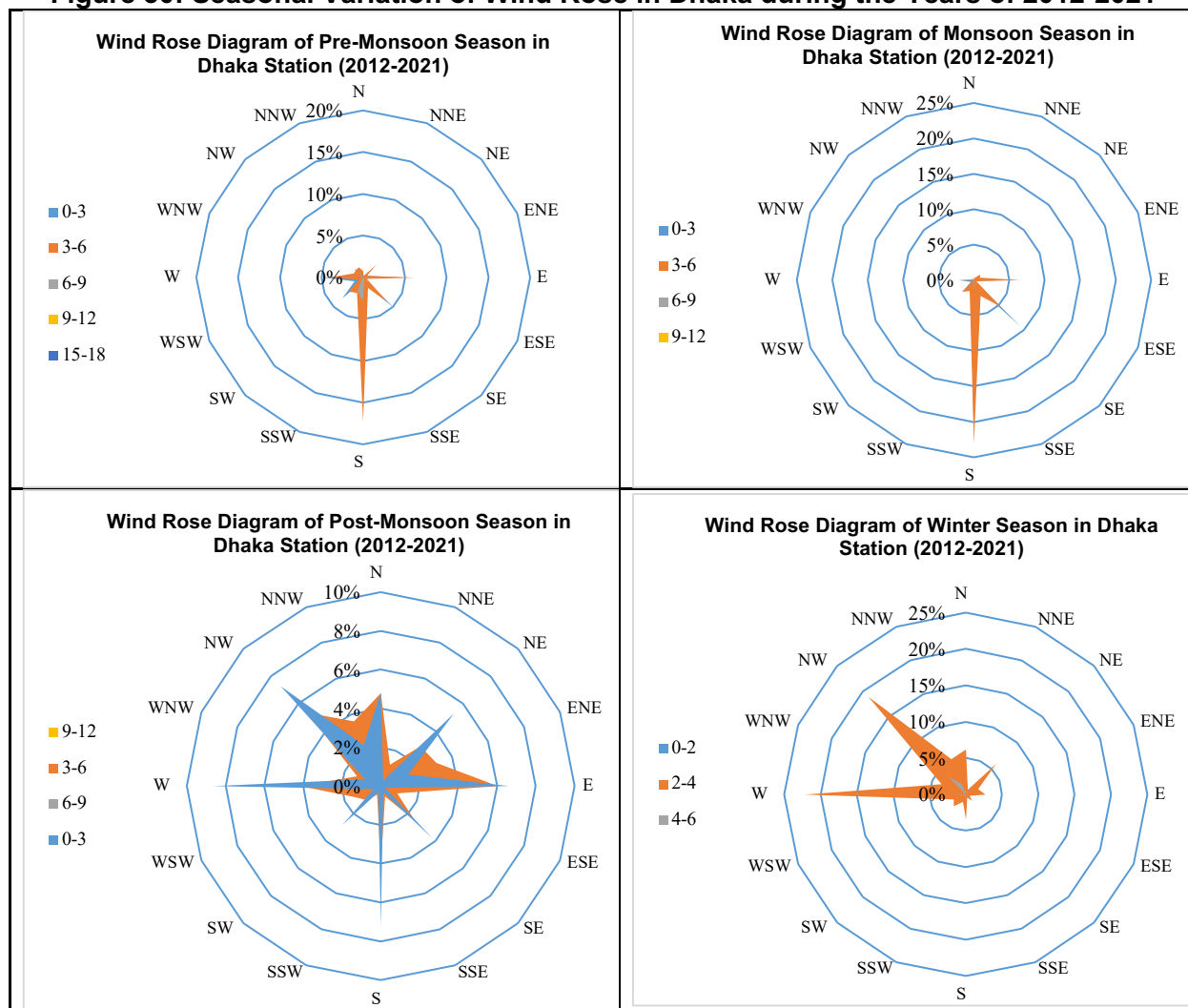
Source: Dhaka Meteorological Station. Bangladesh Meteorological Department. 2022

## 6. Wind

81. The most important and crucial weather aspect may be the wind. Knowing the direction and velocity is crucial because of this. The Wind Rose model, which depicts the project area's predominant wind conditions based on seasonal change, is used to understand wind variables. The wind rose shows how many hours a year the wind blows in the specified direction. The region is predominantly characterized by South, West, West-Southwest, North, and North-West wind flow, according to the wind rise diagrams. The whole wind speed spectrum in a year was dominated by winds of 0 to 18 knots.

82. Due to climatic fluctuations brought on by the monsoons, wind direction fluctuates in the project region. Beginning in the middle of March and lasting until near the end of September is the south-westerly monsoon. Monsoon winds blow continuously from the south from March to October; in January, winds come from the west and northwest. The month of February is uneventful, with gloomy mornings in particular. Figure below shows the seasonal monthly maximum wind speed direction rose plot from 2012 to 2021 duration.

**Figure 30: Seasonal Variation of Wind Rose in Dhaka during the Years of 2012-2021**

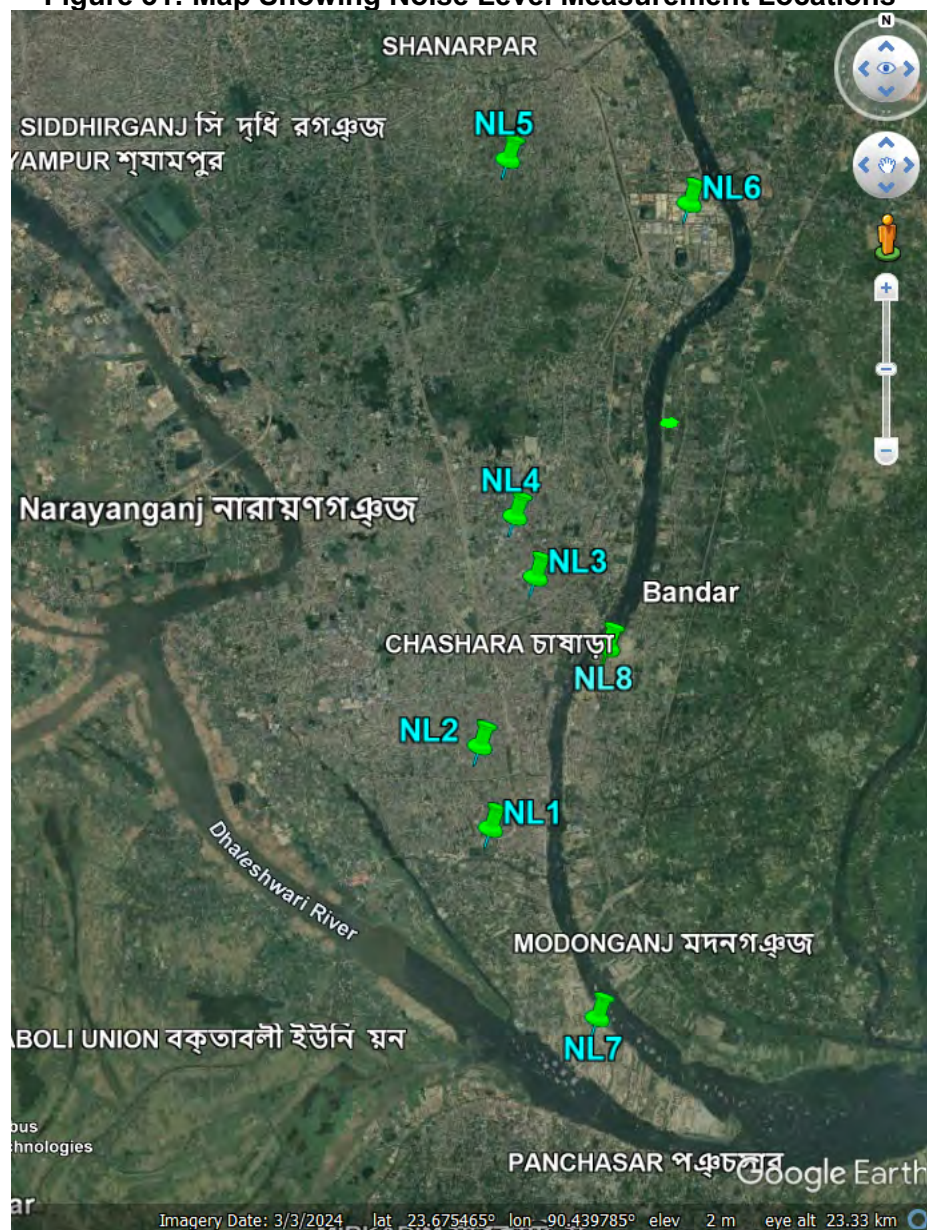


Source: Dhaka Meteorological Station. Bangladesh Meteorological Department. 2022

## F. Acoustic Environment

83. **Ambient Noise Level.** To establish the baseline noise levels in the vicinity of the subproject locations, monitoring of noise levels was carried out during the period 25 January – 4 February 2023. These measurements were taken from various wards of the NCC area and may not be necessarily within the immediate vicinities of the subproject sites. However, with the observed ground conditions, noise level may not deviate significantly from one location to another within the city. Further validation of site-specific baseline noise level will be undertaken prior to construction activities. Assuming these high levels of noise are confirmed during the design phase/pre-construction phase, there is a need for integration of noise protection measures during construction, especially in and around the settlements. The locations of monitoring are in Figure 31 and Table 20 below, and corresponding results are presented in **Table 21** below. Based on results, there is generally a high level of noise for both daytime and nighttime on either working days or non-working days as compared to the standards. Copies of laboratory analysis results are in **Appendix 3**.

Figure 31: Map Showing Noise Level Measurement Locations



**Table 20: Noise Level Measurement Dates and Location Details**

| Location Code           | Location Name                                                      | Sampling Location           | Monitoring date |
|-------------------------|--------------------------------------------------------------------|-----------------------------|-----------------|
| <b>Working Day</b>      |                                                                    |                             |                 |
| NL1                     | Ranada Prasad Saha University, 12 Sahed Bappi Sharoni, Narayanganj | 23°36'5.48"N 90°29'50.01"E  | 25 Jan.2023     |
| NL2                     | Bara Dewbhog, 1 Mobarak Shah Rd, Narayanganj                       | 23°36'41.67"N 90°29'44.81"E | 25 Jan 2023     |
| NL3                     | Shirin Selina Home, Narayanganj                                    | 23°37'55.85"N 90°30'11.56"E | 26 Jan 2023     |
| NL4                     | Fakir Knitwear Ltd., Fakir Rd, Fatullah                            | 23°38'22.57"N 90°30'1.75"E  | 26 Jan 2023     |
| <b>Non- Working Day</b> |                                                                    |                             |                 |
| NL1                     | Ranada Prasad Saha University, 12 Sahed Bappi Sharoni, Narayanganj | 23°36'5.48"N 90°29'50.01"E  | 27 Jan 2023     |
| NL2                     | Bara Dewbhog, 1 Mobarak Shah Rd, Narayanganj                       | 23°36'41.67"N 90°29'44.81"E | 27 Jan 2023     |
| NL3                     | Shirin Selina Home, Narayanganj                                    | 23°37'55.85"N 90°30'11.56"E | 28 Jan 2023     |
| NL4                     | Fakir Knitwear Ltd., Fakir Rd, Fatullah                            | 23°38'22.57"N 90°30'1.75"E  | 28 Jan 2023     |
| <b>Working Day</b>      |                                                                    |                             |                 |
| NL5                     | Chairman Bari, Siddhirganj                                         | 23°40'59.39"N 90°29'58.41"E | 01 Feb 2023     |
| NL6                     | Adamjee EPZ Road, Siddhirganj                                      | 23°40'40.09"N 90°31'25.46"E | 01 Feb 2023     |
| NL7                     | Crown Cement Factory Ltd. Road, Muktarpur, Narayanganj             | 23°34'42.2"N 90°30'41.3"E   | 02 Feb 2023     |
| <b>Non- Working Day</b> |                                                                    |                             |                 |
| NL5                     | Chairman Bari, Siddhirganj                                         | 23°40'59.39"N 90°29'58.41"E | 03 Feb 2023     |
| NL6                     | Adamjee EPZ Road, Siddhirganj                                      | 23°40'40.09"N 90°31'25.46"E | 03 Feb 2023     |
| NL7                     | Crown Cement Factory Ltd. Road, Muktarpur, Narayanganj             | 23°34'42.2"N 90°30'41.3"E   | 04 Feb 2023     |

**Table 21: Primary Baseline Noise Level Measurements Within NCC**

| SL. No                                                     | Ward No | Leqday | Leqnight | Lmax  | Lmin | Standard |           |
|------------------------------------------------------------|---------|--------|----------|-------|------|----------|-----------|
|                                                            |         |        |          |       |      | Day(dB)  | Night(dB) |
| NL1-WD                                                     | Ward-18 | 67.74  | 60.41    | 92.5  | 45.6 | 50       | 40        |
| NL1-NWD                                                    |         | 66.41  | 59.96    | 89.6  | 32.1 |          |           |
| NL2-WD                                                     | Ward-16 | 59.29  | 56.95    | 80.0  | 30.8 | 60       | 50        |
| NL2-NWD                                                    |         | 63.56  | 55.21    | 90.8  | 37.8 |          |           |
| NL3-WD                                                     | Ward-12 | 64.68  | 58.76    | 85.1  | 30.8 | 55       | 45        |
| NL3-NWD                                                    |         | 63.28  | 57.87    | 90.2  | 41.0 |          |           |
| NL5-WD                                                     | Ward-2  | 62.89  | 56.89    | 90.0  | 30.8 | 55       | 45        |
| NL5-NWD                                                    |         | 62.97  | 55.22    | 86.4  | 32.1 |          |           |
| NL6-WD                                                     | Ward-6  | 78.99  | 68.88    | 103.2 | 42.3 | 75       | 70        |
| NL6-NWD                                                    |         | 74.99  | 68.70    | 93.6  | 32.1 |          |           |
| NL7-WD                                                     | -       | 73.39  | 57.16    | 97.9  | 40.8 | 75       | 70        |
| NL7-NWD                                                    |         | 77.78  | 68.93    | 95.9  | 40.8 |          |           |
| Standard (ECR'1997) & Noise Pollution (Control) Rules 2006 |         |        |          |       |      |          |           |
| Silent area                                                |         |        |          |       |      | 50       | 40        |
| Residential area                                           |         |        |          |       |      | 55       | 45        |
| Mixed area                                                 |         |        |          |       |      | 60       | 50        |
| Commercial Area                                            |         |        |          |       |      | 70       | 60        |
| Industrial area                                            |         |        |          |       |      | 75       | 70        |

| SL. No                                  | Ward No | Leqday | Leqnight | Lmax | Lmin | Standard |           |
|-----------------------------------------|---------|--------|----------|------|------|----------|-----------|
|                                         |         |        |          |      |      | Day(dB)  | Night(dB) |
| World Bank/IFC Standard                 |         |        |          |      |      |          |           |
| Residential; Institutional; Educational |         |        |          |      |      | 55       | 45        |
| Industrial                              |         |        |          |      |      | 70       | 70        |

## G. Ecological Environment

### 1. Terrestrial Environment

84. **Flora.** Generally, the terrestrial environment of NCC comprises the different natural and man-made resources. Natural resources include roadside trees and vegetation, homestead trees, woody plants, herbs, shrubs, climbers and other plants on cultivated lands. None of these species is considered endangered or critically endangered or of national significance. Being considered a developed and built-up area with modified urban setting, NCC is mostly surrounded now by a combination of residential, commercial and institutional establishments. There are no natural habitats or forests that will be encroached or affected by the subproject. No protected species per IUCN Red List was observed during field visits within the 100 – 200-meter radius and immediate surroundings of the subproject sites. Table and figure below show the typical flora species found in the NCC area.

**Table 22: Flora Species Found in NCC Area**

| Bangla Name | English Name | Scientific Name                 | Uses       |
|-------------|--------------|---------------------------------|------------|
| Aam         | Mango        | <i>Mangifera indica</i>         | Fruit tree |
| Neem        | Neem         | <i>Azadirachta indica</i>       | Medicinal  |
| Meheguni    | Mahogoni     | <i>Swietenia macrophylla</i>    | Timber     |
| Sojne       |              | <i>Moringa oleifera</i>         | Medicinal  |
| Kathal      | Jacfruit     | <i>Artocarpus heterophyllus</i> | Fruit tree |
| Narikel     | Coconut      | <i>Cocos nucifera</i>           | Fruit tree |
| Taal        | Plum         | <i>Borassus flabellifer</i>     | Fruit tree |
| Jaam        | Black Barry  | <i>Syzygium jambolanum</i>      | Fruit tree |
| Kola        | Banana       | <i>Musa acuminata</i>           | Fruit tree |
| Koroi       |              | <i>Albizia procera</i>          | Medicinal  |

**Figure 32: Typical Vegetations Found at Subproject Sites**



| Parks A and B                                                                      | Park A (For Open Space)                                                             |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|   |   |
| Park C<br>Zone-1                                                                   | Park C<br>Zone -2                                                                   |
|  |  |
| Existing Playground                                                                | Existing Playground                                                                 |

85. **Fauna.** Common animals found in the NCC area are the domesticated animals like dogs and cats. Other species include reptiles such as snake, house lizard, soft-shell, turtle, toad, frog, squirrel, fruit bat, field and house mice, and flying fox. Some of these species also thrive in inland water bodies in the area such as the ponds or canals. There are also some avian species that can be found in the NCC area. The commonly spotted birds include kingfishers, house crow, house sparrow, little fern, etc. but little occurrences. None of these species is considered endangered or critically endangered or of national significance.

## 2. Aquatic Environment

86. The quality of water in the Shitalakhya river that traverses NCC area has continued to deteriorate in the past two decades due to rapid urbanization and poor sewerage and sanitation in the city, including pollution load contribution from upstream municipalities and cities. Nevertheless, monitoring of the quality of this river reveals the presence of dissolved oxygen which may indicate the survival of microscopic aquatic species such as phytoplankton and other species that could adapt to polluted waters. However, no known species of commercial value and appropriate for human consumption has been observed in this river. Based on site visits and consultations with locals, there are no fishing grounds that exist along this river from upstream

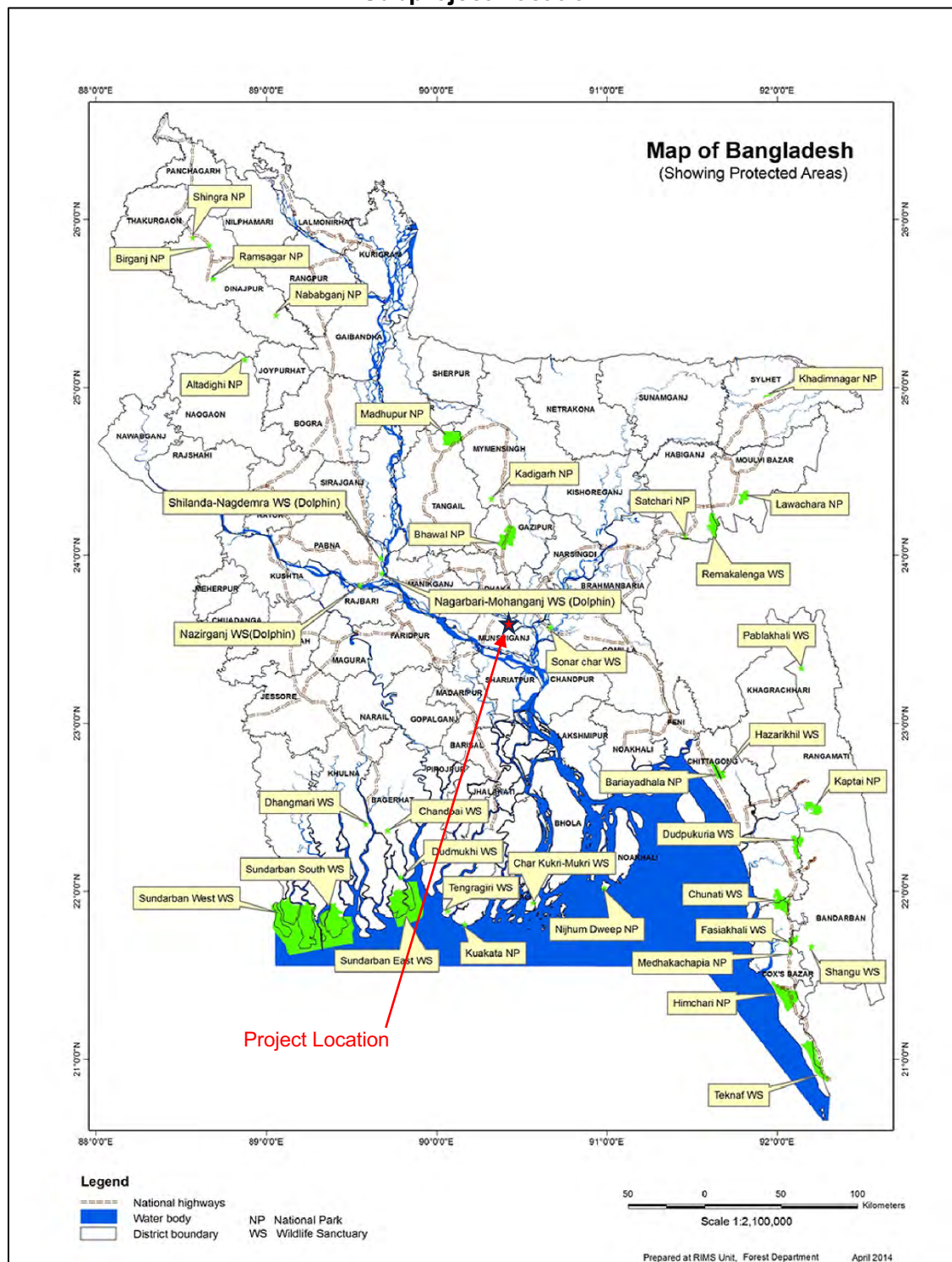
down to the confluence point with Daleshwari river. All along in the past two decades, Shitalakhya river has only been used as a navigational route for industrial, commercial and local ferries.

87. Although Shitalakhya river is not used as a fishing ground, other inland ponds, ditches and swamps in the NCC area are used for fishing or fish production. Fishes include catfishes (magur and shing), major carps (katla, rui, and mrigal), minor carps (puti), and others (tengra, boal, mola, shol). Native waterfowl and migratory birds, freshwater turtles and other reptiles and amphibians depend on these inland water bodies. No species considered endangered or critically endangered or of national significance is present in the area. Most of the waterbodies like the canal and ditches are covered with water hyacinths.

### **3. Protected Areas**

88. There are no protected areas within or around the subproject sites. Per screening conducted, the closest Protected Area is Bhawal National Park which is already about 50 km away. Further research with Bangladesh Forest Department revealed that there is also a wildlife sanctuary (Sonar Char Wildlife Sanctuary) close to NCC, but this is likewise about 50 km away. The following map shows the location of NCC relative to various protected areas in Bangladesh.

**Figure 33: Map Showing Protected Areas of Bangladesh and Their Proximity to Subproject Location<sup>a</sup>**



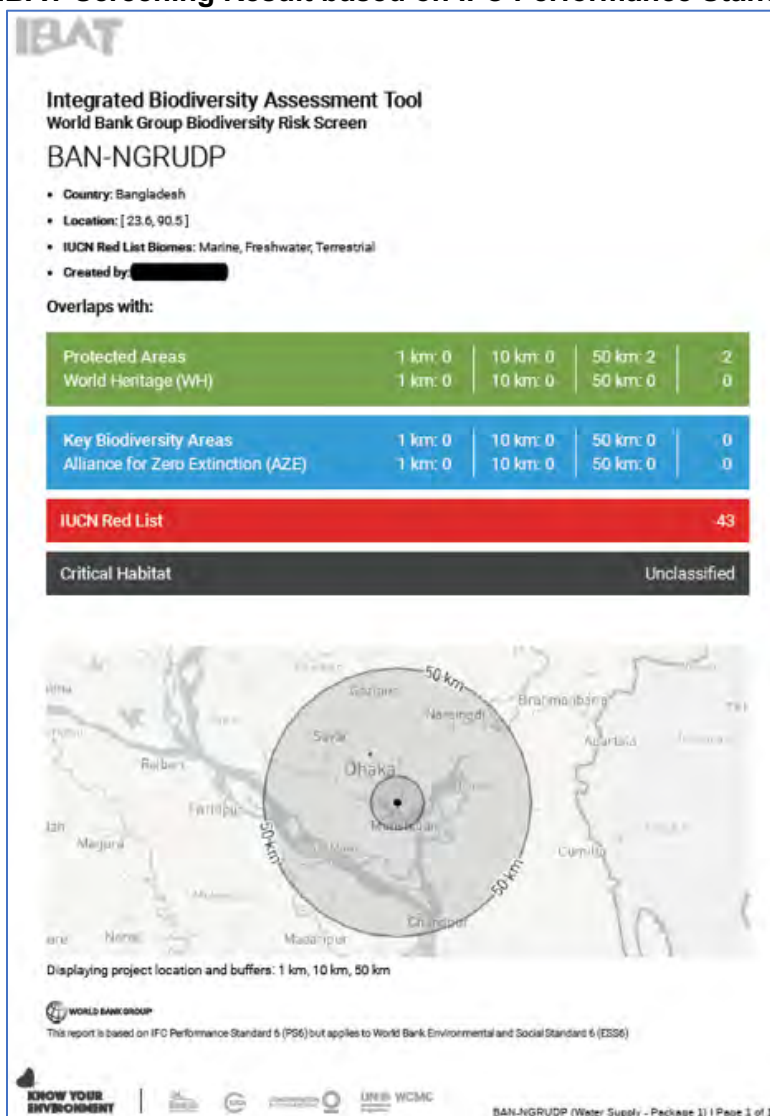
Source: Management Effectiveness Assessment of Protected Areas of Bangladesh. Bangladesh Forest Department. 2016

<sup>a</sup> Disclaimer: Boundaries, colors, denominations or any other information shown on this map do not imply, on the part of ADB, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries, colors, denominations, or information.

#### 4. Critical Habitat

89. Despite being located in a built-up and developed urban area, the subproject sites have been assessed in terms of critical habitat status. A screening using the Integrated Biodiversity Assessment Tool (IBAT) was undertaken to screen and assess potential risks on sensitive areas or critical habitat that may exist around the subproject sites (default area of analysis of 50 km radius). IBAT screening results confirmed that there are no protected areas or key biodiversity areas around the vicinities of the project sites, and the closest protected area is Bhawal National Park which about 50km away. The IBAT screening also shows biodiversity species potentially to occur within the default 50-km radius. However, the subproject sites are already a built-up area and the probability of these species being found at the sites is very low. Site visits have also been conducted which confirmed that none of these species are found or sighted at the subproject sites. Snapshot of the summary of the screening results is shown in figure below and the full set of results is in **Appendix 4**.

**Figure 34: IBAT Screening Result based on IFC Performance Standard 6 (PS6)**



## H. Socio-Economic Environment

90. The NCC is a city corporation in the Narayanganj Sadar Upazila of Narayanganj District. The NCC was established through the merging of three former independent municipalities, namely: Narayanganj Pourashava, Siddhirganj Pourashava, and Kadam Rasul Pourashava. As a result, NCC is composed of 27 wards from these three municipalities or pourashavas. Relative to the Shitalakhya river, Narayanganj and Siddhirganj Pourashavas are situated on the western side while Kadam Rasul Pourashava on the eastern side. As a result, NCC jurisdiction now covers areas on both sides of Shitalakhya river.

### 1. Demography

91. NCC's total area is 72.43 square kilometers with estimated population of 3,074,038.<sup>25</sup> Numbers of households are 53,948 in Siddhirganj Pourashava, 66,045 in Narayanganj Pourashava, and 39,302 in Kadam Rashul Pourashava. The average household size is higher in Narayanganj Pourashava than the other two pourashavas. Likewise, the sex ratio was higher in Narayanganj Pourashava than the other two pourashavas. Literacy rate of women was lower than of men in all three pourashavas. (footnote 18). Table below provides a summary of the demographic data in NCC.

**Table 23: Household Data, Literacy Rate and Sex Ratio in the Study Area (NCC)**

| Ward/Union             | Total Households | Average Household Size | Literacy Rate % |        | Sex Ratio |
|------------------------|------------------|------------------------|-----------------|--------|-----------|
|                        |                  |                        | Male            | Female |           |
| Siddhirganj Pourashava |                  |                        |                 |        |           |
| Ward-01                | 8,623            | 4.2                    | 73.7            | 69.1   | 108       |
| Ward-02                | 5,739            | 4.4                    | 69.9            | 65.6   | 106       |
| Ward-03                | 8,044            | 4.4                    | 78.6            | 74.0   | 111       |
| Ward-04                | 5,655            | 4.1                    | 64.3            | 61.0   | 110       |
| Ward-05                | 4,278            | 4.3                    | 66.2            | 61.3   | 103       |
| Ward-06                | 5,845            | 4.3                    | 55.7            | 49.9   | 105       |
| Ward-07                | 5,196            | 4.2                    | 69.7            | 66.0   | 104       |
| Ward-08                | 10,568           | 4.0                    | 68.6            | 60.4   | 108       |
| Ward-09                | 6,342            | 4.3                    | 68.0            | 61.6   | 104       |
|                        | 60,290           |                        |                 |        |           |
| Narayanganj Pourashava |                  |                        |                 |        |           |
| Ward-01                | 5,094            | 4.0                    | 74.8            | 63.9   | 109       |
| Ward-02                | 5,843            | 4.2                    | 70.6            | 62.9   | 109       |
| Ward-03                | 9,565            | 4.2                    | 74.1            | 66.4   | 108       |
| Ward-04                | 10,004           | 4.6                    | 76.4            | 69.7   | 108       |
| Ward-05                | 6,552            | 4.5                    | 77.7            | 72.3   | 109       |
| Ward-06                | 5,453            | 4.4                    | 72.3            | 65.9   | 112       |
| Ward-07                | 7,920            | 4.4                    | 68.2            | 63.9   | 105       |
| Ward-08                | 8,198            | 4.3                    | 70.3            | 65.3   | 104       |
| Ward-09                | 7,416            | 4.1                    | 60.2            | 57.6   | 105       |
|                        | 66,045           |                        |                 |        |           |
| Kadam Rasul Pourashava |                  |                        |                 |        |           |
| Ward-01                | 2,723            | 4.3                    | 58.8            | 53.4   | 102       |
| Ward-02                | 4,109            | 4.3                    | 60.2            | 55.8   | 98        |
| Ward-03                | 5,039            | 4.3                    | 67.0            | 59.9   | 105       |
| Ward-04                | 7,289            | 4.2                    | 70.7            | 65.6   | 104       |
| Ward-05                | 7,114            | 4.3                    | 57.5            | 51.9   | 104       |

<sup>25</sup> Adjusted Population 2011. Statistical Yearbook of Bangladesh 2022. Bangladesh Bureau of Statistics. June 2023.

| Ward/Union   | Total Households | Average Household Size | Literacy Rate % |        | Sex Ratio |
|--------------|------------------|------------------------|-----------------|--------|-----------|
|              |                  |                        | Male            | Female |           |
| Ward-06      | 5,028            | 4.0                    | 65.1            | 60.7   | 98        |
| Ward-07      | 2,954            | 4.3                    | 64.6            | 59.2   | 104       |
| Ward-08      | 1,655            | 4.1                    | 71.6            | 61.3   | 103       |
| Ward-09      | 3,391            | 4.0                    | 70.3            | 62.0   | 108       |
|              | 39,302           |                        |                 |        |           |
| <b>Total</b> | <b>165,637</b>   |                        |                 |        |           |

Source: Population & Housing Census-2011. Community Report: Narayanganj

## 2. Economy and Employment

92. NCC has a hoary history of development of industries and commerce of the country. Industrial use occupies 5.04% of the areas mostly along Shitalakhya river. Very limited agricultural practice can be seen in Bandar and Shiddirganj region. Narayanganj has become the center of apparel industry in Bangladesh. There was once a time that all sorts of products such as jute and oilseed were exported through the Narayanganj port. The first ever jute mill of the country Bawa Jute Mills, is situated in the Kadam Rasul Pourashava. Sonargaon, which is an important place in Narayanganj, was also very popular for garment products. Narayanganj, as a prime river port, became the center for collection and export of various raw materials due to its direct linkages with Chittagong. Thus, Narayanganj was declared as a port under Sea Custom Act, 1878.

93. Economic growth of NCC has been increasing tremendously for the last decade. A large increase of population became apparent mainly due to in-migration brought about by employment opportunities provided by the expansion of commercial and industrial activities in the NCC and Narayanganj Sadar Upazila. There are many industries and manufacturing companies established in and around the NCC and Narayanganj Sadar Upazila. These companies include textile mills, garments and other type of industries. Most of the employed population of the project area are involved in the services sector, then followed by employment in the industrial and agricultural sectors. Employment in agriculture includes direct farming, sharecropping, and agricultural labor. Table below shows the distribution of employment in NCC.

**Table 24: Occupation of People in the Study Area (NCC)**

| Ward/Union                    | Population Aged 7+ years and Above Not Attending School but Employed |        | Field activities/ Occupation |        |          |        |         |        |
|-------------------------------|----------------------------------------------------------------------|--------|------------------------------|--------|----------|--------|---------|--------|
|                               |                                                                      |        | Agriculture                  |        | Industry |        | Service |        |
|                               | Male                                                                 | Female | Male                         | Female | Male     | Female | Male    | Female |
| <b>Siddhirganj Pourashava</b> |                                                                      |        |                              |        |          |        |         |        |
| Ward-01                       | 1,663                                                                | 612    | 115                          | 4      | 344      | 329    | 1,204   | 279    |
| Ward-02                       | 1,372                                                                | 331    | 75                           | 6      | 387      | 160    | 910     | 165    |
| Ward-03                       | 1,573                                                                | 606    | 51                           | 3      | 493      | 312    | 1,029   | 291    |
| Ward-04                       | 1,868                                                                | 792    | 96                           | 7      | 700      | 393    | 1,072   | 392    |
| Ward-05                       | 1,198                                                                | 475    | 21                           | 4      | 283      | 213    | 894     | 258    |
| Ward-06                       | 2,491                                                                | 702    | 14                           | 2      | 572      | 446    | 1,905   | 254    |
| Ward-07                       | 1,137                                                                | 386    | 58                           | -      | 413      | 302    | 666     | 84     |
| Ward-08                       | 2,745                                                                | 1,464  | 59                           | 7      | 916      | 689    | 1,770   | 768    |
| Ward-09                       | 1,869                                                                | 563    | 322                          | 11     | 311      | 131    | 1,236   | 421    |
|                               | 15,916                                                               | 5,931  | 811                          | 44     | 4,419    | 2,975  | 10,686  | 2,912  |
| <b>Narayanganj Pourashava</b> |                                                                      |        |                              |        |          |        |         |        |
| Ward-01                       | 1,037                                                                | 702    | 9                            | -      | 537      | 511    | 491     | 191    |

| Ward/Union                    | Population Aged 7+ years and Above Not Attending School but Employed |               | Field activities/ Occupation |            |               |              |               |              |
|-------------------------------|----------------------------------------------------------------------|---------------|------------------------------|------------|---------------|--------------|---------------|--------------|
|                               |                                                                      |               | Agriculture                  |            | Industry      |              | Service       |              |
|                               | Male                                                                 | Female        | Male                         | Female     | Male          | Female       | Male          | Female       |
| Ward-02                       | 1,312                                                                | 630           | 19                           | -          | 315           | 228          | 978           | 402          |
| Ward-03                       | 2,339                                                                | 1,474         | 25                           | 6          | 1,057         | 682          | 1,257         | 786          |
| Ward-04                       | 1,794                                                                | 1,131         | 57                           | 17         | 724           | 415          | 1,013         | 699          |
| Ward-05                       | 1,589                                                                | 406           | 94                           | 15         | 763           | 192          | 732           | 199          |
| Ward-06                       | 1,771                                                                | 860           | 13                           | 6          | 1,287         | 585          | 471           | 269          |
| Ward-07                       | 2,121                                                                | 698           | 16                           | -          | 730           | 259          | 1,375         | 439          |
| Ward-08                       | 1,992                                                                | 547           | 19                           | -          | 530           | 159          | 1,443         | 388          |
| Ward-09                       | 3,216                                                                | 979           | 39                           | 5          | 1,188         | 360          | 1,989         | 614          |
|                               | 17,171                                                               | 7,427         | 291                          | 49         | 7,131         | 3,391        | 9,749         | 3,987        |
| <b>Kadam Rasul Pourashava</b> |                                                                      |               |                              |            |               |              |               |              |
| Ward-01                       | 922                                                                  | 232           | 161                          | 76         | 337           | 83           | 424           | 73           |
| Ward-02                       | 1,261                                                                | 307           | 59                           | 8          | 501           | 182          | 701           | 117          |
| Ward-03                       | 1,683                                                                | 576           | 27                           | 10         | 553           | 332          | 1,103         | 234          |
| Ward-04                       | 2,212                                                                | 699           | 23                           | 3          | 322           | 236          | 1,867         | 460          |
| Ward-05                       | 2,859                                                                | 1,146         | 100                          | 36         | 1,029         | 547          | 1,730         | 563          |
| Ward-06                       | 1,117                                                                | 354           | 43                           | 4          | 263           | 201          | 811           | 149          |
| Ward-07                       | 635                                                                  | 304           | 78                           | 2          | 355           | 243          | 202           | 59           |
| Ward-08                       | 374                                                                  | 183           | 30                           | 2          | 161           | 120          | 183           | 61           |
| Ward-09                       | 843                                                                  | 290           | 51                           | 5          | 378           | 209          | 414           | 76           |
|                               | 11,906                                                               | 4,091         | 572                          | 146        | 3,899         | 2,153        | 7,435         | 1,792        |
| <b>Total</b>                  | <b>44,993</b>                                                        | <b>17,449</b> | <b>1,674</b>                 | <b>239</b> | <b>15,449</b> | <b>8,519</b> | <b>27,870</b> | <b>8,691</b> |

Source: Population & Housing Census-2011, Community Report: Narayanganj

### 3. Educational Institution

94. As per survey under the Narayanganj City Corporation Area Action Plan, there are 977 educational structures in NCC area among which, 54.48% pucca (permanent solid), 31.63% semi-pucca and 16.45% katcha or kutchra (made of various light temporary materials such as timber/ wood/ corrugated iron sheet) structures. A total of 153 primary schools, 79 kindergartens and 30 informal and non-formal educational institutes, 83 high schools, 31 colleges, 15 madrasas and 2 universities are located in NCC area.

### 4. Religion

95. Majority of the population of all Wards are Muslims followed by Hindus, Christians, Buddhists, and others. Table below shows a complete picture of the population by religious affiliation in NCC.

**Table 25: Population by Religion in the Study Area**

| Ward                          | Total Population | Muslim | %  | Hindu | % | Christian | % | Buddhist | % | Others | % |
|-------------------------------|------------------|--------|----|-------|---|-----------|---|----------|---|--------|---|
| <b>Siddhirganj Pourashava</b> |                  |        |    |       |   |           |   |          |   |        |   |
| Ward-01                       | 36,592           | 36,080 | 99 | 482   | 1 | 11        | 0 | 12       | 0 | 7      | 0 |
| Ward-02                       | 25,585           | 25,184 | 98 | 399   | 2 | 2         | 0 | -        | - | -      | - |
| Ward-03                       | 35,947           | 35,422 | 99 | 471   | 1 | 30        | 0 | 21       | 0 | 3      | 0 |
| Ward-04                       | 23,385           | 23,042 | 99 | 303   | 1 | 21        | 0 | 1        | 0 | 18     | 0 |
| Ward-05                       | 18,421           | 17,902 | 97 | 503   | 3 | 15        | 1 | 1        | 0 | -      | - |
| Ward-06                       | 25,100           | 24,898 | 99 | 199   | 1 | 3         | 0 | -        | - | -      | - |

| Ward                          | Total Population | Muslim         | %  | Hindu         | %  | Christian  | % | Buddhist   | % | Others    | % |
|-------------------------------|------------------|----------------|----|---------------|----|------------|---|------------|---|-----------|---|
| Ward-07                       | 21,888           | 21,706         | 99 | 139           | 1  | 11         | 1 | 28         | 0 | 4         | 0 |
| Ward-08                       | 42,704           | 41,629         | 98 | 1,050         | 3  | 17         | 0 | 8          | 0 | -         | - |
| Ward-09                       | 27,138           | 26,931         | 99 | 205           | 1  | 2          | 0 | -          | - | -         | - |
|                               | 256,760          | 252,794        |    | 3,751         |    | 112        |   | 71         |   | 32        |   |
| <b>Narayanganj Pourashava</b> |                  |                |    |               |    |            |   |            |   |           |   |
| Ward-01                       | 20,489           | 17,736         | 87 | 2,731         | 13 | 17         | 0 | 5          | 0 | -         | - |
| Ward-02                       | 24,550           | 22,252         | 91 | 2,273         | 9  | 18         | 0 | 7          | 0 | -         | - |
| Ward-03                       | 40,187           | 36,758         | 91 | 3,397         | 8  | 26         | 0 | 6          | 0 | -         | - |
| Ward-04                       | 47,079           | 38,786         | 82 | 8,231         | 17 | 43         | 0 | 16         | 0 | 3         | 0 |
| Ward-05                       | 29,431           | 16,371         | 56 | 13,057        | 44 | 3          | 0 | -          | - | -         | - |
| Ward-06                       | 24,096           | 13,399         | 56 | 10,687        | 44 | 9          | 0 | 1          | 0 | -         | - |
| Ward-07                       | 34,496           | 33,498         | 97 | 976           | 3  | 10         | 0 | 5          | 0 | 7         | 0 |
| Ward-08                       | 35,518           | 33,812         | 95 | 1,705         | 5  | 1          | - | -          | - | -         | - |
| Ward-09                       | 30,484           | 25,511         | 84 | 4,960         | 16 | 7          | 0 | 6          | 0 | -         | - |
|                               | 286,330          | 238,123        |    | 48,017        |    | 134        |   | 46         |   | 10        |   |
| <b>Kadam Rasul Pourashava</b> |                  |                |    |               |    |            |   |            |   |           |   |
| Ward-01                       | 11,822           | 11,628         | 98 | 190           | 2  | -          | - | 4          | 0 | -         | - |
| Ward-02                       | 17,694           | 17,556         | 99 | 137           | 1  | -          | - | -          | - | 1         | 0 |
| Ward-03                       | 22,176           | 20,053         | 90 | 2,111         | 10 | -          | - | 11         | 0 | 1         | 0 |
| Ward-04                       | 30,728           | 26,432         | 86 | 4,282         | 14 | 8          | 0 | 6          | 0 | -         | - |
| Ward-05                       | 30,572           | 28,708         | 93 | 1,856         | 6  | 7          | 0 | -          | - | 1         | - |
| Ward-06                       | 20,308           | 20,077         | 99 | 230           | 1  | 1          | 0 | -          | - | -         | - |
| Ward-07                       | 12,636           | 12,305         | 97 | 325           | 3  | 6          | 0 | -          | - | -         | - |
| Ward-08                       | 6,812            | 6,158          | 90 | 645           | 9  | 1          | 0 | -          | - | 8         | 0 |
| Ward-09                       | 13,543           | 13,256         | 98 | 238           | 2  | 46         | 0 | 3          | 0 | -         | - |
|                               | 166,291          | 156,173        |    | 10,014        |    | 69         |   | 24         |   | 11        |   |
| <b>Total</b>                  | <b>709,381</b>   | <b>647,090</b> |    | <b>61,782</b> |    | <b>315</b> |   | <b>141</b> |   | <b>53</b> |   |

Source: Population & Housing Census-2011, Community Report: Narayanganj

## 5. Health Facilities and Other Community Facilities

96. There are health facilities in NCC, which include 37 different types of government and private hospitals and 44 clinics. There is only one tertiary hospital in NCC area which is the Narayanganj 200 Beds Hospital in Khanpur.

97. There are community facilities in NCC which include mosques, temples, churches, community centers, auditoriums, mazars, etc. There are a total of 524 mosques, 61 temples, 5 pagodas and 1 church in the study area. In addition, there are cinema halls, stadium, swimming pools, theme parks, etc. that serve as recreational facilities for city dwellers.

## 6. Settlement and Housing

98. The predominant housing structures in the study area are in Ward-08 in Kadam Rasul Pourashava, with 59.7% made of katcha or kutcha (made of various light temporary materials such as timber/ wood/ corrugated iron sheet); in Ward-05 of Kadam Rasul Pourashava, with 59.8% made of semi-pucca; in Ward-04 of Narayanganj Pourashava, with 66.1% made of pucca; and in Ward-03 of Narayanganj Pourashava, with 6.7% made of *Jhupri* (hut). Table below shows the summary of the type of structures of dwellings in NCC.

**Table 26: Type of Structures of Houses in the Study Area (NCC)**

| Ward/ Union                                           | Number of Households | Percentage of Type of Housing Structures |            |        |        |
|-------------------------------------------------------|----------------------|------------------------------------------|------------|--------|--------|
|                                                       |                      | Pucca                                    | Semi pucca | Kutcha | Jhupri |
| Siddhirganj Pourashava (Municipality)                 |                      |                                          |            |        |        |
| Ward-01                                               | 8,623                | 39                                       | 47         | 14     | 0      |
| Ward-02                                               | 5,739                | 38                                       | 40         | 22     | 0      |
| Ward-03                                               | 8,044                | 39                                       | 56         | 6      | -      |
| Ward-04                                               | 5,655                | 30                                       | 45         | 23     | 2      |
| Ward-05                                               | 4,278                | 34                                       | 36         | 30     | -      |
| Ward-06                                               | 5,845                | 21                                       | 27         | 51     | 1      |
| Ward-07                                               | 5,196                | 23                                       | 53         | 21     | 2      |
| Ward-08                                               | 10,568               | 16                                       | 40         | 44     | 0      |
| Ward-09                                               | 6,342                | 27                                       | 29         | 44     | 0      |
|                                                       | 60,290               |                                          |            |        |        |
| Narayanganj Pourashava (Municipality)                 |                      |                                          |            |        |        |
| Ward-01                                               | 5,094                | 26                                       | 38         | 37     | 0      |
| Ward-02                                               | 5,843                | 32                                       | 40         | 27     | 1      |
| Ward-03                                               | 9,565                | 47                                       | 33         | 13     | 7      |
| Ward-04                                               | 10,004               | 66                                       | 26         | 8      | 1      |
| Ward-05                                               | 6,552                | 59                                       | 34         | 7      | 1      |
| Ward-06                                               | 5,453                | 64                                       | 25         | 7      | 4      |
| Ward-07                                               | 7,920                | 50                                       | 36         | 9      | 6      |
| Ward-08                                               | 8,198                | 55                                       | 34         | 11     | 1      |
| Ward-09                                               | 7,416                | 35                                       | 39         | 24     | 2      |
|                                                       | 66,045               |                                          |            |        |        |
| Kadam Rasul Pourashava (Municipality)(Bandar Upazila) |                      |                                          |            |        |        |
| Ward-01                                               | 2,723                | 14                                       | 38         | 47     | 1      |
| Ward-02                                               | 4,109                | 21                                       | 30         | 47     | 2      |
| Ward-03                                               | 5,039                | 21                                       | 47         | 32     | 0      |
| Ward-04                                               | 7,289                | 38                                       | 44         | 17     | 0      |
| Ward-05                                               | 7,114                | 18                                       | 60         | 22     | 1      |
| Ward-06                                               | 5,028                | 20                                       | 44         | 36     | 0      |
| Ward-07                                               | 2,954                | 14                                       | 49         | 35     | 2      |
| Ward-08                                               | 1,655                | 8                                        | 32         | 60     | 0      |
| Ward-09                                               | 3,391                | 11                                       | 35         | 54     | -      |
|                                                       | 39,302               |                                          |            |        |        |
| Total                                                 | 165,637              |                                          |            |        |        |

Source: Population & Housing Census-2011, Community Report: Narayanganj

## 7. Water Supply and Electricity

99. The sources of drinking water supply in NCC include piped/tap water and tube wells. Table below shows the data as to the sources of drinking water in the different wards of the three pourashavas of NCC. It can be gleaned that a large number of households of NCC area uses tube wells because these do not have access to piped water supply.

100. As of 2011, ward-wise electricity connection is in the range of 96.2 – 99.7%. Table below also shows the extent of access to electricity in the different wards of NCC.

**Table 27: Drinking Water Sources and Electricity Facilities in Study Area (NCC)**

| Ward / Union           | Number of Households | Source of Drinking Water in (%) |           |       | Electricity Connection in (%) |
|------------------------|----------------------|---------------------------------|-----------|-------|-------------------------------|
|                        |                      | Tap water                       | Tube well | Other |                               |
| Siddhirganj Pourashava |                      |                                 |           |       |                               |
| Ward-01                | 8,623                | 90.6                            | 8.5       | 0.9   | 99.5                          |
| Ward-02                | 5,739                | 91.7                            | 7.3       | 0.9   | 99.3                          |
| Ward-03                | 8,044                | 6.1                             | 93.5      | 3.5   | 99.4                          |
| Ward-04                | 5,655                | 2.2                             | 94.3      | 0.1   | 96.9                          |
| Ward-05                | 4,278                | 5.8                             | 32.2      | 62.1  | 99.1                          |
| Ward-06                | 5,845                | 38.6                            | 35.8      | 25.6  | 99.5                          |
| Ward-07                | 5,196                | 22.1                            | 75.4      | 2.5   | 98.3                          |
| Ward-08                | 10,568               | 46.7                            | 51.1      | 2.1   | 98.9                          |
| Ward-09                | 6,342                | 5.0                             | 90.3      | 4.8   | 97.6                          |
|                        | 60,290               |                                 |           |       |                               |
| Narayanganj Pourashava |                      |                                 |           |       |                               |
| Ward-01                | 5,094                | 87.6                            | 12.0      | 0.4   | 99.2                          |
| Ward-02                | 5,843                | 90.4                            | 9.3       | 0.3   | 99.6                          |
| Ward-03                | 9,565                | 69.8                            | 28.8      | 1.3   | 96.2                          |
| Ward-04                | 10,004               | 71.3                            | 26.2      | 2.5   | 99.4                          |
| Ward-05                | 6,552                | 85.7                            | 12.5      | 1.8   | 99.7                          |
| Ward-06                | 5,453                | 73.9                            | 22.4      | 3.7   | 99.4                          |
| Ward-07                | 7,920                | 57.5                            | 40.7      | 1.8   | 99.3                          |
| Ward-08                | 8,198                | 63.7                            | 35.6      | 0.8   | 99.7                          |
| Ward-09                | 7,416                | 42.5                            | 52.9      | 4.6   | 99.0                          |
|                        | 66,045               |                                 |           |       |                               |
| Kadam Rasul Pourashava |                      |                                 |           |       |                               |
| Ward-01                | 2,723                | 9.5                             | 88.2      | 2.3   | 98.7                          |
| Ward-02                | 4,109                | 53.7                            | 45.0      | 1.4   | 96.3                          |
| Ward-03                | 5,039                | 60.5                            | 37.2      | 2.2   | 99.0                          |
| Ward-04                | 7,289                | 56.2                            | 41.6      | 2.2   | 98.8                          |
| Ward-05                | 7,114                | 19.3                            | 79.1      | 1.6   | 98.5                          |
| Ward-06                | 5,028                | 77.3                            | 19.5      | 3.2   | 98.1                          |
| Ward-07                | 2,954                | 39.7                            | 52.9      | 7.4   | 98.7                          |
| Ward-08                | 1,655                | 11.6                            | 86.7      | 1.7   | 97.6                          |
| Ward-09                | 3,391                | 0.1                             | 82.3      | 17.6  | 97.7                          |
|                        | 39,302               |                                 |           |       |                               |
| Total                  | 165,637              |                                 |           |       |                               |

Source: Population &amp; Housing Census-2011, Community Report: Narayanganj

## 8. Sanitation

101. Generally, most of the households in NCC have sanitary facilities. The difference only lies on whether these are water-sealed or not. However, in poorer areas in the outskirts of the city, there is evidence that significant number of households do not have access to hygienic latrine facilities. Accordingly, and with the lesser population density in these areas, some residents defecate in open spaces. Table below shows the result of a census on sanitation facilities in NCC.

**Table 28: Sanitation Coverage in Study Area (NCC)**

| Ward/Union             | Number of Households | Percentage of Toilet Facility |                          |              |      |
|------------------------|----------------------|-------------------------------|--------------------------|--------------|------|
|                        |                      | Sanitary (with water-seal)    | Sanitary (no water-seal) | Non-Sanitary | None |
| Siddhirganj Pourashava |                      |                               |                          |              |      |
| Ward-01                | 8,623                | 62.9                          | 35.8                     | 1.3          | 0.0  |
| Ward-02                | 5,739                | 45.2                          | 47.2                     | 7.6          | 0.1  |
| Ward-03                | 8,044                | 65.6                          | 33.0                     | 1.4          | 0.0  |
| Ward-04                | 5,655                | 34.1                          | 57.4                     | 8.2          | 0.3  |
| Ward-05                | 4,278                | 26.3                          | 49.1                     | 24.5         | 0.0  |
| Ward-06                | 5,845                | 27.2                          | 62.2                     | 10.6         | 0.1  |
| Ward-07                | 5,196                | 36.2                          | 58.7                     | 5.0          | 0.1  |
| Ward-08                | 10,568               | 12.9                          | 53.0                     | 33.9         | 0.3  |
| Ward-09                | 6,342                | 21.8                          | 62.4                     | 15.7         | 0.1  |
|                        | 60,290               |                               |                          |              |      |
| Narayanganj Pourashava |                      |                               |                          |              |      |
| Ward-01                | 5,094                | 31.7                          | 61.3                     | 6.8          | 0.2  |
| Ward-02                | 5,843                | 38.7                          | 53.5                     | 7.8          | 0.0  |
| Ward-03                | 9,565                | 52.4                          | 36.3                     | 11.0         | 0.3  |
| Ward-04                | 10,004               | 57.5                          | 38.0                     | 4.0          | 0.5  |
| Ward-05                | 6,552                | 40.8                          | 55.7                     | 3.5          | 0.0  |
| Ward-06                | 5,453                | 54.4                          | 39.6                     | 5.6          | 0.3  |
| Ward-07                | 7,920                | 63.2                          | 28.0                     | 5.2          | 3.6  |
| Ward-08                | 8,198                | 72.1                          | 22.7                     | 5.2          | 0.0  |
| Ward-09                | 7,416                | 6.8                           | 81.2                     | 10.2         | 1.8  |
|                        | 66,045               |                               |                          |              |      |
| Kadam Rasul Pourashava |                      |                               |                          |              |      |
| Ward-01                | 2,723                | 34.3                          | 57.2                     | 7.5          | 1.0  |
| Ward-02                | 4,109                | 18.0                          | 39.6                     | 41.3         | 1.2  |
| Ward-03                | 5,039                | 29.9                          | 33.1                     | 36.9         | 0.2  |
| Ward-04                | 7,289                | 47.8                          | 39.8                     | 12.4         | 0.0  |
| Ward-05                | 7,114                | 33.2                          | 61.8                     | 4.5          | 0.5  |
| Ward-06                | 5,028                | 38.0                          | 52.9                     | 8.7          | 0.4  |
| Ward-07                | 2,954                | 32.2                          | 44.2                     | 22.7         | 0.9  |
| Ward-08                | 1,655                | 13.2                          | 67.9                     | 18.7         | 0.2  |
| Ward-09                | 3,391                | 5.0                           | 75.5                     | 19.2         | 0.4  |
|                        | 39,302               |                               |                          |              |      |
| Total                  | 165,637              |                               |                          |              |      |

Source: Population & Housing Census-2011, Community Report: Narayanganj

102. Currently, NCC does not have an organized sewerage and sewage collection and treatment. Inspection of the alignments of drains and canals suggests that both grey water (kitchen water, domestic cleaning and washing) and black water (sewage overflows from septic tanks or direct discharge of sewage) from these establishments are discharged into stormwater drainage channels. The drainage system conveys combined storm water and discharges from both residential and commercial/industrial establishments in NCC. This scenario brings about a drainage system being the conduit of wastewaters with varying pollution load.

## 9. Solid Waste Management

103. An estimation of solid waste generation by NCC in 2017 reveals around 898.60 tons per day, with characteristics of which is about 70% organic, 14% textiles, and 11% plastics. There is no efficient and organized waste segregation in the city. Some recyclable materials are collected

by private collectors for recycling by their own or exported to retailers or to neighboring countries.<sup>26</sup> Generally, wastes are collected, transported and disposed in existing dumpsites. However, coverage of this waste management is limited due to lack of resources, both manpower and equipment. Thus, much of the solid wastes are dumped in many open spaces and low-lying areas, resulting to clogging of natural and man-made drains in many part of the city. Dumpsites are also operating beyond capacity. The Jalkuri Sanitary Landfill Site that is planned to be used by the project (NGRUDP) is likewise approaching its full capacity. Nevertheless, even with limited resources, NCC continuous to adopt responsible management of wastes through the promotion of the 3-R (reduce, reuse, recycle) strategy of the national government.

104. The Jalkuri Sanitary Landfill Site is one landfill that is currently being utilized by NCC. This disposal site is about 4.5 km away from the NCC city center. Wide and 2-way city roads connect the city to this disposal site. There is no potential access issue exists to this disposal site. Figures below shows an aerial view of this site.

**Figure 35: Aerial Visual of Jalkuri Sanitary Landfill Site**



## 10. Roads and Transport

105. According to Narayanganj City Corporation Action Area Plan, 2016, the total road length in NCC area is about 609 km, of which katcha road is 211 km, semi-pucca road is 82 km and

<sup>26</sup> Feasibility Study on Solid Waste Management System For Narayanganj City. JICA. June 2019.

pucca road is 316 km. NCC is connected with Dhaka through three roads, meter-gauge rail line, and rivers (through Buriganga and Shitalakhya rivers).

## I. Physical Cultural Resources

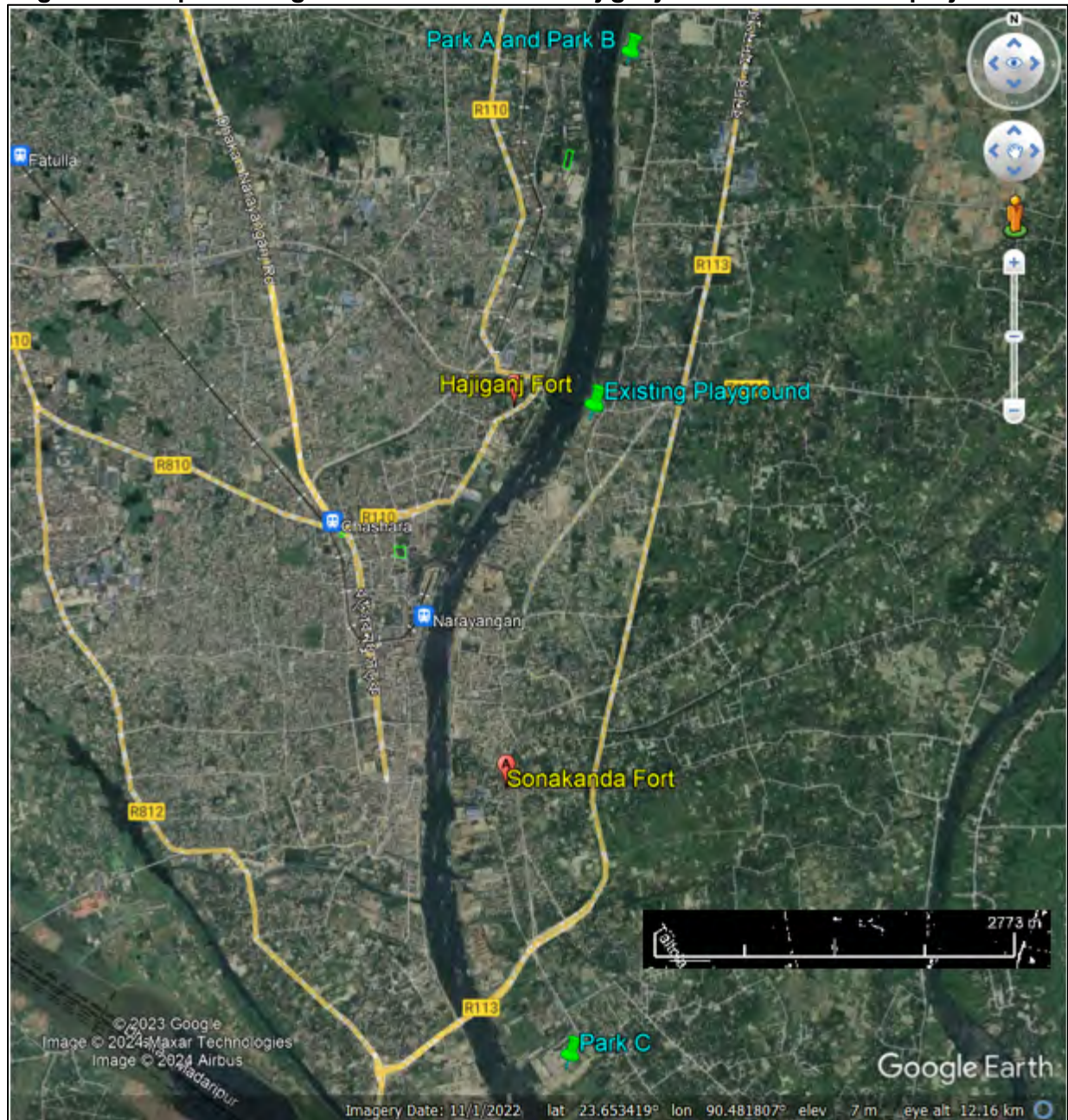
106. Narayanganj has historical importance for its relics of settlements of 12 Bhuiyan such as the Hajiganj Fort or Khizpur and Sonakanda Fort. These two forts are considered as protected monuments and are under the management of the Department of Archaeology. Protection and management of these heritage sites are covered under the Antiquities Act, 1968 and Antiquities Preservation Rules, 1986. These Act and Rules prohibit the destruction or damage to antiquities in the country, which include the Hajiganj Fort and Sonakanda Fort. While these prohibitions and restrictions pertain to activities within the boundaries of the heritage sites, there are no explicit rules pertaining to development activities outside the boundaries of said sites. However, as a precautionary measure, it is important for the subproject to inform the Department of Archaeology of the excavation activities it will undertake along the roads near these two heritage sites, including the chance finds protocol that will be adopted during construction activities. Figure below show ground level photos of these two heritage structures.

**Figure 36: Photos of Widely Known Heritage Structures in Narayanganj**



107. On site assessment specific to Hajiganj Fort and Sonakanda Fort was undertaken. Hajiganj Fort is nearest to the existing playground which is about 500m away and are on opposite sides of Shitalakhya River. Sonakanda Fort is nearest to Park C which is about 3km away. See figure below for the map showing these locations.

**Figure 37: Map Showing Sonakanda Fort and Hajiganj Fort Relative to Subproject Sites**



108. In addition, there are 524 mosques, 61 temples, 5 pagodas and 1 church in the NCC area. None of these PCRs is adjacent the subproject sites.

## V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

### A. Introduction

109. Environmental impact assessment is the systematic identification and evaluation of the potential impacts (effects) of proposed projects, plans, programs, or legislative actions relative to the physical, chemical, biological, cultural, and socioeconomic components of the total environment. The primary purpose of this assessment process is to encourage the consideration of the environmental issues in planning and decision making and to ultimately arrive at actions that are more environmentally compatible.<sup>27</sup>

110. Impact assessment must take account of the nature, scale and duration of effects on the environment, whether such effects are positive (beneficial) or negative (detrimental). It is also imperative that each issue/impact is assessed according to the project stages from planning, through construction and operation to the decommissioning phase. Where necessary, the proposal for mitigation or optimization of an impact is noted. The environmental impact assessment is focused on the following phases of the project namely: (i) pre-construction; (ii) construction phase; and (ii) operation phase. As the subproject entails development of urban facility infrastructures, which will be permanent, decommissioning is not applicable to this specific subproject.

111. The subproject area will require site preparation. Environmental clearance from the DOE to start the construction works is also necessary. The proposed major activities will involve earth filling and site preparation, construction of labor camps, transportation of machinery and ancillaries, storage of equipment and materials for construction, erection of all equipment and machineries, etc. The subproject activities will have diversified impacts on the environment and socio-economic conditions of the local people. However, the potential impacts from the proposed activities, are mostly temporary in nature and limited to pre-construction and construction period. Few potential impacts may continue until the operation phase.

### B. Impact Assessment

#### 1. Methodology

112. Potential environmental and social impacts were identified on the basis of the review and analysis of the primary and secondary data or information and stakeholder consultations, and several field visits to the sites. In order to sketch out the potential impacts posed by the subproject interventions, it was necessary to single out every activity under the subproject; thereafter a detail understanding of the existing environmental and socio-economic settings of the subproject area was made. The significance of potential impacts was assessed using the criteria and methodology given below.

113. **Impact Magnitude.** Interventions associated with this subproject involves traditional construction activities at the work sites. Allied works include land development, backfilling and landscaping. Depending on the types of activities, potential impacts of the subproject has been categorized as major, moderate, minor or negligible based on consideration of the parameters such as: (i) duration of the impact; (ii) spatial extent of the impact; (iii) reversibility; (iv) likelihood; and (v) legal standards and established professional criteria. These magnitude categories are defined in the below Table.

---

<sup>27</sup> Environmental Impact Assessment by Larry W. Canter. McGraw-Hill Publications. 1996

**Table 29: Parameters for Determining Magnitude**

| <b>Parameter</b>                                      | <b>Major</b>                                                                                         | <b>Medium/Moderate</b>                                                                                                  | <b>Minor</b>                                                                | <b>Negligible</b>                                                                                 |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Duration of potential impact                          | Long term (more than 15 years)                                                                       | Medium Term Lifespan of the project (5 to 15 years)                                                                     | Limited to construction period                                              | Temporary with no detectable potential impact                                                     |
| Spatial extent of the potential impact                | Widespread far beyond project boundaries                                                             | Beyond immediate Project components, site boundaries or local area                                                      | Within project boundary                                                     | Specific location within project component or site boundaries with no detectable potential impact |
| Reversibility of potential impacts                    | Potential impact is effectively permanent, requiring considerable intervention to return to baseline | Baseline requires a year or so with some interventions to return to baseline                                            | Baseline returns naturally or with limited intervention within a few months | Baseline remains constant                                                                         |
| Legal standards and established professional criteria | Breaches national standards and or international guidelines/obligations                              | Complies with limits given in national standards but breaches international lender guidelines in one or more parameters | Meets minimum national standard limits or international guidelines          | Not applicable                                                                                    |
| Likelihood of potential impacts occurring             | Occurs under typical operating or construction conditions (Certain)                                  | Occurs under worst case (negative impact) or best case (positive impact) operating conditions (Likely)                  | Occurs under abnormal, exceptional or emergency conditions (occasional)     | Unlikely to occur                                                                                 |

114. **Sensitivity of Receptor.** The sensitivity of a receptor has been determined based on review of the population (including proximity/numbers/vulnerability) and presence of features on the site or the surrounding area. Each detailed assessment has defined sensitivity in relation to the topic. Criteria for determining receptor sensitivity of the subproject's potential impacts are outlined in the following Table.

**Table 30: Criteria for Determining Sensitivity**

| <b>Sensitivity Determination</b> | <b>Definition</b>                                                                                                  |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------|
| Very Severe                      | Vulnerable receptor with little or no capacity to absorb proposed changes                                          |
| Severe                           | Vulnerable receptor with little or no capacity to absorb proposed changes or limited opportunities for mitigation. |
| Mild                             | Vulnerable receptor with some capacity to absorb proposed changes or moderate opportunities for mitigation         |
| Low                              | Vulnerable receptor with good capacity to absorb proposed changes or/and good opportunities for mitigation         |

115. **Assigning Significance.** Following the determination of impact magnitude and sensitivity of the receiving environment or potential receptors, the significance of each potential impact has been established using the impact significance matrix shown below in the table.

**Table 31: Significance of Impact Criteria**

| Magnitude of Potential Impact | Sensitivity of Receptors |            |            |            |
|-------------------------------|--------------------------|------------|------------|------------|
|                               | Very Severe              | Severe     | Mild       | Low        |
| Major                         | Critical                 | High       | Moderate   | Negligible |
| Medium                        | High                     | High       | Moderate   | Negligible |
| Minor                         | Moderate                 | Moderate   | Low        | Negligible |
| Negligible                    | Negligible               | Negligible | Negligible | Negligible |

116. The above methodology is also used to assess the residual impact after all the mitigation measures proposed have been applied. Normally, when the significance of residual impact is rated as either low or negligible, it means the mitigation measures are effective to address the impacts. However, when the significance of residual impact results to a rating in the range of moderate to high or critical, it means the mitigation measures are not effective enough to address the issues. In this case, either change in design or compensatory/offset measure is necessary.

## 2. Summary of Impacts

117. The subproject's potential impacts on the key environmental parameters have been assessed and their significance determined using the methodology described above. A summary of the potential impacts of the project on the key environmental parameters and significance of these impacts are presented in the following Table.

**Table 32: Summary of the Potential Impacts of the Project**

| Potential Impacts                             | Duration of Impact | Spatial Extent | Reversible or not | Likelihood | Magnitude | Sensitivity | Significance Prior to Mitigation | Significance after Mitigation |
|-----------------------------------------------|--------------------|----------------|-------------------|------------|-----------|-------------|----------------------------------|-------------------------------|
| <b>Design/Pre-Construction Phase</b>          |                    |                |                   |            |           |             |                                  |                               |
| Land Development and Stabilization            | Short term         | Local          | Yes               | Certain    | Medium    | Mild        | Moderate                         | Negligible                    |
| Natural Hazards                               | Long term          | Local          | No                | Certain    | Medium    | Mild        | Moderate                         | Negligible                    |
| Design Consideration for Pollution Prevention | Long term          | Local          | No                | Certain    | Medium    | Mild        | Moderate                         | Negligible                    |
| Disruption of existing utilities and services | Short term         | Local          | Yes               | Certain    | Medium    | Mild        | Moderate                         | Negligible                    |
| Removal of Trees                              | Long term          | Local          | Yes               | Unlikely   | Minor     | Mild        | Low                              | Negligible                    |
| Consents, Permits, NOCs, Clearances etc.      | Short term         | Local          | Yes               | Certain    | Medium    | Mild        | Moderate                         | Negligible                    |
| DB Contractor Mobilization                    | Short term         | Local          | Yes               | Likely     | Medium    | Mild        | Moderate                         | Negligible                    |
| Construction camps / workers' accommodation   | Short term         | Local          | Yes               | Likely     | Medium    | Mild        | Moderate                         | Negligible                    |
| Updating of IEE and Preparation of SEMP       | Short term         | Local          | Yes               | Likely     | Medium    | Mild        | Moderate                         | Negligible                    |
| Community awareness                           | Short term         | Local          | Yes               | Likely     | Medium    | Mild        | Moderate                         | Negligible                    |
| EMP Implementation Training                   | Short term         | Local          | Yes               | Certain    | Medium    | Mild        | Moderate                         | Negligible                    |
| <b>Construction Phase</b>                     |                    |                |                   |            |           |             |                                  |                               |
| Sources of Materials                          | Short term         | Local          | Yes               | Certain    | Medium    | Mild        | Moderate                         | Negligible                    |
| Site Clearance and Land Preparation           | Short term         | Local          | Yes               | Certain    | Medium    | Mild        | Moderate                         | Negligible                    |
| Impact to Topography and Aesthetics           | Short term         | Local          | Yes               | Certain    | Medium    | Mild        | Moderate                         | Negligible                    |
| Impact to Surface Water                       | Short term         | Local          | Yes               | Certain    | Medium    | Mild        | Moderate                         | Negligible                    |
| Impact to Groundwater Quality                 | Short term         | Local          | Yes               | Certain    | Medium    | Mild        | Moderate                         | Negligible                    |
| Impact to Ambient Air Quality                 | Short term         | Local          | Yes               | Certain    | Medium    | Mild        | Moderate                         | Negligible                    |

| Potential Impacts                                                 | Duration of Impact | Spatial Extent                | Reversible or not | Likelihood | Magnitude | Sensitivity | Significance Prior to Mitigation | Significance after Mitigation |
|-------------------------------------------------------------------|--------------------|-------------------------------|-------------------|------------|-----------|-------------|----------------------------------|-------------------------------|
| Impact to Noise                                                   | Short term         | Local                         | Yes               | Likely     | Medium    | Mild        | Moderate                         | Negligible                    |
| Impact to Underground PCRs (Relics)                               | Long term          | Global (due to potential OUV) | Yes               | Likely     | Medium    | Mild        | Moderate                         | Negligible                    |
| Impact to Community Health and Safety                             | Short term         | Local                         | Yes               | Certain    | Medium    | Mild        | Moderate                         | Negligible                    |
| Impact to Occupational Health and Safety                          | Short term         | Local                         | Yes               | Certain    | Medium    | Mild        | Moderate                         | Negligible                    |
| Impact on Local Festivals and Cultural Practices                  | Short term         | Local                         | Yes               | Likely     | Medium    | Mild        | Moderate                         | Negligible                    |
| Impact to Terrestrial Flora and Fauna Resources                   | Short term         | Local                         | Yes               | Occasional | Medium    | Mild        | Moderate                         | Negligible                    |
| Impact o Socio-economic Resources                                 | Short term         | Local                         | Yes               | Certain    | Medium    | Mild        | Moderate                         | Negligible                    |
| Impact on Employment                                              | Short term         | Local                         | Yes               | Certain    | Minor     | Mild        | Positive                         | Positive                      |
| Post-construction Waste Management, Disposal and Site Restoration | Short term         | Local                         | Yes               | Certain    | Medium    | Mild        | Moderate                         | Negligible                    |
| <b>Operation and Maintenance Phase</b>                            |                    |                               |                   |            |           |             |                                  |                               |
| Impact to Community Health and Safety                             | Short term         | Local                         | Yes               | Likely     | Medium    | Mild        | Moderate                         | Negligible                    |
| Impact due to Pollution                                           | Short term         | Local                         | Yes               | Likely     | Medium    | Mild        | Moderate                         | Negligible                    |

### C. Anticipated Impacts and Mitigation Measures during Detailed Design and Pre-Construction Phases

118. Detailed design of the subproject has afforded the opportunity to minimize many potential adverse environmental impacts through the appropriate lay-outing within the given area, and structural design ensuring integrity of all infrastructures that will be built and compliance with relevant design standards.

#### 1. Design Consideration for Land/Site Development

119. **Impact.** The locations of the subproject are adjacent the embankment of Shitalakhya river. Any construction activities may cause siltation or pollution of Shitalakhya river. During construction and operation phases, there may also be that risk of landslide towards the river. Any collapse in this area will potentially wipe out or damage portions of the sites.

120. In particular, the area of the proposed public space and the southern section of Park A are still low lying requiring significant amount of filling materials to elevate them to the level of the rest of the park. See figure below. Further, stabilizing these reclaimed areas will require proper construction methodology to ensure they are compacted to soil strength and stability appropriate for the infrastructure that will be built on site.

**Figure 38: Low Lying Areas Requiring Filling Materials and Stabilization**



121. **Mitigation.** During the detailed design phase, DB Contractor will need to comply with the following:

- (i) Determine the actual volume of filling materials required for these low-lying areas to be elevated;
- (ii) Determine the appropriate filling materials to be used ensure land will be stable to withstand any infrastructure development;
- (iii) Ensure to source filling materials from legitimate and duly permitted suppliers of such materials;
- (iv) In coordination with BIWTA, prepare a Method Statement for Site/Land Development specific for these sites. The plan should include specific methodologies or techniques that will ensure no siltation occurs during earth filling works. For example, embankment protection infrastructures should be constructed first to separate the low-lying areas from Shitalakhya river. Only after this

embankment protection is constructed that earth filling on the low-lying area should start; and

- (v) Submit the Method Statement for land/site development and preparation works to PMU through MDSC for approval. No site preparation or quasi-reclamation works shall be undertaken until the method statement is approved. This method statement should be able to provide the specific methodologies that the DB Contractor will use to ensure environmentally sound execution of the subproject. It should include the following:
  - a. Sequence of activities to be undertaken in order to landfill or elevate the low-lying areas to the desired level;
  - b. Volume of landfilling or reclaim materials required;
  - c. Source/s of landfill materials (need to ensure these are government-approved);
  - d. Transport of landfill materials to the site;
  - e. Compaction method, techniques and load-bearing capacity requirements;
  - f. Stormwater and sediment flow control measures at the site;
  - g. Slope protection measures (at the Shitalakhya river sides of the parks);
  - h. Schedule of implementation of land development activities;
  - i. Drawings or sketches of the planned land development; and
  - j. Drawings or sketches showing hauling routes for landfill materials, temporary staging areas, and other facilities needed for the land development or landfilling works.

## 2. Natural Hazards

122. **Impact.** The seismicity map of Bangladesh shows that Narayanganj lies in Zone-2 which shows intermediate level of seismic activity (see Figure 19 in Chapter IV hereof). While the subproject area did not experience significant seismic events in years, there is a likelihood that the site will be impacted by one. Apart from this potential seismic event, other extreme natural events such as unprecedented flooding could also potentially disturb the land within the NCC area. All these events cause damage to any infrastructures that will be built over the lands, including land subsidence or landslides in areas bordering water bodies like the subproject sites.

123. **Mitigation.** Mitigation measures include the following:

- (i) Ensure the stability of the land even during seismic or flooding events need to be included as part of the land development and preparation at the site. The structural designs of the infrastructure components, such as the community center building, shall comply with the Bangladesh National Building Code to ensure the structures can withstand earthquakes and climate-induced events in the future;
- (ii) Use of construction materials that could withstand potential stresses during extreme events, temperatures, pressures, etc.; and
- (iii) Prior to any construction activities, ensure that the embankment works currently being done by the BIWTA is completed. Once these embankment protection works are completed, the subproject needs to resurvey the site to ensure the intended designs per initially determined footprints for the parks improvement are still valid.

### 3. Design Consideration for Pollution Prevention

124. **Impact.** The subproject will include toilet facilities improvement and rehabilitation of the parks and public spaces. During the operation phase of the project, these toilet facilities will be a source of potential pollution to water bodies such as the Shitalakhya river and the immediate environment. During operation phase, indiscriminate disposal of solid wastes may occur, and this will potentially cause land pollution and degradation of visual aesthetics in the area.

125. **Mitigation.** The design of toilet facilities will follow internationally accepted standards, such as the inclusion of two-chambered septic tank for each toilet. The design will adhere to environmental engineering design principles to ensure that the effluent complies with the government standards. With regard to solid waste management, the design of the park will include installation of waste bins at strategic locations of the and will ensure to follow guidelines per relevant national and local solid waste management rules and regulations.

### 4. Disruption to Public Utilities

126. **Impacts.** There are several access roads (for either vehicles or pedestrians) surrounding the different sites. Along these paths are electrical posts and cables. There may also be underground cables or pipelines within and around the sites that could be damaged during the construction phase. Damaging any of these public utilities will interrupt services to consumers. The levels of potential impacts arising from disruption damage to public utilities are summarized in following Table.

**Table 33: Potential Impacts of Disruption to Public Utilities**

| Disrupted or Damaged Utility                  | Potential Impacts                    |
|-----------------------------------------------|--------------------------------------|
| Electricity Posts and Cables <sup>a</sup>     | Interruption of electric supply      |
|                                               | Personal injury due to electrocution |
|                                               | Cost of Repair/Delay to Works        |
| Water Pipelines <sup>b</sup>                  | Interruption of water supply         |
|                                               | Cost of Repair/Delay to Works        |
| Telephone and/or Internet Cables <sup>c</sup> | Interruption of communication system |
|                                               | Cost of Repair/Delay to Works        |

<sup>a</sup> Owned by Bangladesh Power Development Board

<sup>b</sup> Owned by NCC

<sup>c</sup> Various telecom companies in Bangladesh, depending on location

127. Field visits reveal the existence of electrical posts and cable within and around the different sites. A small number of electric or telephone poles may need to be shifted but disruption of services should otherwise be minimal.

128. **Mitigation Measures.** Recorded drawings of underground utility services are not always accurate, and the contractor shall accurately locate all services, by trial pits, if necessary, before work commences in any given area. Nevertheless, accidents will occur where small diameter water pipelines and low voltage power cables are unrecorded or where an excavator operator carelessly swings an extended boom into overhead cables. All such incidents shall be reported to the engineer, and the contractor shall be responsible for the expeditious repair of accidental damage.

129. Damage to any utility at a defined site shall be made good to the satisfaction of the responsible agency at the contractor's cost. Damage to utilities not defined prior to construction, despite the contractor having undertaken all reasonable liaisons with the responsible agencies,

shall not be the responsibility of the contractor. It shall be the responsibility of NCC to ensure the utilities agencies respond in time to the contractor's requests for information.

130. Contractors shall liaise with each of the agencies responsible for the maintenance of utilities that are to be crossed, temporarily diverted or otherwise affected by the works as to the timing and nature of any disruption of service. Where required, the responsible agency shall be requested by NCC to carry out the necessary works at the time required and at NCC cost. The tender documents shall contain sufficient information on utilities at the sites to permit the contractor to include the cost of the works for which it is responsible in the bid.

## 5. Removal of Trees

131. **Impacts.** Construction of the subproject may require clearing of vegetation, including trees. Site visit to the different sites reveal existence of small number of trees (5 mature trees within the area of Parks A and B and proposed Public Space sites; and 1 mature tree within the area of the Playground site). Removal of trees will affect the local ecosystem, habitat of local birds. Particularly, the wildlife that is living on the affected trees will permanently lose the ecological services from those trees. Therefore, removal of mature trees will be a significant loss to the environment, humans and other living organisms benefiting from them.

132. **Mitigation.** The areas of the public parks and open spaces are wide enough to ensure that the existing trees will not be felled. Per preliminary design, the trees will be part of the greenery area of the parks as planned. There is a lot of space to maneuver any equipment without cutting these trees. In order to ensure no impact occurs:

- (i) Site layout to ensure no infrastructure components overlap these trees; and
- (ii) Bidding and contract documents to clearly state no cutting of trees will be allowed, and committing so shall be a non-compliance warranting penalty (monetary or any means to be determined during contract finalization).

## 6. Consents, Permits, NOCs, Clearances

133. **Impacts.** Without permission, the subproject cannot be implemented. Failure to obtain necessary consents, permits, and other appropriate regulatory clearances can result to design revisions and work stoppage.

134. **Mitigation.** All of the necessary consents, permits, and clearances shall be obtained before the start of civil works and acknowledged in writing and provide report on compliance all obtained permits, clearance, NOCs, etc. Permissions and clearances are required from the following government agencies and departments:

- (i) Department of Environment;
- (ii) BIWTA; and
- (iii) NCC.

## 7. Contractor Mobilization.

135. **Impact.** Contractors' fielding of equipment and manpower to the sites will likely impact baseline site conditions and potentially damage private properties and public properties, including cultural heritage sites. Safety of both workers and the community will also be likely affected due to movements of both workers and construction equipment.

136. **Mitigation.** Immediately after award of their respective contracts, the Contractors shall undertake all pre-mobilization works and plans in order to ensure impacts are avoided on natural environment and man-made structures specific to different subproject sites, including any disturbance to existing customs, movements and way of life of local people in these locations. No mobilization and civil works shall be undertaken unless the following have been complied with by the Contractors:

- (i) Developed the required site-specific EMPs (SEMPs) and these are approved by PMU with support from MDSC;
- (ii) Developed a Traffic Management Plan covering all subproject sites and their vicinities, in coordination with local traffic police. Contractor shall have traffic management plan in place prior to the excavation. Sample outline for Traffic Management Plan is in **Appendix 5**;
- (iii) Developed a Spoil Management Plan and Waste Management Plan that will include information on the government-approved disposal site and the route from subproject locations to the said site. Sample outlines for the Spoil Management Plan and Waste Management Plan are in **Appendix 6** and **Appendix 7**, respectively;
- (iv) Established environmentally sound sewage facilities for all offsite facilities and offices, including construction camps to ensure no pollutive discharge to Shitalakhya river. Design considerations for sewage facilities are in **Appendix 8**; and
- (v) Developed a Health and Safety Plan approved by PMU with support from MDSC. The plan will include specific steps to manage potential spread of infectious diseases. Sample outline for Health and Safety Plan is in **Appendix 9**.

## 8. Construction Camps or Workers' Accommodation

137. **Impact.** There may be instances that workers will need to stay within or near the construction sites. Contractors would normally provide construction camps or accommodation at these sites. However, the haphazard construction of these camps without basic amenities could result in social stress and eventual degradation of the local environment.

138. **Mitigation.** The DB Contractor will need to ensure that the camps or accommodations be provided with sanitary amenities at designated areas. In addition to any local regulations, DB Contractor will need to follow the standards for workers accommodation pertaining to *"Workers' accommodation: processes and standards. A guidance note by IFC and the EBRD" 2009*.<sup>28</sup> This shall include environmentally sound sewage facilities to manage septage/sewage from construction camps and DB Contractor's offices, which should be incorporated in the facility designs. Construction notes for environmentally sound sewage facilities are in **Appendix 8**.

## 9. Updating of IEE and Preparation of SEMP

139. PMU with support of MDSC will update IEE based on final detailed designs by the DB Contractor, and submitted to ADB for review, clearance, and disclosure prior to commencement of work. DB Contractor shall be responsible for preparing the SEMP. The SEMP shall be based on the EMP in this IEE report, with details on staff, implementation schedules, monitoring

<sup>28</sup> [https://www.ifc.org/wps/wcm/connect/topics\\_ext\\_content/ifc\\_external\\_corporate\\_site/sustainability-at-ifc/publications/publications\\_gpn\\_workersaccommodation](https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/publications/publications_gpn_workersaccommodation)

procedures, and resources, including costs for implementing measures against infectious diseases that may arise during subproject implementation. The SEMP shall also include detailed health and safety plan with monitoring and reporting procedures consistent with national guidelines and internationally recognized standards or guidelines such as the WHO guidelines. DB Contractor will submit its SEMP to PMU, and PMU will review and approve accordingly. The approved SEMP will be the basis for monitoring by PMU and MDSC. The SEMP will allow PMU, construction supervision engineer to focus on what are specific items expected from the DB Contractor regarding environmental safeguards on a day-to-day basis. With the SEMP, PMU can easily verify the associated environmental requirements each time the DB Contractor will request approval for work schedules.

## **10. Community Awareness**

140. Consultations have been undertaken during the subproject preparation and during the approval stage of the overall project. However, before the start of project implementation, the local population should be well aware of the final schedule. There should be regular interaction with the local population and make them understand the subproject activities. Without proper interaction with local communities and or with stakeholders may lead to confusion and agitation and non-cooperation of local people. Important information needed to be disseminated to the people are, among others, the following:

- (i) Refresher on the overview and objectives of the subproject;
- (ii) Preliminary and/or final detailed design of subproject components;
- (iii) Schedule of implementation;
- (iv) Potential environmental and social impacts (positive and negative) of the subproject, and the proposed mitigation measures for the perceived negative impacts; and
- (v) Grievance redress mechanism and contact details of the subproject.

## **11. EMP Implementation Training**

141. Often lack of proper training to implement the EMP stipulated in the bid document leads to mismanaged environmental safeguards. Therefore, EMP training for the contractors, workers and implementing agency is necessary before construction goes on-board. MDSC will provide the training needs before construction starts. This training will aim to ensure all involved parties (DB Contractors, workers and representatives from NCC through the PMU) understand the nature and purpose of EMP implementation, including spoils management, standard operating procedures (SOP) for construction works; community and occupational health and safety, core labor standards and laws, applicable environmental laws, etc.

### **D. Anticipated Impacts and Mitigation Measures during Construction Phase**

142. The impacts during construction shall include generic construction related impacts associated with construction activities which can be mitigated to acceptable levels with the following mitigation measures.

#### **1. Sources of Materials**

143. **Impacts.** Extraction of construction materials that will be used for the subproject (cement, sand, aggregates) can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution.

144. **Mitigation.** PMU, with support from MDSC, will guide the subproject DB Contractor in minimizing the use of non-renewable resources and rock-based materials. The DB Contractors will be responsible for:

- (i) Sourcing construction materials, including aggregates, etc., from legitimate suppliers authorized by the government;
- (ii) For filling materials required for leveling the subproject sites (specifically the proposed sites for Public Space and southern boundary of Park A), follow instructions from the PMU through MDSC and/or comply with pre-approved arrangement on how to obtain these materials; and
- (iii) Maintain a construction material register at the site.

## 2. Site Clearance and Land Preparation

145. **Impact.** Land preparation, grading and other site clearance activities may result to numerous impacts such as siltation of canals in the area particularly the Shitalakhya river, degradation of air quality in the area due to dust, and elevation of noise level due to use of heavy equipment in the excavation and land grading.

146. **Mitigation.** The potential impacts can be readily mitigated through the institution of preventive measures such as the following:

- (i) Dispose only in the designated disposal areas identified under the subproject;
- (ii) Avoid storing spoils at the vicinity of site for a long period of time particularly at areas near the banks of Shitalakhya river. Haul spoils on a regular basis to ensure more efficient handling and management at the disposal sites. For any temporary storage, use the areas that are farthest from the river banks;
- (iii) Avoid or stop site clearance and grading works during heavy rains;
- (iv) Conventional dust control measures such as use of water sprays and minimizing hauling and vehicle movements during windy times of the day or night;
- (v) Proper covering (e.g. tarpaulin) of hauling equipment such as dump trucks during transport of materials or spoils;
- (vi) Provide temporary barriers or covers around active site grading areas;
- (vii) Limit vehicles speed at work site;
- (viii) Prohibit idling of heavy equipment or vehicles for a long time;
- (ix) Regular maintenance of heavy equipment and vehicles to ensure compliance with national vehicle emissions standards;
- (x) Prohibit burning of any liquid or solid wastes;
- (xi) Conduct regular visual inspections to identify and address other potential sources of dust emissions;
- (xii) Conduct ambient air quality monitoring at strategic locations at least once every quarter. Ensure that sampling locations are based on the wind and dust/smoke dispersion direction at the site;
- (xiii) Provide prior information of the scheduled works to nearby residents;
- (xiv) During night time, avoid construction works that generate noise;
- (xv) Avoid delivery of raw construction materials during night time;
- (xvi) Minimize drop heights during delivery and stacking of raw construction materials;
- (xvii) Use silencers for all equipment;
- (xviii) Use sound barriers to lessen the noise from site, particularly when working at the site for the playground in Ward 24 where surrounding communities may likely be disturbed;

- (xix) Maintain maximum of noise level of 45 dB(A) at the nearest residence relative to the specific worksite;
- (xx) Conduct noise level monitoring. Ensure to conduct at least one sampling every quarter when construction activities are at peak. Important areas to test are at locations nearest the community residents and construction camp;
- (xxi) Use pumping equipment with low level noise generation;
- (xxii) If using generators, use generator set with capacity just enough for the electricity needs at night;
- (xxiii) Ensure generator set complies with the noise standards; and
- (xxiv) Ensure generator set has acoustic enclosure and silencer (if necessary) in the exhaust muffler.

### 3. Impact to Topography and Aesthetics

147. Construction works for the parks and public spaces will affect the topography and aesthetics at the sites due to potential accumulation of unmanaged spoils and construction debris.

148. **Mitigation.** DB Contractors to implement the Spoil Management Plan, and in addition the following measures (if not specifically included in the Spoil Management Plan):

- (i) Avoid storing spoils at the vicinity of site for a long period of time particularly at areas near the banks of Shitalakhya river. Haul spoils on a regular basis to ensure more efficient handling and management at the disposal sites. For any temporary storage, use the areas that are farthest from the river banks;
- (ii) Dispose only in the designated disposal areas identified under the subproject;
- (iii) Ensure adequate compaction, and drainage system around the disposal areas;
- (iv) Ensure disposal areas are utilized up to their capacity limit only and in accordance with the required sloping and leveling/grading specification approved under the subproject; and
- (v) If disposal area reaches the limit, utilize another designated disposal area approved under the subproject.

### 4. Impact to Terrestrial Flora and Fauna Resources

149. While the critical habitat screening and results of site visits show no likely presence of endangered and critically endangered species per IUCN Red List, the construction phase of the subproject may pose impact to other flora and fauna resources in the immediate vicinity of the sites.

150. **Mitigation.** The DB Contractors will ensure that awareness training on environmental safeguards is provided to all construction workers, which will include the following reminders that need to be observed and complied with during the construction period:

- (i) Avoid any cutting of trees and shrubs at the construction site. The spaces are wide enough for any activities without cutting any of the trees or locally important plants, if any;
- (ii) Prohibit use of wood as fuel at construction camp sites, if any;
- (iii) Provide LPG/kerosene to workforce staying at the construction camp sites; and
- (iv) Prohibit the harvest and trade of any plants or poaching of animals found in the area.

## 5. Impact to Surface Water Quality and Aquatic Life

151. Excavation and construction activities may result to accidental spills of chemicals and siltation that could threaten the quality of Shitalakhya river nearby the sites.

152. **Mitigation.** The DB Contractors will implement the following measures:

- (i) Dispose excess spoils only in the designated disposal areas identified under the subproject;
- (ii) Avoid storing spoils at the vicinity of site for a long period of time. Haul spoils on a regular basis to ensure more efficient handling and management at the disposal sites;
- (iii) To minimize excess spoils for disposal, use some for beneficial purposes such as in any other construction activities, or to raise the level of low-lying areas;
- (iv) Ensure proper compaction of refilled soil and there shall not be any loose soil particles on the top; the material shall be refilled in layers and compacted properly layer by layer;
- (v) Silt traps to be provided at construction area near the Shitalakhya River;
- (vi) No equipment or machinery shall be operated outside the work areas;
- (vii) Avoid spillage of fuels, chemicals and lubricants. Fuel and other petroleum products stored at storage areas away from water drainage and protected by impermeable lining and banded 110% by volume;
- (viii) Ensure that drains are not blocked with excavated soil;
- (ix) Locate stockyards away from canals or Shitalakhya River;
- (x) For effluents from construction camps and site offices, provide treatment arrangements such as retention ponds and septic tanks which should be incorporated in the facility designs. If necessary, a sewage management plan has to be prepared by the DB Contractors and agreed with PMU;
- (xi) Monitor water quality according to the environmental management plan;
- (xii) Clean up of the area after the completion and prior to the onset of monsoon season; and
- (xiii) Avoid or stop site clearance and grading works during heavy rains. Avoid scheduling of excavation work during the monsoon season. Earthworks should be undertaken during dry season.

## 6. Impact to Groundwater Quality

153. Operational activities and use of facilities at the subproject site during the construction period could potentially contaminate groundwater resource due to seepage of liquid wastes and chemicals from construction sites and construction camp sites. This may pose further threat to the quality of water from wells in nearby residential areas.

154. **Mitigation.** The DB Contractors will implement the following measures:

- (i) Store fuel, oil and other chemicals in secure, managed areas with lined impervious floors and banded with 110% by volume;
- (ii) Ensure refueling area has lining to avoid seepage of unavoidable spills during refueling. Ensure to clean up spills immediately and all used cleaning materials are disposed properly;
- (iii) Ensure to provide portable toilets in all construction camps to discourage injecting septic wastes on land; and

- (iv) Conduct ground water quality monitoring, particularly at sites near fuel depot or refueling site and construction camps. Ensure to conduct at least one sampling every quarter. Important parameters to test are Oil and Grease, and Fecal Coliform.

## 7. Impact to Ambient Air Quality

155. Excavation and construction activities will result to generation of dust that could remain airborne within and around the subproject sites. Operation of construction heavy equipment and vehicles will also result to release of emissions. The dust and emissions are significant factors that could degrade the ambient air quality in the area, which in turn affect the general wellbeing of the residents in nearby communities.

156. **Mitigation.** The DB Contractors will implement the following measures:

- (i) Conventional dust control measures such as use of water sprays and minimizing hauling and vehicle movements during windy times of the day or night;
- (ii) Proper covering (e.g. tarpaulin) of hauling equipment such as dump trucks during transport of materials or spoils;
- (iii) Provide temporary barriers or covers around active site grading areas;
- (iv) Limit vehicles speed at work site enough to not cause vigorous suspension of dust;
- (v) Prohibit idling of heavy equipment or vehicles for a long time;
- (vi) Regular maintenance of heavy equipment and vehicles to ensure compliance with national vehicle emissions standards;
- (vii) Prohibit burning of any liquid or solid wastes;
- (viii) Conduct regular visual inspections to identify and address other potential sources of dust emissions; and
- (ix) Conduct ambient air quality monitoring at strategic locations at least once every quarter. Ensure that sampling locations are based on the wind and dust/smoke dispersion direction at the sites.

## 8. Impact to Noise Level

157. Excavation and construction activities will result to generation of noise that could disturb both the construction workers, staff, and community people.

158. **Mitigation.** The DB Contractors will implement the following measures:

- (i) Provide prior information of the scheduled works to nearby residents, particularly at the playground site in Ward 24;
- (ii) Use silencers for all equipment;
- (iii) Avoid delivery of raw construction materials during night time at the playground site in Ward 24;
- (iv) Avoid noise-intensive activities at night time;
- (v) Horns should not be used unless it is necessary to warn others or animals of the vehicle's approach;
- (vi) Minimize drop heights during delivery and stacking of raw construction materials;
- (vii) Use sound barriers to lessen the noise from site;
- (viii) Maintain maximum of noise level of 45 dB(A) at the nearest residence relative to the specific worksite;

- (ix) Conduct noise level monitoring. Ensure to conduct at least one sampling every quarter when construction activities are at peak. Important areas to test are at locations nearest the community residents in Ward 24 and construction camps;
- (x) Use pumping equipment with low level noise generation;
- (xi) If using generators, ensure generator set complies with the noise standards; and
- (xii) Ensure generator set has acoustic enclosure and silencer (if necessary) in the exhaust muffler.

## 9. Impact to Underground Physical Cultural Resources

159. Narayanganj is home to many old and ancient structures and there is a possibility that chance finds such as underground relics or structures considered as PCRs will be encountered and impacted during excavation at the subproject sites.

160. **Mitigation.** As a precautionary approach, measures or protocols for chance finds will be followed by the subproject. In the event of chance finds, the following mitigation measures shall be strictly implemented by the DB Contractors:

- (i) strictly follow the protocol which would require the DB Contractors to coordinate immediately with PMU, and Bangladesh Department of Archaeology for any suspicion of chance finds during excavation works;
- (ii) stop work immediately to allow further investigation if any finds are suspected; and
- (iii) request authorized person from the Bangladesh Department of Archaeology to observe when excavation resumes for the identification of the potential chance find, and comply with further instructions.

## 10. Community Health and Safety

161. **Impacts.** The most serious threats will be in the vicinities of the subproject sites which can be easily accessed by pedestrians, animals, and other community people who could be potentially endangered or imperiled by moving heavy equipment or electrocution at the site. There may also be risk of accidental fall of these community people or animals in excavated areas.

162. In case of communicable diseases such as COVID19, there is a serious threat of spreading the virus in the communities surrounding the subproject sites due to interaction of Contractor's staff and construction workers with the locals. This can lead to possible loss of human lives.

163. **Mitigation.** The DB Contractors will implement the following measures:

- (i) Appoint full time EHS officer per contract requirement;
- (ii) Install warning signs, warning tapes, hard barricades, and notices around the work site perimeter to avoid unauthorized entry. For excavated sections that cannot be isolated or enclosed due to access issues for the community or residents, ensure to cover these with steel planks or durable wood planks during off-work hours. If during work hours that these excavated sections, especially the deep trenches, cannot be covered entirely, provide steel planks or durable wood planks with handrails that can be used by pedestrians;
- (iii) Install sturdy fence around storage camps or yards and workers' camps;

- (iv) Assign guards around the subproject sites, including storage camps or yards and workers' camps, on a 24/7 basis;
- (v) Provide lighting all around the subproject site to ensure the perimeter is well-lit at nighttime;
- (vi) Follow a code of conduct for workers, which should include restricting workers in designated areas, no open defecation, no littering, no firewood collection, no setting of fire except when needed but in designated places, no trespassing, no unauthorized overstaying at construction sites, and no obligation to undertake potentially dangerous work without the use of proper personal protective equipment, among others;
- (vii) Follow international best practices on community health and safety such as those in Section 4.3 of World Bank EHS Guidelines on Construction and Decommissioning Activities;<sup>29</sup> The community health and safety plan shall ensure the following:
  - a. implement risk management strategies to protect the community from physical, chemical, or other hazards associated with sites under construction and decommissioning;
  - b. restricting access to the site, through a combination of institutional and administrative controls, with a focus on high risk structures or areas depending on site-specific situations, including fencing, signage, and communication of risks to the local community;
  - c. removing hazardous conditions on construction sites that cannot be controlled affectively with site access restrictions, such as covering openings to small confined spaces, ensuring means of escape for larger openings such as trenches or excavations, or locked storage of hazardous materials; and
  - d. implement measure to prevent proliferation of vectors of diseases at work sites;
  - e. adequate space and lighting, temporary fences, shining barriers and signage at active work sites;
  - f. contractor's preparedness in emergency response;
  - g. adequate dissemination of GRM and contractor's observance and implementation of GRM; and
  - h. upon availability, local people should be given an opportunity for work in the subproject activities;
- (viii) Follow international best practices on traffic safety such as those in Section 3.4 of the World Bank Environmental Health and Safety (EHS) Guidelines on Community Health and Safety;<sup>30</sup> The community health and safety plan should include the following:
  - a. Adoption of best transport safety practices across all aspects of project operations with the goal of preventing traffic accidents and minimizing injuries suffered by project personnel and the public. Measures should include:
    - Emphasizing safety aspects among drivers;
    - Improving driving skills and requiring licensing of drivers;

<sup>29</sup> IFC World Bank Group. 2007. <https://www.ifc.org/content/dam/ifc/doc/2000/2007-general-ehs-guidelines-construction-and-decommissioning-en.pdf>

<sup>30</sup> IFC World Bank Group. 2007. <https://www.ifc.org/content/dam/ifc/doc/2000/2007-general-ehs-guidelines-community-health-and-safety-en.pdf>

- Adopting limits for trip duration and arranging driver rosters to avoid overtiredness;
  - Avoiding dangerous routes and times of day to reduce the risk of accidents;
  - Use of speed control devices (governors) on trucks, and remote monitoring of driver actions;
- b. Regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.

Where the project may contribute to a significant increase in traffic along existing roads, or where road transport is a significant component of a project, recommended measures include:

- a. Minimizing pedestrian interaction with construction vehicles;
  - b. Collaboration with local communities and responsible authorities to improve signage, visibility and overall safety of roads, particularly along stretches located near schools or other locations where children may be present. Collaborating with local communities on education about traffic and pedestrian safety (e.g. school education campaigns);
  - c. Coordination with emergency responders to ensure that appropriate first aid is provided in the event of accidents;
  - d. Using locally sourced materials, whenever possible, to minimize transport distances. Locating associated facilities such as worker camps close to project sites and arranging worker bus transport to minimizing external traffic; and
  - e. Employing safe traffic control measures, including road signs and flag persons to warn of dangerous conditions.
- (ix) Follow the established community and occupational health and safety protocol on emerging infectious diseases such as COVID-19;
- (x) Maintain a complaint logbook at the site and take action promptly of complaints;
- (xi) Schedule transport and hauling activities by avoiding peak traffic periods;
- (xii) Clean wheels and undercarriage of haul trucks prior to leaving construction site;
- (xiii) Educate drivers: limit speed between 20-25 km/h while traversing settlement areas and avoid use of horn unless necessary to prevent accidents; and
- (xiv) Earmark parking place for construction equipment and vehicles when idling; no parking shall be allowed on the roads, that may disturb the traffic movement.

## 11. Occupational Health and Safety

164. **Impacts.** Health risks and safety problems for workers are concerns in all construction projects. Safety risks and health issues arise from storage, handling and transport of hazardous construction material. Construction workers are also at risk of accidents due to moving vehicles, and other construction related activities. Workers are also exposed to high level of pollution from dust, exhaust of vehicles and machinery and noise. Further, extended working hours of workers could lead to risk of accidents due to fatigue.

165. Given the experience with COVID-19 pandemic, concern is high for the site workers' safety and health. Clustering and gathering of workers can easily trigger spread of diseases. Such a situation is dangerous and could potentially lead to loss of human lives. The health risk is also very high within the construction camps due to possibility of high density and unhygienic living conditions.

166. **Mitigation.** The DB Contractor will need to implement its health and safety protocols approved by PMU or MDSC. This will contain normal internationally accepted procedures in relation to the risks imposed by the nature of the work to be undertaken, including risks associated with emerging infectious diseases. The DB Contractor shall ensure all authorized persons present on all sites, be they Contractor staff, representatives of the implementing agency or the construction manager, or other visitors, are aware of any site-specific safety requirements and are supplied with hard hats and other protective clothing appropriate for the work being undertaken, including other precautionary measures against airborne diseases.

167. In particular, the DB Contractors shall implement the following mitigation measures:

- (i) Appoint full time EHS officer per contract requirement;
- (ii) All relevant provisions of the Bangladesh labor Law, 2006, other national regulations related to occupational health and safety as tabulated in Chapter II of this IEE report, and relevant WHO guidelines will be adhered to, concerning the provision of adequate measures to avoid contracting and/or spreading diseases during construction phase;
- (iii) Follow international best practices on occupational health and safety such as those in Section 4.2 of World Bank EHS Guidelines on Construction and Decommissioning Activities,<sup>31</sup> which include the following elements, whichever are applicable:
  - a. Communication and Training
    - Training of all workers on occupational health and safety prior to construction works;
    - Conduct of orientation to visitors on health and safety procedures at work site;
    - Signages strategically installed to identify all areas at work site, including hazard or danger areas;
    - Proper labeling of equipment and containers at construction and storage sites; and
    - Suitable arrangements to cater for emergencies, including: first aid equipment; personnel trained to administer first aid; communication with, and transport to, the nearest hospital with an accident / emergency department; monitoring equipment; rescue equipment; firefighting equipment; and
    - communication with nearest fire brigade station;
  - b. Physical Hazards
    - Use of personal protective equipment (PPE) by all workers such as earplugs, safety shoes, hard hats, masks, goggles, etc. as applicable, and ensure these are used properly;
    - Avoidance of slips and falls through good house-keeping practices, such as the sorting and placing loose construction materials or demolition debris in established areas away from foot paths, cleaning up excessive waste debris and liquid spills regularly, locating electrical cords and ropes in common areas and marked corridors, and use of slip retardant footwear;
    - Use of bracing or trench shoring on deep excavation works;

<sup>31</sup> IFC World Bank Group. 2007. [\*Environmental, Health, and Safety \(EHS\) Guidelines – General EHS Guidelines: Construction and Decommissioning.\*](#)

- Adequate lighting in dark working areas and areas with night works;
  - Rotating and moving equipment inspected and tested prior to use during construction works. These shall be parked at designated areas and operated by qualified and trained operators only;
  - Specific site traffic rules and routes in place and known to all personnel, workers, drivers, and equipment operators; and
  - Use of air pollution source equipment and vehicles that are well maintained and with valid permits;
- c. General Facility Design and Operation
- Regular checking of integrity of workplace structures to avoid collapse or failure;
  - Ensuring workplace can withstand severe weather conditions;
  - Enough work spaces available for workers, including exit routes during emergencies;
  - Fire precautions and firefighting equipment installed;
  - First aid stations and kits are available. Trained personnel should always be available who can provide first aid measures to victims of accidents;
  - Secured storage areas for chemicals and other hazardous and flammable substances are installed and ensure access is limited to authorized personnel only;
  - Good working environment temperature maintained;
  - Worker camps and work sites provided with housekeeping facilities, such as separate toilets for male and female workers, drinking water supply, wash and bathing water, rest areas, and other lavatory and worker welfare facilities; and
  - Maintain records and make reports concerning health, safety and welfare of persons, and damage to property. Take remedial action to prevent a recurrence of any accidents that may occur.
- (iv) Follow established occupational health and safety protocol on emerging infectious diseases such as the COVID19;
- (v) Provide regular health check-ups, sanitation and hygiene, health care, and control of diseases for the workforce;
- (vi) Provide at cost all labor and materials and construct/install and maintain site safety, hard barricading, flexible green net, signboards, and lightings throughout the construction site;
- (vii) Launch awareness programs concerning human trafficking and the possibility of spread of sexually transmitted diseases (STDs) and HIV/AIDS using brochures, posters, and signboards;
- (viii) Make available ambulance facility at the construction site and camp site, if any;
- (ix) Compensation for the loss of life (a zero tolerance to loss of life policy should be developed and implemented) or for any type of injuries; and
- (x) Provide insurance to the workers. Health and safety training for all site personnel is very important and must be mandatory.

## 12. Impact on Local Festivals and Cultural Practices

168. Alignments of the drainage network may pass through near or adjacent locally important cultural and religious sites such as mosques, eidgah, etc. where religious or local festivities are celebrated. Construction activities may have the potential to disrupt the smooth transition of these celebrations.

169. **Mitigation.** DB Contractor shall follow religious and city festival calendar to avoid impact upon local celebrations. Construction works need to be avoided or minimized during the festivals. If excavation works or construction works have been done but remain unrestored approaching a certain festivity, alternative access to mosques and other important sites must be considered or set up.

## 13. Impacts on Socioeconomic Resources

170. Construction works may result in temporary loss of livelihoods and interruption of social and economic activities in some subproject sites. In areas where there are shops or other commercial activities, these could lose some business if access is difficult for customers.

171. **Mitigation.** The DB Contractors will ensure the following:

- (i) Adopt the GRM of the project, and respond to grievances;
- (ii) The construction works do not interfere with the convenience of the public or access to, use, and occupation of public or private roads, or any other access to properties, whether public or private.
- (iii) Temporary access to properties adjacent to the construction site will be provided through the construction of ramps with concrete slabs for use of pedestrians and light vehicles. Handrails may provided to ramps or planks depending on the width of excavations;
- (iv) In critical areas such as institutions, operating hours are factored into work schedules and workforce is increased for speedy completion;
- (v) Advance information on works to be undertaken including appropriate signage is provided;
- (vi) The diversion is done in coordination with the traffic police division for necessary rerouting of traffic and traffic management.

## 14. Impact on Employment

172. Primarily a positive impact, the subproject will create significant temporary employment for construction workers, equipment maintenance and support staff. While a small number of senior project managers may come from overseas and other specialists from elsewhere in Bangladesh, the majority of project staffs and laborers are expected to be recruited locally from within the native/local workforce.

## E. Anticipated Impacts and Mitigation Measures During Post-Construction Phase

173. **Impact.** The activities of the subproject will result to sorts of construction wastes and traces of excess spoils after the construction period. Indiscriminate disposal or ignoring their proper disposal could be dangerous to the environment and the people in the vicinity of the subproject sites.

174. **Mitigation**, Immediately within one week after construction phase, the DB Contractor shall collect all the wastes at the different sites, and implement the following. DB Contractor may opt to outsource this to qualified entities in NCC, provided that DB Contractor's EHS personnel strictly supervise the cradle-to-grave management of all these wastes. All costs related to management of these wastes shall be borne by the DB Contractor, or as per agreement in the DB contract documents.

- (i) Segregate or sort all wastes according to nature (recyclable, non-recyclable, hazardous, non-hazardous or any combination);
- (ii) Ensure to handover (or sell as the case may be) recyclable wastes to authorized recycling entities in Bangladesh. DB Contractor shall coordinate this action with NCC through the PMU;
- (iii) Ensure to dispose non-recyclable and non-hazardous wastes to appropriate disposal sites. These may be collected, transported and disposed similar to how solid wastes in the city is managed. Thus, DB Contractor shall coordinate with NCC through the PMU in this regard;
- (iv) Ensure to transport and dispose hazardous wastes using authorized hazardous waste transporters and treaters in Bangladesh. DB Contractor shall coordinate all actions for these wastes with NCC through the PMU; and
- (v) Ensure the sites are cleared with all wastes disposed accordingly, and compliance with this measure shall be included as one of the conditions for payment to the DB contractor.

## **F. Anticipated Impacts and Mitigation Measures during Operation Phase**

175. During the operational phase of the subproject, certain elements of the operation may still pose potential impacts to the environment and the people. Community health and safety issues are more prevalent and draw more attention than many other issues. Below are discussions on the impacts and associated mitigation measures during the operation phase of the subproject.

### **1. Community Health and Safety**

176. Neighboring community is likely to be temporarily disrupted due to mismanagement of the parks and public space. However, public safety in respect of operational impacts is best secured through the prevention of unauthorized access. As measures, NCC needs to:

- (i) Full time management staff (and caretakers) of the parks will be assigned and trained with the maintenance requirements, delineated by the contractor before handing over the parks;
- (ii) Develop and implement appropriate protocols to reduce risks to safety, public health, and environment that include well-written instructions. If necessary, include curfew hours within these facilities to ensure no illegal dwellers penetrate these public spaces;
- (iii) Protect components of park facilities from damage and ensure their efficient function (e.g. walkways, lightings, toilets, faucets, water supply); and
- (iv) Provide 24/7 security personnel at all subproject sites.

### **2. Pollution**

177. The parks and public spaces could be a potential source of water and land pollution. However, proper management of the parks by NCC as the ultimate administrator will ensure that

this will not occur. NCC will ensure provision of enough budget to maintain all facilities at the sites, such as but not limited to the following:

- (i) Presence of 24/7 guards and caretakers in all these sites;
- (ii) Proper functioning of toilets, including water supply and other components therein (e.g. faucets, flushing mechanisms for sanitary water closets, etc.);
- (iii) Desludging of the septic tanks based on design schedule. Desludged materials will need to be disposed in NCC-authorized disposal sites; and
- (iv) Maintenance of garbage bins all around the facilities and ensuring regular collection of the garbage by the NCC-authorized collectors.

## **G. Cumulative Impact**

178. The subproject activities, including excavation activities will be concentrated in specific area in the city. Works small or localized areas only. The likely main impacts assessed that may have cumulative effects with the impacts of other development works in the city, would be the potential additional contribution of dust emissions and potential traffic disruption. However, the subproject excavation activities are too small in nature and will involve mitigation measures to reduce dust pollution. The subproject area is not in a busy section of the city, and may not affect traffic flow. As such, no impacts that have cumulative effects is envisaged.

## **VI. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION**

### **A. Consultation and Information Disclosure**

179. Meaningful stakeholder consultation and participation is part of the subproject preparation and implementation strategy. Consultation and participation will ensure information is provided and feedback is obtained and considered on the implementation of the subproject. Affected persons will be consulted at various stages of subproject preparation to ensure: (i) incorporation of views/concerns of affected persons, particularly the vulnerable, on environmental impacts and mitigation measures; (ii) identification of any help required by affected persons during construction; and (iii) avoidance of potential conflicts for smooth subproject implementation.

180. Meaningful consultation will also provide adequate opportunities for participation of all stakeholders and inclusion of the vulnerable in subproject process. This is also the avenue where relevant information on any major changes to the subproject will be shared with beneficiaries, affected persons, vulnerable groups, and other stakeholders.

### **1. Objective and Purpose**

181. The objectives of the consultations are to inform the project-affected people about the subproject, the present status of environmental, social and ecological condition in the area, potential impacts of the proposed subproject, suggested measures to mitigate these impacts, and at the same time to seek other possible solutions to these impacts from them. The consultations are also an avenue to reduce conflict through the early identification of controversial issues about the subproject and work with the stakeholders to find acceptable solutions; increase public confidence about the proponent, reviewers and decision makers, and develop a proposal which is truly sustainable which will be integrated into the subproject design.

## 2. Identification of Stakeholder

182. Consultations were organized both formally and informally at different levels including focus group discussions at the ward and community settlement level. During the field survey, significant efforts were made to identify the possible categories of stakeholders and their stakes. The stakeholders identified during field visits were the local residents, government officials, shop owners, community-based organization representatives, NGOs and general public. All those stakeholders had different types of stakes according to their professions.

## 3. Summary Public Consultation Meetings

183. **First consultation meeting.** The first meeting was held on 23 February 2023 at Ward 25, and was presided and facilitated by the NCC Town Planner, Moinul Islam, and Ward-25 Councilor M Anayet Hossain. This consultation meeting focused on the proposed improvement of Parks A and B and proposed Public Space in Ward 25. There were 49 participants (44 males and 5 females) to this meeting, which include representatives from NCC, ADB and PSPS consultants, and residents from the ward. Issues, views and suggestions gathered during the consultation are summarized in the table below. Minutes of meeting is in **Appendix 10**.

184. **Second consultation meeting.** The second meeting was held on 9 May 2023 at the DEPTC Compound of BIWTA along the Shitalakhya river. This meeting was presided by NCC Executive Engineer Ismail Chowdhury and Ward-24 Councilor M Afzal Hossain. The meeting focused on the improvement of Park C in Ward 19 and Playground in Ward 24. There were 38 participants (36 males and 2 females) to this meeting, which include representatives from NCC, ADB and PSPS consultants, BIWTA and residents from the ward. Issues, views and suggestions gathered during the consultation are summarized in the table below. Minutes of meeting is in **Appendix 10**.

185. Overall, participants were supportive and thankful of the subproject, and recognized the need for improved green public spaces and recreational areas in their communities. They expressed their understanding that the project will be very important as part of improving their social life and wellbeing.

**Table 34: Summary of Discussions in Consultation Meetings**

| Location                   | Date             | No. of Participants | Participants                             | Issues, Views, and Suggestions                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------|------------------|---------------------|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Lakkhonkhola, Ward 25, NCC | 23 February 2023 | 49                  | NCC, ADB, PSPS, BIWTA, Ward 25 residents | <ul style="list-style-type: none"> <li>The participants from the community expressed their excitement with the planned improvement and provision of the parks. They opined that in addition to additional parks in the vacant land available community center, they suggested that Eidgah (field for Eid congregation) might also be included.</li> <li>The participants appreciated the initiatives of the NCC with support from ADB. They understand that the efforts would</li> </ul> |

| Location                | Date       | No. of Participants | Participants                                                         | Issues, Views, and Suggestions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------|------------|---------------------|----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                         |            |                     |                                                                      | <p>reduce pollution of the Shitalakshya River.</p> <ul style="list-style-type: none"> <li>• Ex-Councilor Shah Alam appreciated the initiatives and likewise forwarded the same request for an Eidgah to be included.</li> <li>• One participant (local resident Syed Ahmed) suggested that security personnel be provided for these parks in the future to ensure no anti-social activities happen in these parks.</li> <li>• Another two participants (local residents, Mazharul Haque and Badal) reiterated the need for cleanliness and security in the parks once they are completed.</li> <li>• BIWTA Joint Director, Narayanganj Shahid Ullah also expressed willingness to work together in a coordinated way for the benefits and welfare of the city dwellers. He confirmed that BIWTA is also building the Shitalakshya Riverbank protection works and walkways with support from the World Bank. And that BIWTA would continue to provide support to NCC with mutual understanding and will together in similar activities in other wards in the future.</li> </ul> |
| DEPTC Compound of BIWTA | 9 May 2023 | 38                  | NCC, ADB, PSPS, BIWTA, Wards 19, 23, and 24 councilors and residents | <ul style="list-style-type: none"> <li>• Mr. Mohammad Ali, a resident of Ward-24, suggested that boundary wall, lighting and seating arrangements be included as part of improving the playground in Ward 24. Accordingly, this would make the area aesthetically attractive and it would turn into a good recreation place.</li> <li>• Mr. Raihan, another resident from Ward-24, supports the subproject as he views that the parks would provide recreational facilities to the city dwellers.</li> <li>• Ms. Latifa Begum, Prantik Jonoghushti, a NGO representative, also expressed her view that bigger parks could indeed be a good place for</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                |

| Location | Date | No. of Participants | Participants | Issues, Views, and Suggestions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------|------|---------------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|          |      |                     |              | <p>recreation for the rich and the poor.</p> <ul style="list-style-type: none"> <li>● Although the issue is beyond the scope of the consultation, Assistant Teacher of Bandar Colony School, Abdur Rob, expressed his observation about the heavy pollution being caused by various industrial plants along Shitalakhya river.</li> <li>● One of the local residents, Abdul Hamid, suggested the inclusion of a prayer room in the park.</li> <li>● Councilors Shaon Angon and Sheuly Nawshad expressed their happiness for the Park proposed in their Ward and they would support wholeheartedly its implementation.</li> <li>● Ward-23 Councilor Abul Kawser commented that the site of the park was too small and it belonged to private individuals. He suggested that the subproject identify and acquire larger land area for a bigger park for much more benefits to the communities.</li> <li>● Ward-19 Councilor Mokhlesur Rahman Chowdhury also expressed his happiness to have the existing park enriched. He further suggested that a road to Modonganj along the river bank would be helpful if it is to be built.</li> </ul> |

186. After presenting all project details, potential impacts and mitigation measures to be adopted, the participants received the information well with no negative reactions or feedbacks. This implied that the proposed environmental management and mitigation measures are acceptable to the participants.

**Figure 39: Sample Photos Taken During Consultation Meetings**



#### **4. Information Disclosure**

187. Preliminary subproject information was disclosed through the different consultations done. Once the detailed designs of the various components are finalized, the same will be disseminated again, including more formally by making written documents and other materials available in form and at locations which can be easily accessed by stakeholders, such as the NCC, PMU and ward community offices. This will also include providing summary reports in the local language and posted at public locations in the wards and community settlement area. The aim is to provide wider reach and means for the receipt of comments from the general public. Subsequently, all documents will be disclosed on ADB and NCC websites. A copy of this IEE report will also be disclosed on the ADB and NCC websites

#### **B. Future Consultations and Communication Plan**

188. Meaningful consultations with stakeholders will continue throughout subproject implementation as necessary to address issues related to environmental assessment. The consultation process will be continued and expanded during the subproject implementation to ensure stakeholders participate fully in subproject execution, as well as to implement a comprehensive information, education, and communication plan.

189. For the benefit of the community, the IEE report will be made available at (i) offices of executing and implementing agencies, (ii) ward offices; and (iii) DB Contractors' offices at the subproject sites. It will be ensured that the hard copies of IEE report are kept at places which are conveniently accessible to people, as a means to disclose the document and at the same time creating wider public awareness. An electronic version of the IEE report will be placed in the official website of executing and implementing agencies and the ADB website after clearance of the IEE by ADB. Moreover, all semi-annual environmental monitoring reports during subproject implementation will be available at both NCC and ADB websites.

190. Future consultation and disclosure activities shall include the following:

##### **1. Consultations During Construction Phase**

- (i) Public meetings with affected communities to present the final detailed design, discuss and plan work programs and allow issues to be raised, if there still any, and addressed once construction has started; and
- (ii) Smaller-scale meetings to discuss and plan construction work with individual communities to reduce disturbance and other impacts, and to provide a mechanism through which stakeholders can participate in subproject monitoring and evaluation.

## 2. Information Disclosure

- (i) Public information campaigns (via newspaper, flyers, and media) to explain the subproject's final detailed design to the wider population of the subproject area and prepare them for disruptions they may experience once construction is underway;
- (ii) Public disclosure meetings at key project stages to inform the public of progress and future plans, and to provide copies of summary documents in local language;
- (iii) Formal disclosure of completed subproject reports by making copies available at convenient locations in the subproject area, and informing the public of their availability; and
- (iv) Providing a mechanism through which comments can be made.

**Table 35: Indicative Communication Plan for the Subproject**

| <b>Responsible Entity</b>                                    | <b>Target Stakeholders</b>                                                                                                 | <b>Key Concerns</b>                                                                        | <b>Communication Method</b>                                                                                                 | <b>Frequency / Schedule</b>                                         | <b>Key Messages</b>                                                                    |
|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| <b><i>Project Preparation</i></b>                            |                                                                                                                            |                                                                                            |                                                                                                                             |                                                                     |                                                                                        |
| NCC Management                                               | Relevant government agencies<br>- Ministry of Finance<br>- Department of Environment                                       | Progress of project approval by the government<br>- financial<br>- environmental clearance | - Meetings<br>- Presentations<br>- Written communications                                                                   | As needed during project preparation                                | Agreements and solutions to getting approval                                           |
| <b><i>Detailed Design</i></b>                                |                                                                                                                            |                                                                                            |                                                                                                                             |                                                                     |                                                                                        |
| NCC / PMU / DB and DBO Contractors                           | Ward Officials<br>Media<br>Nongovernment Organizations<br>Community-Based Organizations<br>Women's Groups<br>NCC Residents | All aspects of environmental impacts expected from the subproject / project.               | - Community consultation meetings<br>- Focus group discussions<br>- Emails or written communications<br>- Press Conferences | At least once in every target area during the detailed design phase | Update on Environmental Management Plan and Mitigation Measures                        |
| <b><i>Construction Phase</i></b>                             |                                                                                                                            |                                                                                            |                                                                                                                             |                                                                     |                                                                                        |
| NCC / PMU / DB and DBO Contractors / Civil Works Contractors | Media<br>Nongovernment Organizations<br>Community-Based Organizations                                                      | - On-target project implementation<br>- Delays of project implementation                   | - Press Conferences<br>- Emails or written communications<br>- NCC website<br>- Disclosed                                   | At least once every semester                                        | - Progress of project implementation<br>- Information on project implementation delays |

| Responsible Entity             | Target Stakeholders                                | Key Concerns                                                                                                       | Communication Method                                                                                                                                       | Frequency / Schedule                                                                                                            | Key Messages                                                                                                                                              |
|--------------------------------|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                |                                                    | - Other public concerns                                                                                            | Semi-Annual Environmental Monitoring Reports (SEMRs) on ADB and NCC websites                                                                               |                                                                                                                                 |                                                                                                                                                           |
|                                | Ward Officials<br>Women's Groups<br>Ward Residents | - Disruptions due to construction works<br>- Community health and safety issues<br>- Community residents' concerns | - Community consultation meetings<br>- Focus group discussions<br>- One-on-one consultations<br>- NCC website<br>- Disclosed SEMRs on ADB and NCC websites | - Once prior to starting construction works in a particular area<br>- As needed during construction period in a particular area | - Scheduling of works<br>- Community health and safety measures to be in place during construction works                                                  |
| <b>Operation Phase</b>         |                                                    |                                                                                                                    |                                                                                                                                                            |                                                                                                                                 |                                                                                                                                                           |
| NCC / PMU / DBO<br>Contractors | All stakeholders                                   | - Operation and maintenance issues on the Public Parks and Open Spaces<br><br>Temporary closures of parks          | - Press conferences<br>- Press releases (print or broadcast media)<br>- NCC Website<br>- Social media platforms                                            | As needed                                                                                                                       | - Solutions to O&M issues and target dates to resolve issues<br>- Mitigation measures to address / or offset measures to temporary impacts of O&M issues. |

## VII. GRIEVANCE REDRESS MECHANISM

191. A project-specific grievance redress mechanism (GRM) will be established to receive, evaluate, and facilitate the resolution of affected persons' concerns, complaints, and grievances about the social and environmental performance at the level of the overall project, including the subproject. The GRM will aim to provide a time-bound and transparent mechanism to voice out and resolve social and environmental concerns associated with the project.

192. The common GRM will provide an accessible and trusted platform for receiving and facilitating the resolution of affected persons' grievances related to the project. The multi-tier GRM for the project is outlined below, each tier having time-bound schedules and with responsible persons identified to address grievances and seek appropriate persons' advice at each stage, as required.

193. The project area-wide public awareness campaigns will ensure that knowledge of the grievance redress procedures is generated. The PMU will conduct awareness campaigns to ensure that all affected persons and vulnerable households are made aware of grievance redress procedures and entitlements.

194. Affected persons will have the flexibility of conveying grievances/suggestions by dropping grievance redress/suggestion forms in complaints/suggestion boxes to be installed by PMU. Grievances can be sent by post, or by writing in a complaints register in the PMU office. The option of registering complaints on the NCC website can be explored, as this option is not available currently. Careful documentation of the name of the complainant, date of receipt of the complaint, address/contact details of the person, location of the problem area, and how the problem was resolved will be undertaken. The PMU social and environmental officers will have the overall responsibility for timely grievance redress on environmental and social safeguards issues and for registration of grievances, related disclosure, and communication with the aggrieved party. A copy of a proposed outline of a grievance registration form is given in **Appendix 11**. All the documents made available to the public will include information on the contact number, address and contact person for registering grievances, and will be disseminated throughout the project area by the PMU.

#### **A. Existing NCC Grievance Mechanism**

195. The current methods of registering complaints include complaint registration at the Office of the Executive Engineer at Godenail Water Treatment Plant, complaint registration through the concerned elected representatives (ward councilors and the Mayor). Complaints are currently conveyed through emails, phone calls, WhatsApp messages etc. The complaint receiving person channels the grievance to the concerned officer/department of NCC for resolution. Larger issues are resolved in consultation with the Mayor of NCC. The existing grievance redress process is currently not formalized.

#### **B. Proposed Narayanganj Green and Resilient Urban Development (NGRUD) Project Grievance Mechanism**

196. The existing NCC grievance redress processes will be integrated into the proposed project specific grievance redress mechanism which will be established for the project. In case of grievances that are immediate and urgent in the perception of the complainant, the Assistant Engineer/ Contractor safeguard personnel – Social and Environment / Social and Environment Officer from PMU will provide the most easily accessible or first level of contact for the quick resolution of grievances. Contact phone numbers and names of the concerned staff and Contractor, will be posted at all construction sites in visible locations. A representative of affected persons from each settlement will be a special invitee when grievances of a particular settlement are being discussed by the GRC.<sup>32</sup> Given below is the proposed grievance redress mechanism for the project.

- (i) **Local level:** The on-site contractors Safeguards (social and environment) Officer/ Assistant Engineer of the PMU/ Social and Environment Officer, NCC will receive and record the complaint at the subproject site. Alternatively, the complaint can be registered by phone call, message, email, or on the NCC website and this will be reverted to the onsite personnel for 1st level resolution. The complaint will be reviewed by local level GRC comprising of: (i) Deputy Project Director, NCC, who will be the Convener; other members include Social and Environment officer, NCC; (iii) Councilor- reserved seat; (iv) Councilor- concerned ward; (v) GRM Focal (Chief Social Welfare Officer) (vi) Assistant Engineer NCC (designated as member secretary) (iv) Contractors' safeguards

<sup>32</sup> Any travel expenses incurred by affected persons and their representatives (special invitees) to attend the GRC meetings shall be covered under the budgetary provision made for GRC.

personnel- social and environment (v) Resettlement/ Environment Specialist of the MDSC. The first level or the local level officers/ GRC will try to resolve the issue on-site in consultation with the aggrieved party. This will be done within 7 days of receipt of a complaint/ grievance;

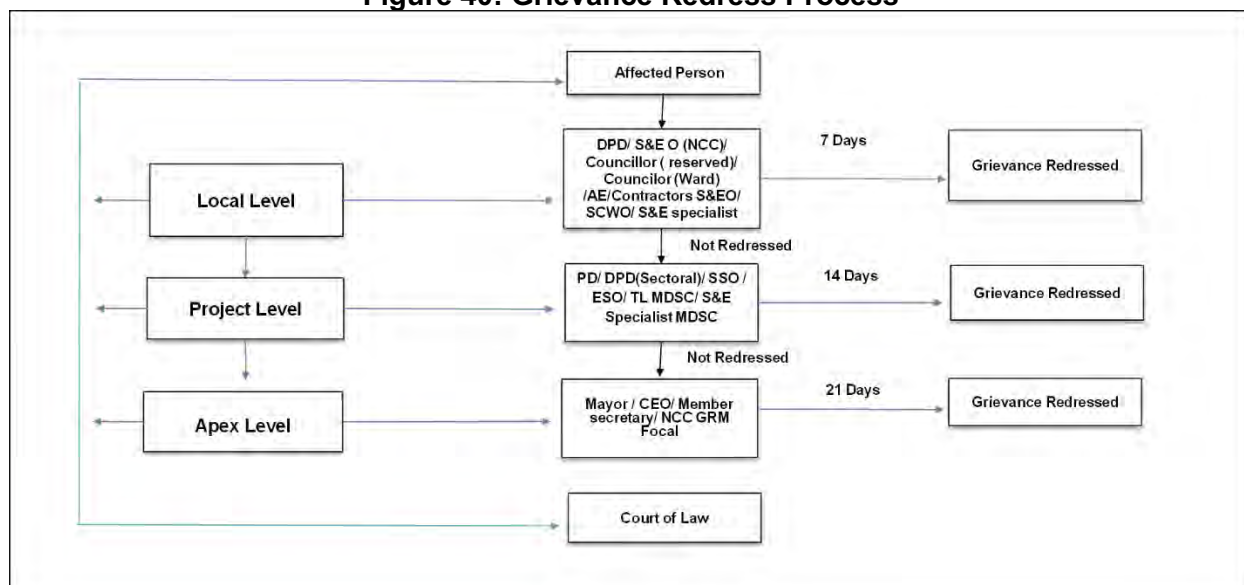
- (ii) **Project level:** All grievances that cannot be redressed within 7 days at the local level will be brought to the notice of the Project GRC, comprising of Project Director who will be the Convener; other members include Deputy Project Director (sectoral); Social Safeguards Officer (PMU); Environment Safeguards Officer (PMU); Team Leader, MDSC (designated as member secretary) and Social and Environment Specialist, MDSC. The Project level GRC will resolve the grievance within 14 days of receipt of a complaint/ grievance; and
- (iii) **Apex level:** If the grievance is not resolved at the Project level, the grievance will be referred to the Apex level, headed by the Honorable Mayor. Chief Executive Officer will support the grievance process. Other members include the Project Director who will be the Member secretary; and NCC GRM focal officer. The grievance at this level will be resolved within 21 days of its receipt.

197. Despite the project GRM, an aggrieved person shall have access to the country's legal system at any stage. This can run parallel to accessing the GRM and is not dependent on the negative outcome of the GRM.

198. **ADB's Accountability Mechanism.** In the event that the established GRM is not in a position to resolve the issue, the affected person also can use the ADB Accountability Mechanism through directly contacting (in writing) the Complaint Receiving Officer at ADB headquarters or the ADB Bangladesh Resident Mission. People who are, or may in the future be, adversely affected by the project may submit complaints to ADB's Accountability Mechanism. The Accountability Mechanism provides an independent forum and process whereby people adversely affected by ADB-assisted projects can voice, and seek a resolution of their problems, as well as report alleged violations of ADB's operational policies and procedures. Before submitting a complaint to the Accountability Mechanism, affected people should make an effort in good faith to solve their problems by working with the concerned ADB operations department. Only after doing that, and if they are still dissatisfied, should they approach the Accountability Mechanism.<sup>33</sup>

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<sup>33</sup> <https://www.adb.org/who-we-are/accountability-mechanism/main>

**Figure 40: Grievance Redress Process**

AE= Assistant Engineer; CEO= Chief Executive Officer; CSWO= Chief Social Welfare Officer; DPD= Deputy Project Director; ESO = Environmental Safeguards Officer; GRM = Grievance Redress Mechanism; MDSC= Management Design and Supervision Consultant; NCC = Narayanganj City Corporation; PD = Project Director; S&E = social and environment; S&EO= Social and Environment Officer; SSO = Social Safeguards Officer; TL = Team Leader.

199. **Record-keeping.** The PMU will keep records of grievances received, including contact details of the complainant, the date the complaint was received, the nature of the grievance, agreed corrective actions and the date these were affected and the outcome. The number of grievances recorded and resolved and the outcomes will be available in the PMU office, as well as reported in monitoring reports submitted to ADB on a semi-annual basis. All resolutions shall be communicated to the aggrieved party/complainant(s).

200. **Periodic review and documentation of lessons learned.** The PMU will periodically review the functioning of the GRM and record information on the effectiveness of the mechanism, especially on the program's ability to prevent and address grievances.

201. **Costs.** All costs involved in resolving the complaints (meetings, consultations, communication, and reporting/ information dissemination) will be borne by the PMU.

## **VIII. ENVIRONMENTAL MANAGEMENT PLAN**

### **A. Introduction**

202. The purpose of this EMP is to provide a framework that outlines how NCC and any contractor appointed will manage and where practicable, minimize negative environmental effects during the design, construction and operation of the subproject. Construction is considered to include all site preparation, preparatory works, demolition, materials delivery, materials and waste removal, construction activities and associated engineering works.

203. This EMP identifies the minimum requirements regarding the appropriate mitigation, monitoring, inspection and reporting mechanisms that need to be implemented throughout design, construction and operation periods of the subproject. Compliance with this EMP does not absolve

the contractors or their subcontractors (during construction phase) and/or the subproject operators (during operation phase) from compliance with all legislation and bylaws relating to construction phase and operation phase activities, respectively.

204. This EMP provides a framework to:

- (i) Describe the subproject for environmental management during design, construction and operation phases;
- (ii) Implement those monitoring and mitigation measures identified in this IEE;
- (iii) Outline the principles and minimum standards required of the contractors during the development of their respective SEMP;
- (iv) Identify the relevant roles and responsibilities for developing, implementing, maintaining and monitoring environmental management; and
- (v) Outline the procedures for communicating and reporting on environmental aspects of the subproject throughout all phases of subproject implementation.

## **B. Institutional Arrangement**

205. The Local Government Division (LGD) of the Ministry of Local Government, Rural Development and Cooperatives (MLGRDC) will be the executing agency and NCC will be the implementing agency for the overall project. A Project Coordination Committee (PCC) will be formed within the NCC to engage with policymakers, obtain guidance on key policy issues and oversee overall project implementation.

206. A Project Management Unit (PMU) will be created under the overall supervision of PCC. The PMU will ensure that the subproject will be implemented in accordance with the ADB SPS and relevant government laws, rules and regulations, including the recently Environmental Conservation rules, 2023, among others. The PMU will be supported by a Management, Design and Supervision Consultant (MDSC) team, comprising individual consultants that will provide all necessary management and supervision expertise in implementing the overall project. The management and supervision will come at varying degrees during design phase and pre-construction phase, construction phase, and operation phase. Figure below outlines the institutional arrangement for the project in terms of safeguards supervision and implementation.



- (xi) Undertake field monitoring to validate compliance with the EMPs, SEMP and other required work plans;
- (xii) With support from MDSC, consolidate monthly environmental monitoring reports from the contractors. Based on these monthly reports and on results of PMU's own field monitoring and validation activities, prepare and submit semi-annual environmental monitoring reports (SEMRs) to ADB;
- (xiii) Ensure timely disclosure of final IEE reports, SEMRs, and other safeguard documents in project website and in a form accessible to the public;
- (xiv) Address any grievances brought about through the grievance redress mechanism (GRM) in a timely manner per the IEEs (GRM is discussed in Section VI hereof);
- (xv) Undertake regular review of safeguards-related loan covenants, and the compliance during project implementation; and
- (xvi) With support from MDSC, organize periodic capacity building and training programs on safeguards for project stakeholders, including PMU personnel and contractors.

208. **Management, Design and Supervision Consultant (MDSC).** The MDSC team will have one International Environment Specialist Consultant and one National Environment Specialist Consultant who will assist PMU in the review and updating of all necessary environmental safeguard documentation as required by ADB SPS and national laws, regulations, policies and guidelines applicable to the project; and in fulfilling all other tasks necessary to ensure the project complies with all environmental safeguard requirements. Specific tasks of the Environment Specialist Consultants are the following:

- (i) Support the PMU in fulfilling all responsibilities as enumerated in the preceding paragraph;
- (ii) Update/Finalize the initial environmental examination (IEE) report including environmental management plans (EMP) based on final detailed design of the subprojects and in accordance with ADB SPS and national laws, regulations, policies and guidelines;
- (iii) Conduct due diligence of associated facilities and/or audit of existing facilities, if any, during the detailed design phase, as defined in ADB SPS;
- (iv) Conduct of meaningful consultations and ensure issues/concerns/suggestions raised are incorporated in the design and updated/final IEE reports;
- (v) Ensure relevant provisions from the updated/final IEE reports and EMPs are incorporated in the bid and contract documents;
- (vi) Support in implementing the grievance redress mechanism and ensure members of the grievance committee have the necessary capacity to resolve project-related issues/concerns;
- (vii) Together with the social safeguards experts, conduct safeguards capacity building to ensure PMU and contractors have the capacity to implement, monitor, and report on implementation of EMPs, resettlement plans and indigenous peoples plans (if any); and
- (viii) Monitor implementation of EMPs at all work sites, including all potential safeguard issues identified in the safeguard documentation mentioned above;
- (ix) Monitor any unanticipated environmental risks or impacts that arise during construction, implementation or operation of the subprojects that were not considered in the IEE reports and EMPs. Prepare corrective action plans and ensure that these are implemented by the contractors and reported accordingly in environmental monitoring reports to ADB; and

- (x) Undertake all other tasks to ensure the project complies with ADB SPS and national environmental laws, rules, and regulations.

209. **DB Contractor (and subcontractor/s, if any).** The IEE reports with EMPs will form part of bidding and contract documents and verified by PMU. The DB Contractor will be required to designate their respective environment, health and safety officers (or equivalent) to ensure effective implementation of EMP and SEMP, including other specific work plans, during civil works. DB Contractor is to carry out all environmental mitigation and monitoring measures outlined in its contract and this IEE report. The DB Contractor will be required to submit to PMU, for review and approval, corresponding SEMP and other required work plans per this IEE report. These plans should be able to provide information on (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; (iii) monitoring program per EMP; and (iv) budget for SEMP and EMP implementation, among others. No works can commence until corresponding SEMPs and required work plans are approved by PMU.

210. Specifically, the DB Contractor will have the following responsibilities, among others, that will be included in the bid and contract documents:

- (i) Ensure that the infrastructure development works are carried out in an environmentally friendly manner, minimizing environmental impacts while ensuring the health and safety of all its workers and the minimizing disturbance to the surrounding environment and communities;
- (ii) Consideration of ADB SPS, national regulations and the EMP during bid preparation and cost estimation;
- (iii) Hire or designate a full time Environment, Health and Safety Officer (or equivalent) responsible for compliance to ADB SPS requirements, national regulations and the EMP/SEMP and other required work plans. The officer/staff must have a clear terms of reference and responsibilities to ensure that all environmental concerns are properly managed;
- (iv) Ensure regular reporting to the PMU on work progress and alert management on any potential issues or delays;
- (v) Strictly follow health and safety measures at the subproject sites;
- (vi) Obtain the necessary permits and clearances, if any is required for the DB Contractor, to implement the subproject;
- (vii) Ensure that all worker recruitment and OHS requirements are complied;
- (viii) Take necessary corrective action to rectify any non-conformance, including actions related to grievances;
- (ix) Institute an emergency plan for natural calamities/disasters and accidents at the site;
- (x) Follow chance finds procedures to discovery of any physical cultural artifact;
- (xi) Ensure any sub-contractors/suppliers who are utilized within the context of the contract comply with the environmental requirements of the EMP. The contractor will be held responsible for non-compliance on their behalf; and
- (xii) Supply method statements for all activities requiring special attention as specified and/or requested by the MDSC environment specialist for the duration of the contract.

211. A copy of the EMP/approved SEMP will be kept on-site during the construction period at all times. Non-compliance with, or any deviation from, the conditions set out in the EMP/SEMP constitutes a failure in compliance and will require corrective actions.

**C. Environmental Management Plan Matrix**

212. Consistent with Section V, the following tables summarize the impacts and mitigation measures relative to the subproject.

**Table 36: Environmental Impacts and Mitigation Measures**

| Project Activity/ Field              | Impacts                                                                                                                                                                                                                                                                    | Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Responsibility             |             |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-------------|
|                                      |                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Implementation             | Supervision |
| 1. Design and Pre-Construction Phase |                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                            |             |
| 1.1 Design for Land/Site Development | The locations of the subproject are adjacent the embankment of Shitalakhya river. Any construction activities may cause siltation or pollution of Shitalakhya river. During construction and operation phases, there may also be that risk of landslide towards the river. | <ul style="list-style-type: none"><li>• Determine the actual volume of filling materials required for these low-lying areas to be elevated;</li><li>• Determine the appropriate filling materials to be used ensure land will be stable to withstand any infrastructure development;</li><li>• Ensure to source filling materials from legitimate and duly permitted suppliers of such materials;</li><li>• In coordination with BIWTA, prepare a Method Statement for Land/Site Development specific for these sites. The plan should include specific methodologies or techniques that will ensure no siltation occurs during earth filling works. For example, embankment protection infrastructures should be constructed first to separate the low-lying areas from Shitalakhya river. Only after this embankment protection is constructed that earth filling on the low-lying area should start; and</li><li>• Submit Method Statement for land/site development and preparation works to PMU through MDSC for approval. No site preparation or quasi-reclamation works shall be undertaken until the method statement is approved. This method statement should be able to provide the specific methodologies that the DB Contractor will use to ensure environmentally sound execution of the subproject. It should include the following:<ul style="list-style-type: none"><li>- Sequence of activities to be undertaken in order to landfill or elevate the low-lying areas to the desired level;</li><li>- Volume of landfilling or reclaim materials required;</li><li>- Source/s of landfill materials (need to ensure these are government-approved);</li><li>- Transport of landfill materials to the site;</li><li>- Compaction method, techniques and load-bearing capacity requirements;</li><li>- Stormwater and sediment flow control measures at the site;</li><li>- Slope protection measures (at the Shitalakhya river sides of the parks);</li><li>- Schedule of implementation of land development activities;</li><li>- Drawings or sketches of the planned land development; and</li><li>- Drawings or sketches showing hauling routes for landfill materials, temporary staging areas, and other facilities needed for the land development or landfilling works.</li></ul></li></ul> | DB Contractor / PMU / MDSC | PMU         |
| 1.2 Natural Hazards                  | Likelihood of seismic events and other extreme events                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>• Land development and preparation at the sites should include construction methodology that will ensure stability of the sites even during seismic or flooding events.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | DB Contractor / PMU / MDSC | PMU         |

| Project Activity/ Field                       | Impacts                                                                                                                                                                   | Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Responsibility             |             |
|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-------------|
|                                               |                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Implementation             | Supervision |
|                                               | such as flooding, landslides, etc. due to climate change                                                                                                                  | <ul style="list-style-type: none"> <li>• Structural designs need to comply with Bangladesh National Building Code.</li> <li>• Ensure embankment works by BIWTA are completed prior to construction activities.</li> <li>• Resurvey the sites after completion of embankment protection works to confirm if intended designs per initially determined footprints for the parks improvement are still valid.</li> </ul>                                                                                                                                                                                                                                                                                                                                  |                            |             |
| 1.2 Pollution Prevention                      | Toilet facilities included as part of the parks development plan will have the potential to pollute the river (Shitalakhya river) and immediate environment.              | <ul style="list-style-type: none"> <li>• Ensure toilet design follows internationally accepted standards such as the included of two-chambered septic tank for each toilet, and other environmental engineering design principles to ensure effluent complies with government standards.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                    | DB Contractor / PMU / MDSC | PMU         |
| 1.3 Disruption of Public Utilities/services   | Utility lines within or in the vicinities of the subproject sites may need to be moved. Otherwise, these may be damaged disrupting or interrupting services to consumers. | <ul style="list-style-type: none"> <li>• Provision in the design and budget for the relocation of the existing utility infrastructures, wherever required;</li> <li>• Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction phase;</li> <li>• Require construction contractors to prepare a contingency plan to include actions to be taken in case of unintentional interruption of services;</li> <li>• Utilities will only be removed and relocated with proper agency approvals and permission; and</li> <li>• Reconnection of utilities will be completed at the shortest practicable time before construction commences.</li> </ul> | DB Contractor / PMU / MDSC | PMU         |
| 1.4 Removal of Trees                          | Around 6 mature trees may be affected/cut during construction.                                                                                                            | <ul style="list-style-type: none"> <li>• Site layout to ensure no infrastructure components overlap these trees; and</li> <li>• Bidding and contract documents to clearly state no cutting of trees will be allowed, and committing so shall be a non-compliance warranting penalty (monetary or any means to be determined during contract finalization).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                  | DB Contractor / PMU / MDSC | PMU         |
| 1.5 Consents, Permits, NOCs, Clearances, etc. | Failure to obtain necessary consents, permits, and other appropriate regulatory clearances can result to design revisions and work stoppage.                              | <ul style="list-style-type: none"> <li>• Obtain all of the necessary consents, permits, and clearances before the start of civil works.</li> <li>• Acknowledge in writing and provide report on compliance all obtained permits, clearance, NOCs, etc.</li> <li>• Include in detailed design drawings and documents all conditions and provisions if necessary.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                             | DB Contractor, MDSC        | PMU         |

| Project Activity/ Field                          | Impacts                                                                                                                                                                                                                                                                                                                          | Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Responsibility              |              |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|--------------|
|                                                  |                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Implementation              | Supervision  |
| 1.6 Contractor Mobilization                      | Fielding of equipment and manpower to the site will likely impact baseline site conditions and potentially damage private properties and public properties, including cultural heritage sites. Safety of both workers and the community will also be likely affected due to movements of both workers and construction equipment | DB Contractor to ensure the following are complied prior to mobilization: <ul style="list-style-type: none"> <li>• Developed the required site-specific EMPs (SEMPs) and these are approved by PMU with support from MDSC;</li> <li>• Developed a Traffic Management Plan covering all subproject sites and their vicinities, in coordination with local traffic police. DB Contractor shall have traffic management plan in place prior to the excavation;</li> <li>• Developed a Spoil or Waste Management Plan that will include information on the government-approved disposal site and the route from subproject locations to the said site; and</li> <li>• Developed a Health and Safety Plan approved by PMU with support from MDSC. The plan will include specific steps to manage potential spread of COVID-19 and other emerging infectious diseases.</li> </ul> | DB Contractor               | PMU<br>MDSC  |
| 1.7 Construction Camps or Workers' Accommodation | When camps or accommodation are constructed, there is a likelihood that these are built without amenities resulting to social stress and degradation of the local environment                                                                                                                                                    | <ul style="list-style-type: none"> <li>• Ensure that the camps or accommodations be provided with sanitary amenities at designated areas. In addition to any local regulations, DB Contractors will need to follow the standards for workers accommodation pertaining to "Workers' accommodation: processes and standards. A guidance note by IFC and the EBRD" 2009.<sup>34</sup></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | DB Contractor               | PMU,<br>MDSC |
| 1.8 Updating of IEE and SEMP Preparation         | Without updated IEE and SEMP, works will not commence resulting to delay in the project implementation.                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>• Ensure IEEs are updated based on final detailed designs, and submitted to ADB for final review, clearance and disclosure.</li> <li>• Ensure SEMPs are prepared and submitted to PMU for approval.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | DB Contractor/<br>MDSC/PMU  | PMU          |
| 1.9 Community Awareness                          | Consultations will be needed prior to civil works construction to enable communities around the subproject sites understand of the final schedule. Without proper interaction with local communities and or with stakeholders may lead to confusion and agitation and non-cooperation of local people.                           | Undertake another round of consultation to inform the people of the following: <ul style="list-style-type: none"> <li>• Refresher on the overview and objectives of the subproject;</li> <li>• Preliminary and/or final detailed design of subproject components;</li> <li>• Schedule of implementation;</li> <li>• Potential environmental and social impacts (positive and negative) of the subproject, and the proposed mitigation measures for the perceived negative impacts; and</li> <li>• Grievance redress mechanism and contact details of the subproject.</li> </ul>                                                                                                                                                                                                                                                                                             | PMU, MDSC,<br>DB Contractor | PMU          |

<sup>34</sup> [https://www.ifc.org/wps/wcm/connect/topics\\_ext\\_content/ifc\\_external\\_corporate\\_site/sustainability-at-ifc/publications/publications\\_gpn\\_workersaccommodation](https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/publications/publications_gpn_workersaccommodation)

| Project Activity/ Field                 | Impacts                                                                                                                                                                                                                                                                                                                     | Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Responsibility |             |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------------|
|                                         |                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Implementation | Supervision |
| 1.10 EMP Implementation Training        | Lack of proper training to implement the EMP leads to mismanaged environmental safeguards.                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Ensure to provide EMP training to contractors, workers and representatives from NCC.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | MDSC           | PMU         |
| <b>2. During Construction Phase</b>     |                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                |             |
| 2.1 Sources of Materials                | Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution.                                                                                                                        | <ul style="list-style-type: none"> <li>Sourcing construction materials, including aggregates, etc., from legitimate suppliers authorized by the government;</li> <li>For filling materials required for leveling the subproject sites (specifically the proposed sites for Public Space and southern boundary of Park A), follow instructions from the PMU through MDSC and/or comply with pre-approved arrangement on how to obtain these materials; and</li> <li>Maintain a construction material register at the site.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | DB Contractor  | MDSC, PMU   |
| 2.2 Stabilization of Land               | There may be risk of landslide towards the river. Any collapse in this area will potentially wipe out or damage portions of the sites.                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>Stabilize the sites with proper construction methodology to ensure they are compacted to soil strength and stability appropriate for the infrastructure that will be built on site;</li> <li>Use of appropriate filling materials to ensure land will be stable to withstand any infrastructure development; and</li> <li>Undertake geotechnical study (or any similar expert-guided study), including assessment of land subsidence potential at these sites, and ensure results are considered in the land preparation and design of the parks infrastructures.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | DB Contractor  | MDSC, PMU   |
| 2.3 Site Clearance and Land Preparation | Land preparation, grading and other site clearance activities may result to numerous impacts such as siltation of canals in the area particularly the Shitalakhya river, degradation of air quality in the area due to dust, and elevation of noise level due to use of heavy equipment in the excavation and land grading. | <ul style="list-style-type: none"> <li>Dispose only in the designated disposal areas identified under the subproject;</li> <li>Avoid storing spoils at the vicinity of site for a long period of time. Haul spoils on a regular basis to ensure more efficient handling and management at the disposal sites;</li> <li>Avoid or stop site clearance and grading works during heavy rains;</li> <li>Conventional dust control measures such as use of water sprays and minimizing hauling and vehicle movements during windy times of the day or night;</li> <li>Proper covering (e.g. tarpaulin) of hauling equipment such as dump trucks during transport of materials or spoils;</li> <li>Provide temporary barriers or covers around active site grading areas;</li> <li>Limit vehicles speed at work site;</li> <li>Prohibit idling of heavy equipment or vehicles for a long time;</li> <li>Regular maintenance of heavy equipment and vehicles to ensure compliance with national vehicle emissions standards;</li> <li>Prohibit burning of any liquid or solid wastes;</li> </ul> | DB Contractor  | MDSC, PMU   |

| Project Activity/ Field       | Impacts                                                                                                                                                                              | Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Responsibility |             |
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|                               |                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>• Conduct regular visual inspections to identify and address other potential sources of dust emissions;</li> <li>• Conduct ambient air quality monitoring at strategic locations at least once every quarter. Ensure that sampling locations are based on the wind and dust/smoke dispersion direction at the site;</li> <li>• Provide prior information of the scheduled works to nearby residents;</li> <li>• During night time, avoid construction works that generate noise;</li> <li>• Avoid delivery of raw construction materials during night time;</li> <li>• Minimize drop heights during delivery and stacking of raw construction materials;</li> <li>• Use silencers for all equipment;</li> <li>• Use sound barriers to lessen the noise from site, particularly when working at the site for the playground in Ward 24 where surrounding communities may likely be disturbed;</li> <li>• Maintain maximum of noise level of 45 dB(A) at the nearest residence relative to the specific worksite;</li> <li>• Conduct noise level monitoring. Ensure to conduct at least one sampling every quarter when construction activities are at peak. Important areas to test are at locations nearest the community residents and construction camp;</li> <li>• Use pumping equipment with low level noise generation;</li> <li>• If using generators, use generator set with capacity just enough for the electricity needs at night;</li> <li>• Ensure generator set complies with the noise standards; and</li> <li>• Ensure generator set has acoustic enclosure and silencer (if necessary) in the exhaust muffler.</li> </ul> |                |             |
| 2.4 Topography and Aesthetics | Construction works for the parks and public spaces will affect the topography and aesthetics at the sites due to potential accumulation of unmanaged spoils and construction debris. | <p>Implement the Spoil Management Plan, and in addition the following measures (if not specifically included in the Spoil Management Plan):</p> <ul style="list-style-type: none"> <li>• Avoid storing spoils at the vicinity of construction sites for a long period of time. Haul spoils on a regular basis to ensure more efficient handling and management at the disposal sites;</li> <li>• Dispose only in the designated disposal areas identified under the subproject;</li> <li>• Ensure adequate compaction, and drainage system around the disposal areas;</li> <li>• Ensure disposal areas are utilized up to their capacity limit only and in accordance with the required sloping and leveling/grading specification approved under the subproject; and</li> <li>• If disposal area reaches the limit, utilize another designated disposal area approved under the subproject.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | DB Contractor  | MDSC, PMU   |

| Project Activity/ Field                    | Impacts                                                                                                                                                                  | Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Responsibility |             |
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| 2.5 Terrestrial Flora and Fauna Resources  | Construction phase activities may pose impact to other flora and fauna resources in the immediate vicinity of the sites.                                                 | <p>DB Contractors need to observe and comply with the following:</p> <ul style="list-style-type: none"> <li>• Avoid any cutting of trees and shrubs at the construction site. The spaces are wide enough for any activities without cutting any of the trees or locally important plants, if any;</li> <li>• Prohibit use of wood as fuel at construction camp sites, if any;</li> <li>• Provide LPG/kerosene to workforce staying at the construction camp sites; and</li> <li>• Prohibit the harvest and trade of any plants or poaching of animals found in the area.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | DB Contractor  | MDSC, PMU   |
| 2.6 Surface Water Quality and Aquatic Life | Excavation and construction activities may result to accidental spills of chemicals and siltation that could threaten the quality of Shitalakhya river nearby the sites. | <p>Ensure to implement the following measures:</p> <ul style="list-style-type: none"> <li>• Dispose excess spoils only in the designated disposal areas identified under the subproject;</li> <li>• Avoid storing spoils at the vicinity of site for a long period of time. Haul spoils on a regular basis to ensure more efficient handling and management at the disposal sites;</li> <li>• To minimize excess spoils for disposal, use some for beneficial purposes such as in any other construction activities, or to raise the level of low-lying areas;</li> <li>• Ensure proper compaction of refilled soil and there shall not be any loose soil particles on the top; the material shall be refilled in layers and compacted properly layer by layer;</li> <li>• Silt traps to be provided at construction area near the Shitalakhya River;</li> <li>• No equipment or machinery shall be operated outside the work areas;</li> <li>• Avoid spillage of fuels, chemicals and lubricants. Fuel and other petroleum products stored at storage areas away from water drainage and protected by impermeable lining and banded 110% by volume;</li> <li>• Ensure that drains are not blocked with excavated soil;</li> <li>• Locate stockyards away from canals or Shitalakhya River;</li> <li>• For effluents from construction camps and site offices, provide treatment arrangements such as retention ponds and septic tanks which should be incorporated in the facility designs. If necessary, a sewage management plan has to be prepared by the DB Contractors and agreed with PMU;</li> <li>• Monitor water quality according to the environmental management plan;</li> <li>• Clean up of the area after the completion and prior to the onset of monsoon season; and</li> <li>• Avoid or stop site clearance and grading works during heavy rains. Avoid scheduling of excavation work during the monsoon season. Earthworks should be undertaken during dry season.</li> </ul> | DB Contractor  | MDSC, PMU   |
| 2.7 Groundwater Quality                    | Construction activities could potentially contaminate                                                                                                                    | Ensure to implement the following:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | DB Contractor  | MDSC, PMU   |

| Project Activity/ Field | Impacts                                                                                                                                                                                                                                          | Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Responsibility |             |
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|                         | groundwater resource due to seepage of liquid wastes and chemicals from construction sites and construction camp sites.                                                                                                                          | <ul style="list-style-type: none"> <li>• Store fuel, oil and other chemicals in secure, managed areas with lined impervious floors and bunded with 110% by volume;</li> <li>• Ensure refueling area has lining to avoid seepage of unavoidable spills during refueling. Ensure to clean up spills immediately and all used cleaning materials are disposed properly;</li> <li>• Ensure to provide portable toilets in all construction camps to discourage injecting septic wastes on land; and</li> <li>• Conduct ground water quality monitoring, particularly at sites near fuel depot or refueling site and construction camps. Ensure to conduct at least one sampling every quarter. Important parameters to test are Oil and Grease, and Fecal Coliform.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                             |                |             |
| 2.8 Ambient Air Quality | Construction activities could result to generation of dust that could remain airborne within and around the subproject sites, and degrade the ambient air quality in the area. This could affect the general wellbeing of residents in the area. | <p>Ensure to implement the following:</p> <ul style="list-style-type: none"> <li>• Conventional dust control measures such as use of water sprays and minimizing hauling and vehicle movements during windy times of the day or night;</li> <li>• Proper covering (e.g. tarpaulin) of hauling equipment such as dump trucks during transport of materials or spoils;</li> <li>• Provide temporary barriers or covers around active site grading areas;</li> <li>• Limit vehicles speed at work site enough to not cause vigorous suspension of dust;</li> <li>• Prohibit idling of heavy equipment or vehicles for a long time;</li> <li>• Regular maintenance of heavy equipment and vehicles to ensure compliance with national vehicle emissions standards;</li> <li>• Prohibit burning of any liquid or solid wastes;</li> <li>• Conduct regular visual inspections to identify and address other potential sources of dust emissions; and</li> <li>• Conduct ambient air quality monitoring at strategic locations at least once every quarter. Ensure that sampling locations are based on the wind and dust/smoke dispersion direction at the sites.</li> </ul> | DB Contractor  | MDSC, PMU   |
| 2.9 Noise Level         | Construction activities will result to generation of noise that could disturb both the construction workers, staff, and community people                                                                                                         | <p>Ensure to implement the following:</p> <ul style="list-style-type: none"> <li>• Provide prior information of the scheduled works to nearby residents, particularly at the playground site in Ward 24;</li> <li>• Use silencers for all equipment;</li> <li>• Avoid delivery of raw construction materials during night time at the playground site in Ward 24;</li> <li>• Avoid noise-intensive activities at night time;</li> <li>• Horns should not be used unless it is necessary to warn others or animals of the vehicle's approach;</li> <li>• Minimize drop heights during delivery and stacking of raw construction materials;</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | DB Contractor  | MDSC, PMU   |

| Project Activity/ Field                      | Impacts                                                                                                                                                                                                                                             | Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Responsibility |             |
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|                                              |                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>• Use sound barriers to lessen the noise from site;</li> <li>• Maintain maximum of noise level of 45 dB(A) at the nearest residence relative to the specific worksite;</li> <li>• Conduct noise level monitoring. Ensure to conduct at least one sampling every quarter when construction activities are at peak. Important areas to test are at locations nearest the community residents in Ward 24 and construction camps;</li> <li>• Use pumping equipment with low level noise generation;</li> <li>• If using generators, ensure generator set complies with the noise standards; and</li> <li>• Ensure generator set has acoustic enclosure and silencer (if necessary) in the exhaust muffler.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                        |                |             |
| 2.10 Underground Physical Cultural Resources | There is a possibility of chance finds. Excavation activities could damage potential underground heritage assets.                                                                                                                                   | <p>Ensure to implement the following protocol:</p> <ul style="list-style-type: none"> <li>• strictly follow the protocol which would require the DB Contractors to coordinate immediately with PMU, and Bangladesh Department of Archaeology for any suspicion of chance finds during excavation works;</li> <li>• stop work immediately to allow further investigation if any finds are suspected; and</li> <li>• request authorized person from the Bangladesh Department of Archaeology to observe when excavation resumes for the identification of the potential chance find, and comply with further instructions.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | DB Contractor  | MDSC, PMU   |
| 2.11 Community Health and Safety             | The construction sites and construction activities could pose danger to pedestrians, animals and other community people due to moving heavy equipment, electrocution, or excavated areas. Spread or outbreak of diseases could be a threat as well. | <p>Ensure to implement the following:</p> <ul style="list-style-type: none"> <li>• Install warning signs, warning tapes, hard barricades, and notices around the site perimeter to avoid unauthorized entry;</li> <li>• Assign guards around the subproject sites on a 24/7 basis;</li> <li>• Provide lighting all around the subproject site to ensure the perimeter is well-lit at nighttime;</li> <li>• Follow a code of conduct for workers, which should include restricting workers in designated areas, no open defecation, no littering, no firewood collection, no setting of fire except when needed but in designated places, no trespassing, no unauthorized overstaying at construction sites, and no obligation to undertake potentially dangerous work without the use of proper personal protective equipment, among others;</li> <li>• Follow International best practices on community health and safety such as those in Section 4.3 of World Bank Environmental Health and Safety (EHS) Guidelines on Construction and Decommissioning Activities;<sup>35</sup> The community health and safety plan shall ensure the following:</li> </ul> | DB Contractor  | MDSC, PMU   |

<sup>35</sup> IFC World Bank Group. 2007. <https://www.ifc.org/content/dam/ifc/doc/2000/2007-general-ehs-guidelines-construction-and-decommissioning-en.pdf>

| Project Activity/ Field | Impacts | Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Responsibility |             |
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|                         |         | <ul style="list-style-type: none"> <li>○ implement risk management strategies to protect the community from physical, chemical, or other hazards associated with sites under construction and decommissioning;</li> <li>○ restricting access to the site, through a combination of institutional and administrative controls, with a focus on high risk structures or areas depending on site-specific situations, including fencing, signage, and communication of risks to the local community;</li> <li>○ removing hazardous conditions on construction sites that cannot be controlled affectively with site access restrictions, such as covering openings to small confined spaces, ensuring means of escape for larger openings such as trenches or excavations, or locked storage of hazardous materials;</li> <li>○ implement measure to prevent proliferation of vectors of diseases at work sites;</li> <li>○ adequate space and lighting, temporary fences, shining barriers and signage at active work sites;</li> <li>○ contractor's preparedness in emergency response;</li> <li>○ adequate dissemination of GRM and contractor's observance and implementation of GRM; and</li> <li>○ upon availability, local people should be given an opportunity for work in the subproject activities;</li> <li>● Follow international best practices on traffic safety such as those in Section 3.4 of the World Bank Environmental Health and Safety (EHS) Guidelines on Community Health and Safety;<sup>36</sup> The community health and safety plan should include: <ul style="list-style-type: none"> <li>○ Adoption of best transport safety practices across all aspects of project operations with the goal of preventing traffic accidents and minimizing injuries suffered by project personnel and the public. Measures should include: <ul style="list-style-type: none"> <li>▪ Emphasizing safety aspects among drivers;</li> <li>▪ Improving driving skills and requiring licensing of drivers;</li> <li>▪ Adopting limits for trip duration and arranging driver rosters to avoid overtiredness;</li> <li>▪ Avoiding dangerous routes and times of day to reduce the risk of accidents;</li> <li>▪ Use of speed control devices (governors) on trucks, and remote monitoring of driver actions;</li> </ul> </li> </ul> </li> </ul> |                |             |

<sup>36</sup> IFC World Bank Group. 2007. <https://www.ifc.org/content/dam/ifc/doc/2000/2007-general-ehs-guidelines-community-health-and-safety-en.pdf>

| Project Activity/ Field             | Impacts                                                                                                                                                                                                | Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Responsibility |             |
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|                                     |                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.</li> </ul> <p>Where the project may contribute to a significant increase in traffic along existing roads, or where road transport is a significant component of a project, recommended measures include:</p> <ul style="list-style-type: none"> <li>Minimizing pedestrian interaction with construction vehicles;</li> <li>Collaboration with local communities and responsible authorities to improve signage, visibility and overall safety of roads, particularly along stretches located near schools or other locations where children may be present. Collaborating with local communities on education about traffic and pedestrian safety (e.g. school education campaigns);</li> <li>Coordination with emergency responders to ensure that appropriate first aid is provided in the event of accidents;</li> <li>Using locally sourced materials, whenever possible, to minimize transport distances. Locating associated facilities such as worker camps close to project sites and arranging worker bus transport to minimizing external traffic; and</li> <li>Employing safe traffic control measures, including road signs and flag persons to warn of dangerous conditions.</li> </ul> <ul style="list-style-type: none"> <li>Follow the established community and occupational health and safety protocol on emerging infectious diseases such as COVID-19;</li> <li>Maintain a complaint logbook at the site and take action promptly of complaints;</li> <li>Schedule transport and hauling activities by avoiding peak traffic periods;</li> <li>Clean wheels and undercarriage of haul trucks prior to leaving construction site;</li> <li>Educate drivers: limit speed between 20-25 km/h while traversing settlement areas and avoid use of horn unless necessary to prevent accidents; and</li> <li>Earmark parking place for construction equipment and vehicles when idling; no parking shall be allowed on the roads, that may disturb the traffic movement.</li> </ul> |                |             |
| 2.12 Occupational Health and Safety | Construction workers are also at risk of accidents due to various hazards (moving vehicles, high level of pollution from dust, exhaust of vehicles and machinery and noise). Further, extended working | <p>Ensure to implement the following:</p> <ul style="list-style-type: none"> <li>All relevant provisions of the Bangladesh labor Law, 2006, other national regulations related to occupational health and safety as tabulated in Chapter II of this IEE report, and relevant WHO guidelines will be adhered to, concerning the provision of adequate measures to avoid contracting and/or spreading diseases during construction phase;</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | DB Contractor  | MDSC, PMU   |

| Project Activity/ Field | Impacts                                                                                                                                                                      | Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Responsibility |             |
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|                         | hours of workers could lead to risk of accidents due to fatigue. Construction workers are also exposed to possible disease outbreak at the work sites or construction camps. | <ul style="list-style-type: none"> <li>Follow international best practices on occupational health and safety such as those in Section 4.2 of World Bank EHS Guidelines on Construction and Decommissioning Activities,<sup>37</sup> which include the following elements, whichever are applicable:               <ul style="list-style-type: none"> <li>Communication and Training                   <ul style="list-style-type: none"> <li>Training of all workers on occupational health and safety prior to construction works;</li> <li>Conduct of orientation to visitors on health and safety procedures at work site;</li> <li>Signages strategically installed to identify all areas at work site, including hazard or danger areas;</li> <li>Proper labeling of equipment and containers at construction and storage sites; and</li> <li>Suitable arrangements to cater for emergencies, including: first aid equipment; personnel trained to administer first aid; communication with, and transport to, the nearest hospital with an accident / emergency department; monitoring equipment; rescue equipment; firefighting equipment; and</li> <li>communication with nearest fire brigade station;</li> </ul> </li> <li>Physical Hazards                   <ul style="list-style-type: none"> <li>Use of personal protective equipment (PPE) by all workers such as earplugs, safety shoes, hard hats, masks, goggles, etc. as applicable, and ensure these are used properly;</li> <li>Avoidance of slips and falls through good house-keeping practices, such as the sorting and placing loose construction materials or demolition debris in established areas away from foot paths, cleaning up excessive waste debris and liquid spills regularly, locating electrical cords and ropes in common areas and marked corridors, and use of slip retardant footwear;</li> <li>Use of bracing or trench shoring on deep excavation works;</li> <li>Adequate lighting in dark working areas and areas with night works;</li> <li>Rotating and moving equipment inspected and tested prior to use during construction works. These shall be parked at designated areas and operated by qualified and trained operators only;</li> <li>Specific site traffic rules and routes in place and known to all personnel, workers, drivers, and equipment operators; and</li> </ul> </li> </ul> </li> </ul> |                |             |

<sup>37</sup> IFC World Bank Group. 2007. [Environmental, Health, and Safety \(EHS\) Guidelines – General EHS Guidelines: Construction and Decommissioning](#).

| Project Activity/ Field | Impacts | Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Responsibility |             |
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|                         |         | <ul style="list-style-type: none"> <li>▪ Use of air pollution source equipment and vehicles that are well maintained and with valid permits;</li> <li>○ General Facility Design and Operation               <ul style="list-style-type: none"> <li>▪ Regular checking of integrity of workplace structures to avoid collapse or failure;</li> <li>▪ Ensuring workplace can withstand severe weather conditions;</li> <li>▪ Enough work spaces available for workers, including exit routes during emergencies;</li> <li>▪ Fire precautions and firefighting equipment installed;</li> <li>▪ First aid stations and kits are available. Trained personnel should always be available who can provide first aid measures to victims of accidents;</li> <li>▪ Secured storage areas for chemicals and other hazardous and flammable substances are installed and ensure access is limited to authorized personnel only;</li> <li>▪ Good working environment temperature maintained;</li> <li>▪ Worker camps and work sites provided with housekeeping facilities, such as separate toilets for male and female workers, drinking water supply, wash and bathing water, rest areas, and other lavatory and worker welfare facilities; and</li> <li>▪ Maintain records and make reports concerning health, safety and welfare of persons, and damage to property. Take remedial action to prevent a recurrence of any accidents that may occur.</li> </ul> </li> <li>• Follow established occupational health and safety protocol on emerging infectious diseases such as the COVID19;</li> <li>• Provide regular health check-ups, sanitation and hygiene, health care, and control of diseases for the workforce;</li> <li>• Provide at cost all labor and materials and construct/install and maintain site safety, hard barricading, flexible green net, signboards, and lightings throughout the construction site;</li> <li>• Launch awareness programs concerning human trafficking and the possibility of spread of sexually transmitted diseases (STDs) and HIV/AIDS using brochures, posters, and signboards;</li> <li>• Make available ambulance facility at the construction site and camp site, if any;</li> <li>• Compensation for the loss of life (a zero tolerance to loss of life policy should be developed and implemented) or for any type of injuries; and</li> <li>• Provide insurance to the workers. Health and safety training for all site personnel is very important and must be mandatory.</li> </ul> |                |             |

| Project Activity/ Field                                | Impacts                                                                                                                                                                                                                                                                                         | Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Responsibility |             |
|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------------|
|                                                        |                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Implementation | Supervision |
| 2.13 Local Festivals and Cultural Practices            | Construction activities may disrupt religious or local festivities.                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>DB Contractor shall follow religious and city festival calendar to avoid impact upon local celebrations.</li> <li>Construction works need to be avoided or minimized during the festivals. If excavation works or construction works have been done but remain unrestored approaching a certain festivity, alternative access to mosques and other important sites must be considered or set up.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | DB Contractor  | MDSC, PMU   |
| 2.14 Socioeconomic Resources                           | Construction works may result in temporary loss of livelihoods and interruption of social and economic activities in some subproject sites. In areas where there are shops or other commercial activities, these could lose some business if access is difficult for customers.                 | <p>Ensure to implement the following:</p> <ul style="list-style-type: none"> <li>Adopt the GRM of the project, and respond to grievances;</li> <li>The construction works do not interfere with the convenience of the public or access to, use, and occupation of public or private roads, or any other access to properties, whether public or private.</li> <li>Temporary access to properties adjacent to the construction site will be provided through the construction of ramps with concrete slabs for use of pedestrians and light vehicles. Handrails may be provided to ramps or planks depending on the width of excavations;</li> <li>In critical areas such as institutions, operating hours are factored into work schedules and workforce is increased for speedy completion;</li> <li>Advance information on works to be undertaken including appropriate signage is provided;</li> <li>The diversion is done in coordination with the traffic police division for necessary rerouting of traffic and traffic management.</li> </ul> | DB Contractor  | MDSC, PMU   |
| 2.15 Job Opportunities                                 | (Positive Impact) Subproject activities will create significant temporary employment for construction workers, equipment maintenance and support staff.                                                                                                                                         | (Intensification or enhancement measure) As much as possible when expertise is available, DB Contractor to recruit from local workforce.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | DB Contractor  | MDSC, PMU   |
| <b>3. Post-Construction Phase</b>                      |                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                |             |
| 3.1 Construction waste management and site restoration | The activities of the subproject will result to sorts of construction wastes and traces of excess spoils after the construction period. Indiscriminate disposal or ignoring their proper disposal could be dangerous to the environment and the people in the vicinity of the subproject sites. | <p>Immediately within one week after construction phase, the DB Contractor shall collect all the wastes at the different sites, and implement the following. DB Contractor may opt to outsource this to qualified entities in NCC, provided that DB Contractor's EHS personnel strictly supervise the cradle-to-grave management of all these wastes. All costs related to management of these wastes shall be borne by the DB Contractor, or as per agreement in the DB contract documents.</p> <ul style="list-style-type: none"> <li>Segregate or sort all wastes according to nature (recyclable, non-recyclable, hazardous, non-hazardous or any combination);</li> </ul>                                                                                                                                                                                                                                                                                                                                                                        | DBO Contractor | MDSC, PMU   |

| Project Activity/ Field                             | Impacts                                                                                                                 | Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Responsibility |             |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------------|
|                                                     |                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Implementation | Supervision |
|                                                     |                                                                                                                         | <ul style="list-style-type: none"> <li>• Ensure to handover (or sell as the case may be) recyclable wastes to authorized recycling entities in Bangladesh. DB Contractor shall coordinate this action with NCC through the PMU;</li> <li>• Ensure to dispose non-recyclable and non-hazardous wastes to appropriate disposal sites. These may be collected, transported and disposed similar to how solid wastes in the city is managed. Thus, DB Contractor shall coordinate with NCC through the PMU in this regard;</li> <li>• Ensure to transport and dispose hazardous wastes using authorized hazardous waste transporters and treaters in Bangladesh. DB Contractor shall coordinate all actions for these wastes with NCC through the PMU; and</li> <li>• Ensure the sites are cleared with all wastes disposed accordingly, and compliance with this measure shall be included as one of the conditions for payment to the DB contractor.</li> </ul> |                |             |
| <b>4. Operation and Maintenance (O&amp;M) Phase</b> |                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                |             |
| 4.1 Community Health and Safety                     | Neighboring community is likely to be temporarily disrupted due to mismanagement of the parks and public space.         | <p>NCC as the administrators of the parks will:</p> <ul style="list-style-type: none"> <li>• Assign full time management staff (and caretakers) of the parks and train them with the maintenance requirements, delineated by the contractor before handing over the parks;</li> <li>• Develop and implement appropriate protocols to reduce risks to safety, public health, and environment that include well-written instructions. If necessary, include curfew hours within these facilities to ensure no illegal dwellers penetrate these public spaces;</li> <li>• Protect components of park facilities from damage and ensure their efficient function (e.g. walkways, lightings, toilets, faucets, water supply); and</li> <li>• Provide 24/7 security personnel at all subproject sites.</li> </ul>                                                                                                                                                   | NCC            | NCC         |
| 4.2 Pollution                                       | The parks and public spaces could be a potential source of water pollution (toilets) and land pollution (solid wastes). | <p>NCC will ensure the following:</p> <ul style="list-style-type: none"> <li>• Presence of 24/7 guards and caretakers in all these sites;</li> <li>• Proper functioning of toilets, including water supply and other components therein (e.g. faucets, flushing mechanisms for sanitary water closets, etc.);</li> <li>• Desludging of the septic tanks based on design schedule. Desludged materials will need to be disposed in NCC-authorized disposal sites; and</li> <li>• Maintenance of garbage bins all around the facilities and ensuring regular collection of the garbage by the NCC-authorized collectors.</li> </ul>                                                                                                                                                                                                                                                                                                                             | NCC            | NCC         |

#### D. Capacity Building

213. In order to ensure smooth implementation and monitoring of the EMP, it is important that all key implementation stakeholders have the necessary capacity and knowledge about the requirements of ADB SPS and relevant government environmental laws, rules and regulations. The MDSC Environmental Specialist will train and assist key stakeholders, particularly NCC and PMU, in developing the capacity. An indicative training program outlined below will be utilized by the MDSC Environment Specialist in the conduct of training.

214. The proposed capacity building program will include:

- (i) sensitization of NCC and PMU staff and stakeholders on environmental management, including on the ADB, and Government of Bangladesh requirements on environment;
- (ii) capacity building programs to improve the capability of environment staff at all levels in carrying out/monitoring and implementing environmental management measures for the subproject; and
- (iii) capacity building programs on environmental issues including quality monitoring.

215. The MDSC Environmental Specialist will provide the basic training required for environmental awareness followed by specific aspects of infrastructure improvement projects along with environmental implications for projects. Specific modules customized for the available skills set will be devised after assessing the capabilities of the members of the Training Program and the requirements of the subproject. The entire training would cover basic principles of environmental assessment and management mitigation plans and programs, implementation techniques, monitoring methods and tools. The proposed training program along with the frequency of sessions is presented in table below.

**Table 37: Training Modules for Environmental Management<sup>a</sup>**

| Program                                              | Description                                                                                                                                                                                                                                                                                            | Participants                                                                                                                                                                                                                                                   | Form of Training | Duration                             | Trainer /Agency             |
|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------------------------|-----------------------------|
| Introduction and sensitization to environment issues | <p>Sensitization on environmental concerns</p> <p>Environmental impacts of water supply projects, drainage projects, and urban developments such as green space and parks improvements.</p> <p>Environmental regulations of the Government and ADB SPS</p> <p>Coordination between departments for</p> | <p>NCC engineers / management team, officials responsible for implementing the overall project and subprojects, and other NCC Officials and PMU Environmental Safeguards Officer</p> <p>Contractors (both DB/DBO contractors; and civil works contractors)</p> | Workshop         | One-day workshop during construction | MDSC Environment Specialist |

| Program                                                                                                         | Description                                                                                                                                                                                                                                                                                                                                                                         | Participants                                                                                                                                                                                                                         | Form of Training         | Duration                                | Trainer /Agency                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                 | implementation of environmental issues.                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                      |                          |                                         |                                                                                                                                                                                                                                                                     |
| Training on hazards, health, safety and environmental issues pertaining to the overall project and subprojects. | <p>Sensitization and training for engineering and management professionals, to be involved in on-site execution and operation of the overall project and subprojects.</p> <p>Special training on handling and disposal of asbestos-containing materials such as asbestos cement pipes.</p> <p>Special training on testing, handling and disposal of sludge from WTP operations.</p> | <p>NCC engineers/ Management Team, PMU Environmental Safeguards Officer</p> <p>Contractors (both DB/DBO contractors and civil works contractors)</p>                                                                                 | Workshops , site visits  | Two days before and during construction | <p>MDSC Environment Specialist and Health and Safety Specialist</p> <p>Asbestos Expert (may be hired by MDSC as resource person during the training)</p> <p>Hazardous Materials Management Expert (may be hired by MDSC as resource person during the training)</p> |
| EMP implementation                                                                                              | <p>Implementation of EMP</p> <p>Identification of environment impacts</p> <p>Monitoring and reporting for EMP</p> <p>Public interactions and consultations</p> <p>Coordination for consents with various departments</p>                                                                                                                                                            | <p>NCC engineers, officials responsible for implementing the overall project and subprojects, and other NCC Staff, PMU Environmental Safeguards Officer</p> <p>Contractors (both DB/DBO contractors and civil works contractors)</p> | Lectures and field visit | Two-day session at construction stage   | MDSC Environment Specialist                                                                                                                                                                                                                                         |

| Program | Description                                       | Participants | Form of Training | Duration | Trainer /Agency |
|---------|---------------------------------------------------|--------------|------------------|----------|-----------------|
|         | Monitoring formats, filling and review of impacts |              |                  |          |                 |

<sup>a</sup> This training program is for the entire NGRUDP. Some elements or modules of the training may not be applicable for the DB Contractor of the Parks Development Subproject (e.g. ACM, sludge management). However, their attendance or participation in such modules of the program is still recommended for knowledge development.

## E. Environmental Budget

216. Costs for implementing the EMP in this IEE report include monitoring costs during construction and capacity building costs on environmental management, which are absorbed into the DB Contractor's work contract. The costs for training proposed include the costs incurred toward site visits, travel to the training program by participants, printing of training materials, and other logistic arrangements. The costs involved towards preparation of training material and training are covered in the consultancy budget for the MDSC. These costs are presented in table below.

217. The cost estimates mentioned in table below are indicative amounts. These shall be reviewed by the DB Contractor, and assessed if enough for implementing the EMP. Any budget shortfall, including other necessary measures identified during the implementation phase, shall be supplemented from the provisional sum of the DB Contractor's contract.

218. As such, these costs must be included in the Contract documents along with a copy of IEE. The EMP implementation shall be integrated into the Project Administration Manual (PAM).

**Table 38: Cost Estimates to Implement the EMP<sup>a</sup>**

| Particulars                                                                                                                                                | Stage                                | Unit         | Total number | Rate (BDT) | Cost (BDT) | Costs covered by |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|--------------|--------------|------------|------------|------------------|
| <b>Mitigation Measures</b>                                                                                                                                 |                                      |              |              |            |            |                  |
| Environmental mitigation / enhancement measures integrated into the designs and costs included as part of civil works, including OHS measures <sup>b</sup> | Pre-construction / Construction      | year         | 3            | 1,085,000  | 3,255,000  | DB Contractor    |
| Sub-Total (A)                                                                                                                                              |                                      |              |              |            | 3,255,000  |                  |
| <b>Monitoring Measures</b>                                                                                                                                 |                                      |              |              |            |            |                  |
| Air Quality monitoring                                                                                                                                     | Pre-Construction: Once               | Per location | 3            | 25,000     | 75,000     | DB Contractor    |
| Air Quality monitoring                                                                                                                                     | Construction: Twice/Year for 3 years | Per location | 18           | 25,000     | 450,000    | DB Contractor    |

| Particulars                                                                                                                                                                       | Stage                                                                                                 | Unit         | Total number | Rate (BDT) | Cost (BDT)           | Costs covered by    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|--------------|--------------|------------|----------------------|---------------------|
| Noise level                                                                                                                                                                       | Pre-Construction:<br>Once at 3 locations during day and night                                         | Per location | 6            | 3,000      | 18,000               | DB Contractor       |
| Noise level                                                                                                                                                                       | Construction:<br>Twice/Year for 3 years at 3 locations during day and night                           | Per location | 36           | 3,000      | 108,000              | DB Contractor       |
| Water Quality monitoring                                                                                                                                                          | Pre-Construction:<br>Once at 2 locations (upstream and downstream of Shitalakhya River)               | Per location | 2            | 15,000     | 30,000               | DB Contractor       |
| Water Quality monitoring                                                                                                                                                          | Construction:<br>Twice/Year for 3 years at 2 locations (upstream and downstream of Shitalakhya River) | Per location | 12           | 15,000     | 180,000              | DB Contractor       |
| Various Monitoring (Adequacy of solid waste management system, chemical and waste disposal, implementation of community and occupational health and safety measures) <sup>c</sup> | Construction, Post construction and operation                                                         | Lump         | -            | -          | 100,000              | DB Contractor / NCC |
| Sub-Total (B)                                                                                                                                                                     |                                                                                                       |              |              |            | 961,000              |                     |
| <b>Capacity Building</b>                                                                                                                                                          |                                                                                                       |              |              |            |                      |                     |
| Introduction and sensitization to environmental issue                                                                                                                             | Preconstruction                                                                                       | LS           | -            | -          | 50,000.00            | MDSC                |
| Training on hazards, health, safety, and environmental issues                                                                                                                     | Preconstruction                                                                                       | LS           | -            | -          | 100,000.00           | MDSC                |
| EMP implementation                                                                                                                                                                | Construction                                                                                          | LS           | -            | -          | 100,000.00           | MDSC                |
| Sub-Total (C)                                                                                                                                                                     |                                                                                                       |              |              |            | 250,000.00           |                     |
| <b>Total (A+B+C)</b>                                                                                                                                                              |                                                                                                       |              |              |            | <b>BDT 4,216,000</b> | DB Contractor       |

| Particulars                             | Stage | Unit | Total number | Rate (BDT) | Cost (BDT)          | Costs covered by |
|-----------------------------------------|-------|------|--------------|------------|---------------------|------------------|
|                                         |       |      |              |            | <b>BDT 250,000</b>  | MDSC             |
| <b>Total (in \$) @ BDT109.63 per \$</b> |       |      |              |            | <b>\$ 38,456.63</b> | DB Contractor    |
|                                         |       |      |              |            | <b>\$2,280.40</b>   | MDSC             |

<sup>a</sup> Assuming implementation period by the DB Contractor is 3 years from 2024 – 2026.

<sup>b</sup> This line item should include OHS-related costs as applicable: (i) PPEs for general construction works, (ii) PPEs for excavation works and works at heights and confined spaces, (iii) barricading, (iv) related training, (v) audits, (vi) emergency handling and specialized equipment, (vii) installation and maintenance of welfare facilities, (viii) equipment inspection and tagging, (ix) medical fitness of personnel and workers, and (x) human resources on EHS/OHS (e.g. EHS Supervisor or equivalent). Indicative list that contractor should consider is in **Appendix 12**.

<sup>c</sup> NCC may utilize general checklists developed for monitoring contractor's activities, such as implementation of EMP, including OHS measures. See **Appendix 13**.

## IX. MONITORING AND REPORTING

219. NCC through the PMU will monitor the progress of EMP implementation. The PMU, with support from MDSC, will undertake site inspections and document review to verify compliance with the EMP and progress toward the final outcome. The DB Contractor will conduct day to day implementation of the SEMP.

220. The DB Contractor will submit monthly reports to the PMU. The monthly reports will include compilation of copies of monitoring sheets accomplished and duly signed by the Contractor's EHS manager (or equivalent) on a daily basis. A sample daily monitoring sheet which can be used by the Contractor is in **Appendix 12**. This monitoring sheet is indicative which can be further enhanced depending on the actual situations at construction sites.

221. PMU, with support from MDSC, shall also conduct its own monitoring activities consistent with the indicators in the EMP to confirm that all environmental safeguard measures are properly implemented at the subproject site, including in the surrounding communities. A sample monitoring sheet which can be used by PMU or MDSC is in **Appendix 13**. Similarly, this monitoring sheet is indicative which can be further enhanced depending on the actual situations and other needs of information during the implementation phase.

222. PMU, with support from MDSC, shall consolidated its own findings with the reports from the contractors. Based on consolidated information, PMU shall accomplish semi-annual environmental monitoring reports (SEMRs), which shall be submitted to ADB for review and disclosure on ADB website. Submission of SEMR will continue until ADB issues a Project Completion Report. The template for the SEMR is available in the Project Administration Manual.

223. ADB will carry out the following monitoring actions to supervise the subproject:

- (i) On a need basis, conduct visits when potential adverse environmental or social impact exists;
- (ii) Conduct supervision missions with detailed review by ADB's environment/social safeguard specialists and/or officers and/or consultants for components with adverse environmental and social impacts;
- (iii) Review the SEMRs submitted by PMU to ensure that adverse impacts and risks are mitigated as planned in the EMP;

- (iv) Work with PMU to rectify to the extent possible any failures to comply with its environmental safeguard commitments, as covenanted in the loan agreement and elaborated in all environmental safeguard documents; and formulate and implement a corrective action plan to re-establish compliance as appropriate; and
- (v) Prepare a project completion report that assesses whether the objective and desired outcomes of the safeguard plans have been achieved, taking into account the baseline conditions and the results of monitoring.

224. ADB's monitoring and supervision activities are carried out on an on-going basis until a project completion report is issued. ADB issues completion report within 1-2 years after the project is physically completed and in operation.

**Table 39: Environmental Monitoring Plan<sup>a</sup>**

| Sl. No.                                                | Monitoring Attributes                              | Parameters to be Monitored                                                                                                                                                                                     | Location                                                                         | Frequency                                                                             | Standards                                                                             | Responsibility                                               |            |
|--------------------------------------------------------|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------|------------|
|                                                        |                                                    |                                                                                                                                                                                                                |                                                                                  |                                                                                       |                                                                                       | Implementation                                               | Monitoring |
| 1. Design / Land Preparation / Pre-Construction Phases |                                                    |                                                                                                                                                                                                                |                                                                                  |                                                                                       |                                                                                       |                                                              |            |
| 1.1                                                    | Design measures addressing risks of climate change | Design elements included to ensure infrastructure can withstand seismic events, flooding, landslides, etc.                                                                                                     | PMU / MDSC Office                                                                | Once after final detailed design is completed                                         | Bangladesh National Building Code                                                     | MDSC                                                         | PMU        |
| 1.2                                                    | Design measures addressing pollution issues        | Toilets include properly designed with minimum two-chambered septic tanks.                                                                                                                                     | PMU / MDSC Office                                                                | Once after final detailed design is completed                                         | Bangladesh National Building Code or internationally accepted design for septic tanks | MDSC                                                         | PMU        |
| 1.3                                                    | Disruption of Public Utilities/services            | Ensure that the respective authority of utility service providers and consumers are informed in time; and Inspect that utilities are being relocated at the designated site maintaining proper safety measures | Subproject sites                                                                 | Monthly - prior to start of construction                                              | Utility relocation plan                                                               | NCC/DB Contractor (together with relevant utility authority) | PMU, MDSC  |
| 1.4                                                    | Tree Removal                                       | Check whether trees were preserved at the sites                                                                                                                                                                | For all the subproject areas                                                     | On an ongoing basis from start of mobilization to construction phase.                 | IEE requirement (avoidance of cutting of trees)                                       | DB Contractor                                                | PMU, MDSC  |
| 1.5                                                    | Consents, Permits, NOCs, Clearances, etc.          | Check all copies of permit, clearance and NOCs, including validity                                                                                                                                             | DB Contractor office or site office                                              | Ongoing basis; prior to start of construction                                         | IEE and Contract requirements                                                         | NCC, MDSC, DB Contractor                                     | NCC, MDSC  |
| 2. Construction Phase                                  |                                                    |                                                                                                                                                                                                                |                                                                                  |                                                                                       |                                                                                       |                                                              |            |
| 2.1                                                    | Construction Camp, Storage Areas                   | Housekeeping practices Compliance with proper storage and labelling of chemicals                                                                                                                               | Construction camp, Stockpile and storage areas at the different subproject sites | Daily by DB Contractor throughout the construction period.<br><br>At least once every | Subproject plans, EMP; No complaints                                                  | MDSC, DB Contractor                                          | NCC, MDSC  |

| Sl. No. | Monitoring Attributes                            | Parameters to be Monitored                                                                                                                                                                                                                                                                                                | Location                                        | Frequency                                                                                                                                   | Standards                                              | Responsibility                                                                       |            |
|---------|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------------------------------------|------------|
|         |                                                  |                                                                                                                                                                                                                                                                                                                           |                                                 |                                                                                                                                             |                                                        | Implementation                                                                       | Monitoring |
|         |                                                  |                                                                                                                                                                                                                                                                                                                           |                                                 | 6 months for MDSC throughout the construction period.                                                                                       |                                                        |                                                                                      |            |
| 2.2     | Sources of Materials                             | Legitimacy of sources of materials to be used for construction                                                                                                                                                                                                                                                            | Storage areas at the different subproject sites | At least once every 6 months for MDSC throughout the construction period.                                                                   | Materials register or record of purchase by contractor | MDSC, DB Contractor                                                                  | NCC, MDSC  |
| 2.3     | Construction of park areas and allied facilities | Potential impacts per EMP:<br>- Land topography and aesthetics<br>- Terrestrial flora and fauna resources<br>- Surface water quality<br>- Groundwater quality<br>- Ambient air quality<br>- Noise level at site and vicinity<br>- Chance finds<br>- Community and occupation health and safety<br>- Grievances/complaints | Construction camps, work sites                  | Daily by DB Contractor throughout the construction period.<br><br>At least once every 6 months for MDSC throughout the construction period. | Subproject plans, EMP; Complaints from Community       | MDSC, DB Contractor                                                                  | NCC, MDSC  |
| 2.4     | Air Quality Sampling                             | PM2.5, PM10, SOx, NOx, CO                                                                                                                                                                                                                                                                                                 | Subproject sites                                | At least once every six months throughout the construction period.                                                                          | National Ambient Air Quality Standards                 | DB Contractor or through a nationally recognized laboratory sourced by DB Contractor | NCC, MDSC  |
| 2.5     | Noise Level Measurement                          | Noise levels at daytime and night time in dBA                                                                                                                                                                                                                                                                             | Subproject sites and vicinities                 | At least once every six months with daytime and night time readings, throughout the construction period.                                    | National Noise Level Standards                         | DB Contractor or through a nationally recognized laboratory sourced by DB Contractor | NCC, MDSC  |

| Sl. No. | Monitoring Attributes                                        | Parameters to be Monitored                                                                                                                                                                                                                                                        | Location                                                                                       | Frequency                                                                                                 | Standards                                                      | Responsibility                                                                       |            |
|---------|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|--------------------------------------------------------------------------------------|------------|
|         |                                                              |                                                                                                                                                                                                                                                                                   |                                                                                                |                                                                                                           |                                                                | Implementation                                                                       | Monitoring |
| 2.6     | Groundwater quality (for construction and drinking purposes) | Groundwater level, pH, TDS, TSS, hardness, oil and grease, and coliform                                                                                                                                                                                                           | Groundwater source at the subproject sites (if any)                                            | At least once every six months throughout the construction period                                         | National Standard for Drinking water                           | DB Contractor or through a nationally recognized laboratory sourced by DB Contractor | NCC, MDSC  |
| 2.7     | Surface Water Quality (Shitalakhya river)                    | BOD, TSS, oil and grease, fecal coliform                                                                                                                                                                                                                                          | Upstream and downstream of Shitalakhya river relative to the locations of the subproject sites | At least once in six months                                                                               | National Standard for Inland Surface water                     | DB Contractor or through a nationally recognized laboratory sourced by DB Contractor | NCC, MDSC  |
| 2.8     | Waste Management                                             | Check storage, transportation, disposal, handling of hazardous waste (e.g., used engine oil, engine filters, etc.);<br><br>Waste and effluents to be collected and disposed safely from construction camp;<br><br>Waste and garbage from construction site to be disposed safely. | Construction camp, Subproject sites                                                            | At least weekly (for DB Contractor)<br><br>At least once in six months (for MDSC)                         | Contract provisions; EMP; No complaints                        | MDSC, DB Contractor                                                                  | NCC, MDSC  |
| 2.9     | Socioeconomic benefit                                        | Local labor employment, income level status                                                                                                                                                                                                                                       | Subproject sites                                                                               | At least once in six months during the construction period.                                               | Primary survey and consultations                               | MDSC (to be led by the Social Safeguard Officer)                                     | NCC, MDSC  |
| 2.10    | Community Health and Safety                                  | Potential health and safety impacts to community people as enumerated and defined in the EMP.                                                                                                                                                                                     | Throughout the subproject areas and surrounding communities                                    | Daily (by DB Contractor)<br><br>At least once in six months (by MDSC) throughout the construction period. | Contract provisions; EMP; Zero accident record; No complaints. | DB Contractor, MDSC                                                                  | NCC, MDSC  |

| Sl. No.                   | Monitoring Attributes                | Parameters to be Monitored                                                                                                                                                                                                                  | Location                                                    | Frequency                                                                                                   | Standards                                                      | Responsibility                         |            |
|---------------------------|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------|------------|
|                           |                                      |                                                                                                                                                                                                                                             |                                                             |                                                                                                             |                                                                | Implementation                         | Monitoring |
| 2.11                      | Occupational Health and Safety       | Potential health and safety impacts to workers as enumerated and defined in the EMP.                                                                                                                                                        | Subproject sites, construction camp                         | Daily (by DB Contractor)<br><br>At least once in six months (by MDSC) throughout the construction period.   | Contract provisions; EMP; Zero accident record; No complaints. | DB Contractor, MDSC                    | NCC, MDSC  |
| 2.12                      | Community awareness and consultation | Progress of continuing community awareness and consultation                                                                                                                                                                                 | At the community areas and/or subproject sites              | At least once every six months                                                                              | Minutes of meetings<br>Record of attendees list<br>Photolog    | DB Contractor, MDSC                    | NCC, MDSC  |
| <b>3. Operation Phase</b> |                                      |                                                                                                                                                                                                                                             |                                                             |                                                                                                             |                                                                |                                        |            |
| 3.1                       | Community Health and Safety          | Potential health and safety impacts to community people as enumerated and defined in any maintenance requirements list delineated by the contractor before the handover. This includes checking of the efficient functioning of facilities. | Throughout the subproject areas and surrounding communities | On an ongoing basis by the management staff and caretakers of the parks throughout the construction period. | Zero accident record; No complaints.                           | NCC Parks Management Staff, Caretakers | NCC        |
| 3.2                       | Pollution                            | Check for the efficient functioning of toilet facilities, including septic tanks. Records of maintenance activities, including septic tank desludging records                                                                               | Throughout the subproject areas and surrounding communities | On an ongoing basis by the management staff and caretakers of the parks.                                    | No complaints.                                                 | NCC Parks Management Staff, Caretakers | NCC        |

<sup>a</sup> All environmental quality sampling should follow methodologies and sampling periods per relevant rules and/or guidelines (ambient air quality, noise level, and water quality)

## **X. CONCLUSION AND RECOMMENDATION**

225. It is envisaged that the proposed subproject will contribute to providing reliable, sustainable, and inclusive urban services in NCC, the fourth most populated city in Bangladesh and one of the major growth engines of the country being adjacent to Dhaka and a vital transport hub. Once implemented, the subproject will have direct benefits to the people of NCC with improved parks and public spaces. These spaces are important recreational or activity areas where the people could enrich their social connection and interaction with families and community people, foster sports development, and other activities that improve individual and social wellbeing.

226. This IEE has been prepared based on known general location of the parks and public places, and on preliminary designs that are limited to indicative site layouts. Due to this preliminary nature of the design used in this assessment, re-assessment will be necessary and updating of this IEE will be required once the final detailed design is prepared by the DB Contractor. Nevertheless, the key environmental considerations and analysis during this IEE process and the implementation of environmental control measures of the subproject have been adequately explained in this report. There are no environmentally sensitive areas and cultural heritage sites near the subproject sites. The extent of adverse impacts is expected to be local, confined within the subproject's main areas of influence, waste disposal sites, and the routes to and from these sites. Any other potential negative environmental impacts that are associated with location, preliminary design, nature of construction works, and operation of the subproject can be mitigated to standard levels without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures and procedures following internationally recognized best practices and standards as discussed in the EMP. It is therefore recommended that the subproject be supported, subject to the implementation of the commitments contained in the EMP and allocation of appropriate technical, financial and human resources by NCC.

227. In addition, during the detailed design phase, the DB Contractor shall prepare the following required work plans and submit to NCC, through the PMU or MDSC, for approval. No works shall commence until any relevant or required work plan is approved.

- (i) Site Development Plan;
- (ii) Traffic Management Plan;
- (iii) Spoil Management Plan;
- (iv) Waste Management Plan; and
- (v) Health and Safety Plan (Community and Occupational).

228. This IEE report has been prepared in accordance with ADB SPS's requirements for projects classified as Category B for environment. With the above premises considered, the classification of Category B for environment is confirmed. Separately, per ECA, 1995 and ECR, 2023 of Bangladesh, the overall project or NGRUDP is classified under "Red" category. Hence, preparation of an environmental impact assessment (EIA) based on DOE approved terms of reference is mandatory. Upon approval of the submitted EIA, ECC must be obtained from the DOE prior to award of contracts.

## Appendix 1: Rapid Environmental Assessment (REA) Checklist (Urban Development)

### Instructions:

- (i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Safeguards Division (SDSS) for endorsement by the Director, SDSS and for approval by the Chief Compliance Officer.
- (ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's: (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.
- (iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

**Country/Project Title:** Bangladesh/Narayanganj Green and Resilient Urban Development Project  
Parks Development and Improvement Subproject

**Sector Division:** Water and Urban Development Sector Office, Sector Group

| Screening Questions                                                             | Yes | No | Remarks                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------------------------------------------------------|-----|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>A. Project Siting</b>                                                        |     |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Is the project area...                                                          |     |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Densely populated?                                                              | ✓   |    | Narayanganj City is the fourth most populated city in Bangladesh with population density of more than 100,000 per square kilometer.                                                                                                                                                                                                                                                                                                                                |
| Heavy with development activities?                                              | ✓   |    | Narayanganj City Corporation (NCC) has a combination of commercial and industrial establishments. There are many industries and manufacturing companies established in and around the NCC and Narayanganj Sadar Upazila. These companies include textile mills, garments, and other types of industries. It has one of the busiest inland river ports in Bangladesh which cater to many trade and shipping of goods locally, and between Bangladesh and the world. |
| Adjacent to or within any environmentally sensitive areas?                      |     |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <ul style="list-style-type: none"> <li>Cultural heritage site</li> </ul>        | ✓   |    | NCC is one city in Bangladesh that has several cultural heritage sites. In particular, the popular Hajiganj Fort and Sonakanda Fort are in NCC. In particular, NCC is the location of the popular Hajiganj Fort and Sonakanda Fort, which are listed as protected monuments by the Bangladesh Department of Archaeology. However, the subproject sites are far from these two monuments and from other PCRs in the city.                                           |
| <ul style="list-style-type: none"> <li>Protected Area</li> </ul>                |     | ✓  | No protected area within or near the subproject sites.                                                                                                                                                                                                                                                                                                                                                                                                             |
| <ul style="list-style-type: none"> <li>Wetland</li> </ul>                       |     | ✓  | No wetlands within or near the subproject sites.                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <ul style="list-style-type: none"> <li>Mangrove</li> </ul>                      |     | ✓  | No mangroves within or near the subproject sites.                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <ul style="list-style-type: none"> <li>Estuarine</li> </ul>                     |     | ✓  | No estuarines within or near the subproject sites.                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <ul style="list-style-type: none"> <li>Buffer zone of protected area</li> </ul> |     | ✓  | No buffer zone of a protected area within or near the subproject sites.                                                                                                                                                                                                                                                                                                                                                                                            |

| Screening Questions                                                                                                                                                                                                                                                                          | Yes | No | Remarks                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Special area for protecting biodiversity</li> </ul>                                                                                                                                                                                                   |     | ✓  | No special area for protecting biodiversity within or near the subproject sites.                                                                                                                                                                                                                                                                                                                                  |
| <ul style="list-style-type: none"> <li>Bay</li> </ul>                                                                                                                                                                                                                                        |     | ✓  | NCC is far from the coastal area.                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>B. Potential Environmental Impacts</b><br>Will the Project cause...                                                                                                                                                                                                                       |     |    |                                                                                                                                                                                                                                                                                                                                                                                                                   |
| impacts on the sustainability of associated sanitation and solid waste disposal systems and their interactions with other urban services.                                                                                                                                                    |     | ✓  | The subproject will not have any adverse impact. The parks development will improve the quality of life of the people with additional green spaces to enjoy.                                                                                                                                                                                                                                                      |
| deterioration of surrounding environmental conditions due to rapid urban population growth, commercial and industrial activity, and increased waste generation to the point that both manmade and natural systems are overloaded and the capacities to manage these systems are overwhelmed? |     | ✓  | Not applicable.                                                                                                                                                                                                                                                                                                                                                                                                   |
| degradation of land and ecosystems (e.g. loss of wetlands and wild lands, coastal zones, watersheds and forests)?                                                                                                                                                                            |     | ✓  | The subproject will not degrade the land and any other ecosystems.                                                                                                                                                                                                                                                                                                                                                |
| dislocation or involuntary resettlement of people?                                                                                                                                                                                                                                           |     | ✓  | No physical displacements anticipated. Subproject sites are in government-owned lands with existing rights of way. Temporary impacts to businesses may occur during construction works and are to be addressed through specific measures in the EMP.                                                                                                                                                              |
| disproportionate impacts on the poor, women and children, Indigenous Peoples, or other vulnerable group?                                                                                                                                                                                     |     | ✓  | Not anticipated. The subproject is pro-poor and gender-inclusive undertakings as they aim to provide additional green spaces for NCC. The subproject provides a positive impact.                                                                                                                                                                                                                                  |
| degradation of cultural property, and loss of cultural heritage and tourism revenues?                                                                                                                                                                                                        |     | ✓  | The subproject sites are far from any PCR.                                                                                                                                                                                                                                                                                                                                                                        |
| occupation of low-lying lands, floodplains, and steep hillsides by squatters and low-income groups, and their exposure to increased health hazards and risks due to pollutive industries?                                                                                                    |     | ✓  | Not applicable.                                                                                                                                                                                                                                                                                                                                                                                                   |
| water resource problems (e.g. depletion/degradation of available water supply, deterioration for surface and ground water quality, and pollution of receiving waters)?                                                                                                                       | ✓   |    | The construction phase will have the potential to pollute Shitalakhya river due to siltation. The operation phase will also have the potential to pollute Shitalakhya river due to discharges from toilets to be build in these parks. However, the EMP provides the measures to mitigate these impacts, which include the development of land development plan and proper design of public toilets/septic tanks. |

| Screening Questions                                                                                                                                                                                                | Yes | No | Remarks                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| air pollution due to urban emissions?                                                                                                                                                                              |     | ✓  | Not applicable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <ul style="list-style-type: none"> <li>risks and vulnerabilities related to occupational health and safety due to physical, chemical, and biological hazards during project construction and operation?</li> </ul> | ✓   |    | The implementation of the subproject will involve activities where the health and safety of workers will be put at risk. However, measures to mitigate impacts to occupational health and safety are included in the EMP, which include the adoption and implementation of international best practices such as those specified in World Bank EHS Guidelines on Occupational Health and Safety.                                                                                |
| road blocking and temporary flooding due to land excavation during rainy season?                                                                                                                                   | ✓   |    | Construction activities during rainy season will have the potential to cause road blocks and flooding. However, mitigation measures to prevent these impacts are in the EMP, which include the avoidance of excavation works during rainy season, covering of excavated trenches during non-operating periods, etc.                                                                                                                                                            |
| noise and dust from construction activities? <ul style="list-style-type: none"> <li></li> </ul>                                                                                                                    | ✓   |    | Construction activities will have the potential to generate noise and dust. However, mitigation measures to prevent the impacts of noise and dust generated from construction and operation activities are enumerated in detail in the EMP,                                                                                                                                                                                                                                    |
| traffic disturbances due to construction material transport and wastes? <ul style="list-style-type: none"> <li></li> </ul>                                                                                         | ✓   |    | Construction activities and transport of materials and wastes will have the potential to disturb traffic in the vicinity particularly during busy hours. However, mitigation measures to prevent this impact are in the EMP, which include the development of a traffic management plan to address all direct and indirect impacts of traffic disturbances.                                                                                                                    |
| temporary silt runoff due to construction?                                                                                                                                                                         | ✓   |    | Excavation and other construction activities will have the potential to cause silt runoff. However, mitigation measures to prevent this impact are included in the EMP, which include the provision of silt traps around construction areas, among others.                                                                                                                                                                                                                     |
| hazards to public health due to ambient, household and occupational pollution, thermal inversion, and smog formation?                                                                                              |     | ✓  | Not applicable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| water depletion and/or degradation? <ul style="list-style-type: none"> <li></li> </ul>                                                                                                                             |     | ✓  | Not applicable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| overpaying of ground water, leading to land subsidence, lowered ground water table, and salinization? <ul style="list-style-type: none"> <li></li> </ul>                                                           |     | ✓  | Not applicable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| contamination of surface and ground waters due to improper waste disposal? <ul style="list-style-type: none"> <li></li> </ul>                                                                                      | ✓   |    | Rehabilitation parks and public spaces will generate wastes. Improper disposal of these wastes will have the potential to contaminate surface and groundwater in the area. However, measures to prevent this impact are included in the EMP, which include the collection of wastes and transporting them immediately after they are collected to pre-identified disposal site approved by NCC.                                                                                |
| pollution of receiving waters resulting in amenity losses, fisheries and marine resource depletion, and health problems?                                                                                           | ✓   |    | Construction activities may result to siltation or pollution of Shitalakhya river. Construction wastes may also pollute the said river. However, measures to prevent this impact are included in the EMP, which include the development of a land development plan to prevent impact to shitalakhya river during land filling activities, and collection of wastes and transporting them immediately after they are collected to pre-identified disposal site approved by NCC. |

| Screening Questions                                                                                                                                                                                                                                                                                                            | Yes | No | Remarks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?<br>▪                                                                                                                                       |     | ✓  | The subproject will not require significant number of people who will move into NCC. Engaging local labor will be a priority under the subproject.                                                                                                                                                                                                                                                                                                                                                          |
| social conflicts if workers from other regions or countries are hired?                                                                                                                                                                                                                                                         |     | ✓  | The subproject will not require significant number of people who will move into NCC. Engaging local labor will be a priority under the subproject.                                                                                                                                                                                                                                                                                                                                                          |
| risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during operation and construction?<br>▪                                                                                                                                  | ✓   |    | Fuel and other chemicals will be used during construction phase. Potential impact of fuel or chemical spill or mishandling during construction phase will be managed through measures included in the EMP, which include the adoption and implementation of related international best practices such as those specified in World Bank EHS Guidelines on Community Health and Safety.                                                                                                                       |
| ▪ community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation, and decommissioning? | ✓   |    | Anticipated during construction phase. But work areas will be clearly demarcated with signages and safety barriers, and access will be controlled. Only workers and subproject concerned members will be allowed to visit the operational sites. Other measures include the adoption and implementation of related international best practices such as those specified in World Bank EHS Guidelines on Construction and Decommissioning and on Community Health and Safety. These are included in the EMP. |

## Appendix 2: Copies of Laboratory Analysis Results on Ambient Air Quality

EQMS

Ref: EQMS/Air Quality/ 20230205227

### EQMS ENVIRONMENTAL LABORATORY

#### Monitoring Results of Ambient Air Quality

Project Name : Urban Infrastructure Improvement Preparatory Facility (UIIPF)

Monitoring Activity : Ambient Air Quality (Working Day)

Monitoring Personnel : EQMS Inspection Team

Monitoring Location :

| SL No | GPS Coordinate              | Location Name                                                      |
|-------|-----------------------------|--------------------------------------------------------------------|
| 1     | 23°36'5.48"N 90°29'50.01"E  | Ranada Prasad Saha University, 12 Sahed Bappi Sharoni, Narayanganj |
| 2     | 23°36'41.67"N 90°29'44.81"E | Bara Dewbhag, 1 Mobarak Shah Rd, Narayanganj                       |
| 3     | 23°37'55.85"N 90°30'11.56"E | Shirin Selina Home, Narayanganj                                    |
| 4     | -                           | -                                                                  |
| 5     | 23°40'59.39"N 90°29'58.41"E | Chairman Bari, Siddhirganj                                         |
| 6     | 23°40'40.09"N 90°31'25.48"E | Adamjee EPZ Road, Siddhirganj                                      |
| 7     | 23°34'42.21"N 90°30'41.3"E  | Crown Cement Factory Ltd. Road, Muktarpur, Narayanganj             |
| 8     | 23°37'24.88"N 90°30'46.23"E | AKU Flour Mills Limited, Nabiganj, Narayanganj                     |

Monitoring Date : 25.01.2022 - 04.02.2023

Reporting Date : 14.02.2023



P.T.O







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Lab Office: (Box # 7), House # 1a-134/A, Rajshahi (Sector), Gulshan-Accadda Udd Road, Dhaka - 1212

Toronto Office: 7 Annet Street, Scarborough, Ontario, M1E 4B5 Canada











Ref: EQMS/Air Quality/ 20230205227

## Description of Analysis:

| Location                            | Sampling Date | Ambient Air Pollutants' Concentration in $\mu\text{g}/\text{m}^3$ |                               |                                  |                                  |                                  |                                  |                   | CO<br>mg/m <sup>3</sup>          |
|-------------------------------------|---------------|-------------------------------------------------------------------|-------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-------------------|----------------------------------|
|                                     |               | PM <sub>10</sub>                                                  | PM <sub>2.5</sub>             | SO <sub>2</sub>                  | NO <sub>2</sub>                  | Pb                               | NH <sub>3</sub>                  | O <sub>3</sub>    |                                  |
| AQ1                                 | 25.01.2023    | 353.87                                                            | 177.43                        | 30.25                            | 61.79                            | 0.031                            | 2.48                             | 41.39             | 2.33                             |
| AQ2                                 | 25.01.2023    | 133.28                                                            | 101.35                        | 30.19                            | 33.98                            | BDL                              | 0.00                             | 21.71             | 0.15                             |
| AQ3                                 | 26.01.2023    | 182.85                                                            | 122.97                        | 27.68                            | 52.24                            | 0.070                            | 0.00                             | 13.02             | 0.20                             |
| AQ4                                 | -             | -                                                                 | -                             | -                                | -                                | -                                | -                                | -                 | -                                |
| AQ5                                 | 01.02.2023    | 108.18                                                            | 68.33                         | 14.49                            | 22.18                            | 0.068                            | 0.00                             | 42.90             | 0.31                             |
| AQ6                                 | 01.02.2023    | 190.75                                                            | 98.89                         | 105.67                           | 75.63                            | 0.059                            | 6.04                             | 29.11             | 1.80                             |
| AQ7                                 | 02.02.2023    | 205.97                                                            | 94.61                         | 43.24                            | 47.88                            | 0.034                            | 6.04                             | 29.12             | 1.80                             |
| AQ8                                 | 02.02.2023    | 93.78                                                             | 59.89                         | 16.07                            | 19.66                            | BDL                              | 0.00                             | 18.44             | 0.14                             |
| Durations                           |               | 24                                                                | 24                            | 24                               | 24                               | 24                               | 24                               | 8                 | 8                                |
| Air Pollution (Control) Rules, 2022 |               | 150                                                               | 65                            | 80                               | 80                               | 0.50                             | 400                              | 100               | 05                               |
| Method of Analysis                  |               | Light Scattering Nephelometer                                     | Light Scattering Nephelometer | High Sensitivity Electrochemical | High Sensitivity Electrochemical | High Sensitivity Electrochemical | High Sensitivity Electrochemical | Mixed Metal Oxide | High Sensitivity Electrochemical |

Note: \* Air Pollution (Control) Rules, 2022. Legend: PM<sub>10</sub>-Particulate Matter of a diameter of 10 microns or less, PM<sub>2.5</sub>-Particulate Matter of a diameter of 2.5 microns or less, SO<sub>2</sub>-Sulphur Dioxide; NO<sub>2</sub>-Nitrogen Dioxide; NH<sub>3</sub> (ammonia); O<sub>3</sub>-Ozone; CO-Carbon Monoxide, BDL - Below detection limit

## Weather Condition:

| Code | Wind Speed (km/h) | Wind Direction            | Relative Humidity (%) | Remarks/Comments |
|------|-------------------|---------------------------|-----------------------|------------------|
| AQ1  | 1.08              | 215.44 (South South West) | 50                    | Sunny Day        |
| AQ2  | 3.1               | 253.56 (West South West)  | 53                    | Sunny Day        |
| AQ3  | 4.25              | 136.50 (South East)       | 60                    | Sunny Day        |
| AQ4  | -                 | -                         | -                     | -                |
| AQ5  | 6.59              | 218.31 (South South West) | 63                    | Sunny Day        |
| AQ6  | 4.14              | 140.51 (South East)       | 57                    | Sunny Day        |
| AQ7  | 4.57              | 140.68 (South East)       | 49                    | Sunny Day        |
| AQ8  | 8.32              | 176.45 (South South West) | 43                    | Sunny Day        |



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 Toronto Office: 7 Avond Street, Scarborough Ontario, M1S 4B5 Canada



Ref: EQMS/Air Quality/ 20230205227

**EQMS**

|                                                                                   |                                                                                   |                                                                                     |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Received By:</b>                                                               | <b>Analyzed By:</b>                                                               | <b>Checked By:</b>                                                                  |
|  |  |  |
| Shihabuddin Ahmed<br>Consultant<br>EQMS Consulting Limited                        | Ahmed Jubair<br>Technical Manager<br>EQMS Consulting Limited                      | Md. Jahidul Islam<br>Quality Manager<br>EQMS Consulting Limited                     |








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Ref: EQMS/Air Quality/ 20230205228

EQMS

**EQMS ENVIRONMENTAL LABORATORY****Monitoring Results of Ambient Air Quality**

Project Name : Urban Infrastructure Improvement Preparatory Facility (UIPF)

Monitoring Activity : Ambient Air Quality (Non-Working Day)

Monitoring Personnel : EQMS Inspection Team

Monitoring Location :

| SL No | GPS Coordinate              | Location Name                                                      |
|-------|-----------------------------|--------------------------------------------------------------------|
| 1     | 23°36'5.48"N 90°29'50.01"E  | Ranada Prasad Saha University, 12 Sahed Bappi Sharoni, Narayanganj |
| 2     | 23°36'41.67"N 90°29'44.81"E | Bara Dewbhog, 1 Mobarak Shah Rd, Narayanganj                       |
| 3     | 23°37'55.85"N 90°30'11.56"E | Shirin Selina Home, Narayanganj                                    |
| 4     | -                           | -                                                                  |
| 5     | 23°40'59.39"N 90°29'58.41"E | Chairman Bari, Siddhirganj                                         |
| 6     | 23°40'40.09"N 90°31'25.46"E | Adamjee EPZ Road, Siddhirganj                                      |
| 7     | 23°34'42.21"N 90°30'41.3"E  | Crown Cement Factory Ltd. Road, Multanpur, Narayanganj             |
| 8     | 23°37'24.88"N 90°30'46.23"E | AKIJ Flour Mills Limited, Nabiganj, Narayanganj                    |

Monitoring Date : 25.01.2022 - 04.02.2023

Reporting Date : 14.02.2023



P.T.O



Head Office: H A 33, B 4 04, B 4 C, Baranaki Dhaka-1213, Bangladesh  
 Lab Office: Flat 3/F, House 9 To 12/A, Tawarwan Road, Ghatkhola, Dhaka-1213  
 Tatara Office: 7, Amari Street, Scarborough Ontario, M1S 4B5 Canada



Ref: EQMS/Air Quality/ 20230205228

## Description of Analysis:

| Location                            | Sampling Date | Ambient Air Pollutants' Concentration in $\mu\text{g}/\text{m}^3$ |                               |                                  |                                  |                                  |                                  |                     | CO $\text{mg}/\text{m}^3$        |
|-------------------------------------|---------------|-------------------------------------------------------------------|-------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|---------------------|----------------------------------|
|                                     |               | PM <sub>10</sub>                                                  | PM <sub>2.5</sub>             | SO <sub>2</sub>                  | NO <sub>2</sub>                  | Pb                               | NH <sub>3</sub>                  | O <sub>3</sub>      |                                  |
| AQ1                                 | 25.01.2023    | 256.59                                                            | 159.58                        | 66.24                            | 39.65                            | 0.032                            | 4.39                             | 38.93               | 1.19                             |
| AQ2                                 | 25.01.2023    | 128.72                                                            | 96.72                         | 27.20                            | 45.67                            | BDL                              | 0.00                             | 14.36               | 0.20                             |
| AQ3                                 | 26.01.2023    | 147.53                                                            | 106.85                        | 20.81                            | 24.15                            | 0.021                            | 0.00                             | 51.97               | 0.17                             |
| AQ4                                 | -             | -                                                                 | -                             | -                                | -                                | -                                | -                                | -                   | -                                |
| AQ5                                 | 01.02.2023    | 113.99                                                            | 82.42                         | 26.67                            | 13.21                            | 0.065                            | 0.00                             | 37.78               | 0.18                             |
| AQ6                                 | 01.02.2023    | 226.16                                                            | 133.19                        | 89.03                            | 73.79                            | 0.060                            | 5.27                             | 33.06               | 2.03                             |
| AQ7                                 | 02.02.2023    | 335.70                                                            | 131.59                        | 59.84                            | 66.04                            | 0.052                            | 4.85                             | 42.28               | 1.61                             |
| AQ8                                 | 02.02.2023    | 116.76                                                            | 84.29                         | 37.99                            | 26.67                            | BDL                              | 0.00                             | 9.15                | 0.21                             |
| Durations                           |               | 24                                                                | 24                            | 24                               | 24                               | 24                               | 24                               | 8                   | 8                                |
| Air Pollution (Control) Rules, 2022 |               | 150                                                               | 65                            | 80                               | 80                               | 0.50                             | 400                              | 100                 | 05                               |
| Method of Analysis                  |               | Light Scattering Nephelometer                                     | Light Scattering Nephelometer | High Sensitivity Electrochemical | High Sensitivity Electrochemical | High Sensitivity Electrochemical | High Sensitivity Electrochemical | Altered Metal Oxide | High Sensitivity Electrochemical |

Note: \* Air Pollution (Control) Rules, 2022. Legend: PM<sub>10</sub>-Particulate Matter of a diameter of 10 microns or less, PM<sub>2.5</sub>-Particulate Matter of a diameter of 2.5 microns or less, SO<sub>2</sub>-Sulphur Dioxide; NO<sub>2</sub>-Nitrogen Dioxide; NH<sub>3</sub> (ammonia); O<sub>3</sub>-Ozone; CO -Carbon Monoxide, BDL - Below detection limit

## Weather Condition:

| Code | Wind Speed (km/h) | Wind Direction           | Relative Humidity (%) | Remarks/ Comments |
|------|-------------------|--------------------------|-----------------------|-------------------|
| AQ1  | 5.33              | 127.69(East South East)  | 53                    | Sunny Day         |
| AQ2  | 10.73             | 262.50(West South West)  | 65                    | Sunny Day         |
| AQ3  | 8.03              | 166.83 (South)           | 61                    | Sunny Day         |
| AQ4  | -                 | -                        | -                     | -                 |
| AQ5  | 7.78              | 196.88(South)            | 60                    | Sunny Day         |
| AQ6  | 4.39              | 177.08(South South East) | 47                    | Sunny Day         |
| AQ7  | 3.10              | 120.21 (East South East) | 49                    | Sunny Day         |
| AQ8  | 8.50              | 121.50 (East South East) | 54                    | Sunny Day         |



*[Signature]*

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Ref: EQMS/Air Quality/ 20230205228

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### Appendix 3: Copies of Laboratory Analysis Results on Noise Level Measurements

EQMS

Ref: EQMS/Noise Level/ 20230205229

**EQMS Environmental Laboratory**  
**Test Results of Noise Level**

**Project Name** : Urban Infrastructure Improvement Preparatory Facility (UIIPF)

**Description of Sample** : Noise Level Measurement

**Sample Collector** : EQMS Inspection Team

**Sampling Location** : NL1 to NL8

**Sampling Date** : 25.01.2022-28.01.2022 & 01.02.2023-04.02.2023

**Reporting Date** : 13.02.2023

**Monitoring Locations:**

| SL No | GPS Coordinate              | Location Name                                                      |
|-------|-----------------------------|--------------------------------------------------------------------|
| 1     | 23°36'5.48"N 90°29'50.01"E  | Ranada Prasad Saha University, 12 Sahed Bappi Sharoni, Narayanganj |
| 2     | 23°36'41.67"N 90°29'44.81"E | Bara Dewbhag, 1 Mobarak Shah Rd, Narayanganj                       |
| 3     | 23°37'55.85"N 90°30'11.56"E | Shirin Selina Home, Narayanganj                                    |
| 4     | -                           | -                                                                  |
| 5     | 23°40'59.39"N 90°29'58.41"E | Chairman Bari, Siddhirganj                                         |
| 6     | 23°40'40.09"N 90°31'25.46"E | Adamjee EPZ Road, Siddhirganj                                      |
| 7     | 23°34'42.2"N 90°30'41.3"E   | Crown Cement Factory Ltd. Road, Muktarpur, Narayanganj             |
| 8     | 23°37'24.88"N 90°30'46.23"E | AKU Flour Mills Limited, Nabiganj, Narayanganj                     |

  
  
  
**P.I.O**


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Ref: EQMS/Noise Level/ 20230205229



EQMS

**Description of Analysis:**

| SL No                                                      | Leq <sub>day</sub> | Leq <sub>night</sub> | L <sub>max</sub> | L <sub>min</sub> | Standard |           |
|------------------------------------------------------------|--------------------|----------------------|------------------|------------------|----------|-----------|
|                                                            |                    |                      |                  |                  | Day(dB)  | Night(dB) |
| NL1-WD                                                     | 67.74              | 60.41                | 92.5             | 45.6             | 50       | 40        |
| NL1-NWD                                                    | 66.41              | 59.96                | 89.6             | 32.1             |          |           |
| NL2-WD                                                     | 59.29              | 56.95                | 80.0             | 30.8             | 60       | 50        |
| NL2-NWD                                                    | 63.56              | 55.21                | 90.8             | 37.8             |          |           |
| NL3-WD                                                     | 64.68              | 58.76                | 85.1             | 30.8             | 55       | 45        |
| NL3-NWD                                                    | 63.28              | 57.87                | 90.2             | 41.0             |          |           |
| NL4-WD                                                     | -                  | -                    | -                | -                | 75       | 70        |
| NL4-NWD                                                    | -                  | -                    | -                | -                |          |           |
| NL5-WD                                                     | 62.89              | 56.89                | 90.0             | 30.8             | 55       | 45        |
| NL5-NWD                                                    | 62.97              | 55.22                | 86.4             | 32.1             |          |           |
| NL6-WD                                                     | 78.99              | 68.88                | 103.2            | 42.3             | 75       | 70        |
| NL6-NWD                                                    | 74.99              | 68.70                | 93.6             | 32.1             |          |           |
| NL7-WD                                                     | 73.39              | 57.16                | 97.9             | 40.8             | 75       | 70        |
| NL7-NWD                                                    | 77.78              | 68.93                | 95.9             | 40.8             |          |           |
| NL8-WD                                                     | 74.42              | 66.99                | 97.3             | 40.6             | 75       | 70        |
| NL8-NWD                                                    | 70.62              | 59.97                | 92.5             | 44.3             |          |           |
| Standard (ECR'1997) & Noise Pollution (Control) Rules 2006 |                    |                      |                  |                  |          |           |
| Silent area                                                |                    |                      |                  |                  | 50       | 40        |
| Residential area                                           |                    |                      |                  |                  | 55       | 45        |
| Mixed area                                                 |                    |                      |                  |                  | 60       | 50        |
| Commercial Area                                            |                    |                      |                  |                  | 70       | 60        |
| Industrial area                                            |                    |                      |                  |                  | 75       | 70        |
| World Bank/IFC Standard                                    |                    |                      |                  |                  |          |           |
| Residential; Institutional; Educational                    |                    |                      |                  |                  | 55       | 45        |
| Industrial                                                 |                    |                      |                  |                  | 70       | 70        |



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Ref: EQMS/Noise Level/ 20230205229

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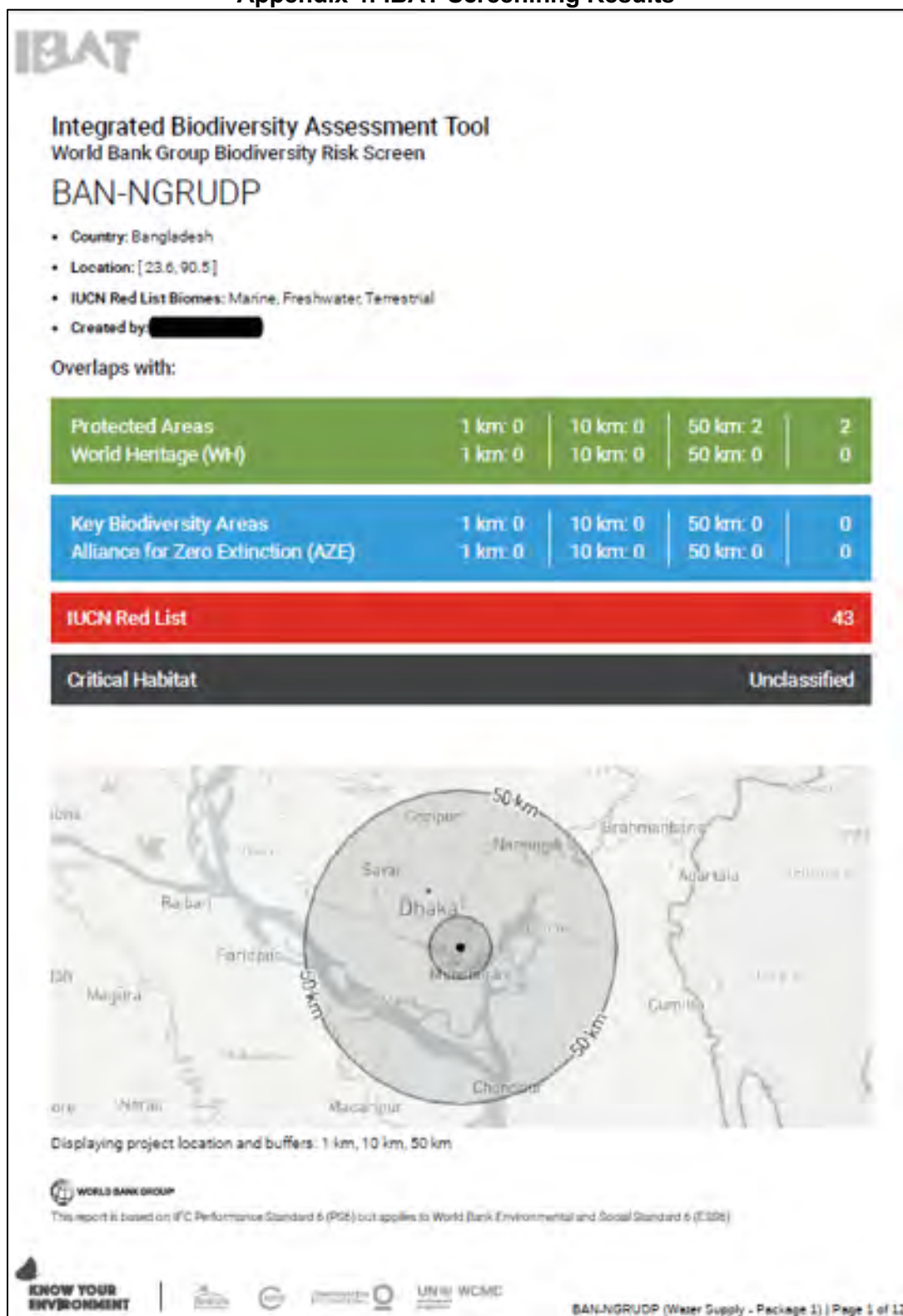
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## Appendix 4: IBAT Screening Results





## About this report

The recommendations stated alongside any Protected Areas and Key Biodiversity Areas identified in this report are determined by the following:

### Protected Areas:

- 'Highest risk. Seek expert help' is stated if the report identifies a designation that includes either 'natural' or 'mixed world heritage site'.
- 'Assess for Critical Habitat' is stated if the report identifies a Strict Nature Reserve, Wilderness Area or National Park as coded by IUCN protected area categories Ia, Ib and II.
- 'Assess for biodiversity risk' is stated if the report identifies any other type of protected area.

### Key Biodiversity Areas:

- 'Highest risk. Seek expert help' is stated if the report identifies an Alliance for Zero Extinction site.
- 'Assess for Critical Habitat' is stated if the report identifies Critically Endangered or Endangered species OR species with restricted ranges OR congregatory species as coded in the IUCN Red List of Threatened Species.
- 'Assess for biodiversity risk' is stated if the report identifies any other type of Key Biodiversity Area.

IBAT provides initial screening for Critical Habitat values. Performance Standard 6 (PS6) defines these values for Critical Habitat (PS6: para. 16) and legally protected and internationally recognized areas (PS6: para. 20). PS6 will be triggered when IFC client activities are located in modified habitats containing "significant biodiversity value," natural habitats, Critical Habitats, legally protected areas, or areas that are internationally recognized for biodiversity. References to PS6 and Guidance Note 6 (GN6) are provided to guide further assessment and detailed definitions where necessary. Please see <https://www.ifc.org/ps6> for full details on PS6 and GN6.

This report identifies restricted range species according to the KBA Standard definition (hyperlink KBA Standard <https://portals.iucn.org/library/sites/library/files/documents/2016-048.pdf>):

Species having a global range size less than or equal to the 25th percentile of range-size distribution in a taxonomic group within which all species have been mapped globally, up to a maximum of 50,000 km<sup>2</sup>. If all species in a taxonomic group have not been mapped globally, or if the 25th percentile of range-size distribution for a taxonomic group falls below 10,000 km<sup>2</sup>, restricted range should be defined as having a global range size less than or equal to 10,000 km<sup>2</sup>. For coastal, riverine and other species with linear distributions that do not exceed 200 km width at any point, restricted range is defined as having a global range less than or equal to 500 km linear geographic span (i.e. the distance between occupied locations furthest apart).

Note, sites supporting restricted range species can qualify as KBAs under criterion B2. These are sites that hold a significant proportion of the global population size of multiple restricted-range species, and so contribute significantly to the global persistence of biodiversity at the genetic and species level.

The report screens for known risks within a standard 50km buffer of the coordinates used for analysis. This buffer is not intended to indicate the area of impact. The report can be used to:

- Scope risks to include within an assessment of risks and impacts



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- Identify gaps within an existing assessment of risks and impacts
- Prioritize between sites in a portfolio for further assessment of risks and impacts
- Inform a preliminary determination of Critical Habitat
- Assess the need for engaging a biodiversity specialist
- Identify additional conservation experts or organizations to inform further assessment or planning

WARNING: IBAT aims to provide the most up-to-date and accurate information available at the time of analysis. There is however a possibility of incomplete, incorrect or out-of-date information. All findings in this report must be supported by further desktop review, consultation with experts and/or on-the-ground field assessment as described in PS6 and GN6. Please consult IBAT for any additional disclaimers or recommendations applicable to the information used to generate this report.

Please note, sensitive species data are currently not included in IBAT reports in line with the [Sensitive Data Access Restrictions Policy for the IUCN Red List](#). This relates to sensitive Threatened species and KBAs triggered by sensitive species.

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## Priority Species

Habitat of significant importance to priority species will trigger Critical Habitat status (See PS6: para 16). IBAT provides a preliminary list of priority species that could occur within the 50km buffer. This list is drawn from the IUCN Red List of Threatened Species (IUCN RL). This list should be used to guide any further assessment, with the aim of confirming known or likely occurrence of these species within the project area. It is also possible that further assessment may confirm occurrence of additional priority species not listed here. It is strongly encouraged that any new species information collected by the project be shared with species experts and/or IUCN wherever possible in order to improve IUCN datasets.

## IUCN Red List of Threatened Species - CR & EN

The following species are potentially found within 50km of the area of interest.  
For the full IUCN Red List please refer to the associated csv in the report folder.

| Species Name            | Common Name                  | Taxonomic Group | IUCN Category | Population Trend | Biome                           |
|-------------------------|------------------------------|-----------------|---------------|------------------|---------------------------------|
| Batagur dhongoka        | Three-striped Roofed Turtle  | REPTILIA        | CR            | Decreasing       | Terrestrial, Freshwater         |
| Sphyrna lewini          | Scalloped Hammerhead         | CHONDROICHTHYES | CR            | Decreasing       | Marine                          |
| Sphyrna mokarran        | Great Hammerhead             | CHONDROICHTHYES | CR            | Decreasing       | Marine                          |
| Sonneratia griffithii   |                              | MAGNOLIOPSIDA   | CR            | Decreasing       | Terrestrial, Marine             |
| Aythya baeri            | Baer's Pochard               | AVES            | CR            | Decreasing       | Freshwater                      |
| Houbaropsis bengalensis | Bengal Florican              | AVES            | CR            | Decreasing       | Terrestrial                     |
| Batagur baska           | Northern River Terrapin      | REPTILIA        | CR            | Decreasing       | Terrestrial, Marine, Freshwater |
| Pelochelys cantorii     | Asian Giant Softshell Turtle | REPTILIA        | CR            | Decreasing       | Terrestrial, Marine, Freshwater |



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| Species Name                  | Common Name                     | Taxonomic Group | IUCN Category | Population Trend | Biome                   |
|-------------------------------|---------------------------------|-----------------|---------------|------------------|-------------------------|
| <i>Geoclemys hamiltonii</i>   | Spotted Pond Turtle             | REPTILIA        | EN            | Decreasing       | Terrestrial, Freshwater |
| <i>Hardella thurjii</i>       | Crowned River Turtle            | REPTILIA        | EN            | Decreasing       | Terrestrial, Freshwater |
| <i>Morenia petersi</i>        | Indian Eyed Turtle              | REPTILIA        | EN            | Decreasing       | Terrestrial, Freshwater |
| <i>Orcaella brevirostris</i>  | Irrawaddy Dolphin               | MAMMALIA        | EN            | Decreasing       | Marine, Freshwater      |
| <i>Panthera tigris</i>        | Tiger                           | MAMMALIA        | EN            | Decreasing       | Terrestrial             |
| <i>Rhincodon typus</i>        | Whale Shark                     | CHONDRICHTHYES  | EN            | Decreasing       | Marine                  |
| <i>Varanus flavescens</i>     | Yellow Monitor                  | REPTILIA        | EN            | Decreasing       | Terrestrial             |
| <i>Nilssonia gangetica</i>    | Indian Softshell Turtle         | REPTILIA        | EN            | Decreasing       | Terrestrial, Freshwater |
| <i>Nilssonia hurum</i>        | Indian Peacock Softshell Turtle | REPTILIA        | EN            | Decreasing       | Terrestrial, Freshwater |
| <i>Nycticebus bengalensis</i> | Bengal Slow Loris               | MAMMALIA        | EN            | Decreasing       | Terrestrial             |
| <i>Hoolock hoolock</i>        | Western Hoolock Gibbon          | MAMMALIA        | EN            | Decreasing       | Terrestrial             |
| <i>Platanista gangetica</i>   | Ganges River Dolphin            | MAMMALIA        | EN            | Decreasing       | Freshwater              |
| <i>Eusphyra blochii</i>       | Winghead Shark                  | CHONDRICHTHYES  | EN            | Decreasing       | Marine                  |





| Species Name                                      | Common Name                | Taxonomic Group | IUCN Category | Population Trend | Biome                           |
|---------------------------------------------------|----------------------------|-----------------|---------------|------------------|---------------------------------|
| <i>Mobula eregoodoo</i>                           | Longhorned Pygmy Devil Ray | CHONDRICTHYES   | EN            | Decreasing       | Marine                          |
| <i>Stegostoma tigrinum</i>                        | Zebra Shark                | CHONDRICTHYES   | EN            | Decreasing       | Marine                          |
| <i>Mobula tarapacana</i>                          | Sicklefin Devil Ray        | CHONDRICTHYES   | EN            | Decreasing       | Marine                          |
| <i>Mobula thurstoni</i>                           | Bentfin Devil Ray          | CHONDRICTHYES   | EN            | Decreasing       | Marine                          |
| <i>Acropora rudis</i>                             |                            | ANTHOZOA        | EN            | Decreasing       | Marine                          |
| <i>Trachypithecus phayrei</i> ssp. <i>phayrei</i> |                            | MAMMALIA        | EN            | Decreasing       | Terrestrial                     |
| <i>Alopias pelagicus</i>                          | Pelagic Thresher           | CHONDRICTHYES   | EN            | Decreasing       | Marine                          |
| <i>Heritiera fomes</i>                            |                            | MAGNOLIOPSIDA   | EN            | Decreasing       | Terrestrial, Marine, Freshwater |
| <i>Holothuria scabra</i>                          | Golden Sandfish            | HOLOTHUROIDEA   | EN            | Decreasing       | Marine                          |
| <i>Holothuria lessona</i>                         | Golden Sandfish            | HOLOTHUROIDEA   | EN            | Decreasing       | Marine                          |
| <i>Thelenota ananas</i>                           | Prickly Redfish            | HOLOTHUROIDEA   | EN            | Decreasing       | Marine                          |
| <i>Urogymnus polylepis</i>                        | Giant Freshwater Whipray   | CHONDRICTHYES   | EN            | Decreasing       | Marine, Freshwater              |



| Species Name                                        | Common Name          | Taxonomic Group | IUCN Category | Population Trend | Biome                   |
|-----------------------------------------------------|----------------------|-----------------|---------------|------------------|-------------------------|
| <i>Mobula birostris</i>                             | Oceanic Manta Ray    | CHONDRICHTHYES  | EN            | Decreasing       | Marine                  |
| <i>Rynchops albigollis</i>                          | Indian Skimmer       | AVES            | EN            | Decreasing       | Terrestrial, Freshwater |
| <i>Sterna acuticauda</i>                            | Black-bellied Tern   | AVES            | EN            | Decreasing       | Terrestrial, Freshwater |
| <i>Haliaeetus leucoryphus</i>                       | Pallas's Fish-eagle  | AVES            | EN            | Decreasing       | Terrestrial, Freshwater |
| <i>Aquila nipalensis</i>                            | Steppe Eagle         | AVES            | EN            | Decreasing       | Terrestrial             |
| <i>Leptoptilos dubius</i>                           | Greater Adjutant     | AVES            | EN            | Decreasing       | Terrestrial, Freshwater |
| <i>Laticilla cinerascens</i>                        | Swamp Grass-babbler  | AVES            | EN            | Decreasing       | Terrestrial, Freshwater |
| <i>Mobula mobular</i>                               | Spinetail Devil Ray  | CHONDRICHTHYES  | EN            | Decreasing       | Marine                  |
| <i>Trachypithecus phayrei</i>                       | Phayre's Leaf-monkey | MAMMALIA        | EN            | Decreasing       | Terrestrial             |
| <i>Trachypithecus pileatus</i> ssp. <i>pileatus</i> | Blond-bellied Langur | MAMMALIA        | EN            | Decreasing       | Terrestrial             |

### Restricted Range Species

| Species Name                 | Common Name    | Taxonomic Group | IUCN Category | Population Trend | Biome              |
|------------------------------|----------------|-----------------|---------------|------------------|--------------------|
| <i>Ophistemon bengalense</i> | Bengal Mud Eel | ACTINOPTERYGII  | LC OR LR/LC   | Stable           | Marine, Freshwater |





| Species Name              | Common Name                | Taxonomic Group | IUCN Category | Population Trend | Biome               |
|---------------------------|----------------------------|-----------------|---------------|------------------|---------------------|
| Bengala elanga            | Bengala Barb               | ACTINOPTERYGII  | LC OR LR/LC   | Unknown          | Freshwater          |
| Xenentodon cancila        |                            | ACTINOPTERYGII  | LC OR LR/LC   | Unknown          | Freshwater          |
| Batasio batasio           |                            | ACTINOPTERYGII  | LC OR LR/LC   | Unknown          | Freshwater          |
| Oreichthys cosuatis       |                            | ACTINOPTERYGII  | LC OR LR/LC   | Unknown          | Freshwater          |
| Oryzias dancena           | Indian Ricefish            | ACTINOPTERYGII  | LC OR LR/LC   | Stable           | Marine, Freshwater  |
| Pseudosphromenus cupanus  | Spiketail Paradise Fish    | ACTINOPTERYGII  | LC OR LR/LC   | Stable           | Freshwater          |
| Oryzias carmaticus        | Spotted Ricefish           | ACTINOPTERYGII  | LC OR LR/LC   | Unknown          | Marine, Freshwater  |
| Macrobrachium scabriculum |                            | MALACOSTRACA    | LC OR LR/LC   | Unknown          | Freshwater          |
| Macrobrachium rude        |                            | MALACOSTRACA    | LC OR LR/LC   | Unknown          | Freshwater          |
| Macrobrachium rosenbergii | Giant River Prawn          | MALACOSTRACA    | LC OR LR/LC   | Unknown          | Freshwater          |
| Fregatta tropica          | Black-bellied Storm-petrel | AVES            | LC OR LR/LC   | Decreasing       | Terrestrial, Marine |
| Nangra bucculenta         |                            | ACTINOPTERYGII  | DD            | Unknown          | Freshwater          |





## Biodiversity features which are likely to trigger Critical Habitat

### Protected Areas

The following protected areas are found within 1 km and 10 km and 50 km of the area of interest.  
For further details please refer to the associated csv file in the report folder.

| Area name             | Distance | IUCN Category | Status     | Designation             | Recommendation               |
|-----------------------|----------|---------------|------------|-------------------------|------------------------------|
| Bhawal                | 50 km    | IV            | Designated | National Park           | Assess for biodiversity risk |
| Mirpur Botanic Garden | 50 km    | Not Reported  | Proposed   | National Botanic Garden | Assess for biodiversity risk |

### Key Biodiversity Areas

There are no key biodiversity areas to show for this report.

### Species with potential to occur

| Area Taxonomic group | Total assessed species | Total (CR, EN & VU) | CR | EN | VU | NT | LC  | DD |
|----------------------|------------------------|---------------------|----|----|----|----|-----|----|
| REPTILIA             | 100                    | 18                  | 3  | 6  | 9  | 3  | 77  | 2  |
| CHONDRICTHYES        | 25                     | 19                  | 2  | 10 | 7  | 2  | 3   | 1  |
| MAGNOLIOPSIDA        | 88                     | 4                   | 1  | 1  | 2  | 3  | 76  | 5  |
| AVES                 | 330                    | 17                  | 2  | 6  | 9  | 21 | 292 | 0  |
| MAMMALIA             | 69                     | 19                  | 0  | 8  | 11 | 4  | 46  | 0  |
| ANTHOZOA             | 8                      | 2                   | 0  | 1  | 1  | 2  | 3   | 1  |



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| Area Taxonomic group | Total assessed species | Total (CR, EN & VU) | CR | EN | VU | NT | LC  | DD |
|----------------------|------------------------|---------------------|----|----|----|----|-----|----|
| HOLOTHUROIDEA        | 30                     | 5                   | 0  | 3  | 2  | 0  | 14  | 11 |
| ACTINOPTERYGII       | 516                    | 8                   | 0  | 0  | 8  | 9  | 461 | 38 |
| INSECTA              | 103                    | 1                   | 0  | 0  | 1  | 0  | 100 | 2  |
| LILIOPSIDA           | 57                     | 1                   | 0  | 0  | 1  | 1  | 53  | 2  |
| MALACOSTRACA         | 27                     | 0                   | 0  | 0  | 0  | 1  | 19  | 7  |
| AMPHIBIA             | 17                     | 0                   | 0  | 0  | 0  | 0  | 17  | 0  |
| HYDROZOA             | 2                      | 0                   | 0  | 0  | 0  | 0  | 2   | 0  |
| GASTROPODA           | 114                    | 0                   | 0  | 0  | 0  | 0  | 109 | 5  |
| POLYPODIOPSIDA       | 4                      | 0                   | 0  | 0  | 0  | 0  | 4   | 0  |
| BIVALVIA             | 35                     | 0                   | 0  | 0  | 0  | 0  | 32  | 3  |
| ARACHNIDA            | 3                      | 0                   | 0  | 0  | 0  | 0  | 3   | 0  |





### Recommended citation

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### Recommended Experts and Organizations

For projects located in Critical Habitat, clients must ensure that external experts with regional expertise are involved in further assessment (GN6: GN22). Clients are encouraged to develop partnerships with recognized and credible conservation organizations and/or academic institutes, especially with respect to potential developments in natural or Critical Habitat (GN6: GN23). Where Critical Habitats are triggered by priority species, species specialists must be involved. IBAT provides data originally collected by a large network of national partners, while species information is sourced via the IUCN Red List and affiliated Species Specialist Groups. These experts and organizations are listed below. **Please note that this is not intended as a comprehensive list of organizations and experts. These organizations and experts are under no obligation to support any further assessment and do so entirely at their discretion and under their terms. Any views expressed or recommendations made by these stakeholders should not be attributed to the IFC or IBAT for IFC partners.**

#### Birdlife Partners

URL: <https://www.birdlife.org/worldwide/partnership/birdlife-partners>

#### Directory for Species Survival Commission (SSC) Specialist Groups and Red List Authorities

URL: <https://www.iucn.org/commissions/ssc-groups>

## **Appendix 5: Sample Outline of Traffic Management Plan**

### **Introduction**

This Traffic Management Plan (TMP) provides the traffic management procedures to be followed by the vehicle users of Contractors' while implementing the construction/reconstruction works of the project (or subproject). The vehicle operators should be careful that, road users are not limited to motorists. There are also the pedestrians, such as school children, people with disabilities, cyclists and animals using or traversing these roads.

### **Traffic Management Objectives and Strategies**

The objectives of the TMP are to:

- i. Provide for a safe environment for all road users;
- ii. Provide protection to Contractors' operators and the general public from traffic hazards that may arise as a result of the driving of vehicles;
- iii. Minimize the disruption, congestion and delays to all road users;
- iv. Ensure access to adjacent private/commercial premises is maintained at all times.

To achieve the above objectives, the Traffic Management Plan will:

- i. Ensure whenever possible, that a sufficient number of traffic lanes to accommodate vehicle traffic volumes are provided.
- ii. Ensure that delays and traffic congestion are kept to a minimum and within acceptable levels.
- iii. Ensure that appropriate/sufficient warning and information signs are installed and that adequate guidance is provided to delineate the travel paths to bypass or cross the construction site.
- iv. Ensure that the roads are free of hazards and that all road users are adequately protected from activities of road users.
- v. Ensure that all needs of road users, motorists, pedestrians, cyclists, public transport passengers and people with disabilities are accommodated around the construction site.

A Traffic Management Plan is a key workplace document that has legal standing. As such it is critical that the structure and content of the Plan is sufficient to explain the potential hazards, the assessed risks and the proposed treatments for the proposed work activities and work site. The TMP should include all of the following. Where any of the following sections are not applicable, the TMP should indicate this accordingly.

#### Introduction

- i. Purpose and Scope,
- ii. Objectives and Strategies.

#### Project Overview

- i. Project Location,
- ii. Project Details and Site Constraints/Impacts

#### Project Representatives (Principal for the Works; Principal Contractor)

#### Safety Plan

- i. Occupational Safety and Health;
- ii. Competencies;
- iii. Responsibilities- Role, responsibility and authority of key personnel, management hierarchy including site representatives and contact details of the responsible personnel;
- iv. Communicating TMP requirements;
- v. Prior approvals (if any) granted by the governing local government agencies with relevant reference number.

#### Trip Hazards & Environmental Conditions

- i. Weather;
- ii. Vegetation;
- iii. Existing signage;
- iv. Structures.

#### Worksite Access

- i. Pedestrians;
- ii. Cyclists;
- iii. Works vehicles;
- iv. Emergency vehicles;
- v. Public Transport;
- vi. Property Access;
- vii. School crossings;
- viii. Impact on adjoining Road Network;
- ix. Heavy and Oversized Vehicles and Loads;
- x. Legal and Other Requirements.

#### Emergency Arrangements and Contingencies

- i. Emergency Services;
- ii. Dangerous Goods;
- iii. Damage/Failure to Services (Traffic signals, street lighting, power, gas);
- iv. Contingency Planning (Road crash or vehicle breakdown, serious injury or fatality);
- v. Emergency Contacts.

## Appendix 6: Sample Outline of Spoil Management Plan

**Purpose and Application:** Spoil Management Plan (SMP) is to describe how the project will manage the spoil generated and reuse related to design and construction works. This is an integral part of EMP. The objective of SMP is to reuse of spoil from works in accordance with the spoil management hierarchy outlined in this document.

**Objectives of Spoil Management Plan:** The objectives of SMP are:

- (i) To minimize spoil generation where possible;
- (ii) Maximize beneficial reuse of spoil from construction works in accordance with spoil management hierarchy;
- (iii) Manage onsite spoil handling to minimize environmental impacts on resident and other receivers;
- (iv) Minimize any further site contamination of land, water, soil; and
- (v) Manage the transportation of spoil with consideration of traffic impacts and transport related emissions.

### Structure of Spoil Management Plan:

Section 1: Introduction of SMP

Section 2: Legal and other requirements

Section 3: Roles and responsibilities

Section 4: Identification and assessment of spoil aspects and impacts

Section 5: Spoil volumes, characteristics and minimization

Section 6: Spoil reuses opportunities, identification and assessment

Section 7: On site spoil management approach

Section 8: Spoil transportation methodology

Section 9: Monitoring, Reporting, Review, and Improvements

### Aspects and potential impacts

The key aspects of potential impacts in relation to SMP are listed in table below:

| Aspects                 | Potential Impacts                                                                                                      |
|-------------------------|------------------------------------------------------------------------------------------------------------------------|
| Air Quality             | Potential for high winds generating airborne dust from the stock piles                                                 |
| Sedimentation           | Potential for sediment laden site runoff from spoil stockpiles and potential for spillage of spoil from truck on roads |
| Surface and groundwater | Contamination of surface and ground water                                                                              |
| Noise                   | Associated with spoil handling and haulage and storage                                                                 |
| Traffic                 | Impacts associated with spoil haulage                                                                                  |
| Land Use                | Potential for spoil to be transported to a that does not have permission for storage/disposal                          |
| Design specifications   | Limitations on opportunities to minimize spoil generation                                                              |
| Sustainability          | Limited sites for storage, reuse opportunities                                                                         |

### **Spoil volumes, Characteristics and Minimization**

**Spoil volume calculations:** Estimate the volumes of spoils produced from each of the construction sites.

**Characterization of spoil:** Based on the type of spoil; characterization is done (sand stone, mud mix materials, reusable materials)

**Adopt Spoil Reduce, Reuse Opportunities:** An overview of the assessment methodology to be used is mentioned below.

- Consideration of likely spoil characteristics
- Identification of possible reuse sites
- Screening of possible reuse opportunities

**Identification of possible safe disposal sites for spoil:** Those spoils which cannot be reuse shall be properly disposed in designated areas, such disposal areas should be identified in project locations. Such disposal areas should be safe from environmental aspects and there should be any legal and resettlement related issues. Such areas need to be identified and prior cliental approval should be obtained to use it as spoil disposal area. The local administration must be consulted and if required permission should be obtained from them.

### **Storage and stock piling Transportation and haulage route**

Based on the above, the contractor will prepare a SMP as an integral part of EMP and submit it to the MDSC for their review and approval.

### **Summary of Key Issues and Remedial Actions**

Summary of follow up time-bound actions to be taken within a set timeframe

## Appendix 7: Sample Outline of Waste Management Plan

### Sample Waste Management Plan Outline

(Note: This was lifted from and patterned after the "Suggested Pre-incident All-hazards Waste Management Plan Outline of US Environmental Protection Agency". Minor edits were made for consistency with specific country setting.)

| Recommended Plan Contents:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Considerations:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| <b>I. Plan Overview</b> <ol style="list-style-type: none"> <li>1. Scope<br/><i>Description of scenario, entity, and geographical area covered</i></li> <li>2. Planning assumptions</li> <li>3. List of officials who should be notified in the case of an incident and contact information</li> <li>4. Roles and responsibilities for waste management activities<br/><i>Include specialized resources (e.g., subject matter experts for consultation, emergency response teams)</i></li> <li>5. Regulatory requirements <b>List necessary permits as they are obtained</b></li> <li>6. Documentation of plan development process<br/><i>Include all internal departments and external entities</i></li> <li>7. Record of plan approvals, reviews, and updates to include any changes made</li> </ol> | <p><b>This section should be updated as needed during an incident with the situational overview.</b></p> <p>Scenarios may be based on site- and community-specific threats, hazards, and vulnerabilities.<sup>3</sup></p> <p>Describe general terrain types, land use, and accessibility for the areas that would most likely be impacted by the incident and how these characteristics may affect waste management activities. Also, identify critical infrastructure and areas that may impact response priorities or present cleanup challenges.</p> <p>Include relevant national, local, tribal, and territorial (including neighboring countries, as appropriate) environmental/public health regulatory and legal requirements that impact waste management and material reuse. Also, include the impact that a government emergency or major disaster declaration might have on the implementation of applicable laws. Keep in mind that local government requirements may be more stringent than national government requirements and may include additional waste streams not covered under national laws.</p> <p>Establish roles and responsibilities for all waste management activities, including who will monitor contractors and waste management sites.</p> |
| <b>II. Materials and Waste Streams</b> <ol style="list-style-type: none"> <li>1. List of anticipated waste streams</li> <li>2. Description of each waste stream<br/><i>Include regulatory status (national and local), associated hazards, if any, agent-specific (e.g., chemical, biological) information, fact sheets, if any, contact information for waste-specific subject matter experts, and packaging, labeling, handling, and transportation requirements, as well as identify decontamination and reuse, recycling, treatment, and disposal</i></li> </ol>                                                                                                                                                                                                                                  | <p><b>This section should be updated as needed during an incident with the actual waste streams generated by the incident.</b></p> <p>Consider these and other potential waste streams:</p> <ul style="list-style-type: none"> <li>• Aqueous Waste (e.g., water from decontamination activities)</li> <li>• Asbestos-containing Material</li> <li>• Ash</li> <li>• Asphalt</li> <li>• Building Contents</li> <li>• Chemically-contaminated Waste</li> <li>• Commingled Debris</li> <li>• Construction and Demolition Debris</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

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| <p><i>options appropriate to that waste stream</i></p>                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>• Cylinders and Tanks</li> <li>• Electronics Waste</li> <li>• Food Waste</li> <li>• Hazardous Waste</li> <li>• Lead-based Paint</li> <li>• Metals</li> <li>• Mixed Waste</li> <li>• Municipal Solid Waste (MSW)</li> <li>• Scrap Tires</li> <li>• Soils, Sediments, and Sandbags</li> <li>• Solid Waste from Response Activities (e.g., personal protective equipment (PPE), waste from law enforcement activities)</li> <li>• Used Oil and Oil-contaminated Waste</li> <li>• Vegetative Debris</li> </ul> <p>Consider all other potential sources of wastes from construction activities.</p>                                                                                                                                                                                                                                                                                                                             |
| <p><b>III. Waste Quantities</b></p> <ol style="list-style-type: none"> <li>1. Forecast quantity of each type of anticipated waste</li> <li>2. Method for estimating actual waste quantities during/after an incident<br/>(e.g., GIS, windshield assessment, manned and unmanned aerial surveillance)</li> </ol>                                                                                         | <p><b>This section should be updated as needed during an incident with waste estimates based on the specifics of the incident.</b></p> <p><b>Recommended Tools:</b><br/>Incident Waste Decision Support Tool (I-WASTE DST)<br/>(registration is required to use this tool)<br/><a href="http://www2.ergweb.com/bdrtool/login.asp">http://www2.ergweb.com/bdrtool/login.asp</a></p> <p>FEMA's Hazards U.S.-Multi-Hazard (Hazus-MH)<br/>(for estimating potential losses from earthquakes, floods, and hurricanes) <a href="http://www.fema.gov/hazus">http://www.fema.gov/hazus</a><br/>(ArcGIS software is required to use Hazus-MH)</p> <p>EPA's Waste Estimation Support Tool (WEST)<br/>(for estimating the type and amount of waste generated from cleanup after a radiological incident)<br/><a href="https://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=288802">https://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=288802</a></p> |
| <p><b>IV. Waste Characterization Sampling and Analysis</b><br/>(for each waste stream)</p> <ol style="list-style-type: none"> <li>1. Sampling<br/><i>Estimate number of samples, identify type of analysis needed for each waste/material type, potential approaches to combine/composite samples, and address Health and Safety issues, such as appropriate PPE for sampling activities</i></li> </ol> | <p>Two different types of sampling may be needed to meet waste acceptance criteria at waste management facilities and to allay community concerns:</p> <ol style="list-style-type: none"> <li>1) sampling to classify and determine compliance with national, local, or tribal regulatory criteria, and</li> <li>2) sampling to ensure that waste/materials have been effectively decontaminated.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

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| <p><i>AND</i><br/><i>Identify any requirements for transporting the samples to laboratories for testing</i></p> <p>2. Analysis<br/><i>Identify data quality objectives, labs which can conduct the analyses, as well as methodologies for the analyses, what items are needed for sampling (e.g., swabs, sample bottles), sampling methodologies (e.g., composite sampling procedures), and the required techniques</i></p> <p>3. Quality assurance<br/><i>Identify methods to ensure the quality of the data, analysis, and results</i></p>                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p><b>V. Waste Management Strategies/Options</b></p> <p>1. Procedures and approaches<br/><i>By activity</i></p> <p>a. Minimization<br/><i>Actions to minimize waste generation, toxicity, and physical size</i></p> <p>b. Collection<br/><i>Methods; health and safety requirements</i></p> <p>c. Segregation</p> <p>d. Decontamination (equipment, people, waste/materials)<br/><i>Health and safety requirements</i></p> <p>e. Accumulation/Storage<br/><i>Site location selection criteria; documentation; health and safety requirements</i></p> <p>f. Monitoring of Waste Management Activities</p> <p>2. Pre-selected waste management sites<br/><i>Site-specific information</i></p> | <p><b>This section should be updated as needed during an incident (e.g., with sites that are used or may be used to manage waste during the incident).</b></p> <p>Relevant legal and regulatory requirements should be considered, including whether waste management activities may trigger compliance with environmental and historic preservation laws, rules, and regulations. Describe how compliance will be attained.</p> <p>Required permits may include waste processing and recycling operations permits, temporary land-use permits, land-use variances, traffic circulation strategies, air quality permits, water quality permits, coastal commission land-use permits, HHW permits, fire department permits, and burn permits.</p> <p>Reuse, recycling, and composting are generally preferred options, where appropriate. Consider adding a list of possible materials that can be reused, recycled, or composted. Having advance information on the local and regional markets, capacity, and local and regional recyclers can be important.</p> <p>Consider the impact of potential decontamination approaches on quantities and characteristics of waste and the impact of waste management constraints on potential decontamination approaches.</p> |

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| <p>a. Waste staging and storage (short-term and long-term) locations</p> <p>b. Equipment staging and storage (short-term and long-term) locations</p> <p>c. Decontamination and treatment stations</p> | <p>Define the priorities during both the response and recovery phase operations, including for facilities that may be impacted.</p> <p>Describe the coordination process with other entities responsible for managing waste.</p> <p>Consider difficulties and issues regarding removing waste from waterways and sensitive habitats (e.g., shorelines, wetlands, marshes) and their impacts on collection and removal activities.</p> <p>Describe the circumstances under which waste will be removed from private property. Identify the laws that allow government to intercede in private property matters, the process to obtain permissions to enter onto private property, and the process for recouping costs (such as insurance proceeds).</p> <p>Account for impacts from adverse weather, such as flooding and wind damage.</p> <p>Identify multiple sites/locations to choose from during an incident, if possible. However, designating specific sites/locations in advance of an incident may not be possible. In this case, develop guidelines that could be used to designate sites during an incident.</p> <p>Whether specifying sites/locations or developing guidelines, consider:</p> <ul style="list-style-type: none"> <li>• Benefits of on-site vs. off-site management</li> <li>• Potential impact of having to transport the waste</li> <li>• Speed with which waste needs to be managed</li> <li>• Facility requirements and capacity</li> <li>• Permitting and land-use variance requirements</li> <li>• Cost of various options</li> <li>• Community concerns</li> <li>• Site security</li> <li>• Resources needed, including private sources of equipment</li> <li>• Proximity to anticipated waste generation points</li> <li>• Ease of access</li> <li>• Ease of containment of wastes/materials</li> <li>• Ownership of sites</li> <li>• Need for buffers and setbacks</li> <li>• Proximity to environmentally sensitive/protected areas (e.g., wetlands, floodplains, critical habitats, surface water, storm drains and sanitary sewer drains)</li> </ul> |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p>that may lead to waterways, drinking water wells, septic tanks with leach fields)</p> <ul style="list-style-type: none"> <li>• Proximity to historically significant areas like historic districts and archeologically sensitive areas</li> <li>• Environmental and human health concerns of specific waste streams</li> <li>• Ability to sort waste streams by category to facilitate recycling</li> <li>• Ability to properly contain radioactive or other highly hazardous waste streams</li> </ul> <p>Consider the possible need for long-term groundwater, air, and other environmental monitoring at on-site burial sites and other waste management facilities or sites.</p> <p>Consider the nature of the waste or material being managed. In some cases, long-term storage may be required.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p><b>VI. Waste Management Facilities</b></p> <ol style="list-style-type: none"> <li>1. Anticipated types of waste management facilities needed<br/><i>Identify all facility types needed to manage anticipated waste streams and quantities</i></li> <li>2. Specific facilities identified<br/><i>Provide detailed information on each potential site to aid in selection at time of the incident, including some or all of the following: facility name, type, contact information for site manager and support staff, location information (including latitude/longitude), permit status and compliance history, types of waste accepted, pre-negotiated contracts, if any, waste capacity, waste acceptance criteria, financial status, distance from anticipated waste generation points, costs, community concerns</i></li> </ol> | <p><b>This section should be updated as needed during an incident with facilities that are used or may be used to manage waste during the incident.</b></p> <p>Communicating with facilities before an incident occurs can help to determine the facilities' waste acceptance criteria, which may be more stringent than what is legally required (e.g., in order to help determine sampling and analysis needs, size requirements).</p> <p>Identify multiple waste management facilities to choose from in case an incident occurs. Waste from wide area incidents may exceed the capacity of local facilities, or facilities may refuse to accept the waste. Out-of-country facilities may be necessary, in which case permissions may be required and different regulations and requirements may apply.</p> <p>In the event that existing waste management facilities do not have the capacity or capability to manage all generated wastes, including those in other communities that are accessible by rail, barge, or truck, planners should consider storing waste long-term, reopening a closed facility, or constructing a new facility. Consider pre-identifying sites for potential new facilities or developing criteria for siting new facilities.</p> <p>Proximity to transportation is an important consideration when selecting a waste management facility, as well as proximity to waste management sites (e.g., whether heavy</p> |

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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | equipment can access the site to load the large quantities of waste onto barges or railcars for transport to facilities).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>VII. Transportation</b><br>1. Logistical options<br>2. Routes (including maps)<br>3. Hauler information<br><i>Provide detailed information on each potential hauler to aid in selection at time of the incident, including some or all of the following: hauler's name, type, contact information, wastes they are permitted to handle, community concerns, security and legal requirements, decontamination needs, insurance requirements, PPE requirements, any special documentation requirements, spill response plan, and prenegotiated contracts, if applicable</i> | <p>Consult with transportation officials on alternate routes, damaged infrastructure, and other matters impacting transport of waste.</p> <p>Prior to transportation, hazardous material must be classified according to the risks it presents and packaged, marked, labeled, and described on a shipping paper, as required by relevant local laws and regulations.</p> <p>Consider all modes of transportation, including aircraft, vessel and rail, as well as possible differences in restrictions for highways and local roads. Keep in mind packaging, labeling, permitting, security (e.g., for certain waste streams, escorts and computerized, real-time tracking systems may be required), and other transportation permit requirements.</p> <p>National or local government permission may be required, which may include obtaining a permit. Expedited permit procedures may be appropriate.</p> <p>Highway weight restrictions may vary based on time of year. Consider including a pre-scripted outline or fact sheet of hauler responsibilities, including health and safety requirements.</p> <p>Drivers may be considered emergency workers and subject to applicable exposure limits.</p> <p>Drivers and personnel who prepare hazardous materials for transportation may be considered hazmat employees and be subject to training requirements.</p> |
| <b>VIII. Waste and Material Tracking and Reporting System</b><br>1. General principles<br>2. Databases or other tracking software to be used<br>3. Waste tracking report templates<br><i>Indicate information to be tracked</i>                                                                                                                                                                                                                                                                                                                                              | <p>Tracking the waste from cradle to grave helps increase transparency and aids in allaying community concerns. Keep in mind security concerns regarding sensitive information.</p> <p>Use of portable measurement and digital tracking devices should be considered.</p> <p>Haulers, government entities, and receiving facilities may use different surveying equipment and units of measurement, which should be adjusted as needed to maintain consistency.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>IX. Community Communications/ Outreach Plan</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | It is important to ensure that the community, including its residents, receive accurate and timely information about                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

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| <ol style="list-style-type: none"> <li>1. Strategy</li> <li>2. Contact information for key stakeholder groups<br/><i>(e.g., community groups, media, government officials)</i></li> <li>3. Pre-scripted information for waste management activities involving the public<br/><i>(e.g., fact sheets, public service announcements (PSAs), frequently asked questions (FAQs))</i></li> <li>4. Information to aid in establishing a response website once an incident occurs and/or contribute to an incident response website created by the Incident Command or other entity<br/><i>(e.g., hosting information, format, potential contents)</i></li> </ol> | <p>the parameters, rules, and guidelines for waste management activities.</p> <p>Community outreach may include detailing special training, required PPE, and safety information, especially during a chemical, biological, or radiological incident, for facility personnel, people who choose not to evacuate their homes and, thus, are living with contamination in their homes, and responders, including volunteers who are helping to clean up the waste.</p> <p>Develop outreach and training materials for stakeholders and the public in multiple languages, as applicable to the target populations.</p> <p>Also consider the use of social media and the need for interpreters/translators.</p>                                                                                                |
| <p><b>X. Health and Safety for Waste Management Activities</b><br/><i>(for emergency workers and the public)</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p>While a general health and safety plan for the incident will be developed, specific waste management activities may require additional guidance and should be addressed. Waste handling at all stages may require environmental monitoring and additional measures to detect and prevent releases to the environment, which may result in harmful exposures to workers or the public (e.g., For potential exposure to fibers from friable asbestos, an Asbestos Management Plan may be necessary).</p> <p>Include specific details on safety rules and procedures to protect workers and the public and specific measures for adherence to safety rules and procedures.</p> <p>Ensure that the overall incident health and safety plan includes information related to waste management activities.</p> |
| <p><b>XI. Resource Summary</b><br/><i>Gathered from all previous sections</i></p> <ol style="list-style-type: none"> <li>1. Resource needs<br/><i>(e.g., equipment, staff, packaging materials, PPE)</i></li> <li>2. Resource sources</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                          | <p>Resources may be available in-house, from contracts, or through agreements.</p> <p>For any contracting need, possible contractors should be identified and prequalified. Identify the types of work that will be performed with contracted resources. Describe the process and procedure for acquiring competitively procured contracted services, provide specific contract requirements, and explain how contractor qualifications are established.</p>                                                                                                                                                                                                                                                                                                                                               |

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>a. Mutual Aid Agreements</li> <li>b. Pre-negotiated contracts</li> <li>c. Specialized experts</li> <li>3. Specialized technical assistance contacts</li> <li>4. Contracting               <ul style="list-style-type: none"> <li>a. Emergency procurement procedures</li> <li>b. Contract oversight plan</li> </ul> </li> <li>5. Cost accounting/financial management</li> </ul>                                                                                                                                                                     | <p>Consider that the availability of resources may be impacted by the incident itself (e.g., contamination, physical damage), lack of access (e.g., road damage), adverse weather conditions, competing needs from other jurisdictions or responses, etc.</p>                                 |
| <p><b>XII. Oversight Activities and Exit Strategy</b></p> <p><i>Describe the process for transitioning each waste management activity back to its pre-incident state, including the scale-down/close-out of each waste management response activity (e.g., waste collection and staging, air monitoring of staging areas) and each waste management oversight activity performed (e.g., site visits/inspections of waste management facilities and sites, sampling and analysis of waste streams), the transition of roles and responsibilities, and the frequency of each activity</i></p> | <p><b>This section should be developed and added at the time of an incident.</b></p> <p>It is important to note that there may be some waste management activities that extend beyond the end of the response that should be addressed in the exit strategy (e.g., long-term monitoring).</p> |

#### RECOMMENDED APPENDICES

- Job descriptions for waste management staff positions
- List of training classes available for different waste management roles
- Pre-written waste management emergency ordinances, orders, directives, declarations, designations, permits, etc.
- Maps of waste management facilities and sites, transportation routes, critical waste management infrastructure, and key resources
- Links to health and safety information
- Glossary and list of acronyms

## **Appendix 8: Environmentally Sound Design Considerations for Sewage Facilities at Construction Camps or Temporary Work Sites**

### **Pit Privy**

Outdoor pit privies must:

- be maintained in a clean and sanitary condition and in good working order;
- be protected so that insects, rodents or other animals do not have access to the contents;
- be constructed so as to prevent the entry of either rain or surface water into the pit;
- be located more than 7.5 meters from a well or camp facilities (e.g. residence, kitchen, etc.);
- be located more than 30 meters from any river, stream, creek, lake, spring or other body of surface water;
- be located as far as possible but at least 15 meters from a water well or other supply. A 30 meters setback is recommended for water supplies other than a properly constructed drilled water well;
- include a 1.5 meter separation from the bottom of the pit to a water table if the soil is clay or 7.6 meter separation if the soil is sand;
- have setbacks to other features and structures so as to not create a health hazard; and
- only be used for human waste.

### **Privy Vaults**

Outdoor privy vaults must:

- be maintained in a clean and sanitary condition and in good working order;
- utilize a sewage holding tank or portion of a holding tank conforming to septic tank standards;
- be protected so that insects, rodents or other animals do not have access to the contents;
- be pumped and the sewage hauled to an appropriate disposal location by a licensed sewage hauler;
- be located more than 7.5 meters from a well or camp facilities (e.g. residence, kitchen, etc.);
- be located as far as possible but at least 7.5 meters from any river, stream, creek, lake, spring or other body of surface water;
- be located as far as possible but at least 7.5 meters from a properly constructed drilled water well or any other type of water well or water supply;
- have appropriate setbacks to other features and structures should be considered when constructing a privy vault; and
- be constructed so as to prevent the entry of either rain or surface water into the vault.

### **Seepage Pits**

A seepage pit is a pit that has been excavated in the soil. A seepage pit is not intended to be a permanent structure.

The seepage pit should:

- be maintained in a clean and sanitary condition and in good working order;
- be protected so that insects, rodents or other animals do not have access to the contents;

- be located more than 30 meters from any river, stream, creek, lake, spring or other body of surface water;
- be located more than 30 meters from a properly constructed drilled water well or any other type of water well or water supply;
- include a 1.5 meter separation from the bottom of the seepage pit to a water table if the soil is clay or 7.6 meters separation if the soil is sand;
- be located such that individuals do not walk through sewage during the performance of duties;
- be located so as to contain sewage within the seepage pit;
- Be located such that surface runoff and overland flooding does not enter the seepage pit;
- be covered with a cover capable of holding the weight of an adult male (103 kg); and
- be constructed and located to as not pose a physical hazard. Seepage pits should be filled in with native soil when the contents reach to within 0.6 m (2 ft of the ground surface) or the pit will no longer be used.

## **Appendix 9: Sample Outline of Health and Safety Plan**

(See separate document)

**Appendix 10: Minutes of Consultation Meetings**  
**(Complete copies of minutes of meetings is voluminous and provided as separate files)**

### Appendix 11: Sample Grievance Registration Form

The \_\_\_\_\_ Project 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 that information to remain confidential, please inform us by writing/typing \*(CONFIDENTIAL)\* above your name. Thank you.

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

#### FOR OFFICIAL USE ONLY

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

## Appendix 12: Sample Daily Monitoring Sheet for Contractor

(Note: This checklist is indicative which can be further enhanced depending on the project circumstances.)

[NAME OF ADB PROJECT]

Contractor Monitoring Sheet

Name of Subproject: \_\_\_\_\_

Location: \_\_\_\_\_

Contractor: \_\_\_\_\_

Contractor EHS Supervisor (or equivalent): \_\_\_\_\_

Date of monitoring: \_\_\_\_\_

### Summary of Findings

| Monitoring Item                                     | Status                                                                                 | Remarks |
|-----------------------------------------------------|----------------------------------------------------------------------------------------|---------|
| <b>1. Compliance with Local Permit Requirements</b> | <b>(Obtained / Application Submitted / Not Applicable)</b>                             |         |
| <i>Location/zoning permits</i>                      |                                                                                        |         |
| <i>Permit to construct</i>                          |                                                                                        |         |
| <i>Building permit</i>                              |                                                                                        |         |
| <i>Transport / hauling permits</i>                  |                                                                                        |         |
| <b>2. Compliance with IEE Requirements</b>          | <b>(Approved / Under Preparation / Submitted to PMU for Approval / Not Applicable)</b> |         |
| <i>Site-specific EMP (SEMP)</i>                     |                                                                                        |         |
| <i>Corrective Action Plan, if any</i>               |                                                                                        |         |
| <b>3. Compliance with SEMP</b>                      |                                                                                        |         |
| <b>Construction Site</b>                            | <b>(Satisfactory / Needs Improvement / Not Implemented/Not Applicable)</b>             |         |
| - Conduct of toolbox talk                           |                                                                                        |         |
| - Use of PPE                                        |                                                                                        |         |
| - Rest areas for male and female workers            |                                                                                        |         |
| - Toilets for male and female workers               |                                                                                        |         |
| - Medical kits                                      |                                                                                        |         |
| - Drinking water supply                             |                                                                                        |         |
| - Dust control                                      |                                                                                        |         |
| - Noise control                                     |                                                                                        |         |
| - Solid waste management                            |                                                                                        |         |
| - Wastewater management                             |                                                                                        |         |
| - Chemicals storage (fuel, oil, etc.)               |                                                                                        |         |
| - Siltation or erosion control                      |                                                                                        |         |
| - Heavy equipment staging / parking area            |                                                                                        |         |
| - Barricades around excavation sites                |                                                                                        |         |
| - Access to residential houses/shops/businesses     |                                                                                        |         |
| - Traffic routing signages                          |                                                                                        |         |
| - Lightings at night                                |                                                                                        |         |

| Monitoring Item                                                          | Status                                                                  | Remarks |
|--------------------------------------------------------------------------|-------------------------------------------------------------------------|---------|
| - Trench shoring / landslide protection                                  |                                                                         |         |
| <b>Construction Workers' Camp Site</b>                                   | <b>(Available / Needs Improvement / Not Available / Not Applicable)</b> |         |
| - Quarters for male and female workers                                   |                                                                         |         |
| - Sleeping utilities (e.g. beds, pillows, blankets, mosquito nets, etc.) |                                                                         |         |
| - Power/Electricity supply                                               |                                                                         |         |
| - Drinking water supply                                                  |                                                                         |         |
| - Toilets for male and female workers                                    |                                                                         |         |
| - General purpose water supply (cooking, washing, bathing)               |                                                                         |         |
| - Cooking facilities and areas                                           |                                                                         |         |
| - Solid waste management                                                 |                                                                         |         |
| - Wastewater management                                                  |                                                                         |         |
| - Pest control                                                           |                                                                         |         |
| <b>4. Implementation of GRM</b>                                          | <b>(Yes / No or None / Under Resolution)</b>                            |         |
| <i>Complaints</i>                                                        |                                                                         |         |
| <i>Complaints resolution</i>                                             |                                                                         |         |
| <b>5. Environmental Quality Measurement</b>                              | <b>(Passed / Failed / Not Applicable)</b>                               |         |
| <i>Ambient air quality sampling</i>                                      |                                                                         |         |
| <i>Noise level measurement</i>                                           |                                                                         |         |
| <i>Receiving water quality sampling</i>                                  |                                                                         |         |

**Other Issues:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Attachments:**

1. Copies of new permits obtained, if any.
2. Photos taken at worksites, if any.  
(photos attached in previous monitoring sheets should not be used again).
3. Laboratory results of environmental quality measurements, if any.

**Prepared by:** \_\_\_\_\_

Name, Designation and Signature

### Appendix 13: Sample Inspection Checklist for Project Management Unit

(Note: This checklist is indicative which can be further enhanced depending on the project circumstances.)

#### [NAME OF ADB PROJECT] SITE INSPECTION CHECKLIST

Subproject / Location: \_\_\_\_\_

Date: \_\_\_\_\_

| MONITORING/INSPECTION QUESTIONS |                                                                                      | FINDINGS |    |    | COMMENTS / CLARIFICATIONS |
|---------------------------------|--------------------------------------------------------------------------------------|----------|----|----|---------------------------|
| 1.                              | Supervision and Management On-Site                                                   | Yes      | No | NA |                           |
|                                 | a. Is an EHS supervisor available?                                                   |          |    |    |                           |
|                                 | b. Is a copy of the SEMP available?                                                  |          |    |    |                           |
|                                 | c. Are daily toolbox talks conducted on site?                                        |          |    |    |                           |
| 2.                              | The Facilities                                                                       | Yes      | No | NA |                           |
|                                 | a. Are there a medical and first aid kits on site?                                   |          |    |    |                           |
|                                 | b. Are emergency contact details available on-site?                                  |          |    |    |                           |
|                                 | c. Are there PPEs available? What are they?                                          |          |    |    |                           |
|                                 | d. Are the PPEs in good condition?                                                   |          |    |    |                           |
|                                 | e. Are there firefighting equipment on site?                                         |          |    |    |                           |
|                                 | f. Are there separate sanitary facilities for male and female workers?               |          |    |    |                           |
|                                 | g. Is drinking water supply available for workers?                                   |          |    |    |                           |
|                                 | h. Is there a rest area for workers?                                                 |          |    |    |                           |
|                                 | i. Are storage areas for chemicals available and with protection? in safe locations? |          |    |    |                           |
| 3.                              | Occupational Health and Safety                                                       | Yes      | No | NA |                           |
|                                 | a. Are the PPEs being used by workers?                                               |          |    |    |                           |
|                                 | b. Are excavation trenches provided with shores or protection from landslide?        |          |    |    |                           |
|                                 | c. Is breaktime for workers provided?                                                |          |    |    |                           |
|                                 | d. How many for each type of collection vehicle is in current use?                   |          |    |    |                           |
| 4.                              | Community Safety                                                                     | Yes      | No | NA |                           |
|                                 | a) Are excavation areas provided with barricades around them?                        |          |    |    |                           |
|                                 | b) Are safety signages posted around the sites?                                      |          |    |    |                           |
|                                 | c) Are temporary and safe walkways for pedestrians available near work sites?        |          |    |    |                           |
|                                 | d) Is there a record of treated wastewater quality testing/measurement?              |          |    |    |                           |
| 5.                              | Solid Waste Management                                                               | Yes      | No | NA |                           |
|                                 | a. Are excavated materials placed sufficiently away from watercourses?               |          |    |    |                           |
|                                 | b. Is solid waste segregation and management in place?                               |          |    |    |                           |

| MONITORING/INSPECTION QUESTIONS |                                                                                                                          | FINDINGS |    |    | COMMENTS / CLARIFICATIONS |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------|----------|----|----|---------------------------|
|                                 | c. Is there a regular collection of solid wastes from work sites?                                                        |          |    |    |                           |
| 6.                              | Wastewater Management                                                                                                    | Yes      | No | NA |                           |
|                                 | a) Are there separate sanitary facilities for various types of use (septic tanks, urination, washing, etc.)?             |          |    |    |                           |
|                                 | b) Is any wastewater discharged to storm drains?                                                                         |          |    |    |                           |
|                                 | c) Is any wastewater being treated prior to discharge?                                                                   |          |    |    |                           |
|                                 | d) Are measures in place to avoid siltation of nearby drainage or receiving bodies of water?                             |          |    |    |                           |
|                                 | e) Are silt traps or sedimentation ponds installed for surface runoff regularly cleaned and freed of silts or sediments? |          |    |    |                           |
| 7.                              | Dust Control                                                                                                             | Yes      | No | NA |                           |
|                                 | a. Is the construction site watered to minimize generation of dust?                                                      |          |    |    |                           |
|                                 | b. Are roads within and around the construction sites sprayed with water on regular intervals?                           |          |    |    |                           |
|                                 | c. Is there a speed control for vehicles at construction sites?                                                          |          |    |    |                           |
|                                 | d. Are stockpiles of sand, cement and other construction materials covered to avoid being airborne?                      |          |    |    |                           |
|                                 | e. Are construction vehicles carrying soils and other spoils covered?                                                    |          |    |    |                           |
|                                 | f. Are generators provided with air pollution control devices?                                                           |          |    |    |                           |
|                                 | g. Are all vehicles regularly maintained to minimize emission of black smoke? Do they have valid permits?                |          |    |    |                           |
| 8.                              | Noise Control                                                                                                            | Yes      | No | NA |                           |
|                                 | a) Is the work only taking place between 7 am and 7 pm, week days?                                                       |          |    |    |                           |
|                                 | b) Do generators operate with doors closed or provided with sound barrier around them?                                   |          |    |    |                           |
|                                 | c) Is idle equipment turned off or throttled down?                                                                       |          |    |    |                           |
|                                 | d) Are there noise mitigation measures adopted at construction sites?                                                    |          |    |    |                           |
|                                 | e) Are neighboring residents notified in advance of any noisy activities expected at construction sites?                 |          |    |    |                           |
| 9.                              | Traffic Management                                                                                                       | Yes      | No | NA |                           |
|                                 | a) Are traffic signages available around the construction sites and nearby roads?                                        |          |    |    |                           |
|                                 | b) Are re-routing signages sufficient to guide motorists?                                                                |          |    |    |                           |

| MONITORING/INSPECTION QUESTIONS |                                                                                                                                    | FINDINGS |    |    | COMMENTS /<br>CLARIFICATIONS |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------|----------|----|----|------------------------------|
|                                 | c) Are the excavation sites along roads provided with barricades with reflectors?                                                  |          |    |    |                              |
|                                 | d) Are the excavation sites provided with sufficient lighting at night?                                                            |          |    |    |                              |
| 10.                             | Recording System                                                                                                                   | Yes      | No | NA |                              |
|                                 | a) Do the contractors have recording system for SEMP implementation?                                                               |          |    |    |                              |
|                                 | b) Are the daily monitoring sheets accomplished by the contractor EHS supervisor (or equivalent) properly compiled?                |          |    |    |                              |
|                                 | c) Are laboratory results of environmental sampling conducted since the commencement of construction activities properly compiled? |          |    |    |                              |
|                                 | d) Are these records readily available at the site and to the inspection team?                                                     |          |    |    |                              |

**Other Issues:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Prepared by:** \_\_\_\_\_

Name, Designation and Signature