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Non-Technical Summary of ESIA for Saidabad WTP Phase-III Project

Project Mangement Consultants for Component 1&3 of Saidabad III Water Treatment Project

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Mott MacDonald
10 Fleet Place
London EC4M 7RB
United Kingdom

T +44 (0)20 7651 0300
mottmac.com

Dhaka Water Supply and Sewerage Authority (DWASA)

Non-Technical Summary of ESIA for Saidabad WTP Phase-III Project

Project Mangement Consultants for Component 1&3 of Saidabad III Water Treatment Project

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Contents

1 Introduction

1.1 Background

The Environmental and Social Impact Assessment (ESIA) of the Saidabad Water Treatment Plant Phase III was done in August 2014 by EGIS and IWM during the feasibility stage of the project. The ESIA for the project was accepted by the Department of Environment (DoE) and an environmental permit for the proposed works under Saidabad Phase-III was given accordingly. As Dhaka Water Supply and Sewerage Authority (DWASA) started project implementation from July 2021, it was required to review and update 2014 version of the ESIA, as necessary for the change(s) occurred during the final design and planning of the project. The ESIA document is updated by both Project Management Consultant (PMC) and Design and Supervision Consultant (DSC) as a combined report covering the overall impact to proposed works for Saidabad Phase-III including component 1, 2 and 3 of the project. The updated ESIA was reassessed against various changes that are now deemed necessary to deliver the project including an update on the studies conducted over the period between May 2022 and January 2023 by both Component 1&3 and Component 2 consultants. As per the DSC contract ToR, DSC has led the ESIA aspect of overall Saidabad Phase-III project and coordinated with PMC, as necessary. This Non-technical Summary draws from the updated ESIA document of the project (DSCJV-ENV-RP-CMP2-0028, Version 07, dated 19 December 2024).

1.2 ESIA Objectives and Requirements

The scope of the updated ESIA aligns with the requirements as defined in the activity G: Review and Update of ESIA and Associated Documents of the Terms of References of PMC and DSC. The non-technical summary of the ESIA is another requisite to be submitted along with the updated ESIA as per EIB's loan pre-condition.

The overall objectives of the ESIA of the proposed project were to identify potential significant environmental and social impacts, both positive and negative, during construction and operational phases of the project, recommend mitigation measures to avoid or reduce adverse environmental impacts and to enhance positive impacts, and to develop a comprehensive environmental management plan (EMP), including monitoring requirements, for both construction and operational phases of the project. The specific objectives of the ESIA are:

1. to assess the existing environmental and social conditions surrounding the proposed locations of intake structure, treatment plant, and along the proposed routes of the raw water transmission line and treated water primary main up to the injection point in order to establish a baseline framework, against which potential environmental and social impacts due to the implementation of the project would be compared.
2. to identify and evaluate environmental and social impacts resulting from the project activities during both construction and operational phases of the project, and to suggest appropriate mitigation measures.
3. to carry out focus group discussions (FGDs) and public consultations in order to get views and concerns of local people and peoples' representatives regarding different aspects of the proposed project, and to address those in the ESIA; and
4. to develop a comprehensive Environmental and social Management Plan (ESMP), including monitoring plans, for both construction and operational phases of the proposed project.

The updated ESIA has been carried out following the guidelines of the Department of Environment (DoE) and relevant operational guidelines, e.g., those of the GoB (GoB, 2023), the World Bank ES Framework (Environmental and Social Standard), and IFC Performance Standards (as per

DSC Terms of Reference for Component 2 of the project and as approved by DSIF) on Environmental and Social Sustainability followed by adherence to the EIB Standards.

1.3 Assessment Topics

The assessment has been broken down by topic to reflect the scope of the ESIA. These topics are as follows:

- Climate change
- Water Quality
- Biodiversity (Ecology)
- Occupational and Community Health & Safety
- Traffic
- Cumulative Impact
- Noise
- Geology and Seismicity
- Soil Quality
- Air Quality
- Waste and resources

1.4 Project Timeline

- Project Implementation started in July 2021 through appointment of Project Management Consultants (PMC) for Component 1&3. Design and Supervision Consultants (DSC) for Component 2 appointed in March 2022.
- Stage-1: Design and Tender Documents for Component 1&3 completed in May 2023
- Stage-2: Procurement for Component 1&3 is ongoing. Tender Evaluation completed by January 2025.
- Pre-qualification stage for Component 2 is currently ongoing followed by shortlisting and floating of tenders in Q1 2025.
- Component 1 (Intake and Raw Water Pipelines) contract award is planned for Q1 2025
- Component 2 (Treatment Works) contract award is planned for Q2 2026
- Component 3 (Distribution Network Pipelines) contract award is planned for Q2 2025
- Construction commencement in Q2 2025.
- Planned completion in Q4 2029
- Completion of defect liability period is Q4 2030.
- Operational period starts from 2030.

2 Project Description

2.1 Project Overview

Need for the Project

Dhaka Water Supply and Sewerage Authority (DWASA), entrusted with the responsibility to supply potable water to Dhaka Metropolitan City and adjacent areas, meets 75% of the water demand through extraction from ground water sources. But the high rate of extraction to meet the demand of the city population is proving to be unsustainable as the ground water table is declining at an alarming rate of 2 – 3 m per year with a possibility of alarming environmental consequences in the future. To respond to this emerging scenario, DWASA has made a strategic decision to shift from ground water source to conjunctive use of surface and ground water source, as per direction of the Government of Bangladesh. Saidabad Phase – III surface water treatment plant (SWTP) will be a part of that endeavour. Therefore, the objective of the project is to increase the capacity of DWASA in supplying safe drinking water to the city population utilizing surface water sources and thereby diminishing the reliance on ground water resources and thereby, ensure water security.

Component 1 & 3 of the project is financed by Agence Française de Développement (AFD) and, Kreditanstalt für Wiederaufbau (KfW)., European Investment Bank (EIB) is financing Component 1 only. All taxes and custom duties will be financed by and Government of Bangladesh (GoB). The Project Management Consultant (PMC) consists of a joint venture (JV) of Mott MacDonald-SWECO-Artelia was awarded the contract to manage works associated with Components 1 and 3 in July ’21will be undertaking design review and construction supervision.

Project Location and Layout

The proposed Saidabad Phase III project will be installed at the site of the existing Saidabad phase I and phase II plants. In the event the Sarulia intake becomes inoperable (e.g., due to poor water quality of Shitalakshya river) for certain periods of the year, the proposed project will also have provisions for drawing the entire raw water (i.e. up to 950 MLD) from the Meghna River to feed the Saidabad phase I, II and III treatment plants.

The major activities associated with the implementation of the Saidabad phase-III project will be:

1. Construction of Intake at Haria site located 5 km upstream of Baidder Bazar.
2. Construction of a 450 MLD surface water treatment plant at Saidabad site. The plant will include components such as clarification, rapid sand filtration, storage and high lift pumping facilities for treated water as well as treated water primary. Works will also include sludge treatment for the phases I, II and III.
3. Construction of twin primary transmission line for raw water from the proposed intake in the Meghna River to the SWTP at Saidabad.
4. Construction of main feeder lines from the SWTP at Saidabad to the injection points of the water distribution system
5. Construction of about 61.8 km of distribution line.

The base map for Saidabad WTP Phase III is shown in Figure 2.1. The layout plan of Intake and WTP is shown in Figure 2.2 & 2.3 respectively.

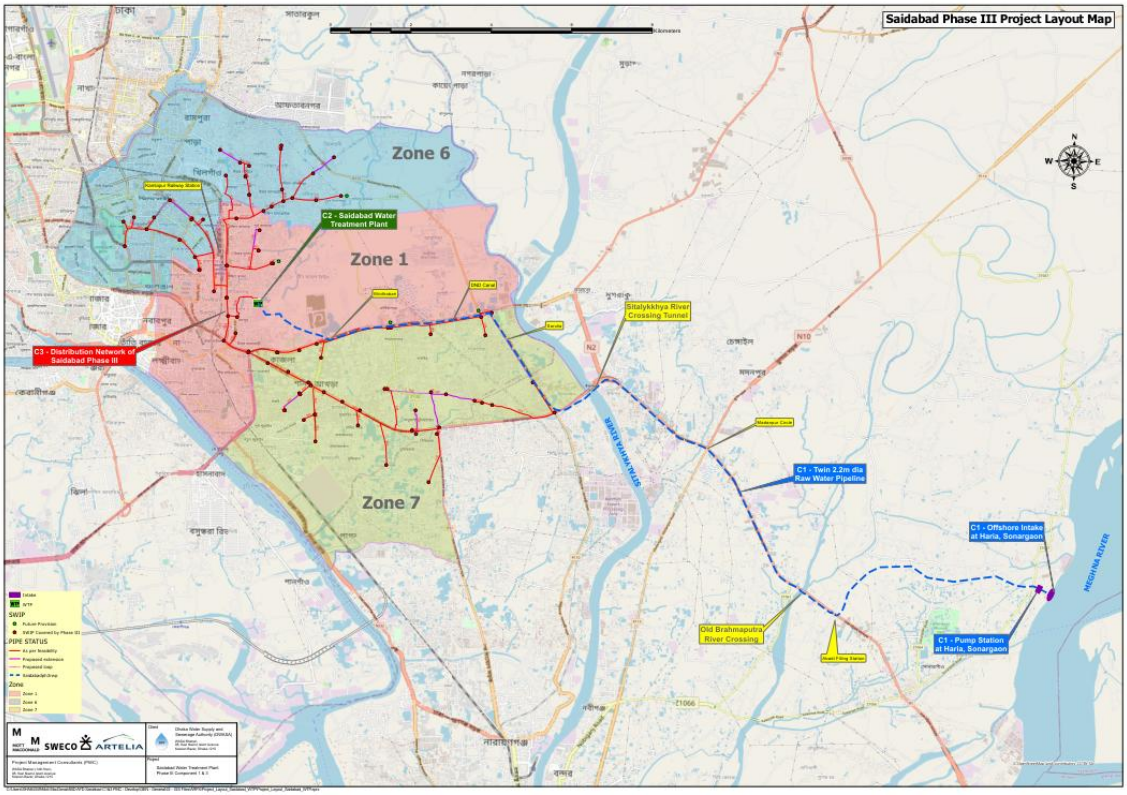

Figure 2.1: Project Base Map of Saidabad WTP Phase III

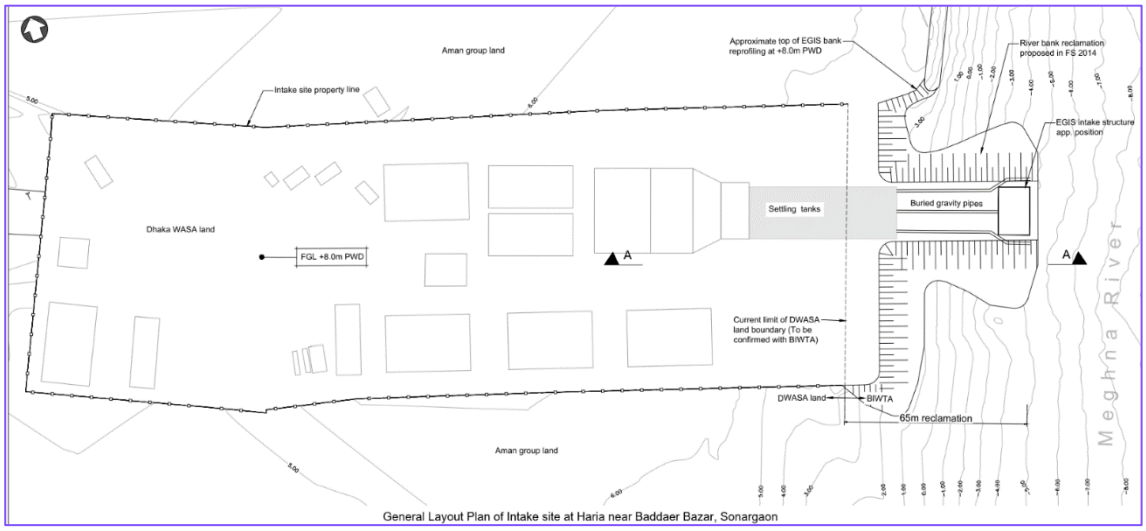

Figure 2.2: Layout Plan of Intake Site

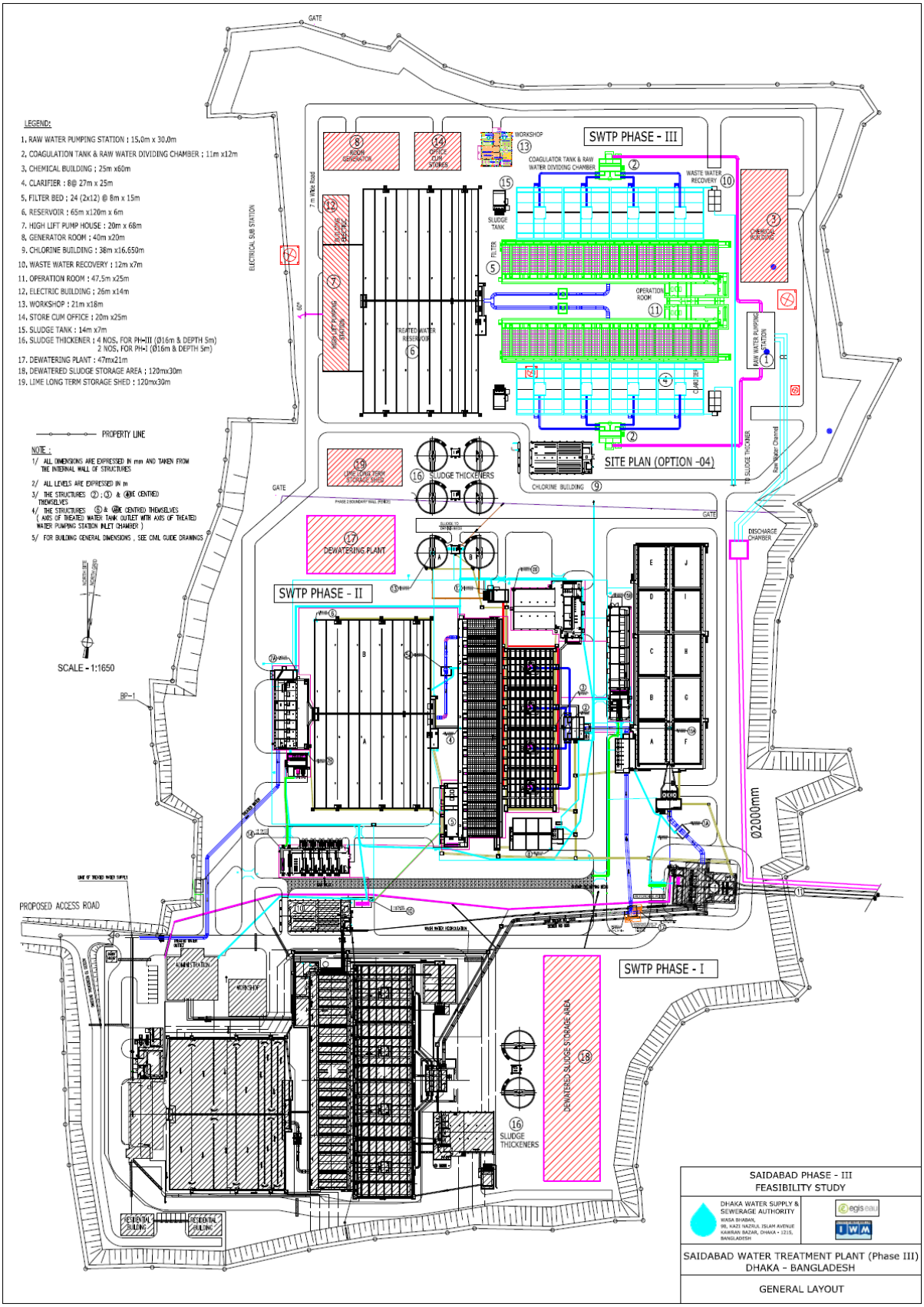

Figure 2.3: Proposed layout of Water Treatment Plant

2.2 Project Components

Construction Phase

Dhaka Water Supply and Sewerage Authority (DWASA) has planned to double the existing surface water treatment capacity at Saidabad Water Treatment Plant (WTP) by conveying cleaner raw water from a new river source and extending the treated water distribution system. Project implementation of this upgrade started in July 2021 under the Saidabad WTP Phase III project. The project implementation work items are broken down into three components as outlined below:

- Component 1: Abstraction of 950,000 m^3/d of raw water from the Meghna River at Haria in Sonargaon District and conveying it to the Saidabad WTP site to supply a new Phase III WTP as well as providing a new raw water supply to the existing treatment plants built under Phase-I (225,000 m^3/d) and Phase-II (225,000 m^3/d). The raw water transmission system will consist of a new pumping station and high voltage electric supply at the intake site, and a 27 km long, 2,200 mm diameter, twin pipeline system comprising multiple river and road crossings, associated structural works for tunnelling under the Sitalakhya River. The works also include interfacing with the existing raw water supply to the Phase I and Phase II WTPs at Mridhabari.
- Component 2: Construction of a new treatment facility (Phase-III) at Saidabad capable of producing 450,000 m^3/d of treated water together with combined sludge handling facilities for the two existing WTP facilities and the new Phase III works. The total output of Saidabad Water Treatment Plant after completion of Phase-III construction works will be 900,000 m^3/d.
- Component 3: Delivery of 54 km of treated water to the south-eastern part of Dhaka city by constructing a distribution pipeline network of pipe sizes ranging from DN1800 to DN400.

Components 1 and 3 are funded by the Government of the People's Republic of Bangladesh (GoB), AFD, KfW and EIB (EIB: funding part of Component 1 only) and will be implemented as a single sub-project, and Component 2 is funded by GoB and DSIF as another sub-project.

Components 1 and 3 designed to be completed in 44 months with a defect liability period of 12 months. The two sub-projects are being implemented independently, each with their own set of Development Partners and consultants but with the DWASA Project Management Unit (PMU) ensuring coordination of the Overall Project. DWASA is the implementing agency and future asset owner. Coordination of the Funding Agencies for Components 1 and 3 works will be led by AFD.

Operation Phase

During the operational phase, DWASA will be responsible for the operation and maintenance of intake channel, intake structure, water treatment plant and the water transmission lines. The important issues to be addressed during the operational phase include the following:

- Stability of riverbank and intake channel
- Availability of raw water
- Raw water quality
- Treated water quality
- Proper operation of treatment plant
- Public health and DWASA service facilities
- Disposal of dewatered sludge
- Safety of water distribution network
- Disposal of additional volumes of wastewater that will be generated due to increased water supply in Dhaka city after completion of the project

- Navigation in rivers and khals through which water transmission line has crossed
- Site security
- Monitoring of environmental and social aspects (including monitoring of livelihood restoration from the resettlement (As per RAP report (Summary addressed in Subsection 6.5 of Section 6 this ESIA Report).
- Workforce during the Operational period would be around 100-150.

2.3 Project Schedule

The key dates of the revised Baseline Programme of the Saidabad Phase III project are shown in Figure 2.4.

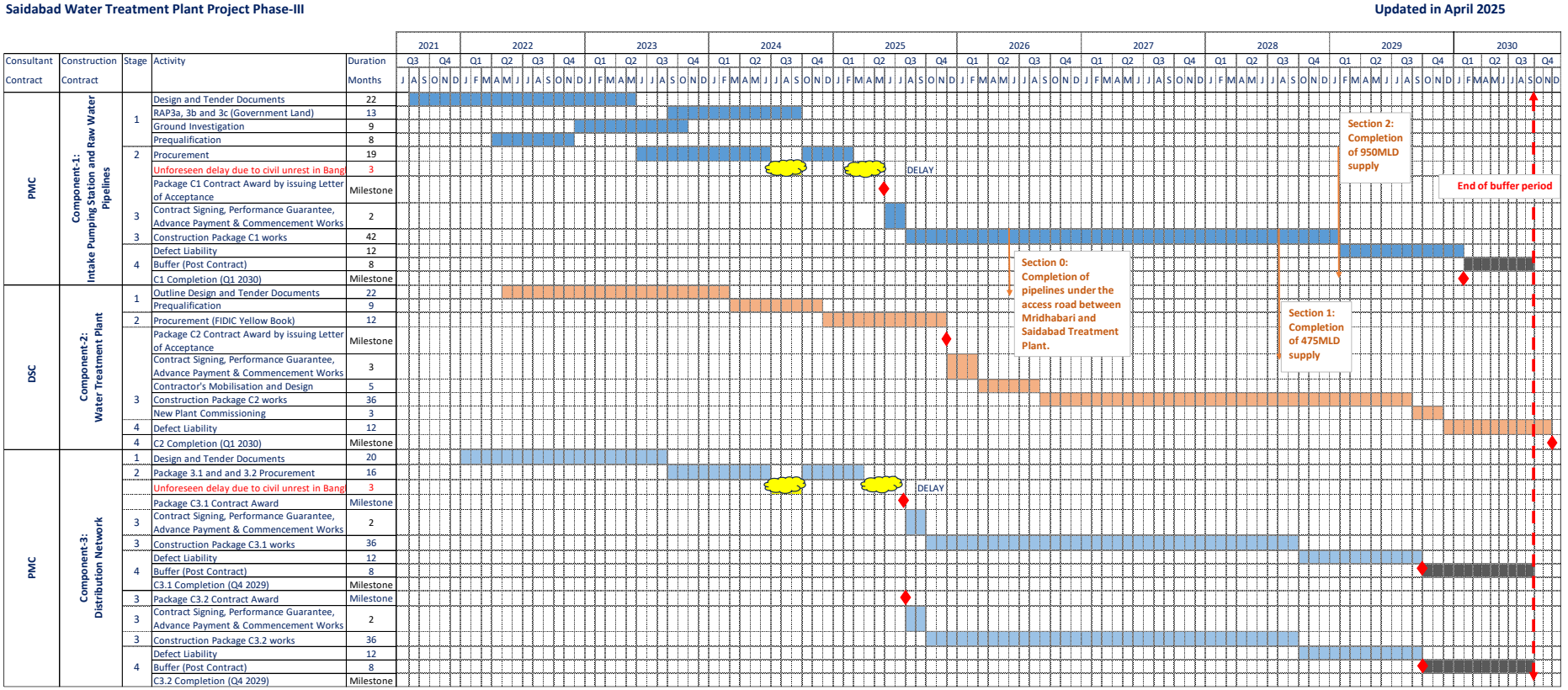

Figure 2.4: Saidabad Water Treatment Project Phase III Strategic Overview Programme[1]

[1] Please note that the project schedule is subject to change and will be updated as part of the Project Administration Manual soon.

2.4 Project Area of Influence (AoI)

As defined in IFC PS1 and EIB ESS1, Area of Influence (AoI) encompasses the following, as appropriate:

- The area likely to be affected by: (i) the project construction and operation activities and facilities that are directly owned, operated or managed (including by contractors) and that are a component of the project; (ii) indirect project impacts on biodiversity or on ecosystem services upon which Affected Communities' livelihoods are dependent.
- Associated facilities, which are facilities that are not funded as part of the project, but which are significant in determining the success of a Project or in producing agreed project outcomes. These would not have been constructed or expanded if the project did not exist and without which the project would not be viable.
- Cumulative impacts that result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted.

The AoI covers all land or water, directly or indirectly impacted by the Project, and therefore extends beyond the area of the project boundary. This includes communities and areas adjacent to the project affected area (PAA), which is defined as the area of land used by the Project permanently or temporarily, that may experience impacts during the construction or operation of the Project, despite being located outside of the area in which the Project will be located e.g. air or noise impacts. The AoI is defined on a topic-by-topic basis, as each topic will define its AoI based upon the potential effects.

3 Environmental and Social Impacts and Mitigation

3.1 Overview

The ESIA Report provides a description of the environment and social baseline and explains the Project's potential impacts and identifies the mitigation measures to avoid or minimize the significant adverse environmental and social impacts. The mitigation measures are also included in the Environmental and Social Management Plan (ESMP) that has been developed as part of the ESIA study, and includes description of the mitigation measures, responsible parties for the implementation of the mitigation measures, the timing, monitoring and audit requirements.

The topics that are included in the ESIA study include (1) Climate Change (2) Geology and Seismicity, (3) Soil Quality, (4) Water Quality (5) Biodiversity (Ecology), (6) Noise (7) Air Quality, (8) Traffic (9) Occupational and Community Health & Safety, (10) Waste and Resources (11) Cumulative Impacts. These topics and related impacts and proposed mitigation measures are summarized in the following sections.

3.2 Summary of Impacts and Mitigation/Management Measures

3.2.1 Climate Change

The main climate risks for surface water intake structure of the project is flooding, droughts, and water scarcity. Flooding can cause significant disruption to the infrastructure necessary for the project, while droughts and water scarcity can reduce the volume of water available for treatment. Additionally, climate-induced changes in temperature, and the salinity of the water can affect the effectiveness of the water treatment process. This project is in better position in consideration of the climate impact. The project confirms the intake water availability throughout the year (including dry periods). As well as project sites are safer in consideration of droughts, flooding and water scarcity. In particular, Water Treatment Plant site does not have any of the climate risk discussed above.

The Saidabad Water Treatment Plant Project Phase III has conducted a Climate change risk assessment for the Component 1. The risk analysis confirms the very significant risk linked to flooding at a more distant horizon concerning the pumping station. The risk can be qualified during "extreme" (above 1 in 100 year) events on the horizon 2050-2100. Modelling study shows that the magnitude of a 1 in 100-year flow in Meghna River is projected to increased correlated with increasing global temperature. The intake site is designed above 1 in 100-year flood level of 8.14m. All the associated equipment will be designed at least 0.5m above this level.

The design flood level at the intake site is determined to be +8.14mPWD, which corresponds to the 1:100 level of the Meghna River. An additional allowance of 0.5m is added above this level to account for climate change and future uncertainties, a standard practice for installing mechanical and electrical equipment. All rotary equipment will be installed above the specified level of 8.64m, in accordance with the contract specifications, which is below the lowest historical flood level at the intake location.

During the construction stage, the intake site will be filled up to +8.14mPWD, and river works will be carried out within the temporary cofferdam areas to ensure a dry working area. Considering the high flow capacity of the Meghna River, the flow restriction caused by the temporary cofferdam is negligible. Therefore, no additional flood risk is anticipated downstream of the works due to the temporary cofferdam.

In Old Brahmaputra River crossing, pipelines will be installed in an open cut method. The contract specifications require the Contractor to install pipelines in sections without blocking half of the river width as a minimum. The Old Brahmaputra River is relegated to a minor river after 1762 Arakan earthquake when the main river flow diverted to the Jamuna River. Old Brahmaputra River stores flood water during monsoon season rather than conveying flood flows. Considering the current characteristics of the river, it is safe to construct pipelines across the channel in an open cut method where part of the channel width will be kept open anyway during construction. Once the pipelines will be installed about 2-3m depth of the riverbed, there won't be any impact on flooding during operation.

Construction Impacts

Points of attention: accessibility to the intake facilities will be limited during flood events above 1 in 100-year level at the intake site on the Meghna riverbank. At the Brahmaputra River crossing the contractor is not allowed to restrict more than 50% of the river flow. The interaction with the Sitalakhya river flow is fully avoided by designing a full bore deep long tunnel for the proposed river crossing. Storm water and groundwater flooding is anticipated locally which will be managed by contractor during construction.

Climate models also predict a significant rise in heat peaks in future. However, the Meghna River abstraction point has been designed below the low water level of the river, ensuring a continuous flow of water throughout the year.

Points of attention: water treatment process (rapid sand gravity filter) to resist the growth of algae and bacteria.

Drought-related risks would have significant impacts on the operation of the water intake and the pumping station. Climate projections show an increase in these episodes in the coming years, but this increase would remain moderate as water abstraction level was designed after careful hydrological assessment of minimum water level of the River Meghna.

Points of attention: positioning of the water intake to withstand low water events and treatment to deal with a too high concentration of pollutants in the water. The Meghna River Masterplan (a separate project) details.

Finally, the risks related to salinity are qualified as “low” in this analysis. The project is far enough away from the sea, even if in connection with saline intrusions, the risk of corrosion and degraded water quality remains to be monitored.

Mitigation Measures

Opportunities available to the project for reducing the potential GHG emission from the project interventions are to adopt Best Practices, Designing with a Low Carbon Approach in Mind, Reusing buildings instead of constructing new ones, Specify low-carbon concrete mixes, Limiting carbon-intensive materials, Choosing carbon sequestering materials, Reusing materials, Using high-recycled content materials, Maximizing structural efficiency, Using fewer finish materials, Minimizing waste, Using block instead of bricks, Using low carbon materials, Using durable materials for the facade and roof, Designing facade systems that are easy to maintain, Buying local materials, Reducing waste with prefabrication and modular elements, Being mindful when using finishes or decorative facade elements etc.

Operation Impacts

Drought-related risks would have significant impacts on the operation of the water intake and the pumping station. Climate projections show an increase in these episodes in the coming years, but this increase would remain moderate. The lowest low flow level was recorded at 0.67m at Bishnondi in 2014. Based on the historic and model data analyis, PMC has recommended 1.0m

for pump operation under normal condition and 0.0m for extreme low flow condition. Climate models also show a sharp increase in heat peaks in the next few years.

The risks related to salinity are qualified as “low” in this analysis. The project is far enough away from the sea, even if in connection with saline intrusions, the risk of corrosion and degraded water quality remains to be monitored. The tidal influence of the Meghna River is observed up to the Bhairab Bazar Railway Bridge which is about 50km upstream of the intake site. However, tides are observed only during the low condition, i.e. when Meghna River water level will be below 0.0m; therefore the risk of salinity at the intake site is low for several days and the salinity concentration is within the acceptable limit.

Sitalakhya crossing is tunnelled, so no impact to present or future flood or low flow.

Mitigation Measures

Opportunities available to the project for reducing the potential GHG emission from the project interventions are to adopt Best Practices, Designing with a Low Carbon Approach in Mind, Reusing buildings instead of constructing new ones, Specify low-carbon concrete mixes, Limiting carbon-intensive materials, Choosing carbon sequestering materials, Reusing materials, Using high-recycled content materials, Maximizing structural efficiency, Using fewer finish materials, Minimizing waste, Using block instead of bricks, Using low carbon materials, Using durable materials for the facade and roof, Designing facade systems that are easy to maintain, Buying local materials, Reducing waste with prefabrication and modular elements, Being mindful when using finishes or decorative facade elements etc.

3.2.2 Geology and Seismicity

The soil formation in Bangladesh is remarkably homogeneous in appearance, both vertically and laterally. It comprises layer of unconsolidated clay, about 10m thick near Dhaka. The soil formation of the SWTP phase-III project area falls under the Brahmaputra floodplain. The dominant soil texture is sandy loam. The soils are acidic in character and the pH ranges from 5.5 to 6.8. The soils are naturally fertile and are recharged every year by fresh deposition by the floodwaters.

The whole of Bangladesh is divided into three seismic zones. The northern part of the country are in the Zone-I where earthquake shock of maximum intensity of IX of the Modified Mercalli Scale is possible. The Zone-II includes the greater districts of Dinajpur, Bogra, Dhaka and Chittagong and the shocks of intensity of VIII are possible. Zone III is the southern part of the country and is the least active region. The SWTP project area falls under Zone II on the earthquake zone map, which implies that earthquakes of moderate intensities are expected here.

3.2.3 Soil Quality

A total extraction of heavy metal from soil samples following the USEPA guidelines has been performed to determine the selected heavy metal contents. It has been found that the heavy metal contents of soil are within usual limits of such metals found in natural soil. Lead concentrations have been found to be slightly higher than the average value especially near the Dhaka-Chittagong and Demra-Jatrabari roads. This probably indicates higher particulate matter pollution in these areas from vehicles. Also, the sediment quality of the Old Brahmaputra and Shitalakshya rivers were also assessed at transects near the river-crossing locations and found that the heavy metal concentrations in the sediments are not significantly different from those of the soil samples.

During the construction period of the Intake site, water transmission pipeline, and water treatment plant which includes activities like soil excavation, pipeline bed preparation, water body crossing and structutal works where soil quality deterioration may happen. To mitigate and enhance measures, the specification requires the contractor to use biodegradable fuel and prevent the

discharge of fuel, lubricants, chemicals, and wastes on land. Hazardous materials shall be stored in designated areas to prevent environmental spillage, ensuring these facilities are located on impermeable surfaces and enclosed by sealed bund walls capable of containing 110% of the maximum stored volumes. Hazardous waste, such as excavation materials from sludge lagoons, shall be disposed of to designated landfills.

During the operation period, the unsanitary disposal of aluminum-rich dried sludge can lead to metal leaching and soil contamination, potentially causing long-term environmental impacts. To protect the environment, dried sludge will be disposed of to Matuail landfil site. Liquid residuals from sludge dewatering operations must be tested by O&M Contractor against effluent discharge criteria before disposal, as they may contain excess organic matter, toxic metals, ammonia, and suspended solids. Additionally, accidental chemical or oil leaks and spills from equipment or parts of the treatment plant or pumping station can negatively impact surface water and soil quality, posing risks to public health. Therefore, ESMP requires continuous monitoring and reactive measures in case of such occurrences.

The ESMP requires liquids not to be disposed off via sewers should be stored in a designated area and disposed through mobile vacuum tanker.

3.2.4 Water Quality

Source water quality of Meghna River is periodically being assessed as part of the feasibility study and for the purpose of treatment process model studies. The water quality has changed with progress of time though there are some seasonal impacts. These changes are due to the influence of season.

During construction phase of the intake site, water transmission pipeline, and water treatment plant include activities such as access road construction, land clearing, soil excavation, concreting work, and water body crossing which may lead to water quality deterioration. To mitigate these impacts, works specifications requires the contractors to use biodegradable fuel and prevent the discharge of fuel, lubricants, chemicals, and wastes into surface waters. Designated areas for hazardous material storage shall be arranged to prevent environmental spillage, ensuring these facilities are located on impermeable surfaces and enclosed by sealed bund walls capable of containing 110% of the maximum stored volumes. Proper disposal techniques for hazardous waste, such as excavation materials from sludge lagoons, shall be adopted. Works specifications also require settlement tanks to trap sediments in storm water before discharge into surface water.

During the operation period, improper disposal of aluminum-rich dried sludge can cause metal leaching and water pollution, with long-term environmental impacts. To mitigate these risks, ESMP requires the Contractor to prepare protocols for handling and storing chemicals and oils to prevent accidental leaks and spills, including regular maintenance, immediate spill response plans, and secondary containment systems to protect the environment and public health.

The ESMP requires liquids not to be disposed off via sewers should be stored in a designated area and disposed through mobile vacuum tanker.

3.2.5 Biodiversity (Ecology)

Bio-ecologically the entire project site falls under the Brahmaputra-Jamuna Floodplain. As noted earlier, the proposed project has three major components viz. (a) water intake, (b) water transmission pipeline, and (c) water treatment plant. The ecological characteristics of water intake location, route of transmission pipeline and treatment plant differ from each other. The water intake point is located beside the Meghna River at Haria, Sonargaon, Narayanganj. This area has some villages with planted vegetation that provides supportive habitat for certain type of fauna. Land filling activities were observed in the area. Thus, the existing ecological features of the area are changing gradually. Apart from anthropogenic influence, the ecological features generally

fluctuate seasonally due to the environmental reasons. Ecological features along the route of the raw water transmission line have already changed by the previous development works (e.g., road construction, other infrastructure development, etc), and a new ecosystem has evolved there to support local adaptive biodiversity. The route of the proposed water transmission pipeline runs along a 6 km stretch from the Haria intake point through the village areas, fallow lands and agricultural lands that support diversified floral and faunal species.

On the other hand, the site for the proposed water treatment plant is currently a vacant piece of land beside the existing SWTP (Phase-I and Phase-II) site. This area has been raised by land filling; the nearby areas are inundated seasonally and act as a seasonal wetland during rainy season for up to 6 months.

The baseline ecological survey primarily focused on identifying the diversity, distribution, and abundance of flora and fauna in Bangladesh, as well as their biological status, including threatened species. Protected areas, wildlife sanctuaries, game reserves, and ecologically critical areas were also identified. The threatened wildlife and fish species of the study areas declared by the World Conservation Union (IUCN) were studied. No threatened floral and faunal species were found in the project area during the feasibility study. However, endangered wildlife and fish species, such as the Yellow Monitor Lizard, Tire-trak Spinyeel, Indian Chaca, and Ganges River Dolphin, were identified in the Meghna and the Sitalakhya rivers, which are considered threatened nationwide.

No Protected Areas exist near any of the proposed project sites, although the ancient Panam City is located near the water intake point at Sonargaon. There are no national parks, game reserves, or wildlife sanctuaries at or near the proposed project sites. The raw water transmission pipeline will cross the Sitalakhya River, which has been declared an Ecologically Critical Area. To avoid impacts on endangered species along the Sitalakhya River, the river crossing will be executed through a full-bore deep tunnel (3.5m in diameter, 2.2 km long). This design change eliminates the risk of polluting the Sitalakhya River and minimizes interaction with road traffic by using a full-bore tunnel at the Kanchpur river and road crossings.

3.2.6 Noise

As a part of the baseline study, noise level measurements were carried out near the proposed intake location at Haria, at different points along the proposed raw water transmission route in proximity to the Dhaka-Chittagong, Dhaka-Sylhet and Demra-Jatrabari highways/roads and also at the proposed treatment plant site at Saidabad. Current noise level data show that at Dhaka-Chittagong highway crossing, Langalbandh bridge, Madanpur bus station, Kanchpur circle and DND Canal Road the maximum sound levels recorded were 86.4, 89.8, 83.9, 82.7 and 103.7 dBA. This is expected as these are very busy areas with high volume of traffic which generates high levels of noise. The 1-minute equivalent noise levels (Leq) in most of these locations exceeded the noise level standards in Bangladesh for Mixed to Commercial areas.

Current baseline of noise level is changes 0-18% in compared to the 2013 noise level data. To update of the WTP site baseline another set of Noise monitoring was conducted in the proposed WTP site in late December 2022. This monitoring was conducted both day and nighttime to assess the overall baseline noise level information of the project site. However, in the rural areas (area near the proposed intake at Haria) and at the proposed WTP site, the measured noise levels are mostly lower and are within the noise level standards for residential areas.

During the construction phase, several measures should be implemented to mitigate noise pollution. Heavy construction equipment should be fitted with noise suppressors and mufflers. Construction activities producing excessive noise should be avoided during school hours and at night to minimize disturbances. Workers should be provided with protective gear to avoid prolonged exposure to noise. The use of horns should be regulated, and hydraulic horns in project

vehicles should be avoided. Contractors must take all reasonable measures to minimize noise nuisance from construction, installation, testing, and commissioning activities. If noise levels are likely to exceed 100 dB(A) in any area, suitable warning signs should be prominently displayed, indicating that a noise hazard exists, and ear protection should be worn. Areas where noise levels could exceed 115 dB(A) should be cordoned off to prevent unprotected personnel from entering. These measures will help minimize noise pollution and its impacts on the surrounding environment and community. Heavy construction traffic is expected for the construction of the pipes and intake as well as the WTP, meanwhile, a lot of material is also expected to come via boat, the Contractor should take necessary mitigation measures to minimise the induced noise.

During the operation phase of a water treatment plant, noise pollution will be managed in compliance with the National Noise Pollution (Control) Rules of 2006. Permissible noise levels inside buildings must adhere to the limits specified by Noise Rating (NR) rating curves, ensuring that these levels are not exceeded when the building is in normal operation, which includes closed windows and doors, and running air-conditioning or ventilation systems. Contractors must account for noise from the operation of facilities outside the room, as well as noise from the air-conditioning/ventilation system and any equipment within the room. Furthermore, noise levels experienced by personnel on-site, whether at grade level or on various structures such as buildings, platforms, galleries, plant items, and access ways, should not exceed the limits specified by applicable laws, with the more stringent standard being applied.

3.2.7 Air Quality

As a part of the environmental assessment of the proposed project, ambient air quality measurement was carried out at two locations: (a) near the intake location (inside the village area), and (b) at a location along the proposed route of the raw water transmission line beside the Dhaka-Chittagong highway. SPM concentration near the Haria intake location inside the village is relatively lower compared to that recorded beside the Dhaka-Chittagong highway, while the PM_{10} concentrations were relatively similar. This may be due to high vehicular movements in the Dhaka-Chittagong highway. The particulate matters ($PM_{2.5}$) of the ambient air of the treatment plant site exceeds the national standard. But the PM_{10} found within the national standard of Bangladesh.

During the construction phase, ESMP requires several measures to be implemented to mitigate air pollution. All project vehicles shall be well-maintained and in good operating condition to minimise emissions. Dry surfaces and unpaved roads will be sprayed regularly to reduce dust generation and consider paving access roads. Maintain adequate moisture content in soil during transportation, compaction, and handling to prevent dust. Stockpiles of loose materials, such as fine aggregates, shall be sprinkled to reduce particulate matter in the air. Construction materials should be properly covered while hauled and stored, roads properly cleaned, and water sprayed in order to minimize concentration of dust in air.

3.2.8 Traffic

The access route of the SWTP site is a single road which is exclusive for the SWTP staffs and personnel. This road has finally ended at the gate of the SWTP. There is no branch road of this access road of the treatment plant. Some shops were evident on both sides of this road. The traffic trend is similar like other routes of the capital. Rickshaw/ Cycle/ Van are the predominant

means of transportation which comprised of around 66% of all vehicles. The traffic volume almost shows a similar trend for both the directions. During the morning the traffic volume is comparatively low and it gradually increases as the day goes on. During the afternoon especially between 12:00 and 14:00 the traffic in the area reaches its peak and gradually the volume drops down after 17:00. Apart from the Rickshaw/Cycle/Van considerable numbers of Motorcycle and

Pick up Van were observed. Heavy vehicles like truck and covered van, private car, CNG were rarely seen.

The new road will be built on the water main are intended solely for pipeline maintenance. Only Dhaka WASA vehicles will be permitted on this maintenance road. Consequently, no traffic impact will be anticipated due to this new road construction.

During the construction phase, ESMP requires several measures to be taken to mitigate traffic congestion and communication problems. Deliveries of materials and equipment shall be scheduled during non-school hours and after regular working hours to avoid peak traffic times. Contractor shall prepare and implement a comprehensive traffic and transport management plan using roadside signage to ensure the safety of local communities and deploy security personnel at the camp gate and flagmen at nearby roadsides to manage traffic flow. These measures will help reduce traffic congestion and communication problems, ensuring smoother project operations and minimal inconvenience to the public. Heavy construction traffic is expected for the construction of the pipes and intake as well as the WTP, meanwhile, a lot of material is also expected to come via boat, the Contractor should also prepare and implement a traffic management plan to manage the traffic flow.

3.2.9 Occupational and Community Health & Safety

Occupational and Community Health & Safety is an important issue both during construction and operational phases. Safety issues are also important for general construction activities, which should be addressed as part of occupational health and safety plan. Construction workers may face occupational health hazards such as minor or major injuries if there is a lack of general safety requirements and precautions applicable for such sites, malfunctioning equipment, careless use of equipment and vehicles. Poorly designed temporary accommodation and sanitation facilities may pose a health threat and nuisance to the workers. Worker accommodations must follow international guidelines, such as “Workers’ Accommodation: Processes and Standards – Guidance Note by IFC/EBRD”. There should be separate, clearly marked toilets for men and women, following legal ratios: 1 toilet per 25 female workers and 1 per 40 male workers and regular cleaning and monitoring systems to ensure hygiene. Uncontrolled vending of food and drinking water on the work site may also pose a risk with respect to the transmission of contagious diseases like Typhoid, Diarrhoea, Malaria, Dengue, etc. Construction workers will be required to handle hazardous materials such as cement, paints, chemicals, fuels etc., which may increase health risks of workers. High noise from the heavy construction machines would also pose a threat to the construction workers. Accident during construction phase is also an important issue. To ensure the occupational health and safety of workers during the construction phase, construction workers will be provided with appropriate personal protective equipment (PPE) and tube wells should be constructed to provide water of acceptable quality. Contractor shall arrange regular toolbox talks to raise awareness about hygiene practices and conduct regular health check-up of workers. All construction workers should receive training in basic sanitation, health care issues, safety matters, and the specific hazards of their work. Contractor shall also arrange regular consultation with communities on HIV awareness, including information on sexually transmitted infections (STIs) and HIV. During monsoon periods, regular mosquito repellent spraying shall be conducted. Adequate healthcare and sanitation facilities must be available at construction sites. Additionally, measures against mosquitoes and health and safety guidance on dengue will be implemented, including providing sufficient soap, masks, protective clothing, and mosquito nets at labour camps.

The Occupational Health and Safety Management Plan for SWTP PHASE III includes - OHS Policy and Management, Consultation, Induction, Training, Hazard/ incident/ accident reporting, Incident Recording, Manual Handling, Slips, Trips & Falls, Hazardous Substances, Infectious diseases, Workplace Bullying, Occupational Violence, Off-site workers, Office/ computer

workstations, Electrical Safety, First Aid, Contractor Management, Purchasing Equipment, Emergency Preparedness.

During the construction/operation phase of this water treatment plant project, several measures will be implemented to ensure community health and safety. Efforts will be taken to avoid or minimize the transmission of communicable diseases that may be associated with the influx of temporary or permanent project labor. This can be achieved through health screenings, vaccinations, and health education programs. Measures and actions will be in place to control the safety of deliveries, storage, transportation, and disposal of hazardous materials and wastes. It is also crucial to implement strategies to avoid or control community exposure to these hazardous materials. Additionally, the emergency response plan of DWASA will include comprehensive public evacuation procedures to ensure the community's safety in case of any incidents. By following these mitigation measures, the project can minimize health and safety risks to the surrounding community.

To ensure adequate safeguarding measures are provided in the camps 24 x 7 security coverage through built in CCTV cameras located at specific zones around the camps shall be deployed by the Contractor. All workers must have written contracts and undergo background checks with references from prior employers. The security of the community, particularly of women must be safeguarded, considering the influx of mainly male construction workers. To ensure this, a Code of Conduct (CoC) must be developed making it part of the employment contracts, including sanctions for non-compliance (e.g., termination). Mandatory and repeated CoC awareness and behavioural training should be conducted, focusing on respectful behaviour toward local communities and cultural norms, especially those relating to women. Workers must be clearly informed about national laws prohibiting sexual harassment and gender-based violence (GBV), including punishments and legal processes. Contractor must adopt a policy to fully cooperate with law enforcement agencies in cases of misconduct or GBV. In rural areas with limited law enforcement, heightened measures must be taken to prevent risks of harassment, especially for women, girls, and boys. Mandatory training should be included on GBVH (Gender-Based Violence and Harassment) for all staff, including contractors, subcontractors, core suppliers, and consultants. Collaboration with local women’s rights organizations or NGOs to conduct awareness campaigns and provide community guidance on unacceptable behaviour and reporting GBVH. No forced, bonded, or underage labor will be allowed. Children aged 14–18 may only engage in light work as per national law. Development of a Worker Influx Management Plan following IFC Performance Standards 2 if more than 500 external workers are mobilized at the site. The Contractor will follow EIB’s International human rights standards and principles include (i) the UN Basic Principles on the Use of Force and Firearms by Law Enforcement Officials, (ii) the UN Code of Conduct for Law Enforcement Officials, (iii) the Voluntary Principles on Security and Human Rights and (iv) the International Code of Conduct on Private Security Providers whilst employing security personnel and implementing security measures during construction. The Contract should also use robust recruitment processes to select, train, manage and monitor security companies and personnel.

3.2.10 Impact on Fisherman

Construction activities associated with crossing of rivers/water bodies by water transmission line are likely to have some adverse impact on fisherman using the Brahmaputra River for commercial/other purposes. There will be passage maintained along crossing of rivers/water bodies during construction activities such that river users are not significantly impacted. In addition, full cofferdam is prohibited during the pipeline crossing of the Old Brahmaputra River to avoid flow interruption and disturbance to the aquatic flora and fauna as well as navigability of the local small boats for the livelihood of fisherman along Brahmaputra River. Full dry season is recommended for the construction works of the river crossing activity. With above-mentioned measures and ESMP to be implemented during the life cycle of the project, the impact on

fisherman is not identified to be permanent and back to original state once construction phase is complete. No impact is envisaged on fisherman during the operation phase. Because there are no fishing activities near the intake site area of the Meghna River, as well as no river route will be used during the operation period of the project**.**

3.2.11 Waste and Resources

Construction Impacts

Material resources: The construction materials required for the Project will be transported to the site by road and water transportation from suppliers. No borrow areas or quarries will be operated by the contractor. Potential aggregate quarry sites throughout the Project are identified to supply the construction firstly with locally available materials and then for importing from abroad. Best practices measures will be employed by all contractors in quarry sites to minimize their impact on communities and the landscape. Therefore, no adverse impacts from the extraction of raw materials or production of finished materials will be generated directly to the Project.

Waste and wastewater: The incremental increase in waste materials produced during construction would be minimal with respect to the waste production of the project area. It is expected that both non-hazardous and hazardous waste are likely to be produced during construction. Inappropriate disposal of construction waste could have medium or long-term environmental and public health impacts. The extent of this impact will be local to areas where waste is dumped or their immediate neighborhoods. The intensity of the impact is expected to be low given that the area where the Project is located has an existing waste collection system. This waste will be managed in collaboration with the Municipality/City Corporation and through licenced waste services with private companies, if required. Non-reusable and recyclable wastes will be disposed of to land fill and other wastes such as bricks, pieces of metals and wood will be recycled and reused. The sensitivity of the receptors is rated low. Hence the significance of the impact is determined as minor.

Operation Impacts

Waste and wastewater: During the operational phase of the Project, it is anticipated that various hazardous and non-hazardous materials/chemicals will be used in the Intake and WTP site and solid and liquid wastes will be generated as non-hazards and hazardous waste. Therefore, improper and inadequate waste handling, treatment and disposal can cause public health and environmental risks.

Provided that a proper waste management plan is in a position and maintained over the course of time, the Project would not create negative impacts to both the workers and the public in general. As the Project is expected to generate different types of waste including organic and inorganic solid waste, hazardous waste and wastewater, it is important to handle, treat and dispose those wastes according to both national and international legislation and guidelines. Therefore, the existing waste management plan shall be updated to meet both national and international standards. As a result, the impact magnitude will be minor and considering that the sensitivity of the receptors is medium, the resulting impact would be minor.

Mitigation Measures

The Contractor shall source materials from locations as close as possible to the project site to minimise transport impact, using recycled materials, and opting for materials certified as "green" or low-carbon where feasible. Additionally, all environmental and other necessary permits and licenses for the Intake and Water Treatment Plant (WTP) components must be maintained, ensuring full compliance with applicable environmental standards and specifications. The project aims to achieve a 50% target for the reuse and recycling of generated waste. Waste management

activities on-site and the recycling ratio will be audited. At the operational phase, techniques for the prevention, minimization, and control of waste-related impacts will be implemented.

According to the ESMP, the Contractor should implement measures and actions to control the safety of deliveries of hazardous materials, and of storage, transportation and disposal of hazardous materials and wastes, and implement measures to avoid or control community exposure to the hazardous material.

3.2.12 Cumulative Impacts

The cumulative impact assessment examined the interaction between the project's residual effects (i.e., those effects that remain after mitigation measures have been applied) and those associated with other past, existing, and reasonably foreseeable future projects or activities. The interaction of residual effects associated with multiple projects and/or activities can result in cumulative impacts, both positive and negative. The project's potential cumulative effects were considered with respect to valued components in environmental and socioeconomic categories, in four areas:

- of any potential residual project effects that may occur incrementally over time;
- consideration of other known relevant projects or activities within the specified study area boundaries, even if not directly related to the project;
- potential overlapping impacts that may occur due to other developments, even if not directly related to the proposed project; and
- future developments that are reasonably foreseeable and sufficiently certain to proceed

The project has identified the valued components as water quality, air quality, acoustic environment, socioeconomic and socio-community components, and human health and safety. There are no foreseeable projects that will overlap with the said project. The spatial boundary of the subproject are the areas where the facilities (water treatment and Sludge treatment facilities) is located. The temporal boundary can be considered as the whole Water Treatment Plant area.

Water quality. During the construction phase, the ESMP requires the Contractor to adopt waste and wastewater disposal practices, the installation of sufficient septic tanks, and the proper disposal of solid waste.

In the O&M phase, there is a risk of contamination from surface runoff and wastewater generated from toilets. Intake and Water Treatment facilities will have drains to ensure that wastewater generated during operations is treated through soakaways. Short-term negative impacts will be mitigated through ESMP, resulting in negligible potential residual effects.

Air quality. Emissions of common air contaminants and fugitive dust may be elevated in proximity to active work sites during construction and O&M phases; these impacts will be short-term and localized to the immediate vicinity of treatment Plant site. Greenhouse gas (GHG)emissions may increase as a result of the project activities (i.e., vehicle and equipment operation, concrete production, disposal of excavated material, land filling of residual wastes). Given the project's relatively minor contribution to common air contaminants and GHG emissions during construction, the overall significance rating of both these potential residual effects is considered to be negligible.

Acoustic environment. Noise levels during construction and O&M activities in immediate proximity of work sites are expected to increase. The exposure duration will be relatively brief but not imperceptible during the construction period. However, for the operational period, it will be long- term and imperceptible, particularly at the Intake and Water Treatment Plant (WTP) facilities. The exposure represents a temporary, localised, adverse residual effect of low significance for affected receptors. While building damage due to ground vibrations is unlikely, there may be annoyance to spatially located receptors during construction and O&M activities. The overall significance rating of potential residual effects is considered to be negligible.

Threatened species and the ECA. The assessment indicates that the majority of the ecological effects evaluated are either minimal or moderate in severity, with only a transient duration. It is anticipated that there will be no lasting detrimental consequences on plant species or on the communities of mammals, reptiles, amphibians, avian species, and aquatic life. The Ecologically Critical Areas (ECA) will be fully avoided by adopting shaft tunnelling technology for this project.

Socioeconomic and socio-community. Concerns on existing provisions for pedestrians, other forms of transport, and over-all impact on liveability particularly nearby the Water Treatment plant will occur spatially during construction and O&M activities. Traffic movement will be improved once the construction activities are completed. Since the subproject involves small-scale facilities, it will not conflict with existing or planned land use. O&M manuals for the facilities, comprehensive capacity building, and community involvement to be provided under WTP will ensure efficient operation of the facilities and acceptability by the stakeholders. However, following improvement in infrastructures and services, added residential developments, commercial, and business facilities and increased densities are expected to develop and enhance DWASA area. This can be considered a long-term cumulative benefit of the project.

Given the scale of the project it is likely that a number of local people will obtain at least temporary socio-economic benefits, by gaining employment in the construction workforce, and thus raising their levels of income. In addition, a significant number of employments will be generated associated with the O&M of the facilities to be developed under the subprojects. These benefits can bring wider social gains if they are directed at vulnerable groups.

Potential impacts of project activities include disruptions to water supply, electricity, and communication connections. To mitigate water supply disruptions, the Contractor shall provide advanced notice to the community, arrange alternative sources such as tankers, ensure rapid repair and restoration services, and coordinate with local water authorities. For electricity supply disruptions, give prior notice to the community, install back-up generators at critical locations, establish a priority restoration plan, and develop an energy management plan with contingencies. To address communication disruptions, notify the community in advance, set up temporary communication channels like mobile networks or satellite communications, designate emergency contact points and information centers, and strengthen communication infrastructure to ensure quick recovery. By implementing these measures, potential impacts can be minimized, ensuring minimal inconvenience to the socioeconomic and socio-community aspects of the project.

Community and workers health and safety. No adverse residual effects to human health will occur as a result of construction or O&M activities, and mitigation measures are in place to ensure public and worker safety and will be closely monitored. While exposure to elevated noise levels, fugitive dust and common air pollutants will occur in proximity to worksites, due to their short-term and localised nature, these effects are expected to be minor and insignificant with no measurable effects on human health. Contractor shall arrange regular sessions on transmissible diseases through health screenings, vaccinations, and education. Mandatory safety trainings should be provided to the construction workers. Additional measure for health, safety and ethical labour standards will include - construction of sanitary latrines and septic tank systems at worker accommodations; Installation of “No Litter” signs and provision of waste bins/cans at appropriate locations; Implementation of waste minimization, recycling, and reuse principles; Proper disposal of solid waste in line with the National “Solid Waste Management Rules 2021.”; Potable water supply must be ensured at both the workplace and labour shed areas; Worker accommodations must follow international guidelines, such as “Workers’ Accommodation: Processes and Standards – Guidance Note by IFC/EBRD”; Separate, clearly marked toilets for men and women, following legal ratios: 1 toilet per 25 female workers and 1 per 40 male workers and regular cleaning and monitoring systems to ensure hygiene. Also, safety of hazardous materials during delivery, storage, transportation, and disposal shall be in place to control community exposure to these materials. The DWASA emergency response plan will include comprehensive public evacuation procedures. These steps will help minimize health and safety risks to the community.

To ensure community safety, and security during both the construction and operation phases, the Contractor shall implement comprehensive measures aligned with national laws and international best practices. Continuous 24 x 7 CCTV surveillance must be installed at key areas within the workers' camp for security and safeguarding purposes. All workers shall be employed under written contracts following thorough background checks, including references from previous employers. Considering the likely influx of mostly male construction workers, special attention must be given to the protection of the community, particularly women. A robust Code of Conduct (CoC) must be developed, incorporated into employment contracts, and strictly enforced with clear disciplinary measures for non-compliance, including termination. Mandatory and recurrent CoC awareness and behavioural training shall be conducted for all workers, with emphasis on respectful conduct toward local communities and adherence to cultural norms, especially regarding the treatment of women. Workers must be explicitly informed about national laws prohibiting sexual harassment and gender-based violence (GBV), including legal repercussions and procedures. The Contractor must adopt a zero-tolerance policy for GBV and fully cooperate with law enforcement agencies in the event of any misconduct. In rural or remote areas with limited law enforcement presence, heightened preventive measures shall be implemented to safeguard women, girls, and boys from harassment risks. Training on gender-based violence and harassment (GBVH) shall be mandatory for all personnel, including contractors, subcontractors, core suppliers, and consultants. The Contractor should also collaborate with local women's rights organizations or NGOs to conduct awareness campaigns and guide the community on unacceptable behaviours and GBVH reporting mechanisms. The use of forced, bonded, or underage labour is strictly prohibited. Children aged 14 to 18 may only engage in light work in accordance with national law. If more than 500 external workers are mobilized, a Worker Influx Management Plan must be developed in line with IFC Performance Standard 2. All security-related activities during construction must follow international human rights standards, including the UN Basic Principles on the Use of Force and Firearms by Law Enforcement Officials, the UN Code of Conduct for Law Enforcement Officials, the Voluntary Principles on Security and Human Rights, and the International Code of Conduct for Private Security Providers. The Contractor must use rigorous recruitment, training, and monitoring systems to manage all security companies and personnel engaged at the site. Upon completion of the subproject, the socio-community will be the major beneficiaries of this subproject. With the improved water Supply facilities, additional vehicles and workers, they will be provided with reliable and climate resilient WASA services. In addition to improved environmental conditions, the subproject will reduce occurrence of diseases and people would spend less on healthcare and lose fewer working days due to illness, so their economic status should also improve, as well as their overall health. These are considered a long-term cumulative benefit.

Therefore, the project will benefit the public by contributing to the long-term improvement of WASA services and community liveability in DWASA area.

3.2.13 Social Surveys

A 5-days site visit was carried out on 12th to 16th May 2022 together with Social and Gender Specialist, a 4-members survey team and a project Engineer. During the visit, some informal group discussions were held with local people and various stakeholders. A sample social survey was conducted while a total of 100 individual stakeholders were interviewed through a questionnaire survey. A total of 15 Focus Group Discussions (FGDs) were held, and some affected people's in-depth interview were conducted.

A total of 9 (nine) Focus Group Discussions organized at different locations for updating the ESIA report. To get people's view on possible impact on social aspects due to the project intervention a total of 140 local people were consulted through group discussions and noted their opinions.

A courtesy site visit carried out on 11th December 2022 in presence of Social and Gender Specialist and Environmental Specialist to assess current scenario of the locations for WTP and

peoples' perspectives specifically officials of Saidabad WTP Phase-II of DWASA and project staff. An informal meeting was held with SWTPP-II O&M Team to be acquainted with the WTP site for Component-2 of Saidabad WTP Phase III. A transect walk was done by the group of experts during the site visit held in December 2022, to oversee the construction site of WTP C-2 of Saidabad Phase III. It was observed that the land for construction of WTP C-2 site is protected by the boundary wall which is already belongs to DWASA. Then some informal discussions held with local people of neighbourhood locality including entrance and future pathway for construction materials carrying to the site.

Another meeting was held at Saidabad WTP site office with the O&M Team and laboratory officials of SWTPP-II to know the probable competence or obstacles based on their experiences. There was another meeting held with Managing Director and RAP team of Knowledge Management Consultants (KMC / Resettlement NGO) and Project Director including Executive Engineer of SWTPP-III at the DWASA office to understand the RAP status of C-1 and C-3 and requirement of RAP for C-2 including present status of their activities in relation to resettlement and socio-economic status.

Detail information and data from this survey and FGDs are analysed and incorporated in the updated ESIA report. The social surveys re-visited some households which are affected by planned construction of pipeline along the proposed route.

DWASA have appointed Knowledge Management Consultancy (KMC) to address all latest developments that may affect the Resettlement Action Plan (RAP). A validation of the RAP against the approved Resettlement Policy Framework (RPF) is currently being undertaken by KMC.

3.2.14 Profiles of affected HH

The total project affected unit is 56 (including CPR), of them the households number is 52. Plain landowners are not surveyed since they will be finally identified by the DC office based on record of rights. The people who will be finally identified by the DC office as landowners and paid compensation as per law, additional compensation will be paid to them by DWASA. The total number of PAPs identified during survey are 232 of the affected HHs. Throughout the surveys and RAP studies, vulnerable people were identified as labours such as rickshaw pullers, students, unemployed people and housewives whereas business owners are observed as mixture of high/middle income group as they have relatively steady income. The male population is higher than that of the female. In percentage ratio, 57% are male and (132 no.) 43% are female (100 no.) found in the HH census. This ratio is similar to the national male-female ratio (109:100). The average household size among the affected people is 4.46. It is noted that there is no ethnic minority in the project area. Besides, all of the affected households in the project area recognized as Bengali.

3.2.15 Summary of resettlement action plan

The project requires private land acquisition of about 34 acres from which mostly (32 acres) from Naryanganj district and 2 acres in Dhaka district. Approximately 300 HHs and other entities including shops and community properties will be affected within the pipeline right of way. Three (3) Resettlement Action Plans (RAPs) has been prepared for the three sections of the project i.e. RAP-1: From Raw water pumping station to near Darikandi Bus stand of Dhaka- Chittagong Highway (6km); RAP-2: Mridhabari Sluice Gate to Saidabad WTP (6.5Km); RAP-3a: Along Dhaka-Chittagong Highway up to Kanchpur Bridge Circle (8.5 Km); RAP 3b: Along the DND canal and RAP 3c: Primary & Secondary Distribution Mains for Saidabad Phase-III WTP (54Km within the Dhaka South City Corporation Area). The RAP-I is for the land acquired for raw water pumping station and 6.00km pipeline alignment (six km) under Narayanganj district based on the 100% census and survey of the affected HHs.

Land Acquisition and resettlement Impacts

Sl. No.	Project Impact	Total
1	Private Land Area (Acres)	32.277
2	Affected Households	52
2.1	Residence Structures	51
2.2	Commercial Structures	1
3	No. of CPRs	3
4	Land and secondary structure of a group of company (titled)	1
(2+4) Total affected units		56
5	Business affected	1
6	Trees affected	1031

Resettlement Cost and Budget

The cost is estimated on the basis of inventory of losses identified through census and IoL and property valuation/market surveys. Replacement value of land, structures and other assets are calculated using the market rates. The Property Valuation Advisory Committee will confirm the rates by types of land and location during the RAP implementation. The costs for relocation and special assistance are consistent with the entitlement matrix.

3.3 Grievance Redress Mechanism

The Grievance Redressal Procedure (GRP) for the planned construction works aims to provide a structured approach for addressing and resolving grievances related to the works. This procedure ensures that individuals or organizations affected by the construction activities have a fair and transparent mechanism to express their concerns and seek resolution.

The GRP applies to all stakeholders, including local communities, residents, employees, contractors, and any other party directly or indirectly affected by the proposed works. Grievances will include, but are not limited to, the following categories:

- Water quality/pollution issues.
- Temporary interruptions or disruptions during construction.
- Environmental concerns.
- Health and safety issues.
- Resettlement matters.
- Communication and public relations matters.

The Contractor shall be responsible for assisting the Employer in all aspects related to the grievance redressal process of the relevant sections of the construction work packages.

Individuals or organizations with grievances shall be advised to follow the following steps:

a) Submit a written grievance to the designated Grievance Redress Official (GRO) at PMU's office within 30 days of the incident or concern.

b) The grievance should include the following details:

c) Name and contact information of the complainant.

d) Date, time, and location of the incident.

e) Description of the grievance, including relevant supporting documents or evidence.

f) Desired resolution or outcome sought by the complainant.

g) The grievance can be submitted via email, physical mail, or an online portal established for this purpose.

3.3.1 Grievance Redressal Official (GRO)

The Project Management Unit (PMU) of Saidabad Water Treatment Plant Phase-3 will be accountable for the overall implementation of the project-level grievance mechanism (GM) to ensure that all grievances and/or objections (raised by affected stakeholders or communities) are received, acknowledged and addressed as per the GM procedure as set out below. The contractor shall support implementation of the GM procedure.

PMU will appoint a qualified and impartial GRO responsible for handling and overseeing the grievance redress process. The GRO will acknowledge the receipt of the grievance within three working days and provide a unique reference number for tracking purposes.

3.3.2 Grievance Evaluation and Investigation:

The GRO will assess the grievance, investigate if necessary, and collect all relevant information from relevant departments or individuals. The investigation process should be completed within 15 working days from the date of grievance submission. If the investigation requires more time, the GRO should inform the complainant of the delay, providing an estimated timeline for resolution.

3.3.3 Grievance Resolution

Based on the findings of the investigation, the GRO will propose a resolution or action plan to address the grievance. The proposed resolution will be communicated to the complainant in writing, along with the reasons for the decision.

If the complainant accepts the proposed resolution, the GRO will ensure its implementation within a reasonable timeframe.

If the complainant does not accept the proposed resolution, they can request a review of the decision by submitting a written request to the GRO within ten working days.

Review and Appeal:

The GRO will review the request for a review within ten working days and reconsider the proposed resolution in light of additional information provided by the complainant.

The revised decision will be communicated to the complainant within ten working days.

If the complainant remains dissatisfied with the outcome, they may appeal to the senior management authority of Dhaka WASA.

The senior management authority, led by the Deputy Managing Director (Development) will conduct an independent review of the grievance and provide a final decision within 20 working days.

4 Project Environmental and Social Management Plan

The primary goal of environmental management and monitoring is to document the environmental effects stemming from project activities. Additionally, it aims to enforce the identified “mitigation measures” to minimize adverse impacts and enhance positive outcomes related to specific project tasks. Furthermore, it serves to address any unforeseen environmental consequences that might emerge during the construction and operational phases of the project.

The Environmental and Social Management Plan (ESMP) clearly lay out: (a) the measures to be taken during both construction and operation phases of the project to eliminate or offset adverse environmental impacts or reduce them to acceptable levels; (b) the actions needed to implement these measures; and (c) a monitoring plan to assess the effectiveness of the mitigation measures employed. Environmental management and monitoring activities for the proposed transmission line project could be divided into management and monitoring: (a) during construction phase, and (b) during operation phase.

The ESMP plans and procedures identified following documents for the construction and operation phases of this SWTP III Project.

Table 4-1: Summary of Project Plan Requirements

Sl. No.	Plan Name	Phase	Responsibility
1.	Worksite Environmental and Social Management Plan (Worksite ESMP)	Construction	Contractor
2.	Health and Safety Plan (part of Worksite ESMP)	Construction	Contractor
3.	Traffic Management Plan (part of Worksite ESMP)	Construction	Contractor
4.	Training and capacity building programme/Plan (part of Worksite ESMP) (i) Basic training for non-qualified staff (ii) Health & safety training	Construction	Contractor
5.	Public relations plan	Construction	Contractor
6.	Quality Plan	Construction	Contractor
7.	Vegetation Clearing Plan	Construction	Contractor
8.	Environment Protection Plans	Construction	Contractor
9.	Emergency plan	Construction	Contractor
10.	Worksite Environmental and Social Management Plan (Worksite ESMP)	Operation	DWASA
11.	Health and Safety Plan (part of Worksite ESMP)	Operation	DWASA
12.	Traffic Management Plan (part of Worksite ESMP)	Operation	DWASA
13.	Training and capacity building programme/Plan (part of Worksite ESMP)	Operation	DWASA

Sl. No.	Plan Name	Phase	Responsibility
	(i) Basic training for non-qualified staff (ii) Health & safety training		
14.	Public Relations Plan	Operation	DWASA
15.	Emergency plan	Operation	DWASA