

# SIRAJGANJ ECONOMIC ZONE LIMITED.

Executive Summary

Volume I

August 2021



**SIRAJGANJ**  
ECONOMIC ZONE  
NESTING INNOVATION AND INVESTMENT

**EQMS**

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## E.1. INTRODUCTION

Since the 1980s, Bangladesh has made effort to promote investment and industrial diversification by establishing —Export Processing Zones (EPZs) under Bangladesh EPZ Authority (BEPZA), and currently, eight (8) EPZs are operating in Dhaka, Chittagong, and other locations. However, most of the businesses (about 70% out of 300 companies) within these EPZs are mainly labor-intensive industries that rely on imported raw materials and processing them with low labor costs. This kind of processing industry, however, has a limited impact on backward linkage within the country and is less likely to induce other downstream or upstream manufacturing businesses. As a result, the government of Bangladesh has announced that no new EPZ is needed, but instead, it has launched a new policy to establish —Economic Zones (EZs) to reinforce the entire industrial relationship of the export industry and domestic industry, and to optimize the domestic market.

For supporting such arrangement, Bangladesh Economic Zones Authority (BEZA) has been emerged by the Bangladesh Economic Zones Act, 2010. BEZA aims to establish economic zones in all potential areas in Bangladesh including backward and underdeveloped regions to encourage rapid economic development through increase and diversification of industry, employment, production, and export. Sirajganj Economic Zone is one out of twenty-nine private economic zones which have been established to support decentralized economic activity specially closed to the marginalized people. Sirajganj Economic Zone Limited (SEZL) was formed by a consortium of nine renowned business groups to develop Sirajganj's largest private economic zone. SEZ will be the hub of manufacturing activity and job creation in Bangladesh's northwestern region. SEZ is committed to developing best-in-class facilities for prospective global/local investors in order to employ 50,000 people, generate export revenue, and make a significant contribution to the GDP. BEZA issued the final license to SEZ for establishment, development, operation, maintenance, and promotion of Sirajganj Economic Zone in different mouza of Sirajganj Sadar and Belkuchi Upazila of Sirajganj district intending to encourage rapid economic development through increase and diversification of industry, employment, production, and export. Phase 1 will cover 415 acres of land where the 1<sup>st</sup> phase activity will go on for the development of land and further construction work.

## E.2. APPLICABLE REFERENCE FRAMEWORK

The proposed project's national environmental policies, laws, and legal framework have all been identified. In Chapter 2 of the main report, an overview of a few of the major national environmental laws and regulations that are relevant and may apply to the activities supported by the proposed project, as well as World Bank safeguard policies, are discussed, with additional information provided in Annex C. The following is a summary of the most important rules, guidelines, and acts.

## **E 2.1 Environment Conservation Rules (ECR) 1997, amended 2003 and 2010**

These are the first set of rules, promulgated under the Environment Conservation Act 1995. Among other things, these rules set: (i) the National Environmental Quality Standards for ambient air, various types of water, industrial effluent, emission, noise, vehicular exhaust, etc., (ii) Categorization of industries, development projects, and other activities based on actual and anticipated pollution load, iii) requirement for and procedures to obtain Environmental Clearance, and (iv) requirements for IEE/EIA according to categories of industrial and other development interventions, v) Procedure for damage-claim by persons affected or likely to be affected due to polluting activities or activities causing hindrance to normal civil life. Relevant environmental and social, legal, and national laws and regulations of GoB have been discussed in Chapter 2 of the main report.

## **E 2.2 World Bank Performance Standards for Private Sector Projects**

The World Bank operational guideline Performance Standards for Private Sector Activities (OP 4.03) is primarily applicable for the SEZL project. There are eight key Performance Standards against which the impacts of the project would be evaluated to identify the impacts and affected stakeholders to help with the preparation of the management and mitigation plan.

### **E.2.2.1 Triggering of WB PS in SEZL**

The triggering of the WBG Performance Standards (PS) in the present project with explanations are given in **Table E 1** below. The applicable GOB laws, Rules, Policies, and Guidelines are listed alongside the WBG PS in **Table E2**.

**Table E 1: Triggered WBG Performance Standard (PS) in the Project**

SL #	Performance Standards and Title	Triggered (Yes/No)
1.	Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts	Yes
2.	Performance Standard 2: Labor and Working Conditions	Yes
3.	Performance Standard 3: Resource Efficiency and Pollution Prevention	Yes
4.	Performance Standard 4: Community Health, Safety, and Security	Yes
5.	Performance Standard 5: Land Acquisition and Involuntary Resettlement	Yes
6.	Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	No
7.	Performance Standard 7: Indigenous Peoples	No
8.	Performance Standard 8: Cultural Heritage	No

**Table E 2: Triggered WBG Performance Standard (PS) in the Project**

Sl. No.	Study Items/Topics	Applicable WBG PS and other guidelines	Relevant Chapter/Annex
01	Project Description & Study of the project's Area of Interest for Environmental and Social Setting, Scoping, and Categorization.	This is part of the screening, which is a vitally important tool for visualizing and understanding potential environmental and social impacts, as it can help to identify significant issues for the project, and spotlight what issues to monitor and prioritize for studies needed and risk analysis. A year-wise phased implementation schedule should be provided. Applicable Standards/Guidelines: PS1, WBG EHSG	<ul style="list-style-type: none"> <li>• Chapter 2</li> <li>• Chapter 3.</li> <li>• Annex A</li> </ul>
02	Legal and Policy Framework	Applicable Standards/Guidelines: PS1	<ul style="list-style-type: none"> <li>• Chapter 2</li> <li>• Annex C</li> </ul>
03	Baseline Studies	Applicable Standards/Guidelines: PS1, PS3	<ul style="list-style-type: none"> <li>• Chapter 4</li> <li>• Annex B</li> </ul>
04	Water Resources and water pollution potential Study	Applicable Standards/Guidelines: PS3, WBG EHSG, Water Pollution Control Ordinance 1970, Water Supply and Sanitation Act 1996.	<ul style="list-style-type: none"> <li>• Chapter 4</li> <li>• Chapter 6</li> <li>• Annex B</li> </ul>
05	Air Quality study	Applicable Standards/Guidelines: PS3, WBG EHSG, ECR 1997, and Air Quality SRO 2005	<ul style="list-style-type: none"> <li>• Chapter 4 &amp; 6</li> <li>• Annex B</li> </ul>
06	Climate Change and Disaster Risk	Applicable Standards/Guidelines: PS3, IPCC Assessment Reports (2014 and 2018)	<ul style="list-style-type: none"> <li>• Chapter 4 &amp; 6</li> <li>• Annex L</li> </ul>
07	Assessment and GHG Emission Assessment	Applicable Standards/Guidelines: PS1, WBG EHSG	<ul style="list-style-type: none"> <li>• Chapter 4</li> <li>• Chapter 6</li> <li>• Annex L</li> </ul>
08	Noise Pollution Study	Applicable Standards/Guidelines: PS3, WBG EHSG, Noise Pollution Control Rules 2006	<ul style="list-style-type: none"> <li>• Chapter 4 &amp; 6</li> <li>• Annex B</li> </ul>
09	Soil Characteristics Assessment	Applicable Standards/Guidelines: PS3, WBG EHSG	<ul style="list-style-type: none"> <li>• Chapter 4 &amp; 6</li> <li>• Annex B</li> </ul>
10	Seismicity	Applicable Standards/Guidelines: PS3, WBG EHSG	<ul style="list-style-type: none"> <li>• Chapter 4</li> <li>• Annex B</li> </ul>
11	Flood Potential Assessment	Applicable Standards/Guidelines: PS3, WBG EHSG	<ul style="list-style-type: none"> <li>• Chapter 4</li> <li>• Annex B &amp; L</li> </ul>
12	Cumulative Impact Assessment	Applicable Standards/Guidelines: PS3	<ul style="list-style-type: none"> <li>• Chapter 6</li> </ul>

Sl. No.	Study Items/Topics	Applicable WBG PS and other guidelines	Relevant Chapter/Annex
13	Labor, Human Rights, and Gender Assessment	Applicable Standards/Guidelines: PS2	<ul style="list-style-type: none"> <li>• Chapter 6 &amp; 9</li> <li>• Annex C &amp; H</li> </ul>
14	Community Health, Safety (including Hazardous materials) and Security Review	Applicable Standards/Guidelines: PS3, PS4, WBG EHSG, BLR 2015	<ul style="list-style-type: none"> <li>• Chapter 6 &amp; 9</li> <li>• Annex H</li> </ul>
15	Critical Habitat Review and Ecosystem Services Assessment	Applicable Standards/Guidelines: PS6, IUCN Guidelines, Bangladesh Wildlife Preservation Act 1974 and Revision 2008 (Draft), National Biodiversity Strategy and Action Plan	<ul style="list-style-type: none"> <li>• Chapter 4</li> <li>• Chapter 6</li> <li>• Annex B</li> <li>• Annex F</li> </ul>
16	Grievance Redress	Applicable Standards/Guidelines: PS1, PS5	<ul style="list-style-type: none"> <li>• Chapter 8</li> <li>• Annex J</li> </ul>
17	Consideration of Alternatives	Applicable Standards/Guidelines: PS1	<ul style="list-style-type: none"> <li>• Chapter 6</li> </ul>
18	Land Acquisition and Resettlement Action Plan (RAP)	Applicable Standards/Guidelines: PS5, The Land Acquisition Act 1984, The Acquisition and Requisition of Immovable Property Ordinance 1982, and subsequent amendments in 1994, 1995, 2004 & 2017	<ul style="list-style-type: none"> <li>• Chapter 4</li> <li>• Chapter 6</li> </ul>
19	Indigenous People	Applicable Standards/Guidelines: PS7	Chapter 2 (section 2.4.6), Chapter 4 (section 4.1.6.1.5)
20	Cultural Heritage	Applicable Standards/Guidelines: PS8	Chapter 1 (section 1.5.3), Chapter 2 (section 2.3 and 2.4.6)
21	Environmental and Social Management Plan, and Environmental and Social Action Plan (including EHS, Community EHS, Fire safety, Traffic Safety, Emergency Response and Preparedness, Monitoring)	The management plan can be a phased program depending on the activities in the project. Applicable Standards/Guidelines: PS1, PS3, PS4, PS6, PS8, EHS guidelines	<ul style="list-style-type: none"> <li>• Chapter 9</li> <li>• Annex H</li> </ul>

### **E 2.3 Environmental and Social Policy and Procedures**

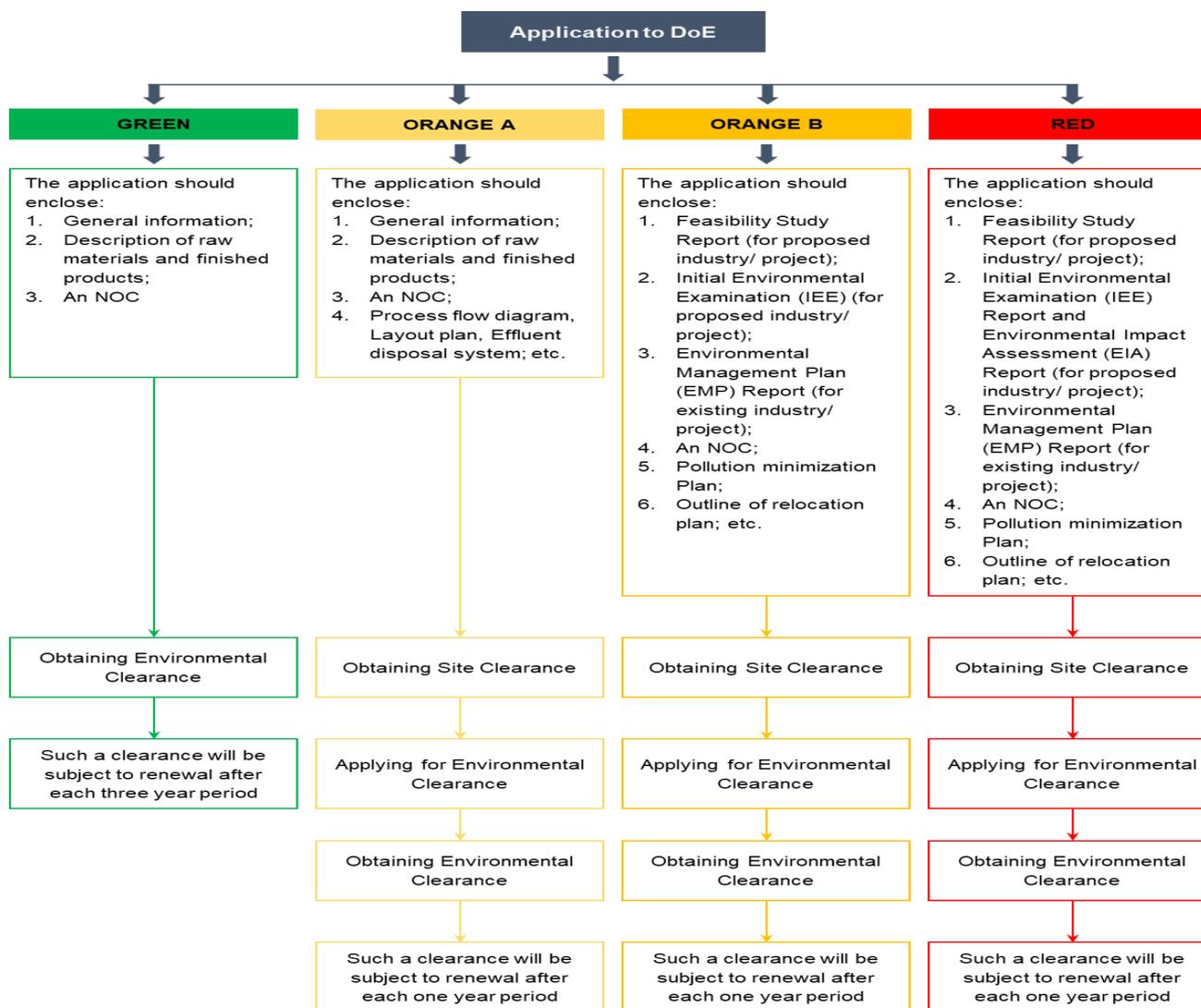
The ESPP outlines the approach, scope, applicable requirements, and standards, as well as due diligence and monitoring process and procedure. It also adopted different national standards and requirements like National Environmental Policy 1992, Environment Conservation Rules (ECR) 1997, Environmental Court Act 2010, Bangladesh Factories Act (1965), National Water Policy, 2000, etc. ESPP also acknowledges the under the international conventions and treaties for example International Plant Protection Convention, Rome, 1951, Convention Concerning the Protection of the World Cultural and Natural Heritage, Paris, 1972 (World Heritage Convention) (Ratified 1983), Convention on Biological Diversity, Rio de Janeiro, 1992 (Ratified 1994) Fundamental ILO conventions, etc.

### **E 2.4 Fundamental Conventions of ILO**

The ILO Governing Body has identified eight “fundamental” Conventions, covering subjects that are considered to be fundamental principles and rights at work: freedom of association and the effective recognition of the right to collective bargaining; the elimination of all forms of forced or compulsory labor; the effective abolition of child labor; and the elimination of discrimination in respect of employment and occupation. Details of the applicable ILO Conventions are provided in **Annex -C**

### **E 2.5 Environmental Clearance Process**

The Environmental Clearance Process starts with the project the proponent is to apply for clearance in the prescribed form to the Director/Deputy Director of respective DoE divisional offices. The detailed process has been discussed in Annex C. A flow chart to obtain environmental clearance by a project proponent is given in Figure E.3.



Source: Environmental Conservation Rules; 1997

**Figure E 1: DoE Categorization for any Project**

## E 2.6 Categorization of the Project

The project's total land area is 415 acres, which was previously used as fallow land, a homestead area, and agricultural activities. The project area is currently in the development stage, and plots in the SEZL remain unallocated. This economic zone, however, will be allocated to a diverse range of industries. The potential impacts have been addressed in Chapter 6 of the main report based on statistical considerations. According to detailed environmental and social analysis, the impact is either moderate or low. As a result, the SEZL sub-project has been classified as medium risk (i.e., Category-B).

It is mentionable here that, the pre-construction phase involved dredge-filling of 415 acres of land which did not support any critical habitat. During the field investigation, it was found that no vulnerable group or ethnic minorities are dependent on the land as well. The potential impact on biodiversity can be assessed as very low and no potential impact on the vulnerable group or ethnic minorities is anticipated. Moreover, the wastewater will be treated in a Central Effluent Treatment Plant (CETP) and the economic zone will practice zero discharge practice in the operation phase. Thus, the SEZL sub-project of IPFF II has been classified as medium risk (i.e., Category-B) sub-project. Categorization of the project as per ESPP of IPFF II project is given in **Error! Reference source not found.** of the main report.

## E.3. PROJECT BACKGROUND

### E 3.1 The Project – Sirajganj Economic Zone

The proposed Sirajganj Economic Zone (SEZ) site is located at Saidabad & Rajapur Union, under Sirajganj Sadar and Belkuchi Upazila which is adjacent to the Elenga-Nalka-Hatikumrul highway. The total land of SEZ is approximately 415 acres.

The proposed project involves the development of an economic zone and associated off-site facilities for the upcoming Sirajganj Economic Zone. At present both economic zone and off-site facilities will be constructed. The economic zone and off-site development will include the following:

#### The basic infrastructure

1. Internal Roads suitable access under fire emergency,
2. Electric power supply distribution lines and sub-stations,
3. Gas sub-station and distribution lines,
4. Storm water storage and drainage system (separate from sewage),
5. Water supply from deep wells or surface water through water supply pipelines,
6. Fire water system with supply network and hydrants at suitable locations,
7. Separate networks for sewage, wastewater pipelines,
8. Sewage treatment plant,

9. CETP (in some cases pretreatment at plant level will be needed) with defined intake standards.
10. TSDF (Transport, Storage and disposal facility) and landfill for solid-waste and sludge management
11. Transport hub (i.e., bus station for daily 200,000 arrivals and departures and parking areas)
12. Fire station
13. Sub-zoning of plots based on hazardous materials handling
14. Environmental Monitoring laboratory with continuous air monitoring station (CAMS).
15. Hospital
16. Labor camps
17. Services such as Banks, Shopping Mall, Hotels/Rest Houses, food services, post office etc.

#### **Other facilities and Buildings**

1. Gate/Security Guards booth,
2. Administration building,
3. Access Road: Garden/walkway/parking,
4. Commercial Development

The total area of the upcoming SEZ is about 415 acres. EZ can have the following components as per EZ Act, 2010:

- **Industrial plot:** Specified for industrial establishment;
- **Green Area:** Specified for green belt area;
- **Utility:** Specified for STP, CETP, Power Station, Fire Service, etc.;
- **Admin and Commercial Area:** Specified for offices, markets, etc.;
- **Rehabilitation:** Specified for resettlement purposes
- **Internal Road:** Specified for internal road communication

At a later stage, the developer will carry out EZ development. Agriculture/food processing industry, Plastic and Rubber Products, RMG/ apparels, Wooden Products, Knitting and Textile, Jute and Jute Goods Materials, Pharmaceutical and Healthcare Goods, Footwear and Leather Goods, Electrical and Electronics, Garments Accessories, and Light Engineering industry are among the industries that will be developed within EZ. Before developing the EZ, the developer will prepare a detailed project report detailing the types of industries that will come, utility requirements for the industries, and an assessment of the environmental impacts of those industries. Currently, four plots (A, B, C, and D) totaling 289 acres out of 415 acres of land have been proposed for the industrial area. However, the detailed list of industries has not yet been finalized.

## **E 3.2 Size and Magnitude of Operations**

### **E 3.2.1 Land**

At this stage, the total land area of SEZ is approximately 415 acres. However, it is planned to extend the project site to 1041 acres in the next phase.

### **E 3.2.2 Natural Gas (Primary Fuel)**

A gas pumping station operated by Paschimanchol Gas Company Limited (PGCL) is approximately 5 kilometers from the site. Additional pipelines could be laid from this pumping station to supply gas to the industrial tenants. Pipes with 20" and 30" diameters transmitting gas at 200–1,500 psi are available in the area, according to the feasibility report. The estimated demand for gas in the SEZ is 50 MMCFT. It is proposed that the respective company conduct a more detailed study before constructing the gas supply pipeline to the SEZ.

### **E 3.2.3 Water**

The total potable water demand for the proposed economic zone (phase 1) is 7 MLD. It has been decided to build three to four new bore wells within the proposed site to draw the groundwater to meet the initial demand of EZ. It is recommended in the feasibility report that while operationalizing the proposed EZ, the possibility of both groundwater and surface water is evaluated. During the initial stage of operation, it has been considered that the proposed EZ would be dependent on groundwater supply, however for the long-term sustenance, provision of sourcing water from the surface has been assimilated in the infrastructure assessment. Preliminary assessment suggests that extracting water from Jamuna River located 2 km towards the eastern boundary of the proposed EZ may be considered by providing a suitable intake system and water treatment plant. The exact location of water intake will be finalized during the implementation stage. It has been proposed to lay 210 dia. DI pipes for the length of 2 km for the incoming external water supply network from Jamuna River for the EZ. The exact location of the pumping station & booster stations will be finalized during the implementation stage.

### **E 3.2.4 Power**

As per the feasibility study, the total power demand for the proposed SEZ has been estimated to be approximately 44.48 MVA. For fulfilling the demand of this power, the main receiving substation of 132/33/11 kV substation must be established on the site (layout given in Figure A5 to A8 of Annex C). A new 132 kV dedicated power transmission line has been proposed from the nearby sub-station to EZ site for fulfilling the needs of industries occupying the economic zone along with 132/33/11 KV substation within EZ. As per the information of the SEZ, the transmission line will be installed by the NESCO (application letter to NESCO by SEZL has attached in Figure C 15 of Annex C). Since the proposed line from the nearby power plant enters the site on the Northern side, it is planned to establish the proposed main receiving substation of 132 /33/11 kV substation at the entry of the feeder line. From the sub-station, the transmission line network is planned along the proposed road network to feed the individual plots. But as per the project proponent's verbal status, the sub-station will be located at the utility zone.

### **E 3.2.5 Project Schedule and Cost:**

The total duration of the SEZ project construction phase is 36 months. The entire months are divided according to project activities e.g. site grading, boundary wall, external water & power supply, internal road access, drainage facility, water supply system, water treatment plant, waste management, and landscaping works, etc. Preparation of road & footpath, stormwater drain, and telecom duct consuming the highest duration of the total project period. Project schedule Detail project cost is given in **Table E 3**. The detailed project schedule is given in **Table E 4**

**Table E 3: Proposed Project Cost**

Amount in Crore BDT					
SL	Particulars	Unit	Quantity (NOs)	Rate (BDT)	Cost (BDT)
1	Cost of Land	Acre	415	0.316	131.14
2	Land Development and Other Costs:				
	Earth Filling	CFT	21.78	6.5	141.6
	Compound wall, Fencing, and Gates	RM	5000		21.3
	Internal Road, bridge, culverts, and drainage				136.5
	Water Supply, treatment, and distribution	MLD	7.06		45.913
	Electrical, street lighting and fire fighting	MVA	44.48		70.331
	Telecom and communication system				4.705
	Sustainable infrastructure elements, RW harvesting, etc	RM	7764		0.35
	Wastewater, network, and solid waste management				36.104
	Building- commercial				16.272
	Building - MEP				0.136
	Gas supply and network				16.6
	Standard factory buildings				49.01
	<b>Total</b>				<b>669.961</b>
3	<b>Financing Cost During Construction and Pre-Construction Period</b>				
	Pre-Construction Stage				
	Construction Stage				78.1
	<b>Grand Total</b>				<b>748.061</b>

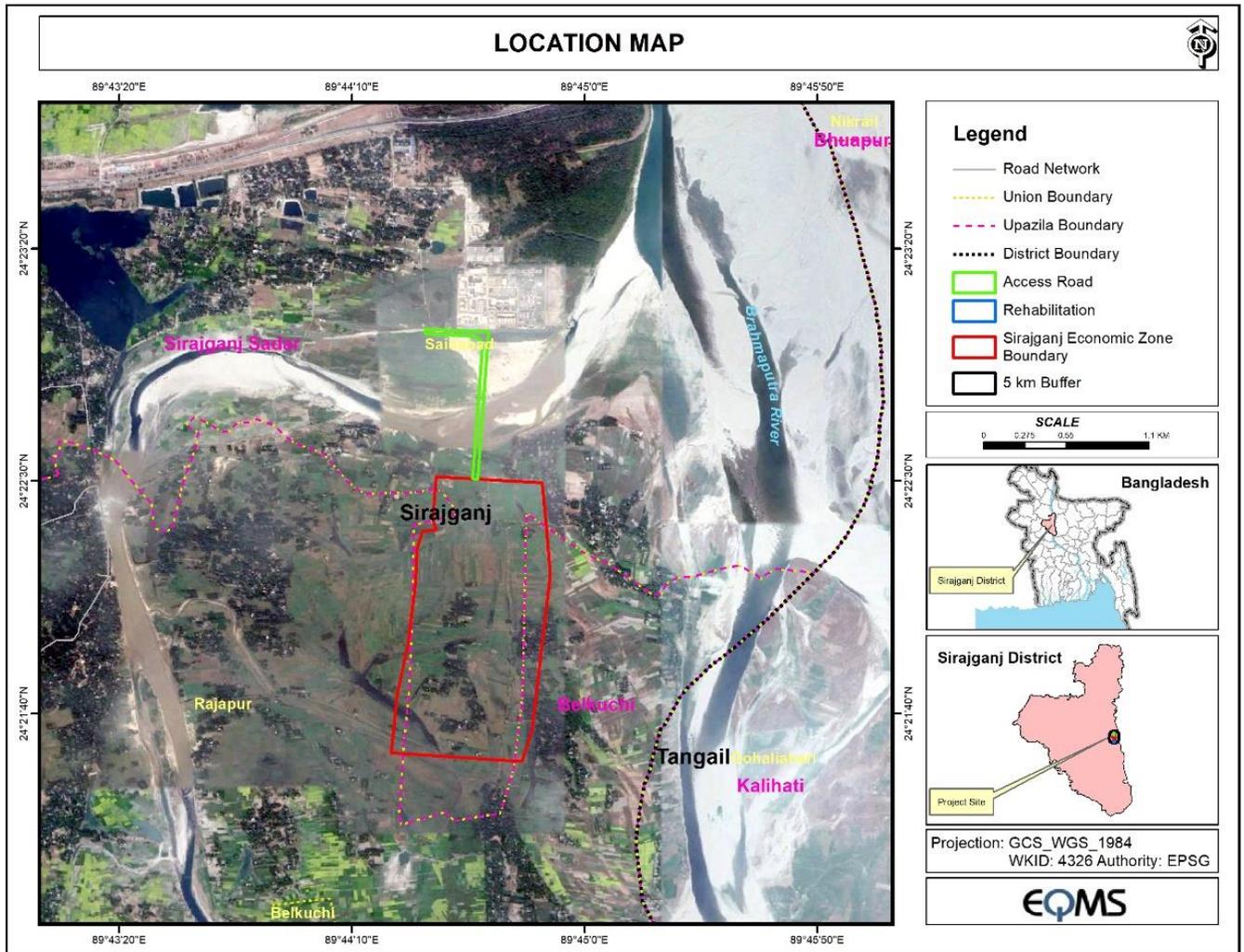
Table E 4: Proposed Project Schedule as Per Feasibility Study Report

Task Name	%	Upto June 2021	Sep-21	Dec-21	Mar-22	Jun-21	Sep-22	Dec-22
Land Cost	100%	100%						
Site grading	100%	79%	6%	15%				
Compound wall, fencing and gates	100%	15%	20%	30%	15%	10%	10%	
Road carriageway & median	100%	5%	20%	25%	15%	15%	10%	10%
Foot path and plot entry culvert	100%	5%	20%	25%	15%	15%	10%	10%
Drains and culvert	100%	5%	20%	25%	15%	15%	10%	10%
Bridge	100%	10%	20%	25%	20%	15%	10%	
Water supply network	100%		10%	30%	35%	10%	10%	5%
Sump, Overhead Tank, Pumps	100%		10%	30%	35%	10%	10%	5%
Water Treatment plant	100%			30%	35%	15%	10%	10%
External water supply network	100%		10%	30%	35%	10%	10%	5%

Task Name	%	Upto June 2021	Sep-21	Dec-21	Mar-22	Jun-21	Sep-22	Dec-22
Electrical, street lighting & fire fighting	100%		10%	25%	40%	5%	10%	10%
Telecom & communication systems	100%		5%	15%	25%	25%	15%	15%
Sustainable infrastructure elements, RW harvesting, summer storage tank & greenery	100%		10%	20%	15%	20%	20%	15%
Decentralized wastewater, network and solid waste management	100%	10%	20%	25%	20%	10%	5%	10%
Buildings	100%			25%	20%	25%	15%	15%
Gas Infrastructure	100%		10%	15%	20%	20%	25%	10%
Standard Factory Building (SFB)	100%				20%	25%	25%	30%

**E 3.2.6 Project Location and Layout Plan:**

A layout map for SEZ as per preliminary planning is given in the following **Figure E 3**. Where all locations of waste management facilities such as STP, ETP and CETP are marked in this layout map. A recent google imagery map is given in **Figure E 2** to understand the existing situation of the area.



[Source: Google Earth Image]

**Figure E 2: Proposed Layout of the Master Plan of SEZ**



[Source: SEZL Authority]

**Figure E 3: Proposed Layout of the Master Plan of SEZ**

## E.4. ENVIRONMENTAL AND SOCIAL AUDIT

The project area is in a Greenfield project. So, there are no existing industries. As a result, no environmental and social audit was needed in this stage. An annexure (Annex G) is given for the environmental audit of the proposed industries.

## E.5. DESCRIPTION OF THE ENVIRONMENT

### E 5.1 Physical Environment

#### E 5.1.1 Land use/ Land Cover

To assess the land use/land cover of the project area, cloud-free multi-temporal Satellite Imagery of Google Earth, 15-DEC-2018 has been used. Analysis revealed that the land use/land cover of the AOI consists mainly of agricultural land (41.66%), Sand bar (18.35%), settlement with homestead plantation (14.21%).

#### E 5.1.2 Topography

The project site is located is just beside the Jamuna River. Contour maps derived from DEM show that the topography of the Project AOI is predominantly flat terrain with depressions in the Jamuna River section. However, interestingly the sandbars/ island areas within the River are visible with higher elevation values. The Jamuna Eco Park and Saidabad Power Generation Complex can be observed to be in the elevation range of 12-18 m above MSL from the map.

#### E 5.1.3 Geology

The project site is located at Sirajganj lies in the Rajshahi Division of Bangladesh which falls under a stable Precambrian platform and is characterized by limited to the moderate thickness of sedimentary rocks above a Precambrian igneous and metamorphic basement. This unit is geologically stable in relative terms and has not been affected by fold movement. The 5km buffer AOI of the project site is in Active Brahmaputra-Jamuna Floodplain and the geology of the surface is covered by alluvial silt and sand and by the river.

#### E 5.1.4 Hydrology

The proposed SEZL site is flat agricultural land and submerged in the rainy season. A channel of Jamuna is flowing within the area. The channel has been using for the transportation of agricultural products and fertilizers by small boats in the monsoon season. In winter, it is normally dry. Waterlogging was observed at the site during the monsoon season. The area is severely flood-prone. However, during heavy rainfall and monsoon season, the river water enters the low laying area causes water stagnation in the area for some time.

The hydrological regime of Project AOI is governed by the Jamuna River and is the main drainage channel of the area. Historically, the sediments carried by the Jamuna River have been deposited in the area. The Jamuna River is a braided river characterized by a network of interlacing channels with numerous sandbars enclosed in between them.

#### **E 5.1.4 Water Quantity**

To understand the water quality of the project area, both ground (four samples) and surface water (four samples) were collected and analyzed. Ca, hardness, and potassium concentrations in groundwater were found to be higher than the national standard (ECR 1997). The concentration of other parameters in the groundwater samples, on the other hand, was found to be satisfactory. All of the parameters for surface water were found to be higher than the standards. Despite the fact that there is no standard for the majority of the parameters in ECR, 1997, the TDS is slightly higher when compared to schedule 10 of ECR, 1997.

#### **E 5.1.5 Climate**

Bangladesh is in the tropical monsoon region and its climate is characterized by high temperature, heavy rainfall, often excessive humidity, and fairly marked seasonal variations. From the climatic point of view, three distinct seasons can be recognized in Bangladesh - the cool dry season from November through February, the pre-monsoon hot season from March through May, and the rainy monsoon season which lasts from June through September. January is the coolest month with temperatures averaging near 26°C and April the warmest with temperatures from 33 to 36°C. Most places receive more than 1,525 mm of rain a year, and areas near the hills receive 5,080 mm. Most rains occur during the monsoon (June-September) and little in winter (November-February). Moderate rains are also reported in March, April, and October.

Wind direction and speed exhibit seasonal variation. Winds are generally moderate during the non-monsoon season, whereas during the monsoon season, these are moderate to strong. The wind speed varies from 1.02 m/s to 7.71 m/s, with wind speed varying between 2.31 to 3.34 m/s most of the time. The annual windrose shows the predominant wind direction to be SSE to NNW. From May to October, the predominant wind direction is SSE to NNW and from November to April, it is NNE to SSW.

#### **E 5.1.6 Natural Hazards**

The Project site falls in the Zone-II area with a basic seismic coefficient of 0.05g and at moderate risks from earthquakes. The Project site does not fall under cyclone-affected areas; however, there are reports of a Tornado in 1991, a wind storm in 2001, and a tropical storm in 2002 in the district, though no data on any effect in the Project AOI is available.

Every year near about one-fifth of Bangladesh undergoes floods during the monsoon season. A flood season in Bangladesh may start as early as May and can continue until November. The project AOI also gets inundated with floodwater of Jamuna River every year during the rainy season and is highly prone to riverbank erosion. The Project site also used to get affected by floodwaters before its raising and embankment construction.

### **E 5.1.8 Ambient Air Quality**

#### ***PM2.5***

Particulate matter is the dust found in the air. Particulate matter is the term for tiny particles found in the air. These particles can include dust, dirt, smoke, and liquid droplets. The 24-hourly average PM2.5 concentration in ambient air in the study area was recorded in the range of 24.67  $\mu\text{g}/\text{m}^3$  - 69.32  $\mu\text{g}/\text{m}^3$ . All the monitoring locations result except AQ4 was within the 24-hourly National Ambient Air Quality Standard (NAAQS) for PM2.5 in Bangladesh. But in consideration of WBG EHS Guidelines (2007), results of all locations were found higher than the standard limit.

#### ***PM10***

The 24-hourly average PM10 concentration in ambient air in the study area was recorded in the range of 64.32  $\mu\text{g}/\text{m}^3$ -114.36  $\mu\text{g}/\text{m}^3$ . All the monitoring locations result was within the 24-hourly National Ambient Air Quality Standard (NAAQS) for PM10 in Bangladesh but higher than the WBG EHS Guidelines (2007).

#### ***SO<sub>2</sub>***

The 24-hourly average SO<sub>2</sub> concentration was recorded within the range of 8.24  $\mu\text{g}/\text{m}^3$  - 43.24  $\mu\text{g}/\text{m}^3$ . All the monitoring location results were found within the 24-hourly National Ambient Air Quality Standard (NAAQS) for SO<sub>2</sub> in Bangladesh. In addition, results of all monitoring locations except AQ1 were found higher than the WBG EHS Guidelines (2007).

#### ***NO<sub>x</sub>***

The 24-hourly average NO<sub>x</sub> concentration was recorded in the range of 22.32  $\mu\text{g}/\text{m}^3$  - 51.67  $\mu\text{g}/\text{m}^3$ . All the monitoring locations were within the annual National Ambient Air Quality Standard (NAAQS) for NO<sub>x</sub> in Bangladesh. In addition, all locations monitoring results except AQ4 were found within the WBG EHS Guidelines (2007), results at AQ4 were found higher than the standard.

#### ***CO***

The 8-hourly CO concentration was recorded at 0.008 ppm - 01 ppm range. CO concentrations were recorded at all the monitoring locations was within the Bangladesh Standards (9ppm). No available standards for CO are included in WBG EHS Guidelines (2007).

## ***Air Pollution***

The air quality of the proposed project area was recorded within the National Ambient Air Quality Standard (NAAQS) of Bangladesh except for the PM<sub>2.5</sub> and SPM value at AQ4. On the contrary, values of air quality parameters of almost all the locations were recorded higher than the permitted limit as prescribed in the WBG EHS Guideline (2007). This may be resulting from the emission of vehicles from adjacent highways, emissions from shallow engine water vehicles at Jamuna River and Sirajganj CCPP.

### **E 5.1.9 Ambient Noise Levels**

Noise levels were recorded at Six (06) locations in the study area during the monitoring period. Noise levels were recorded in the form of sound pressure levels with the help of a digital sound level meter. In most of the cases, the ambient noise level was found satisfactory. However, Day time noise level of NL1 (Silent area), NL4 (Commercial area) were found as an existing national standard.

## **E 5.2 Biological Environment**

The area is situated at the right bank of the Jamuna (Brahmaputra) at approximately one kilometer from the Jamuna Multi-Purpose Bridge. Land use of buffer area includes agricultural land, river, canal, homestead forest, etc.

Total fifty-five species were recorded based on consultation with the fishermen, fishing ground analysis, and fish market survey. The common fish species found within the study area are Bagha Air (*Bagarius bagarius*), Boal (*Wallago attu*), Tengra (*Mystus tengra*), Tengra (*Mystus vittatus*), Veda (*Nandus nandus*), Rita (*Rita rita*), Baim (*Mastacembelus pancalus*), Shing (*Heteropneustes fossilis*), Taki (*Channa punctatus*), Aor (*Sprata aor*), Chital (*Notopterus chitala*), Rui fish (*Labeo rohita*), Elish (*Hilsa ilisha*), Kajuli (*Ailia coila*), etc. Among them, 3 species are critically endangered, 9 species are endangered, 15 species are Near Threatened, 6 species are Vulnerable and 18 species are least concerned as per IUCN Redlist, 2015.

A total of 52 species of common floral species were recorded within the study area. Species are mainly Eucalyptus (*Eucalyptus spp.*), Mangoo (*Mangifera indica*), Koroi (*Samanea saman*), Nim (*Azadirachta indica*), Khejur (*Phoenix dactylifera*), etc. One vulnerable species named Mahaguni (*Swietenia macrophylla*) was recorded during the survey.

A total of forty-nine species of birds were recorded belonging to thirty-one families the highest number of birds that were dominated in the study area belonging to the family Scolopacidae. Homesteads, Road Side vegetations, Char (Riverine Island), ditches are the habitat of this area that supports the wild birds for feeding and roosting ground. Primarily, one species named River Lapewing (*Vanellus duvaucelii*) was found within the study area which is Near Threatened (NT) as per IUCN red list, 2015.

Although EQMS did not observe dolphins during the primary field visit, previous observation and a secondary source confirm that the area supports the availability of Ganges River Dolphins.

### E 5.3 Socio-Economic Profile

The administrative setup of Sirajganj District comprises nine (9) Upazillas, eighty-two (82) Unions. Villages situated within a 2km radius from the proposed project were considered for conducting a social survey. To get the actual population/households of the studied villages, secondary sources such as Population and Housing Census, District Statistics, District Web Portal, and respective Union Parishad Office information have been verified.

Basic demographical characteristics of the households. Survey result has found about a total number of 521 populations are living within the 106 households, whereas about 52% are male and rest 48% are female. The average family size is 4.9. On the other hand, the 1-70+ age range has been formulated to capture the age distribution of the studied population. Importantly around 64.1% population belongs to the 14-69 age range which signifies that most of the populations are eligible for being active in economic activities. Contrary, only 35.9% population is found dependent. Additionally, 50.5% population is married. All over health status among the households has been found quite well. Around 96.9% populations are found physically normal and only 0.6% is found handicapped by birth and 2.5% is in acute health problem. The study area is found Muslim dominated where surveyed households were found all are Muslims.

The study finds that about 33% primary (class 1-5) education, at least 14.6% S.S.C level, 1.9% who complete at least H.S.C level, 1.2% Hafez (Islamic Curriculum), and 1.3% Graduate. About 48% of populations are found underlie within the illiterate category where include children who have the future potentiality to enroll in school

## E.6. KEY ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Pre-construction, construction, and operation activities likely to cause environmental and social impacts that were identified, and evaluated to assess their magnitude, duration, and potential receptors.

### E 6.1 Pre-Construction Phase (Site Preparation)

The activities which have the potential to cause impacts on the surrounding environment and receptors during the Construction of the power plant are identified as:

- site preparation;
- transportation of construction material and machinery by road;
- construction of water pipelines and gas pipeline;
- excavation of equipment foundations;
- laydown areas for temporary use during the construction phase;
- storage and handling of hazardous materials, waste, and wastewater

### **E 6.1.1 Impacts on ambient air quality**

The sources of air pollution at the pre-construction stage are vehicle emission and dust on the vehicle wheels. Based on activities during the pre-construction stage, the impact on ambient air quality is found Low. But it is possible to mitigate the pollution using low Sulphur content diesel, spraying water and washing vehicle wheel, etc.

### **E 6.1.2 Impacts on Noise**

A small range of sound will be generated in the pre-construction period from the vehicle movement, dredging activities, landfilling by pumping, etc. But the overall impacts have been considered as low. Noise level is possible to reduce by avoiding unnecessary engine operation, avoid high noise-based equipment, and regular servicing of the machinery.

### **E 6.1.3 Impacts on Water**

Land development, construction of access roads, and spillage from heavy equipment are the main sources of water pollution in the pre-construction stage. Depending on pre-construction stage activities, there is Low impact on water resources. But these impacts are likely to reduce by avoiding excavation during rain, proper drainage system, protect leaching sediments, and continuous monitoring of water quality.

### **E 6.1.4 Impacts on Soil Quality**

The disposed of slurry is the main element of soil quality degraded during this stage. Mainly agricultural land is to be impacted by the disposed of slurry. Considering the activities in the pre-construction period the impacts on soil quality found low. The impacts on soil quality can be reduced by accepting some steps like surplus water should not be disposed at surrounding land and carefully handling the landfilling activities.

### **E 6.1.5 Impacts on Sediment Quality**

Oil spillage, lubricants, fuel, and leakage of heavy equipment are the cause of sediment contamination during the pre-construction period. According to pre-construction period activities, the level of impact on sediment quality found Medium-Low. But it is possible to alleviate the impacts by taking clean-up actions of any spillage of oils, fuels, and or chemicals and site-specific emergency response plan.

### **E 6.1.6 Soil contamination by dredged material**

During the pre-construction period, limited waste will be generated but slurry will be generated due to landfilling activity. The slurry is nonhazardous, but it decreases soil fertility. With these things in mind, the impact of dredged materials is Low. Avoid excavation during rain and ensuring proper drainage facilities these impacts can be mitigated.

### **E 6.1.7 Changes in Land Use pattern and production**

The entire proposed land will be developed up to the 14.5m PWD by dredged sand and agricultural land will be changed to the industrial realm. That's why at the preconstruction stage low impact is found in land use pattern and production. This impact can be eliminated by taking actions like before land development, the contractor must be informed to landowners for harvesting standing crops and no activities should be carried out outside of the project boundary.

### **E 6.1.8 Occupational Health and Safety**

There would be some possibility to happen accidents and or incidents during land development works of pre-construction stage. Considering all issues in this stage the impact has been considered as Low on occupational health and safety. But it can be mitigated by ensuring first aid facility, safe drinking water supply, OHS training, proper PPEs, etc.

### **E 6.1.9 Community Health and Safety**

At the pre-construction stage, there is a possibility of dust generation by removal of vegetation, land leveling & filling activities that may impact community health and safety and the impact has been considered as Very-Low. To minimize dust generation by water spraying and minimize vehicle movement can mitigate the impact on community health and safety.

### **E 6.1.10 Transboundary impact and climate change**

Both natural and human-induced activities are responsible for climate change. During the pre-construction period, some heavy equipment such as excavators, cranes, and compactors will be used that are generating emissions. But the impact will be regional to an extent that's why the impact is considered as Very-Low.

### **E 6.1.11 Impact on Biological Environment**

Considering all of the activities at the pre-construction stage the impact on terrestrial flora (Plants) found Medium-Low, impact on terrestrial flora (Birds) found Low, impact on aquatic fauna (Fishes) found Medium-Low, impact on aquatic fauna (Aquatic mammals) found Medium-Low respectively. Avoiding unnecessary engine operation, replant the species nearby where no disturbance due to project activity can be mitigated terrestrial ecosystem loss. It is possible to reduce the impact on aquatic fauna by avoiding excavation during rain and limited fishing/no fishing during the breeding season.

### **E 6.1.12 Impact on society**

#### ***Land Acquisition***

Due to permanent, irreplaceable loss and severity, the impact on loss of land is considered as *Medium-High*. But this impact can be mitigated by proper monitoring, early payment, establishing a grievance redress mechanism, and prioritization for work during the project construction period.

***Loss of Homestead Assets***

It is anticipated that the affected peoples will be significantly impacted as a consequence of homestead assets loss. Due to its permanent, irreplaceable loss and severity, this loss of land is considered as *Medium-Low*. By paying replacement cost, compensation for both movable & immovable structures, and provision of materials taking allowance can mitigate the impact in this stage.

***Loss of Livelihood***

It is envisaged that the affected peoples will be significantly impacted especially farmers, sharecroppers, and agricultural labors who will lose their livelihood once the agricultural activity stops permanently. Considering this issue the impact on livelihood is found as Medium-Low. However, it can be mitigated by following approved RAP, Payment of transitional allowance to support economic loss, and Livelihood restoration measures.

***Restriction on accessing primary School***

In the pre-construction phase restriction on accessing to school, impacts have been assessed and it is assessed that impact is found Medium-High. However, this impact can be reduced by relocating affected schools before land development starts and establishing a grievance redress mechanism.

***Restriction on accessing Mosque for Religious Observance***

In the pre-construction stage, due to permanent, irreplaceable loss and severity, this loss of accessing Mosques is considered as Medium-High. But this impact may be mitigated by relocating affected Mosques before land development starts and establishing a grievance redress mechanism.

***Effect on Vulnerable Households***

At the pre-construction stage, due to permanent, irreplaceable loss of land, the impact is considered as Medium-Low. But this impact may be mitigated by additional grant provision for the vulnerable households and establishing a grievance redress mechanism.

**E 6.2 Construction Phase**

During the construction phase, contamination of soil, sediment, and groundwater may result from potential leaks and spills of oil, lubricants, or fuel from heavy equipment, improper handling of sanitary effluent, or chemical/fuel storage, and sanitary and construction wastes. Also, soil compaction and erosion may take place during civil works at the project site, laying of pipelines, temporary jetty, and laydown areas.

Construction of the EZ will be carried out by the construction contractor appointed by SEZL. The construction contractor will handle, store and dispose of all waste following applicable GOB guidelines to prevent soil, sediment, and groundwater contamination.

### **E 6.2.1 Impacts on ambient Air Quality**

During the construction stage site preparation & leveling, excavation of soil, concreting works will conduct. Where different air pollutants will increase that are harmful to human and environmental health. Due to dust generation and exhaust emission, the impact is considered as Low impact. But it can be mitigated by the implementation of regular watering and regular maintenance of vehicles.

### **E 6.2.2 Noise Level**

The possible sources of noise in the construction period are equipment, machinery, and transportation. According to baseline noise level monitoring the level of noise is under the national standard that's why the impact of noise is considered as Low during the construction period. Some mitigation measures can reduce the impacts such as using well-maintained equipment and regular maintenance of vehicles & machinery.

### **E 6.2.3 Impact on Water Resource**

The potential sources of impact to surface water and groundwater resources within the Project area during the construction phase will be from earthworks, sewage from construction labor camps (if any), and run-off from inappropriately stored waste.

Based on construction stage activities, the level of impact on water resources from wastewater discharge is considered as Medium-Low. And the level of impact from groundwater contamination is considered as Low. But it is possible to mitigate the potential impacts on water resources during the construction period by designated vehicle servicing area, prevent oil spillage (using tray) adequate sanitary facility, and making awareness among the workers and employees.

### **E 6.2.4 Waste**

There is a Very-Low impact from waste during the construction period. Hazardous waste will be disposed of by licensed contractors and solid waste will be disposed of by maintaining GOB guidelines. Segregation of waste, disposed of in designated dumping site and apply to recycle procedure are the mitigation process of waste.

### **E 6.2.5 Soil and Sediment Quality**

During the construction stage, the movement of heavy vehicles and equipment will cause soil compaction. But a permanent assessment of the road in the project site is already under construction that's why the level of impact is considered as Low. The entire project area will be closed and compacted before monsoon season that prevents soil erosion that's why the impact of soil erosion is considered as Low. But there is a potentiality of soil and sediment contamination during the construction stage and considering all issues the level of impacts found Medium-Low. Some mitigation measures can be to reduce the potential impacts on soil and sediment quality by demarcating routes for movements of heavy vehicles, use of drip trays, continuous follow-up & monitoring, and ensuring unloading & loading protocols.

### **E 6.2.6 Impact on Biological Environment**

Considering all of the activities during the construction period the impact on terrestrial fauna (Birds) found Low, impact on aquatic fauna (Fishes) found Medium-Low, impact on aquatic fauna (Aquatic mammals) found Medium-Low respectively. However, impacts on the biological environment can be mitigated by reducing the noise level, minimize the secondary source of noise generation, constructing stormwater drains, collecting & reusing curing overflow and avoid excavation during rain.

### **E 6.2.7 Employment Generation**

Considering the potential for employment generation and skill enhancement, the significance of the impact on employment generation is considered Medium. But the impact can be reduced by enhancing local people's employment and grievance redress mechanism.

### **E 6.2.8 Safety and health risks**

There is a possibility of accidents and incidents during construction that's why the impact is considered as Medium. However, this impact can be mitigated by improving the sanitation system, building awareness, and safe working practices.

## **E 6.3 Operation Phase**

In the operation phase, different types of industries (for example Food and beverage, Textile industry, Fertilizer industry, etc.) will be installed in the economic zone which is likely to generate different type's impacts. Operation of the industries is likely to impact ambient air quality, ambient noise level, water quality, waste, working conditions, occupational health, and safety.

### **E 6.3.1 Impacts on ambient Air Quality**

Impacts on air quality include the generation of particulate material, NO<sub>x</sub>, SO<sub>x</sub>, CO, toxic emission. The impacts of different categories of industry on air quality are broadly described in Chapter 6. At this stage of the study, the number of industries, the process flow are yet to be finalized. During the operation period, various industries e.g. Food and beverage processing, Tanning/leather facilities, Textile manufacturing operations, Fertilizer Industries, and Plastic industries will hamper air quality and the level of impacts considered as Medium-Low. The potential mitigation measures to reduce impacts are capture & control fugitive emission, installation of the ventilation system, use of covered conveyor belts and indoor storage, enclosure of dust-producing equipment, and use of local exhaust ventilation, installation of fabric filters to prevent outdoor emissions, consider water-based formulations for spray dyeing and cover stockpiles, especially outdoors, etc.

### **E 6.3.2 Impact on Noise**

Due to the operational activity of the industry noise will be generated at the operation phase. The noise generating equipment, design of the structure is yet to be finalized for the project. Therefore, the cumulative impact cannot be assessed at this stage of the study. The overall impact on noise during the operation period is considered as Medium-Low. Regular maintenance of machinery, installing noise barriers, and continuous noise level monitoring can reduce the potential impact in this stage. However, it is recommended that, during the installation of factories, a separate Environmental Impact Assessment report will be prepared covering the cumulative impact of noise.

### **E 6.3.3 Water Quality**

During the operation period, the level of impact on surface water quality is considered as Medium-high and the impact on groundwater quality is considered as Low. The potential impacts on surface water can be mitigated by installing ETP, proper drainage, and continuous water quality monitoring. On the other hand, the impact on groundwater can be reduced by treating the effluents & sewage, periodical monitoring, and rainwater harvesting.

### **E 6.3.4 Waste**

The sources of waste generation in the operation period are office & canteen, CRTP-ETP-STP, laboratories, and industrial waste, etc. The potential impact from waste is considered as Medium-Low and the impact can be mitigated by originate less waste, reuse practices, segregate waste materials, and building awareness.

### **E 6.3.5 Soil Pollution**

Based on operational stage activities the impact on soil is considered as Low. But there is a possibility of mitigating the impact by installing ETP, use a common waste storage area, use a drip tray, segregate hazardous and nonhazardous waste, etc.

### **E 6.3.6 Sediment Quality**

Waste and waste materials may contaminate the sediment quality in the operational period. Considering all factors the level of impact on sediment quality found Medium-Low and that can be mitigated by treating the effluents & sewage, ensure proper disposal, and adopting best management practices to prevent any spillage of raw materials.

### **E 6.3.7 Topography and Geology**

The impact on topography and geology is negligible at the operation stage that's why the impact is considered as very-Low.

### **E 6.3.8 Working Conditions, Including Occupational Safety**

Accidents or incidents are expected to occur during the operation phase e.g. physical trouble, noise, vibration, lighting, electrical, heat, and cold, nuisance dust, fire/explosion, machine grinding, working space, chemical, gases, dust, fumes, vapors, liquids are the major hazards which are harmful to workers health. Considering this issue the impact on working conditions & occupational safety found as High. This impact can be mitigated by establishing Bangladesh labor Law, proper training, proper sanitary facility, provision of safe drinking water, etc.

### **E 6.3.9 Impact on Biological Environment**

Considering all of the activities at the operation stage the impact on aquatic fauna (Fishes) found Medium-Low, impact on aquatic fauna (Aquatic mammals) found Low respectively. To minimize the impact on the biological environment during the operation period, each industry should obtain ECC from DoE, Bangladesh, periodic monitoring, using drip tray, carefully handling of oil & diesel, and properly treating the wastewater.

### **E 6.3.10 Livelihood impacts**

Stakeholders will experience loss of livelihood sources mainly due to loss of shops/commercial enterprises and agricultural fields. But it can be mitigated by recruiting affected persons and their family members in the construction and operational jobs.

### **E 6.3.11 Green House Gas Emission**

Due to the establishment of different types of industries, direct and indirect sources of greenhouse gases will be increased in this area. Already Sirajganj Power Station (S1, S2, S3, and S4) is emitting CO<sub>2</sub> is in a good amount to the air. Industries in 289 acres of land will contribute to increasing the CO<sub>2</sub> emission in the air. As per the requirement of the Electricity and gases, the assumption on CO<sub>2</sub> emission is about 4212 ton/year for the construction period and 196 ton/day. In this stage for both construction and operation period, all the item of scope 1, 2 and 3 is not estimated yet. So, the calculation is based on the available data. During both the construction stage and operation stage reporting period, total scope 1, 2, and 3 will be calculated and reported.

## **E 6.4 Cumulative Environmental Impact**

### **E 6.4.1 Cumulative Impacts on Water Resources**

The cumulative impact on surface water was found as medium-low impact because of the proper water intake system and water treatment plant facility. On the other hand, the cumulative impacts on groundwater found as high impact because of the abstraction of groundwater for SEZ are high and surrounding water demand. But this impact can be mitigated by conduct a hydrological study before water extraction and need approval from WARPO.

### **E 6.4.2 Air Quality**

During the operation period emission from the existing power generation source and different factories in the Economic Zone would impact the ambient air quality. However, the cumulative impact on ambient air quality of the project area cannot be assessed because of sector-specific emission sources and various categories of industry. To find actual pollution levels for ambient air quality, its need to monitor a continuous basis during the construction and operation phase of the SEZ.

### **E 6.4.3 Noise**

During the construction and operational period, lots of noise will be generated from its construction activities and factories activities respectively. Different types of industry will make a different level of noise that's why cumulative noise level cannot be assessed. To find the actual pollution level for noise, it's required to continuously monitor during the construction and operation phase of the SEZ.

### **E 6.4.4 Labor Influx**

The majority of the workers (Skilled/nonskilled) will be hired from the local area during the construction stage. But during the operation stage, the required number of skilled manpower may not be locally available. In SEZ, both locals and outsiders will do their job together that's why there is a possibility of interaction of the local community with migrant workers. That's why considering all issues the severity of the impacts identified are expected to be medium-low.

Therefore, the cumulative impact cannot be predicted at the stage of the study. It is recommended that, during the installation of factories, a separate Environmental Impact Assessment report will be prepared covering the cumulative impact.

## **E 6.5 Alternative Site Analysis**

BEZA initially handover the land for the proposed SEZ to SEZL authority by acquiring through DC and AC Land. As per the record, the land is Khas land and as a result, initially, a grant has been given to the project-affected people for their displacement. Due to land scarcity in the country, seeking an alternative site for establishing the economic zone area is quite difficult. In addition, land acquisition is a lengthy and complex procedure under the existing Land Acquisition Law of Bangladesh (LA Ordinance 1982). Therefore, no alternative site analysis was considered for this project.

## E.7. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

In the impact assessment part, mitigation measures have already been discussed to mitigate the possible impact. In the main report of the Environmental and Social Management Plan part, many mitigation measures are suggested for the preconstruction, construction, and operation phase. In the operation phase, project category-wise mitigation measures have been suggested. So, all the mitigation measures are needed to be followed strictly by the SEZL authority to minimize the impact in the pre-construction, construction, and operation stage.

There is a separate part in annexure as Annex H as an Environmental and Social Action Plan for the gaps which are required but currently not available. This part also needs to be followed by the Contractor during the construction and operation stage.

## E.8. PUBLIC CONSULTATION AND DISCLOSURE AND GRIEVANCE REDRESS

Public consultation & disclosure process is conducted for any project to intimate the community about the project, its activities, and associated benefits, impacts, risks, etc. so that people can participate in the project activities in an informed manner and can raise their concerns to be addressed.

A good consultation process effectively manages public apprehensions, identifies control measures for these apprehensions in association with the public stakeholder, and facilitates in implementation of the identified measures.

### E 8.1 Approach to Consultation and Disclosure

The public consultation and disclosure process takes place at different project stages and has varying needs and objectives. The approach undertaken for information disclosure and consultation at the draft ESIA stage involved the following key processes.

- Mapping and Identification of key stakeholders such as primary and secondary and prioritizing them according to their influence;
- Conducting expert consultations, interviews, and focused group discussions (FGD);
- Assessing the influence and impact of the project on these stakeholder groups and vice versa;
- Summing up of key findings and observations from the consultations; and
- Preparing a future disclosure and consultation plan considering the project lifecycle phases and their implications on the stakeholder.

## **E 8.2 Disclosure and Consultation**

A number of consultation exercises were conducted during this phase of ESIA preparation. The stakeholders consulted include local People, the community in the vicinity of the project area, local elected representatives, and other external stakeholders such as government officials. In that meeting, the Participant pointed out different potential environmental and social issues.

### **E 8.2.1 1st Public Consultation Meeting:**

The first public consultation meeting was held on 1<sup>st</sup> August 2019 at the Hall Room of Rajapur Union Parishad, Rajapur, Belkuchi, Sirajganj, which is adjacent to the project site. Before the notice, the project proponent prepared the invitation letter together with the notice of the meeting in Bengali language and announced to the invitees, who are villagers in Rajapur Union and relevant governmental organizations, non-governmental organizations (NGOs), community-based organizations (CBOs), and anyone who are interested. Information on the meeting was announced to the invitees 3 days in advance before the meeting by sending invitation letters to the respective invitees.

### **E 8.2.2 2nd Public Consultation Meeting:**

The 2<sup>nd</sup> Public Consultation Meeting was held on 29 August 2019 at the Manab Mukti Academy School located at Khash Baro Shimul, Bango Bondhu Bridge West sub, Saidabad Union, Sirajganj, which is located about 0.5 km away from the project site. The meeting commenced at noon and was presided by Mr. Md. Abdul Aziz Mondol, Union Parishad Member, Saidabad Union, Sirajganj Sadar Upazila, Sirajganj.

### **E 8.2.3 3rd Public Consultation Meeting**

The 3<sup>rd</sup> Public Consultation Meeting was held on 28 September 2019 at Jamunabali Govt. Primary School located at Khash Baro Shimul, Saidabad Union, Sirajganj. The project proponent published the advance newspaper notice on 26 September 2019 in one daily local newspaper named “The Daily Jamuna Probaho” for organizing the Public Consultation Meeting. The meeting was attended by more than 150 people.

In that meeting, the Participant pointed out different potential environmental and social issues. However, the answer and policy of countermeasures were also elaborately discussed in the meeting. In general, local people showed a positive attitude toward the project.

## E.9. GRIEVANCE REDRESSAL

The project is currently in the process of finalizing the key contracts including those for engineering procurement and construction with the selected contractor. The SEZ (PCO) will be formed in due course after the receipt of any grievances related to the project, from the formation of the PCO to commencement of construction, which can be directly addressed to the Commercial Head, of the PCO. After the commencement of construction, the PCO will duly form a Grievance Redress Cell (GRC). The possibility of including an external member nominated by the local District Administration to be part of the GRC will also be explored. The nominated member may be an elected member from the Union Parishad or a senior administrative officer of the district. In the interim period, any grievances may be addressed to:

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**Designation:** Head of Finance and accounts

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## E.10. CONCLUSIONS AND RECOMMENDATIONS

### E 10.1 Introduction

Bangladesh Economic Zones Authority (BEZA) has been emerged by the Bangladesh Economic Zones Act, 2010; The Bangladesh Economic Zones Authority (BEZA) was officially instituted by the Government on 9<sup>th</sup> November 2010. BEZA aims to establish economic zones in all potential areas in Bangladesh including backward and underdeveloped regions to encourage rapid economic development through increase and diversification of industry, employment, production, and export. Sirajganj Economic Zone Limited has formed a vision of such investment for countries' development.

So, for starting the development work of the economic zone for further investment, a detailed Environmental Impact Assessment has been already studied which has been approved already by the DoE. Now SEZL is looking for funding from national and international lenders. All the operations related to projects should be carried out in an environmentally responsible manner that complies with all local environment legal obligations and appropriate World Bank guidelines. In this regard, the developments in the SEZL project should conform to the World Bank's Performance Standards for Private Sector Activities (OP 4.03). As part of the World Bank funding guidelines, an Environmental and Social Impact Assessment (ESIA) should be carried out to address the environmental and social issues of the project following operational procedures, policies, guidelines, and standards set by the World Bank. So as per the ToR provided by IDCOL and following the World Bank Group guidelines, this ESIA has been studied.

## E 10.2 Conclusions

The proposed private Economic Zone is envisaged to build up in a greenfield area by the project proponents. The site is located at Saidabad union under Sirajganj Sadar Upazila and Rajapur union under Belkuchi Upazila of Sirajganj district. The area is just located beside the national highway of N4. The total land of Sirajganj Economic Zone (SEZ) is approximately 415 acres for 1<sup>st</sup> phase. Upon completion, SEZ is envisaged to create approximately 50,000 jobs when fully occupied by investors. The area is divided into four blocks for setting up the industries comprises 289 acres out of 415 acres of land. These 289 acres of land will be used to attract both national and foreign investment and then the plot will be allocated to the proponents based on the revised master plan before the construction period. The following sections provide a summary of the findings of the ESIA study and recommendations.

### *General Issues and Categorization*

As a part of the build-up process, the pre-construction phase involved the dredge-filling of 415 acres of lowlands of SEZL. This filling operation will create a negligible impact on the physical environment (like air, water, noise, soil, and sediment, etc.) and the area will be settled down to a new ambient condition. The nature of proposed industries and their environmental impact can't be specified with certainty at present. Though there are some proposed industries which impact has been considered medium-low to low with some specific mitigation measures. However, based on statistical considerations, the impacts are likely to be similar; as no industries on the negative list in the ESPP document will be allowed in the zone. Detailed analysis of impacts/risk in this document shows that impact significance is identified from medium-low to low, on all environmental and social issues. Thus, as per the sub-project of IPFF II, it has been classified as medium risk (i.e., Category-B) sub-project. Based on the categorization of the World Bank Group, the project also triggered all the performance standards except biodiversity, indigenous people, and cultural heritage-related performance standards. But as per overall consideration and based on the applicable mitigation measures, the project will be considered as Category B Projects as per World Bank group guidelines.

### *Construction of Project*

The construction phase of the project involved three steps which are pre-construction, construction, and operation stage. During the pre-construction stage, normally the land will be developed by dredging sand from the Jamuna River and also by clearing up the existing structures and flora. In the construction stage, both on-site and off-site facilities will be developed. The basic infrastructure includes internal roads, stormwater drainage system, water supply from deep wells or surface water through water supply pipeline, wastewater-related treatment plant. Also, gate/security guards booth, administration building, access roads, commercial development also will take place during the construction stage. Besides some off-site facilities like external road connections, gas pipelines, transmission lines, etc. also will be taken place during the construction phase. In the operation period, different kind of industries will run their operation in the SEZ premises. Proposed additional measures are expected to be sufficient to deal with the impacts during the total construction period of the EZ.

## ***Environmental and Social Baseline***

### **Physical Environment**

The project site is located at Sirajganj lies in the Rajshahi Division of Bangladesh which falls under a stable Precambrian platform and is characterized by limited to the moderate thickness of sedimentary rocks above a Precambrian igneous and metamorphic basement. The project site is located is just beside the Jamuna River. Contour maps derived from DEM show that the topography of the Project AOI is predominantly flat terrain with depressions in the Jamuna River section. The land use/land cover of the AOI consists mainly of agricultural land (41.66%), Sand bar (18.35%), settlement with homestead plantation (14.21%). The site is flat agricultural land and submerged in the rainy season. A channel of Jamuna is flowing within the area. The channel has been using for the transportation of agricultural products and fertilizers by small boats in the monsoon season. In winter, it is normally dry. Both surface and groundwater quality was found within the standard except for some parameters. The air quality of the proposed project area was recorded within the National Ambient Air Quality Standard (NAAQS) of Bangladesh except for the PM<sub>2.5</sub> and SPM value at AQ4. On the contrary, values of air quality parameters of almost all the locations were recorded higher than the permitted limit as prescribed in the WBG EHS Guideline (2007). The noise level was also found within the acceptable limit except the daytime noise level except NL1 and NL4 area. From the climatic point of view, April is the warmest month and the January is the coolest. Winds are generally moderate during non-monsoon season whereas, during the monsoon, it is moderate to strong.

### **Biological Environment**

The key habitats that support “Natural Habitat” determination by analyzing IFC, are char land used by different birds for forage, roost, and staging. The riverine and adjoin waterbodies support a good number of species for longitudinal migration and spawning as connected with international water bodies. This whole waterbody area partially overlaps IBA’s according to Birdlife international. No Ecologically sensitive (ECA, PA, etc.) area is fallen within the project AOI.

### **Social**

Baseline survey result has found about a total number of 521 populations are living within the 106 households out of 439 households, whereas about 52% are male and rest 48% are female. The average family size is 4.9. On the other hand, the 1-70+ age range has been formulated to capture the age distribution of the studied population. Importantly around 64.1% population belongs to the 14-69 age range which signifies that most of the populations are eligible for being active in economic activities. Contrary, only 35.9% population is found dependent. Additionally, 50.5% population is married. All over health status among the households has been found quite well. Around 96.9% populations are found physically normal and only 0.6% is found handicapped by birth and 2.5% is in acute health problem. The study area is found Muslim dominated where surveyed households were found all are Muslims.

### *Identification of Impacts*

Impacts have been analyzed based on the different stages of the project namely pre-construction, construction, and operation stage. From the physical environmental part, the items are most common in all the stages. These are ambient air, ambient noise, water, soil and sediment, all kind of wastes, and others. In the pre-construction stage, the impact on the physical environment is comparatively low than the construction and operation stage as the activities are mostly limited with site development. During the construction stage, except for wastewater, the rest of the items are considered as low impact. Wastewater is considered as the medium-low in terms of impact significance. For the operation period, most of the items are considered as medium-low in terms of impact significance. Specific mitigation measures have been proposed in the mitigation plan to avoid such impacts.

For the biological part, we can conclude that the area supports diversified biodiversity but the dominance of threatened species is minor. So, to maintain the natural habitat and sustainable biodiversity, there is no alternative to follow the proper management and monitoring plan for every stage of the project.

In terms of the social part, the most impact will occur in the pre-construction stage as the land development and clearing of existing structures and the biological component will be held in this stage. The affected people will be shifted to their new resettlement area, as a result, these people will lose their existing livelihood, there will be a restriction to access the existing site. In the construction phase, both positive and negative impacts will be there. Due to construction activity, many local people will get employment opportunities. Due to both direct and indirect impact, new entrepreneurship will be grown up based on the construction activity. But as in the pre-construction phase, in this stage also there will be a restriction on local access to the project site surroundings. In the operation stage, the impact will be negligible as there will be minimal social issues rather than the pre-construction and construction stage.

### *Cumulative Impacts*

This ESIA study finds that most of the adverse impacts resulting from the project during the construction and operation phase would be medium-low to medium-high. However, these impacts could further be minimized if appropriate mitigation measures are taken. However, the cumulative impact of including the tenant industries may be significant in the future. The main impact is considered on the water resources, air quality, noise level, and the labor influx.

### ***Environmental and Social Management Plan***

An Environmental and Social Management Plan (ESMP), including monitoring requirements, has been developed to ensure the implementation of the “mitigation measures” identified in the environmental assessment. Proper mitigation measures, as suggested in the ESMP, should be followed to reduce such adverse impacts to the extent possible. Accordingly, the ESMP has provided suggestions on tree plantation, wetland and surface water body preservation, and green area delineation which should be ensured by the proponent. On the other hand, some positive impacts of the Project such as an increase in job opportunities (approximately 50000) and improvement of social infrastructure are also expected. The project would bring about socio-economic benefits during its operational phase through the improvement of resilient building construction, risk reduction, disaster preparedness, and trained personnel in the entire country. In consideration of the result of the ESIA study for the Project, the Environmental and Social Management Plans (ESMPs) including adequate mitigation measures to reduce the negative impacts and Environmental Monitoring Plan (EMoP) are proposed for this Project: pre-construction phase, construction phase, and operation phase. It was also confirmed that the environmental, social, and health impacts of the Project were assessed and the Environmental and Social Management Plan was formulated properly.

### ***Public Participation and Community Concern***

In the process of ESIA, the opportunity for public involvement was ensured and comments from the public were reflected in the final ESIA Report. Affected persons, local community, and relevant stakeholders including both govt. and private sector representatives irrespective of gender participated in this Public Consultation Meeting. During the operational phase, the project is likely to bring about significant benefits for the nation. Social issues are likely to play an important role during the construction as well as operational phases. The project activities are likely to generate opportunities for significant employment. Relationship between the community and the project personnel regarding safety and security through a participatory program. The local people residing near the boundary of the economic zone have expressed concern regarding the resettlement issue and also other environmental issues due to the construction and operation stage of the project. Mitigation of such issues should be addressed at the earliest to assuage the concerns of the local people. As mentioned earlier, the operational phase of SEZL requires the withdrawal of a significant volume of groundwater with the existing Sirajganj Power Plant which in consequence may create a shortage of drinking water in the adjacent area during the winter season. So, continuous monitoring of the water table has been suggested to realize the impacts on groundwater resources due to the project. It has also been recommended to adopt measures for increasing groundwater recharge to compensate for the impact. Also, RAP needs to be implemented accordingly to resolve the concern of the local people.

### ***Grievance Redress Mechanism***

A Grievance Redress Mechanism has been proposed with due procedures; through which aggrieved parties may launch complaints during both the pre-construction, construction, and operational phase, which will be addressed by a committee upon formal hearing and investigation.

### ***Compliance with PSs and Management Plan***

The Project will make its best effort to minimize the environmental and social impacts unavoidably associated with the Project; during its entire life cycle by implementing suggested mitigation measures and management plans as described in this ESIA to ensure compliance with the requirement of the World Bank PS and EHS guidelines. Provision for indicative budget resources has been recommended for the purpose. SEZ will ensure that the project conforms to all the legal, regulatory, and policy objectives and also ensure that all the necessary permits are obtained and renewed from time to time as necessary.

### ***Disclosure***

The ESIA document will have been disclosed on the SEZL website and also been posted on the website of the Bangladesh Bank. Finally, it is expected that all necessary information/ evidence contained in this report are enough to meet all requirements for the operation of the SEZL's facilities the following WB OP4.03 and applicable WBG guidelines and standards.

## **10.3 Recommendations**

Thus, the ESIA was completed following the requirements of the ESIA Procedure properly in case the project proponent will follow EMP accordingly. Recommendations made for the project development based on ESIA study are given below:

- Branch of Jamuna River should be retained in its natural position;
- The proposed Environment & social management plan should be implemented strictly both during the pre-construction, construction, and operation phase of the project;
- Suggestions & requests made by the public for employment shall be taken into consideration;
- Proper training of maintaining the environment, health, and safety should be given to the Project management unit in both constructions and operation phase;
- Provision of CETP, WTP, Drainage system, Retention pond, and green belt need to be implemented;
- Rainwater harvesting should be carried out to reduce the pressure on the surface and groundwater resources as per the EIA and feasibility report.;
- Construction activities for proposed off-site development should only be started by following the condition of the environment clearance certificate from DoE, Bangladesh;
- Environmental monitoring should be conducted as proposed in the environment and social management plan;

- A separate Environment impact assessment study needs to be carried out for individual industries where applicable as per the ECR,1997.