PWCPL

Support to Capacity Building of Bangladesh Economic Zones Authority Project (under Private Sector Development Support Project)

Bangladesh Economic Zones Authority

March 16, 2019

Strictly Private and Confidential

Final Report

Proposed Economic Zone at Gopalgonj, Bangladesh

pwc

March 16, 2019

To
Mr. SM Nurul Alam
Project Director (Joint Secretary),
Support to Capacity Building of Bangladesh Economic Zones Authority
Bangladesh Economic Zones Authority

Sub: Support to Capacity Building of Bangladesh Economic Zones Authority Project (under Private Sector Development Support Project) - Pre Feasibility Study of Moheshkhali EZ, Feni Economic Zone, Shariatpur Economic Zone (Jajira), Gopalgonj Economic Zone-2, and Jessore-2 Economic Zone

Dear Sir,

Greetings from PricewaterhouseCoopers Private Limited.

Through this letter, we are glad to submit the revised Final Report for the proposed Economic Zone at Gopalganj, Bangladesh. We have attempted to capture all sections mandated as per the agreed Terms of Reference for this project. This report also takes into cognizance the suggestions/ observations discussed with your good office and the World Bank.

We trust you find the report in order.

For any clarifications, please feel free to contact us.

Thank you..

Yours sincerely,

Manish R Sharma
Team Leader
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Gurgaon – 122002, India

Encl: Final Report

Disclaimer

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List of Abbreviations

Abbreviation	Full Form
ADB	Asian Development Bank
AMSL	Average Mean Sea Level
API	Active Pharmaceutical Ingredients
AQ	Air Quality
ASEAN	Association of South East Asian Nations
BBIN	Bangladesh Bhutan India Nepal
BBS	Bangladesh Bureau of Statistics
BDT	Bangladesh Taka
BEPZA	Bangladesh Export Processing Zone Authority
BEZA	Bangladesh Economic Zone Authority
BIDA	Bangladesh Investment Development Authority
BIWTA	Bangladesh Inland Water Transportation Authority
BMD	Bangladesh Meteorological Department
BOD	Biological Oxygen Demand
BOI	Board of Investment
BRRI	Bangladesh Rice Research Institute
BTCL	Bangladesh Telecom Company Limited
CAGR	Compound Annual Growth Rate
CBR	California Bearing Ratio
CETP	Central Effluent Treatment Plant
CMP	Current Market Price
CPA	Chittagong Port Authority
CUL	Cash Compensation under Law
CWTP	Central Water Treatment Plant
Db(A)	Audible Decible
DoE	Department of Environment
DPHE	Department of Public Health and Engineering
ECA	Environment Conservation Act
ECC	Environment Clearance Certificate
ECR	Environment Conservation Rules
EIA	Environment Impact Assessment
ELSR	Elevated Level Service Reservior
EMP	Environmental Management Plan
EPZ	Export Processing Zone
ETP	Effluent Treatment Plant
EXIM	Export Import
EZ	Economic Zone

Abbreviation	Full Form
F&B	Food & Beverages
FDI	Foreign Direct Investment
FMCG	Fast Moving Consumer Goods
FY	Financial Year
G2G	Government to Government
GDP	Gross Domestic Product
GIS	Geographic Information System
GoB	Government of Bangladesh
GTCL	Gas Transmission Company Limited
HDPE	High Density Polyethylene
HSIA	Hazrat Shah Jalal International Airport
HFL	Highest Flood Level
HT	High Tension
H&S	Health & Safety
ICT	Information and Communication Technology
ISA	Initial Site Assessment
ITC	International Trade Centre
JICA	Japan International Cooperation Agency
JV	Joint Venture
KEI	Knowledge Economic Index
KLD	Kilo Liter Per Day
KVA/MVA	Kilo Volt Ampere / Mega Volt Ampere
KwH	Kilo Watt Hour
LDC	Least Developed Countries
MACE	Mahindra Consulting Engineers Limited
MBR	Membrane Bio Reactor
MSA	Million Standard Axles
MSL	Mean Sea Level
MLD	Million Liters per day
MRSS	Main Receiving Sub-Station
MNCs	Multi-National Companies
MSW	Municipal Solid Waste
MT	Metric Tonne
MVA	Mega Volt Ampere
MW	Mega Watt
NAS	National Accounts Statistics
NOx	Oxides of Nitrogen
OSSC	One Stop Service Centre
POL	Petroleum Oil & Lubricant
PM_{10}	Particulate Matter less than 10 micron size

Abbreviation	Full Form
$PM_{2.5}$	Particulate matter less than 2.5 micron size
PPP	Public Private Partnership
PPP	Purchasing Power of Parity
PUC	Pollution Under Control Certificate
PwC	PricewaterhouseCoopers Private Limited
QA	Quality Assessment
QC	Quality Control
QIIP	Quantum Index of Industrial Production
QIIP	Quantum Index of Industrial Production
RCC	Reinforced Cement Concrete
REB	Rural Electricity Board
RMG	Ready Made Garments
R&D	Research & Development
SBR	Sequencing Batch Reactor
SEZ	Special Economic Zone
SITC	Standard International Trade Classification
SME	Small & Medium Enterprises
SMI	Survey of Manufacturing Industries
SPM	Suspended Particulate Matter
STP	Sewage Treatment Plant
SWM	Solid Waste Management
TBT	Tributyltin
TDS	Total Dissolved Solids
TEU	Twenty Foot Equivalent
ToR	Terms of Reference
TPD	Tonnes Per Day
TVET	Technical and Vocational Education and Training
UDC	Union Digital Centre
UNCTAD	United Nations Conference on Trade & Development
UNO	Upazila Nirbahi Officer
USD	United States Dollar
VAT	Value Added Tax
VFD	Variable Frequency Drive
VOC	Volatile Organic Compounds
WB	World Bank
$\mu g/m^3$	microgram per cubic meter

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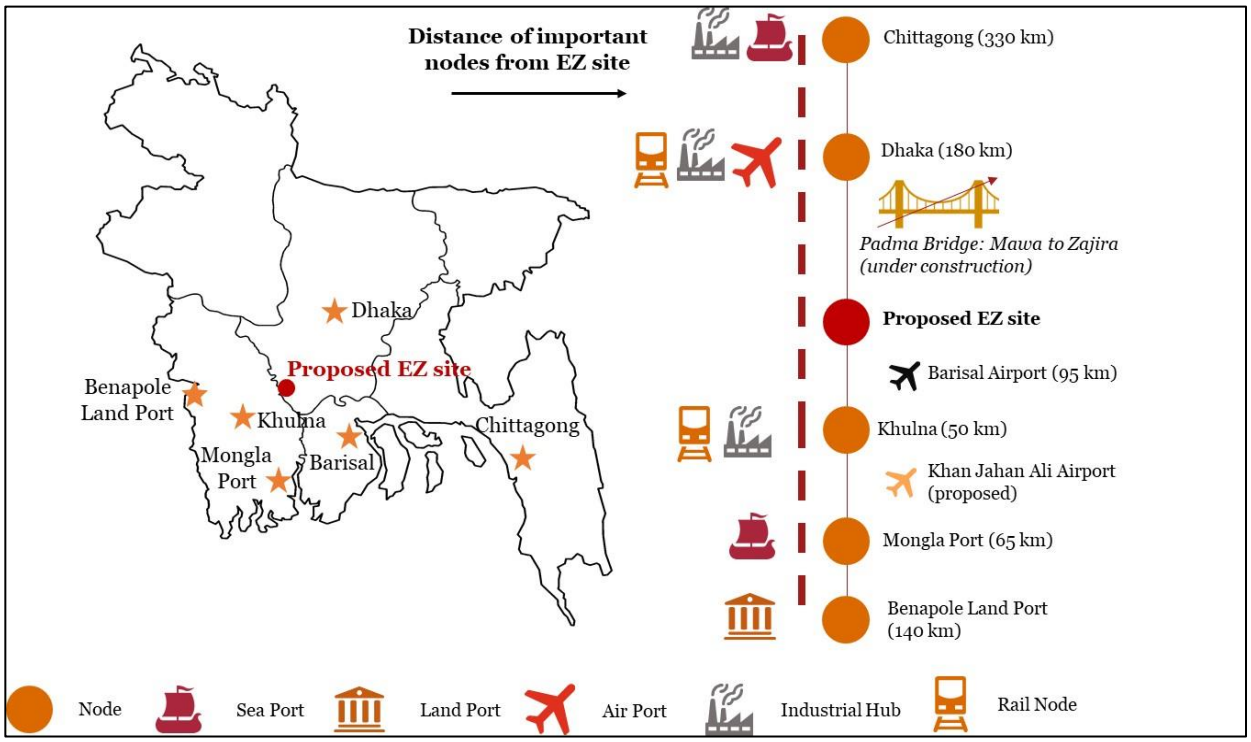
1. Executive Summary

Changing global dynamics depict the tremendous growth prospect in Bangladesh and how this country is shaping up as an attractive investment destination. Country's specialisation in Readymade Garments (RMG) sector is a success story for which Bangladesh has been able to effectively leverage its demographic dividend. However, the country has been over dependent on this sector and is not being able to diversify its export basket. Government of Bangladesh (GoB) envisages that organized industrialization in the country will be able to improve the country's competitiveness thereby attracting more investments from global manufacturers across different sectors. The advent of the EZ model is expected to foster organized industrialization in the country with an impetus to manufacturing, which in turn shall promote investment inflow and employment generation. This is expected to increase contribution from other sectors to the export basket of Bangaldesh.

GoB has adopted a proactive approach to promulgate investment within the country and foster organized industrialization. In tandem with this initiative, economic zone (EZ) regime ushered in, and Bangladesh Economic Zones Authority (BEZA) was conceptualized. BEZA is the nodal agency mandated for economic zone development in the country. BEZA in support with World Bank is implementing Private Sector Development Support Project (PSDSP) to upkeep pilot EZ projects under the new EZ regime.

As part of this endeavour, BEZA and the World Bank intend to undertake pre-feasibility studies of five economic zone locations spread across the country. This report captures pre-feasibility assessment of economic zone located at Gopalgonj.

Figure 1: Location of the proposed EZ site



Proposed EZ is spread over an area of 200 acres and it is located in Gopalgonj Sadar Upazila, Gopalgonj district of Dhaka division. Economy of Gopalgonj district is primarily agriculture based with about 60.93% of total land is under agricultural cultivation. Industries in this district are dependent on agricultural produces; industrial landscape in this district comprises cottage industry, fish processing, rice mill, saw mill, wheat mill, oil mill, wooden furniture etc. Gopalgonj district, by virtue of its location, has access to major trade and industrial nodes located in south-western part of the country.

Location of the site in between Benapole Port (land port with India) and Dhaka makes it a suitable stopover point for processing of goods coming in from India and going towards Dhaka or vice versa.

The EZ site is located favourably between the regional highway, R850 (Gopalgonj town road) and National Highway, N805 (Dhaka-Khulna highway). Proximity to highways could foster good last mile connectivity for the site and enable smooth movement of heavy vehicles. These roads also provide connectivity to industrial towns of Khulna, Jessore and Mongla. Once Padma Bridge becomes operational, direct road connectivity to Dhaka would also be established.

Benapole Land Port (the busiest land port of Bangladesh) is located around 140 km away from the EZ site. This land port is also well connected with the EZ site through road network. Currently this land port experiences congestion and frequent delays in clearance of goods due to limited mechanization of goods handling facility and outdated data management system. However, works are underway to install equipment for mechanizing cargo handling. In addition, a pilot project has been undertaken to implement digitalization of records for improving data entry and record maintenance. These projects would enhance the efficiency of Benapole Land Port. Other land ports in close proximity to this site include Darshana (~170 km) and Bhomra (~118 km) land ports.

The site also has access to river based ferry ghats like Shekirhat ferry ghat, Vatpara ferry ghat, Khulna ferry terminal and Barisal ferry terminal in vicinity of the EZ site. These ferry ghats could be accessed to transport goods and raw material through Inland Water Transportation. However, these ghats are currently not mechanized and are equipped to handle movement of only light and medium cargo or transportation of vehicles. **Possibility of upgrading these ghats** could be explored in order to leverage Bangladesh's extensive riverine network and transport goods across the country and even to India, which has an existing Protocol on Inland water transit and trade with Bangladesh. Moreover, **a river based jetty could also be set up on Madhumoti River** in order to boost inland waterway based transport of goods to/from the proposed EZ site. Madhumoti River flows parallel to the western boundary of the EZ site at about 700 m distance and forms a part of Bangladesh's riverine network.

Mongla Sea Port is located at a distance of 65 km from the subject site. This port can be accessed for developing foreign trade relationships (through sea port) with buyers and sellers of goods in other countries. Currently, this port has a draft of 4.9 – 6.1 metres which hinders large sea faring vessels from reaching the port directly. However, GoB is undertaking dredging exercises near this port to increase its draft and cater larger vessels. Infrastructure development projects such as construction of Khulna-Mongla railway line and improving road connectivity to the port are already in progress to boost cargo traffic at this port.

Nearest international airport to the EZ site is Hazrat Shah Jalal International Airport (HSIA) located at a distance of 180 km from the EZ site. Currently there is no direct road connectivity till the airport and a ferry needs to be availed to cross Padma River and reach HSIA airport. However, post operationalization of Padma River Bridge, direct road connectivity would be established to this airport. GoB is also in the process of developing a green field international airport in Bagerhat at a distance of around 45 km from the EZ site. It is envisaged that this airport could be functional within the next 5 – 10 years. This airport would be better placed for catering to air transport requirements of stakeholders in the proposed EZ. Barisal airport located at around 70 km from EZ site is the nearest domestic airport.

Nearest available rail head is at Gopalgonj (at a distance of 3 km from the EZ site). This rail node connects the proposed EZ to other parts of the country such as Khulna, Mongla, Benapole land port, Dhaka, and Chittagong. **Developing cargo handling facility at this station** would ease transport of goods to/from the EZ site through rail transport. Khulna station is the nearest major railway station at a distance of 50 km from the site having cargo handling facility.

The EZ site is ideally located with respect to access to multiple modes of transportation which would support movement of men and material to/from the site location. Moreover, upcoming projects like Padma Bridge and Bagerhat airport would provide a fillip to transport network in the region.

Site assessment indicates that proposed EZ has access to multiple sources for extracting power and potential to develop water supply. Gas network is not available at present, but is expected to be constructed in the future. Basic social infrastructure is available in this region for unskilled and semi-skilled labour. However, this region lacks in term of quality social infrastructure (residential, and academic facilities suitable for expats, executives and skilled human resources), which is available in Khulna. Provisions have been made in the master plan to include adequate social infrastructure facilities that could serve the needs of skilled personnel and expats working in the proposed EZ.

In line with the identified transport infrastructure, access to utility and prevailing economy in the region of the proposed EZ, a framework of industry assessment has been formulated.

This framework takes into cognizance availability of factors of production (logistics, utility and manpower), agricultural & natural resources, and possible industrial linkages in site surrounding context. Based on the regional landscape and site intrinsic features, suitability of various industrial sectors have been assessed. Desk based study in synthesis with stakeholder consultations with domestic and foreign manufacturers indicate that the economy of Gopalgonj district and the surrounding region is predominantly agriculture dependent which might act as steady source of raw material towards establishment of food & beverage and agro based sector. Rising rural demand for electronic goods and location of industrial belts in the surrounding (Khulna, Jessore and Barisal) will be ideal for setting up of industries like Electrical and Electronics and Light Machinery, Equipment and Furniture. Basis this hypothesis, the following industrial sectors emerged out as the potential industrial mix for the proposed EZ:

- **Food & Beverages**
- **Agro Based Products**
- **Electrical and Electronics**
- **Light Machinery, Equipment and Furniture**

Based on the above mentioned industrial mix, land demand forecasting using statistical projection techniques have been undertaken. Three scenarios have been considered viz. aggressive, base, and conservative. Assumptions related to industrial growth rates and investment inflow to the subject site have been varied as per the three scenarios elaborated below.

Base case assumes business as usual situation, where macro-economic parameters are indicating steady trend; industrial growth rates and investment inflow are denoting status quo situation. For aggressive case, it has been assumed that the macro-economic situation is showing an increasing pattern and higher investment inflow is envisaged. **Conservative case** assumes pessimistic situation, where macro-economic situations reflecting downward trend and investment inflow is reducing. Base case assumes as-is commencement of proposed infrastructure projects in this region, where as conservative case considers delay in commencement of infrastructure projects. **Aggressive case** considers infrastructure developments commencing prior to plan.

Demand forecasting projections indicate the following rate of industrial land uptake within the proposed EZ site.

Table 1: Industrial land uptake projections

Scenarios	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030 onwards
Conservative	15%	21%	29%	29%	47%	66%	79%	83%	90%	100%
Base	22%	37%	55%	63%	94%	100%	100%	100%	100%	100%
Aggressive	31%	56%	85%	100%	100%	100%	100%	100%	100%	100%

Demand projection outlines that in conservative case, complete industrial space uptake would take place in 10 years. For base and aggressive cases, the same would be spread over 6 years and 4 years respectively.

For purpose of demand forecasting, around 65% of the EZ site has been allocated for industrial purpose after taking into consideration development guidelines of BEZA and similar developments globally.

Demand forecasting suggests that power requirement could be around 22.4 MVA and water requirement could be around 7.3 MLD for this EZ. Projection indicates that the proposed EZ may generate direct employment for approximately 8,000 to 9,000 skilled and unskilled workers.

Master Plan, Off-site Infrastructure plan, and On-site infrastructure plan have been prepared for the EZ site in line with the industries proposed to be established within the EZ site, conceptual demand forecasting, and prevalent best industry practices. Off-site infrastructure takes into consideration providing the external basic infrastructure facilities (such as power supply, water supply, and access road) to the doorstep of the site. Development of off-site infrastructure is the responsibility of BEZA. On-site infrastructure considers internal infrastructure components (such as internal road network, power substation, water conveyance system, effluent treatement facilities). Development of on-site infrastructure is the responsibility of the private developer.

The Master Plan has envisaged allocating around 72% of total land area as saleable (industrial land, commercial land, logistics zone and real estate).

There are 133 plots earmarked in the proposed master plan for different usage out of which 1 plot for Utilities, 4 for amenities, 4 for supporting facilities and balance 124 plots are demarcated for industrial use.

The project is planned to be developed over 2 phases with each phase having construction timeline of 2 years. In phase I – 98.31 acres will be developed, in phase II – 101.69 acres will be developed.

To enable a smooth movement of vehicular traffic with the EZ site and to avoid traffic congestion, two entry/exit points have been proposed from the eastern boundary of EZ site till Gopalgonj – Khulna Highway.

The proposed Master Plan has segregated the site into 4 zones viz. Industrial Zone, Logistics Zone, multi-facility complex, amenities & utilities, green spaces & walkways.

For master planning purpose, entire processing area has been considered as a single industrial zone having varied plot sizes. However, this zoning plan is indicative in nature and may vary based on on-ground implementation of the project. The developer may undertake a separate industry assessment and master planning exercise in order to validate the same.

Further to developing the best practice Master Plan, infrastructure plan has been developed for the EZ site in Gopalgonj including the following –

Site filling – The average natural ground level for the proposed EZ is +4 m level. To avoid inundation during monsoon season, the land filling of +2 m above the existing natural ground level has been recommended.

Road – The total length of the internal road network planned within EZ is 5,317 m. This comprises arterial (30 m) and primary (25 m) types of road network. Internal road network provides access to the industrial plots apart from providing access to areas having support amenities.

Power – Our assessment suggests that basis industrial assessment and demand forecasting for the proposed EZ, power demand for the proposed EZ would be about 22.4 MVA. This figure is indicative in nature and may vary based on on-ground implementation of the project. The private developer may undertake a separate industry assessment and master planning exercise in order to validate this figure. To cater to the above mentioned power requirements a main receiving substation of 132 /33/11 kV substation might be established on the site. Power to this substation can be availed from the existing 33 kV substation at Tungipara substation at a distance of 6 km from the EZ site.

Water – Infrastructure assessment suggests that basis industrial assessment and demand forecasting for the proposed EZ, potable water demand calculated for the proposed EZ would be about 6.3 MLD (this includes basic water demand for industries which is 4.5 MLD) and total water demand would be 7.3 MLD. This figure is indicative in nature and may vary based on on-ground implementation of the project. The private developer may undertake a separate industry assessment and master planning exercise in order to validate this figure. In order to meet the above mentioned water requirements, Madhumoti River (in close proximity to this EZ), which is a

perennial fresh water source could be tapped to meet the water requirements of the EZ site. Provision to establish infiltration gallery/well, collection well and pump house near the river basin at an approximate distance of 700 m from the site to supply water to EZ has been proposed. In order to prevent the storm water entering from adjacent areas to the development area, a cut-off drain all along the periphery of the site has been considered, this drain would be connected to the agricultural lands in the north side of the site and River Madhumoti to the west side of the site

Sewer System – Total sewage estimation of proposed EZ site is 5.1 MLD. Sewage Treatment Plant is proposed within the EZ site to treat the sewage water.

Storm Water Drain – In order to prevent the storm water entering from adjacent areas to the development area, a cut-off drain all along the periphery of the site is considered and connected to the agricultural lands in the north side of the site and River Madhumoti in the west side of the site. It has been planned to discharge the flow of the internal drain into nearby River Madhumoti.

Solid Waste Management – The estimated total solid waste quantity for the proposed EZ is about 22.4 TPD.

Master plan and proposed infrastructure interventions in the proposed EZ necessitate the need for a social and environmental review to assess the impact arising from the development initiatives.

Social Review suggests that current use of the site area is predominantly agricultural with both single and double crop cultivation taking place. **Out of the 200 acres of area identified by BEZA for setting up of this EZ, 199.7 acres is privately owned and 0.3 acres has been identified as *Khas land*.**

As per the 'Conventional' rule set by the law i.e. Cash compensation under law (CUL), cost of land acquisition is taken as 3 times the cost obtained from Assistant Commissioner (AC) land office for private land and 1 time the cost for government land or Khas land. Based on Govt. mouza rate, total cost of land acquisition is BDT 4.358 billion (i.e. USD 0.05 billion). Current market price (CMP) method through primary survey recommends that the cost of land acquisition is BDT 4.794 billion i.e. USD 0.06 billion (excluding registration cost and stamp duty).

Based on AC land office records, the proposed land for acquisition is mostly agricultural/Nul land. More than 200 persons are dependent on the land proposed for EZ development. There is no presence of household structure and any institutions on the proposed site. Hence loss of structure due to the proposed development is not envisaged.

As a part of the social review, focused group discussions have been conducted with local stakeholders to understand their view on the planned EZ in Gopalgonj. During the Focused Group discussions, people were found to be enthusiastic about the planned EZ site and were hopeful of getting employed in the industries that would be established in the EZ site.

Environmental Review formulates Environment Management Plan (EMP) to mitigate adverse impact on the environment due to development of EZ. This EMP envisages precautions needed to be taken by the developer during pre-construction, construction and operation phases along with regular monitoring of environmental impacts. Fixed cost of implementing the EMP has been estimated to be **BDT 20.36 million (i.e. USD 0.25 million).**

Basis the master planning and environmental management plan, the cost estimate of developing the EZ site is expected to be around **BDT 2,510.7 million (i.e. USD 30.62 million)**. This is the total hard cost for development of infrastructure in the proposed EZ. Estimated project cost is tentative in nature and may vary during on-ground implementation.

Taking into consideration the cost of developing the EZ site and expected revenue that would be generated from the EZ site a financial model has been developed in order to assess the feasibility of developing this EZ site by a PPP developer and expected returns have been calculated for the private developer who would be undertaking the construction and operation of this economic zone.

This model calculates the return under all the three different scenarios outlined during demand forecasting exercise. The expected returns for the developer are as shown on the next page –

Table 2: Returns to the developer from Gopalgonj EZ

Parameters	Conservative Case	Base Case	Aggressive Case
Project IRR	8.2%	10.4%	11.5%
Equity IRR	6.2%	9.5%	12.0%

The interest rate of debt has been assumed to be 10% for the purpose of constructing the financial model, as per the prevailing lending rates in Bangladesh. Considering the rate of interest, the returns being generated from the project is moderate for the developer under the current parameters assumed for constructing the financial model.

Project structuring exercise has been undertaken to evaluate different options that could be considered to make the project returns more attractive. It has been found that if the private developer is able to get funding for the project from multi-lateral agencies or raise external commercial borrowings at low interest rates. The returns from this project stands to become attractive for the private developer. Considering private sector efficiency and better access to diversified resources, **project structuring option through a private developer appears to be a better option with respect to the other project structuring options.**

In addition to the financial modelling, an economic modelling exercise has also been undertaken to evaluate the economic benefits accrued from this project. Financial analysis (or Financial IRR) estimates the return accruing to the project operating entity (EZ developer), whereas Economic Internal Rate of Return (EIRR) estimates the return on the investment to the national economy. Economic analysis is essential to develop a rationale for Government of Bangladesh to support the development of the proposed EZ and illustrates the measure of the accrued economic benefits. A good EIRR would also assist the private developer in making a good case to be able to avail concessional loans.

Three scenarios have been considered for the purpose of EIRR calculation viz. conservative, base, and aggressive. Details of these scenarios are outlined in the demand forecasting exercise. Base case Economic Internal Rate of Return (EIRR) has been calculated as 25.75%, which indicates that the project is attractive and would provide good returns. In conservative case, the project generates 18.58% economic return which is good. Aggressive scenario indicates that the economic return of the project is 32.54%, which is highly attractive in nature.

Based on the area, location attributes, stage of development, macroeconomic parameters, and subscription tariffs a bench-marking exercise has been undertaken with the intention of assessing the competitiveness of the proposed economic zone vis-a-vis other similar developments in the region or emerging economies.

The benchmarking exercise has assessed various parameters such as commercial terms, infrastructure availability, labour cost, distance from trade gateways, etc. for similar developments. This analysis not only provides the relative competitiveness of the proposed economic zone but also synthesises the key learnings from each of these zones. For the purpose of benchmarking of the proposed EZ site with other competitors at the same development stage, a total of 6 economic zones/ industrial parks have been shortlisted at local, regional, and global levels. These 6 economic zones/ industrial parks are spread across countries such as India, Sri Lanka, and Bangladesh.

Benchmarking exercise brings out the fact that the EZ site at Gopalgonj is competitive with respect to factors such as availability of standard factory buildings, land lease rates, water tariff and labour cost. Manufacturers in the EZ site would enjoy good access to sea port and rail network, thus enabling smooth logistics of bulk cargo through water and rail routes. Upon operationalization of Khulna-Mongla rail line and Padma Bridge, proposed EZ would have access to rail network connecting Mongla Port with Dhaka and Chittagong. Power tariff in Bangladesh is significantly higher as compared to India and Sri Lanka due to paucity of electricity in the country as Bangladesh has to rely upon import of coal to generate electricity. Lack of ready-made social infrastructure in proximity to EZ could act as a hindrance to attract skilled human resources especially the expatriates. However, as stated in the Master Planning section, a land parcel has been earmarked for developing support amenities which can be used to establish vocational training centre, retail outlets and child care facility within the EZ site.

The proposed EZ site is quite competitive compared to other international Economic Zones in the region. This EZ site has good connectivity and has access to factors of production (man and material). Developing of this EZ site would drive economic growth of the region, which is currently agro based. The financial returns accruing from this project for the private developer is currently not attractive. However, if the developer is able to access concessional loans, the returns generated from this project could become attractive.

2. Introduction

The objective of this chapter is to picture a broad overview of this engagement. At the onset, a need assessment of organized industrialization in Bangladesh context has been undertaken. This further deep dives into the salient features of the engagement in light of economic zone development programme towards validating the growth agenda of Government of Bangladesh (GoB).

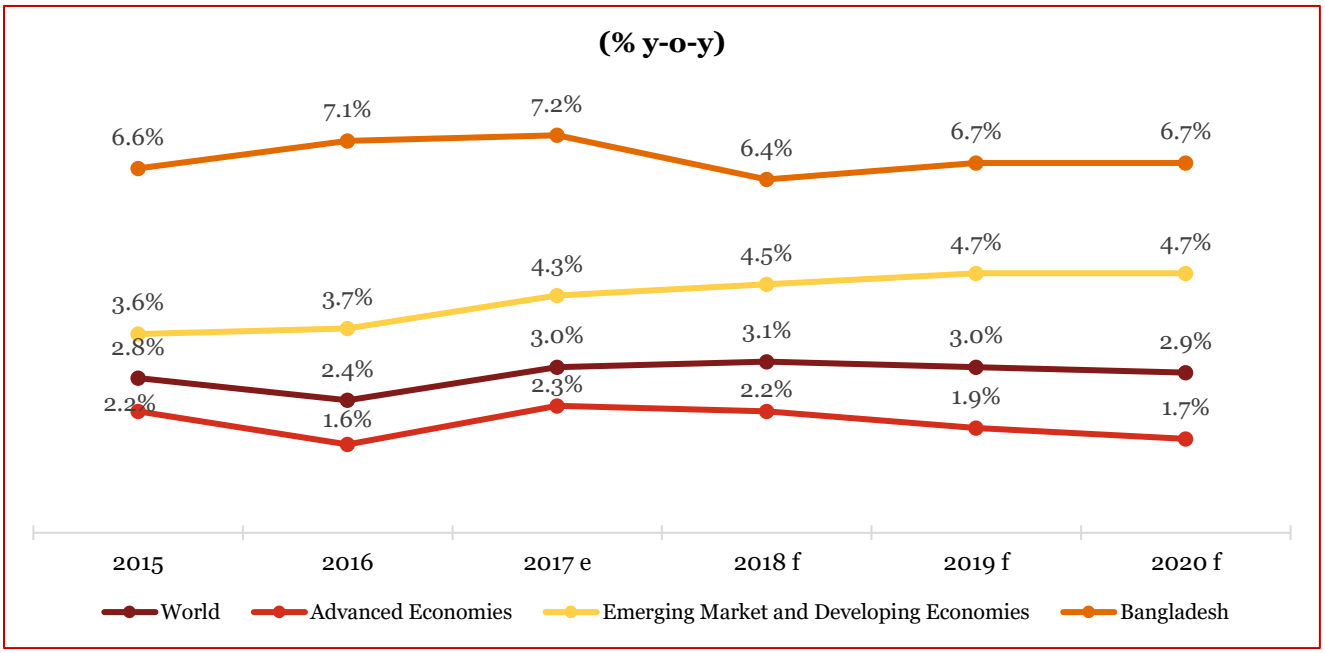
2.1. Bangladesh – Need for organized industrial growth

Recent economic and investment trends indicate a **gradual shifting of economic prowess from large economies to emerging markets**. Owing to rising cost of operation and cost of manpower in the developed economies, global production centers are moving towards Asian region.

As per World Bank reports, after dip in the past, global GDP growth is estimated to have picked up from 2.4 percent in 2016 to 3 percent in 2017.[1] This upturn is broad-based, with growth prospects improving in more than half of world's economies. As per World Bank estimates, global economy is expected to grow at a steady rate of ~3 percent on a year on year basis.

This is conducive for global trade and commerce, especially for the Emerging Market and Developing (EMD) economies which generally depend on exports for their GDP growth. **Among the EMD economies, it is expected that Bangladesh will sustain its healthy growth rate at above 6 percent on the back of its robust export sector and investment in infrastructure.**

Figure 2: Global Real GDP growth (e-estimated; f-forecasted)



Source: World Bank database

Above figure indicates how real GDP growth rate of Bangladesh has outperformed EMD and world's average. **Bangladesh, strategically located adjacent to the neighboring large economies of India and China has embarked into an ambitious journey of industrial development and economic progress.**

On the global economic radar, Bangladesh has long been overshadowed by its larger neighbors in the region, India and China. However, with a population exceeding 160 million, Bangladesh has been steadily building its economic strength and is now emerging as an attractive frontier growth market in South Asia. This presents a

[1] *http://www.worldbank.org/en/publication/global-economic-prospects*

sizeable opportunity for organizations seeking to expand their global footprint and further establish a presence in the South Asia region.

This stable growth rate in recent times is an outcome of investment friendly policy push from GoB, and significant infrastructure augmentation across the country. Bolstered by these initiatives, Bangladesh is poised to shape up as manufacturing hub. **Various global accolades indicate the confidence expressed by the global agencies on the economic development of the country.**

- The growth potential of the economy has led to Bangladesh's inclusion in the 'Next 11'of Goldman Sachs.[2]
- The country being considered as the next Asian Tiger Economy.[3]
- Bangladesh was also included in the 'Frontier Five' economies by JP Morgan.[4] It indicates impressive economic and investment potential.
- Credit rating agency Standard & Poor has awarded Bangladesh a credit rating of BB-, [5] indicating long term stability.
- Bangladesh was also ranked 22nd in AT Kearney Global Services Location Index,[6] which analyses and ranks countries for outsourcing worldwide based on financial attractiveness, people skills and availability.
- Economy of Bangladesh was the 34th largest economy in the world in 2016 in GDP PPP (Purchasing power parity-2016) terms.[7]
- In Ease of Doing Business Index (2018), Bangladesh has improved its overall Distance to Frontier score. It has also made notable improvement along the parameter 'getting electricity'.

Bangladesh had effectively leveraged its attractive demographic dividend and low cost of operation (including low cost of manpower) to emerge as one of the largest exporters of Ready Made Garments (RMG). RMG sector has been the cornerstone of Bangladesh's growth story, so much so that RMG industry accounts for more than 81 percent of Bangladesh's export basket. [8] Such high dependency on RMG sector for exports symbolizes all that is good and not so good for Bangladesh's economy. **While, Bangladesh's dominance in RMG can be painted as a success story for the country which has effectively utilized its abundant pool of human resources, it also reveals that Bangladesh has not been able to diversify its export basket.** Bangladesh's export basket is four times more concentrated in a few individual product lines than the average of a developing country. The contribution of new products, identified by the six-digit level of Harmonized System of trade classification, to the overall export growth between 2005 and 2015, was less than 5 percent for Bangladesh in comparison to 78 percent for Malaysia, 42 percent for Vietnam, 32 percent for China, 25 percent for China and 20 percent for India.[9]

The world economy has increasingly become less predictable and is dictated by technological innovations which are disruptive in nature. In such a dynamic business environment, it has become imperative for Bangladesh to diversify its product mix and to hedge the risks associated with any particular sector. In order to reduce the high dependency of its economy on the textile and RMG sector, Bangladesh needs to address its infrastructure, energy and urbanization bottlenecks by chalking out a strategy to create a holistic environment for organized industrial growth. **Organized industrial growth will not only help in improving the country's competitiveness but will also attract more investments from manufacturers across the world.**

In order to carve out a strategic roadmap towards organized industrialization in the country, GoB has come up with the concept of economic zone (EZ) development. The advent of EZ model is expected to foster investment inflow and employment generation, which in turn will boost the overall socio-economic condition of the country.

[2] *http://www.goldmansachs.com/our-thinking/archive/archive-pdfs/brics-book/brics-chap-13.pdf*
[3] *http://www.thefinancialexpress-bd.com/2015/12/17/6199*
[4] *http://bangladesh.nlembassy.org/doing-business/bangladesh-economy.html*
[5] *https://en.wikipedia.org/wiki/List_of_countries_by_credit_rating*
[6] *http://www.prnewswire.com/news-releases/at-kearney-releases-2016-global-services-location-index-gsli-300201927.html*
[7] *World Bank Growth Indicators- GDP current in PPP basis*
[8] *http://www.dhakatribune.com/business/2018/02/01/ready-industry-4-0/*
[9] *http://www.thedailystar.net/supplements/building-modern-economy/revitalising-exports-1536607*

2.2. Project Overview

As a key part of its growth strategy, GoB, with the support of the World Bank is implementing the Private Sector Development Support Project (PSDSP) to support pilot EZ projects under the new EZ model. The project will support viability and will promote the removal of barriers and constraints faced by the private sector, which hinders their participation in developing EZs in Bangladesh. This project will support creation of serviced industrial land and use of good social and environmental practices. GoB intends to pay special attention to supporting international commercial practices and good governance to attract public-private partnerships in –

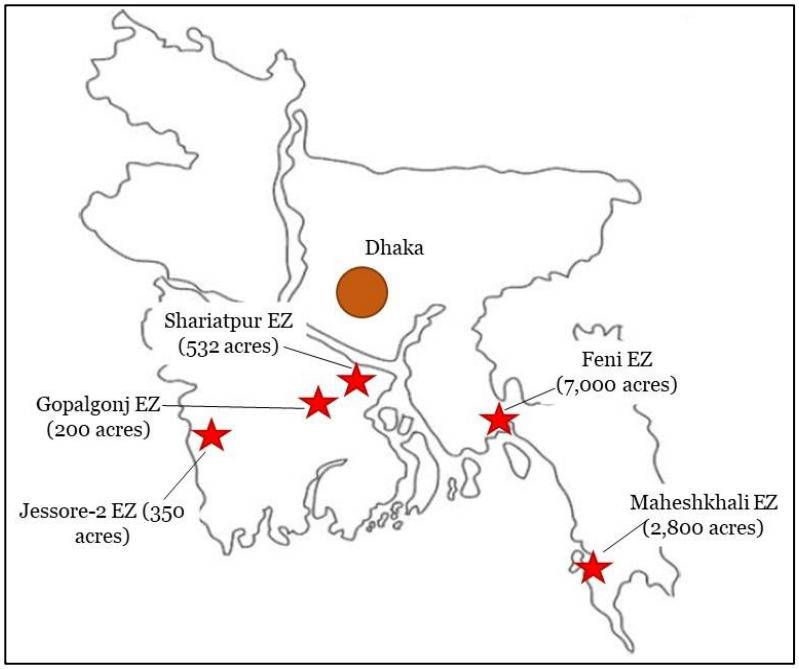
i) Zone Development
ii) Service and/or Management provision
iii) A strong emphasis on environmentally and socially-compliant manufacturing

A strengthened institutional framework will also be supported through policy advice and capacity building to help accomplish the above objectives.

The PSDSP consists of public sector portion of investment in land, infrastructure and services for a number of pilot EZs established under the new EZ law. The PSDSP will support transformative investments beyond already established sectors. A key outcome of this program is a contribution towards zoned industrialization, which will enable Bangladesh to maximize its growth benefits of agglomeration and ease the increasing urban congestion. More importantly, the project will enable new sources of growth, where investor interests have already been noted.

To support GoB's commitment to develop EZs in Bangladesh. BEZA intends to undertake five independent pre-feasibility studies for setting up Economic Zones in the locations as shown in the figure below –

Figure 3: Site Location of proposed EZs



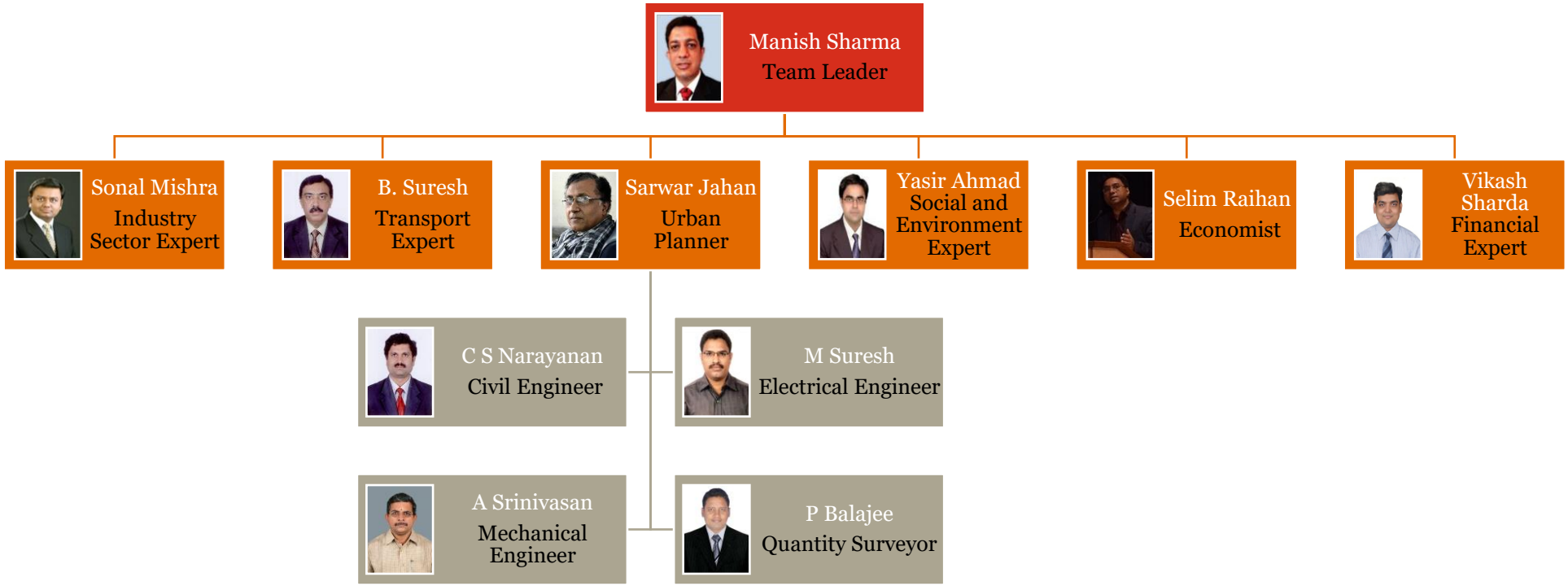
This report aims at pre-feasibility assessment of proposed economic zone at Gopalgonj spread over an area of 200 acres

2.3. PwC's Team of Experts

In consideration of the deliverables required during the course of this engagement, PwC has formed a team of experts with ***significant experience in the required areas of focus***. Through cross sectoral experience in handling projects of various types, our experts are well versed in the areas where expertise is required for this engagement: ***Feasibility Studies, Industry Assessment, Demand Forecasting, Competition Benchmarking, Transport Assessment, Master Planning, Financial & Economic modelling, and Environment and Social Review***.

The proposed team of experts demonstrates our qualifications and capabilities in executing the engagement. The organogram depicting the experts for various key positions is elucidated below, their detailed CVs have been duly submitted as a part of PwC's proposal on 8th June, 2017, under Form Tech-6.

Figure 4: Team of Experts



2.4. Project Timeframe

In conformance to this engagement's Terms of Reference, following deliverables will be submitted to BEZA as per the schedule laid out in the below table –

Table 3: Schedule of Deliverables

Deliverable	Description	Timeline	Status
D1	Inception Report	At 15-day milestone	Inception Report Submitted
D2	Draft Interim Report Presentation workshop to discuss findings of Interim Report Final Interim Report	At 3-month milestone	Final Interim Report submitted
D3	Draft Final Pre-Feasibility Study Report Presentation workshop on finding of Draft Final Pre-Feasibility Study	At 6-month milestone	Draft Final Pre-Feasibility Study Report submitted
D4	Final Pre-Feasibility Study Report	At end of the project	Final Pre-Feasibility Study Report submitted
	Deliverable submitted		
	Deliverable to be submitted in the future		

Legend:

D1: Inception Report
D2: Draft Interim Report, Presentation on Key Findings & Final Interim Report
D3: Draft Final Pre-Feasibility Study, Presentation on Key Findings
D4: Final Pre-Feasibility Study

The activities covered under this assignment will be scheduled in a manner so that all tasks to be executed are in sync with each other, thus ensuring an organized and sequential flow of activities. A detailed timeframe has been previously submitted under Section 3.2 of the Inception Report dated, 8th February, 2018.

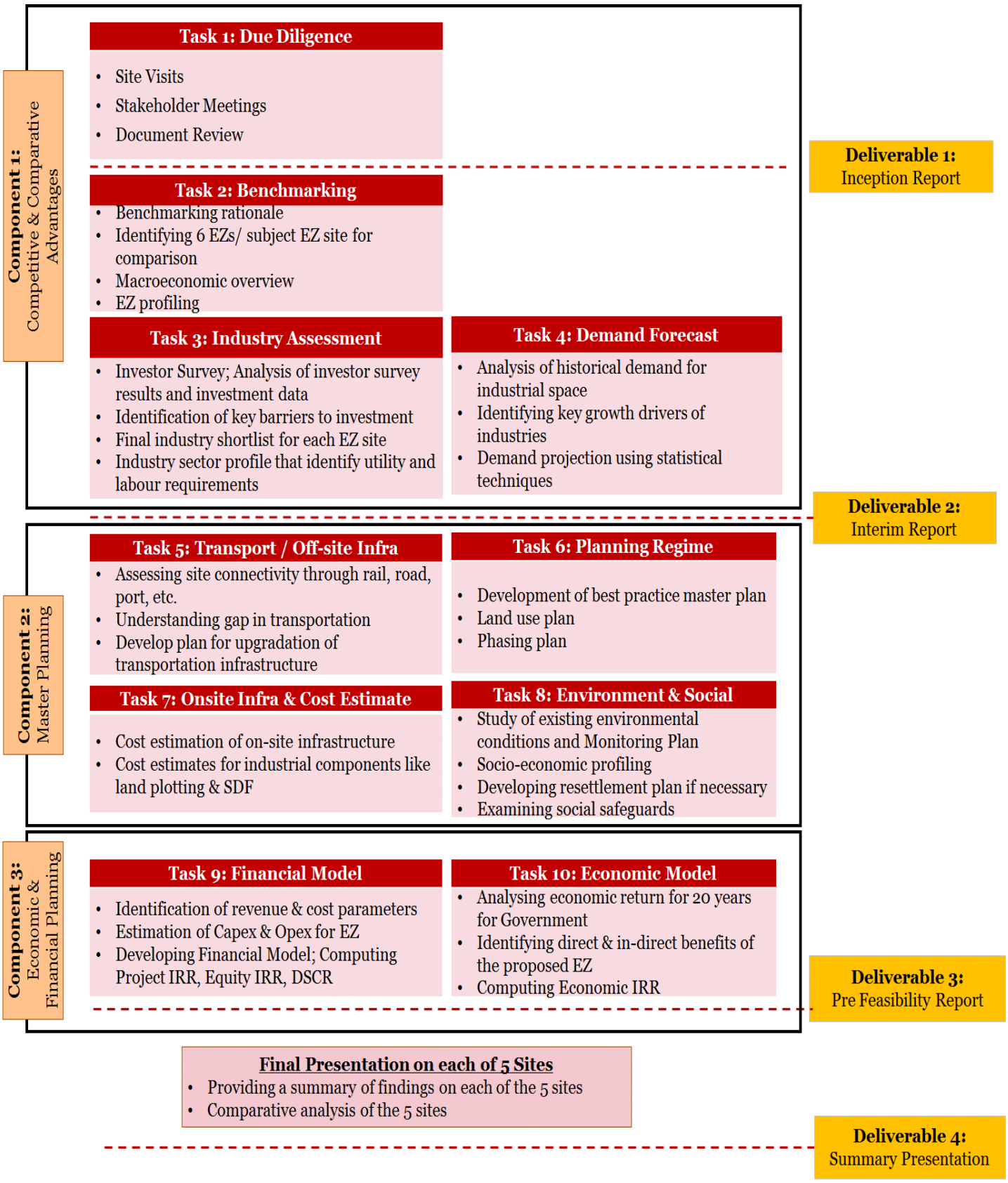
Next section elaborates detailing about the key activities/ tasks to be undertaken under each of the deliverables.

2.5. Outline of the Engagement

A detailed outline of the Terms of Reference and approach have been previously submitted as part of the Inception Report dated, 8th February, 2018.

Figure in the next page captures a concise outline of the engagement as per the Terms of Reference –

Figure 5: Tasks covered under current engagement



2.6. Description of Site Location

The proposed EZ is located in Gopalgonj Sadar Upazila, Gopalgonj district of Dhaka division. Dhaka division, located at the central part of the country is economically most affluent division of Bangladesh and houses the capital city of the country, Dhaka. This division contributes to ~30% of overall GDP of the country[10] and it houses various industrial powerhouses. Almost all the leading conglomerates of Bangladesh are registered in Dhaka. Dhaka division has 13 districts, Gopalgonj is one of these.

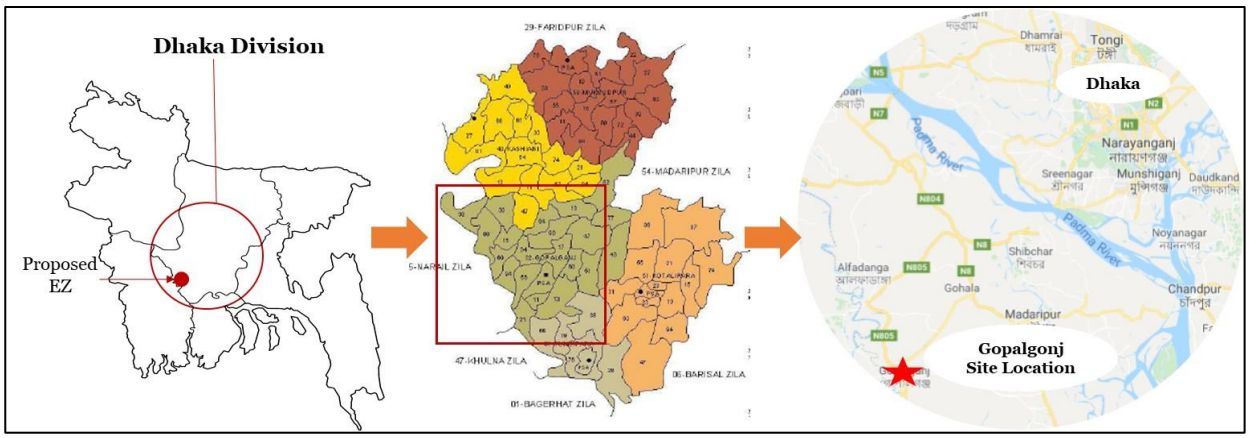
Gopalgonj district is located on the south-western side of Dhaka division. It is surrounded by the following districts:

- Faridpur – North
- Madaripur – East
- Barisal – South-East
- Khulna & Bagerhat – South-West
- Narail - West

Gopalgonj district comprises of 5 upazilas; proposed EZ is located in Gopalgonj Sadar upazila.

As per Housing and Population Census 2011, Gopalgonj district had an overall population of 1,172,415 with a well-balanced gender ratio of 50% male and 50% female. Linear projection techniques indicate that in 2017, overall population of Gopalgonj district could be ~1,920,173; and population of Gopalgonj Sadar upazila could be ~563,414.

Figure 6: Gopalgonj Site Location (Dhaka Division-Gopalgonj District-Gopalgonj Sadar Upazila)



Source: Google Map and PwC Analysis

Gopalgonj experiences a moderate climate throughout the year with temperature ranging from 23.3°C during summer to 8.6°C during winter.[11] Such a moderate climate could support development of agro based and food processing industries in the region and also promote manufacturing activities which caters to the need of the farming community.

2.6.1. Economic Profile of Gopalgonj District

Currently, major population of Gopalgonj district is engaged in agriculture, fish rearing and animal husbandry. Although few people also work in small cottage industries and industrial units like rice, flour and oil mills. Students who obtain higher education, migrate to cities like Dhaka and Chittagong due to lack of industrial development in the region. However, creation of an economic zone in Gopalgonj could enable a transformation

[10] *Planning Commission- Lagging Regions' Survey*
[11] *Gopalgonj District Census, 2011*

in the social profile of the area as local people would be willing to take up blue collared jobs, which are financially better rewarding than agriculture.

The primary economy of Gopalgonj is agro based, with about 60.93% of total land under temporary or permanent cultivation, as per Bangladesh District Statistics, 2011. The industries in this district comprise Cottage industry, fish processing, rice mill, saw mill, wheat mill, oil mill, wooden furniture etc.

Nearest industrial belts are in:

(i) Barisal district (comprising industries like pharmaceuticals, cement, food and beverages) and

(ii) Khulna district (comprising industries like jute, chemicals, fish, sea food, shipbuilding etc.)

(iii) Jessore district (comprising industries like automobile assembling, light engineering etc.)

Industries in these industrial belts could serve as good markets and source of raw material for the proposed EZ. It is also expected that agro based economy of Gopalgonj district may provide supply of raw materials for agro processing related industries at the proposed EZ.

2.6.2. Site Surrounding Features

Districts in vicinity of the proposed EZ site location are Faridpur in the north, Barisal in south-east, Khulna in south-west, Madaripur in the east and Narail in the west. Industrial development has taken place in Barisal and Khulna districts.

Key location attribute of the project site is its location in between Benapole Port (land port with India) and Dhaka, which makes it a suitable stopover point for processing of goods coming in from India and going towards Dhaka or vice versa.

Project site is located at a distance of around 180 km from Dhaka; it can be accessed via Dhaka-Mawa highway, taking a ferry crossing on Padma River from Mawa ghat till Kathalbari Ghat and travelling along Mawa-Bhanga Highway/N8 till Dhaka-Khulna highway/ N805. N805 leads to the eastern boundary of the proposed EZ site. Currently travel time from Dhaka to the proposed EZ location takes around 7-8 hours. On operationalization of this bridge, travel time across Padma River is expected to come down. This will bring down the travel time from Dhaka to the proposed EZ site resulting in faster access to raw material and consumer hub in Dhaka.

2.6.3. Location Reconfirmation

The proposed EZ site is located towards the western part of Gopalgonj district. Basis site visit, site location and site demarcation details have been reconfirmed. The same have been captured in the table on the next page –

Table 4: Proposed EZ Site Information

Parameters	Details
Site co-ordinates	789547.552 Easting – 2543850.317 Northing 788256.904 Easting – 2543510.391 Northing 788555.489 Easting – 2542827.159 Northing 789476.237 Easting – 2543165.382 Northing
Site boundaries on East	Dhaka Khulna Highway, N805
Site boundaries on West	Regional Highway, R850
Site boundaries on North	Agricultural Land
Site boundaries on South	Agricultural Land, with Bangabandhu Sheikh Mujibur Rahman Science and Technology University within 1 km radium
Total area of the site	200 acres
Privately owned land	199.7 acres

Parameters	Details
Government Land/*Khas Land*	0.3 acres
Expansion potential	Basis discussion with site surveyor, it was understood that it was feasible to expand the site beyond its northern and southern boundaries, due to presence of agricultural lands. However, this is subjected to land survey.

Source: Information obtained from Site visit and MACE Analysis

On analysis of the proposed EZ site location, it can be observed that the site is ideally positioned to cater to industrial belt in Barisal and Khulna, it can also cater to the consumer market in Dhaka or improve Bangladesh's exports to India through Benapole Port. Its demography offers a readily available pool of labor who can be trained to take up blue-collared jobs in the EZ. Also, setting up of the EZ can reverse the trend of migration of educated young people from Gopalgonj to other parts of the country.

Basis discussions with site surveyor during site visit, we were informed that there lies an expansion possibility of the project site beyond its northern and southern boundaries; in the future, based on industrial space demand. Expanding of this EZ site can be considered as a second phase development activity, after assessing the land uptake for the current area. Any decision regarding site expansion should be based on feasibility studies and topography survey.

Figure in the next page elucidates the site boundary superimposed on google earth image.

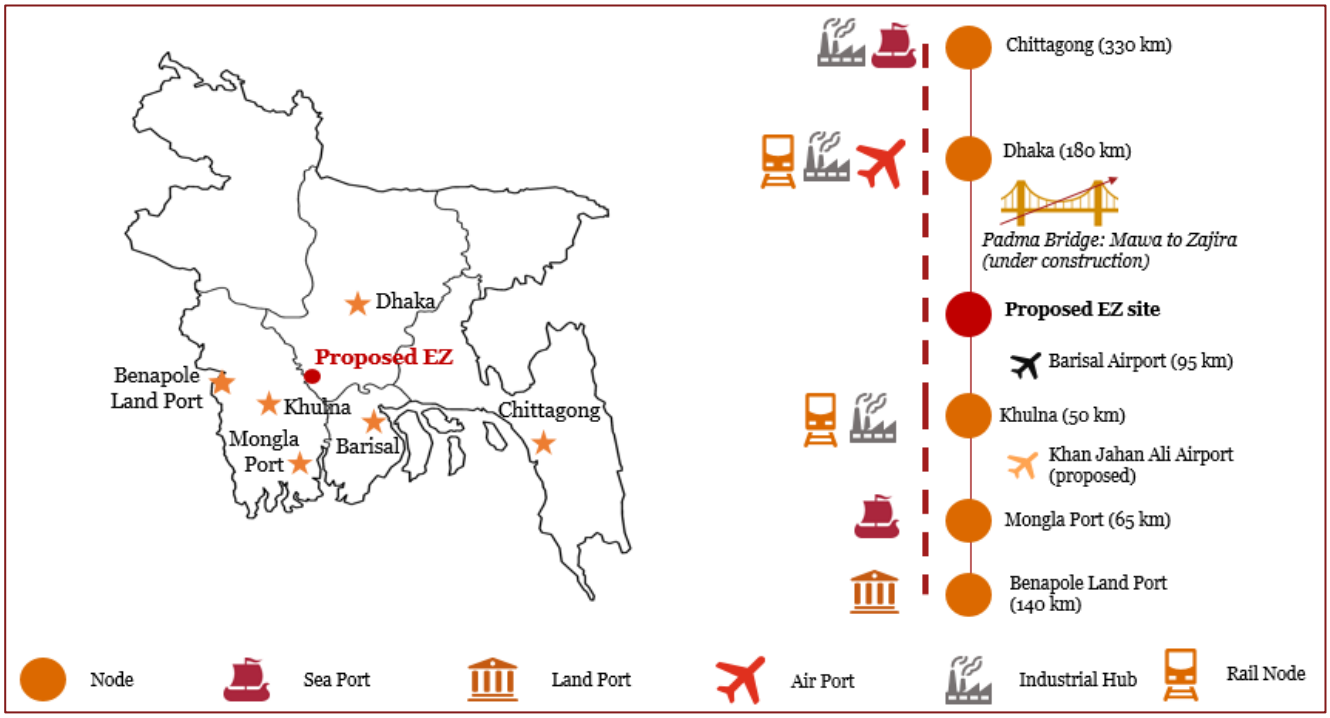
Figure 7: Site Boundary of the proposed EZ

Source: Mace Analysis

2.6.4. Proposed EZ: Transport Infrastructure

For any location to shape up as a potential EZ, access to multimodal connectivity is an important feature to enable seamless logistics. Figure below depicts the site location in light of the major trade gateways, industrial nodes, and transport infrastructure in the country.

Figure 8: Transport infrastructure in proximity of proposed EZ site



Source: Information obtained from site visit, Google Map, and PwC Analysis

Figure above elucidates that the proposed EZ has good access to Khulna, Jessore and Barisal. It is also located on the transit route from Dhaka to Benapole Port. This is expected to give a prime advantage to the proposed EZ site in manufacturing of goods, which are traded between the two countries through Benapole Port. Operationalization of Padma Bridge will provide seamless road transport between the proposed EZ site and consumer hub in Dhaka.

Last Mile Connectivity: Proposed EZ site is bordered by National Highway, N805 (Dhaka-Khulna Highway) towards the eastern and Regional Highway, R850 (Gopalgonj town road) towards the western side of the site. Presently, both the bordering roads are bituminous. While N805 is 2-laned road having average width of 7.73 m, R850 is 1.5-laned having an average width of 5.4 m. Basis our discussion with RHD officials, we were informed that Roads and Highways Department has plans to widen R850 to 2-lane road and also to widen N805 to 4-lane road.

Rail Connectivity: Gopalgonj Station (3 km) is the nearest railway head to the proposed EZ site. However, it is a small station with no cargo handling facility. Nearest major railway station is in Khulna located at about 50 km from the proposed EZ site.

Air Connectivity: Nearest airport is Hazrat Shah Jalal Airport (HSIA) in Dhaka. It is Bangladesh's largest and busiest airport. This airport is around 180 km away from EZ site. Barisal airport is nearest domestic airport at a distance of 70 km.

Sea Port Connectivity: Mongla Sea Port is the nearest port to the proposed EZ site at a distance of 65 km. It is the 2nd busiest port in Bangladesh after Chittagong Port (330 km from EZ site). GoB is developing another port at Payra as a deep-sea port (200 km from site location). It is understood that the proposed EZ is located at a significant distances from sea ports of Bangladesh.

Land Port Connectivity: Benapole is the nearest land port located at around 140 km west of the proposed EZ site. It is Bangladesh's largest and busiest land port with a capacity to handle 2 million tonnes of goods per year. Bhomra Land Port is another port located at around 118 km west of the proposed EZ site, towards south of Benapole Port. It started its operations from May, 2013 and has a capacity to handle .5 million tonnes of goods per year.[12]

2.6.5. Utility Linkages at the Proposed EZ

Power Availability: Presently, there are 2 operational substations in proximity to the proposed EZ site from where power can be drawn. These are Gopalgonj Sadar substation and Tungipara substation located around 10 km and 7 km from the proposed EZ site. These substations have capacity of 10 MVA each, having voltage line of 33/11 KV. Basis discussions with REB officials, we were informed that the present demand in the region is 12 MVA, the surplus power can be supplied to the EZ location, thus these substations can meet the power requirements of proposed EZ site during the construction phase.

Currently work is in progress to upgrade Tungipara substation to 20 MVA capacity, it is expected that capacity augmentation will be completed by June, 2018. REB is also planning to construct a new 10 MVA capacity substation in vicinity of the proposed EZ location. However, location for the same is yet to be finalized.

These substations are currently drawing power from Gopalgonj grid having capacity of 2x41 MVA. We were also informed that the capacity of existing grid in Gopalgonj is to be augmented to 2x60 MVA.

Basis discussions with REB officers, we were informed that 33 or 11 KV line can be provided at the proposed EZ site location.

Power sources available in proximity of the proposed EZ site can meet the power requirements of the proposed EZ site during construction phase.

Water Availability: Presently there is no existing pumped water supply system present in the proposed site location. Source of irrigation for agricultural activity is a small channel flowing through the site area which is insufficient to meet industrial requirements. Basis discussions with site surveyor, we were informed that water for industrial purpose can be pumped from Madhumati River flowing around 1-2 km along the western boundary of proposed EZ site. Also there is a pumping station at Shishubon water treatment plant in Gopalgonj Sadar Upazila, having a pumping capacity of 313 cu. m/hr x 4. Work is currently in progress to lay a pipeline from this pumping station till Essential drugs pharmaceutical plant around 2-3 km south of proposed site area. This pipeline will be laid almost adjacent to the west boundary of EZ site location. This pipeline will be of 200 mm diameter and will provide 1 mld water to the drug manufacturing facility. This pipeline will not be able to supply water to the proposed EZ site. However, there has been a proposal submitted by Water Development Board to GoB for construction of 330 cum/hr capacity water pumping station near southern boundary of site area. If the project is approved, this pumping station can supply water to proposed EZ site.

Gas Availability: Presently, there is no gas source or gas supply near to the proposed EZ. During our discussions with UNO officials, it was highlighted that the nearest gas pipeline is located in Munshiganj (located at road distance of around 150 km from the proposed EZ, on the other side of Padma River). GoB is undertaking a project to install 30-inch diameter gas pipeline across Padma River to west and south-west Bangladesh. It also intends to import LNG from Payra port and transmit the same to the nation grid of Bangladesh. These projects may ensure availability of gas in Gopalgonj.[13] Presently, there is no gas source or gas supply near to the proposed EZ. Gas Transmission Company Limited (GTCL) is the primary nodal agency responsible for laying down gas transmission pipelines in Bangladesh. Basis discussions with UNO officers and information available on website of GTCL, it was understood that the nearest gas pipeline is available in Munshiganj (located at road distance of around 150 km from the proposed EZ, on the other side of Padma River). GoB is undertaking a project to install 6.15 km long, 30-inch diameter gas pipeline over Padma River Bridge to west and south-west Bangladesh. It is

[12] *http://bsbk.portal.gov.bd/sites/default/files/files/bsbk.portal.gov.bd/page/aff207ea_8eaa_470b_9280_c939c972cf7d/overview%20(June'15).pdf*

[13] *http://www.daily-sun.com/post/213515/Gas-pipeline-to-Gopalgonj-thru-Padma-Bridge-likely*

expected that gas will be made available in south-west region of Bangladesh, once construction of Padma River Bridge is completed. Among the list of upcoming projects, construction of Jajira-Gopalgonj 30"x 95 km gas pipeline and Payra-Barisal-Jajira gas pipeline is also on the cards for GTCL.[14] Though the projects are at conceptualization stage, GTCL anticipates establishing the pipeline by 2021.[15] Proposed Payra-Barisal-Jajira gas pipeline will enable import of LNG from Payra port and transmission of the same to the national grid of Bangladesh. [16] Establishing of gas pipelines in the proposed EZ region would boost setting up of industries like fertilizers, ceramics, cement etc. and also gas based power plants.

Gas is a comparatively cheaper fuel source to generate power, thus ensuring smooth industrial production. It is expected that BEZA officials can make provision to establish gas connection till proposed EZ site in future after the gas pipeline is established in Gopalgonj region.

Telecom Availability: Telecommunication facility is available in the region of the proposed EZ site with major private telecom service providers (like Grameen Phone, Bharti Airtel, Banglalink, Teletalk) providing voice calling and internet facility. Optical fiber cables are present near the proposed EZ site area due to the presence of Bangabandhu Sheikh Mujibur Rahman Science and Technology University on the southern boundary of the proposed EZ site. Optical fiber network at the proposed EZ could be set up by sourcing the telecom line from UNO office.

Wastewater Treatment Facility: Presently, there is no wastewater treatment facility in the vicinity of the proposed EZ site which can be used by the industries that would come up inside the EZ. Provision for wastewater treatment facility has been captured in the master planning section of this report.

Solid Waste Management Facility: Presently, there is no solid waste management facility in the vicinity of the proposed EZ site which can be used by the industries that would come up inside the EZ. Provision for solid waste management facility has been captured in the master planning section of this report.

2.6.6. Access to Social Infrastructure

An important predecessor for establishing of industries in a region is the type of social infrastructure that is present in the region. Quality of educational institutes determine the availability of skilled local manpower, quality of residential and medical facilities determine whether skilled manpower can be brought in from outside to work at a particular place or not. With the growth in economy, quality of lifestyle has become an important determining factor which can influence investment decisions for a particular place. Hence, it is important to understand social infrastructure available in Gopalgonj district.

Academic Facilities: Gopalgonj district has 5 Polytechnic Institutes, 1 Technical School and College, 1 Nursing College, 14 General Secondary Schools, providing vocational training for basic skill development and 5 Union Digital Centre for imparting knowledge about computers to the young people in the district.

Some of the major colleges in Gopalgonj district are –

- Gopalgonj Polytechnic Institute
- Gopalgonj Technical School and College
- Gopalgonj Bigyaan Mahabidyalay

As per the TVET Census – 2015 report, there are 47 Vocational Institutes in Gopalgonj district offering courses ranging from Computer Science, Telecommunications, Electrical and Electronics to Dress Making, Textile Technology, Pisciculture, Ship Building, General House Wiring etc.

International quality educational facilities are not available in this region. Khulna and Jessore cities near the proposed EZ site, provide good standard educational facilities.

[14] *https://petrobangla.org.bd/admin/attachment/webtable/596_upload_0.pdf*
[15] *http://www.daily-sun.com/post/213515/Gas-pipeline-to-Gopalgonj-thru-Padma-Bridge-likely*
[16] *http://www.daily-sun.com/post/213515/Gas-pipeline-to-Gopalgonj-thru-Padma-Bridge-likely*

Medical Facilities: There are 5 upazila health complex, 1 general hospital, 24 union sub centres, 200 community clinics, and 45 private clinics in Gopalgonj district.[17] In addition, there are also a few Union Health and Family Welfare Centres being operated by Directorate of General Health Services in Gopalgonj district.

The upgraded Gopalgonj General Hospital was inaugurated by the Prime Minister of Bangladesh in 2010, this hospital is relatively modern and has facilities for MRI, ultra-sonogram, CT scan etc.

Residential Facilities: Basic residential facilities are available in Gopalgonj upazila. Basis preliminary site visit and discussions with local residents, it was informed that residential requirements of unskilled and semi-skilled manpower employed in the proposed EZ are available in the surrounding region.

Key Takeaway

The Proposed EZ site at Gopalgonj is well connected by road network, which in turn connects the site to other modes of transportation (railways & ports). Preliminary assessment suggests that the site has access to telecommunication facility, multiple sources of power and scope for development of water supply. Gas does not exist however, based on stakeholder discussion with UNO officials; we understand that the GoB has plans to supply gas in the region once the Padma Bridge is operational. In absence of existing effluent treatment facilities, provision for wastewater treatment and solid waste management to be done within the EZ site has been captured in the master planning section of this report. Basic social infrastructure is available in the region surrounding the EZ site, which can cater to the needs of semi-skilled and unskilled employees.

[17] *Local Health Bulletin, 2016 for Upazilas in Gopalgonj district*

3. Benchmarking

3.1. Key Objectives

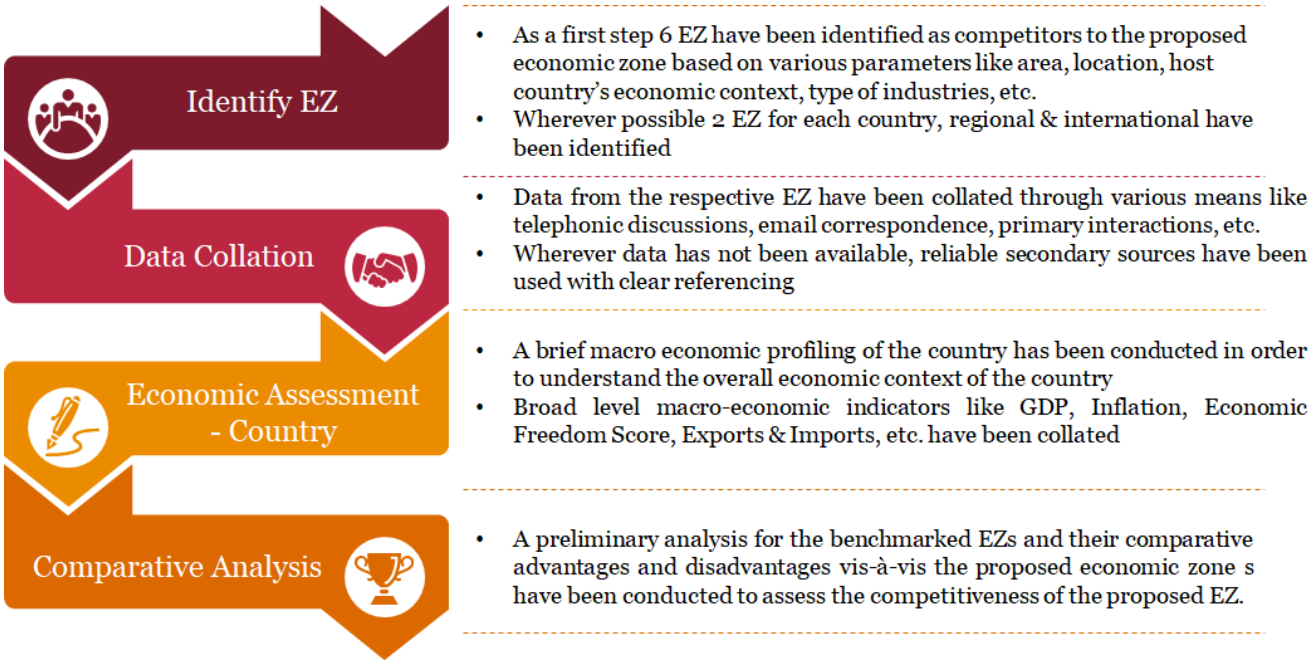
The success of an economic zone often hinges upon the competition experienced by it from similar developments either within the country or region. Additionally, at a planning stage a developer should be well abreast of various best practices and the quality of economic zones that are being developed across the world. Hence, studying of other economic zones and their development strategies are vital information for a developer to construct a state of the art industrial region which incorporates the best prevalent practices of the world.

Based on this premise, this chapter attempts to provide a profiling of various economic zones which share similar physical and economic attributes as the proposed economic zone.

3.2. Methodology of Benchmarking

The benchmarking exercise has been conducted through extensive research which entailed telephonic discussions, email correspondence, primary interactions, with developers of economic zones, etc. An illustration for the flow of the benchmarking exercise has been depicted below:

Figure 9: Benchmarking Methodology



The identification of economic zones has been carried out on the following broad parameters as described below:

Figure 10: Benchmarking Methodology

Area of Economic Zone	Wherever possible economic zones of similar sizes to the proposed EZ have been selected. However, this parameter has been kept flexible to accommodate more of comparable economic zones
Industry Type	Only those economic zones which are multi-product in nature have been considered for the benchmarking. Sector specific or service based economic zones have been ruled out
Product Offering	Economic zones offering superior quality infrastructure and professionally management have been considered. Non operational of decrepit zones have been ruled out.
Stage of Development	The benchmarking have been limited to economic zones that are in active stages of marketing. Non operational or saturated zones have not been considered

Post identification of the shortlisted EZs an information request mailer have been circulated to the respective marketing or business development teams for the EZs. The data thus obtained have been further validated through telephonic discussions with concerned persons in order to ensure data adequacy and accuracy.

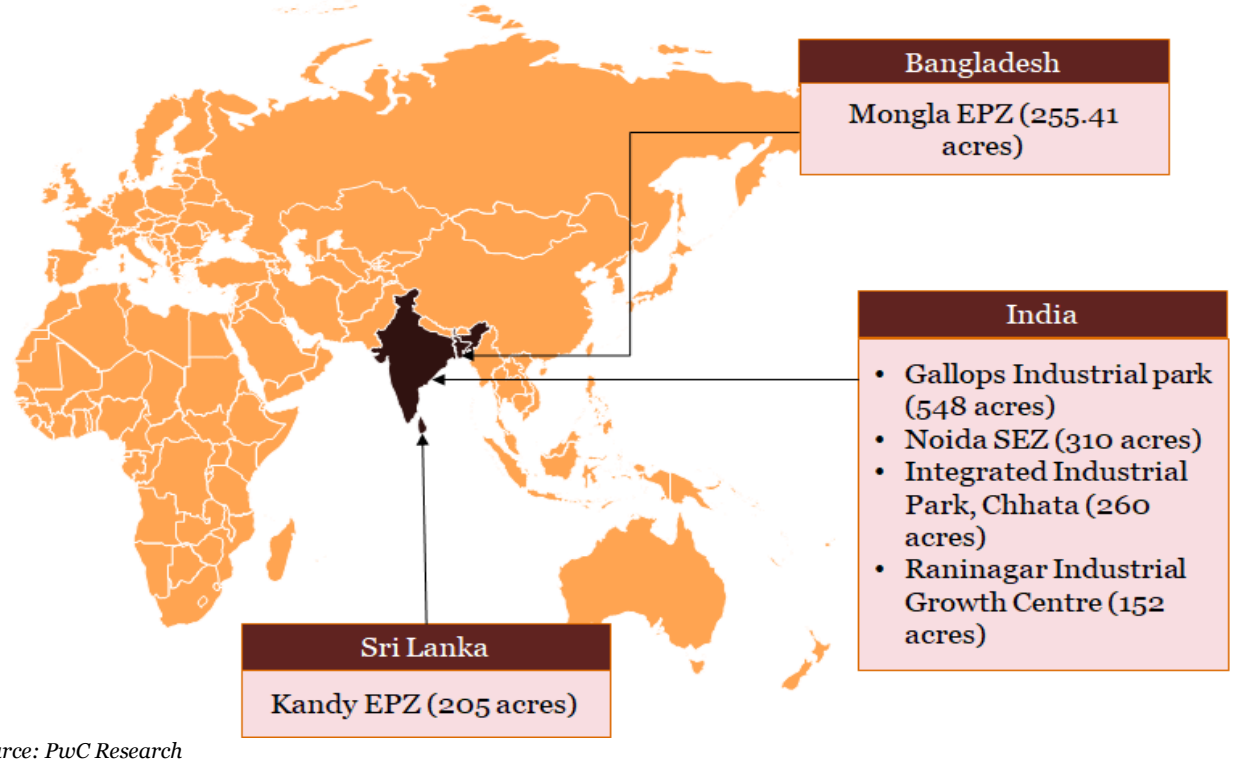
Post receipt of all data pints a brief macro-economic profiling of the respective countries have been conducted to assess their economic landscapes.

Finally a comparative assessment of all these EZs have been done with proposed EZ in Gopalgonj to assess the comparative position of the proposed EZ in Gopalgonj to each of these EZs.

3.3. Competitor Identification

The subject economic zone is located in Gopalgonj, Bangladesh and is envisaged to cover a **land area of 200 acres.** Bangladesh has not witnessed the development large scale organized economic zones as yet, however it has got a few small scale export processing zones. Hence, **an EPZ comparable** to the subject economic zone was identified within the country. Based on extensive research and the parameters as highlighted above, the following economic zones have been identified in the figure shown on next page.

Figure 11: Geographic Spread of Comparable EZ



Source: PwC Research

A brief overview and rational for selection for each of these economic zones have been provided below:

Table 5: Brief Overview of Shortlisted SEZ

Name of economic zone	Country	Type of industries	Land Area	Rational
Gallops Industrial Park	India	Light Engineering, Pharmaceuticals, Chemicals, Non-metallic Mineral Products, etc.	548 acres	The Gallops Industrial park is located in Gujarat, approximately 28 km from the industrial city of Ahmedabad. The Industrial park is spread across approx. 548 acres. The Gallops Industrial park is developed by a private developer from India. The industrial park caters to a wide variety of industries some which might also be developed in the proposed economic zone. Thus keeping cognizance of the overall size, type of product offering and industries catered to, this industrial park is considered to be a suitable comparable to the proposed economic zone in Gopalgonj.
Noida SEZ	India	Trading and services, gems and jewelry, textiles and garments, computer/electronic software, leather, footwear and sport shoes.	310 acres	Noida Special Economic Zone is located in the planned city of Noida, in close proximity to the capital city of New Delhi. The region is one of the planned areas of the country and replete with superior quality social and institutional infrastructure. The zone is one of the smaller multi-products economic zones of the country and has witnessed healthy absorption levels owing to its proximity to the capital city of New

Name of economic zone	Country	Type of industries	Land Area	Rational
				Delhi. Since Gopalgonj is also an area of political importance and the envisaged economic zone is a smaller one; the Noida SEZ is considered to be a suitable comparable.
OIA Integrated Industrial Park	India	Food processing Industry, Chemical and chemical products Industry, Electronics Industry, Machinery and equipment sector etc.	260 acres	OIA Integrated Industrial Park is an upcoming industrial park close to Mathura in northern India. This park is a relatively smaller industrial park similar to the proposed economic zone and has a similar industry mix with the proposed economic zone. The park caters to a wide variety of industries. Hence, the size and overall development plans are similar to the proposed economic zone and hence this park has been considered as a suitable comparable.
Raninagar Industrial Growth Center	India	Food & Beverages, Petroleum Products, Plastic Products, Poultry Feed	152 acres	The Raninagar Industrial Growth Center is located in the state of West Bengal in India and is a Government promoted industrial park that houses diverse industries. This park is one of the smaller parks and has witnessed healthy absorption levels owing to presence of superior quality utilities like power and water. Since this park is a Government promoted multi-product industrial park and of relatively smaller size, this park is considered to be a suitable comparable for the envisaged economic zone.
Kandy Export Processing Zone	Sri Lanka	Textile, RMG, Pharmaceutical, Food Processing, Rubber Products, Light Engineering.	205 acres	The Kandy EPZ is a government promoted export processing zone by the Government of Sri Lanka and located in central Sri Lanka. The zone is similar in size to the proposed EZ and has industries which have also been proposed in the economic zone in Gopalgonj. Hence, keeping in mind the overall economic context of Sri Lanka, the land area of the EPZ, type of industries, etc. Kandy EPZ in considered to be a suitable comparable to the proposed economic zone in Gopalgonj
Mongla EPZ	Bangladesh	Metal, Agro, paper, garments, Electronic and electrical goods, tent, zipper, Sewing thread and Embroidery thread etc.	255.41 acres	The Mongla EPZ is an export processing zone towards the south of Bangladesh and located adjoining the Mongla Port. The export processing zone is similar in size and industry mix to the proposed economic zone. Being located in Bangladesh, this zone becomes a natural comparable to the proposed economic zone in Gopalgonj

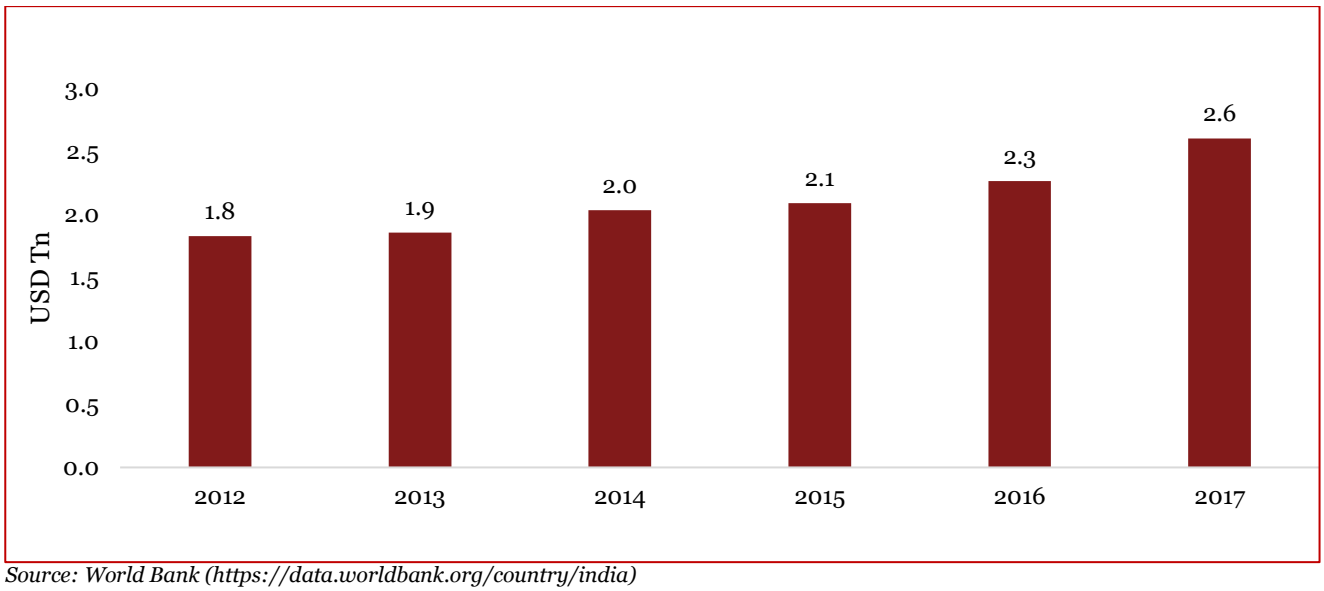
Source: PwC Research

The following sections of the report shall elucidate the macroeconomic landscape of the each of the host country and a profiling of the respective economic zones.

3.3.1. India

India is one of the largest trade partners of Bangladesh and share longstanding trade and cultural relationships. India also has one of the longest internationals borders with Bangladesh. India had started its special economic zone regime in 2001 and has successfully promoted a number of successful economic zone both through government initiatives as well as joint venture with private sectors. India has emerged as one of the fastest growing economies of the world and registered healthy GDP growth rates as depicted below. **Data used for the analysis is the latest data point available in the respective database.**

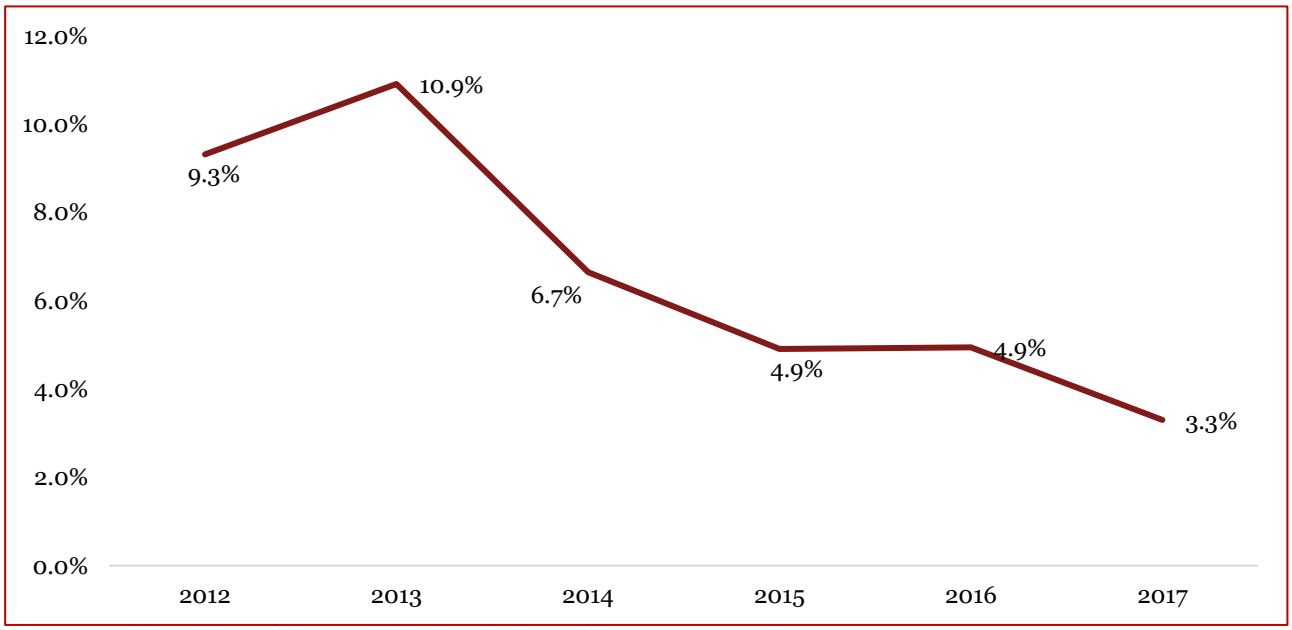
Figure 12: GDP Trend of India



Source: World Bank (https://data.worldbank.org/country/india)

Inflation rates in India have eased post a surge in the inflation rates owing to decreasing prices of food grains and the same is depicted below. **Data used for the analysis is the latest data point available in the respective database.**

Figure 13: Inflation Trend of India



Source: World Bank (https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG?locations=IN)

The other macroeconomic indicators for the country have been summarized below:

Table 6: Macro-economic Parameter of India

Macroeconomic Indicator	Description	Data Source
Unemployment	3.50%	The Heritage Foundation
FDI Inflow	$40.0 billion	The World Bank
Exports	USD 260.3 Bn in 2016	ITC Trade Map
Imports	USD 356.7 Bn in 2016	ITC Trade Map
Heritage Foundation's Index of Economic Freedom Rankings.	130	The Heritage Foundation
Cato Institute's Human Freedom ranking	102	Human Freedom Index | Cato Institute
World Economic Freedom's Global Competitive Index Rating	40	Global Competitiveness Index 2017–2018 rankings
WB Doing Business ranking	100	Doing Business 2018

India is an emerging economy with a predominantly restricted economy as might be deciphered from its rank of 130. The country is gradually shifting from being a largely regulated and restricted economy to a more open market economy. Economic liberalization measures, including industrial deregulation, privatization of state-owned enterprises, and reduced controls on foreign trade and investment began in the 1990s and unshackled the economy from a longstanding regime of regulations. The country also witnessed a paradigm shift in its taxation regime with introduction of Goods & Services Tax (GST). The restricted levels of economic freedom is also reflected in the human freedom ranking wherein India ranks fairly low.

Recent years have witnessed India gaining significantly on the economic competitiveness front and is leading group of South Asian economies. Some of the key factors contributing to the improved rankings are improvement in infrastructure, increased public investment and sped up approval procedures by the Government.

Post identification of the various macro-economic parameters of India, the subsequent section of the report intends to highlight the various attributes of each of the economic zones within the country.

3.3.1.1. Gallops Industrial park

The Gallops Industrial Park is located in the industrially advanced state of Gujarat in India. Developed by the NG Group, this industrial park is a multi-product estate housing industries like pharmaceuticals, light engineering, chemicals, metal fabrication, etc. The industrial park is equipped with state of the art infrastructure like centralized water distribution facility, STP, well planned roads, warehousing facilities, etc. The park also provides access to critical utilities like water and power. The superior quality infrastructure coupled with the thriving industrial eco system of the state of Gujarat has allowed industries to thrive within the park.

Figure 14: Gallops Industrial park

Source: Google Images

The detailed profiling of the Gallops Industrial Park is provided below –

Table 7: Gallops Industrial park

Factors	Gallops Industrial park
Site	
Land Size (acres)	548 acres
Number of Plots	Over 42 companies are operational within the park till date
No. of Development Phases	The development has been carried out over a period of time but in a single phase
Land Lease (+length) or Sale (Taka/USD)	Industrial land within the zone is provided only on a sale basis. The sale price of industrial land is INR 7,200 / sq.yard (USD 132 / sq.m).
Pre-Built Factories (PBF) (Y/N)	There are no Pre-Built Factories provided as a part of the product offering
Lease Rate for PBF (Taka/USD)	Lease rate for PBF is not applicable since PBFs are not a part of the product offering
Infrastructure/Utilities	

Factors	Gallops Industrial park
Onsite Independent Power (Y/N and Type)	There is no onsite captive power plant available for the special economic zone
Cost of Power (Taka/USD)	The cost of industrial power within the economic zones is approx. INR 4.05 / KwH [18] (0.062 / KwH)
Cost of Water (Taka/USD)	The cost of industrial water is approx. INR 90 / KL (USD 1.39 / KL)
Onsite Wastewater Treatment Plant (Y/N)	There is onsite waste water treatment plant available within the special economic zone
Transport costs	
Cost of shipping 20 foot FCL container shipping from Kandla	The approximate shipping charges of a 20 foot FCL Container from the nearest port are as follows: • Hamburg – Kandla → USD 725-1415[19] • Rotterdam – Kandla → USD 725-1415[20] • Antwerp – Kandla → USD 725-1303[21] • New York – Kanlda → USD 880-1874[22]
Cost of Labour (Taka/USD)	
Management	The salary of a management professional in the state of Gujarat is approx. USD 1,356 / month[23]
Technicians	The salary of a technician in the state of Gujarat is approx. USD 308 / month[24]
Skilled	The salary of a skilled in the state of Gujarat is approx. USD 109 / month[25]
Unskilled	The salary of a unskilled in the state of Gujarat is approx. USD 104 / month [26]
Sectors	
Type of Sectors within the Zone	Pharmaceuticals, Light Engineering, Chemicals, Metal Fabrication, etc.
Special Regime	
Yes/No	**Yes,** the incentives applicable under Gujarat Industrial Policy shall be applicable**.**
Fiscal Incentives	
Customs Duties	There are no exemption from custom duties as per Industrial Policy of Gujarat, however sector specific incentives might be applicable
Corporate Taxes / Indirect Taxes	There are no exemption from corporate taxes as per Industrial Policy of Gujarat, however sector specific incentives might be applicable
Income Tax on Profits	There are no exemption from income tax on profits as per Industrial Policy of Gujarat, however sector specific incentives might be applicable
Social Security Tax	No social security tax is available in India
No restrictions on Money Transfers	Profit and dividend earned from an Indian company are repatriable after payment of dividend distribution tax (DDT). DDT @ 16.995% (inclusive of cess) is payable by the company (that declares dividend) on the amount of dividend distributed. However, dividend is free of Indian income tax in the hands of the recipient shareholders, Indian or foreign. Profit of LLP is flow-through and repatriable without payment of any taxes and without any regulatory approval[27].
Others	There are sector specific incentives applicable which would depend on the sector of the industrial unit seeking to avail benefits

[18] *Source: http://www.ugvcl.com/petition/Tariff_Schedule.pdf*
[19] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[20] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[21] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[22] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[23] *Source: http://www.averagesalarysurvey.com/india*
[24] *Source: http://www.averagesalarysurvey.com/india*
[25] *Source: https://tradingeconomics.com/india/indicators*
[26] *Source: https://tradingeconomics.com/india/indicators*
[27] *Source: http://www.dobusinessinindia.in/repatriationoffund.php*

Factors	Gallops Industrial park
Non-Fiscal Incentives	
One Stop Shop Within the Zone	There is no One Stop Shop Within the Zone
Support Amenities	
Onsite Administration office	There is onsite administration office
Onsite Convenience Retail	There is no convenience retail stores available within the zone
Onsite Housing	There is no onsite housing available in the zone
Onsite Schools	There are no onsite schools available in the zone
Onsite Community Facilities	There are no community facilities available in the zone
Onsite Security	There is 24 hours onsite available in the zone
Quality of Life	
International Housing (Within 15 Km)	There are quality residential facilities like Kesar City available in proximity to the zone
International Hospital/Clinic (Within 20km)	There are quality international hospitals like NIMS Multi Specialty Hospital in close proximity to the zone
International Schools (Within 20 kms)	There are quality schools like DAV International School in close proximity to the zone

The Gallops Industrial Park has leveraged on the existing industrial eco system of Gujarat and superior quality infrastructure like power, water, waste treatment, etc. Such facilities have assisted the industrial park in attracting tenants from various sectors.

3.3.1.2. Noida SEZ

The Noida SEZ is located in the planned city of Noida within the National Capital Region (NCR). The SEZ is one of the smaller economic zones in India and draws its strength from its strategic location and well developed social and institutional infrastructure within the vicinity. The zone provides excellent infrastructure, supportive services and sector specific facilities for the thrust areas of exports like gems and jewelry and electronics/software. This has resulted in the zone experiencing heightened level of interest from investors.

Figure 15: Noida SEZ

Source: Google Images

Table 8: Noida SEZ

Factors	Noida SEZ
Site	
Land Size (acres)	310 acres
Number of Plots	Currently almost 360 firms are occupying either industrial space and industrial land within the economic zone
No. of Development Phases	The development have been carried out over a period of time but in a single phase
Land Lease (+length) or Sale (Taka/USD)	The park has variable land lease depending on the size of plots. The same have been depicted below: The upfront land lease for INR 6,500 (USD 100.04) / sq.m up to 4000 sq.m; • INR 5,500 (USD 84.65) / sq.m from 4,000 to 8,000 sq.m; • INR 4,500 (USD 69.26) / sq.m from 8,000 to 20,000 sq.m; • INR4,200 (USD 64.64) / sq.m from 20,000 to 40,000 sq.m; • INR 4,000 (USD 61.56) / sq.m from 40,000 to 80,000 sq.m;

Factors	Noida SEZ
	• INR 3,750 (USD 57.71) per sq.m for land above 80,000 sq.m [28]
Pre-Built Factories (PBF) (Y/N)	There are 13 Standard Design Factory (SDF) blocks available.
Lease Rate for PBF (Taka/USD)	The Lease rent for PBF is INR 1,812 / sq.m. / annum (USD 27.89 / sq.m. / annum)
Infrastructure/Utilities	
Onsite Independent Power (Y/N and Type)	There is no onsite captive power plant available for the special economic zone
Cost of Power (Taka/USD)	The cost of power is approx. INR 5.9 / KwH[29] (USD 0.091 / KwH)
Cost of Water (Taka/USD)	The charge for industrial water is reserved at INR 3,640 / per annum (USD 56 / annum) for plots up to 1,000 sq.m ; INR 5136 / annum (USD 79.2 / annum) for plots up to 5,000 sq.m ; INR 10,272 / annum (USD 158.39 / annum) for plots up to 5,000 sq.m[30]
Onsite Wastewater Treatment Plant (Y/N)	There is onsite waste water treatment plant available within the special economic zone
Transport costs	
Cost of shipping 20 foot FCL container shipping from Kandla	The approximate shipping charges of a 20 foot FCL Container from the nearest port are as follows: • Hamburg – Kandla port → USD 725-1415[31] • Rotterdam – Kandla port → USD 725-1415[32] • Antwerp – Kandla port → USD 725-1303[33] • New York – Kandla port → USD 880-1888[34]
Cost of Labour (Taka/USD)	
Management	The average salary of an operations manager is estimated at INR 52,138 / month (USD 803.97 / month)[35]
Technicians	The average salary of a maintenance technician is estimated at INR 19,310 / month (USD 297.76 / month)[36]
Skilled	The average salary of a skilled manpower is estimated at INR 11,830 / month (USD 182.42 / month)[37]
Unskilled	The average salary of a unskilled manpower is estimated at INR 9,724 / month (USD 150 / month)[38]
Sectors	
Type of Sectors within the Zone	Trading and services, gems and jewelry, textiles and garments, computer/electronic software, leather, footwear and sport shoes.
Special Regime	
Yes/No	**Yes**, there's a special regime for incentives
Fiscal Incentives	
Customs Duties	Exemptions from Customs duty on imports.
Corporate Taxes / Indirect Taxes	Exemption from central and state level taxes
Income Tax on Profits	100% Income Tax exemption on export income for SEZ units under Section 10AA of the Income Tax Act for first 5 years, 50% for next 5

[28] *Source: http://www.greaternoida.com/lrates*
[29] *Source: http://www.noidapower.com/images/Consumer_Handbook-Revised.pdf*
[30] *Source: https://www.nsez.gov.in/Resources/Announc/Circular%20for%20Revision%20in%20lease%20rentals%20&%20water%20charges.pdf*
[31] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[32] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[33] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[34] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[35] *Source: https://www.payscale.com/research/IN/Location=New-Delhi-Delhi/Salary*
[36] *Source: https://www.indeed.co.in/salaries/Maintenance-Technician-Salaries,-New-Delhi-DL*
[37] *Source: https://paycheck.in/main/salary/minimumwages/delhi/minimum-wage-in-delhi-with-effect-from-october-1-2016-to-march-31-2017*
[38] *Source: https://paycheck.in/main/salary/minimumwages/delhi/minimum-wage-in-delhi-with-effect-from-october-1-2016-to-march-31-2017*

Factors	Noida SEZ
	years thereafter and 50% of the ploughed back export profit for next 5 years.
Social Security Tax	No social security tax is available in India
No restrictions on Money Transfers	Profit and dividend earned from an Indian company are repatriable after payment of dividend distribution tax (DDT). DDT @ 16.995% (inclusive of cess) is payable by the company (that declares dividend) on the amount of dividend distributed. However, dividend is free of Indian income tax in the hands of the recipient shareholders, Indian or foreign. Profit of LLP is flow-through and repatriable without payment of any taxes and without any regulatory approval[39].
Others	• Exemption from Service Tax
Non-Fiscal Incentives	
One Stop Shop Within the Zone	**Yes**, there is a one stop shop within the zone
Support Amenities	
Onsite Administration office	There is onsite administration office available within the zone
Onsite Convenience Retail	There is no convenience retail available within the zone
Onsite Housing	There is no onsite housing available within the zone
Onsite Schools	There is no onsite housing available within the zone
Onsite Community Facilities	There is community facilities available within the zone
Onsite Security	There is onsite security available within the zone
Quality of Life	
International Housing (Within 15 Km)	Quality international housing like Exotica Fresto, Lotus Zing and many others are available around the area of SEZ
International Hospital/Clinic (Within 20 Km)	Quality international hospital like max multi-specialty, metro multi-specialty hospitals are available in close proximity to the economic zone
International Schools (Within 20 Km)	Quality international schools like Kothari International school, Ryan International school, Sapphire International school, Billabong high International school etc. are available in close proximity to the economic zone

The Noida SEZ is one of the smaller multi-product economic zones of India and has witnessed resounding success owing to its proximity to the capital city of New Delhi and the thriving industrial eco system in Noida. Access to superior quality physical and social infrastructure has also facilitated industrial development within the zone.

[39] *Source: http://www.dobusinessinindia.in/repatriationoffund.php*

3.3.1.3. Overseas Infrastructure Limited, Mathura

Overseas Infrastructure Limited is a privately owned industrial park promoted by the Overseas Infrastructure Group. The park is located in close proximity to the city of Mathura situated in northern India. The industrial park is at a nascent stage of development and is equipped with state of the art infrastructure like developed land plots, utility connections, social infrastructure, etc. The superior quality infrastructure within the zone and its proximity to the capital city of New Delhi has resulted in a positive image from end users.

Figure 16: Overseas Infrastructure Limited

Table 9: Integrated Industrial Park, Mathura

Factors	Integrated Industrial Park, Mathura
Site	
Land Size (acres)	260 acres
Number of Plots	Plots of variable sizes are available, however the exact number of plots have not been demarcated
No. of Development Phases	The development has been carried out over a period of time but in a single phase
Land Lease (+length) or Sale (Taka/USD)	The land lease rental for industrial plot is INR 123.5 / sq.m / month (USD 1.91 / sq.m / month)
Pre-Built Factories (PBF) (Y/N)	No pre-Built factories are available as a part of the product mix
Lease Rate for PBF (Taka/USD)	There is no lease rentals available for PBF since they are not available in the product mix
Infrastructure/Utilities	
Onsite Independent Power (Y/N and Type)	There is no onsite captive power plant available for the special economic zone
Cost of Power (Taka/USD)	The cost of industrial power is INR 5.2 / KwH (USD 0.08 / KwH)[40]
Cost of Water (Taka/USD)	The cost of industrial water is INR 30 / KL (USD 0.45 / KL)[41]

[40] *Source: UPERC Tariff Order*
[41] *Source: Noida SEZ*

Factors	Integrated Industrial Park, Mathura
Onsite Wastewater Treatment Plant (Y/N)	There is onsite waste water treatment plant available within the special economic zone
Transport costs	
Cost of shipping 20 foot FCL container shipping to Kandla	The approximate shipping charges of a 20 foot FCL Container from the nearest port are as follows: • Hamburg – Kandla port → USD 725-1415[42] • Rotterdam – Kandla port → USD 725-1415[43] • Antwerp – Kandla port → USD 725-1303[44] • New York – Kandla port → USD 880-1888[45]
Cost of Labour (Taka/USD)	
Management	The average salary of an operations manager is estimated at INR 52,138 / month (USD 803.97 / month)[46]
Technicians	The average salary of a maintenance technician is estimated at INR 19,310 / month (USD 297.76 / month)[47]
Skilled	The average salary of a skilled manpower is estimated at INR 11,830 / month (USD 182.42 / month)[48]
Unskilled	The average salary of a unskilled manpower is estimated at INR 9,724 / month (USD 150 / month)[49]
Sectors	
Type of Sectors within the Zone	Food processing Industry, Chemical and chemical products Industry, Electronics Industry, Machinery and equipment sector etc.
Special Regime	
Yes/No	**Yes,** the incentives applicable under Gujarat Industrial Policy shall be applicable**.**
Fiscal Incentives	
Customs Duties	There are no exemption from custom duties as per Industrial Policy of the state, however sector specific incentives might be applicable
Corporate Taxes / Indirect Taxes	There are no exemption from corporate taxes as per Industrial Policy of the state, however sector specific incentives might be applicable
Income Tax on Profits	There are no exemption from income tax on profits as per Industrial Policy of the state, however sector specific incentives might be applicable
Social Security Tax	No social security tax is available in India
No restrictions on Money Transfers	Profit and dividend earned from an Indian company are repatriable after payment of dividend distribution tax (DDT). DDT @ 16.995% (inclusive of cess) is payable by the company (that declares dividend) on the amount of dividend distributed. However, dividend is free of Indian income tax in the hands of the recipient shareholders, Indian or foreign. Profit of LLP is flow-through and repatriable without payment of any taxes and without any regulatory approval[50].
Others	There are sector specific incentives applicable which would depend on the sector of the industrial unit seeking to avail benefits

[42] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[43] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[44] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[45] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[46] *Source: https://www.payscale.com/research/IN/Location=New-Delhi-Delhi/Salary*
[47] *Source: https://www.indeed.co.in/salaries/Maintenance-Technician-Salaries,-New-Delhi-DL*
[48] *Source: https://paycheck.in/main/salary/minimumwages/delhi/minimum-wage-in-delhi-with-effect-from-october-1-2016-to-march-31-2017*
[49] *Source: https://paycheck.in/main/salary/minimumwages/delhi/minimum-wage-in-delhi-with-effect-from-october-1-2016-to-march-31-2017*
[50] *Source: http://www.dobusinessinindia.in/repatriationoffund.php*

Factors	Integrated Industrial Park, Mathura
Non-Fiscal Incentives	
One Stop Shop Within the Zone	**Yes**, there is a one stop shop within the zone
Support Amenities	
Onsite Administration office	Onsite administration office is available within the zone as part of the development plan
Onsite Convenience Retail	Onsite convenience retail is available within the zone as part of the development plan
Onsite Housing	Three types of housing based on income i.e. high, medium and low are planned within the development.
Onsite Schools	An on-site education center is planned within the development.
Onsite Community Facilities	Community facilities like health care centres are planned within the zone
Onsite Security	Onsite security is available within the zone
Quality of Life	
International Housing (Within 15 Km)	There are no superior quality housing available in close proximity to the zone
International Hospital/Clinic (Within 20km)	There are no superior quality schools available in close proximity to the zone
International Schools (Within 20 kms)	There are no superior quality schools available in close proximity to the zone

The major advantage of the site is its location within the National Capital Region of the country which has an existing industrial base. The site also has access to key enablers like Inland Container Depots (ICD) and falls in the alignment of the Dedicated Freight Corridor. The presence of critical infrastructure like warehouse, water treatment plant, etc. have further added to the attractiveness of the location as an investment destination.

3.3.1.4. Raninagar Industrial Growth Center

The Raninagar Industrial Growth Center is located in the state of West Bengal in the eastern part of India. It is promoted by the West Bengal Industrial Infrastructure Development Corporation which is the nodal agency for the state of West Bengal for industries. This growth center is home to a number of industries including reputed brands Hindustan Coca Cola Beverages (HCCB) and Indian Oil.

Figure 17: Raninagar Industrial Growth Center

A detailed profiling of the park has been provided below –

Table 10: Raninagar Industrial Growth Center

Factors	Raninagar industrial growth center
Site	
Land Size (acres)	152 acres
Number of Plots	Currently there are 27 industrial units operating in the growth center
No. of Development Phases	The development have been carried out over a period of time but in a single phase
Land Lease (+length) or Sale (Taka/USD)	Industrial land lease premium is INR 2.45 Mn / acre (USD 37,810 / acre). [51]
Pre-Built Factories (PBF) (Y/N)	There are no Pre-Built Factories provided as a part of the product offering
Lease Rate for PBF (Taka/USD)	There is no lease rate for PBF since PBF are not provided in the product mix
Infrastructure/Utilities	

[51] Source: http://www.wbidc.com/industrial_parks/available_land.htm

Factors	Raninagar industrial growth center
Onsite Independent Power (Y/N and Type)	There is no onsite captive power plant available for the special economic zone
Cost of Power (Taka/USD)	The cost of power is approx. INR 7.45 / KwH **(USD 0.11 / KwH) for** industries[52]
Cost of Water (Taka/USD)	The cost of industrial water is approx. INR 18 / KL (USD 0.28 / KL)[53]
Onsite Wastewater Treatment Plant (Y/N)	There is no onsite water treatment plant since industries within the zone typically have their own treatment plant
Transport costs	
Cost of shipping 20 foot FCL container shipping to Kolkata	• Hamburg – Kolkata → USD 1312-1677[54] • Rotterdam – Kolkata → USD 1285-1665[55] • Antwerp – Kolkata → USD 1370-1665[56] • New York – Kolkata → USD 836-924[57]
Cost of Labour (Taka/USD)	
Management	The salary for a management professional in West Bengal is approx. USD 1,125 / month[58]
Technicians	The salary for a technician in West Bengal approx. USD 478 / month[59]
Skilled	The salary for a skilled labour in West Bengal approx. USD 153 / month[60]
Unskilled	The salary for an un-skilled labour in West Bengal approx. USD 115 / month[61]
Sectors	
Type of Sectors within the Zone	Automotive, Light Engineering, Food & Beverages, Fast Moving Consumer Goods (FMCG)
Special Regime	
Yes/No	**No**, there's no special regime for incentives
Fiscal Incentives	
Customs Duties	As per the Industrial policy of West Bengal, there are no incentives on custom duties. However, there could be sector specific incentives
Corporate Taxes / Indirect Taxes	As per the Industrial policy of West Bengal, there are no separate incentives on corporate taxes. However, there are a few sector specific incentives available.
Income Tax on Profits	There is no incentive on income taxes as per industrial policy. However, there could be incentives based on sector of industries.
Social Security Tax	No social security tax is available in India
No restrictions on Money Transfers	Profit and dividend earned from an Indian company are repatriable after payment of dividend distribution tax (DDT). DDT @ 16.995% (inclusive of cess) is payable by the company (that declares dividend) on the amount of dividend distributed. However, dividend is free of Indian income tax in the hands of the recipient shareholders, Indian or foreign. Profit of LLP is flow-through and repatriable without payment of any taxes and without any regulatory approval[62].
Others	• 100% of Electricity Duty subject to the maximum ceiling of INR 25 lakhs / year / INR 1.25 crores in 5 years (USD 38,450 / year to USD 192,250 in 5 years)

[52] *Source: https://www.wbsedcl.in/irj/go/km/docs/internet/new_website/pdf/Tariff_Volumn/PDFsam_mergetariff2.pdf*
[53] *Source: Interactions with WBIDC officials*
[54] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[55] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[56] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[57] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[58] *Source: https://www.payscale.com/research/IN/Job=General_%2F_Operations_Manager/Salary/6e042b69/Kolkata*
[59] *Source: http://www.averagesalarysurvey.com/calcutta-india*
[60] *Source: https://paycheck.in/main/salary/minimumwages/west-bengal*
[61] *Source: https://paycheck.in/main/salary/minimumwages/west-bengal*
[62] *Source: http://www.dobusinessinindia.in/repatriationoffund.php*

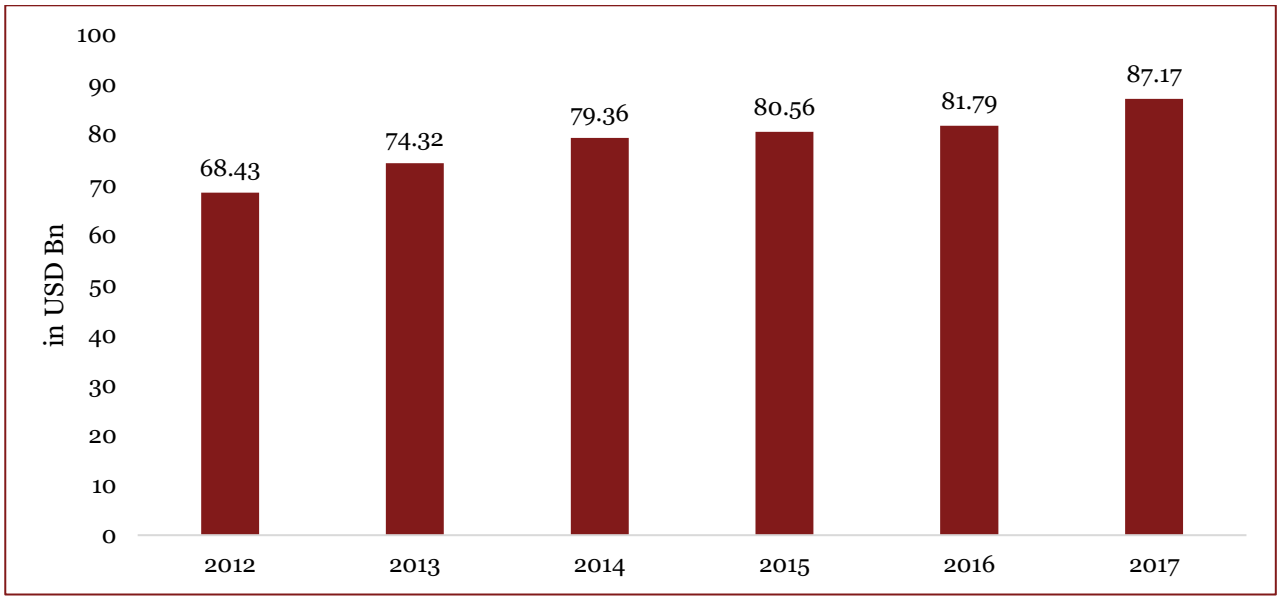
Factors	Raninagar industrial growth center
	• An eligible unit in the medium and large sector will be entitled to reimbursement to the extent of 80% of contribution towards Employee Provident Fund and Employees' State Insurance • Industries shall be eligible for 75% of refund of stamp duty • Anchor unit subsidy of INR 100 lakh (USD 153,800) shall be offered for the first two manufacturing enterprises with minimum employment of 100 members and minimum investment of INR 50 Crore (USD 7,690,000) • Industrial units will be encouraged for filing their successfully generated, registered and accepted patents based on their original work/research. The State Government will provide financial assistance of 50% of the expenditure incurred, up to a maximum of INR 2 lakh (USD 3,076), / patent. The expenditure incurred will include the amount spent on filing of patent, attorney fees, patent tracking etc. • 75% waiver of fees incurred towards land conversion charges
Non-Fiscal Incentives	
One Stop Shop Within the Zone	One stop shop is not available within the zone.
Support Amenities	
Onsite Administration office	There is an onsite administration office available within the zone.
Onsite Convenience Retail	Onsite convenience retail is not available inside the zone
Onsite Housing	There is limited number of staff quarter present within the park
Onsite Schools	There are no schools available inside the zone
Onsite Community Facilities	There are no community facilities inside the zone.
Onsite Security	Onsite security is available at the zone.
Quality of Life	
International Housing (Within 15 Km)	Quality housing facilities are available in the nearby town of Jalpaiguri
International Hospital/Clinic (Within 20km)	Quality healthcare facilities like Jalpaiguri District Hospital is available in proximity to the economic zone
International Schools (Within 20 Km)	Various schools like Holy Child School, Techno India Public School etc. are present in proximity to the economic zone

The industrial park is an important Trade Centre due to its proximity with North-East states. Since the industries in the Growth Centre are majorly small to medium scale industries, they source their raw material from nearby locations and have their distribution Centres in neighboring districts of North Bengal and other states in North East like Assam and Sikkim

3.3.2. Sri Lanka

Sri Lanka is an island nation situated to the southern tip of India. The country is also an emerging economy like Bangladesh and has a thriving garments sector. Sri Lanka's economy had suffered for a prolonged period from civil unrest, however recent times of witnessed the economy reviving on the back of strong domestic demand and exports. The major exports of the country are tea, garments, fish, spices, etc. The Government of Sri Lanka in a bid to attract foreign investments have also developed Export Processing Zones in the country and also providing prudent incentives. The GDP growth of Sri Lanka has been depicted below. **Data used for the analysis is the latest data point available in the respective database.**

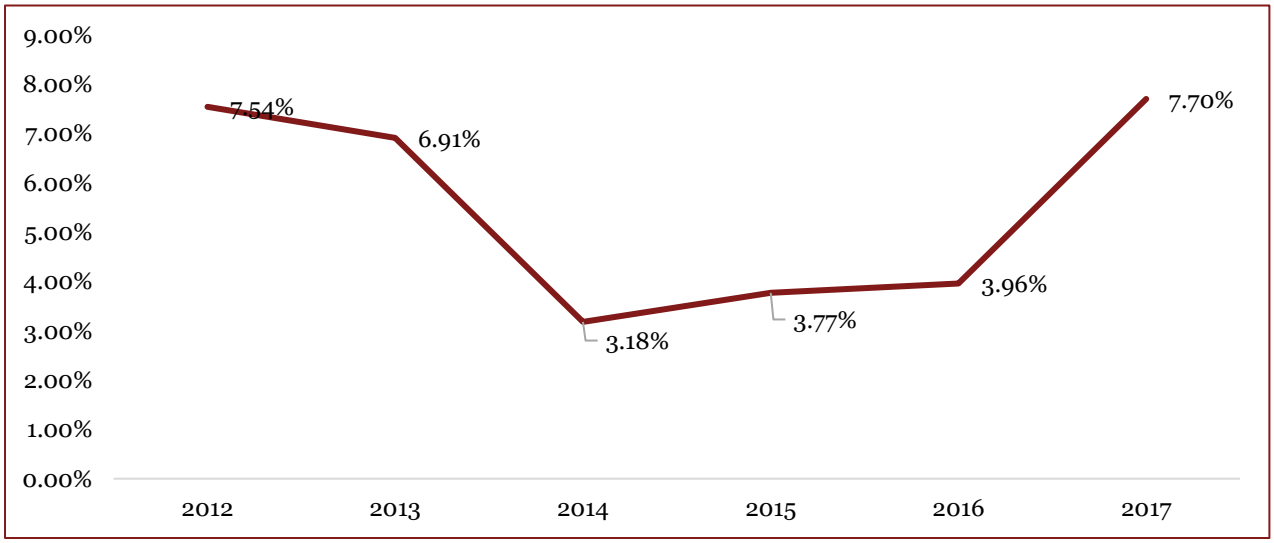
Figure 18: GDP of Sri Lanka



Source: The World Bank

Post the political unrest in Sri Lanka, the inflation rates have declined only to rise steeply over the past one year on account of natural disasters like cyclone which resulted in escalation of food prices. The increase in charges like VAT has also adversely impacted the inflation trend adversely. **Data used for the analysis is the latest data point available in the respective database.**

Figure 19: Inflation Trend of Sri Lanka



Source: The World Bank

The other broad level economic parameters of the country have been depicted below –

Table 11: Macro-economic Parameter of Sri Lanka

Macroeconomic Indicator	Description	Data Source
Unemployment	5.0%	The Heritage Foundation
FDI Inflow	USD 1.4 billion	The World Bank
Exports	USD 10.5 billion	ITC Trade Map
Imports	USD 19.5 billion	ITC Trade Map
Heritage Foundation's Index of Economic Freedom Rankings.	111	The Heritage Foundation
Cato Institute's Human Freedom ranking	135	Human Freedom Index | Cato Institute
World Economic Freedom's Global Competitive Index Rating	85	Global Competitiveness Index 2017–2018 rankings
WB Doing Business ranking	111	Doing Business 2018

Sri Lanka's overall score has increased from previous years owing to improvements in investment freedom, business freedom and judicial effectiveness. The economy of Sri Lanka is transitioning from being predominantly rural-based to urban economy-oriented around manufacturing and services. The government is implementing fiscal reforms, improving public financial management, increasing public and private investments, addressing infrastructure constraints and improving competitiveness. Sri Lanka has made significant improvements in human development. The country's Social indicators rank among the highest in South Asia and compare favorably with those in middle-income countries. The national poverty headcount ratio declined from 15.3 % in 2006/07 to 6.7 % in 2012/13[63] although disparities still remain within the country.

Post analysis of the broad macro-economy of Sri Lanka, an analysis of the Kandy Industrial Park has been provided on the next page –

[63] *Source: World Bank*

3.3.2.1. Kandy Industrial Park

The Kandy Export Processing Zone is located at Pallekele in the Kandy District of Sri Lanka. The zone harbors industries from varied sectors like Textile, RMG, Pharmaceutical, Food processing, rubber products, light Engineering, etc. The zone has benefited from presence of superior quality infrastructure like internal roads, utility connections, well laid out internal roads, etc.

Figure 20: Kandy Industrial park

Source: Google Images

A detailed profiling of the park is provided below –

Table 12: Kandy Industrial park, Sri Lanka

Factors	Kandy Export Processing Zone
Site	
Land Size (acres)	205 acres
Number of Plots	According to the existing master plan approx. 40 plots are present in Kandy Industrial park
No. of Development Phases	The development have been carried out over a period of time but in a single phase
Land Lease (+length) or Sale (Taka/USD)	There is a minimum upfront land premium of USD 2.47 / sq.m. Additionally there would be a land rental of USD 1.05 / sq.m / annum
Pre-Built Factories (PBF) (Y/N)	There are no PBF available as a part of the product offering
Lease Rate for PBF (Taka/USD)	There is no lease rate for PBF since PBF are not provided as a part of the product mix
Infrastructure/Utilities	
Onsite Independent Power (Y/N and Type)	There is no onsite captive power plant available for the special economic zone
Cost of Power (Taka/USD)	For Industries with demand less than or equal to 42 KVA the cost of power is as follows: • For consumption <301 KWh, the tariff is LKR 10.8 /KWh (USD 0.069/KWh)[64] • For consumption >300 KWh, the tariff is LKR 12.2 /KWh (USD 0.078/KWh)[65]

[64] *Source: http://www.ceb.lk/for-your-business/*
[65] Source: http://www.ceb.lk/for-your-business/

Factors	Kandy Export Processing Zone
	For Industries with demand more than 42 KVA the cost of power is as follows: • During peak hours, the tariff is LKR 20.5 / KWh (USD 0.13/KWh)[66] • During day time, the tariff is LKR 11 / KWh (USD 0.071/KWh)[67] • During Off-peak, the tariff is LKR 6.85 /KWh (USD 0.044/KWh) [68]
Cost of Water (Taka/USD)	The charge of industrial water is LKR 61 / KL (USD 0.31 / KL) plus extra Service charge per month.[69]
Onsite Wastewater Treatment Plant (Y/N)	There is no centralized waste water treatment plant available. Individual companies need to have their own treatment plant.
Transport costs	
Cost of shipping 20 foot FCL container shipping to Colombo	The approximate shipping charges of a 20 foot FCL Container from the nearest port are as follows: • Hamburg – Colombo port → USD 1161[70] • Rotterdam – Colombo port → USD 1140[71] • Antwerp – Colombo port → USD 1175[72] • New York – Colombo port → USD 960[73]
Cost of Labour (Taka/USD)	
Management	The average salary for a management professional is approx. USD 800 / month[74]
Technicians	The average salary for a technician is approx. USD 200 / month[75]
Skilled	The average salary for a skilled labour is approx. USD 112 / month[76]
Unskilled	The average salary for a un-skilled labour is approx. USD 84 / month[77]
Sectors	
Type of Sectors within the Zone	Textile, RMG, Pharmaceutical, Food processing, rubber products, Light Engineering.
Special Regime	
Yes/No	Yes, there's a special regime for incentives
Fiscal Incentives	
Customs Duties	• Exemptions of Customs Duty on capital goods and raw materials. • Non-export oriented companies are entitled to import project related capital goods free of Customs Duty.
Corporate Taxes / Indirect Taxes	• Exemption of tax on dividends. • Minimum tax exemption of 4 to 11 years depending on the type of sectors and percentage of exports.
Income Tax on Profits	• Income tax exemption up to 5 years • Reduced rate after 5 years/ tax holiday is levied at 12% to 28% depending on the income.
Social Security Tax	There is social security tax in Sri Lanka. The employer contributes 12% and the employee 8% of remuneration to the Employees Provident Fund (EPF). The employer also contributes 3% of employee remuneration to the Employee Trust Fund. Employees that have completed 5 years of service are entitled to a gratuity at the time of

[66] Source: http://www.ceb.lk/for-your-business/
[67] Source: http://www.ceb.lk/for-your-business/
[68] Source: Ceylon Electricity Board : http://www.ceb.lk/for-your-business/
[69] Source: http://www.waterboard.lk/web/images/contents/consumer_help/water_tariff_e.pdf
[70] Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/
[71] Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/
[72] Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/
[73] Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/
[74] Source: http://www.investsrilanka.com/free_trade_zones/kandy_other_cost_factors
[75] Source: http://www.investsrilanka.com/free_trade_zones/kandy_other_cost_factors
[76] Source: http://www.investsrilanka.com/free_trade_zones/kandy_other_cost_factors
[77] Source: http://www.investsrilanka.com/free_trade_zones/kandy_other_cost_factors

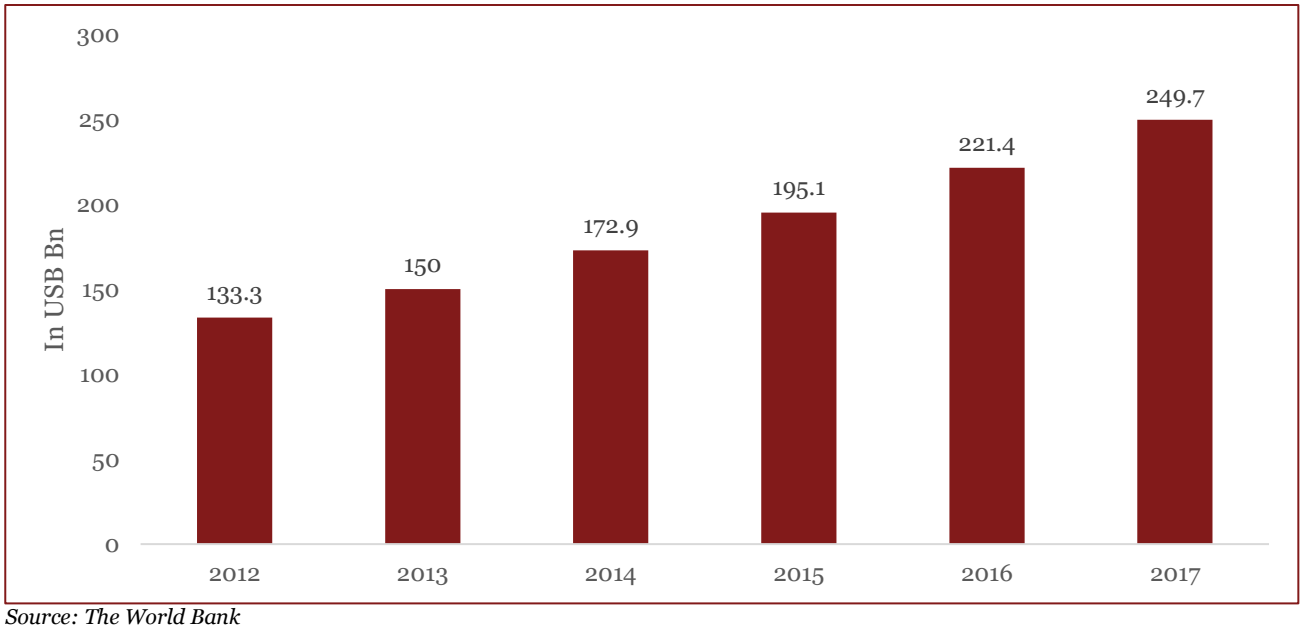
Factors	Kandy Export Processing Zone
	retirement at a rate of 50% of the last drawn salary multiplied by the number of years of service at the time of retirement.
No restrictions on Money Transfers	Sri Lanka does not impose any restrictions on the repatriation of profits. The government allows 100% repatriation on earnings, fees and capital, and on foreign exchange transactions relating to current account payments.
Others	• Exemption of transfer charges on transfer of land
Non-Fiscal Incentives	
One Stop Shop Within the Zone	Yes, one stop shop is available within the zone.
Support Amenities	
Onsite Administration office	Administration office is available onsite
Onsite Convenience Retail	Onsite convenience retail is not available
Onsite Housing	Onsite housing is not available
Onsite Schools	Onsite schooling is not available
Onsite Community Facilities	Onsite community facilities are not available
Onsite Security	Onsite security is available onsite
Quality of Life	
International Housing (Within 15 Km)	Superior quality residential facilities in the form of Victoria Range (A large residential area) and other are available in proximity to the economic zone
International Hospital/Clinic (Within 20km)	Superior quality international hospital like Kandy Teaching Hospital is present in proximity to the zone
International Schools (Within 20 kms)	Superior quality schools like École Internationale Kandy is present in proximity to the zone

The Kandy EPZ is a Government promoted export processing zone and located in Kandy which is a prominent urban agglomeration in the country. The zone is well connected with the capital city of Colombo, which also houses one of the largest transshipment port of Asia. The zone is also located in close proximity to the Kandy Railway which allows for seamless evacuation of goods from the export processing zone. This has resulted in a number of investors setting up manufacturing units within the zone.

3.3.3. Bangladesh

Bangladesh is a South Asian country is one of the rapidly emerging economies of the World and also one of the most populous countries. The major exports of the country include garments, sea foods and agriculture products. Ready Made Garments contribute to majority of the export share followed by sea food. The major imports include machinery, cotton, iron and steel. Bangladesh has been listed among the next 11 emerging markets and is also one of the fastest growing economies according to International Monetary Fund (IMF). The Financial centers in the country have performed extremely well making the financial sector second largest in sub-continent after India. The investments from foreign companies made Bangladesh grow rapidly in communication sector. The GDP is mostly driven by exports from RMG and sea foods. The GDP trend over the years is depicted below. **Data used for the analysis is the latest data point available in the respective database.**

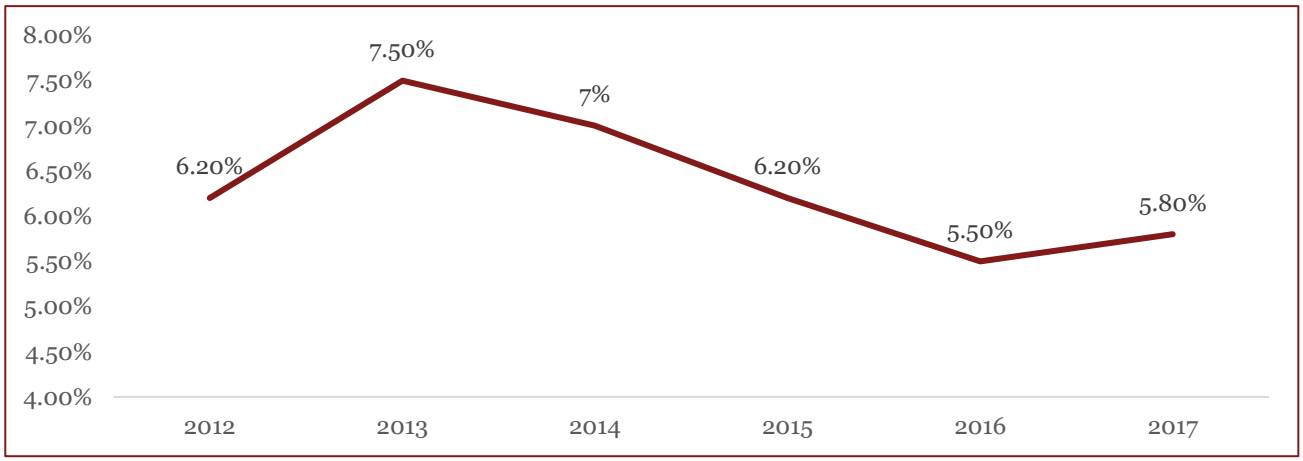
Figure 21: GDP of Bangladesh



Source: The World Bank

According to leading economists of World Bank, the non-food inflation of Bangladesh declined, aided by prudent monetary management and weak aggregate demand growth. The aggregate demand growth further slowed in recent years due to a large decline in remittances, depressed earnings in garments exports. **Data used for the analysis is the latest data point available in the respective database.**

Figure 22: Inflation Trend of Bangladesh



Source: The World Bank

Post analysis of the broad macro-economy of Bangladesh, an analysis of the Mongla EPZ has been provided below.

Table 13: Macro-economic Parameters of Bangladesh

Macroeconomic Indicator	Description	Data Source
Unemployment	4.10%	The Heritage Foundation
FDI Inflow	$2.1 billion	The World Bank
Exports	USD 39.97 billion	ITC Trade Map
Imports	USD 44.83 billion	ITC Trade Map
Heritage Foundation's Index of Economic Freedom Rankings.	128	The Heritage Foundation
Cato Institute's Human Freedom ranking	133	Human Freedom Index | Cato Institute
World Economic Freedom's Global Competitive Index Rating	99	Global Competitiveness Index 2017 –2018 rankings
WB Doing Business ranking	177	Doing Business 2018

Bangladesh's economy has grown by approximately 6 % annually for two decades despite prolonged political instability, poor infrastructure, insufficient power supplies, and slow implementation of economic reforms. Garment exports forms the backbone of Bangladesh's industrial sector, accounted for more than 80 % of total exports from the country. Some of the areas where Bangladesh lags which has resulted in the country's poor scoring are antiquated property rights, poor record keeping, inefficient contract enforcement, etc.

3.3.3.1. Mongla EPZ

Mongla Export Processing Zone (EPZ) is located towards the southern region of Bangladesh in close proximity to the Mongla Port. The Mongla EPZ is promoted by Bangladesh Export Processing Zones Authority (BEPZA) which is one of the nodal agencies responsible for promoting industrialization within Bangladesh. The Mongla EPZ harbors companies from various sectors like Ready Made Garments (RMG), Pulp & Paper, Electrical & Electronics, etc. Despite being located in close proximity to the Mongla Port, the zone has not been able to achieve full occupancy owing to lack of gas which is a critical utility in Bangladesh's context.

Figure 23: Mongla EPZ

Source: BEPZA

The detailed profiling of the Mongla EPZ has been depicted below –

Table 14: Mongla EPZ

Factors	Mongla EPZ
Site	
Land Size (acres)	255.41 acres
Number of Plots	There are about 190 Industrial plots within the export processing zone
No. of Development Phases	The development have been carried out over a period of time but in a single phase
Land Lease (+length) or Sale (Taka/USD)	Tariff for land is USD 1.25 / sq.m / year. For a standard lease period of 30 years
Pre-Built Factories (PBF) (Y/N)	Pre-Built factories are available with an area of 18717.68 sq.m
Lease Rate for PBF (Taka/USD)	Lease rental for PBF is USD 19.2 / sq.m / year
Infrastructure/Utilities	
Onsite Independent Power (Y/N and Type)	There is no onsite captive power plant available for the special economic zone

Factors	Mongla EPZ
Cost of Power (Taka/USD)	The cost of power is BDT 7.5 / KwH (USD 0.091 / KwH)[78]
Cost of Water (Taka/USD)	The cost of water is BDT 24.74 / KL (USD 0.3 / KL)[79]
Onsite Wastewater Treatment Plant (Y/N)	There is onsite waste water treatment plant available within the Export processing zone.
Transport costs	
Cost of shipping 20 foot FCL container shipping to Mongla	The approximate shipping charges of a 20 foot FCL Container from the nearest port are as follows: • Hamburg – Port of Mongla → USD 1110-1672[80] • Rotterdam – Port of Mongla → USD 1122-1672[81] • Antwerp – Port of Mongla → USD 1125-1672[82] • New York – Port of Mongla → USD 2366-2615[83]
Cost of Labor (Taka/USD)	
Management	The cost of management is approximately USD 533 / month[84]
Technicians	The cost of a technician is approximately USD 403 / month[85]
Skilled	The cost of a skilled labourer is approximately USD 107.25 / month[86]
Unskilled	The cost of an unskilled labourer is approximately USD 56 / month[87]
Sectors	
Type of Sectors within the Zone	Metal, Agro, paper, garments, Electronic and electrical goods, tent, zipper, Sewing thread and Embroidery thread etc.
Special Regime	
Yes/No	**Yes**, there's a special regime for incentives
Fiscal Incentives	
Customs Duties	• Duty free import of construction materials • Duty free import of machineries, office equipment & spare parts etc. • Duty free import and export of raw materials and finished goods
Corporate Taxes / Indirect Taxes	
Income Tax on Profits	• 100% exemption from income tax for first 3 years • 50% exemption from income tax between 3rd to 6th years • 25% exemption from income tax on 7th year • No benefit on income tax thereon
Social Security Tax	
No restrictions on Money Transfers	Full repatriation of capital invested from foreign sources is allowed by Bangladesh. Similarly, profits and dividend accruing to foreign investment may be transferred in full. If foreign investors reinvest their repatriable dividends and or retained earnings, those will be treated as new investment. Foreigners employed in Bangladesh are entitled to remit up to 50 percent of their salary and will enjoy facilities for full repatriation of their savings and retirement benefits.
Others	Exemption from dividend tax; Remittance of royalty, technical and consultancy fees
Non-Fiscal Incentives	
One Stop Shop Within the Zone	**Yes**, there's one stop shop within the zone
Support Amenities	
Onsite Administration office	Onsite Administration office is available within the zone

[78] *Source: http://bepza.gov.bd/pages/epzdetails/mongla-export-processing-zone/utility-services-7*
[79] *Source: http://bepza.gov.bd/pages/epzdetails/mongla-export-processing-zone/utility-services-7*
[80] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[81] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[82] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[83] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[84] *Source: http://www.averagesalarysurvey.com/bangladesh*
[85] *Source: http://www.averagesalarysurvey.com/bangladesh*
[86] *Source: https://tradingeconomics.com/bangladesh/indicators*
[87] *Source: https://tradingeconomics.com/bangladesh/indicators*

Factors	Mongla EPZ
Onsite Convenience Retail	Onsite Convenience Retail is not available within the zone
Onsite Housing	Onsite Housing is not available within the zone
Onsite Schools	Onsite Schools is not available within the zone
Onsite Community Facilities	Onsite Community Facilities are not available within the zone
Onsite Security	Onsite Security is available within the zone
Quality of Life	
International Housing (Within 15 Km)	Not available
International Hospital/Clinic (Within 20km)	Various Primary and private hospitals within 20kms are available. A super specialty Hospital "Khulna City medical Hospital" is at 45km distance
International Schools (Within 20 kms)	St. Paul's high school, Digraj secondary school and a list of various other schools.

3.4. Comparative Analysis

This section captures an exhaustive comparative analysis of both broad level geographic indicators and site specific comparative parameters between the EZ site coming up in Gopalgonj and its potential competitors in the region. Tables below provide an insight into macro-economic performance indicators of the countries which are home to the industrial parks shortlisted as competitors to EZ site in Gopalgonj, Bangladesh. A comparison has been made to understand how Bangladesh stands with respect to these countries. This comparison is important as investors often take into consideration the macro-economic performance of countries to shortlist investment destinations in order to minimize risks to their investments and maximize their returns.

Table 15: Macro-Economic indicators (2017-18)

Country	GDP (USD billion)	GDP annual growth rate (%)	GDP per capita (PPP) (USD)	Inflation Rate (%)	Unemployment Rate (%)	Population (million)
India	2,597	6.62%	1,939	3.3%	3.5%	1,339.2
Sri Lanka	87.2	3.11%	4,065	7.7%	5.0%	21.4
Bangladesh	249.7	7.28%	1,516	5.8%	4.1%	164.67

Source: World Bank and the Heritage Foundation

Table 16: FDI indicators 2017

Country	FDI for 2017 (USD million)
India	39,966
Sri Lanka	1,374
Bangladesh	2,151

Source: World Bank

Table 17: Heritage Foundation Score 2018

Country	Heritage Foundation Rating (global)	Individual country score	Score change	Freedom group ranking	Competitor's ranking
India	130	54.5	+1.9	Mostly unfree	3
Sri Lanka	111	57.8	+0.4	Mostly unfree	1
Bangladesh	128	55.1	+0.1	Mostly unfree	2

Source: The Heritage Foundation

Table 18: Global Competitiveness Ranking 2017-18

Country	Global Competitiveness Ranking 2018	Country Score	Global Competitiveness Ranking 2017	Rank Change from 2017 to 2018
India	40	4.59	39	-1
Sri-Lanka	85	4.08	71	-14
Bangladesh	99	3.91	106	+7

Source: World Bank

Table 19: Global Financial Market Development Ranking (World Economic Forum)

Country	Financial Market Development Ranking
India	42
Sri-Lanka	83
Bangladesh	98

Table 20: World Bank Doing Business Ranking 2017-18

Country	Ease of Doing Business Ranking 2018	Ease of Doing Business Ranking 2017	Rank Change from 2017 to 2018
India	100	130	+30
Sri-Lanka	111	110	-1
Bangladesh	177	176	-1

Source: World Bank

Table 21: World Bank Doing Business Components 2017-18

Parameters	India	Sri-Lanka	Bangladesh
Starting Business	156	77	131
Dealing with Construction Permits	181	76	130
Getting Electricity	29	93	185
Registering Property	154	157	185
Getting Credit	29	122	159
Protecting Minority Investors	4	43	76
Trading Across Borders	146	86	173
Enforcing Contracts	164	165	189

Source: World Bank

The comparative study done indicates that while Bangladesh is becoming more competitive at the global stage, it still lags behind the Indian economy. Due to Bangladesh's close proximity to India, India can be considered a major competitor to Bangladesh in terms of attracting foreign investments. Although, Bangladesh fares better than India in terms of allowing new businesses to be established, providing construction permits and heritage foundation freedom ratings, it lags behind India in all other major macro-economic parameters like providing electricity and easy credit facility, registering of property, protecting minority investors and enforcing contracts.

Bangladesh Investment Development Authority (BIDA) has taken cognizant of the need to improve Bangladesh's ease of doing business rankings and has set a target of reaching double digit ranking by 2021 from its current rank of 177. Areas of improvement identified by BIDA are - Streamlining regularity service delivery in National Board of Revenue, Directorate of Environment, RAJUK, Courts, Export Promotion Bureau, Chief Controller of Imports and Exports, and other agencies in 11 thematic areas which are a part of Doing Business Components as listed in Table named "World Bank Doing Business Components 2017-18".

These initiatives could make Bangladesh a more competitive economy in future.

Improvement in macro-economic scenario of Bangladesh would also need to be supported by the facilities and cost advantages being offered by proposed EZ site in Gopalgonj in order to attract investments. A comparative study of competing economic zones have been done on the next page to understand competitiveness of the EZ site in Gopalgonj with respect to its competitors.

Table 22: Comparative Analysis

Parameters	Gopalgonj EZ site	Gallops Industrial Park	Noida SEZ	Integrated Industrial park, Mathura	Raninagar Industrial Growth Centre	Kandy EPZ	Mongla EPZ
Site							
Land Size (acres)	200 acres	548 acres	310 acres	260 acres	152 acres	205 acres	255.41 acres
Number of Plots	133 plots have been allocated. 124 of these plots are for industrial use and rest for specialized infrastructure & utilities.	Over 42 companies are operational within the park till date	Currently almost 360 firms are occupying either industrial space and industrial land within the economic zone	Plots of variable sizes are available, however the exact number of plots have not been demarcated	Currently there are 27 industrial units operating in the growth center	According to the existing master plan approx. 40 plots are present in Kandy Industrial park	There are about 190 Industrial plots within the export processing zone
No. of Development Phases	The development is proposed to be carried out over a period of 4 years in 2 phases of 2 years each.	The development has been carried out over a period of time but in a single phase	The development have been carried out over a period of time but in a single phase	The development has been carried out over a period of time but in a single phase	The development have been carried out over a period of time but in a single phase	The development have been carried out over a period of time but in a single phase	The development have been carried out over a period of time but in a single phase
Land Lease (+length) or Sale (Taka/USD)	Industrial land lease rent is BDT 193.68/ sq. m. / year (USD 2.36/sq. m. / year) for 50 years lease period, subject to escalation of 10%	Industrial land within the zone is provided only on a sale basis. The sale price of industrial land is INR 6,019 / sq. m. (USD 132 / sq.m).	The park has variable land lease depending on the size of plots. The same have been depicted below: The upfront land lease for INR 6,500 (USD 100.04) /	The land lease rental for industrial plot is INR 123.5 / sq.m / month (USD 1.91 / sq.m / month)	Industrial land lease premium is INR 605/ sq. m. (USD 9.34/sq. m.) [89]	There is a minimum upfront land premium of USD 2.47 / sq.m. Additionally there would be a land rental of USD 1.05 / sq.m / annum	Tariff for land is USD 1.25 / sq.m / year. For a standard lease period of 30 years

[89] Source: http://www.wbidc.com/industrial_parks/available_land.htm

Parameters	Gopalgonj EZ site	Gallops Industrial Park	Noida SEZ	Integrated Industrial park, Mathura	Raninagar Industrial Growth Centre	Kandy EPZ	Mongla EPZ
	in a block of 3 years.		sq.m up to 4000 sq.m; • INR 5,500 (USD 84.65) / sq.m from 4,000 to 8,000 sq.m; • INR 4,500 (USD 69.26) / sq.m from 8,000 to 20,000 sq.m; • INR4,200 (USD 64.64) / sq.m from 20,000 to 40,000 sq.m; • INR 4,000 (USD 61.56) / sq.m from 40,000 to 80,000 sq.m; • INR 3,750 (USD 57.71) per sq.m for land above 80,000 sq.m [88]				
Pre-Built Factories (PBF) (Y/N)	Yes, 13 acres of land parcel has been earmarked for PBF	No Pre-Built Factories are provided as a part of the product offering	Yes, 13 Standard Design Factory (SDF) blocks are available.	No pre-Built factories are available as a part of the product mix	No Pre-Built Factories provided as a part of the product offering	No PBF available as a part of the product offering	Yes, Pre-Built factories are available with an area of 18717.68 sq.m

[88] *Source: http://www.greaternoida.com/lrates*

Parameters	Gopalgonj EZ site	Gallops Industrial Park	Noida SEZ	Integrated Industrial park, Mathura	Raninagar Industrial Growth Centre	Kandy EPZ	Mongla EPZ
Lease Rate for PBF (Taka/USD)	Lease rent rate for PBF is BDT 2,690/ sq. m / year (USD 33.63/ sq. m/ year)	Lease rate for PBF is not applicable since PBFs are not a part of the product offering	The Lease rent for PBF is INR 1,812 / sq.m. /annum (USD 27.89 / sq.m. / annum)	There is no lease rentals available for PBF since they are not available in the product mix	There is no lease rate for PBF since PBF are not provided in the product mix	There is no lease rate for PBF since PBF are not provided as a part of the product mix	Lease rental for PBF is USD 19.2 / sq.m / year
Infrastructure/ Utilities							
Onsite Independent Power (Y/N and Type)	No onsite captive power plant available for the economic zone. Power will be sourced from an onsite substation connected to national electricity grid	No onsite captive power plant available for the special economic zone Power sourced from national electricity grid	No onsite captive power plant available for the special economic zone Power sourced from national electricity grid	No onsite captive power plant available for the special economic zone Power sourced from national electricity grid	No onsite captive power plant available for the special economic zone Power sourced from national electricity grid	No onsite captive power plant available for the special economic zone Power sourced from national electricity grid	No onsite captive power plant available for the special economic zone Power sourced from national electricity grid
Cost of Power (Taka/USD)	The cost of power within the economic zone is taken as BDT 8.69/ KwH (USD 0.106/KwH)	The cost of power within the economic zones is approx. INR 4.05 / KwH [90] (USD 0.062 / KwH)	The cost of power within the economic zone is approx. INR 5.9 / KwH[91] (USD 0.091 / KwH)	The cost of power within the economic zone is INR 5.2 / KwH (USD 0.08 / KwH)[92]	The cost of power withing the economic zone is approx. INR 7.45 / KwH (USD 0.11 / KwH) for industries[93]	For Industries with demand less than or equal to 42 KVA the cost of power within the economic zone is as follows:	The cost of power within the economic zone is BDT 7.5 / KwH (USD 0.091 / KwH)[99]

[90] *Source: http://www.ugvcl.com/petition/Tariff_Schedule.pdf*
[91] *Source: http://www.noidapower.com/images/Consumer_Handbook-Revised.pdf*
[92] *Source: UPERC Tariff Order*
[93] *Source: https://www.wbsedcl.in/irj/go/km/docs/internet/new_website/pdf/Tariff_Volumn/PDFsam_mergetariff2.pdf*
[99] *Source: http://bepza.gov.bd/pages/epzdetails/mongla-export-processing-zone/utility-services-7*

Parameters	Gopalgonj EZ site	Gallops Industrial Park	Noida SEZ	Integrated Industrial park, Mathura	Raninagar Industrial Growth Centre	Kandy EPZ	Mongla EPZ
						• For consumption <301 KWh, the tariff is LKR 10.8 /KWh (USD 0.069/KWh)[94] • For consumption >300 KWh, the tariff is LKR 12.2 /KWh (USD 0.078/KWh)[95] For Industries with demand more than 42 KVA the cost of power is as follows: • During peak hours, the tariff is LKR 20.5 / KWh (USD 0.13/KWh)[96] • During day time, the tariff	

[94] *Source: http://www.ceb.lk/for-your-business/*
[95] Source: http://www.ceb.lk/for-your-business/
[96] Source: http://www.ceb.lk/for-your-business/

Parameters	Gopalgonj EZ site	Gallops Industrial Park	Noida SEZ	Integrated Industrial park, Mathura	Raninagar Industrial Growth Centre	Kandy EPZ	Mongla EPZ
						is LKR 11 / KWh (USD 0.071/KWh)[97] • During Off-peak, the tariff is LKR 6.85 /KWh (USD 0.044/KWh) [98]	
Cost of Water (Taka/USD)	The cost of industrial water supply is BDT 41.316/ KLD (USD 0.50/ KLD)	The cost of industrial water is approx. INR 90 / KL (USD 1.39 / KL)	The cost for industrial water is reserved at INR 3,640 / per annum (USD 56 / annum) for plots up to 1,000 sq.m ; INR 5136 / annum (USD 79.2 / annum) for plots up to 5,000 sq.m ; INR 10,272 / annum (USD 158.39 / annum) for plots up to 5,000 sq.m[100]	The cost of industrial water is INR 30 / KL (USD 0.45 / KL)[101]	The cost of industrial water is approx. INR 18 / KL (USD 0.28 / KL)[102]	The cost of industrial water is LKR 61 / KL (USD 0.31 / KL) plus extra Service charge per month.[103]	The cost of industrial water is BDT 24.74 / KL (USD 0.3 / KL)[104]
Onsite Wastewater	Yes, an onsite waste water	Yes, there is onsite waste	Yes, there is onsite waste water	Yes, there is onsite waste	No, there is no onsite water	No, there is no centralized waste	Yes, there is onsite waste water

[97] Source: http://www.ceb.lk/for-your-business/
[98] Source: Ceylon Electricity Board : http://www.ceb.lk/for-your-business/
[100] *Source: https://www.nsez.gov.in/Resources/Announc/Circular%20for%20Revision%20in%20lease%20rentals%20&%20water%20charges.pdf*
[101] *Source: Noida SEZ*
[102] *Source: Interactions with WBIDC officials*
[103] Source: http://www.waterboard.lk/web/images/contents/consumer_help/water_tariff_e.pdf
[104] *Source: http://bepza.gov.bd/pages/epzdetails/mongla-export-processing-zone/utility-services-7*

Parameters	Gopalgonj EZ site	Gallops Industrial Park	Noida SEZ	Integrated Industrial park, Mathura	Raninagar Industrial Growth Centre	Kandy EPZ	Mongla EPZ
Treatment Plant (Y/N)	treatment plant has been proposed in the master plan	water treatment plant available within the special economic zone	treatment plant available within the special economic zone	water treatment plant available within the special economic zone	treatment plant since industries within the zone typically have their own treatment plant	water treatment plant available. Individual companies need to have their own treatment plant.	treatment plant available within the Export processing zone.
Transport Costs							
Cost of shipping 20 foot FCL container	The approximate shipping charges of a 20 foot FCL Container from the nearest port are as follows: • Hamburg – Port of Mongla → USD 1,110-1,672[105] • Rotterdam – Port of Mongla →	The approximate shipping charges of a 20 foot FCL Container from the nearest port are as follows: • Hamburg – Kandla → USD 725-1,415[109] • Rotterdam – Kandla → USD 725-1415[110]	The approximate shipping charges of a 20 foot FCL Container from the nearest port are as follows: • Hamburg – Kandla port → USD 725-1415[113] • Rotterdam – Kandla port → USD 725-1415[114]	The approximate shipping charges of a 20 foot FCL Container from the nearest port are as follows: • Hamburg – Kandla port → USD 725-1,415[117] • Rotterdam – Kandla port → USD 725-1,415[118]	The approximate shipping charges of a 20 foot FCL Container from the nearest port are as follows: • Hamburg – Kolkata → USD 1,312-1,677[121] • Rotterdam – Kolkata → USD 1,285-1665[122]	The approximate shipping charges of a 20 foot FCL Container from the nearest port are as follows: • Hamburg – Colombo port → USD 1,161[125] • Rotterdam – Colombo port	The approximate shipping charges of a 20 foot FCL Container from the nearest port are as follows: • Hamburg – Port of Mongla → USD 1110-1,672[129] • Rotterdam – Port of Mongla →

[105] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[109] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[110] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[113] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[114] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[117] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[118] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[121] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[122] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[125] Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/
[129] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*

Parameters	Gopalgonj EZ site	Gallops Industrial Park	Noida SEZ	Integrated Industrial park, Mathura	Raninagar Industrial Growth Centre	Kandy EPZ	Mongla EPZ
	USD 1,122-1,672[106] • Antwerp – Port of Mongla → USD 1,125-1,672[107] • New York – Port of Mongla → USD 2,366-2,615[108]	• Antwerp – Kandla → USD 725-1,303[111] • New York – Kandla → USD 880-1,874[112]	• Antwerp – Kandla port → USD 725-1303[115] • New York – Kandla port → USD 880-1,888[116]	• Antwerp – Kandla port → USD 725-1,303[119] • New York – Kandla port → USD 880-1,888[120]	• Antwerp – Kolkata → USD 1370-1,665[123] • New York – Kolkata → USD 836-924[124]	→ USD 1,140[126] • Antwerp – Colombo port → USD 1,175[127] • New York – Colombo port → USD 960[128]	USD 1122-1,672[130] • Antwerp – Port of Mongla → USD 1125-1,672[131] • New York – Port of Mongla → USD 2366-2,615[132]
Cost of Labor (Taka/USD)							
Management	The salary of management professional is	The salary of a management professional in	The average salary of an operations manager is INR	The average salary of an operations	The salary of a management professional in	The salary of a management professional is	The salary of management professional is

[106] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[107] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[108] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[111] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[112] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[115] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[116] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[119] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[120] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[123] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[124] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[126] Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/
[127] Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/
[128] Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/
[130] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[131] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*
[132] *Source: https://www.freightos.com/portfolio-items/freight-rate-calculator-free-tool/*

Parameters	Gopalgonj EZ site	Gallops Industrial Park	Noida SEZ	Integrated Industrial park, Mathura	Raninagar Industrial Growth Centre	Kandy EPZ	Mongla EPZ
	approximately USD 533 / month[133]	the state of Gujarat is approx. USD 1,356 / month[134]	52,138 / month (USD 803.97 / month)[135]	manager is INR 52,138 / month (USD 803.97 / month)[136]	West Bengal is approx. USD 1,125 / month[137]	approx. USD 800 / month[138]	approximately USD 533 / month[139]
Technicians	The salary of a technician is approx. USD 403 / month[140]	The salary of a technician in the state of Gujarat is approx. USD 308 / month[141]	The salary of a maintenance technician is INR 19,310 / month (USD 297.76 / month)[142]	The salary of a maintenance technician is INR 19,310 / month (USD 297.76 / month)[143]	The salary for a technician in West Bengal is approx. USD 478 / month[144]	The salary for a technician is approx. USD 200 / month[145]	The salary of a technician is approx. USD 403 / month[146]
Skilled	The salary of a skilled labourer is approximately USD 107.25 / month[147]	The salary of a skilled labourer in the state of Gujarat is approx.	The salary of a skilled labourer is approx. INR 11,830/month (USD 182.42 / month)[149]	The salary of a skilled labourer is approx. INR 11,830/month	The salary for a skilled labour in West Bengal approx. USD 153 / month[151]	The average salary for a skilled labour is approx. USD 112 / month[152]	The cost of a skilled labourer is approx. USD 107.25 / month[153]

[133] *Source: http://www.averagesalarysurvey.com/bangladesh*
[134] *Source: http://www.averagesalarysurvey.com/india*
[135] *Source: https://www.payscale.com/research/IN/Location=New-Delhi-Delhi/Salary*
[136] *Source: https://www.payscale.com/research/IN/Location=New-Delhi-Delhi/Salary*
[137] *Source: https://www.payscale.com/research/IN/Job=General_%2F_Operations_Manager/Salary/6e042b69/Kolkata*
[138] Source: http://www.investsrilanka.com/free_trade_zones/kandy_other_cost_factors
[139] *Source: http://www.averagesalarysurvey.com/bangladesh*
[140] *Source: http://www.averagesalarysurvey.com/bangladesh*
[141] *Source: http://www.averagesalarysurvey.com/india*
[142] *Source: https://www.indeed.co.in/salaries/Maintenance-Technician-Salaries,-New-Delhi-DL*
[143] *Source: https://www.indeed.co.in/salaries/Maintenance-Technician-Salaries,-New-Delhi-DL*
[144] *Source: http://www.averagesalarysurvey.com/calcutta-india*
[145] Source: http://www.investsrilanka.com/free_trade_zones/kandy_other_cost_factors
[146] *Source: http://www.averagesalarysurvey.com/bangladesh*
[147] *Source: https://tradingeconomics.com/bangladesh/indicators*
[149] *Source: https://paycheck.in/main/salary/minimumwages/delhi/minimum-wage-in-delhi-with-effect-from-october-1-2016-to-march-31-2017*
[151] *Source: https://paycheck.in/main/salary/minimumwages/west-bengal*
[152] Source: http://www.investsrilanka.com/free_trade_zones/kandy_other_cost_factors
[153] *Source: https://tradingeconomics.com/bangladesh/indicators*

Parameters	Gopalgonj EZ site	Gallops Industrial Park	Noida SEZ	Integrated Industrial park, Mathura	Raninagar Industrial Growth Centre	Kandy EPZ	Mongla EPZ
		USD 109 / month[148]		(USD 182.42 / month)[150]			
Unskilled	The salary of an unskilled labourer is approx. USD 56/month[154]	The salary of an unskilled labourer in the state of Gujarat is approx. USD 104/month [155]	The salary of an unskilled labourer is approx. INR 9,724 / month (USD 150 / month)[156]	The salary of a unskilled labourer is approx. INR 9,724 / month (USD 150 / month)[157]	The salary for an unskilled labour in West Bengal is approx. USD 115 / month[158]	The salary for a unskilled labour is approx. USD 84 / month[159]	The salary of an unskilled labourer is approx. USD 56 / month[160]
Sectors							
Type of Sectors within the Zone	The sectors proposed through Inustry ssessment include : Food and Beverages, Agro based products, Electrical and electronics, Light Machinery, equipment and furniture	Pharmaceuticals, Light Engineering, Chemicals, Metal Fabrication, etc.	Trading and services, gems and jewelry, textiles and garments, computer/electronic software, leather, footwear and sport shoes.	Food processing Industry, Chemical and chemical products Industry, Electronics Industry, Machinery and equipment sector etc.	Automotive, Light Engineering, Food & Beverages, Fast Moving Consumer Goods (FMCG)	Textile, RMG, Pharmaceutical, Food processing, rubber products, Light Engineering.	Metal, Agro, paper, garments, Electronic and electrical goods, tent, zipper, Sewing thread and Embroidery thread etc.
Special Regime							

[148] *Source: https://tradingeconomics.com/india/indicators*
[150] *Source: https://paycheck.in/main/salary/minimumwages/delhi/minimum-wage-in-delhi-with-effect-from-october-1-2016-to-march-31-2017*
[154] *Source: https://tradingeconomics.com/bangladesh/indicators*
[155] *Source: https://tradingeconomics.com/india/indicators*
[156] *Source: https://paycheck.in/main/salary/minimumwages/delhi/minimum-wage-in-delhi-with-effect-from-october-1-2016-to-march-31-2017*
[157] *Source: https://paycheck.in/main/salary/minimumwages/delhi/minimum-wage-in-delhi-with-effect-from-october-1-2016-to-march-31-2017*
[158] *Source: https://paycheck.in/main/salary/minimumwages/west-bengal*
[159] Source: http://www.investsrilanka.com/free_trade_zones/kandy_other_cost_factors
[160] *Source: https://tradingeconomics.com/bangladesh/indicators*

Parameters	Gopalgonj EZ site	Gallops Industrial Park	Noida SEZ	Integrated Industrial park, Mathura	Raninagar Industrial Growth Centre	Kandy EPZ	Mongla EPZ
Yes/No	**Yes**, there's a special regime for incentives	**Yes,** the incentives applicable under Gujarat Industrial Policy shall be applicable**.**	**Yes**, there's a special regime for incentives	**Yes,** the incentives applicable under Gujarat Industrial Policy shall be applicable**.**	**No**, there's no special regime for incentives	**Yes**, there's a special regime for incentives	**Yes**, there's a special regime for incentives
Fiscal Incentives							
Customs Duties	• Declaration of EZ as Ware housing Station- Duty free import & Export of Raw material etc. • 100% duty free Import of Vehicle (One Car, One Microbus- 2000 cc) • 100% VAT free Import of Machinery, Construction Materials	There are no exemption from custom duties as per Industrial Policy of Gujarat, however sector specific incentives might be applicable	Exemptions from Customs duty on imports.	There are no exemption from custom duties as per Industrial Policy of the state, however sector specific incentives might be applicable	As per the Industrial policy of West Bengal, there are no incentives on custom duties. However, there could be sector specific incentives	• Exemptions of Customs Duty on capital goods and raw materials. • Non-export oriented companies are entitled to import project related capital goods free of Customs Duty.	• Duty free import of construction materials • Duty free import of machineries, office equipment & spare parts etc. • Duty free import and export of raw materials and finished goods
Corporate Taxes / Indirect Taxes	• Corporate income tax exemption for 10 years (First 3 years- 100%,	There are no exemption from corporate taxes as per Industrial Policy of Gujarat,	Exemption from central and state level taxes	There are no exemption from corporate taxes as per Industrial Policy of the state,	As per the Industrial policy of West Bengal, there are no separate	• Exemption of tax on dividends. • Minimum tax exemption of 4	100% exemption of tax for 3 years, 50% for the next three, 25% for the final (7th) year;

Parameters	Gopalgonj EZ site	Gallops Industrial Park	Noida SEZ	Integrated Industrial park, Mathura	Raninagar Industrial Growth Centre	Kandy EPZ	Mongla EPZ
	gradually diminishing from 80% in 4th Year to 20% in 10th Year) • Exemption of VAT on utilities (80% on gas, water, and electricity; 100% on supplies)	however sector specific incentives might be applicable		however sector specific incentives might be applicable	incentives on corporate taxes. However, there are a few sector specific incentives available.	to 11 years depending on the type of sectors and percentage of exports.	Relief from double taxation
Income Tax on Profits	• Corporate income tax exemption for 10 years (First 3 years- 100%, gradually diminishing from 80% in 4th Year to 20% in 10th Year)	• There are no exemption from income tax on profits as per Industrial Policy of Gujarat, however sector specific incentives might be applicable	• 100% Income Tax exemption on export income for SEZ units under Section 10AA of the Income Tax Act for first 5 years, 50% for next 5 years thereafter and 50% of the ploughed back export profit for next 5 years.	• There are no exemption from income tax on profits as per Industrial Policy of the state, however sector specific incentives might be applicable	• There is no incentive on income taxes as per industrial policy. However, there could be incentives based on sector of industries.	• Income tax exemption up to 5 years • Reduced rate after 5 years/ tax holiday is levied at 12% to 28% depending on the income.	• 100% exemption from income tax for first 3 years • 50% exemption from income tax between 3rd to 6th years • 25% exemption from income tax on 7th year

Parameters	Gopalgonj EZ site	Gallops Industrial Park	Noida SEZ	Integrated Industrial park, Mathura	Raninagar Industrial Growth Centre	Kandy EPZ	Mongla EPZ
							• No benefit on income tax thereon
Social Security Tax	No social security tax is available in Bangladesh	No social security tax is available in India	No social security tax is available in India	No social security tax is available in India	No social security tax is available in India	There is social security tax in Sri Lanka. The employer contributes 12% and the employee 8% of remuneration to the Employees Provident Fund (EPF). The employer also contributes 3% of employee remuneration to the Employee Trust Fund. Employees that have completed 5 years of service are entitled to a gratuity at the time of retirement at a rate of 50% of the last drawn salary multiplied by the number of years of service at	No social security tax is available in Bangladesh

Parameters	Gopalgonj EZ site	Gallops Industrial Park	Noida SEZ	Integrated Industrial park, Mathura	Raninagar Industrial Growth Centre	Kandy EPZ	Mongla EPZ
						the time of retirement.	
No restrictions on Money Transfers	Full repatriation of capital invested from foreign sources is allowed by Bangladesh. Similarly, profits and dividend accruing to foreign investment may be transferred in full. If foreign investors reinvest their repatriable dividends and or retained earnings, those will be treated as new investment. Foreigners employed in Bangladesh are entitled to remit up to 50 percent of their salary and will enjoy facilities for full	Profit and dividend earned from an Indian company are repatriable after payment of dividend distribution tax (DDT). DDT @ 16.995% (inclusive of cess) is payable by the company (that declares dividend) on the amount of dividend distributed. However, dividend is free of Indian income tax in the hands of the recipient shareholders, Indian or foreign. Profit of LLP is flow-through and repatriable without payment	Profit and dividend earned from an Indian company are repatriable after payment of dividend distribution tax (DDT). DDT @ 16.995% (inclusive of cess) is payable by the company (that declares dividend) on the amount of dividend distributed. However, dividend is free of Indian income tax in the hands of the recipient shareholders, Indian or foreign. Profit of LLP is flow-through and repatriable without payment of any taxes and without any regulatory approval[162].	Profit and dividend earned from an Indian company are repatriable after payment of dividend distribution tax (DDT). DDT @ 16.995% (inclusive of cess) is payable by the company (that declares dividend) on the amount of dividend distributed. However, dividend is free of Indian income tax in the hands of the recipient shareholders, Indian or foreign. Profit of LLP is flow-through and repatriable without payment	Profit and dividend earned from an Indian company are repatriable after payment of dividend distribution tax (DDT). DDT @ 16.995% (inclusive of cess) is payable by the company (that declares dividend) on the amount of dividend distributed. However, dividend is free of Indian income tax in the hands of the recipient shareholders, Indian or foreign. Profit of LLP is flow-through and repatriable without payment	Sri Lanka does not impose any restrictions on the repatriation of profits. The government allows 100% repatriation on earnings, fees and capital, and on foreign exchange transactions relating to current account payments.	Full repatriation of capital invested from foreign sources is allowed by Bangladesh. Similarly, profits and dividend accruing to foreign investment may be transferred in full. If foreign investors reinvest their repatriable dividends and or retained earnings, those will be treated as new investment. Foreigners employed in Bangladesh are entitled to remit up to 50 percent of their salary and will enjoy facilities for full repatriation of their savings and

[162] *Source: http://www.dobusinessinindia.in/repatriationoffund.php*

Parameters	Gopalgonj EZ site	Gallops Industrial Park	Noida SEZ	Integrated Industrial park, Mathura	Raninagar Industrial Growth Centre	Kandy EPZ	Mongla EPZ
	repatriation of their savings and retirement benefits.	of any taxes and without any regulatory approval[161].		of any taxes and without any regulatory approval[163].	of any taxes and without any regulatory approval[164].		retirement benefits.
Others	Exemption from income tax on salary of expatriates , dividend tax and royalty, technical fees, local govt. tax, land development tax	There are sector specific incentives applicable which would depend on the sector of the industrial unit seeking to avail benefits	Exemption from Service Tax	There are sector specific incentives applicable which would depend on the sector of the industrial unit seeking to avail benefits	• 100% of Electricity Duty subject to the maximum ceiling of INR 25 lakhs / year / INR 1.25 crores in 5 years (USD 38,450 / year to USD 192,250 in 5 years) • An eligible unit in the medium and large sector will be entitled to reimbursement to the extent of 80% of contribution towards Employee Provident	Exemption of transfer charges on transfer of land	Exemption from dividend tax; Remittance of royalty, technical and consultancy fees

[161] *Source: http://www.dobusinessinindia.in/repatriationoffund.php*
[163] *Source: http://www.dobusinessinindia.in/repatriationoffund.php*
[164] *Source: http://www.dobusinessinindia.in/repatriationoffund.php*

Parameters	Gopalgonj EZ site	Gallops Industrial Park	Noida SEZ	Integrated Industrial park, Mathura	Raninagar Industrial Growth Centre	Kandy EPZ	Mongla EPZ
					Fund and Employees' State Insurance • Industries shall be eligible for 75% of refund of stamp duty • Anchor unit subsidy of INR 100 lakh (USD 153,800) shall be offered for the first two manufacturing enterprises with minimum employment of 100 members and minimum investment of INR 50 Crore (USD 7,690,000) • Industrial units will be encouraged for filing their successfully generated, registered and accepted patents based		

Parameters	Gopalgonj EZ site	Gallops Industrial Park	Noida SEZ	Integrated Industrial park, Mathura	Raninagar Industrial Growth Centre	Kandy EPZ	Mongla EPZ
					on their original work/research. The State Government will provide financial assistance of 50% of the expenditure incurred, up to a maximum of INR 2 lakh (USD 3,076), / patent. The expenditure incurred will include the amount spent on filing of patent, attorney fees, patent tracking etc. • 75% waiver of fees incurred towards land conversion charges		
Non-Fiscal Incentives							

Parameters	Gopalgonj EZ site	Gallops Industrial Park	Noida SEZ	Integrated Industrial park, Mathura	Raninagar Industrial Growth Centre	Kandy EPZ	Mongla EPZ
One Stop Shop Within the Zone	**Yes**, there is one stop shop proposed with the zone	**No**, there is no one stop shop within the zone	**Yes**, there is a one stop shop within the zone	**Yes**, there is a one stop shop within the zone	**No**, there is no one stop shop within the zone.	**Yes**, one stop shop is available within the zone.	**Yes**, there's one stop shop within the zone
Support Amenities							
Onsite Administration office	Provision for onsite administration office has been captured in Master Plan	There is onsite administration office available within the zone	There is onsite administration office available within the zone	There is onsite administration office available within the zone	There is onsite administration office available within the zone	There is onsite administration office available within the zone	There is onsite administration office available within the zone
Onsite Convenience Retail	Area earmarked for support amenities in Master Plan can accommodate Onsite Convenience Retails store	There is no convenience retail stores available within the zone	There is no convenience retail stores available within the zone	Onsite convenience retail is available within the zone as part of the development plan	There is no convenience retail stores available within the zone	There is no convenience retail stores available within the zone	There is no convenience retail stores available within the zone
Onsite Housing	No provision for onsite housing has been captured in Master Plan	There is no onsite housing available within the zone	There is no onsite housing available within the zone	Three types of housing based on income i.e. high, medium and low are planned within the development.	There is limited number of staff quarter present within the park	There is no onsite housing available within the zone	There is no onsite housing available within the zone
Onsite Schools	Area earmarked for support amenities in Master Plan can	There is no onsite school available within the zone	There is no onsite school available within the zone	An on-site education center is planned within the development.	There is no onsite school available within the zone	There is no onsite school available within the zone	There is no onsite school available within the zone

Parameters	Gopalgonj EZ site	Gallops Industrial Park	Noida SEZ	Integrated Industrial park, Mathura	Raninagar Industrial Growth Centre	Kandy EPZ	Mongla EPZ
	accommodate onsite schools						
Onsite Community Facilities	Area earmarked for support amenities in Master Plan can accommodate onsite community facilities	There are no community facilities inside the zone	There is community facilities available within the zone	Community facilities like health care centres are planned within the zone	There are no community facilities inside the zone.	There are no community facilities inside the zone	There are no community facilities inside the zone
Onsite Security	Provision for onsite security has been duly considered	There is onsite security available within the zone	There is onsite security available within the zone	There is onsite security available within the zone	There is onsite security available within the zone	There is onsite security available within the zone	There is onsite security available within the zone
Quality of Life							
International Housing (Within 15 Km)	There is no international housing facility available within 15 km radius of the EZ site	There are quality residential facilities like Kesar City available in proximity to the zone	Quality international housing like Exotica Fresto, Lotus Zing and many others are available around the area of SEZ	There is no international housing facility available within 15 km radius of the EZ site	Quality housing facilities are available in the nearby town of Jalpaiguri	Superior quality residential facilities in the form of Victoria Range (A large residential area) and other are available in proximity to the economic zone	There is no international housing facility available within 15 km radius of the EZ site
International Hospital/Clinic (Within 20km)	There is basic healthcare facility available in the region. The upgraded	There are quality international hospitals like NIMS Multi Specialty Hospital	Quality international hospital like max multi-specialty, metro multi-	There are no superior quality hospitals available in close	Quality healthcare facilities like Jalpaiguri District Hospital is	Superior quality international hospital like Kandy Teaching Hospital is	Various Primary and private hospitals within 20kms are available. A super

Parameters	Gopalgonj EZ site	Gallops Industrial Park	Noida SEZ	Integrated Industrial park, Mathura	Raninagar Industrial Growth Centre	Kandy EPZ	Mongla EPZ
	Gopalgonj General Hospital is relatively modern and has facilities for MRI, ultra-sonogram, CT scan etc.	in close proximity to the zone	specialty hospitals are available in close proximity to the economic zone	proximity to the zone	available in proximity to the economic zone	present in proximity to the zone	specialty Hospital "Khulna City medical Hospital" is at 45km distance
International Schools (Within 20 kms)	There are no international schools available within 20 km radius. However, basic education facilities, polytechnic and engineering colleges are in Gopalgonj district. Nearest international school is in the region of Khulna (50 km from EZ site)	There are quality schools like DAV International School in close proximity to the zone	Quality international schools like Kothari International school, Ryan International school, Sapphire International school, Billabong high International school etc. are available in close proximity to the economic zone	There are no superior quality schools available in close proximity to the zone	Various schools like Holy Child School, Techno India Public School etc. are present in proximity to the economic zone	Superior quality schools like École Internationale Kandy is present in proximity to the zone	St. Paul's high school, Digraj secondary school and a list of various other schools.

Table on the previous page provides a comparative study on different economic zones and industrial parks that could compete with this proposed EZ site. The industrial parks studied for comparative purposes are located in South East Asia region and support sectors similar to those proposed for this EZ, providing potential investors a plethora of options for making investment decision. Following key findings may be concluded from this exercise:

Competitiveness of the proposed EZ site as compared to its competitors

1. The subject site in Gopalgonj has been envisaged to be built over an area of 200 acres which is of a comparative size to its competitors. Provision has been kept for providing both industrial land and Standard Factory buildings to the manufacturers in Gopalgonj; however apart from Noida EZ and Mongla EPZ, no other competing economic zone offers standard factory buildings.
2. The land lease rental being charged for the subject site is competitive with respect to other EZs being studied with exception of Mongla EPZ, which offers offer lower rates due to the fact that it is operated by GoB. Proposed EZ would be operated by a private developer, who would bring in his domain knowledge and expertise resulting in better service quality to the investors in the EZ. This could encourage investors to plan their investment in the proposed EZ. Owing to the EZ's proximity to the consumer markets in Dhaka, investors looking to sell their products in Dhaka could be tempted to invest in this site.
3. Moderate water tariff makes the proposed site more competitive thans the others.
4. The proposed master plan includes a provision for establishing a water and sewage treatment plant within the EZ. This is in line with other competing economic zones (except Raninagar Industrial Growth Centre and Kandy EPZ) which also have captive waste treatment plant.
5. Bangladesh enjoys demographic dividend thereby providing labour at a very competitive rate as compared to other competing countries / economic zones. This might act as a catalyst for promoting labor intensive manufacturing activities within the zone.
6. Fiscal incentives offered by GoB, like exemption on corporate income tax for a period of 10 years and exemption of VAT on utilities, import of machinery and construction material are attractive as compared to the incentives offered in India. Kandy EPZ in Sri Lanka provides similar incentives for investors but the incentives are sector specific unlike Bangladesh. These incentives might attract international investors to the country. Moreover, absence of any social security tax in the country unlike Sri Lanka, might further incentivize investors.

Areas where the proposed EZ site is lagging behind its competitors

1. Steep power tariff acts as a key bottleneck for investors investing in the EZ. This is a country level challenge as Bangladesh faces a power deficit due to its dependence on import of coal and nautral gas from other countries for generation of power. Moreover, power generation infrastructure has not developed in the country, due to which it has to buy power from neighbouring countries like India. This could prove to be a major disadvantage when compared to other competing economic zones in neighboring countries like India and Sri Lanka. None of the competing EZ have an onsite captive power plant which could be mainly attributed to the size of the EZ/Industrial Park and the cost involved in establishing a captive power plant. Masterplan of the proposed EZ envisages establishing an onsite substation of capacity 132/33/11 KV, which would source electricity from the national electic grid at Gopalgonj located around 10 km from the site. Developer would be able to procure electricity from this grid as per the requirements inside the EZ during construction and operation phase.
2. The subject site does not have quality social infrastructure in the form of international quality schools and other urban facilities in vicinity of the site. However certain land parcel has been earmarked in the Master Plan as 'support amenities" to develop support facilities such as retail store, vocational training centre and community facility inside the EZ. This could attract quality man power to work in Gopalgonj.

Basis the analysis done above, proposed EZ is found to be competitive with respect to other EZs on majority of the comparative parameters.

In order to address high electricity cost in Bangladesh, developer could explore harnessing of solar energy. Padma Bridge, once operational shall provide access to natural gas supply in the region surrounding the proposed EZ. Natural gas is a cost beneficial source of fuel as compared to electricity.

Moreover, Khulna city located at 50 km from EZ site, houses international quality social infrastructure like schools and hospitals which could cater to investors inside the EZ. The private developer, while marketing this economic zone may showcase proximity to Khulna city as the unique selling proposition of this EZ, which would enable access to quality social infrastructure.

4. Industry Assessment

4.1. Purpose and Objective

Bangladesh has been considered as a global hub for producing garments and exporting the same, across the globe. Its garment industry which formed 3.89% of its total export basket in 1983-84, occupied 81.23% of the total exports in 2016-17, providing employment to around 4 million people.[165] This underlines the importance of garment sector in Bangladesh. However, at the same time also highlights the over dependency of Bangladesh's exports on a single sector. There is a need for Bangladesh to improve its manufacturing competencies in other sectors as well, in order to make its economy resilient to possible sector specific disruptions due to automation, policy changes and increasingly competitive global scenarios. GoB has taken cognizance of this situation and has identified other sectors apart from textile and garment sector as priority sectors.

High Priority Industrial Sectors	Priority Potential Industrial Sectors
•Agri-Business •Textile & Garments •ICT •Leather Products •Electrical & Electronics	•Plastic Industry •Light Engineering •Ship Building •Tourism Industry •Frozen Food •Ceramic Sector •Power Sector •Medical Equipment Sector •Health Care Sector •Renewable Energy Sector

Source: Bangladesh Investment Development Authority

As a part of Industry Assessment, our objective is to identify site specific target industries which can be compatible with the local economy of the region. Through this chapter, recent growth trends and policy support for various industries will be highlighted to draw attention to nascent industries which are registering robust growth figures in Bangladesh. Local level infrastructural and manpower support, presently available and proposed plans, would be elaborated and site specific suitability of various industries would be assessed. Reference to insights obtained through primary survey have also been elucidated in this section. Results obtained from both primary and secondary studies would be synthesized to arrive at final shortlist of sectors for the proposed EZ site. An industrial profiling exercise would be undertaken for these sectors, covering typical land, water, power and employment requirements for these sectors.

4.2. Our Approach

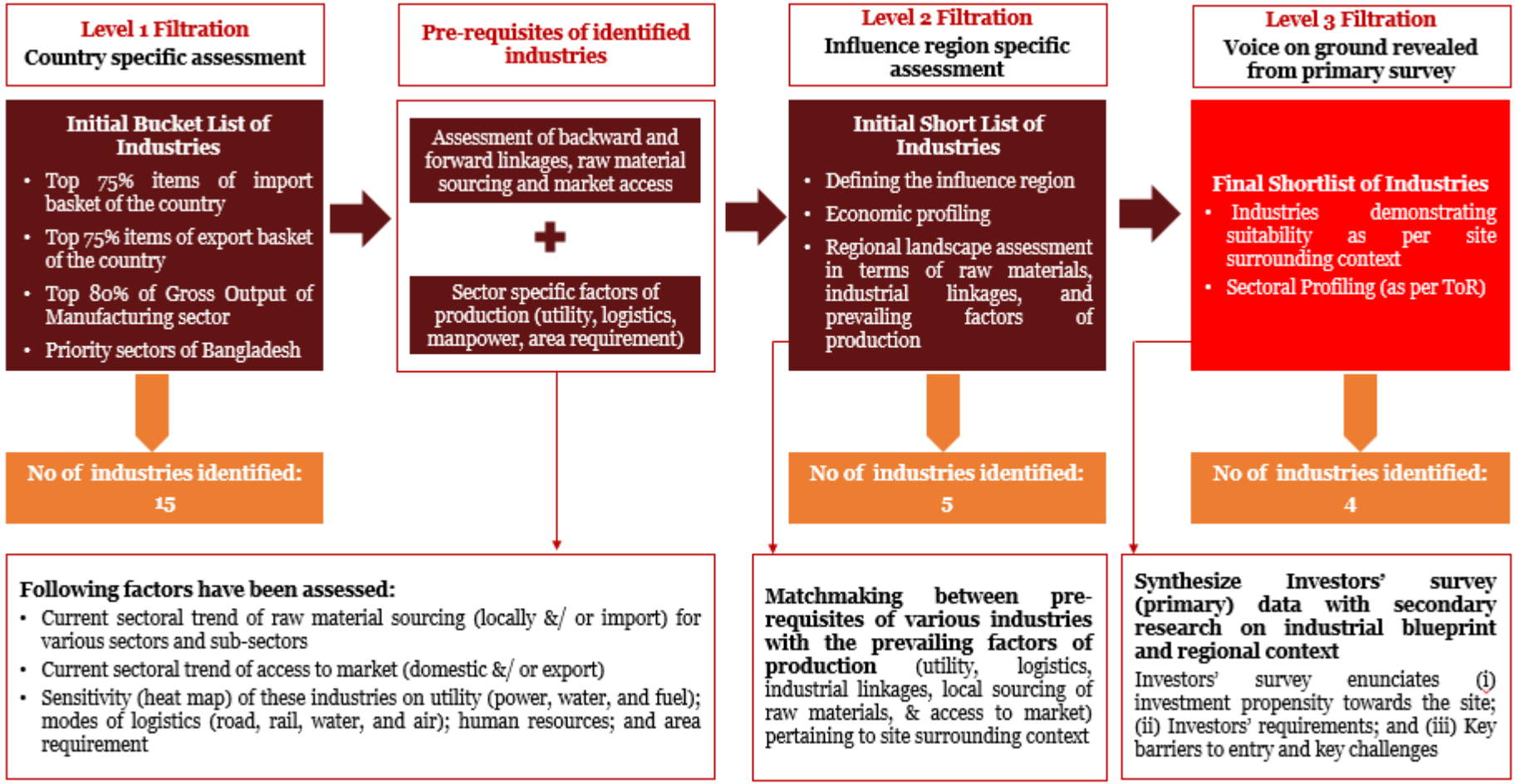
The process to shortlist the industrial sectors that can be most compatible for the proposed EZ site at Gopalgonj involves a 4-step approach covering macro level assessment of Bangladesh as a whole and then funneling down to site level assessment, with validation from current manufacturers and members of various industrial associations.

As a part of this study, recent growth trends of different industries in manufacturing sector have been analyzed to identify an initial bucket list of industries demonstrating high growth potential. Data sources available with agencies like BIDA, BEPZA, BEZA and ITC trade map have been used for this study. This has been followed by an assessment of forward & backward linkages and factors of production requirement for each industry in the bucket list. Further, a deep dive into influence region assessment has been undertaken to assess the availability of raw materials, forward & backward linkages and factors of production requirements prevailing at the project site and influence region. In cognizance of the above, initial shortlist of industries have been arrived at. To validate the findings of the same, a primary survey has been undertaken to reach out to potential investors across different

[165] http://www.bgmea.com.bd/home/pages/tradeinformation

sectors to gauge their views on sectors and suitability of the same. The findings have been synthesized to create a final shortlist of industries that should be most compatible for the proposed EZ site. Figure on the next page captures diagrammatic representation of the approach adopted.

Figure 24: Approach Methodology for Industry Assessment



Source: PwC Analysis

4.3. Country Level Assessment

In order to shortlist potential sectors that can be established at the proposed EZ site in Gopalgonj, it is important to identify a bucket list of industries under the following heads –

- Traditionally dominant in Bangladesh
- Demonstrating better growth than country's GDP in recent past
- Thrust Sectors identified by government

Above mentioned selection criteria will ensure that during the shortlisting process all those industries are taken into consideration, which have the potential to do well in the country on basis of their historical trends. The aim is to also ensure that the shortlisted sectors are in line with those sectors which GoB has identified as thrust sectors in its National Industrial Policy, 2016.

Thrust sectors are those sectors which have been able to successfully contribute to Bangladesh's industrialization, poverty alleviation and employment generation. GoB would also consider special incentives like tax exemptions, exemption from dual taxation, tax holidays, taxation at reduced rates, accelerated depreciation etc. for these sectors on basis of their performance and contribution to national economy.

These industries would provide an initial universe of list that can be taken up for further scrutiny with respect to regional and site context for the proposed EZ. Sectors can then be further shortlisted, based on various sector specific prerequisites and region/site specific support available.

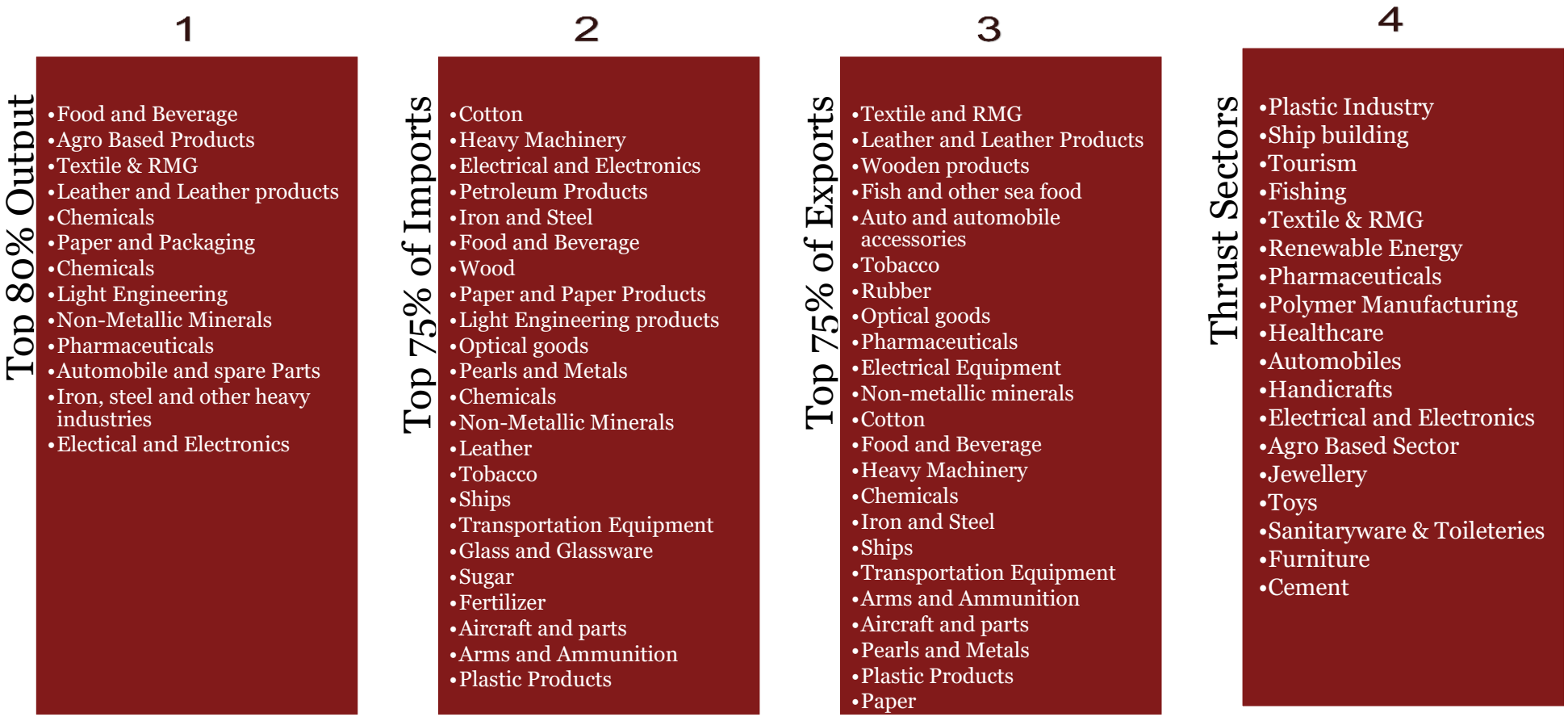
In order to create a shortlist of industries, data was extracted from secondary sources like ITC trade map, Ministry of Industries, Bangladesh Investment Development Authority and Bangladesh Bureau of Statistics.

Sectors were shortlisted by selecting industries on the basis of the following parameters -

- ✓ Product wise ranking of industries to identify top 80% of items, currently being produced in Bangladesh.
- ✓ A list of top 75% of items, being exported and imported, were shortlisted on basis of average trade value over the past 5 years (in million USD).
- ✓ Sectors that have been identified by GoB as thrust sectors.

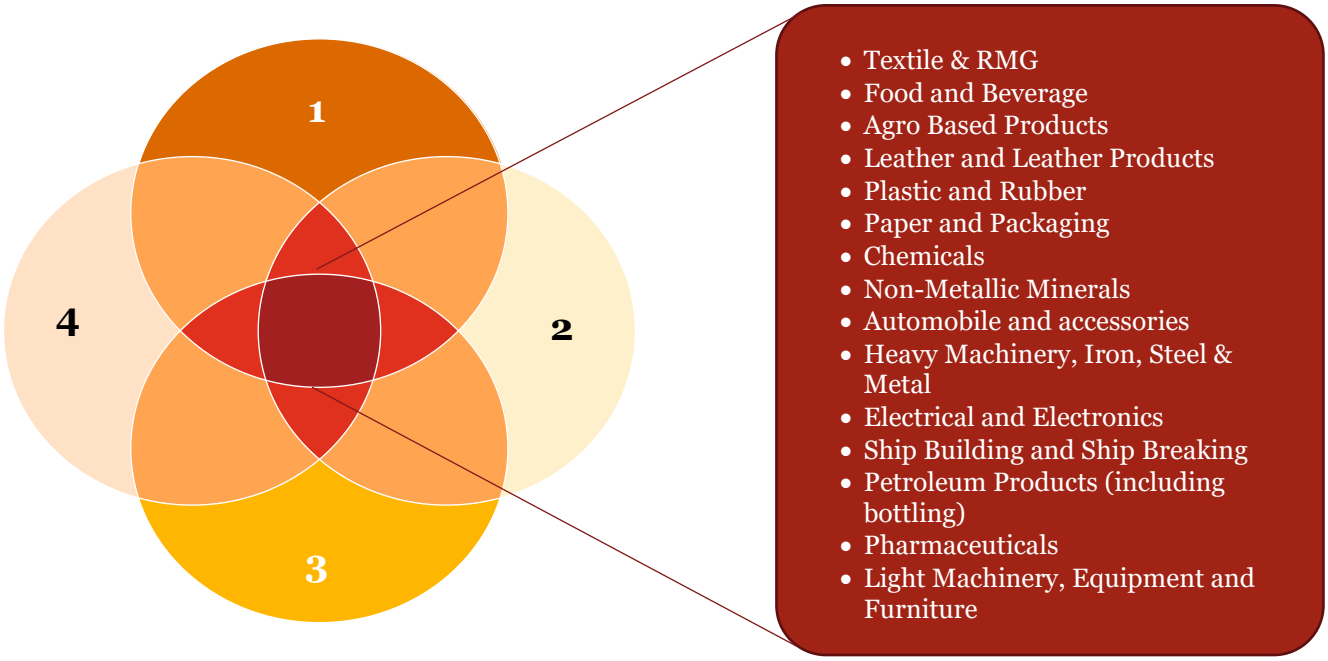
The major sectors identified post filtering through the above mentioned parameters are listed in the next page. Details of export trend, import trend and gross output of manufacturing sectors in Bangladesh are presented in the Annexure.

Figure 25: Bucket list of Sectors & Products



An initial universe of sectors was created by identifying those industries performing well across the parameters highlighted in the previous page. The initial universe of sectors are as mentioned below:

Figure 26: Initial Universe of Sectors



Based on secondary research, above mentioned initial list of sectors has been shortlisted. These sectors have either demonstrated healthy growth in Bangladesh or are a part of the thrust sectors identified by GoB

4.4. Sector Specific Requirements

*P*ost shortlisting of sectors based on a country level assessment, it is imperative to understand the salient features of each sector in order to deduce suitability of the sector with respect to the proposed EZ location. This analysis, will culminate into a basic list of pre-requisites needed for the specific sector to develop in a particular region. The criteria for assessing the pre-requisites of sectors are two-fold –

- Study of Backward and Forward Linkages
- Sector specific Factors of Production

The above two criteria will provide an in-depth insight into the requirements of each of the shortlisted sector.
A study of **Backward and Forward Linkages** of each sector will provide information about various stages of development of these sectors, raw material required and markets where these products are consumed.
Sector specific Factors of Production will provide qualitative information about the dependency of each sector on different supporting infrastructure like modes of transportation, utility (water, power, & gas), and manpower.
Basis behind this assessment are (i) detailed primary survey undertaken among investors to comprehend the voice on ground; and (ii) in-depth secondary research on sectoral outlook.
Holistic assessment of backward and forward linkages of various sectors including raw material sourcing and access to market have been captured in a tabular format on the next page –

Table 23: Sector Specific Backward and Forward Linkages

Sector	Description of raw materials, industrial linkages, and market access
Textile & Ready Made Garments (RMG)	Textile & RMG is the major industrial sector in the country. Bangladesh is 2nd largest exporter of RMG in the world after China, having 6.4% of global market share. This industry is already well developed in Bangladesh generating growth rate of 13%.[166] Gross value added from this sector is BDT 2534.7 million, which is ~47% of the country's overall gross value added from manufacturing sector.[167] GoB has set a target to achieve USD 50 billion of exports from RMG sector by 2020, in order to do so, it has also placed textile & RMG sector in its high priority industrial sector list. Among the incentives offered by GoB, garment manufacturers and exporters get 4 percent cash incentive against value addition of products manufactured in the country using locally manufactured yarn.[168] The basic material required for this sector is cotton, which is converted into yarn, followed by conversion into fabric and finally into RMG after dyeing. Bangladesh specialises in manufacturing of RMG by dint of its attractive demographic dividend and low cost of manpower. It is cost advantageous to produce RMG in Bangladesh as compared to other parts of the world. Bangladesh's humid climate is not conducive for cultivation of cotton, hence cotton is primarily imported from neighbouring countries like China, India. Basis primary survey with industry sectors, local textile mills are also not able to meet demand for fabric by the RMG industry, hence fabric is also imported. Moreover due to specific quality requirements of international customers, many customers have pre-designated fabric sourcing units outside Bangladesh, from where fabrics are imported into the country. Dyeing of garment is the last stage of activity before RMG being manufactured. This is a water intensive exercise, for which mostly ground water or river water towards captive sourcing is utilized (which ascertains continuous water supply). Due to poor quality of locally available dyeing material, some firms either export their garments for dyeing or use imported dyes.[169] Textile buyers (customers) from large economies such as USA, EU, and others place orders to RMG manufacturers in Bangladesh as producing RMG in Bangladesh is cost advantageous. This is why RMG is the major export commodity from Bangladesh to major markets such as USA, Europe, and various other large economies. Yarn and fabric produced in Bangladesh primarily caters to domestic requirements as industrial linkage towards RMG.
Food and Beverages (F&B)	Bangladesh's large population base has created a huge domestic potential for this sector. With growing consumption economy, demand for nutrient rich, high quality food products is increasing. Besides, catering to local demand, Bangladesh also exports processed food products to 104 countries, with major exports being to middle-east and south-east Asian countries. [170] These countries have a lot of immigrants from Bangladesh, who drive demand for Bangladesh food products in these countries. As per data available with Bangladesh Agro-Processors Association, Bangladesh clocked a growth of 33% in exports of processed food in between 2011-12 to 2013-14. Major items of exports were fruit juice, biscuits, potato crackers, chips,

[166] *https://www.textiletoday.com.bd/overview-bangladesh-rmg-2016/*
[167] *Survey of Manufacturing Industries, Bangladesh Bureau of Statistics*
[168] *http://rmgbd.net/incentives-for-textile-clothing/*
[169] *Primary Survey with Industry sectors*
[170] *http://www.bapabd.org/home/export/1*

Sector	Description of raw materials, industrial linkages, and market access
	puffed rice, jam, confectionery items, ketchup, parathas, singharas etc. As per Bangladesh Investment Development Authority, frozen food export is a priority sector for Bangladesh with special focus towards exports of shrimps. Food and Beverage industry can be broadly segregated into two categories – (i) agro based products and (ii) animal products For agro based products, the first stage is cultivation of necessary agricultural crops like cereals, fruits and vegetables. This is followed by 2-stage processing, where products like wheat are converted into flour by agro based industries and flour is then converted into 2nd stage products. These products are then packaged and sent to consumer markets. F&B is the second stage in the value chain, while the first being agro based products. Although Bangladesh being an agrarian economy is able to supply most of the raw material required for agro based industry, it also has to rely on imports for products like Wheat, Sugar and few fruit various reasons ranging from poor protein content in wheat to poor productivity of sugarcane. For animal products, Bangladesh is primarily focussed of exports of fish products, in particular exports of shrimp. Shrimp production is a three-stage process, starting at hatcheries, where shrimp fries are cultivated, followed by farming where adult shrimps are cultivated from the shrimp fries. This is followed by processing, where activities like deshelling, de-heading and some minimal processing takes place in order to increase the shelf life of shrimp products. Lack of technological know-how prevents shrimp processing firms from adding further value to the processed shrimps. Fish and shrimp cultivation takes place in coastal parts of the country like Khulna, Barisal, Cox's Bazar and Chittagong. Basis primary survey, investors prefer setting up of F&B units at central locations of Bangladesh so that seamless supply to consumers located across the country can take place easily. Some large domestic and foreign F&B players also source a part of their raw materials (like additives, flavours, and chemicals) from outside the country from registered vendors in order to conform to their global quality policy.
Agro Based Products	Agro based products act as source of raw material and intermediaries/ backward linkage to F&B sector in Bangladesh. Agro based products can broadly be classified into three categories viz. (a) cereal, egg & fruits based; (b) tobacco; and (c) non edibles (such as jute, cotton). This sector deals with first level processing of agricultural products and it acts as the upstream industry sector for F&B sector. Being an agrarian economy, Bangladesh cultivates agricultural products in abundance. Although Bangladesh shows prominence in yield per unit area for wheat (3.1 MT per hectare vis-à-vis 3.07 MT per hectare globally), locally produced wheat are low on protein content. As a result of the same, Bangladesh has import dependency for wheat (Russia, Ukraine, and India are the major importers).[171] Rajshahi division is the top wheat producing division in the country. Egg and milk production in Bangladesh is not sufficient. Bangladesh's sugar yield (per unit area) is lower compared to neighbouring countries and as a result of the same, sugar is also imported. Rajshahi division produces major sugarcane and it is also largest producer of fruits including mango. Rice cultivation takes place in abundance in this country; ~75% of the total cropped area and ~80% of the total irrigated area is planted to rice. It caters to ~67% of total calorie supply and ~50% of total protein intake of an average person in this country.[172] Agro produces (both in raw form and intermediaries) caters to domestic demand as well as to F&B units for production of second stage of value chain products.

[171] *ITC Trade Database*
[172] *http://www.knowledgebank-brri.org/riceinban.php*

Sector	Description of raw materials, industrial linkages, and market access
	Bangladesh specialises in export of unmanufactured tobacco. Bangladesh produces 10,000 MT of tobacco in a year, out of which ~30% is exported. Khulna and Rangpur divisions are the top most tobacco producing divisions. Tobacco cultivated caters to the domestic demand and the tobacco leaves are being exported to large economies. Jute is one of the predominant cash crops in Bangladesh. Bangladesh is contributing ~39% of world's jute production. Jute is cultivated in almost all districts of Bangladesh; various jute mills are located in Khulna division. As explained earlier, humid climate in this country is not conducive for cultivation of cotton, hence cotton is primarily imported from countries like China, and India owing to quality aspects as well as less lead time requirement due to import from neighbouring countries. Agro based products manufactured in Bangladesh primarily caters to the domestic demand and as feed to F&B industry. Export of agro based products mostly takes place to India and the surrounding countries. High dependency on primary sector (agriculture) necessitates the usage of light machinery and agricultural equipment in Bangladesh.
Leather and Leather Products	Leather industry is the second largest export earning sector of Bangladesh with major markets being Italy, England, Spain, France, Germany, Poland, China, Japan, USA and Canada. The overall leather industry is classified into three broad categories such as finished leather, leather products, and footwear. GoB has also declared this industry as the priority sector. This sector caters to only 0.5% of the world's leather trade (worth USD 75 billion). About 113 tanneries in Bangladesh produce 220 million square feet of hides and skins every year.[173] There are about 30 modern shoe manufacturing plants involved in production of high-quality footwear; also, ~2,500 small and medium scale footwear manufacturers are operational.[174] Value chain assessment of this sector depicts that in tanneries raw animal skins and hides are processed (using industrial salt and chemicals) to manufacture finished leather, which in turn is used to manufacture leather based products and footwear. Design of the leather products is a critical step which precedes the leather based products manufacturing. Designing involves skilled human resources and there appears to be a clear gap in availability of specialised manpower towards this stage. Tanneries in Bangladesh form a cluster, recently this cluster has been relocated to Savar area from Hazaribagh area of Dhaka. This move was undertaken in order to regulate tanneries in Bangladesh and to ensure that proper safety and environment friendly norms were being followed. Basis primary survey, these tanneries suffer from inadequate infrastructure (such as non-metalled internal road, non-functional CETP, and high electricity cost), resulting in adverse effect on production of leather and underutilization of capacity for tanneries, located in Savar. The raw material required for leather is animal hide and skin. Due to its large cattle population, Bangladesh has a good supply of leather. Cow hides account for 56% of production, goat skins for 30% and buffaloes make up the rest.[175] Bangladesh is a net exporter of raw hides and skins. In 2016, Bangladesh's exports within the category were about ~USD 208 million and imports were ~USD 116 million.[176] Raw hides obtained from animals are mixed with chemicals for the purpose of tanning. The chemicals used for this process are currently imported due to lack of domestic production of the same.

[173] *http://www.theindependentbd.com/printversion/details/112906*
[174] *https://www.researchgate.net/publication/235609270_Bangladeshi_Leather_Industry_An_Overview_of_Recent_Sustainable_Developments*
[175] *Research Gate. 2013. Bangladeshi Leather Industry: An Overview of Recent Sustainable Developments.*
[176] *ITC Trade map*

Sector	Description of raw materials, industrial linkages, and market access
	After tanning of leather, these leather goods are supplied to manufacturers of leather goods, where leather is converted into different products like footwear, bags, belts, clothes etc. Final output from this sector caters to the domestic demand as well as it serves the export market. High quality and high end leather products are being manufactured in this country which are fit for export to large economies. Bangladesh is a net exporter of leather, however export share of leather products has potential to increase in Bangladesh. For which adoption of new technologies, investment in R&D, and gradual development of designing capacity will be required. Bangladesh currently exports its leather products across the globe.
Plastic and Rubber	Plastic and rubber industry segment acts as intermediary and backward linkages for other sectors such as leather, packaging, machineries & equipment, footwear, and accessories. Plastic and rubber industry in Bangladesh is depicting an annual growth rate of 20%.[177] There are a total of 300 manufacturers in Bangladesh generating export of plastic goods is ~USD 99 million (in 2015-16, contributing to ~0.01% of global export) primarily to India.[178] Oil and gas industries are the primary upstream industries required for plastic and synthetic rubber production. From crude oil distillation, compounding exercise is undertaken in which plastic products are polymerised. Further, mixing and moulding takes place for converting polymers to plastic products. Natural (procured from rubber plantation) and synthetic rubber are compounded through adding chemical additives to manufacture rubber based products for industrial, commercial, and household purposes. Owing to lack of oil refineries in this country, Bangladesh has limited participation in the plastic compounding stage. Since there is no polyolefin units in Bangladesh and demand of polymers is met through import (from China, Saudi Arabia, Chinese Taipei, Korea, and Thailand). Raw material requirements of plastic is met through import and from local recycled plastic waste.[179] It is to be noted that 20% of raw materials are from recycled materials.[180] Bangladesh has limited production capacity in this sector due to lack of advanced machinery and lack of skilled human resources. As a result, plastic products manufactured in this country primarily cater to domestic demand. Due to lack of upstream petrochemical industries, there is no production of synthetic rubber in Bangladesh. USD 25 million of synthetic rubber is imported annually. Natural rubber is produced from rubber plantations located in Chittagong, Sylhet, Madhupura, and in Bandarban hill tracts.[181] Major importing countries for synthetic rubber are India and non SASEC countries. Produces from plastic and rubber industries are mostly used for industrial, commercial, and domestic consumption. Due to lack of advanced technology, local small and medium players have restriction in producing quality rubber products. As a result, rubber produced in Bangladesh primarily caters to the domestic demand and export contribution is very less.

[177] *http://bida.gov.bd/plastic-industry*
[178] *Bangladesh Investment Development Authority*
[179] *http://emergingrating.com/wp-content/uploads/2017/09/Plastic-Industry-of-Bangladesh-Vol-I.pdf*
[180] *The Financial Express. 2015. Export-Oriented Plastic Industry of Bangladesh: Opportunities and Challenges*
[181] *http://en.banglapedia.org/index.php?title=Rubber_Industry*

Sector	Description of raw materials, industrial linkages, and market access
Paper and Packaging	As per Bangladesh Paper Mills Association, there are 100 paper mills in Bangladesh with a production capacity of 1.5 million metric tonne per year. Manufacturers in Bangladesh are investing in upgradation of technology to produce export quality papers in order to export paper to 40 countries. Paper exports from Bangladesh generated revenue of USD 920,488 in fiscal year 2016-17.[182] The process of manufacturing paper products can be divided into a 3-stage process. The first stage involves acquiring raw material which can be soft wood, bamboo or other fibre based plants. Raw material availability in Bangladesh is limited currently due to lack of ample land, conducive climate and soil conditions. Manufacturers are able to source local wood for manufacturing of basic paper. The wood obtained from plants is converted into pulp through use of digester, bleaching agents are typically sourced from local suppliers.[183] Manufacturers also use recycled paper or import pulp from other countries depending on the final product. This pulp is then converted into paper or packaging products. Usually integrated paper manufacturers in other countries have upstream access to forest towards sourcing of wood. In Bangladesh, locally sourced wood is procured from forest areas in Bandarban and Chittagong forest areas. However, the pulp available locally is not of high quality fit for commercial and industrial purposes. Per capita paper and board production in Bangladesh is ~3.5-4 kg, whereas the world average is 50 kg.[184] This shows that Bangladesh is still lagging behind the world in per capita paper production. Although, Bangladesh is producing sufficient paper for writing, printing and newsprint purposes, consumers are still dependent on imports for packaging material used in RMG, medicine and food items. This is because Bangladesh does not produce high quality pulp locally and while local raw material can meet local demand for basic paper and tissues, it does not satisfy the needs of manufacturers in RMG, F&B and pharmaceutical sectors, who are very particular about their paper quality. Paper packaging items are currently imported from Japan, South Korea, China, India and Indonesia. Bangladesh imported 1 million MT of packaging material in 2016-17.[185]
Chemicals	Chemicals sector comprises various products viz. (i) fertilizer, (ii) adhesives & paints related products, and (iii) other chemicals. This sector exhibits annual growth trend of ~9%.[186] Chemicals sector acts as the downstream sector for various sectors such as agro based, shipbuilding, and heavy machineries. Adhesives and paints based products are consumed for household, commercial, and industrial purposes. At present, chemicals sector fulfils domestic demand and it is not export oriented. This sector is largely dominated by local traders who offer competitive price across the range of products.[187] Primary survey among industrial players reveals that owing to lack of technical know-how, lack of skilled manpower, and lack of quality laboratory facilities (research and testing) in this country, Chemicals sector is yet to shape up in Bangladesh and get ready for export oriented manufacturing. Urea is the major raw material for fertilizer production. Additives are added to Urea for manufacturing fertilizers. Basis primary survey, production of urea based fertilizer is controlled by GoB; current production of urea is not sufficient to meet local demand (demand is 2.5 million MT annual

[182] *http://www.theindependentbd.com/home/printnews/139544*
[183] *Paper Sector in Bangladesh: MMA Quader (2011)*
[184] *Paper Sector in Bangladesh: MMA Quader (2011)*
[185] *http://www.theindependentbd.com/home/printnews/139544*
[186] *http://www.thedailystar.net/supplements/painting-the-future-bright-1331338 https://factsweek.com/160464/asia-textile-chemicals-market-is-projected-to-exhibit-a-cagr-of-7-6-from-2014-2020/ https://advancedtextilessource.com/2014/07/23/bangladesh-textile-chemicals-market-growth-continues/*
187 www.banglajol.info/index.php/jce/article/download/10178/7533

Sector	Description of raw materials, industrial linkages, and market access
	and local supply is only 1 million MT annual) and owing to the same, import of fertilizer is required. Private players are involved in adding micro nutrients (NKPF) to urea in order to enhance the quality. Resin is the basic raw material for adhesive manufacturing, the same is imported. Downstream produces from adhesives are used in footwear, light engineering and construction sectors in the country. Large paints companies in Bangladesh are dependent on procuring raw materials through import from reputed empanelled vendors worldwide. Basis primary survey with industrial players, local (small and medium scale) chemicals manufacturers are dependent on importing resins from countries like India and South Asia. Outputs of Chlor Alkali and Hydrogen Peroxide are basic chemicals necessary for all industrial usage. Downstream products from these basic chemicals have demand across various sectors such as dyeing, textile, F&B, Electrical & Electronics, Steel, Leather, Pharmaceuticals, and Plastic. These inputs are primarily imported from India, China, and other Asian countries. Due to lack of integrated chemical manufacturing facilities in Bangladesh, this sector is import dependent.
Non-metallic minerals	Non-metallic minerals sector comprises of (a) glass, (b) ceramics, and (c) cement. This sector records an average annual growth trend of ~24%.[188] Manufacturing output from these sectors primarily caters to the domestic demand. Domestic market for glass and glassware has been estimated at USD 2 billion (2016) and sectoral outlook is demonstrating healthy growth rate of ~20% annually. Main ingredient of glass industry is sand, although quality sand is imported from China and Egypt.[189] In addition, Bangladesh imports the other ingredients (like limestone, dolomite, feldspar, and other minerals) required for glass industry. Local sand deposits of Bangladesh are located at Balijuri, Shahjibazar, Maddhyapara, and Barapukuria.[190] Secondary research depicts that local glass sector caters to ~95% of the domestic demand; local glass companies are exporting products to South Asian countries (such as India, Nepal, Bhutan, and Sri Lanka).[191] Domestic market for ceramics industry has been estimated at USD 593 million (2016) and this segment is growing at ~20% annually; Bangladesh is a net importer of ceramics (USD 145 million).[192] Clay mining (main ingredient) is sourced locally from Mymensingh and Sylhet regions. Basis primary survey with industry sector players, for high quality products, Bangladesh is import dependent and other raw materials (minerals, adhesives, and chemicals) are being imported. This sector caters to ~85% of the domestic demand and export takes place to various countries (like India, large western economies).[193] Natural gas is used in the production process and owing to low Sulphur content in locally available natural gas, ceramics products look shiny and bright, which makes it adequate for export to large markets.[194] Limestone is the major raw material for cement production. Limestone is processed to form clinker, on which additives are mixed and crushed to manufacture cement. For cement production in this country, end-to-end manufacturing is not available as Bangladesh doesn't have enough supply of limestone. Clinker (processed limestone) is being imported from countries such as India, China, and South East Asia. Coal is also imported and

[188] http://www.thedailystar.net/supplements/overview-bangladeshs-ceramics-industry-1498489
[189] *Secondary research and primary survey*
[190] *Banglapedia*
[191] *http://www.thedailystar.net/news-detail-42940*
[192] *Secondary Research and information obtained from industry associations*
[193] *http://www.thedailystar.net/supplements/overview-bangladeshs-ceramics-industry-1498489*
[194] *http://www.thedailystar.net/supplements/overview-bangladeshs-ceramics-industry-1498489*

Sector	Description of raw materials, industrial linkages, and market access
	fly ash is sourced locally. All the cement based industrial units are located adjacent to river to facilitate smooth logistics. Cement production in this country is primarily used for domestic consumption and minimal export takes place.
Automobile and accessories	With rising income levels in the country, Bangladesh's demand for automobiles is rising. The domestic market demand has been mostly satisfied by imports. Bangladesh is not present across the value chain of automobile industry due to lack of technological know-how and trained manpower. The country has been primarily dependent on assembling of automobile components; these components (completely knock down units) are being imported. Currently the passenger car import comprise of refurbished cars or re-used cars that are reconditioned in Bangladesh. Import of passenger cars has clocked USD 351 million (in 2015). Basis interaction with respondents from automobile sector it was informed that import duty on brand new vehicles ranges from 100% to 300% and as a result of the same, passenger cars are costly in the country. Due to GoB's tax structure which imposes 165 percent duty on imported new cars, 60 percent duty on cars made in Bangladesh and 25 percent Supplementary Duty on reconditioned hybrid cars, Bangladesh is witnessing a rising demand of refurbished vehicles in Bangladesh.[195] [196] However, with development of technological know-how automobile manufacturers are starting to manufacture vehicles at competitive prices locally and have also started targeting export markets. In the recent past several foreign entities expressed their intent to invest in Bangladesh. For example, recently Ashok Leyland opened a new commercial vehicle assembly plant near Dhaka. Various assemblers of vehicles are joint-ventures with foreign entities to help bring in technology and parts. Examples include a partnership between Ashok Leyland and IFAD Autos Limited, and a partnership between Tata Motors and Nitol Niloy Group. Bangladesh has duty-free agreement with several countries due to which cars manufactured and exported from Bangladesh do not attract import duties. These cars can also attract local customers who are interested in buying new cars rather than refurbished cars.
Heavy Machinery, Iron, Steel and Metal	Bangladesh is one of Asia's emerging steel markets having more than 400 steel, re-rolling and auto re-rolling mills. Most of steel manufacture in Bangladesh takes place in form of long steel products and MS bars used in construction of buildings. Majority of the steel and metal based industrial units in Bangladesh are re-rolling mills and they are located in Chittagong and Narayanganj areas, where downstream produces (steel and metal scraps) from ship breaking industry are readily available. As per discussions with leading steel manufacturers, Bangladesh currently produces more than 4 million tonnes of steel and production of this sector is expected to double by 2022. The value of chain of this sector involves mining of iron ore and converting it into pig iron inside blast furnace. This pig iron is converted into steel ingots by adding metals like magnesium, nickel etc. as per requirements of the final products. These steel ingots are then sent to rolling mills where they are converted into billets. Billets are then converted into final products in re-rolling mills. Due to absence of iron ore deposits, steel industry in Bangladesh is dependent on import of scraps and billets to produce final products. Bangladesh is a net importer of iron ore; as per ITC trade data Bangladesh imported USD 2054 million worth of iron and steel products, and USD 31 million worth of iron ore and slag in 2015. This contributes to ~5% of total import of the country.[197] However, Bangladesh has now developed capacity to manufacture 90% of its billet requirement locally.

[195] *http://www.thedailystar.net/business/sales-of-reconditioned-cars-getting-popular-in-bangladesh-1530604*
[196] *http://www.business-standard.com/article/companies/bangladesh-firm-keen-to-assemble-tata-small-cars-117092600034_1.html*
[197] *ITC Trade Database*

Sector	Description of raw materials, industrial linkages, and market access
	Bangladesh currently manufactures steel for its domestic consumption only, however due to capacity expansion by steel manufacturers, Bangladesh has also developed potential to export steel products. Heavy machineries are dependent on supply of metals and steel. However the skill and technology requisite for the same are not available in the country. Water front facilities are required for setting up of steel, metal, and heavy machinery manufacturing related industries in the country.
Electrical and Electronics	Electrical and electronics sector consists of various end products such as cables, electrical appliances, switches, white goods, electronics appliances and goods. This sector caters to both household requirements as well as industrial requirements in sectors such as shipbuilding, heavy machineries & equipment, and light machinery. Size of this sector is BDT 150 billion, out of which ~BDT 70-80 billion is met through domestic production.[198] Raw materials for this sector is diversified and dependent on industrial linkages of various sectors. Products from plastic and rubber industries are used as base for production of switches and cables. Products from metal based industries are used for electrical wiring. Electronics sector has a fragmented value chain spread across various geographic locations. Spare parts of electronics sector (such as compressor, coil, and circuit) are sourced through import from India, China, Thailand, Singapore, and Malaysia. In addition to assembling of the spare parts, manufacturing of spare parts are also available in the country.[199] The country's import in computer and telecommunication devices has been growing with negligible export. Growth in this sector is primarily attributed to the growing consumption pattern countrywide. Singapore, Malaysia, China, and India are the major supplier of spare parts and accessories. Major produces from this sector (such as electronic appliances like AC, fridge, TV, computer and peripherals; electrical fittings, cables, and lighting) are consumed locally. Electrical and Electronics products manufactured locally are comparatively cheaper as compared to the products being manufactured by large brands (such as Sony, Samsung, Hitachi). Walton is the major player in electronics segment in Bangladesh with a market share of ~70%-80%. Local manufacturers hold minuscule share of market and they fail to enjoy economies of scale. Since the output from this sector are cost beneficial as compared to the product offerings of international brands, this sector mostly caters to the domestic demand. Minimal export takes place to India, Africa, Nepal, and Sri Lanka.[200]
Ship Building and Ship Breaking	Shipbuilding industry in Bangladesh is growing; exports earning from this sector in FY 2016-17 was USD 65.61 million, whereas in FY 2012-13 it was USD 5.73 million.[201] However, Bangladesh is still a net importer of end products of shipbuilding industry, with imports of USD 155 million in 2016.[202] The most imported items in Bangladesh are cruise ships, excursion boats, ferry boats, cargo boats; and light vessels, fire-floats, and dredgers. There are currently 300 shipyards operating in Bangladesh where 0.3 million people are employed.[203] Approximately 70% of the yards are located in and around Dhaka and Narayanganj along the side of the river banks of the Buriganga, Shitalakha, and Meghna. About 20% of the shipyards are in Chittagong division located along the side of the Karnapuli River and 6% are located along the bank of Poshur River of Khulna

[198] *INSPIRED, Electronics Sector Report, EU*
[199] *Primary survey with industry players*
[200] *Primary Survey with industry players*
[201] *https://thefinancialexpress.com.bd/trade/export-earnings-from-shipbuilding-soar-1513396358*
[202] *ITC Trade Database*
[203] *https://thefinancialexpress.com.bd/trade/export-earnings-from-shipbuilding-soar-1513396358*

Sector	Description of raw materials, industrial linkages, and market access
	division, and the remaining 4% are located in Barisal division. Almost all inland, coastal, and bay crossing ships are constructed and repaired locally in these local shipyards.[204] Design stage is the first component in the value chain where the layout of the ship is finalized. Ship production is primarily dependent on using steel plates to manufacture the hull of the ship and installing engines, cables and machines inside the ship. Manufacturing of ship requires designing of ship and availability of power sources. Shipbuilding industry requires input from various other downstream industries such as light engineering, chemicals (paints and adhesives), and steel. At present, Bangladesh has limited participation at the design stage of the value chain, which requires skilled manpower. Bangladesh shipbuilders (due to lack of specialised skillset) are supplied with designs by foreign ship owners. From the input perspective, inputs such as steel plates, switch boards, steel cables, and power transformers, are procured locally, whereas engines are imported exclusively. With regard to steel, which is the primary input necessary for the industry, Bangladesh is import-dependent. This is because maximum steel rolling mills in Bangladesh are focussed towards producing long bars which have a higher demand from the construction industry and Bangladesh has a limited steel plate producing capacity. The coast line of Bangladesh is also conducive for setting up ship breaking industry which primarily requires cheap labour. Shipyards in India, Pakistan and Bangladesh comprise around 80% of global breaking and recycling market.[205] The biggest ship recycling yard out of these 3 countries is in Chittagong, which recycled 230 ships in 2017.[206] Basis primary interaction and sectoral research, it was understood that Bangladesh gets 60% of its steel supply from ship breaking industry, which is used in iron, steel, light engineering and equipment manufacturing industries.
Petroleum products (including bottling)	Petroleum sector in Bangladesh is exhibiting historical annual growth trend of 10%.[207] Gross value added in this sector is estimated at BDT 1309 billion.[208] Bangladesh is a major importer of petroleum products. Based on the petroleum and petroleum based products (such as LPG, LNG, and polymers), gas refining, storage and bottling facilities have been developed in water front locations mostly located near the sea sides of the country. Imported volume of POL (petrol, oil, lubricants) products has clocked 4.1 million MT (2016).[209] Based on extraction of crude oil, distillation and polymerization takes place to manufacture various downstream products such as lube oil, plastic, and rubber. Since there is no crude oil reserve in this country, Bangladesh is not present across the value chain of this sector. Crude oil is mostly being imported from gulf countries. Setting up of oil refineries is highly capital intensive and it involves usage of advanced technologies and heavy machineries. Further, highly skilled and specialized manpower is essential towards smooth functioning of this sector. Basis primary survey with industry players, Bangladesh lacks in terms of availability of highly skilled manpower; as a result of which, Bangladesh is present in less technologically challenging aspects in the value chain of this sector. There are various local players manufacturing lube oil and blended oil which

[204] *Japan Bangla Business Center. 2014. A Report on Shipbuilding Industry of Bangladesh.*
[205] *http://www.atimes.com/article/shipbreaking-asia-profit-price/*
[206] *http://www.atimes.com/article/shipbreaking-asia-profit-price/*
[207] *http://fpd-bd.com/wp-content/uploads/2016/10/Research-Report-on-Energy-Sector-of-Bangladesh-Initiation-Mar-15-11.pdf*
[208] *Survey of Manufacturing Industries by Bangladesh Bureau of Statistics*
[209] *Bangladesh Petroleum Corporation*

Sector	Description of raw materials, industrial linkages, and market access
	are primarily consumed in sectors such as automobile, heavy engineering, and light machinery. LPG based cylinders are bottled in cylinders for industrial, commercial, and domestic supply. This sector caters to the local demand and not export oriented.
Pharmaceuticals	Pharmaceuticals is one of the most popular industry sector in the country; gross value added from this sector is BDT 113 billion yearly.[210] Domestic market has been estimated at ~USD 2 billion (2016) with an indicative growth rate of 15% annually.[211] Pharmaceuticals is a highly research and development oriented industry where regulatory aspects (like drug laws, patent issues, and affiliation with drug agencies) play key role. From basic chemicals and other products (like herbal contents), Active Pharmaceutical Ingredients (APIs) are manufactured. APIs are the key ingredients for drug manufacturing. Active Pharmaceutical Ingredients (APIs) of Pharmaceutical sector is sourced through import owing to quality issues and lack of API manufacturing ecosystem in the country. Basis primary survey, Bangladesh has commenced API manufacturing, but the production is not sufficient to cater to the economies of scale (~10% APIs are locally sourced). Also, owing to lack of educational ecosystem and lack of research facilities, Bangladesh is limited in R&D and sourcing of skilled technicians in this sector. Chemicals and various ingredients of drug are imported (from various markets spread across USA, Europe, and Asia) and end products (drugs) are being manufactured in this country. Dhaka and the surrounding region has evolved as a hub for pharmaceutical manufacturing with majority of the pharmaceutical units are located in this region. Basis primary survey with industry players, lack of adequate educational system related to pharmaceutical sector and availability of skilled human resources are major challenges that this sector is facing. End products of this industry primarily caters to domestic demand and minuscule export takes place (mostly to Africa and LDC countries).
Light Machinery, Equipment and Furniture	This sector involves production of mechanical equipment, agricultural machinery, bicycles, and furniture. Produces from this sector is predominantly used for catering to domestic demand. This is an important industry in Bangladesh as it provides backward and forward linkages to all other industries. Light machinery sector provides support for operation and maintenance of heavy machines through production of spare parts, castings, moulds, dies, fittings etc. As per information provided by Bangladesh Investment Development Authority (BIDA) there are currently 40,000 light engineering units/workshops scattered across Bangladesh. These industries develop in vicinity of industrial clusters in order to provide support to large scale capital intensive factories requiring heavy machinery. Products manufactured by this sector can be made out of rubber, ceramics, metals or plastic. Exporters from countries like China, Japan and Korea are developing light engineering facilities in Bangladesh in order to cater to export market. Raw materials are steel scraps, components of plastic and rubber, and wood. Basis primary interaction, it was informed that steel scrap is sourced primarily from ship breaking industries (located in Chittagong and Narayanganj). Other raw materials (such as articles made of plastic and rubber) are sourced locally; Bangladesh doesn't produce good quality wood required for manufacturing of furniture. Since, wood available in Bangladesh are high in moisture and fibre content and is not fit for processing.

[210] *Survey of Manufacturing Industries 2012, Bangladesh Bureau of Statistics*
[211] *https://www.jetro.go.jp/ext_images/world/asia/bd/seminar_reports/20160413/p4.pdf*

Sector	Description of raw materials, industrial linkages, and market access
	Bicycle sector in Bangladesh participates in the entire value chain (assembling and manufacturing). Manufacturers focused on export are completely import dependent for raw material sourcing. According to them, quality raw material fit for export is not available locally. However, majority of manufacturers are focused on catering to domestic demand.

Above table describes sector wise dependency on raw material sourcing and major markets. It is evident that across the industry sectors, Bangladesh is a net importer for major raw materials and intermediaries. Industries in Bangladesh are primarily focussed on meeting domestic demand and negligible export takes place in all sectors apart from RMG, leather and F&B. As a next step, pre-requisites in terms of logistics, utility sourcing, and dependency on manpower have been assessed. Table in the next page covers the dependency of each sector on various factors of production.

Table 24: Sector Specific dependency on Factors of Production

Industries	Import Dependency	Export Dependency	Land Transport	Air Transport	Water Transport	Access to Water Front	Electricity Requirement	Water Requirement	Gas Requirement	Labor dependency	Area Sensitivity
Textiles & RMG	High	High	Moderately High	Moderately Low	Moderately High	Low	High	Moderate	Low	High	Low
Food and Beverages	Moderate	Moderately High	Moderately High	Moderate	Moderately High	Moderately Low	Moderate	Moderate	Moderate	Moderate	Moderate
Agro Based Products	Low	Moderate	Moderately High	Moderately Low	Moderate	Moderate	Moderate	Moderate	Moderately Low	Moderately High	Moderate
Leather and Leather Products	Moderately Low	High	Moderately High	Low	Moderately High	Low	Moderately Low	Moderately High	Moderately Low	Moderately High	Moderate
Plastic and Rubber	Moderately High	Moderately Low	Moderate	Low	Moderately Low	Low	Moderate	Moderate	Moderately High	Moderately High	Moderate
Paper and Packaging	Moderate	Moderately Low	Moderate	Low	Moderately Low	Low	High	High	Moderate	Low	Moderately Low
Chemicals	High	Moderately Low	Moderate	Moderate	Moderately High	Moderately High	High	High	Moderate	Low	Moderately High
Non-Metallic Minerals	High	Moderate	Moderate	Low	High	High	High	Low	High	High	High
Automobile and Accessories	High	Low	Moderate	Moderately Low	Moderately Low	Low	Moderate	Low	Moderately Low	Moderately High	High
Heavy Machinery, Iron, Steel and Metal	High	Low	Moderate	Low	High	High	High	Moderate	High	High	High
Electrical and Electronics	High	Low	Moderately High	Moderately Low	Moderately Low	Low	Low	Low	Low	Moderate	Low
Ship Building and Ship Breaking	High	Moderately High	Moderately Low	Low	High	High	High	Low	Moderately High	High	High
Petroleum Products (including Bottling)	High	Moderately Low	Moderate	Low	High	High	High	Low	Moderate	Moderate	High
Pharmaceuticals	High	High	Moderate	Moderately High	Moderately High	Moderate	High	High	Moderately High	High	Moderately High
Light Machinery, Equipment and Furniture	Moderately Low	Moderate	Moderately High	Moderately Low	Low	Low	Moderately Low	Moderate	Moderate	Moderate	Moderate

Source: PwC Analysis

Table in the previous page captures a heat map, which highlights the dependency of each sector on various factors of production. Further, project site and influence region (surrounding the project site) specific assessment is undertaken to assess the economic profiling, natural resources, industrial development, and backward/ forward linkages prevailing in the region. Assimilating the outcome of regional assessment with the site specific attributes related to factors of production, compatibility of initial universe of industries in site surrounding context would be assessed. Outcome of this assessment would result in the initial shortlist of industries. Next section captures the regional assessment involving economic profiling, natural resources, and industrial linkages prevailing in the influence region surrounding the proposed EZ.

4.5. Regional Assessment

This section assesses the region surrounding Gopalgonj district in terms of the following:

- Agricultural and natural resources,
- Industrial development,
- Analysis of manpower sourcing to the proposed EZ

In Chapter 3, detailed location assessment captures inherent features owing to location and proximity to infrastructure projects (such as Khulna Mongla rail line, Padma Bridge, and other upcoming infrastructure development projects in this region). Outcome of this regional assessment shall capture if the initially shortlisted industries are suitable for establishment in the proposed EZ based on factors of production.

Border adjoining districts of Gopalgonj district have been considered as the immediate influence region for the proposed EZ. These districts are the neighboring districts of the proposed EZ and could have major influence on the industries in the proposed EZ from the aspects of local supply of raw materials and industrial linkages. This influence region consists of the following districts:

- Gopalgonj
- Faridpur
- Madaripur
- Barisal
- Khulna
- Bagerhat
- Narail

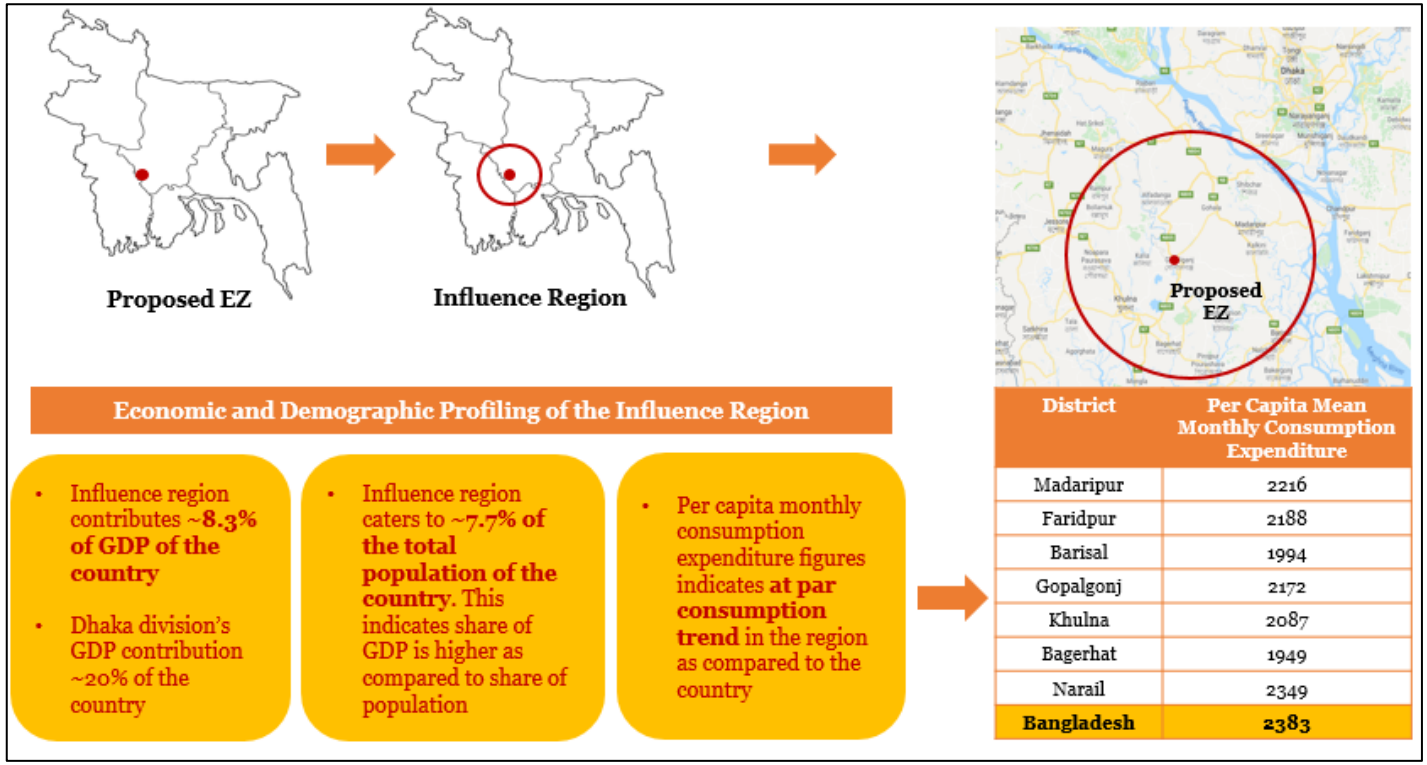
4.5.1. Key Characteristics of Influence Region

The proposed EZ site location is in Gopalgonj Sadar Upazila of Gopalgonj district. This district (and the influence region) is well positioned in between the industrial hubs of Dhaka and economically affluent Khulna distrct and other districts such as Faridpur, Madaripur, Barisal, Bagerhat, and Narail. The economy of Gopalgonj district is predominantly agricultural. Total area under agriculture in this district is 222,290 acres, and the agricultural produces per acre is 2.58 MT per year.[212]

[212] *Bangladesh district statistics, 2011*

Following figure captures profiling of the influence region based on demographic and economic indicators.

Figure 27: Economic and Demographic profiling of the influence region[213]



District	Per Capita Mean Monthly Consumption Expenditure
Madaripur	2216
Faridpur	2188
Barisal	1994
Gopalgonj	2172
Khulna	2087
Bagerhat	1949
Narail	2349
Bangladesh	**2383**

Figure on the left indicates that the influence region is not economically well off. Share of GDP and population are homogeneous in this region, which indicates no path-breaking economic and industrial activities are taking place in this region.

Per capita monthly consumption expenditure figures indicate that the economic condition and spending pattern in Gopalgonj is **at par as compared to the country average.** Industries in proposed EZ could see some consumer driven demand locally, as well.

Once the proposed EZ is operational, it could act as catalyst towards transforming the overall industrial and economic outlook of this region.

[213] *Source: Secondary Research (Lagging Region's Survey, District Statistics, World Bank) and PwC Analysis*

4.5.2. Raw Materials and Natural Resources available in the Influence Region

Agricultural and natural resources in Gopalgonj district

An analysis of district statistics report, 2011 of Bangladesh, reveals that Gopalgonj district witnesses healthy production of rice (393,055 MT), water melon (47,156 MT), jute (39,665 MT), Sugarcane (19,496 MT), Pulses (12,817 MT), potatoes (11,762 MT), onion (9,893 MT), wheat (9,201 MT), and other agricultural products.

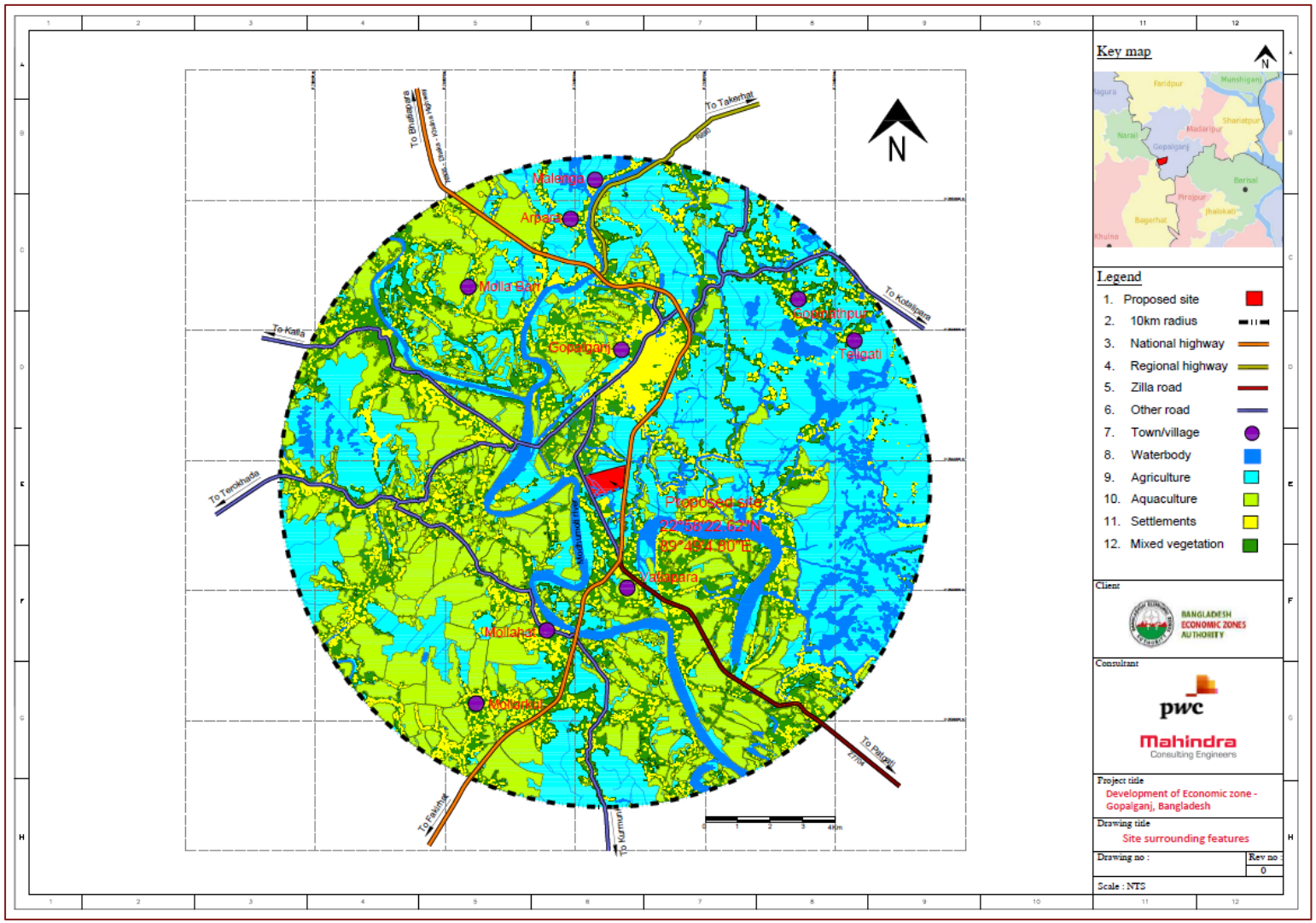
These crops are grown both for domestic consumption as well as for exports to other countries. Agro based and food processing related industries situated in neighbouring districts also source their raw material from Gopalgonj district for purpose of manufacturing.

High dependency on agricultural activities may also push demand for fertilizers and agricultural machinery in this region.

Gopalgonj district with fertile land falls in Gangetic basin land area and it is very rich in prospect of flora and fauna.

A settlement profile of the proposed site location is shown on the next page. This profile covers an area of around 10 km radius. The map shows that there is predominantly agricultural land in the vicinity of the proposed EZ site, with scattered settlements and aquaculture being practiced.

Table 25: Settlement Profile of the proposed EZ



Source: MACE Analysis

Shrimp is produced in abundance in this district. Shrimp produced in Gopalgonj is supplied to Khulna and Chittagong for processing and further export to large economies.[214]

Agricultural and natural resources in the influence region

Following table captures snapshot of major agricultural produces in the influence region. Major crops produced in each of these districts have been captured based on annual production.

Table 26: Agricultural produces in the influence region (figures in MT annual production)

Crops	Barisal	Bagerhat	Khulna	Narail	Madaripur	Faridpur
Rice	526156	343178	1093435	206586	216979	285089
Potatoes	14661	6992	6525		30806	
Banana	9076	5061				
Pulses	8335			15991		
Jute	6282		6730	121826	48161	131338
Fish		43368	40367		10885	
Mango			7181			
Sugarcane		14558		13556	21211	167148
Pumpkin				11284		
Onion						153251
Wheat						68778

Source: Bangladesh Bureau of Statistics- Districts' Statistics

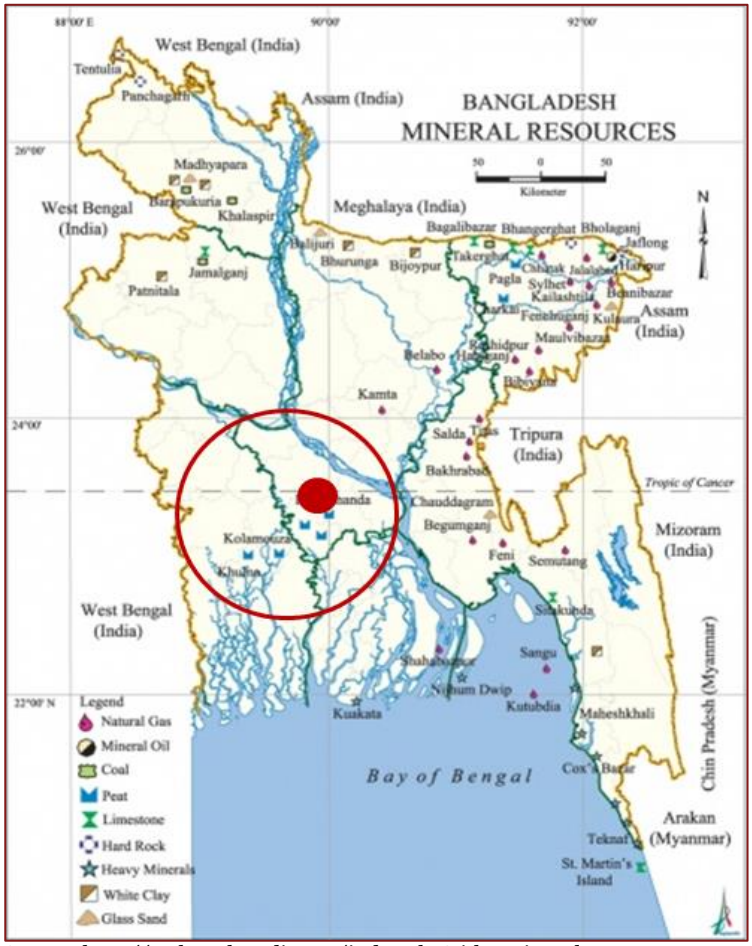
Agro based natural resources are available across the influence region. This may act as a source of raw material for potential industries like agro based products and food & beverage industry in the proposed EZ.

Mineral resources in the influence region

Bangladesh is not a mineral rich nation. Figure on the next page captures the mineral map of the country outlining the influence region.[215]

[214] *http://www.Gopalgonj.gov.bd/site/page/0e77eb33-2013-11e7-8f57-286ed488c766*
[215] *https://www.omicsonline.org/open-access/present-scenario-of-renewable-and-non-renewable-resources-in-bangladesh-2151-6219.1000134.pdf*

Figure 28: Mineral Map of Bangladesh



Source: http://en.banglapedia.org/index.php?title=Mineral_Resources

Figure on the left indicates that in the influence region of the proposed EZ, only peat is available.

Deposits of peat are available in Gopalgonj, Madaripur, Khulna, Sylhet, and in Sunamganj districts. Peat is primarily used for household usage as an alternative fuel. Briquettes are formed after drying peat. Briquettes are used as fuel in brick, lime and thermal power based industries.

Petrobangla launched a pilot project for extracting peat and making briquettes. The outcome was not sanguine and also the project was not economically feasible.

It is evident from this map that no significant mineral resources are available in the influence region.

4.5.3. Industrial Ecosystem of the Influence Region

Industrial ecosystem in Gopalgonj district

Industrial proliferation is yet to take place in this district. District Statistics reveal that there are a total of 2,784 manufacturing related establishments employing 8,135 (~0.7% of total population of this district).

As of now, there are a total of 3,777 small scale and cottage industries functional in this district.[216] Owing to its geographical proximity with Benapole land port, trade linkage channel with India is well developed. Popular industrial activities in this district are: iron and steel based, cement, milk based, cigarette, and textile/ RMG.

Following table outlines the industrial snapshot in this district and in Gopalgonj Sadar upazila (where the proposed EZ is located).

Table 27: Industrial snapshot in Gopalgonj district and in Gopalgonj Sadar upazila

Industrial Sector	Gopalgonj District (nos.)	Gopalgonj Sadar Upazila (nos.)
Handloom (operational)	1	0
Bamboo and Cane	336	157
Wooden Furniture	1550	113
Saw Mill	161	39
Rice Mill	232	38

[216] *District Statistics of Gopalgonj- Bangladesh Bureau of Statistics*

Industrial Sector	Gopalgonj District (nos.)	Gopalgonj Sadar Upazila (nos.)
Oil Mill	94	58
Bakery	43	16
Flour Mill	129	57

Source: Bangladesh Bureau of Statistics- District Statistics of Gopalgonj

Furniture and agro based industries have witnessed proliferation in this district and also in Gopalgonj Sadar upazila.

Khulna district: Third largest economy of Bangladesh

Proposed EZ is located at ~50 km from Khulna city. Khulna is situated north of the Port of Mongla and it has various heavy and light industries. In the past, Khulna gained popularity for salt and molasses. Till 1970, various industries (such as jute mill, newsprint, hardboard, shipbuilding) flourished in Khulna.

Development of Salt, Jute and Fish/ Shrimp processing units since past; currently shaping up as the third economic centre of Bangladesh

Access to Mongla Port and various infrastructure projects including Khulna-Mongla rail line upgradation, planned road projects are conducive for industrial development in this region

Various jute mills are located on the bank of Bhairab River. In the following table, details of various jute mills in this region have been elucidated:[217]

Table 28: Jute mills in Khulna

Name of the Jute Mill	Details
Khalispur Jute Mill	Profitable entity; around 4,000 workers
Crescent Jute Mills	More than 5,000 workers
Daulatpur Jute Mill	Spread over 22.59 acres; daily production 9.09 MT
Platinum Jubilee Jute Mill	Around 5,000 workers, nationalized entity
Star Jute Mill	Around 3,000 workers, nationalized entity
Alim Jute Mills	Spread over 44.66 acres; around 1,300 employees
Eastern Jute Mills	More than 1,500 workers
Ajax Jute Mills	Spread over 66 acres
Sonali Jute Mills	Spread over 56 acres; currently no production
Mohasin Jute Mills	Currently no production
Jute Yarn and Towain Mill	Spinning mill
Jute Textile Mills Ltd.	Daily production 30 MT per day
Shawnawaz Jute Mills	Fully export oriented unit

Some other major industries in Khulna district have been outlined below:[218]

Table 29: Major Industries in Khulna

Name of the Industry	Details
Khulna Shipyard	Spread over 68.97 acres; pre order for ship building up to 2020
Bangladesh Cables	Optical fibre production; spread over 33 acres; production capacity 3 lakh conductor km
Pharmaceutical	National Chemical and Pharmaceutical Works, Aseptic Pharmaceutical Works

[217] *Information obtained from District Officials during site visit*
[218] *Information obtained from District Officials during site visit and secondary sources*

Name of the Industry	Details
Foundry and Iron related	National Iron Foundry and Industrial Works, Bangladesh Iron and Engineering Works: Major produces are GI pipe, CI pipe, measuring devices, tube well pipe
Rice Mill	Rupsha Rice Mill, Khulna Rice Mill
Jute Press	Helan Jute Press, Bangladesh Jute Baller, Khulna Industries, Bhangura Jute Bailing, Sultanul Kishanlal Jute Press, Daulatpur Jute Press, Daulatpur Traders & Company
Fish and Shrimp based industries	Around 0.27 million hectare land available for fish cultivation and 23 cold storages are located in Khulna for fish/ shrimp processing. Major companies: Anam Sea Food, Sundarban Sea Food, Lockpur Sea Foods, Modern Sea Foods, Bionic Sea Foods, Prince Sea Foods, Gazipur Sea Foods, Sigma Sea Foods etc.
Salt Processing	Sundarban Salt Industries, Rajapur Salt Industries, Padma Salt, Teesta Salt, Gaffar Food Products etc.
BSCIC Industrial Complex, Khulna	Battery, Jute spinning, Paperboard and packaging, Bakery and Confectionery, Food Processing, Textile, Rice Mill, Plastic, Oil Mill etc.

Further to the above mentioned industries, Khulna city is home to the corporate branch offices of numerous companies, including among others, M. M. Ispahani Limited, Beximco, James Finlay Bangladesh, Summit Power and the Abul Khair Group.[219]

With an aim to modernise Khulna region, the Khulna Development Authorities (KDA) has taken up several projects which are either ongoing or will be implemented by 2018. The projects are also targeted to develop Noapara industrial belt and Mongla port with new infrastructures. Also, a 630 MW Coal Fired Power Project and installation of a new line of 33kv and 11kv of 5,184 km under 33 PBS in the Rajshahi, Rangpur, Khulna and Barisal divisions under the Bangladesh Rural Electrification Board. The projects mainly focus on alleviating housing problems, expanding urbanisation, easing pressure on the roads, setting up more industries and income-generation of a large population. Some of the projects undertaken are:[220]

Table 30: Major Infrastructure Projects in Khulna

Type of projects	Amount (in Taka)
Construction of different roads in Noapara	500 crore
Construction of dams and bridges along with tunnels on both sides of the Rupsha River and construction of a park on its bank	2,000 crore
Construction of a bridge connecting Mongla with Khanjahan Ali Bridge and a road on the Passur riverside	1,700 crore
Development of Civic services	300 crore
Development of the city centre on the Rupsha Bridge approach road	400 crore
Construction of a link road from Niklapur to Tilka	48 crore
Construction of an internal road network in the city	250 crore
Construction of several roads including Rayer Mahal-Koira Bazar Road and Khulna-Satkhira Road	250 crore
Construction of an IT village park	250 crore
Construction of a bypass road at Noapara	300 crore

Following infrastructure projects are awaiting approval for implementation:[221]

- Construction of 21.20 kilometer road from Barakpur to Chandanimahal at a cost of Tk 532.66 crore,
- Construction of Sheikh Russel Civic Centre at a cost of Tk103.60 crore,
- Construction of three link roads from Satkhira Road to city bypass at a cost of Tk 266. 12 crore and
- Construction of a 450-metre long overpass at Phulbari level crossing at a cost of Tk153.63 crore

[219] *Secondary research from various web resources*
[220] *KDA website and Secondary research from various web resources*
[221] *KDA website*

Basis information obtained during site visit and information available from secondary sources, it appears that Khulna district has significant industrial proliferation. The major industries in this area are **jute, fish and shrimp processing, food processing, salt processing** etc. Also, various infrastructure projects are planned/ under implementation in order to augment the overall connectivity of this region with other parts of Bangladesh.

Proximity to Khulna shall foster the possibility of industrial linkage at the proposed EZ based on already developed industrial ecosystem in Khulna. Rich agricultural and fish resource base in Khulna can be leveraged towards setting up of agro based and food processing industries in the proposed EZ.

Industrial ecosystem in the influence region

Barisal district is one of the major sources of food grains and fish products in the country. It is known as "Venice of Bengal" as there is an abundance of rivers and channels that drain this region; some of the major crops cultivated in this area are – rice, paddy, seasonal vegetables etc. Barisal river port is a very important river port in Bangladesh. It is the 2nd largest river port in Bangladesh and is used to transport cargo like coal, petroleum, agricultural crops to and from Dhaka, Narayanganj, and Chandpur. Some of the industries currently operational in Barisal are –

- Pharmaceuticals (Opso Pharma)
- Textile and RMG (Khansons Textile Ltd.)
- Saline (Opso Saline)
- Cement (Anchor cement)
- Biscuit and Food Processing (Bengal Biscuit)

Barisal being a riverine district is also emerging as a hub of ship building industry. There are already 10 shipyards in this district, creating employment for around 350 people.[222] GoB's proposal to develop Payra Port (100 km downstream of Barisal River Port) as a deep sea port will further boost industrialization in Barisal.

Industrial development and upcoming infrastructure projects in Barisal district can establish industrial linkages in the proposed EZ.

Economy of **Bagerhat district** is predominantly agriculture dependent. Shrimp and fish processing based industries have grown in this district. This district also houses Mongla Port; various industries are operational in the area surrounding Mongla Port. Petrochemical, food processing, cement, and chemical based industries are located in Digraj Bazar area (surrounding Mongla Port). Industrial snapshot of this district is presented below:

- Rice mill: 285 nos.
- Garments factory: 2 nos.
- Cottage industry: 6113 nos.
- Bamboo and cane industry: 358 nos.
- Wooden furniture: 884 nos.

There is a BSCIC industrial complex in Bagerhat district. It houses various industrial establishments related to diversified sectors such as agro products, food processing, light engineering, and furniture. Mongla EPZ is located in close proximity to Mongla Port; industrial ecosystem of this EPZ constitutes of textile/ RMG, food processing, agro based and others.

Snapshot of industrial ecosystem in three adjoining districts (Faridpur, Madaripur, and Narail) of the influence region is summarized in the table next page.

[222] *https://bangladesheconomy.wordpress.com/2011/02/02/barisal-emerging-as-a-shipbuilding-zone/*

Table 31: Industrial snapshot in Faridpur, Madaripur, and Narail districts

Faridpur		Madaripur		Narail	
Husking Mill	**49%**	**Weaving/ Handloom**	**29%**	**Husking Mill**	**74%**
Furniture industry	**11%**	**Furniture industry**	**23%**	**Handicraft**	**3%**
Bamboo industry	**8%**	**Rice Mill**	**15%**	**Bamboo industry**	**5%**
Handicraft	**8%**	**Pottery**	**10%**	**Furniture industry**	**5%**
Pottery	**5%**	**Bamboo industry**	**7%**	**Pottery**	**7%**
Rice Mill	**5%**	**Saw Mill**	**7%**	**Rice Mill**	**4%**
Flour Mill	4%	**Flour Mill**	**5%**	Weaving/ Handloom	1%
Weaving/ Handloom	3%	Oil Mill	1%	Saw Mill	1%
Saw Mill	3%	Printing Press	1%	Flour Mill	1%
Oil Mill	2%			Oil Mill	1%

Source: District Statistics- Bangladesh Bureau of Statistics

Above table depicts that Textile/ RMG, agro based, furniture, and bamboo based industries are the most proliferated industries in the adjoining three districts. Proliferation of agro based industries in this region may be attributed to locally available raw materials. Owing to local market demand and availability of unskilled human resources, furniture and handloom related industrial units have developed in this region.

Hence it can be concluded that these districts have witnessed industrial development.

Access to Export Processing Zones

Export Processing Zones (EPZs) in Bangladesh house various foreign and domestic industrial establishments which are completely export oriented. Proximity to these EPZs foster the possibility of downstream industrial linkages. Proposed EZ is located at a distance of ~65 km from Mongla EPZ Industrial profiling of this EPZ is placed in the following table.

Table 32: EPZ within 100 km radius from the proposed EZ

Mongla EPZ	Metal, Agro products, Paper, Textile/ RMG, Electrical & Electronics

Source: BEPZA website

With the operationalization of Padma Bridge and other infrastructure development projects in this region, access from proposed EZ to Mongla EPZ shall improve. Downstream linkages from the above mentioned industries could be potential for the proposed EZ.

4.5.4. Assessment of Manpower Sourcing

Basis interactions with heads of educational institutes during site visit, it can be inferred that unskilled manpower can be sourced from Gopalgonj Sadar upazila and nearby villages. Primary survey with investors reveal that migration of unskilled labor is quite widespread and prevalent in Bangladesh context. Thus, sourcing of unskilled human resources is not a challenge. Having a source of semi-skilled and skilled labor is a challenge in Bangladesh, as these workers prefer to live in urban and semi-urban areas. Most students in rural parts of Bangladesh migrate to industrialized centers near Dhaka and Chittagong in search of jobs, after completing their education. However, growth of industries in their hometown could arrest this trend of migration.

The average literacy rate in Gopalgonj district is 58.09 percent which is above the national average of 51.77 percent.[223] A study of Technical and Vocational Education and Training (TVET) Institution Census 2015 reveals that Gopalgonj district has 79 TVET institutes having the following breakup –

[223] *Statistical Yearbook of Bangladesh, 2016*

Table 33: TVET institutes in Gopalgonj

Type of Institute	Number of establishments
Polytechnic Institutes	5
HSC (Business Management)	5
Institute of Medical Technology	5
Vocational Secondary Education	3
General Secondary School (Attached vocational education)	14
General Madrasa (Attached Vocational Education)	1
General HSC (Attached Business Management)	3
Nursing College	1
Union Digital Centre (UDC)	5
Technical School and College	1
Technical Training Centre	1
Agriculture Training Institute	1
Office(Training)	32
Textile Vocational Institute	1
Sarkari Shishu Paribar	1
Total	**79**

Source: PwC Research

These institutes offer diploma courses in subjects ranging from Computer Science, Telecommunications, Electrical and Electronics to Dress Making, Pisciculture, Ship Building, General House Wiring etc. Certain new courses like Food & Beverage Technology and Textile Technology are gaining traction among students. As a result of high demand among the young people wanting to learn basic computer skills, several office training institutes have been established in Gopalgonj. These centers impart basic computer training to the students, enabling them to be employed in firms requiring tasks like data entry, record keeping etc.

Prominent TVET Institutes in the district

Below is a brief overview of Gopalgonj's popular institutes –

Gopalgonj Polytechnic Institute – It is a polytechnic institute offering courses in Computers, Electrical and Electronics, Food Technology and Fridge and AC repair. Each course has a tenure of 4 years, with around 530 students in each year. Most of the students opt to take up higher studies or migrate to places like Dhaka, Khulna and Narayanganj in search for employment. Basis our interaction with the college principal, it was also understood that in 2016-17, around 350 students had gone to China from this college in search of job opportunity.

Gopalgonj Bigyan Mahabidyalaya – It is a polytechnic institute offering diploma and vocational courses in Civil, Textile, Computer, Electrical, Mechanical and Garment Design. Each course has a tenure of 4 years and there are around 450 students in each year. This institute also offers several short courses of 6 months, in subjects like dress making, ship building, house wiring and Fridge and AC repair. There are 300 students enrolled for these short courses. Students from this college travel to different parts of Bangladesh in search for jobs, there are also few students who stay in Gopalgonj district and take up jobs in small service centers for repairing electronic and mechanical equipment.

In Bangladesh, each Upazila has an Upazila Youth Development Officer, who is responsible for providing short term courses (ranging from 7-90 days) to young people of the Upazila wishing to learn new skills. As per our discussion with Youth Development Officer of Gopalgonj Sadar Upazila, it was understood that most popular courses in Gopalgonj Sadar Upazila are House wiring, Fridge and AC repair, poultry farming, fish rearing and animal husbandry. It is expected that young people in proximity of proposed EZ location will be skilled in above mentioned trades.

Sufficient educational institutes are available in the region to produce skilled and semi-skilled workers for the proposed EZ. However, there could be a dearth of skilled manpower in the region as majority of the educated class migrate to other regions and overseas in search of employment.

4.5.5. Summary of Influence Region Assessment

Above discussions related to an overall holistic assessment of the influence region can be summarized in the following-

1. Consumption expenditure trend in this region is at-par with the country average, which indicates that the region surrounding the proposed EZ is a growing marketplace for the proposed EZ.
2. Gopalgonj district has good access to locally available agro based raw material which can be used in the proposed EZ.
3. Cash crops like jute is grown in the region which can be used as a raw material in the proposed EZ.
4. Predominant agriculture based economy could create a demand for fertilizers and agricultural machinery in the region.
5. This district and the influence region hosts aquaculture activities. Fish and shrimp available in the influence region can act as a steady source of raw material towards the proposed EZ.
6. No significant mineral resources in this region. Peat available in this region could be used as fuel source for power, lime, and brick based industries.
7. Presence of industrial regions (Khulna, Barisal, and Mongla EPZ in Bagerhat district) near Gopalgonj district have created a conducive ecosystem for growth of economic zone in Gopalgonj.
8. Availability of skilled labor in vicinity of the proposed EZ is a challenge due to absence of industrialization and dearth of social infrastructure in Gopalgonj district.
9. Students, after obtaining education, opt to migrate to industrialized cities like Khulna, Gazipur, Dhaka, Narayanganj etc. in search of better job prospects
10. Locally available semi-skilled labor can be employed in the proposed EZ after providing industry specific training.

4.5.6. How Proposed EZ can act as Catalyst of Industrial Transformation in Gopalgonj District

Once this proposed EZ comes up, it shall act as a catalyst towards industrial transformation in Gopalgonj district and the surrounding region.

Investment (local and foreign) trend at the country level is analyzed to forecast the future potential investment figures. Further, potential investment figure at the Gopalgonj district level has been estimated based on GDP share (Source: Bangladesh Investment Development Authority and Lagging Districts' Survey). In three scenarios, various cases have been developed considering the proposed EZ can tap 1%, 5%, and 10% of cumulative investment inflow (from 2023 to 2027) in Gopalgonj district. Following table elucidates the outcome of this quantitative analysis.

Table 34: Estimated investment inflow in the proposed EZ

Scenarios	Elaboration	Anticipated cumulative investment inflow in Gopalgonj district from 2023 to 2027 (USD million)	Projected Cumulative Investment inflow to the proposed EZ (USD million)		
			1%	5%	10%
Conservative	Macro-economic conditions are diminishing and as a result of the same, investment inflow prospects are not sanguine	3552	**36**	**178**	**355**
Base (as-is)	Business as usual scenario	4737	**47**	**237**	**474**
Aggressive	Macro-economic conditions are expected to improve and as a result of the same, investment inflow prospects are good	5921	**59**	**296**	**592**

Source: Secondary Data and PwC Analysis

Above assessment reveals that in worst possible case, USD 36 million of cumulative potential investment can flow into the proposed EZ (from 2023 to 2027) even if the proposed EZ taps 1% of the potential investment inflow to Gopalgonj district. In best possible case, proposed EZ could tap USD 592 million investment. Bolstered by these potential investment figures, proposed EZ is poised to shape up as catalyst towards industrial transformation in this region and it can catapult overall socio-economic condition of Gopalgonj district.

4.6. Initial Shortlist of Industries

Information from the previous sections provide insights about the pre-requisites of the bucket list of industries, profiling of the region surrounding the proposed EZ in light of economic indicators, natural resources, industrial development, and sourcing of semi-skilled and skilled manpower. This information can be distilled to create a matrix for compatibility mapping.

A compatibility mapping will create an understanding about which industries from among the bucket list of sectors are suitable for the proposed EZ. On basis of this compatibility assessment, a shortlist of industries can be drawn which are most suitable to be developed in the proposed EZ location. This shortlist will contain those specific sectors which are in conformance with the utility, connectivity and other support infrastructure available at the proposed EZ location. This shortlist will further assist in streamlining the primary assessment for which interaction with industry players in the sectors will be required to understand the on ground perception about the proposed EZ location and whether the shortlisted industries are suitable to be developed in the proposed EZ.

A matrix has been created in the next page, to map requirements of each sector with the supporting Backward & Forward linkages, Factors of Production and other prerequisites available at proposed EZ location.

Table 35: Compatibility Mapping

Sector	Access to Backward and Forward Linkage		Access to Factors of Production							
	Access to Raw Material	Access to Markets	Land Connectivity	Air Connectivity	Water Connectivity	Availability of Power	Availability of Water	Availability of Gas	Availability of manpower	Access to Water Front
Features prevailing at proposed EZ site			Easily Accessible	Multiple modes of transport required	Moderately Easy to access	Sufficient power available	Water source available in vicinity	Not Available	Semi-skilled/ Unskilled available; Skilled unavailable	Not Available
Assessment of pre-requisites of industrial sectors										
Textiles & RMG	Moderately High	Low	Moderately High	Moderately Low	Moderately High	High	Moderate	Low	High	Low
Rationale for selection	• This is an export oriented industry, with already a high global market share. • Sector pre-requisites are met by the proposed EZ for all parameters • This sector requires good access to sea ports in order to cater to global markets • Mongla Port is around 65 km from the proposed EZ site, however low draft allows only feeder vessels to berth at the port resulting in increased turn-around time • This sector can be considered suitable for proposed EZ, if Payra deep sea port is developed or Padma Bridge is operationalized									
Food and Beverages	High	High	Moderately High	Moderate	Moderately High	Moderate	Moderate	Moderate	Moderate	Moderately Low
Rationale for selection	• This industry primarily caters to domestic demand as well as it exports to neighboring countries and countries having significant Bangladeshi immigrants like middle east Asia • Sector pre-requisites are met by the proposed EZ for all parameters except gas, which can be substituted by electricity • Proposed EZ holds a lot of growth potential for this industry as it has easy access to raw material from local industries like flour mill, rice mill, oil mill etc. • Water, the basic ingredient for beverage industry can be made available at proposed EZ site by developing suitable infrastructure • Aquaculture being practiced in proximity to proposed EZ site can provide raw material for fish and shrimp processing • Proposed EZ is located close to Benapole Land Port from where exports of food items to India can be facilitated • FMCG products like ketchup, biscuits, juice, cake etc. can find good demand in local markets of Dhaka, Khulna, Barisal etc. • Locational advantage of proposed EZ site in terms of connectivity shall foster the possibility of supplying across the country, which is a pre-requisite for fast moving consumer goods (for F&B), especially after construction of Padma River Bridge									

Sector	Access to Backward and Forward Linkage		Access to Factors of Production							
	Access to Raw Material	Access to Markets	Land Connectivity	Air Connectivity	Water Connectivity	Availability of Power	Availability of Water	Availability of Gas	Availability of manpower	Access to Water Front
Agro Based Products	High	High	Moderately High	Moderately Low	Moderate	Moderate	Moderate	Moderately Low	Moderately High	Moderate
Rationale for selection	• This industry mainly caters to domestic demand • Sector pre-requisites are met by the proposed EZ for all parameters • District of Khulna near proposed EZ site is a major jute processing region in Bangladesh, proposed EZ can support jute processing industries • Moreover, areas like Rajshahi and Rangpur (close to proposed Gopalgonj EZ) produce significant quantities of fruits and vegetables • Establishing an agro based industry in close proximity to the raw material will result in lesser wastage and better quality of products due to low lead time • This sector can act as upstream industry for Food & Beverage sector in the proposed EZ area									
Leather and Leather Products	Moderately Low	Moderate	Moderately High	Low	Moderately High	Moderately Low	Moderately High	Moderately Low	Moderately High	Low
Rationale for rejection	• This industry is mostly export oriented and generates 2nd highest exports after textile & RMG • Apart from raw hides, Bangladesh has also started exporting finished products • Proposed EZ site location satisfies all the pre-requisites for the industry • To produce high quality finished goods, this sector requires skilled employees • Presently Leather industry is established near Dhaka and Chittagong region, this could create challenges in sourcing of skilled labor • Majority of the tanneries in Bangladesh are located in Savar area near Dhaka, which could cause infrastructural bottlenecks in supply of raw material to the proposed EZ site • In order to establish industries that can manufacture finished leather products in the proposed EZ, pre-requisites will be establishing direct road connectivity to Dhaka and developing social infrastructure in the region to incentivize skilled workers									
Plastic and Rubber	Low	Moderately High	Moderate	Low	Moderately Low	Moderate	Moderate	Moderately High	Moderately High	Low
Rationale for rejection	• This sector is highly dependent on import of raw material plastic beads, resin etc. for their production • Gas is the primary fuel used in this industry; Proposed EZ, presently does not have any gas source in its vicinity • Plastic and Rubber products are mostly consumed in local markets, industries located in vicinity of Dhaka will be better positioned to cater to domestic demand • Setting up of this industry can be considered in proposed EZ, when gas connection is established to the proposed EZ site									
Paper and Packaging	Low	High	Moderate	Low	Moderately Low	High	High	Moderate	Low	Low

Sector	Access to Backward and Forward Linkage		Access to Factors of Production							
	Access to Raw Material	Access to Markets	Land Connectivity	Air Connectivity	Water Connectivity	Availability of Power	Availability of Water	Availability of Gas	Availability of manpower	Access to Water Front
Rationale for rejection	• This sector is dependent on import of raw material like pulp, fiber and chemicals • It also has a moderate requirement of gas, which is used as fuel during preparation of paper products • This sector will be more suitable if it located near Chittagong port or Dhaka-Chittagong highway, from where it can have easy access to imported raw material • This sector mainly caters to domestic demand, industries engaged in this sector would perform well if they are located in between Dhaka-Chittagong region, where there is high demand for paper and packaging products as well as having availability of gas pipeline • On development of Payra, deep sea port and laying down of gas pipeline till the proposed EZ site, this industry can be developed in proposed EZ									
Chemicals	Moderate	High	Moderate	Moderate	Moderately High	High	High	Moderate	Low	Moderately High
Rationale for rejection	• There are different types of chemicals having varied utility requirements like fertilizers, adhesives, washing powder, paints, varnishes etc. • Adhesives, paints and varnishes cater to domestic market, these industries would perform well if they are located in proximity to Dhaka • Fertilizers have a high demand in proximity to proposed EZ region, due to widespread agriculture based economy • Establishing of fertilizer industry at proposed EZ in Gopalgonj can cater to the local demand due to proximity of proposed EZ sites, however since this industry is recommended at proposed EZ in Shariatpur, it would lead to cannibalism of the market • Hence this industry is recommended if fertilizer industries are not established in nearby EZs									
Non-Metallic Minerals	Low	Moderately High	Moderate	Low	High	High	Low	High	High	High
Rationale for rejection	• Non-metallic minerals involve manufacturing of cement, ceramics, glass etc. • For manufacturing of cement, the basic prerequisite is to have a water front access, since all clinker in Bangladesh is currently imported through sea • Manufacturing of ceramics and glass require application of high temperatures for which gas is an indispensable source of fuel • These features are not present at the proposed EZ • It is not recommended to establish non-metallic mineral industry in proposed EZ									
Automobile and Accessories	Low	Moderately High	Moderate	Moderately Low	Moderately Low	Moderate	Low	Moderately Low	Moderately High	Low
Rationale for rejection	• Automobile manufacturing in Bangladesh is highly import dependent • CKD units are brought through Benapole or Chittagong port and assembled in the country • Manufacturing in this sector is automated and there is high dependency on skilled manpower like engineers • Presently the proposed EZ location does not have social infrastructure like residential, educational, recreational, medical facilities etc. for skilled employees and their families • Automobile manufacturing industries operate in clusters with other ancillary units									

Sector	Access to Backward and Forward Linkage		Access to Factors of Production							
	Access to Raw Material	Access to Markets	Land Connectivity	Air Connectivity	Water Connectivity	Availability of Power	Availability of Water	Availability of Gas	Availability of manpower	Access to Water Front
	• Small land parcel of proposed EZ might hinder development of automobile cluster • Proposed EZ is ideally located to support development of automobile industries for which CKD units are being brought from India, however creating an automobile industry would require larger land parcel (400-500 acres) and development of social infrastructure in vicinity of proposed EZ site									
Heavy Machinery, Iron, Steel and Metal	Low	Moderately High	Moderate	Low	High	High	Moderate	High	High	High
Rationale for rejection	• Bangladesh is highly import dependent for this sector, with majority of port coming through Chittagong Port • This sector requires large quantities of power and fuel • Proposed EZ has sufficient power available although it does not have an existing gas pipeline • Moreover, it does not have close proximity to Chittagong Port from where majority of the imports take place • The proposed EZ site is presently not suitable for setting of industries in this sector • On development of Payra, deep sea port and laying down of gas pipeline till the proposed EZ site, this industry can be developed in proposed EZ									
Electrical and Electronics	Low	Moderately High	Moderately High	Moderately Low	Moderately Low	Low	Low	Low	Moderate	Low
Rationale for selection	• Bangladesh currently performs assembly of all electronic items • These items are imported from different countries in individual units and assembled in workshops • Proposed EZ offers all utilities required for manufacturing of electronics and electrical items • Skilled labor can be available locally for this industry due to presence of local service centers catering to electrical and electronic items • Consumption of electrical and electronic items is rapidly rising in rural Bangladesh leading to high demand • Operationalization of Padma Bridge is expected to boost the economy of south west Bangladesh (region in which proposed EZ site is located) by 2.5%[224] resulting in higher disposable income • Presently the region does not have any major electronics industry in vicinity • Proposed EZ is ideally suitable for setting up industries pertaining to this sector									
Ship Building and Ship Breaking	Low	Moderate	Moderately Low	Low	High	High	Low	Moderately High	High	High
Rationale for rejection	• Access to water front is mandatory for setting up of this sector • Proposed EZ site does not have access to water front • Proposed EZ site presently not suitable for setting of industries in this sector									

[224] *http://www.copenhagenconsensus.com/publication/bangladesh-priorities-padma-bridge-project-rahman-and-khondker*

Sector	Access to Backward and Forward Linkage		Access to Factors of Production							
	Access to Raw Material	Access to Markets	Land Connectivity	Air Connectivity	Water Connectivity	Availability of Power	Availability of Water	Availability of Gas	Availability of manpower	Access to Water Front
Petroleum Products (including Bottling)	Low	Moderately High	Moderate	Low	High	High	Low	Moderate	Moderate	High
Rationale for rejection	• Bangladesh is currently dependent on import of petroleum products via large sea faring tankers • Access to water front is mandatory for setting up of this sector • Proposed EZ site does not have access to water front • Proposed EZ site presently not suitable for setting of industries in this sector									
Pharmaceuticals	Moderately Low	High	Moderate	Moderately High	Moderately High	High	High	Moderately High	High	Moderate
Rationale for rejection	• This sector is dependent of availability of skilled employees • Dearth of social infrastructure in proximity to proposed EZ area might hinder availability of skilled manpower for this industry • Development of API park in Munshiganj will create a hub for raw material needed in pharmaceutical industry • Pharmaceutical industries coming up near Munshiganj will have advantage in terms of access to raw material, as well as central location in Bangladesh will enable better supply to different parts of the country • Pharmaceutical industries have been established in vicinity of proposed EZ in Gopalgonj, Khulna, Barisal etc. • It is also proposed to set up pharmaceutical sector in nearby EZ of Shariatpur, which can cater to local demand in vicinity of EZ in Gopalgonj									
Light Machinery, Equipment and Furniture	Moderately High	High	Moderately High	Moderately Low	Low	Moderately Low	Moderate	Moderate	Moderate	Low
Rationale for selection	• Demand for light machinery, equipment and furniture products are rising in Bangladesh • Bangladesh is gradually shifting away from importing light engineering goods to manufacturing them inside the country • Raw material like steel, aluminum plates can be imported via Benapole Port from India • Light Engineering industry also includes spare machinery parts or ancillary parts for automobiles • Proposed EZ is located close to industrial region of Jessore, Khulna and Barisal making it ideal for establishing light engineering industries • All utilities required for setting up of this sector can be made available at proposed EZ • Proposed EZ is conducive for setting up light machinery, equipment and furniture products									

Source: PwC Analysis

Based on the analysis done, an initial shortlist of five sectors were created from the bucket list of 15 sectors. These shortlisted sectors were found to be most suitable for the proposed EZ site due to the compatibility of their forward and backward linkages, access to factors of production and growth prospects in Bangladesh. The shortlisted sectors are 1) Textile & RMG, 2) Food & Beverages, 3) Agro Based Products, 4) Electrical and Electronics, and 5) Light Machinery, Equipment and Furniture.

Step-wise approach brings out the initial shortlist of five industrial sectors. Next section captures voice on ground to arrive at the final shortlist of industrial sectors suitable for the proposed EZ

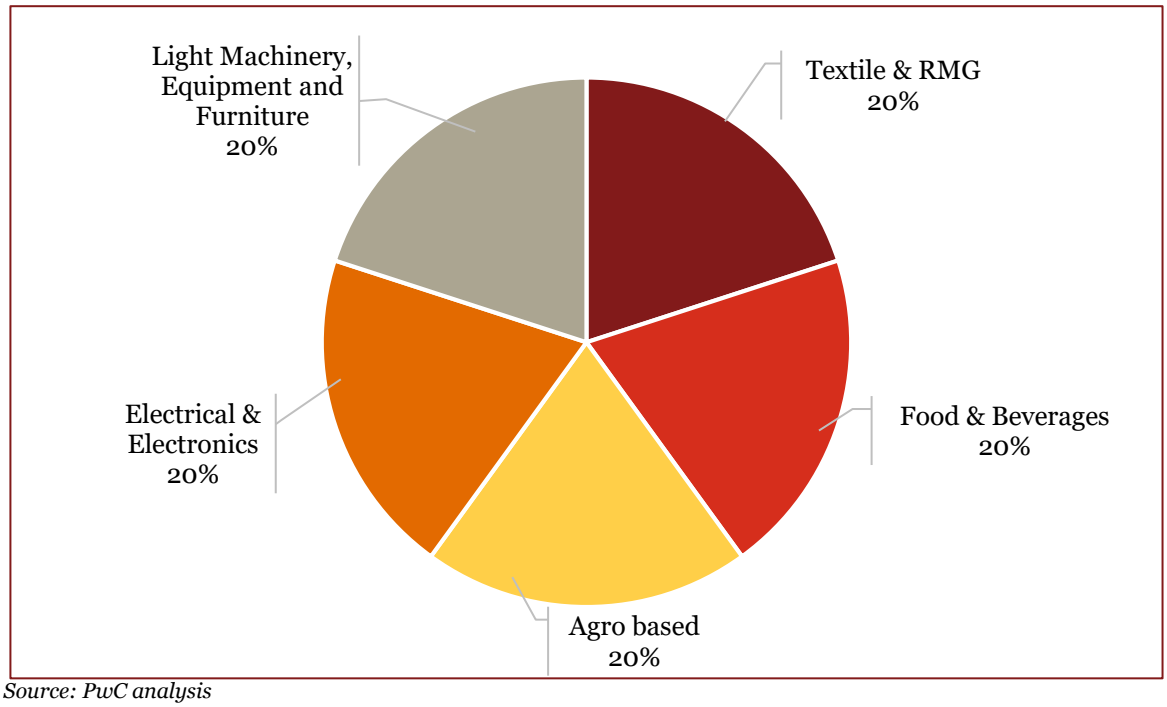
4.7. Analysis of Survey Results

The initial shortlist of industries was created using insights obtained through site visits, interaction with various government departments and information available in public domain. In order to validate the findings of the secondary research, primary survey was undertaken by interacting with various industry players in Bangladesh and overseas. A total of 65 manufacturers were approached – 50 respondents were Bangladesh based firms, while the rest were foreign companies, who did not have a presence in Bangladesh. For the purpose of this survey, questionnaire format provided in the ToR was used as the base to obtain insights from the industry players. Information about the perception of respondents towards Economic Zone Policy in Bangladesh, their opinion about performance of their industry in the proposed EZ region, challenges faced by respondents in doing business in Bangladesh and prerequisites of the respondents for setting up a new manufacturing unit in the proposed EZ were analyzed.

4.7.1. Profile of Respondents

The respondents of the survey were equally divided among the five shortlisted sectors for the proposed EZ site. Ten local respondents from each of the five sectors were selected for in-person interaction and three foreign respondents from each of the five sectors were selected for telephonic interviews. Attempt was made to ensure that local respondents for the survey were spread across different locations of the country (like Jessore, Mongla, Dhaka, Chittagong etc.). Companies operating out of various foreign countries were approached for interaction under the foreign respondents category.

Figure 29: Sectoral Profile of Respondents



Source: PwC analysis

The final shortlist of industries was prepared after taking into consideration the responses received from respondents.

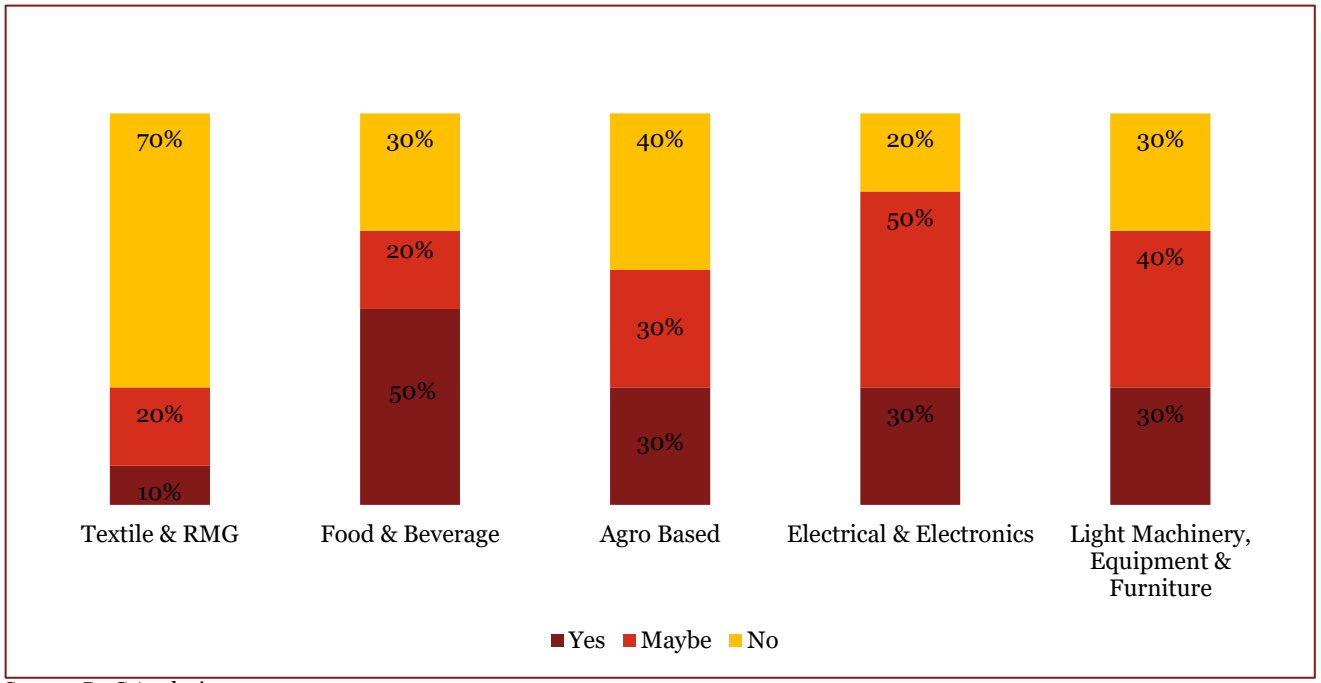
4.7.2. Perception about the Economic Zone

One of the key objective of the exercise was to assess the awareness about the GoB's Economic Zone policy among the industrial players and also the investment appetite for the proposed EZ. Among the domestic manufacturer's surveyed ~20% respondents were not aware about the existing policy, 58% respondents confused the Economic Zone policy with Export Processing Zone policy, 14% respondents had heard about the policy and 8% respondents were aware about the policy beforehand.

Among the foreign investors surveyed, 2 Indians were aware about Bangladesh's Economic Zone policy while others had to be briefed about the same.

Below figure captures the opinion of domestic respondents from different sectors about whether their specific sector could be successful in the proposed EZ location –

Figure 30: Investment opinion expressed by domestic investors



Source: PwC Analysis

The above figure reveals that maximum number of respondents belonging to Food & Beverage sector showed positive intent regarding the proposed EZ and maximum number of respondents belonging to Textile & RMG sector showed negative intent. There were quite a few respondents who had ambivalent opinion regarding the proposed EZ site, their responses have been captured under "Maybe" option. These respondents were either unsure about whether industries from their sectors would perform well in proposed EZ site or they wanted certain pre-requisites to be fulfilled for industries to be successful.

As an outcome of this survey, 31 domestic respondents have expressed positive interest ("Yes" and "Maybe" categories together) about their industries, in the proposed EZ. Sectors from which more than 50% respondents have expressed positive interest are –

- Food & Beverages
- Agro Based
- Electrical & Electronics
- Light Machinery, Equipment & Furniture

Among the foreign respondents surveyed, 11 respondents showed negative interest towards investing in Bangladesh in near future. 4 investors (2 from Textile & RMG, 1 each from Agro based and Light Machinery, Equipment and Furniture) showed positive interest, however they wanted further details like date of operationalizing of Economic Zone, price of land, details of lease holding agreement etc.

4.7.3. Analysis of responses obtained through survey

Considering the responses of both domestic and foreign industry players taken together, it is observed that 35 respondents have indicated positive or ambivalent interest towards the proposed EZ in Gopalgonj. A brief synopsis of the response and discussion held with the respondents is captured in the table below –

Table 36: Synopsis of Primary Survey

Description	Yes	Maybe	No
% of respondents	26%	27%	47%
Key reasons for response	• Location is advantageous in terms of future connectivity • Close proximity to Benapole Port provides advantage in getting raw material to manufacturing unit • Last mile connectivity is very good and will provide easy access to proposed EZ site • Incentives offered by BEZA are attractive • Interest in expanding existing facility in Bangladesh • Proposed EZ site has provision to provide adequate power, water, gas in future	• Considering business expansion in a new economic zone • Will wait to see if required utility is provided on site • Decision depends on development of Payra Port and draft available • Further evaluation needs to be done regarding the site • Proposal will have to be discussed with management • More details regarding the proposed EZ is needed (Ex- rent, utility charges)	• Have already committed significant investments for current expansion facilities • Time required for development of proposed EZ site • Political instability in Bangladesh is hindering investment decision • Unavailability of adequate power/gas supply • Difficulty in procuring license or permits from GoB • Given current underutilization of existing facilities, not interested in expansion plans • Interested in investing somewhere closer to Dhaka
Prominent Companies	Mahmud Group, ACI Pure Flour Ltd., General Battery Co. Ltd., M.M Ispahani Ltd.	ACI Chemical Industries, NAF Garments, Sagar Cables, Panna Group	Rancon Electronics, T.B.S Electrical Industries, Youth Spinning Mills Ltd.
Insights	Basis our discussion, manufacturers who have their hometown near Gopalgonj are interested in setting up manufacturing units in proposed EZ.	Manufacturers did not have good experience with utilities provided at other industrial belts like BSCIC, several industrial clusters are yet to get CWTP, gas connection etc.	Foreign manufacturers were wary about investing in a new country since they were unaware of local policies, language, culture etc.

Source: PwC Analysis

4.7.4. Barriers to Investment

The respondents were also asked about the current challenges faced by them in running business in Bangladesh and barriers to investment, specific to the EZ site area. The responses received can be broken up into 3 parts – Bangladesh specific, sector specific and site specific.

Bangladesh Specific

Most of the respondents, surveyed were optimistic about the Bangladesh's economy and expressed their satisfaction about the country's growth. However, country specific hindrances to growth and investment mentioned by the respondents had resonance across the sectors. The common problems faced by manufacturers in running a business in Bangladesh, across sectors are listed on the next page.

Power Shortage – All the investors surveyed expressed discontent with power availability across Bangladesh. Many complained about the 2-3 hour power outages suffered on a daily basis, which had affected the capacity utilization of existing machineries. Among the respondents surveyed, 23% had to make arrangements for their own source of power, which was either diesel or gas operated.

Gas Unavailability – Frequent drop in pressure of gas supply was another grouse among the respondents. Bangladesh has a network of pipes through which gas is supplied to manufacturing units. Most manufacturing units apply for piped gas to be used as fuel in their industries or a source for generating electricity (Gas is cheaper than diesel). Due to Bangladesh's depleting gas reserves, GoB has also stopped issuing new gas connections to manufacturers in the country. This is a major hindrance to investment in Bangladesh. 20% of the respondents, have put their expansion plans on hold due to unavailability of new gas connection.

Congestion at Chittagong Sea Port – Manufacturing sector in Bangladesh is dependent on imported raw material for their production to take place. Chittagong port is the most important port in Bangladesh, it caters to around 92% of the country's sea borne trade. However, this has resulted in heavy congestion in Chittagong Port, resulting in manufacturer's having to wait 10-15 days to get their raw material. Due to low draft at Mongla Port, Chittagong Port is still the most efficient way to get raw materials for the manufacturers. 67% of the respondents complained about delays in getting custom clearance and access to their imported products. Although few respondents who had outsourced the handling of their imports to 3rd party agencies were satisfied with the turn-around time taken for their goods.

Sudden changes in applicable HS code – Few of the respondents expressed their dissatisfaction at the sudden changes in the applicable HS code for the imported items. Import duty on goods are levied on basis of their HS codes. Respondents claimed that custom officials suddenly charge higher import duty on items of regular import, by changing the applicable HS code under which the item is covered. This results in extra hassle for the importers as they need to visit customs law office to get the goods cleared and get clarity on applicable HS code. Sudden changes in the rate of applicable import duty creates uncertainty among the manufacturers as it causes delay in access to raw material and also makes it difficult to accurately predict costing of the manufactured goods.

Access to Credit – During the survey exercise, most of the respondents expressed disappointment in getting easy access to credit. Getting credit in Bangladesh, is a tedious task spread over 2-3 months involving lot of paperwork, documentation etc. Credit rate in Bangladesh ranges from 9-14% depending on the relationship that respondents develop with the banks. Large industry houses are able to get credit at low rates while medium and small scale manufacturers pay high interest rates. 32% of the respondents mentioned that high interest rates and amount of paperwork involved in getting credit, prevented them from availing loans.

Excessive Bureaucracy – Respondents in their feedback, complained about the difficulty in interacting with government officials for any purpose. It was claimed that obtaining permission or license for any utility or activity is cumbersome, requiring many days and several levels of permissions. This is a major reason hindering manufacturers in Bangladesh from starting a new business.

Corruption – 56% of the respondents conveyed their dissatisfaction with the unprofessional approach of government officials from clerk to officer level. In their opinion, it had become a mandatory affair to bribe Government Officials in order to get any approval or permit.

The above responses were received from manufacturers who are based out of Bangladesh and have been operating their enterprise in Bangladesh over the years. These problems were highlighted at a country specific level.

Sector Specific

The respondents were asked questions about their particular sectors to understand the challenges that they are facing in their sector, which is hindering their current business operations and affecting the growth/expansion plans. The problems specific to each sector are listed below –

Textile & RMG – Respondents were positive about the growth prospects in this sector, with consistently increasing demand from foreign customers. They recognized GoB's initiatives to provide impetus to exports of textile & RMG through export subsidies, VAT exemption and lower duty on import of cotton. However, small and medium scale manufacturers were concerned about rising competition affecting the profit margins in the industry. Previously large manufacturers used to outsource, embroidery work, sewing of sequins and placing of decorative beads and stones on clothes to small scale manufacturers. However, cost and quality control awareness among the large manufacturers have led to creation of in-house facility for the same. Respondents also aired their view about high import duties on fabrics like sequins, better quality thread, beads etc. These items are used to produce high value garments.

Food and Beverages – Respondents in this sector were quite upbeat about the growth prospects of their sector. As per the respondents, F&B sector has been growing at a rapid pace in Bangladesh as rising income levels of the people in Bangladesh are allowing them to spend more on food items. Respondents engaged in shrimp and fish farming have been increasingly exporting their produces to South-East Asian countries. Major challenge that industry players faced in this sector was from the unorganized and small scale industries, which had localized operations and had a cost advantage over the unorganized sector through evasion of taxes. Lack of proper cold storage and freezing facilities have resulted in high wastage especially in sea food industry. Quality control in getting standard raw material from 3rd party agro-based industries was challenging due to which some large Food & Beverage players have entered agro processing industry, as well.

Agro based – Respondents in this sector mentioned that there was a rising demand for better quality and organic agro products. Industries based on cash crops like jute have seen a revival in demand. Respondents expressed satisfaction with incentives being offered by GoB in terms of subsidized electricity, export and tax incentives. Challenges outlined by respondents in this sector were that poor supporting infrastructure was resulting in high wastage of agro products and getting access to organic agricultural produces. Manufacturers in jute processing industry were optimistic about their sector's growth in the proposed EZ site, since the region near Gopalgonj produces the best quality jute in Bangladesh.

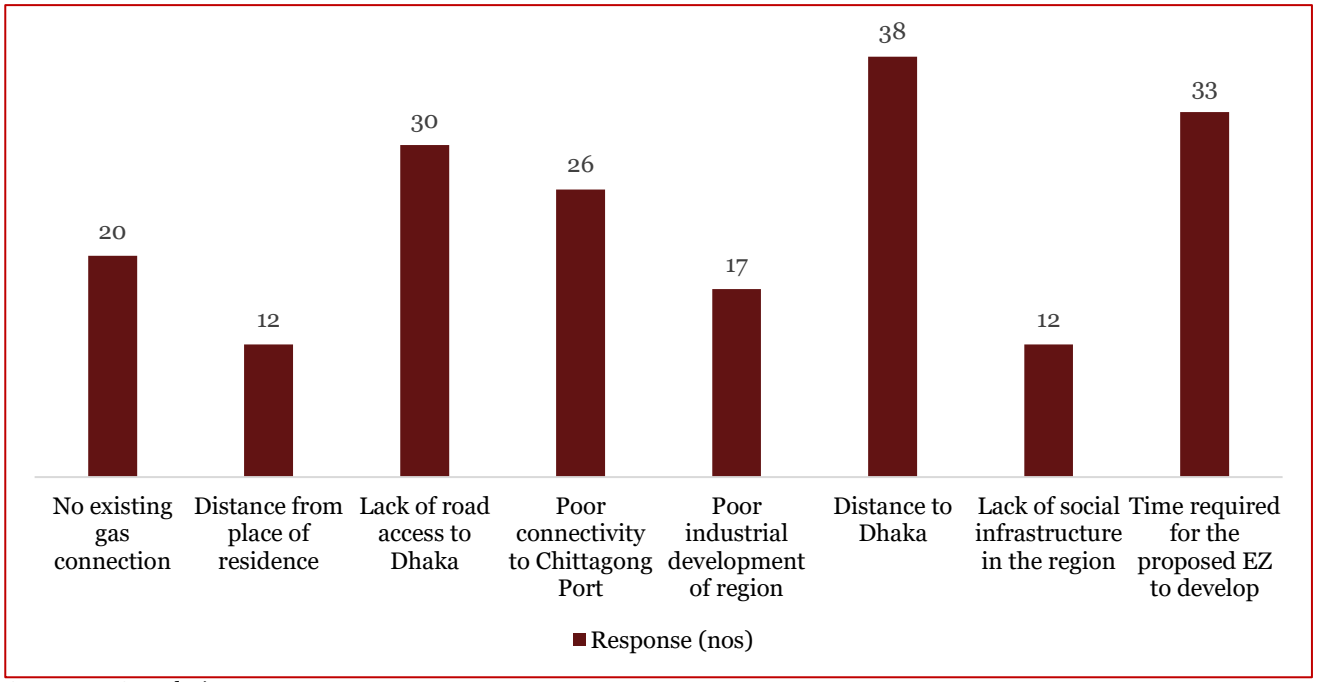
Electrical and Electronics – Respondents in this sector were divided in their opinion about the sector's performance. The big players, like Walton group, were looking to expand aggressively and establish new manufacturing units. However, the SMEs were witnessing falling sales and shrinking margins due to their inability to compete with large scale manufacturers, who have cornered a lion's share of market sales due to economies of scale.

Light Machinery, Equipment and Furniture – Respondents in this sector did not have any major sector specific issues. Their only concern was that rising competition in the sector was affecting their profitability and high dependence on import of steel and iron products prevented them from manufacturing goods at competitive rates. Respondents were dependent on GoB's import duty policy for growth of their industry.

EZ Site Specific

Responses received from manufacturers regarding key hindrances to site specific investments were captured in specific baskets. The figure below captures the responses of the manufacturers, some of the respondents also listed out more than one reason, hindering their investment plan in the proposed EZ region.

Figure 31: Site specific barrier to investment



Source: PwC Analysis

The above figure reveals that the major reason hindering investment in the proposed EZ region was the distance of the EZ site to Dhaka. This shows the high dependency of manufacturers on Dhaka, as a major market, for selling their goods. However, once construction of Padma Bridge is complete, there will be seamless road access from proposed EZ site to Dhaka. Another major reason, hindering investment in the proposed EZ site is the time required for development of proposed EZ. This reveals that most respondents were unwilling to base the investment decisions on forecasted timelines for construction of the Economic Zone as it is common for infrastructure construction in Bangladesh to suffer from time overruns. Thus, given the very preliminary stage of planning for the proposed EZ site location, manufacturers did not want to take any investment decisions, 27 of the respondents surveyed, said that it was too early to make a decision. Most of the SME manufacturers choose to set up their businesses close to their area of residence. The need to shift to a new location for establishing a new manufacturing unit also hindered investment decision for the proposed EZ site. Other site specific factors that served as barrier to investment were – absence of any gas connection at the proposed EZ site, lack of social infrastructure, poor connectivity to Chittagong Port and poor industrial development in the region.

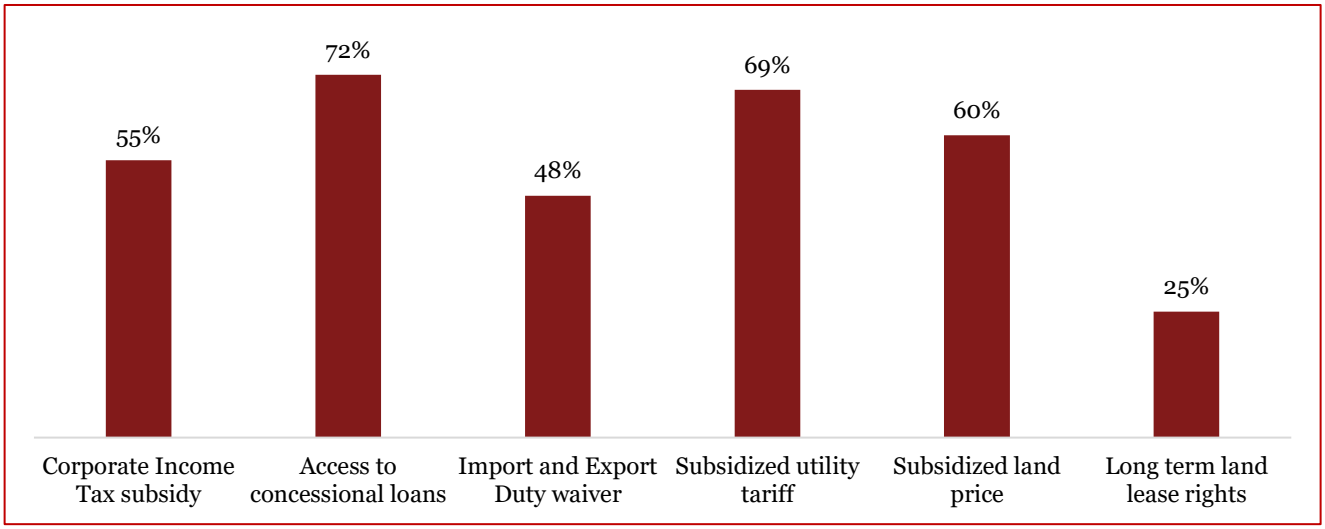
4.7.5. Pre-requisites to Investment

In order to understand the pre-requisites of investment, all the respondents were asked about their requirement with respect to (i) fiscal and non-fiscal incentives and (ii) infrastructure & logistics.

Fiscal/ Non-Fiscal Incentives

For assessing this aspect, the respondents were asked about the various fiscal and non-fiscal benefits that they require for considering an investment decisions in the proposed EZ site. Respondents raised concern about various incentives such as corporate income tax subsidy, waiver on import and export duty, subsidized utility tariff, ease in concessional loan facility and ease in obtaining clearances and approvals. Responses received from the survey is depicted in the figure on the next page –

Figure 32: Pre-requisites in form of incentives



Source: PwC Analysis

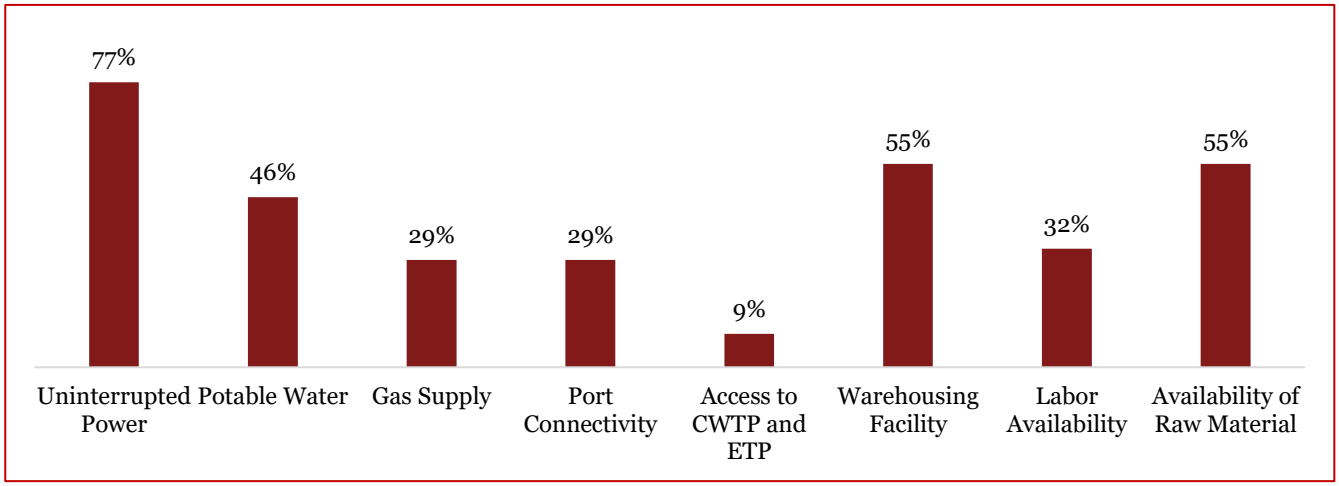
The above figure reveals that majority of the respondents have asked for access to concessional loans and subsidized utility tariff. Subsidized land price was also among the top requirements for respondents. A healthy demand has also been obtained for getting Corporate Income Tax subsidy and import/export duty waiver for the proposed EZ.

BEZA has already formulated a set of fiscal incentives and the same has been approved by their governing board. These fiscal incentive package would take into consideration the concerns expressed by the investors. Medium and (a few) large scale manufacturers have expressed concern about availability of concessional loan facility, the same is not captured under the incentive package offered by BEZA.

Pre-requisites for Infrastructure

A good infrastructure availability is a key enabler for success of any Economic Zone project. To understand the priority of the same, respondents were asked to specify the pre-requisites expected by them for investing in the proposed EZ. Their response is captured in the figure below –

Figure 33: Pre-requisites in form of supporting infrastructure



Source: PwC Analysis

Manufacturers have expressed that the major factors which influence investment decisions include access to uninterrupted power supply (without voltage fluctuation), warehousing facility and availability of raw material. Availability of water (potable and fit for industrial consumption) and labor in the vicinity of the proposed EZ is another important factor that was highlighted during our interaction with manufacturers.

During interactions, manufacturers, particularly those involved in Food & Beverage and agro based industry stressed on the importance of having their industry in vicinity of raw material. Some manufacturers also inquired about availability of social infrastructure in the vicinity like school, colleges, hospitals etc. Manufacturers involved in textile & RMG industry stressed on the need for having access to CWTP and ETP.

In the event of addressing the list of pre-requisites requested by the manufacturers, BEZA can expect several manufacturers to evince interest in the proposed EZ site

4.7.6. Final Shortlist of Site Specific Industry Sectors

On the basis of incorporating the feedback received during the survey, it can be safely deduced that among the respondents surveyed from the initial shortlisted sectors. Manufacturers from textile and RMG sector have majorly expressed negative opinion about growth prospects of their sector in the proposed EZ site. However, manufacturers from Food & Beverages, Agro based, Electrical & Electronics and Light Machinery, Equipment and Furniture sectors have majorly evinced positive interest about the growth prospects of their sectors in the proposed EZ location.

As per the responses recorded from domestic and foreign manufacturers it can be deduced that Food & Beverages, Agro based, Electrical & Electronics and Light Machinery, Equipment and Furniture sectors are most suitable for the proposed EZ site

A demand forecast model has been prepared in the next chapter, for the above mentioned industries to understand the land, utility and employment requirements for each of these industries over the years. Master Plan section of this report, incorporates the best practice layout and requirements of industry specific supporting infrastructure for the shortlisted industries.

4.7.7. Sector Profiles

This section contains the profiles of all the four shortlisted sectors obtained through industry assessment exercise. This sector profile provides a brief overview about the various sub-categories of the sectors, sector overview, sector trends, barriers to investment in the sector and various utility requirements.

Table 37: Sector Profile 1

Sector	**Food & Beverage Sector**
Sub-Categories Proposed	Fast Moving Consumer Goods like packaged food items – Cake, Processed Fish and shrimp, Biscuits, Bread, Ketchup, Juice, Drinks etc.
Sector Overview	Growing economy of Bangladesh has created a consumer driven demand for F&B sector. Interactions with F&B companies have revealed that past decade has seen an average of 17-18 percent year on year growth in their sales volume both on domestic front as well as in exports. Demand for biscuits have been growing at a rate of 15 percent on a year on year basis.[225] Farmed fish market in Bangladesh has grown by a factor of 25 in three decades.[226] Proposed EZ location is strategically located near centers of major consumption market and sources of raw material. Fish & shrimp farming is widely practiced within 200 km radius of proposed EZ location in Gopalgonj, Faridpur, Madaripur, Mongla, Khulna and Barisal. There are 232 rice mills, 94 oil mills, and 129 flour mills in Gopalgonj which can provide raw material to F&B industry in proposed EZ site.
Sector Trends	Operationalization of Padma Bridge is expected to boost the economy of South-West Bangladesh (proposed EZ region) by 2.5 percent.[227] This will result in increased level of disposable income for people in the region of proposed EZ. It

[225] *http://lankabd.com/dse/stock-market/news/Biscuit-market-grows-fast-as-demand-rises?storyId=49129*
[226] *http://theconversation.com/let-them-eat-carp-fish-farms-are-helping-to-fight-hunger-90421*
[227] *http://www.copenhagenconsensus.com/publication/bangladesh-priorities-padma-bridge-project-rahman-and-khondker*

	is believed that the future prospects of F&B industry in the proposed EZ region is very bright and it can replicate the growth figures of F&B industry (17-18 percent) in Bangladesh, driven by catering to existing consumer demands in Khulna, Barisal, Jessore, Dhaka etc.
Current Barriers to Investment	Major impediment to the growth of F&B industry in the proposed EZ region is lack of road connectivity to major consumer market in Dhaka across Padma river. Existing river transport is inefficient causing a delay of 5-6 hours in transportation across the river. Presently there is no industrial belt in proximity of the EZ region where supporting infrastructure (power, gas) is available. Nearest industrial belts are in Khulna, Barisal and Munshiganj.
Land Requirements	Land requirements for this sector is highly variable depending on the capacity of the factory, use of technology and type of sub-sector. However, basis our secondary research and primary survey, it can be mentioned that land requirement for this sector would be between 99 to 103 acres. For purpose of demand projections, land requirement of 101 acre has been taken for this sector.
Power Requirements	Power requirements for this sector is highly variable depending on the capacity of the factory, use of technology and type of sub-sector. Basis our prior experience of working on similar projects, secondary research and interaction with local respondents, it can be mentioned that power requirement for this sector would range from 160 to 200 KVA per acre of factory land. For the purpose of demand projections, power requirement of 182.11 KVA/ acre has been taken for this sector.
Water Requirements	Water requirements for this sector is highly variable depending on the capacity of the factory and type of sub-sector. Basis our interactions with manufacturers, it was understood that currently in Bangladesh the current practice is to install deep tube-wells and extract groundwater for industrial consumption. Permission from GoB needs to be taken to install the pump, however, there is no monitoring mechanism in place to check the amount of water extracted. However, basis our prior experience of working on similar projects and secondary research, it can be mentioned that water requirement for this sector normally ranges in between 6 to 8 cum. per day per acre of factory land. For the purpose of demand projections, water requirement of 7.28 cum. per day per acre has been taken for this sector.
Employment per Factory	Manpower requirement for this sector is highly variable depending on the capacity of the factory, use of technology and type of sub-sector. Basis our prior experience of working on similar projects, primary survey and taking inputs from Survey of Manufacturing Industries Database published by Bangladesh Bureau of Statistics, a typical factory generates direct employment for 20-25 people per acre of factory land. For the purpose of demand projections, manpower requirement of 23 people per acre has been taken for this sector.

Source: PwC Analysis

Table 38: Sector Profile 2

Sector	**Agro based Sector**
Sub-Categories Proposed	Jute processing units, flour mills, rice mills, sugar mills
Sector Overview	Bangladesh is still an agrarian economy with nearly half of Bangladesh's workers being employed by agriculture.[228] This sector contributes about 17 percent of the country's GDP. Major crops grown in Bangladesh are rice and jute, although wheat is also gaining importance in the country. Extensive irrigation, introduction of high yielding varieties of crops, efficient markets and policy reforms have driven this sector's growth in Bangladesh. Presently, Bangladesh is

[228] http://www.worldbank.org/en/results/2016/10/07/bangladesh-growing-economy-through-advances-in-agriculture

	one of world's largest producer of rice and jute. Bangladesh contributes ~39% of world's jute production. Jute is cultivated in almost all districts of Bangladesh, however west Bangladesh is known for jute production and several jute mills are located in Khulna division. Proposed EZ site is in close proximity to fertile agricultural land, as per Bangladesh district statistics 2011, Gopalgonj district produces 3.9 lakh MT of rice, 39 thousand MT of jute and 19 thousand MT of sugarcane every year.
Sector Trends	Agro based products sector was declared to be the thrust sector by GoB in its Industrial Policy in 2016 in order to boost the sector's exports. As per Bangladesh Agro-Processors Association (BAPA), Bangladesh exported food products worth USD 300 million in FY 2016-17. GoB has set a target to increase agro-processed food exports to USD 1 billion by 2021. Besides exports, increasing domestic income is driving local demand for good quality agro based products in Bangladesh. It is expected that operationalization of Padma Bridge is expected to boost the economy of South-West Bangladesh (proposed EZ region) by 2.5 percent.[229] This will result in increased level of disposable income for people in the region of proposed EZ, who will be able to spend more on better quality food products. Proposed EZ region is expected to see a rise in demand for good quality agro based food like flour, rice, jute etc. It is also recommended to establish food processing units in close proximity of agro based units, which will act as downstream markets for this sector. This growth rate in this sector will be driven by local demand as well as through export through Payra deep sea port being developed 200 km south of the proposed EZ region.
Current Barriers to Investment	Major impediment to the growth of agro based industry in the proposed EZ region is lack of efficient transport infrastructure and cold storage units for perishable food items. Absence of a deep sea port in the proposed EZ region also hinders growth of agro based sector in the region as this sector is involves dealing with perishable food items which have a limited shelf life. Presently there is no industrial belt in proximity of the EZ region where supporting infrastructure (power, gas) is available. Nearest industrial belts are in Khulna, Barisal and Munshiganj.
Land Requirements	Land requirements for this sector is highly variable depending on the capacity of the factory, use of technology and type of sub-sector. However, basis our secondary research and primary survey, it can be mentioned that land requirement for this sector would be 5 acres. For purpose of demand projections, land requirement of 5 acre has been taken for this sector.
Power Requirements	Power requirements for this sector is highly variable depending on the capacity of the factory, use of technology and type of sub-sector. Basis our prior experience of working on similar projects, secondary research and interaction with local respondents, it can be mentioned that power requirement for this sector normally ranges in between 130 to 150 KVA per acre of factory land. For the purpose of demand projections, power requirement of 141.64 KVA/ acre has been taken for this sector.
Water Requirements	Water requirements for this sector is highly variable depending on the capacity of the factory and type of sub-sector. Basis our interactions with manufacturers, it was understood that currently in Bangladesh the current practice is to install deep tube-wells and extract groundwater for industrial consumption. Permission from GoB needs to be taken to install the pump, however, there is no monitoring mechanism in place to check the amount of water extracted. However, basis our prior experience of working on similar projects and secondary research, it can be mentioned that water requirement for this sector normally ranges in between 6 to 8 cum. per day per acre of factory land. For the purpose of demand projections, water requirement of 7.28 cum. per day per acre has been taken for this sector.

[229] *http://www.copenhagenconsensus.com/publication/bangladesh-priorities-padma-bridge-project-rahman-and-khondker*

Employment per Factory	Manpower requirement for this sector is highly variable depending on the capacity of the factory, use of technology and type of sub-sector. Basis our prior experience of working on similar projects, primary surveys and taking inputs from Survey of Manufacturing Industries Database published by Bangladesh Bureau of Statistics, a typical factory generates direct employment for 110 to 130 people per acre of factory land. For the purpose of demand projections, manpower requirement of 119 people per acre has been taken for this sector.

Source: PwC Analysis

Table 39: Sector Profile 3

Sector	**Electrical and Electronic Sector**
Sub-Categories Proposed	Manufacture of TV, Fridge, AC and other household appliances
Sector Overview	Size of this sector is BDT 150 billion, out of which ~BDT 70-80 billion is met through domestic production. GoB's digital Bangladesh 2021 policy has resulted in exponential increase in country's import in computer and telecommunication devices. Singapore, Malaysia, China, and India are the major supplier of spare parts and accessories. Major products from this sector (such as electronic appliances like AC, fridge, TV, computer and peripherals; electrical fittings, cables, and lighting) are consumed locally. Basis primary survey, local players are dependent on import of raw materials and manufacturing of spare parts locally. Bangladesh presently does not have any integrated manufacturing facilities in the country, electronics industry in Bangladesh is dependent on assembly of spare parts, imported from outside the country.
Sector Trends	This is one of the fastest growing sectors in Bangladesh and is also recognized by GoB as one of the high priority sectors. More than 3000 units are currently operational in Bangladesh generating direct and indirect employment for around 1 million people. Rural Bangladesh is currently witnessing an exponential growth in terms of demand for electronic products like smartphones, TVs, refrigerators and fridges. Operationalization of Padma Bridge is expected to boost the economy of South-West Bangladesh (proposed EZ region) by 2.5 percent.[230] This will result in increased level of disposable income for people in the region of proposed EZ, who will be able to spend more on purchasing electronic goods. Construction of deep sea Payra Port around 200 km from the proposed EZ site will be greatly beneficial to this sector as manufacturers are dependent on imports to get spare parts for manufacturing of electronic goods.
Current Barriers to Investment	Major impediment to the growth of electronics industry in the proposed EZ region is lack of demand for electronic products due to economic backwardness of the region. Absence of a deep sea port in Bangladesh, other than Chittagong Port which is more than 250 km away from the proposed EZ location hinders growth of electronic manufacturing in the region as this sector is highly dependent of import of spare parts, which is then assembled. Nearest industrial belts are in Khulna, Barisal and Munshiganj
Land Requirements	Land requirements for this sector is highly variable depending on the capacity of the factory, use of technology and type of sub-sector. However, basis our secondary research and primary survey, it can be mentioned that land requirement for this sector would be between 14 to 16 acres. For purpose of demand projections, land requirement of 15 acre has been taken for this sector.
Power Requirements	Power requirements for this sector is highly variable depending on the capacity of the factory, use of technology, nature of manufacturing activity and type of sub-sector. Basis our prior experience of working on similar projects, secondary research and interactions with local respondents, it can be mentioned that power

[230] *http://www.copenhagenconsensus.com/publication/bangladesh-priorities-padma-bridge-project-rahman-and-khondker*

	requirement for this sector normally ranges in between 110 to 130 KVA per acre of factory land. For the purpose of demand projections, power requirement of 121.41 KVA/ acre has been taken for this sector.
Water Requirements	Water requirements for this sector is highly variable depending on the capacity of the factory, nature of manufacturing activity and type of sub-sector. Basis our interactions with manufacturers, it was understood that currently in Bangladesh the current practice is to install deep tube-wells and extract groundwater for industrial consumption. Permission from GoB needs to be taken to install the pump, however, there is no monitoring mechanism in place to check the amount of water extracted. However, basis our prior experience of working on similar projects and secondary research, it can be mentioned that water requirement for this sector normally ranges in between 12 to 15 cum. per day per acre of factory land. For the purpose of demand projections, water requirement of 13.35 cum. per day per acre has been taken for this sector.
Employment per Factory	Manpower requirement for this sector is highly variable depending on the capacity of the factory, use of technology, nature of manufacturing activity and type of sub-sector. Basis our prior experience of working on similar projects, primary surveys and taking inputs from Survey of Manufacturing Industries Database published by Bangladesh Bureau of Statistics, a typical factory generates direct employment for 200 to 300 people per acre of factory land. For the purpose of demand projections, manpower requirement of 253 people per acre has been taken for this sector.

Source: PwC Analysis

Table 40: Sector Profile 4

Sector	**Light Machinery, Equipment and Furniture Sector**
Sub-Categories Proposed	Manufacture of spare parts of machines
Sector Overview	This is an important industry in Bangladesh as it provides backward and forward linkages to all other industries. Light machinery sector provides support for operation and maintenance of heavy machines through production of spare parts, castings, molds, dies, fittings etc. As per information provided by Bangladesh Investment Development Authority (BIDA) there are currently 40,000 light engineering units/workshops scattered across Bangladesh. These industries develop in vicinity of industrial zones in order to provide support to large scale capital intensive factories requiring heavy machinery. Products manufactured by this sector can be made out of rubber, ceramics, metals or plastic. Exporters from countries like China, Japan and Korea are developing light engineering facilities in Bangladesh in order to cater to export market. Although, this sector is very flexible and versatile, proposed EZ region has not seen much development in its vicinity due to lack of industrial development. There are small spare part manufacturing workshops in Gopalgonj which cater to requirements of local population. However, this industry is highly fragmented in this region, due to lack of any major industries. Local residents often have to travel to Dhaka in order to get spare parts for their household products and agricultural machinery. Nearest industrial belts are in Khulna, Barisal region, proposed EZ can address the spare parts requirements of industries in these region.
Sector Trends	It is expected that industrialization in vicinity of proposed EZ will take place with the operationalization of Padma River Bridge. This bridge is touted to bring a decisive infrastructure development in the region which will boost the economy of South-West Bangladesh (proposed EZ region) by 2.5 percent.[231] This will

[231] *http://www.copenhagenconsensus.com/publication/bangladesh-priorities-padma-bridge-project-rahman-and-khondker*

	result in rapid industrialization of the region resulting in increased demand of spare parts for heavy machinery.
Current Barriers to Investment	Major impediment to the growth of light machinery industry near the proposed EZ site is the economy backwardness in the region due to lack of industrialization. Lack of road connectivity to Dhaka across Padma river is a challenge as existing river transport is inefficient causing a delay of 5-6 hours in transportation across the river. Access to Dhaka is important as it is a major trading hub from where raw material for this sector can be bought. Presently there is no industrial belt in proximity of the EZ region where supporting infrastructure (power, gas) is available. Nearest industrial belts are in Khulna, Barisal and Munshiganj.
Land Requirements	Land requirements for this sector is highly variable depending on the capacity of the factory, use of technology and type of sub-sector. However, basis our secondary research and primary survey, it can be mentioned that land requirement for this sector would be between 9 to 10 acres. For purpose of demand projections, land requirement of 9 acre has been taken for this sector
Power Requirements	Power requirements for this sector is highly variable depending on the capacity of the factory, use of technology, nature of manufacturing activity and type of sub-sector. Basis our prior experience of working on similar projects, secondary research and interaction with local respondents, it can be mentioned that power requirement for this sector normally ranges in between 110 to 130 KVA per acre of factory land. For the purpose of demand projections, power requirement of 121.41 KVA/ acre has been taken for this sector.
Water Requirements	Water requirements for this sector is highly variable depending on the capacity of the factory, nature of manufacturing activity and type of sub-sector. Basis our interactions with manufacturers, it was understood that currently in Bangladesh the current practice is to install deep tube-wells and extract groundwater for industrial consumption. Permission from GoB needs to be taken to install the pump, however, there is no monitoring mechanism in place to check the amount of water extracted. However, basis our prior experience of working on similar projects and secondary research, it can be mentioned that water requirement for this sector normally ranges in between 8 to 11 cum. per day per acre of factory land. For the purpose of demand projections, water requirement of 9.71 cum. per day per acre has been taken for this sector.
Employment per Factory	Manpower requirement for this sector is highly variable depending on the capacity of the factory, use of technology, nature of manufacturing activity and type of sub-sector. Basis our prior experience of working on similar projects, secondary research and taking inputs from Survey of Manufacturing Industries Database published by Bangladesh Bureau of Statistics, a typical factory generates direct employment for 170 to 200 people per acre of factory land. For the purpose of demand projections, manpower requirement of 186 people per acre has been taken for this sector.

Source: PwC Analysis

4.8. Analysis of Survey Results

In order to arrive at the most suitable industries in site surrounding context, an industry assessment framework comprising of top-down (secondary research) and bottom-up (primary survey) was adopted.

The **top-down approach** identifies 15 best-performing industrial sectors (initial bucket list of industries) in the country context based on historical trend analysis of industrial production and foreign trade. At the next level, sectoral outlook of these industries were studied in details to understand about (i) raw material sourcing, (ii) major markets being served, and (iii) factors of production (such as utility, logistics, and manpower) necessary.

In-depth regional landscape assessment of the influence region (comprising of adjoining districts) surrounding the proposed EZ was undertaken in light of (i) economic profiling, (ii) natural resources (agricultural, marine, and mineral), (iii) industrial ecosystem in the influence region, and (iv) availability of semi-skilled and skilled manpower. It emerged out that the influence region is yet to witness significant industrial development and the economy is primarily agriculture dependent. Economically Gopalgonj and the surrounding districts are yet to shape up as marketplace and industrial hub. Once Padma Bridge is operational, project site is expected to gain significantly and industrial & economic profile of this region is poised to shape up.

Regional assessment depicts the suitability of the initial bucket list of industries in site surrounding and influence region context. **Five industries were initially shortlisted** ex post facto this regional landscape assessment. These industries are: (a) Textile & RMG, (b) Food & Beverages, (c) Agro based, (d) Electrical & Electronics, and (e) Light Machinery, Equipment and Furniture.

On-ground primary survey was undertaken to validate the aptness of these initially shortlisted industries and to capture the feedback from investors. A total of 65 respondents (comprising of 50 Bangladeshi and rest foreign) were surveyed. Primary survey revealed that ~22% of the respondents have some understanding about economic zone policy and regime. Voice on ground also captured that the investors are facing challenges regarding power shortage, unavailability of fuel (natural gas), access to credit, excessive bureaucracy, and with overall logistics scenario in the country. These challenges (country specific, site specific, and sector specific) are causing hindrances to investment. Among the various site specific challenges faced by manufacturers, hindering investment towards proposed EZ, it was observed that distance from Dhaka was listed as the common reason by the manufacturers.

Respondents opined that they have certain pre-requisites of investment. **Key pre-requisites** as divulged by the primary survey are:

- Subsidized industrial space and utility tariffs
- Access to concessional loan
- Corporate income tax subsidy
- Availability of Raw Material
- Uninterrupted access to quality utility services (power, water, and gas)
- Warehousing facility

Many fiscal and infrastructure related pre-requisites are already under implementation by BEZA as part of its EZ incentive package and operational guidelines.

(i) Food & Beverages, (ii) Agro Based Products (iii) Electrical & Electronics and (iv) Light Machinery, Equipment and Furniture have emerged as the most suited sectors for this proposed EZ

5. Demand Forecast

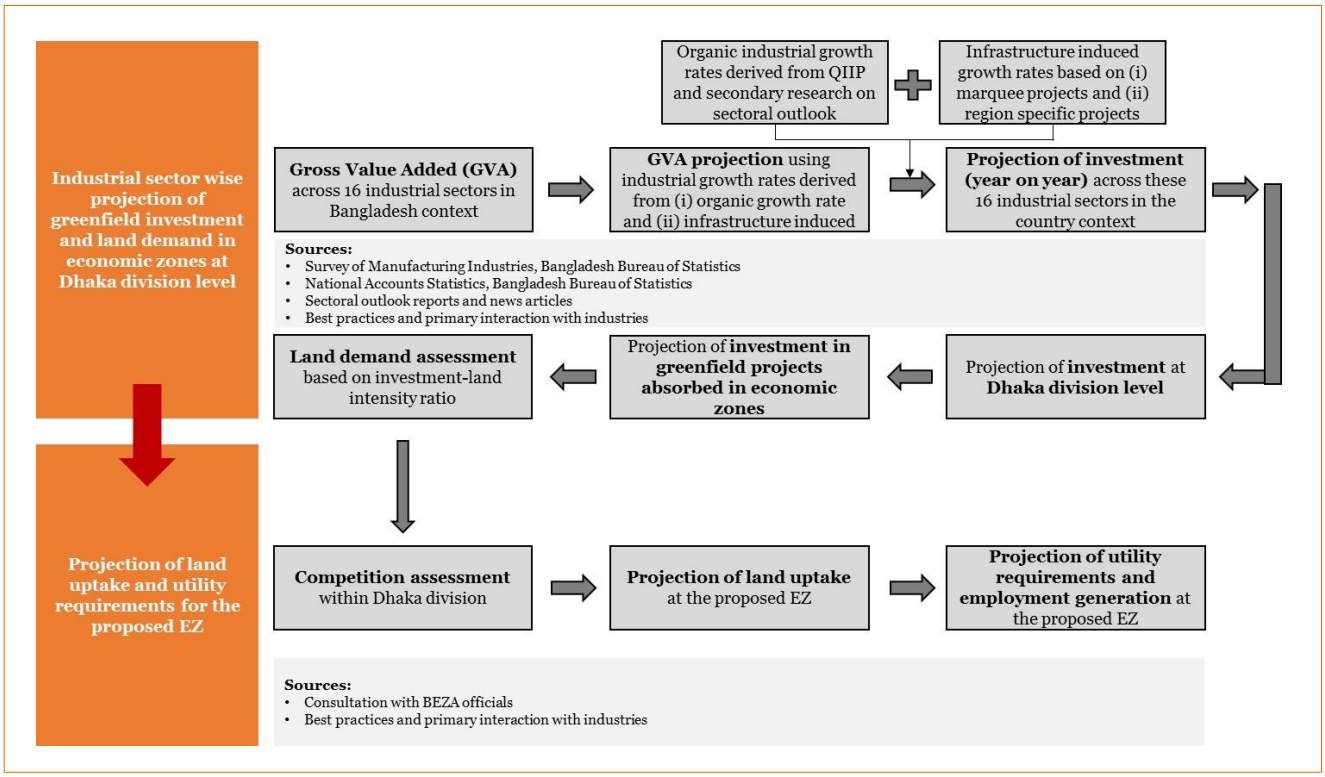
5.1. Purpose and Objective

Former chapter delves into an overall assessment of industrial sectors in regard to the country and the regional landscape (for the region surrounding the proposed EZ). This assessment culminates into identification of key industry sectors which are suitable for the proposed EZ. Based on the shortlisted industrial sectors, statistical projection techniques are applied to develop a mathematical model towards estimation of demand for the proposed EZ spread over a time span of 20 years. This chapter captures estimation of the potential demand (in terms of land uptake and utility requirements) in the context of the proposed EZ. An assessment of employment generation have also been undertaken in this chapter. Basis the key findings of this demand model, land demand uptake and potential industrial mix for the proposed EZ is arrived at; this forms the basis of the best practice master planning and infrastructure planning.

5.2. Methodology of Demand Forecast

Associative method projection technique is used for this demand forecasting study. Various parameters have been analyzed in the country and region context to understand the impact on the variables used for projection. Following figure captures overall methodology for the demand forecasting exercise.

Figure 34: Overall approach for demand forecast



Source: PwC Analysis

Step-wise approach has been elucidated in the following-

Step-1: Gross Value Added (GVA) is the measure of the value of goods and services produced by a particular industry sector. In this exercise, GVA for the best performing 16 industrial sectors (identified in last chapter) in the country context has been considered as the base for forecasting. Survey of Manufacturing Industries 2012 (SMI) data published by Bangladesh Bureau of Statistics (BBS) has been referred for the same.

Step-2: GVA for these 16 industrial sectors have been forecasted based on industrial growth rates. It has been considered that these growth rates are generating owing to (i) organic growth rate(s) of the respective industrial sector(s) and (ii) infrastructure induced growth rates.

Quantum Index of Industrial Production (QIIP) published in National Account Statistics 2017 (NAS) by BBS has been analyzed to find out CAGR for each of these industry sectors. The results obtained from the same have been further validated by detailed secondary research on sectoral outlook and industry trends in Bangladesh. Data points in support to these parameters are furnished in the annexure.

It has been assumed that the organic growth rates of industrial sectors are augmented due to upcoming infrastructure projects planned in the country and in the region surrounding the proposed EZ. Details of the related assumptions are mentioned in the next section.

Step-3: Earlier step estimates projection of investment in the overall country context. Based on certain sets of assumptions, Greenfield investment in economic zones at Dhaka division level have been assessed. These assumptions are outlined in the next section.

Step-4: Basis secondary research on industry sector outlook and primary interaction with industries, investment-land intensity ratio (investment per unit area) has been assessed. This ratio is applied on the projected investment to estimate the land uptake forecasting in the economic zones of Dhaka division.

Step-5: In addition to the proposed EZ, various other economic zones are planned within Dhaka division. In consultation with BEZA officials, land uptake in these proposed economic zones have been prepared. After considering competition from the other economic zones within Dhaka division, land uptake projection at the proposed EZ is arrived at.

Step-6: Based on the shortlisted industry sectors suitable for the proposed EZ (identified in last chapter), land uptake projection has been calculated. Proceeds from the same have been used to formulate the best practice master planning and accordingly infrastructure requirements have been assessed.

Step-7: Referring to secondary research and prevailing best practices, utility requirements and employment generation (per unit area) have been considered. These index figures have been validated through the primary interaction held on ground. Based on the same, projection of utility requirements and employment generation for the proposed EZ has been estimated.

It is to be noted that forecasting of land uptake, utility requirements and employment generation are based on the hypothesis elaborated above. Actual scenario during on-ground development of the proposed EZ may vary than this estimation.

5.3. Demand Scenarios and Associated Assumptions

5.3.1. Demand Scenarios

Three scenarios have been considered while developing the demand forecasting model.

- Aggressive case: Economic conditions of Bangladesh and the region are improving and behaving better than expected; as a result of the same, macro-economic indicators showing good prospect and potential infrastructure projects are commencing as scheduled.
- Base case: Economic conditions of Bangladesh and the region are showing steady trend and behaving as expected; macro-economic indicators also indicating good prospect.
- Conservative case: Economic conditions of Bangladesh and the region are showing lagging trend and behaving worse than expected; macro-economic indicators indicating hindrances to growth.

5.3.2. Key Assumptions

1. Timing and related assumptions

It has been assumed that regulatory activities and study on the proposed EZ would take place throughout the next financial year i.e. 2018-19 (termed as 2018). Further, project preparatory activities (such as off-site infrastructure development, decision on development model and appointment of private developer) would consume a timeframe of 2 years (i.e. from 2019 to 2020). Taking cues from similar developments across the globe, construction timeline of 3 years (from 2020 to 2022) has been considered.

Basis above timelines, it has been assumed that land uptake in the proposed EZ to commence from 2021 and accordingly a demand model has been prepared for 20 years (i.e. from 2021 to 2040).

2. Industries considered for this assessment

As elaborated in earlier chapter, following industries have been identified for the demand projection framework.

- Food and Beverages
- Agro based products
- Electrical and Electronics
- Light Machinery and Equipment & Furniture

3. Assumptions related to industrial growth rate (organic)

Basis primary survey of industrial units, growth trend and changing investment landscape in the country context were assessed. Based on the responses recorded during primary survey, organic industrial growth has been taken into cognizance.

As outlined in the methodology of the demand forecast, following organic industrial growth rates have been assumed. The values considered are on the conservative side. Detailed rationale behind these assumptions are placed as annexure.

Table 41: Organic industrial growth rate related assumptions

Industrial Sectors	Description of the Assumptions
Food and Beverages	• 8.5% annual growth from 2012 to 2021 • 9.0% annual growth from 2022 to 2026 • 10.0% annual growth from 2027 to 2031 • 8.5% annual growth from 2032 to 2042
Agro based products	• 8.0% annual growth from 2012 to 2021 • 9.0% annual growth from 2022 to 2026 • 10.0% annual growth from 2027 to 2031 • 8.0% annual growth from 2032 to 2042
Electrical and Electronics	• 15.0% annual growth from 2012 to 2016 • 17.5% annual growth from 2017 to 2021 • 22.0% annual growth from 2022 to 2026 • 16.0% annual growth from 2027 to 2042
Light Machinery and Equipment & Furniture	• 20.0% annual growth from 2012 to 2016 • 21.0% annual growth from 2017 to 2021 • 18.0% annual growth from 2022 to 2042

Source: National Accounts Statistics (May' 2017) by Bangladesh Bureau of Statistics; Secondary Research and PwC Analysis

4. Assumptions related to industrial growth rate (infrastructure induced)

Respondents from primary survey also opined that the infrastructure induced growth trend in the country is going to impact industrial development landscape.

Various marquee projects are planned across the country. These projects, once operational are expected to bolster the overall socio-economic growth of Bangladesh and in turn will also facilitate industrial growth. Three path-breaking infrastructure projects have been identified in the country context such as (i) Padma Bridge (~ 111 km from the proposed EZ), (ii) Upgradation of Dhaka-Chittagong Highway (Dhaka is ~180 km from the proposed EZ), and (iii) Payra Port (~200 km from the proposed EZ).

In addition to these projects, following infrastructure development projects in the region surrounding the proposed EZ have been considered.

(i) Khan Jahan Ali Airport (~45 km from the proposed EZ),

(ii) Rampal Power Plant (~87 km from the proposed EZ),

(iii) Khulna Mongla Rail Line (~50 km from the proposed EZ),

(iv) Ruppur Nuclear Power Plant (~221 km from the proposed EZ),

(v) Other projects: Upgradation of Dhaka-Khulna Highway, Widening of Dhaka-Barisal Highway, Proposed Bangabandhu Sheikh Mujib International airport.

It has been assumed that owing to development of these projects, industrial growth rate would be augmented to a certain extent. Following table elucidates the infrastructure induced augmentation in industrial growth rate across the three scenarios.

Table 42: Assumptions towards infrastructure induced augmentation in industrial growth rate

Details	Conservative	Base	Aggressive
Industrial growth rate augmentation per year (%) as a result of Padma Bridge (from 2021 to 2027)	0.725%	0.75%	0.775%
Industrial growth rate augmentation per year (%) as a result of upgradation of Dhaka Chittagong highway (from 2020 to 2024)	0.10%	0.125%	0.150%
Industrial growth rate augmentation per year (%) as a result of Payra Port (from 2022 to 2028)	0.175%	0.200%	0.225%
Industrial growth rate augmentation (%) as a result of (i) Khulna Airport, (ii) Rampal Power Plant, (iii) Khulna Mongla Rail Line, (iv) Ruppur Nuclear Power Plant and (v) various infrastructure development projects planned in South-West of Bangladesh (from 2021 to 2030)	0.375%	0.400%	0.425%

Source: Secondary research and PwC Analysis

Research articles and secondary sources hint that Padma Bridge is expected to boost the GDP growth of the country by 1.66%. Considering the distance of Padma Bridge from the proposed EZ, it has been assumed that once the bridge is operational, industrial growth in this region shall be augmented by 0.75% annually. Impact of other potential infrastructure projects at country level and region level has been assumed subsequently.

Detailed rationale behind these assumptions are placed as annexure.

5. Assumptions related to investment inflow in economic zones of Dhaka division

Out of the total investment forecasted at the country level, certain portion is expected to inflow at Dhaka division level. A part of this investment inflow is Greenfield in nature (involves setting up of new facilities). Out of the total Greenfield investment estimated at Dhaka division level, it has been assumed that a certain quantum would take place in the economic zones proposed within Dhaka division. Following table captures the assumptions related to investment inflow in economic zones of Dhaka division.

Table 43: Assumptions related to investment inflow in economic zones of Dhaka division

Details	Conservative	Base	Aggressive
Investment in Dhaka Division as % of the total investment estimated for the country	27.5%	30.0%	32.5%
% of greenfield investment	47.5%	50.0%	52.5%
Investment in economic zones (%) out of total greenfield investment	27.5%	30.0%	32.5%

Source: Secondary research and PwC Analysis

Based on information availed from secondary research and PwC analysis, Dhaka division contributes to ~30% of GDP of the country. Thus, investment in Dhaka division has been assumed as 30% (in base case) of the total investment inflow in the country. Research articles suggest that in developing countries, % of Greenfield investment is ~57.85%.[232] Thus in base case, 50% of Greenfield investment has been assumed.

BEZA has embarked into an ambitious journey of setting up of 100 economic zones in the coming 15 years. Basis information obtained from BEZA officials, around 30 economic zones (including govt. driven, G2G and private) are planned in Dhaka division. Keeping in cognizance scarcity of land in Dhaka division and significant industrialization in Dhaka division, it has been assumed that in base case, 30% investment in economic zones (out of total Greenfield investment) would flow in.

Detailed rationale behind these assumptions are placed as annexure.

6. Assumptions related to investment-land intensity and number of establishments

Based on prevailing practices and primary interaction with industries and taking in cognizance similar developments in the geographical context, investment-land intensity ratio (investment per unit land area) for the shortlisted industries have been arrived at. These figures are indicative in nature and may vary depending on the exact stage of value chain and the type of finished goods.

It is very difficult to estimate number of industrial establishments in any economic zone during project conceptualization stage. Synthesizing number of industrial establishment data obtained from Survey of Manufacturing Industries 2012 with the feedback obtained from primary survey, number of industrial establishment per unit acre figures have been arrived at. It has also been taken into consideration that as per prevailing BEZA development guidelines, minimum land plot size is 1 acre.

While calculating the above, it has been assumed that the proposed EZ houses only small, medium, and large scale industries.[233]

Table 44: Assumptions related to investment-land intensity ratio

Industrial Sectors	Investment (BDT million) per acre	Area (acre) Requirement for each industrial establishment (small, medium and large)
Food and Beverages	36.76	2.00
Agro based products	51.37	1.00
Electrical & Electronics	172.35	1.00
Light Machinery and Equipment & Furniture	198.86	1.00

Source: Secondary research, primary interaction with industries and PwC Analysis

[232] *http://documents.worldbank.org/curated/en/628261468781753575/110510322_20041117173021/additional/325780wps3192.pdf*
[233] *Definitions of Small, Medium, and Large industries are as per Survey of Manufacturing Industries (2012) published by Bangladesh Bureau of Statistics*

7. Assumptions related to competition from other proposed EZs within Dhaka division

Basis discussion with BEZA officials and data provided in BEZA website, information on the competing manufacturing EZs within Dhaka division have been gathered. Following table captures information about the same.

Table 45: Competing economic zones within Dhaka division

Sl. No.	Name of EZ	Location	District	Acres	Remarks
1	Dhaka EZ	Dhohar	Dhaka	316.35	Govt. driven
2	Dhaka SEZ	Karanigonj	Dhaka	105.00	Govt. driven
3	Shreepur EZ	(Nayanpur), Shreepur	Gazipur	510.00	Govt. driven
4	Gopalgonj EZ	Kotalipara	Gopalgonj	201.83	Govt. driven
5	Shariatpur EZ	Jajira, Shariatpur	Shariatpur	525.27	Govt. driven
6	Manikgnnj EZ	(BIWTA old Aricha Ferighat), Shibaloy	Manikganj	300.00	Govt. driven
7	Munshiganj Gazaria EZ	Gazaria	Munshiganj	97.98	Govt. driven
8	Araihazar -2 EZ	Araihazar	Narayanganj	413.00	Govt. driven
9	Araihazar EZ	Araihazar	Narayanganj	1010.90	Govt. driven
10	Narayanganj EZ	Bandar & Sonarga	Narayanganj	875.65	Govt. driven
11	Narsingdi EZ	Narsingdi Sadar	Narsingdi	690.20	Govt. driven
12	Shariatpur EZ	Gosharhat	Shariatpur	750.00	Govt. driven
13	Narayanganj EZ Sonargaon	Sonargaon	Sonargaon	1000.00	Govt. driven
14	Madaripur EZ	Rajoir upazila	Madaripur	667.00	Govt. driven
15	Faridpur EZ	Faridpur Sadar upazila	Faridpur	888.28	Govt. driven
16	A K Khan PEZ	Polash	Narshindi	200.00	Private
17	Megna Industrial Economic Zone PEZ	Sonargaon	Narayangonj	80.00	Private
18	Megna Economic Zone PEZ	Sonargaon	Narayangonj	68.00	Private
19	Aman Private EZ	Sonargaon	Narayangonj	150.00	Private
20	Abdul Monem PEZ,	Gojaria	Munsigonj	197.00	Private
21	Bay Private EZ	Gazipur	Gazipur	65.00	Private
22	United City IT Park Ltd.	Badda and Vatara	Dhaka	2.43	Private
23	Arisha Private EZ	Keranigonj, Savar	Dhaka	84.95	Private
24	East-West Special EZ	Keranigonj	Dhaka	54.00	Private
25	Bosundhora Special EZ	Keranigonj	Dhaka	56.00	Private
26	city EZ	Narayangonj	Narayangonj	92.00	Private
27	City SEZ	Dhaka	Dhaka	110.00	Private

Sl. No.	Name of EZ	Location	District	Acres	Remarks
28	Sonargaon EZ	Narayangonj	Narayangonj	350.00	Private
29	private ez (bgme)	Munshiganj	Munshiganj	482.00	Private

Source: BEZA website and discussion with BEZA officials

In line with the above information, industrial space uptake in the competing EZs from 2017 to 2041 have been assumed. Details of the same are placed in the annexure. Basis suggestions obtained from various BEZA officials and realistic development scenarios of these competing EZs, this assumption has been formulated. However, on ground scenario may vary than this assumption.

8. Industrial space requirement as % of total land area

In any EZ, a certain proportion is allotted for industrial space. Remaining portion is kept reserved for allied on-site infrastructure (such as internal road connection, water and sewer system, effluent treatment facilities and utility connection) and non-processing zone (such as entrance plaza, social infrastructure, skill development facilities, green space and other amenities). It has been assumed that 65% of total land area is to be earmarked for industrial purposes. However, this is tentative and based on development guidelines of BEZA & similar developments worldwide.

9. Utility requirements and employment generation

Standard industry benchmarks and excerpts from the primary survey have been referred to arrive at the benchmark figures (per unit area) towards estimation of utility requirements and direct employment generation. It is to be noted that these figures are indicative in nature. These figures may vary during on-ground implementation of the proposed EZ and as per the stage in the value chain for the industry. These figures are also dependent on the production capacity and exact type of finished goods being produced.

Following table captures these benchmark figures.

Table 46: Utility requirements and employment generation- benchmark figures

Industry sectors	Power requirements (kVA per acre)	Water requirements (Cum per day per acre)	Direct Employment generation (Number per acre)
Food and Beverages	182.11	28.33	23
Agro based products	182.11	28.33	119
Electrical & Electronics	182.11	14.57	253
Light Machinery and Equipment & Furniture	182.11	14.57	186

Source: Industry best practices & standard benchmarks, primary survey

Basis primary survey, most of the industries use gas as fuel source to generate power and for boiler usage. Depending on the value chain requirements and requirements of factors of production, the same would vary. It is very difficult to estimate gas requirements without comprehending the exact requirements and exact product type from these industries. Thus, estimation of gas requirement has not been carried out in this module.

5.4. Demand Forecasting

5.4.1. Industrial Space Uptake

Based on the above stated assumptions, industrial space occupancy for the three scenarios are captured in the following table.

Table 47: Industrial space occupancy (in %) for the three scenarios (cumulative)

Scenarios	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030 to 2040
Conservative	15%	21%	29%	29%	47%	66%	79%	83%	90%	100%
Base	22%	37%	55%	63%	94%	100%	100%	100%	100%	100%
Aggressive	31%	56%	85%	100%	100%	100%	100%	100%	100%	100%

Source: Demand Forecasting

Detailed calculations are furnished in the annexure. Following tables elucidates the industrial sector wise industrial space uptake for the three scenarios.

Table 48: Industrial space uptake- Conservative Scenario (figures in acres) - cumulative

Industries	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030 to 2040
Food & Beverages	16	22	30	30	47	66	78	83	89	99
Agro based products	1	1	1	1	2	3	4	4	4	5
Electrical & Electronics	2	3	4	4	7	10	12	13	14	16
Light Machinery and Equipment & Furniture	1	2	3	3	4	6	8	8	9	10
Total	**20**	**28**	**38**	**38**	**60**	**85**	**102**	**108**	**116**	**130**

Source: Demand Forecasting (kindly ignore the rounding off)

Table 49: Industrial space uptake- Base Scenario (figures in acres) - cumulative

Industries	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030 to 2040
Food & Beverages	23	39	56	65	95	101	101	101	101	101
Agro based products	1	2	3	3	4	5	5	5	5	5
Electrical & Electronics	3	5	7	9	14	15	15	15	15	15
Light Machinery and Equipment & Furniture	2	3	5	6	9	9	9	9	9	9
Total	**29**	**49**	**71**	**83**	**122**	**130**	**130**	**130**	**130**	**130**

Source: Demand Forecasting (kindly ignore the rounding off)

Table 50: Industrial space uptake- Aggressive Scenario (figures in acres) - cumulative

Industries	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030 to 2040
Food & Beverages	32	58	87	103	103	103	103	103	103	103
Agro based products	1	3	4	5	5	5	5	5	5	5
Electrical & Electronics	4	7	11	14	14	14	14	14	14	14
Light Machinery and Equipment & Furniture	3	5	7	8	8	8	8	8	8	8
Total	**40**	**73**	**109**	**130**	**130**	**130**	**130**	**130**	**130**	**130**

Source: Demand Forecasting (kindly ignore the rounding off)

In accordance to the above estimated land demand, number of industrial establishments (small, medium, and large) has also been estimated. Following table (in the next page) captures the same.

Table 51: Estimation of Industrial Establishments- cumulative

Scenarios	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030 to 2040
Conservative	12	17	23	23	37	52	63	67	72	81
Base	18	30	43	51	75	80	80	80	80	80
Aggressive	24	44	66	79	79	79	79	79	79	79

Source: Demand Forecasting (kindly ignore the rounding off)

5.4.2. Utility Requirements

In line with the industrial space uptake projections, following tables elaborates the forecasting of utility (power and water) requirements at the proposed EZ.

Table 52: Power Requirements- Three Scenarios (figures in MVA) - cumulative

Scenarios	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030 to 2040
Conservative	3.6	5.1	6.9	6.9	10.9	15.5	18.6	19.7	21.1	23.7
Base	5.3	8.9	12.9	15.1	22.2	23.7	23.7	23.7	23.7	23.7
Aggressive	7.3	13.3	19.8	23.7	23.7	23.7	23.7	23.7	23.7	23.7

Source: Demand Forecasting (kindly ignore the rounding off)

Table 53: Water Requirements- Three Scenarios (figures in MLD) - cumulative

Scenarios	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030 to 2040
Conservative	0.5	0.7	1.0	1.0	1.5	2.2	2.6	2.8	3.0	3.3
Base	0.8	1.3	1.8	2.1	3.1	3.4	3.4	3.4	3.4	3.4
Aggressive	1.0	1.9	2.8	3.4	3.4	3.4	3.4	3.4	3.4	3.4

Source: Demand Forecasting (kindly ignore the rounding off)

The above stated utility consumption figures were taken at a conception and on basis on primary surveys undertaken among various industry sector players in Bangladesh. Actual demand estimation of utility has been undertaken in the Infrastructure Planning chapter, based on prevailing development guidelines in Bangladesh context.

5.4.3. Employment Generation

In line with the industrial space uptake projections, following figure elaborates the forecasting of direct employment generation from the proposed EZ.

Figure 35: Direct employment generation for the three scenarios

Scenarios	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030 to 2040
Conservative	1179	1756	2379	2379	3834	5521	6794	7162	7739	8780
Base	1779	2958	4346	5245	7877	8387	8387	8387	8387	8387
Aggressive	2425	4392	6562	7994	7994	7994	7994	7994	7994	7994

Source: Demand Forecasting (kindly ignore the rounding off)

Detailed calculations are furnished in the annexure.

5.5. Key Takeaways

- Three scenarios (conservative, base, and aggressive) have been developed to forecast land demand for the proposed EZ. Base scenario assumes Business-as-Usual situation for the overall economic condition of the country and the influence region; whereas the conservative (aggressive) scenarios assume bad (good) performance of economic and infrastructure indicators in regard to the country and the influence region.

- Assumptions related to industrial growth rates and investment inflow to the subject site have been varied as per the three scenarios elaborated above. It has been assumed that in aggressive (conservative) case, higher (lower) infrastructure induced growth rate and higher (lower) investment inflow taking place to the subject site. Base case considers the current scenario backed up by evidences and present trends.
- It appears that in conservative case, complete land uptake would take place in 10 years. For base and aggressive cases, the same would be spread over 6 years and 4 years respectively.
- Total number of industrial establishments (small, medium, and large) for conservative case is 81. For base and aggressive cases, it is 80 and 79 respectively.
- For conservative case, ultimate power and water demand have been estimated as 23.7 MVA and 3.3 MLD; For base case, ultimate power and water demand have been estimated as 23.7 MVA and 3.4 MLD; For aggressive case, ultimate power and water demand have been estimated as 23.7 MVA and 3.4 MLD.
- Proposed EZ is expected to generate direct employment of 8,780 in conservative case. In base and aggressive cases, employment generation figures could be 8,387 and 7,994. These figures are indicative and may vary during implementation.

6. Transport Assessment

6.1. Purpose and Objective

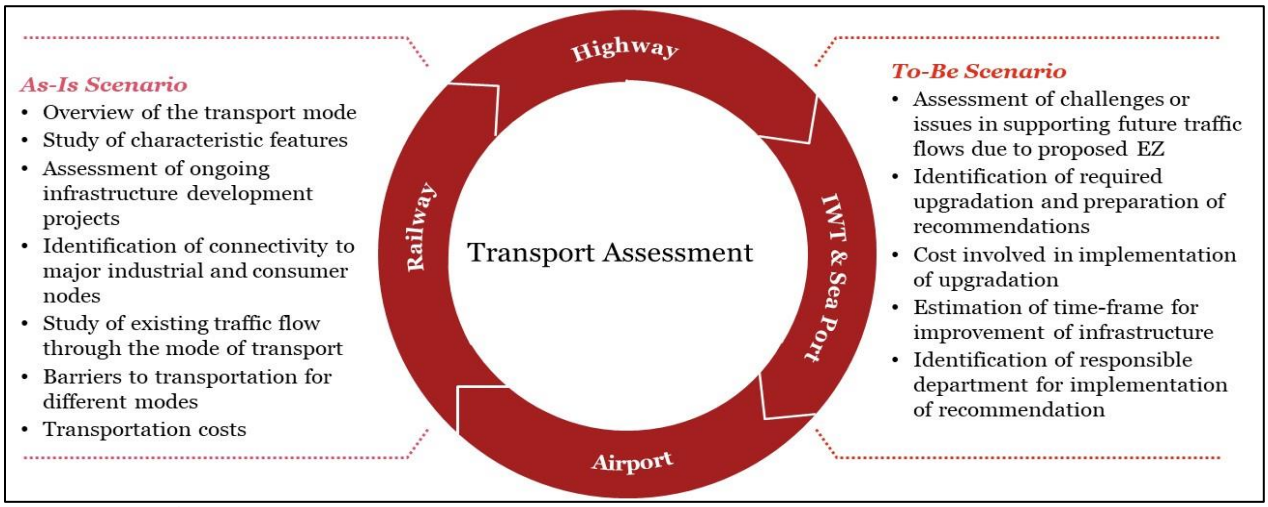
A robust transport infrastructure is the most vital enabler for movement of men and material from origin to destination. In an increasingly globalized economy, industrial development of any region needs to be supported by a seamless movement of traffic to ensure resources can be brought in or sent out to major international transit gateways.

This chapter will delineate the transport infrastructure available in the vicinity of proposed EZ site and existing connectivity with major international transit points. A comprehensive study of each mode of transport i.e. road, railway, port and airport will be performed to understand as-is scenario of these modes of transport. The impact of the development of proposed EZ site on all transport modes will be considered and proposals to upgrade the existing transport network in order to support the proposed EZ site will be elucidated.

6.2. Methodology of Transport Assessment

The approach adopted to assess transport infrastructure supporting movement of goods and passengers in the vicinity of the proposed EZ site is segregated into 2 modules. 1st module deals with evaluation of the existing status of different modes of transport with respect to its features, connectivity, traffic flow, ongoing projects and transportation costs involved. 2nd module contains recommended upgradations of different modes of transport infrastructure to support the future traffic flows due to the proposed EZ, cost implication of such upgradations, timeframe over which the upgradation should take place and department responsible for concerned upgradation.

Figure 36: Assessment Methodology

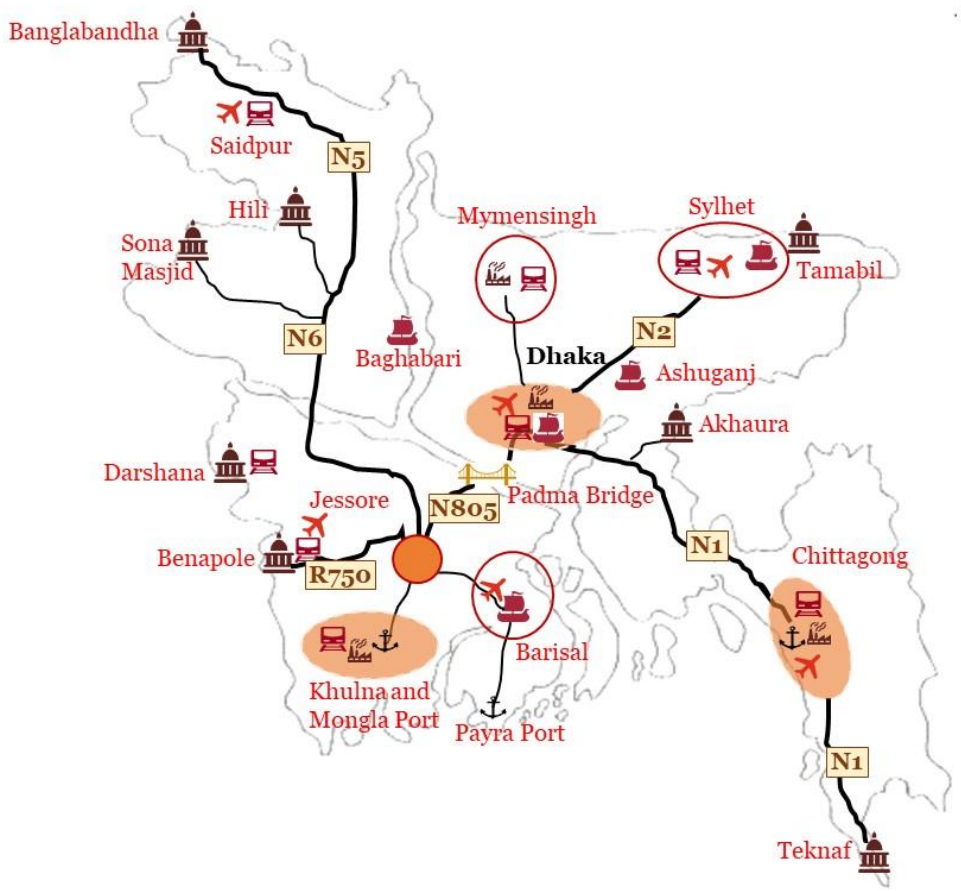


Source: PwC Analysis

6.3. Review of National Infrastructure with respect to site

A macro level view of major transport nodes across Bangladesh has been outlined in the figure below –

Figure 37: Bangladesh's major transport nodes with respect to Proposed EZ site



Legends:

- Land Port
- Airport
- Major IWT Node
- Major National Highway
- Major Rail Node
- Proposed EZ
- Sea Port
- Major Industrial Hub

Distances from Major National Infrastructure Nodes:

Node	Distance (km)	Node	Distance (km)
Benapole	140	Barisal	90
Darshana	170	Payra Port	200
Jessore	100	**Chittagong**	**330**
Khulna	**50**	Sylhet	400
Saidpur	450	Mymensingh	300
Mongla Port	65	Akhaura	300
Dhaka	**180**	Teknaf	520

Major Highways:

- **N1 –** Dhaka-Chittagong Highway
- **N2 –** Dhaka-Sylhet Highway
- **N5 –** Dhaka-Rangpur Highway
- **N6 –** Dhaka-Rajshahi Highway
- **N805 –** Dhaka-Khulna Highway
- **R750 –** Jessore-Narail Highway

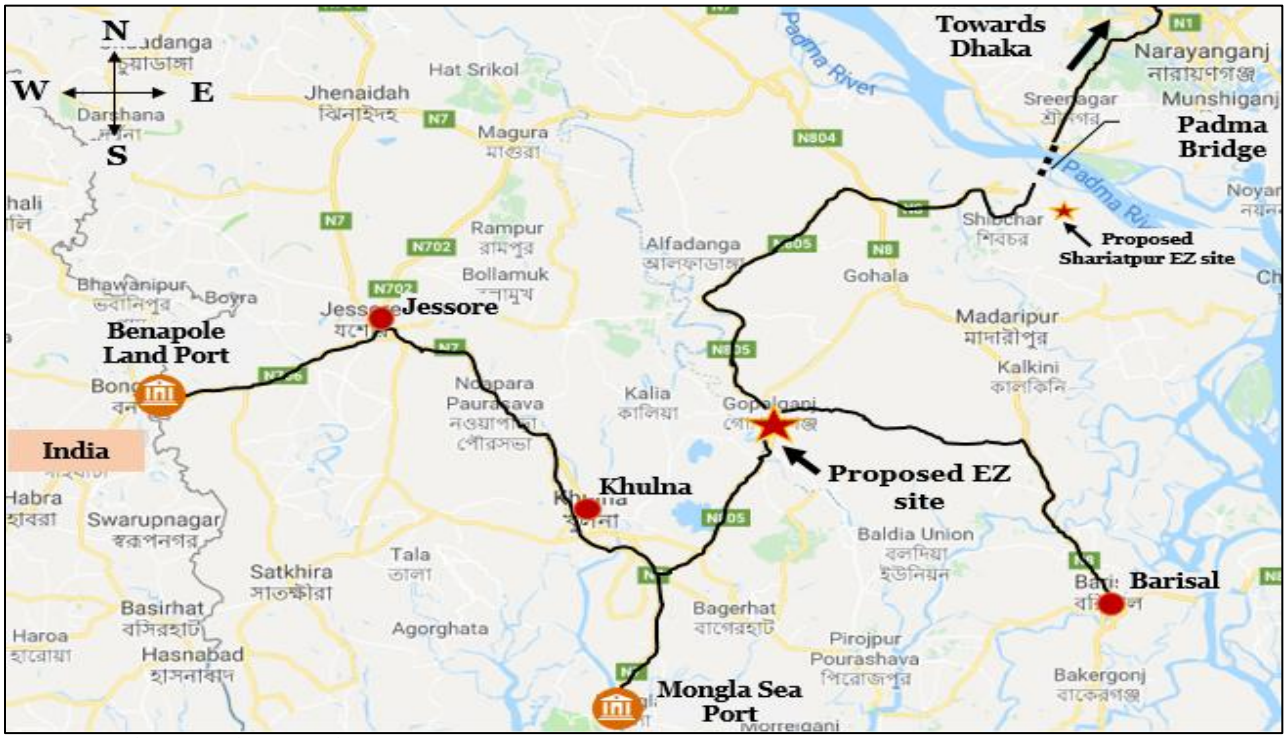
Source: PwC Analysis

6.3.1. Highways

Road connectivity is essential to foster last mile connectivity of cargo from source to destination. Good access to roadways shall enable seamless movement of cargo to/ from the proposed EZ to industrial nodes and trade gateways.

Following figure captures the road infrastructure in the vicinity of the project site.

Figure 38: Road infrastructure in the vicinity of the proposed EZ



Source: Google Map and PwC Analysis

Figure above elucidates that the proposed EZ has direct road access to Khulna, Jessore and Barisal. It is also located on the transit route from Dhaka to Benapole Port. Location of the proposed EZ may be conducive for industries, which are dependent on foreign trade between India & Bangladesh, through Benapole Land Port. Operationalization of Padma Bridge will provide direct road access between the proposed EZ site and consumer hub in Dhaka.

6.3.1.1. Highways near the proposed EZ

As shown in the figure placed on next page, proposed EZ site is bordered by National Highway, N805 (Dhaka-Khulna Highway) towards the eastern boundary of the project site.

Regional Highway, R850 (Gopalgonj town road) borders the project site towards the western side. Presently, both the bordering roads are bituminous and can support movement of heavy vehicles. While N805 is 2-lane road having average width of 7.73 m, R850 is single lane road having an average width of

5.40 m.[234] This could hinder smooth flow of traffic on R850, as it will not be able to support two way traffic of cargo carrying large vehicles, resulting in congestion and risk of accident.

GoB is envisaging development of South West Bangladesh Economic Corridor (SWBEC); this will enable the region's economic output increase up to USD 148 billion by 2050.[235] Economic Corridors focus on holistic development in terms of industrial development, urban growth and infrastructure development projects. The alignment of SWBEC is from Bagerhat and Jessore to Dhaka through Khulna and Gopalgonj. Since the two growth centers of the country (i.e. Dhaka and Khulna) would be connected to the South West region of Bangladesh, Proposed EZ in Gopalgonj is poised to reap the benefit of industrialization and transportation improvement owing to the establishment of SWBEC. In furtherance to improving connectivity and industrialization, SWBEC would also improve connectivity with the neighboring countries and North Eastern part of India. GoB is also supporting growth of economic activity in the region through entering into a BBIN (Bangladesh, Bhutan, India, Nepal) Motor Vehicles Agreement, which would allow seamless movement of vehicles of these countries. A pilot bus was operated on 25th April, 2018 from Dhaka in Bangladesh to Kathmandu in Nepal in order to promote inter country road transportation.

Vehicular Traffic

As per data available in Roads and Highways Department (RHD) database, Average Annual Daily Traffic (AADT) for N805 is 8,629 vehicles, out of which 7,090 is motorized, rest is non-motorized. Comparison with busiest road links of Bangladesh indicates that the AADT for N805 is approximately 20% of the AADT of the busiest road links in the country.

Data from RHD reveals that AADT for R850 is 7,870, out of which 5,750 is motorized and rest is non-motorized. Traffic volume in R850 is significantly lower than the traffic volume of busiest road links in the country. This may be attributed to the fact that Gopalgonj area is yet to witness industrial development.

Basis our discussion with RHD officials, we were informed that Roads and Highways Department has plans to widen R850 to 2-lane road and also to widen N805 to 4-lane road. Widening of roads would greatly improve upon the already favorable last mile infrastructure. This would allow a faster 2-way movement of heavy vehicles, required for transporting construction material as well as manufactured goods.

Figure 39: Highways near proposed EZ

The proposed EZ site is located in between a Regional Highway and National Highway, which provides last mile connecting infrastructure to the proposed EZ site. Last mile connectivity to proposed EZ site is further set to improve, given the road widening plans of RHD.

6.3.1.2. Trunk Connectivity to Mongla, Khulna and Jessore

There are three major urban/industrial nodes in vicinity of the proposed EZ site. These are –

- Mongla
- Khulna
- Jessore

[234] *Roads and Highways Department*
[235] *https://www.thedailystar.net/business/economic-corridor-southwest-will-bump-growth-adb-1504156*

Mongla is an upcoming industrial town located around 65 km away from the proposed EZ site location, requiring a travel time of around 1.5 hours from the site location. This town is home to Mongla Port, Mongla EPZ, LPG bottling plants and 2 Economic Zones (under development).

Mongla can be accessed via Dhaka-Khulna National Highway (N805) followed by Khulna-Mongla Road (N7). Presently, these road alignments are bituminous and conducive for movement of heavy vehicles. Basis stakeholder discussions with RHD officials, we were informed that RHD is in process of widening roads along this stretch from existing 2-lane to 4-lane, this will improve the vehicle carrying capacity of the roads and create an industry friendly passageway for transportation of goods and services to and from the proposed EZ. Accessibility to the sea port in Mongla will aid in the import and export of goods and materials.

Khulna is an industrial city in proximity of EZ site location. This town is around 50 km away from proposed EZ site at Gopalgonj, requiring a travel time of around 1.5 hrs. It is the 3rd largest city of Bangladesh and is home to various industries like jute, chemicals, seafood packaging, food processing, sugar mills etc.

Khulna can be accessed from the EZ site location through the Dhaka-Khulna National Highway, N805 and onto Khulna-Jessore-Dhaka highway, N7. Presently, these road alignments are 2-lane, however work is under progress to convert sections of the stretch of road in between Khulna and Gopalgonj to 4-lane.

Jessore is the gateway to Benapole Land Port. This is a major city in close proximity to proposed EZ location at a distance of around 100 km. Travel time from proposed EZ site to Jessore is around 3 hours and can be accessed via Dhaka-Khulna highway, N805 and Khulna-Jessore-Dhaka highway, N7. This town has a major automobile assembly plant, several jute industries and recently BEZA has announced plans to set up two economic zones in this district.[236] This town can serve as a good demand center for finished products as well as provide raw material for the industries in proposed EZ site.

6.3.1.3. Trunk Connectivity from Dhaka

Currently there is no direct road access to Dhaka. The proposed EZ is around 180 km from Dhaka city and can be accessed by travelling along N8 (Dhaka-Mawa Highway) till Mawa Ferry Ghat. Dhaka-Mawa Highway is 2-lane bituminous road and work is in progress to make it a 4-lane highway. Four laning of Dhaka-Mawa road is being undertaken in anticipation of meeting the requirements of additional traffic flow that will take place, upon operationalization of Padma River Bridge.

Travel on Dhaka-Mawa Highway is followed by a ferry ride till Kaorakandi Ferry Ghat or Shariatpur Ferry Ghat. This ferry ride presently requires at least 2 hours of travel time, however traffic at ghat, often results delay of 2-3 hours in crossing the Padma River. From the ghat, Mawa-Bhanga Highway needs to be accessed. This road leads to National Highway, N805, which provides last mile connectivity to the proposed EZ site. Road condition of the entire stretch (from ferry ghat to EZ site) is suitable for movement of heavy goods and vehicles.

Mawa-Bhanga Highway is presently 2-lane but along several stretches upgradation work of 4-laning has commenced, while there are plans to start work on 4-laning of remaining stretches. 4-laning of Mawa-Bhanga Highway could enhance the vehicle carrying capacity of the road thus enabling faster movement of men and material.

The travel time required for crossing the Padma River could come down once the construction of Padma River Bridge is completed. This would also result in direct road access to the consumer hub, Dhaka.

[236] *http://www.daily-sun.com/post/272989/Jessore-to-have-2-economic-zones*

6.3.2. Land ports

Bangladesh and India share a border line of 4,096 km, which is the fifth longest border in the world.[237] Such a long land border creates opportunity for mutually beneficial foreign trade. Land ports facilitates trade and commerce between two countries, since they provide secure gateways through which cargo can be transported. Facilities that can be developed at land ports include weighbridges, cargo handling stations, warehouses, Inland Container Depots etc. Currently, India and Bangladesh have 23 land ports to facilitate trade between the two countries.[238]

Benapole is the nearest land port located at around 140 km west of the proposed EZ site. It is Bangladesh's largest and busiest land port with a capacity to handle 2 million Metric Tonnes (MT) of goods per year. Access to Benapole takes place through Khulna-Jessore Highway and Jessore-Benapole Highway. Both these highways are part of the Asian Highway network and basis our discussion with RHD officials, procurement process is completed towards upgradation of these road alignments.

Present Hindrance and Redressal by GoB

This land port is yet to be modernized. Lack of digitization and absence of modern surveillance system at Benapole Land Port results in mismanagement and theft of goods. Also, 60% of goods traded through Benapole is handled manually resulting in higher lead-time for clearance of vehicles. This results in traffic congestion at this land port. On an average cargo movement of ~250 trucks carrying export goods reach Benapole land port on a daily basis, however 100-150 vehicles are cleared. Voice on ground reveals that owing to high gestation time at this land port, cost of export increases due to demurrage charges.[239]

Bangladesh Land Port Authority, inaugurated a new gate at Benapole on May 28, 2018 in order to ease traffic congestion at the land port and provide an alternative gate for movement of cargo carrying vehicles. A pilot project for digitalization of records has been initiated at Benapole Land Port in order to improve data entry and record maintenance. Works are also underway to install more equipment for mechanized cargo-handling at Benapole Land Port.

Benapole land port is spread over an area of ~62 acres, having storage capacity of 40,000 MT. Benapole port has weighbridges, mechanized cargo handling facilities, and warehouses to support movement of goods.[240]

Figure 40: Historical trend of foreign trade through Benapole land port (figures in MT)

[237] *http://www.thehindu.com/news/national/half-of-indiabangladesh-border-fenced/article17396794.ece*
[238] *Bangladesh Land Port Authority*
[239] *Bangladesh Land Port Authority*
[240] *Bangladesh Land Port Authority*

Figure on the previous page indicates that imports and exports have demonstrated stable trends over the past 5 years indicating consumption and manufacturing activities have remain broadly unchanged over the timeframe considered. Absence of marquee industrial projects in South-West Bangladesh region is another factor hindering growth of import or export through Benapole Land Port. Imports through Benapole Land Port is higher as compared to exports, this signifies lack of industrialization in immediate vicinity of Benapole Port resulting higher dependency on India for consumer goods. Bangladesh also lacks in availability of raw material fit for industrial consumption, due to which industries (such as textile/RMG, automobile, light engineering, food and beverages) are dependent on India for import of raw material.

Major commodities traded through Benapole land port is listed in the table below.

Table 54: Types of goods being traded through Benapole land port

Major imports	Cotton, chemical, motor car, motor cycle, tyre-tube, machinery & spare parts, food grains, fish, spices, sugar, egg, aluminum, refrigerator, paper etc.
Major exports	Jute & jute goods, fish, soap, plastic goods, battery, construction materials etc.

Source: Data from Bangladesh Land Port Authority Website

Products enlisted in the previous page indicate the market potential for cross-border trade from proposed EZ.

Darshana Land Port is located ~170 km North-West of the proposed EZ site. This port does not have direct road connectivity to India but this port facilitates trade with India through railways. Wagon to wagon transshipment on railway tracks takes place at Darshana Land Port. Generally commodity items like rice, wheat, clinker, sugar, fish and milk powder are transported through this port. Currently this is a single broad gauge line, however, GoB has recently approved doubling of this line to provide connectivity from India to Mongla Port in order to facilitate better access of Indian traders to Mongla Port.[241]

Bhomra Land Port is another port located at around 118 km west of the proposed EZ site, towards South of Benapole Port. It started its operations from May, 2013 and has a capacity to handle 0.5 million MT of goods per year.[242] This port was developed in 2013 and does not witness capacity traffic. However, with rising trade between India and Bangladesh, traffic through this land port could increase.

Good access to land port shall ascertain trade relationship with India, in particular West Bengal; industries can tap into Indian markets for their products and have access to raw material from the Indian side.

6.3.3. Sea Ports and Inland Water Terminals

Waterway transport is one of the most fuel efficient, environment friendly and cheapest mode of transportation. Cost of transporting one tonne freight over a distance of one km by waterway is around 50% and 80% of the same transport done via road and rail respectively.[243] Bangladesh is blessed with a riverine geography, especially towards its south, where distributaries of large rivers like Padma and Meghna drain the region. This creates a fairly widespread inland waterways network, creating an opportunity for Inland waterways transportation. Bangladesh also has a coastline of 580 km which creates good potential for sea trade with other countries. Currently, more than 90% of international trade in Bangladesh is done via

[241] *https://www.joc.com/rail-intermodal/double-track-seen-slashing-bangladesh-india-transit-cost-time_20180508.html*
[242] *Bangladesh Land Port Authority*
[243] *https://www.thehindubusinessline.com/opinion/flowing-down-the-waterways/article23384237.ece*

shipping. This makes it vital to understand potential of waterways connectivity to support transportation in the proposed EZ region.

Proposed EZ site is on the west of Shariatpur and Kaorakandi ghats on Padma River. These ghats are around 110 km away from the EZ site and are equipped to handle movement of heavy vehicles. These ferry ghats are well connected to Mawa Ghat and all major river ports of Bangladesh through widespread waterway network criss-crossing the country. However, these ghats do not have any mechanized cargo handling facilities and serve to transport passengers and vehicles across the river. Currently, these ferry ghats can handle movements of agro based products, chemicals, fertilizer, light machinery, processed food, fish products etc.

Developing these ferry ghats as river ports and/ or private jetty over Padma River enables riverine transport of bulk cargo for the proposed EZ. However, any decision on the same is subjected to bathymetric analysis, topo survey, and feasibility assessment. Land acquisitions issues and government approvals need to be taken into cognizance.

There are other ferry ghats in proximity to proposed EZ sites like Khulna Ferry Terminal (at a distance of 50 km), Vatpara Ferry Ghat (at a distance of 85 km) and Barisal ferry terminal (at a distance of 90 km). These ferry ghats currently have capacity to handle movement of passengers, small vehicles and light cargo; possibilities of developing these ghats to handle heavy goods can to be explored.

Protocol on Inland Water Transit and Trade

India and Bangladesh have an existing Indo-Bangladesh Protocol on Inland Waterways and Transit which allows for using inland waterways network between the two countries for the purpose of trade and commerce. As per Standard Operating Procedure of the existing protocol, both countries have six ports each, designated as the Port of Call. In Bangladesh, the Ports of Call are Mongla, Khulna, Sirajganj, Narayanganj, Pangaon (in Dhaka) and Ashuganj, whereas in India the Ports of call are Kolkata, Haldia, Pandu, Karimganj, Silghat and Farakka.

Figure on the next page captures the route earmarked under the Protocol on Inland Water Transit and Trade between India and Bangladesh.

Figure 41: India Bangladesh Inland Waterways Route

Source: Bangladesh Inland Waterways Authority

This IWT route can be used by industries in the proposed EZ to transport cargo across Bangladesh and also to India. Khulna Ferry Terminal is the nearest river port to the proposed EZ at a distance of 50 km. As per information available with Bangladesh Inland Waterways Authority, Khulna Ferry Terminal has a capacity of handling 1,700 MT of cargo per month and 2,500 MT of bulk goods. Draft near this port is around 3.5 meters. Presently, there are no cranes operational at this Port.[244] This port can be used to transport packaged food products, fly ash, clinkers, light engineering products etc.

Mongla Sea Port is another port close the proposed EZ site used by India-Bangladesh protocol vessels, as per information available with Mongla Port Authority an average of 106 ships have called at this port over past 5 years.

Access to Sea Port

Mongla Sea Port is the nearest port to the proposed EZ site at a distance of 65 km. It is the 2nd busiest port in Bangladesh after Chittagong Port (330 km from EZ site), having the capacity to handle 1 lakh TEUs of containers every year.[245]

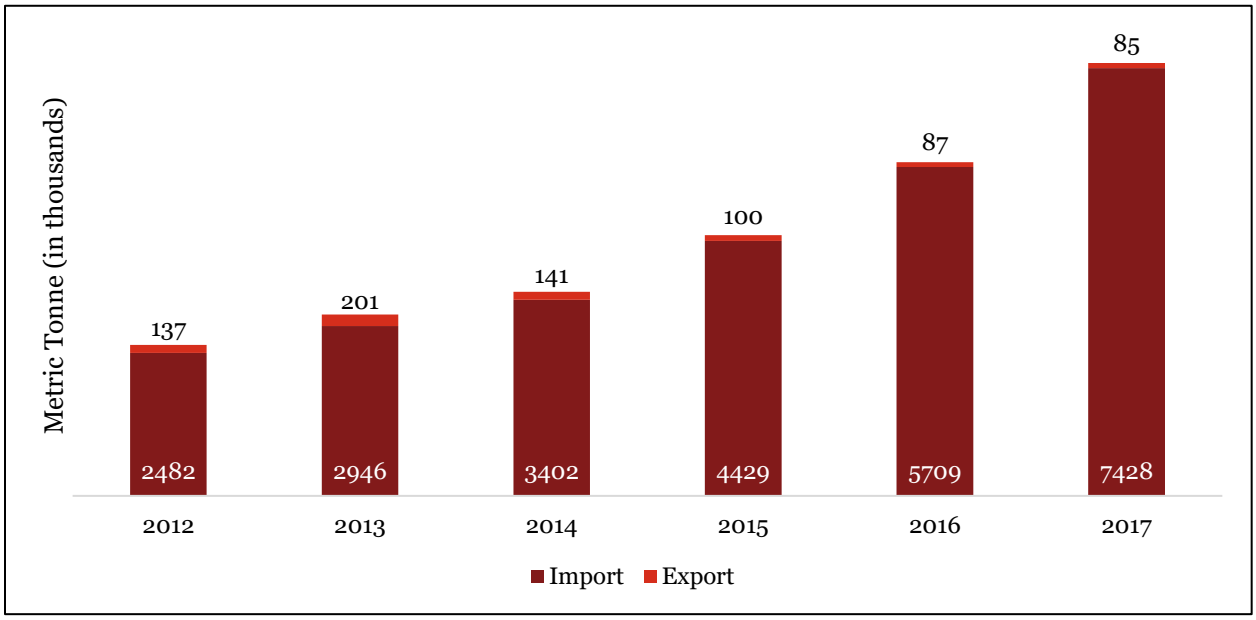
However, due to Bangladesh's major industries being located in Dhaka-Chittagong region and lack of direct road or rail connectivity of the industrial region with Mongla port, this port's capacity remains under-

[244] *Bangladesh Waterways Additional Information*
[245] *Director (Traffic) Mongla Port Authority*

utilized. Presently goods like jute products, frozen food, fertilizer, food grains, sugar, vehicles and containers are transported through this port.[246] Draft at Mongla Sea Port is currently around 4.9-6.1 meters,[247] which necessitates the use of feeder vessels to transport goods from large mother ships till the port. To address this issue, GoB is also developing another port at Payra as a deep-sea port (200 km from site location), having draft of up to 16m.[248]

Figure below captures the quantum of cargo handled at Mongla Port over the past 5 years.

Figure 42: Mongla Port - Annual Import and Export Figures



Source: Mongla Port Authority

The above figure elucidates that volume of cargo being imported through Mongla Port is far higher that export figures. This indicates that there is a lack of industrialization in vicinity of Mongla Sea Port. Also, exports have declined by almost ~38% over past 5 years, when compared to imports, which have grown at a CAGR of ~25% over the same period.

Present Hindrance and Redressal by GoB

Factors, which are currently hindering growth of traffic at Mongla Port, can be attributed to the following:[249]

- Heavy siltation in Pussur Channel where Mongla Port is located. This has decreased the navigable draft available to cargo carrying vessels.
- Irregular dredging in Pussur channel
- Inadequate port facilities – like obsolete equipment, dearth of storage facilities, insufficient manpower at port etc.

[246] *Bangladesh Port of Mongla, Additional Information*
[247] *https://www.searates.com/port/mongla_bd.htm*
[248] *https://www.joc.com/regulation-policy/infrastructure-news/asia-infrastructure-news/bangladesh-opts-make-payra-deep-sea-port_20171121.html*
[249] *http://article.sciencepublishinggroup.com/pdf/10.11648.j.ijtet.20160202.11.pdf*

- Lack of direct road connectivity to Dhaka resulting in higher lead time and cost due to multiple handling of goods

Developing Mongla Port can create a viable alternative to facilitate sea bound trade for Bangladesh, as the existing seaport at Chittagong is already handling traffic much beyond its designed capacity. Recognizing the potential of Mongla Port to be developed as an important international gateway for trade and commerce, GoB has undertaken five development projects worth about BDT 42.16 billion BDT to develop facilities at Mongla Sea Port. These projects are –

- Procurement of cutter suction dredger, pilot and dispatch boat
- Navigational aids to Mongla Port
- Dredging at outer bar in Pussur Channel
- Dredging in harbor channel
- Procurement of container and cargo handling facility

Mongla Port could witness higher movement of cargo, once the above mentioned projects are executed. Operationalization of Padma Bridge could also give an impetus to the traffic at this port, since it will create direct road connectivity between Mongla Port and existing industrial hubs of Bangladesh.

Mongla Sea Port would provide a transit gateway to manufacturers from EZ site to meet their sea trade requirements.

6.3.4. Airport

Air travel is the fastest mode of travel, which enables movement of passengers as well as time sensitive and perishable cargo. Having such a mode of transport in vicinity of an industrial location enables faster movement of decision makers of an organization who may have a need of making brief visits to production centers. Perishable items like drugs, chemicals or food ingredients like dairy products, fish, fruits requiring short travel time from centers of production to that of consumption also need access to air travel. This necessitates the need to understand air travel facilities around the proposed EZ region.

Nearest international airport to the proposed EZ is Hazrat Shah Jalal International Airport (HSIA) in Dhaka. This airport provides both international as well as domestic flight services. It is Bangladesh's largest and busiest airport. This airport is around 180 km away from EZ site and requires around 7-8 hours of travel time, due to absence of direct road connectivity. Currently, this airport has the capacity to handle 8 million passengers and 2 hundred thousand metric tonnes of cargo. Over 4 million international and 1 million domestic passengers (as well as 150,000 MT of freight and mail exchange) pass through this airport annually. HSIA is anticipated to witness a passenger traffic of 12 million by 2022 and 22 million by 2035.[250] This airport also has a freight village (warehouse), terminal buildings, hangers and other modern equipment for aircraft handling.[251] Goods like RMG, vegetables, fruits, fish, dry fish and crabs are transported through HSIA.

Present Hindrance and Redressal by GoB

Air freight transportation services are used for EXIM cargo movement only with **Dhaka international airport** providing facilities for cargo handling. Most of the **major international airline operators** such as Emirates, Etihad Airways, HK airlines, Cathay Pacific, Qatar Airways are servicing the

[250] *https://www.airport-technology.com/projects/hazrat-shahjalal-international-airport-expansion-dhaka/*
[251] *http://www.shahjalalairport.com/*

air cargo freight movement through a mix of **passenger aircrafts and dedicated freighters**. Biman Bangladesh is the Bangladesh Government owned airline facilitating cargo movement to Middle East region. The **cargo handling operations** at the Dhaka airport are also managed by **Biman Bangladesh exclusively**. The international airlines have reported significant gaps in the cargo operation as Biman Bangladesh **lacks expertise, assets and manpower** to run the operations efficiently. In fact, the operator is yet to develop expertise to track and trace the goods unloaded from aircrafts. Further, there is **no separate procedure for handling of perishable and temperature sensitive cargo**. The industry players station their representatives to follow-up with Biman Bangladesh once the cargo is unloaded in Dhaka. Biman Bangladesh cites shortage of infrastructure at airport as the main reason for mismanagement of cargo. Owing to lack of necessary infrastructure for screening of cargo, **Dhaka international airport does not have the statutory clearance for shipment directly to Europe**. The Europe bound cargo is first unloaded in Dubai/other hubs for re-scanning and clearance, then forwarded to Europe. This adds to extra cost and time for industries exporting to Europe.

Given the current capacity of the airport, GoB has already appointed developers to construct a new terminal at HSIA. This project is being funded by Japan International Cooperation Agency (JICA) and post operationalization of this terminal in 2021, annual passenger handling capacity of this airport could be 20 million and cargo handling capacity could rise to 5 hundred thousand metric tonnes.[252]

In order to meet the continuously rising air traffic in Bangladesh. GoB has also planned construction of two Greenfield airports. These airports are –

i. Khan Jahan Ali Airport in Bagerhat (45 km from proposed EZ site)

ii. Bangabandhu Sheikh Mujib International Airport near Dhaka (location to be finalized)

Good access to airport will allow industries manufacturing time sensitive goods, like RMG or designer clothes and requiring perishable products like fruits or chemicals, to develop in the proposed EZ.

As mentioned above, distance between the proposed EZ site and HSIA 180 km, which could create challenges in logistics of perishable products due to higher lead-time involved. Thus, it is pertinent to explore the possibility of leveraging upcoming international airports in vicinity of the proposed EZ site. Presently conceptualization of developing Khan Jahan Ali Airport in Bagerhat is in progress, this airport could be developed within the next 5 – 10 years. Once developed, this airport could provide a faster transit point for perishable goods manufactured in the proposed EZ.

Barisal airport is the nearest domestic airport close to the EZ site at a distance of 70 km, from where flights till Dhaka and Chittagong can be taken.

Developing of a direct road connectivity could bring down travel time to HSIA airport from proposed EZ site to 4-5 hours.

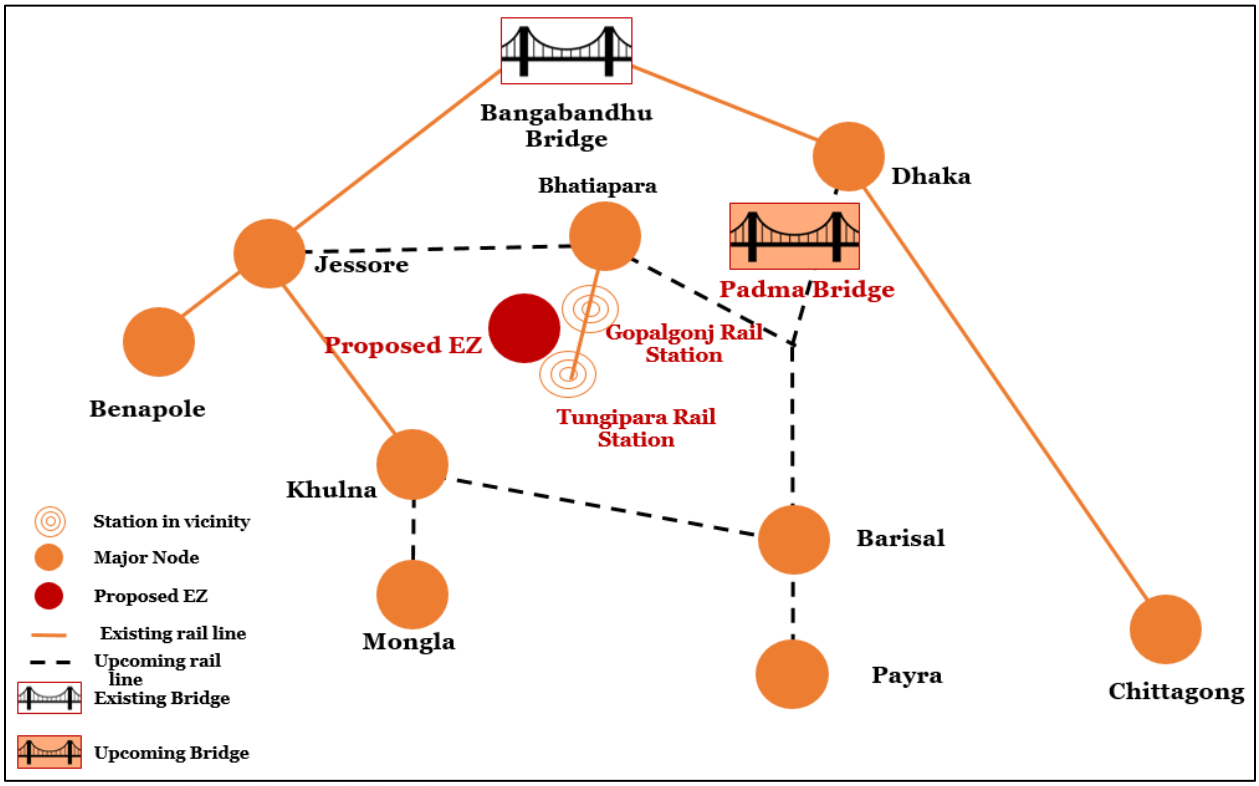
6.3.5. Railways

It is cheaper to move goods through railways as compared to road. Railways can haul larger volumes of cargo over longer distances as compared to trucks and trailers, and is also faster than vehicles plying on road, since it is easier to monitor and regulate traffic on railway lines. Moreover, transporting goods through railways also help in easing traffic congestions on road by reducing the requirement of trucks which would otherwise have to ply. An overview of railway connectivity in the proposed EZ region is mentioned below.

[252] *http://www.dhakatribune.com/bangladesh/dhaka/2017/06/12/construction-third-airport-terminal-begins-next-year/*

Recently commisoned Gopalgonj station is the nearest railway head to the proposed EZ site located at a distance of 3 km from proposed EZ site. However, it is a small station with no cargo handling facility. Nearest major railway station is in Khulna located at about 50 km from the proposed EZ site. This station has direct connectivity till Benapole Land Port, enabling movement of goods between India and Bangladesh. As per Bangladesh Railway Handbook, an average of 4 freight trains move in between Khulna-Jessore section transporting ~2,324 tonnes of goods on a daily basis. Presently, goods handled at this station are cotton, chemical, food grains, spices, fish products, jute, plastic goods etc. **Industries requiring similar inputs or producing similar goods could leverage this route for transportation of such goods**.

Figure 43: Present and proposed railway route near proposed EZ site



Source: PwC Analysis and Bangladesh Railway

Construction work has been completed for setting up a new railway route from Tungipara to Bhatiapara Station. This route is a single line railway track which runs parallel to the eastern boundary of the proposed EZ site at a distance of 2-3 km. Gopalgonj railway station comes on this route. Upon completion of railway connectivity across Padma Bridge, direct rail access would be established between proposed EZ site till Dhaka, via Bhatiapara. This in turn would provide railway connectivity till the Sea Port of Chittagong. This railway route once completed, will enable faster movement of both goods and people between EZ site and other major cities like Dhaka and Chittagong. Goods like cement, jute, fertilizer, rice, wheat, iron & steel, sugarcane etc. which are transported between Dhaka & Chittagong will also be accessible to the proposed EZ region via direct rail route. **Industries having trade relations with Chittagong would stand to benefit by having direct rail access.**

GoB has already started work on improving railway connectivity in South West region of the country with plans to connect Khulna railway station to Mongla Sea Port, extending direct railway route from Khulna till

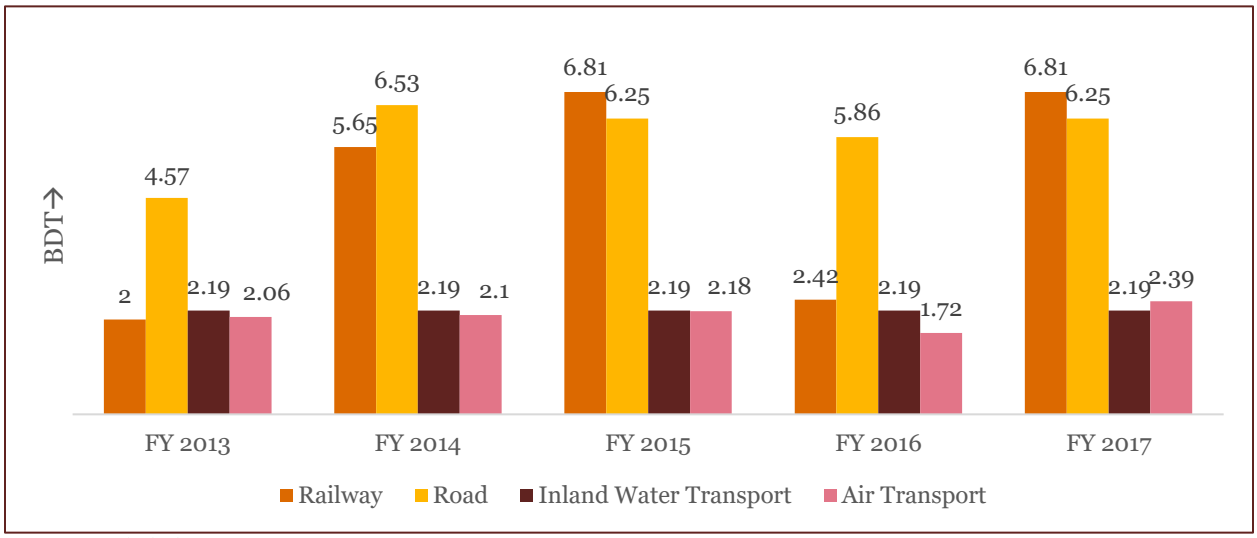
Barisal and onwards to Chittagong.[253] On completion, these projects will transform the rail connectivity in the region of proposed EZ by creating infrastructure to transport goods and passenger from Gopalgonj to different parts of Bangladesh, as well as to neighboring countries like India. **It can be envisaged that goods being transported to/from Benapole Land Port, Mongla Sea Port as well as from Chittagong Sea Port will be able to reach Gopalgonj Station via direct railway line in future.** GoB is also working with Indian Government to establish better rail links between the 2 countries. In an effort to boost transportation of goods via railways, a pilot container train containing animal feed was flagged off from India for Bangladesh on April 3, 2018. This train reached Bangabandhu west station (near Bangabandhu Bridge), 117 km from Dhaka after a 24 hours journey. Based on the results of this trial run India and Bangladesh might further increase the frequency container trains between India and Bangladesh.[254]

Once the railway network in the vicinity of the EZ site is established, manufacturers could benefit from faster movement of bulk cargo through different parts of Bangladesh and India.

In order to perform a holistic transport assessment, it is imperative to understand the freight charges applicable for different modes of transportation. This would help in assessing the most economical mode of cargo transport for the proposed EZ site and also assist in determining the interventions that could be taken up by GoB to further improve the transport logistics infrastructure in the vicinity of the Economic Zone sites.

6.4. Rate of freight for different modes of transport

Figure 44: Freight per tonne per km for different modes of transport



Source: Bangladesh Statistics 2017

The figure above indicates that freight transport through inland waterways and air transport have been the most economical mode of transporting goods, in Bangladesh. However, cost of transporting goods through rail and roads have shown an increasing trend over the past 5 years due to rising demand from manufacturers and traders.

[253] *http://mor.portal.gov.bd/sites/default/files/files/mor.portal.gov.bd/page/9a1ba160_209b_4d94_9077_3befdc9e2ef3/8.%20Formulation%20of%20BR%20Masterplan.pdf*
[254] *https://www.thehindubusinessline.com/news/pilot-container-train-chugs-off-to-bangladesh/article23427404.ece*

Data presented in the figure elucidates that it is cheaper to transport goods through airways or IWT for longer distances and can then be transported via roadways to provide last mile delivery.

6.5. Potential Infrastructure Interventions to support proposed EZ

Proposed EZ site at Gopalgonj has advantage of being located in proximity to Benapole Land Port in South West Bangladesh. Operationalization of Padma Bridge would provide seamless road connectivity for industries located in proposed EZ site, to the existing industrial belt in Bangladesh, along the Dhaka-Chittagong corridor. National Highway, N805 is on the eastern boundary of the proposed site and Regional Highway, R850 is on the western boundary of the EZ site.

While the EZ site is well connected through multiple modes of transport (road, rail, air and ports) there could be a few additional improvements needed to be undertaken by GoB to improve the attractivesness of the EZ site with respect to transport infrastructure. This could include and not be limited to the following table on the next page.

Table on the next page captures present and potential future hindrances for smooth movement of manufactured goods in the region and infrastructure interventions that could be undertaken in order to make the proposed EZ site attractive to industries looking to set up manufacturing units in the region. Interventions suggested in the table on the next page have been done after taking into considerations the infrastructure upgradation currently being planned by different departments of GoB. These interventions are indicative development activities that could be further studied apart from development activities already being implemented.

Table 55: Proposed Infrastructure Interventions

Key Asset	Existing Condition	Issues	Recommendation	Cost Implications	Timeframe for Improvement	Jurisdictional Responsibility
Upgradation of Benapole Land Port	Equipment being used at the land port is outdated with 60% of cargo being handled manually.	Lack of modern surveillance system adversely affects cargo handling in the port.	• Setting up of modern surveillance system to track movement of cargo across the port.	A detailed feasibility study needs to be undertaken in order to arrive at cost estimation and timeframe for improvement.		Bangladesh Land Port Authority
Area demarcation at Benapole Land Port	Currently no separate zone has been earmarked for goods being transported to Economic Zones.	Congestion at Benapole Port results in delay and increased lag time in transportation of goods.	• Allocation of a separate zone within Benapole for faster clearance of goods being transported to/from the cluster of Economic Zones in South West Bangladesh	A detailed feasibility study needs to be undertaken in order to arrive at cost estimation and timeframe for improvement.		Bangladesh Land Port Authority
Cargo Handling Facilities at Gopalgonj Railway Station	This station is primarily to cater to passenger movement.	Absence of cargo handling facilities at the station necessitates longer road transport of cargo till the nearest major railway station in Khulna.	• Set up a cargo-handling facility at Gopalgonj station	A detailed feasibility study needs to be undertaken in order to arrive at cost estimation and timeframe for improvement.		Bangladesh Railways
River Jetty	Nearest river ferry is at a distance of 50 km from EZ site	Tranporting goods over road for 50 km, till nearest existing river ferry would increase the cost of transportation.	• Establishing a river jetty in Madhumoti River about 1 km from EZ site	A detailed feasibility study needs to be undertaken in order to arrive at cost estimation and timeframe for improvement.		Bangladesh Inland Waterways Authority

7. Off-Site Infrastructure Assessment

7.1. Purpose and Objective

For sustained business operation of EZ, it is pertinent that off-site infrastructure and EZ connectivity to the proposed sectors are adequately addressed. To facilitate integration of basic infrastructure and utilities like approach road, water, power and drain with EZ, the existing infrastructure facilities surrounding the site needs to be identified and gaps that could hinder development of the EZ site, need to be addressed. The major offsite infrastructure components considered for EZ are as follows –

- Site filling
- Access road to EZ
- Power supply to EZ
- Water supply to EZ
- Drainage
- Boundary wall

The above listed off-site infrastructure components would be developed by BEZA in order to provide support to the private developer who would undertake construction of the EZ. The location of the proposed site is shown below.

Figure 45: Location map of Gopalgonj EZ

Source: MACE analysis

7.2. Methodology of Off-site Infrastructure Assessment

A stepwise approach has been adopted to assess the off-site infrastructure at proposed EZ site in Gopalgonj.

Step 1: Identification of existing utility sources

The available infrastructure facilities at the project site and in the surrounding region have been identified by carrying out following activities –

- Study of satellite image
- Site visit
- Field investigation
- Discussion with the officials (Roads and Highways Department, Rural Electricity Board, Department of Public Health and Engineering)

Step 2: Feasibility study

The feasibility of utilizing the identified infrastructure component depends upon several factors for different components as outlined below.

All the infrastructure components and its developments should be in compliance with the standards prescribed in the Bangladesh Economic Zones (Construction of Building) Rules, 2017.

Site filling – The average natural ground level for the proposed EZ and the depth of site filling required.

Access road – The existing carrying capacity of the road and the probability of expansion if required.

Power supply – The available surplus capacity of existing sub-station to cater the power demand of the proposed EZ. Distance of sub-station from the proposed site and the possibility of bringing the feeder line to EZ.

Water supply – Surface water: Availability of water to meet the demand, Distance, Quality and possibility of bringing the main supply line from the source.

Ground water: Aquifer depth, Yield to meet the demand and quality of Groundwater.

Drain – Capacity of existing drain to carry the additional water from the proposed EZ area.

The terrain of the site would be leveraged to support the flow of water from the drain within the EZ to reach the surrounding drain through gravity.

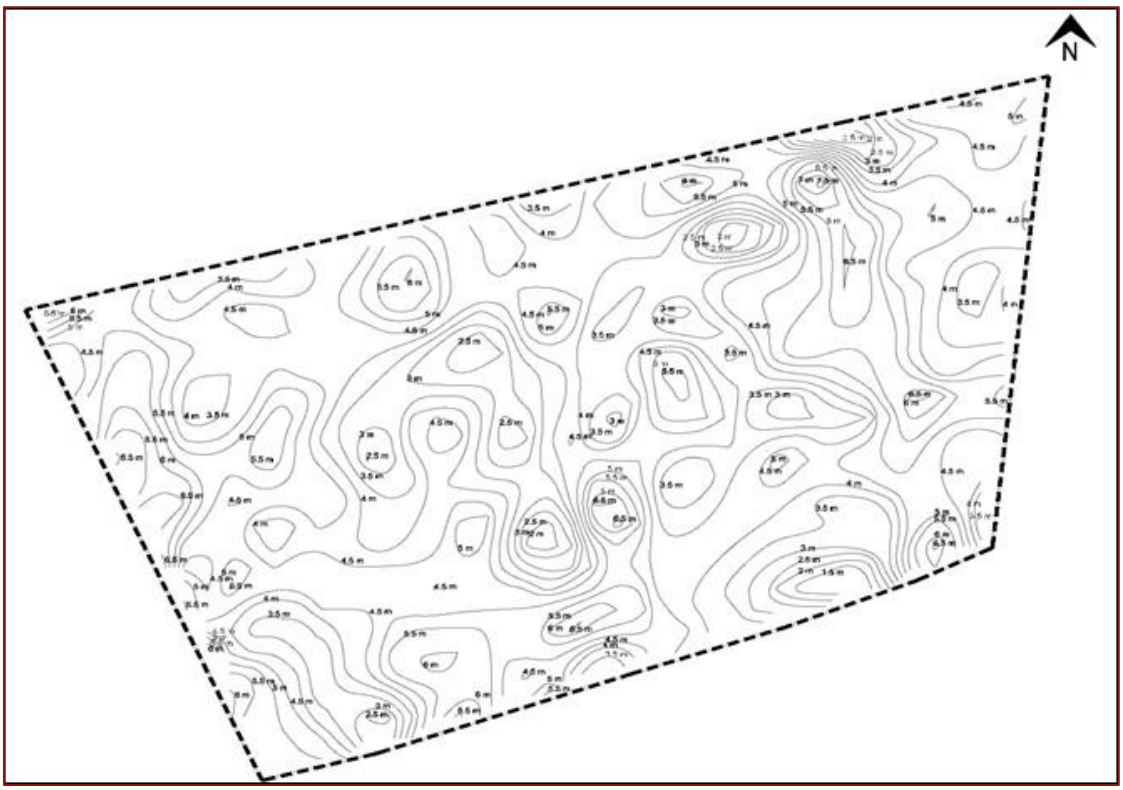
7.3. Review of last mile offsite infrastructure

Site filling

The average natural ground level for the proposed EZ is +4 m level above the Average Mean Sea Level (AMSL). To avoid inundation during monsoon season, the site filling of 2 m (approx. 5 to 6 feet) above the existing natural ground level is considered.

The finished ground level for the proposed EZ will be around +6 m from Average Mean Sea Level (AMSL). An average depth of 5 feet to 6 feet of site filling has envisaged for the proposed EZ area. The site can be filled through dredging sand from nearby River. The existing spot level of the proposed site is depicted on the next page.

Figure 46: Site development details of the proposed EZ



Source: MACE Analysis

As per discussion with BIWTA, River Madhumoti can be the source of dredging sand. This river is approximately 1 km from proposed site. However, detailed hydrostatic study has to be carried out to identify point of dredging.

Figure 47: Source of Dredging Sand

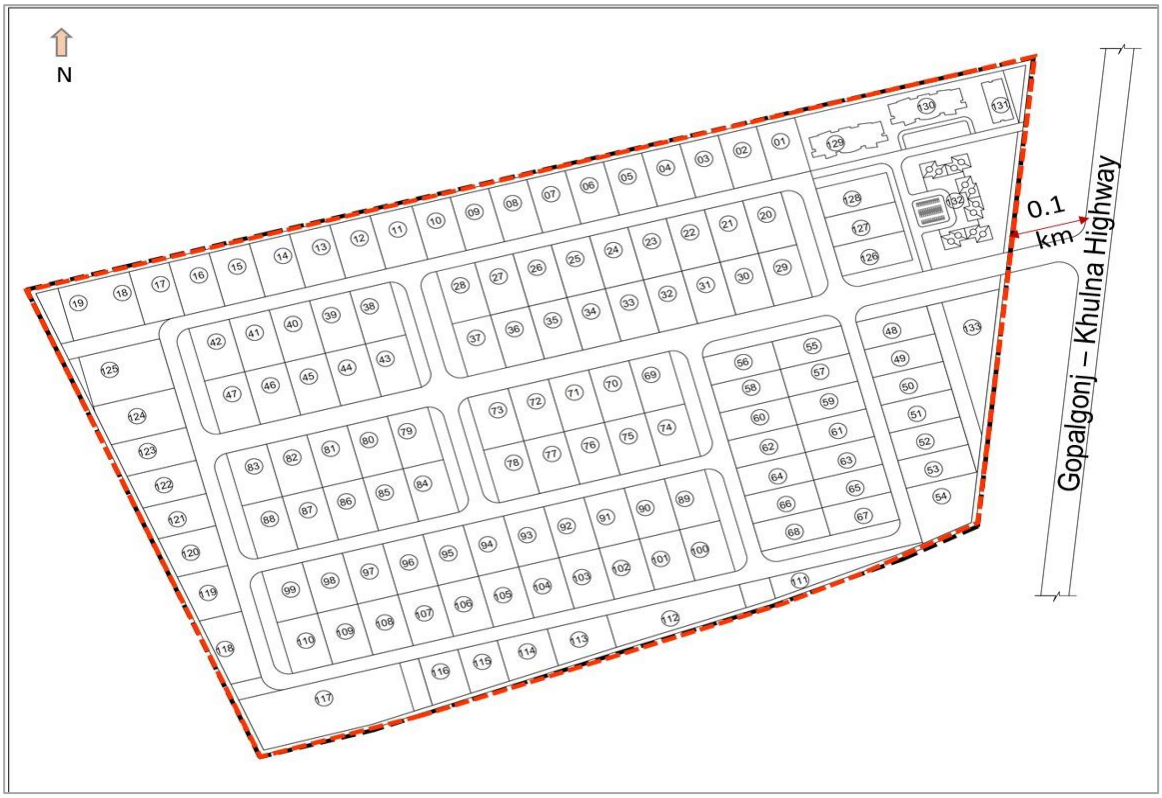
Source: MACE analysis

Approach Road

Gopalgonj – Khulna highway lies on the eastern site of the proposed EZ at a distance of ~100 m, establishing trunk connectivity to the proposed EZ. Hence, approach roads can be constructed from (Gopalgonj – Khulna Highway) to eastern side of the proposed EZ. For ease of movement of transportation to and from the EZ site, construction of an approach road has been suggested to connect the EZ site with the highway.

The connectivity and linkages for the proposed EZ is shown below.

Figure 48: Map of last mile connectivity to proposed EZ



Source: MACE analysis

Power Supply to Economic Zone

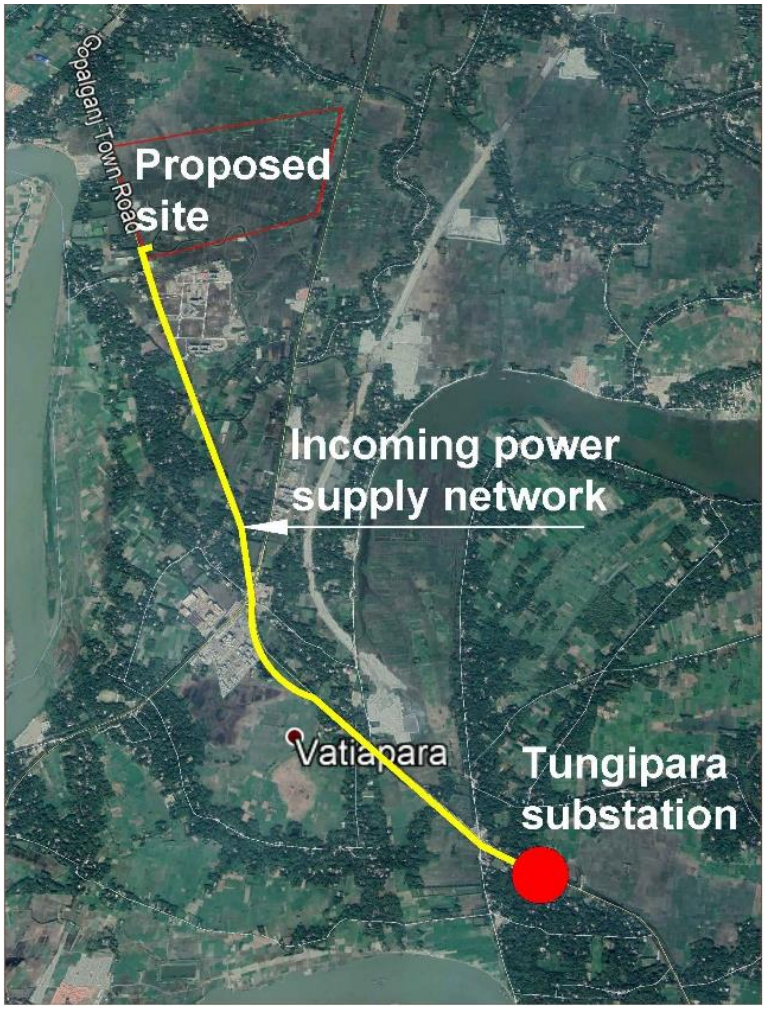
Our assessment suggests that basis industrial assessment and demand forecasting for the proposed EZ, power demand for the proposed EZ would be about 22.43 MVA. This figure is indicative in nature and may vary based on ground implementation of the project. The developer may undertake a separate industry assessment and master planning exercise in order to validate this figure.

To cater this power demand a Main Receiving substation of 132 /33/11 kV substation has to be established within the site.

During the initial phase of development, the 33/11 kV components of the MRSS can be established. Power to this substation can be availed from the existing 33 kV substation at Tungipara at a distance of 6 km to EZ site. During the site visit and the discussions with authorities it is understood that the existing substation at Tungipara has a spare capacity 4 MVA demand. Based on the load growth, the MRSS can be upgraded with 132 kV components and power supply at 132 kV level shall be tapped from 132 kV Gopalgonj substation.

The alignment of the proposed power transmission line and the typical details of sub-station are depicted on the next page.

Figure 49: Details of External Power Supply System



Source: MACE analysis

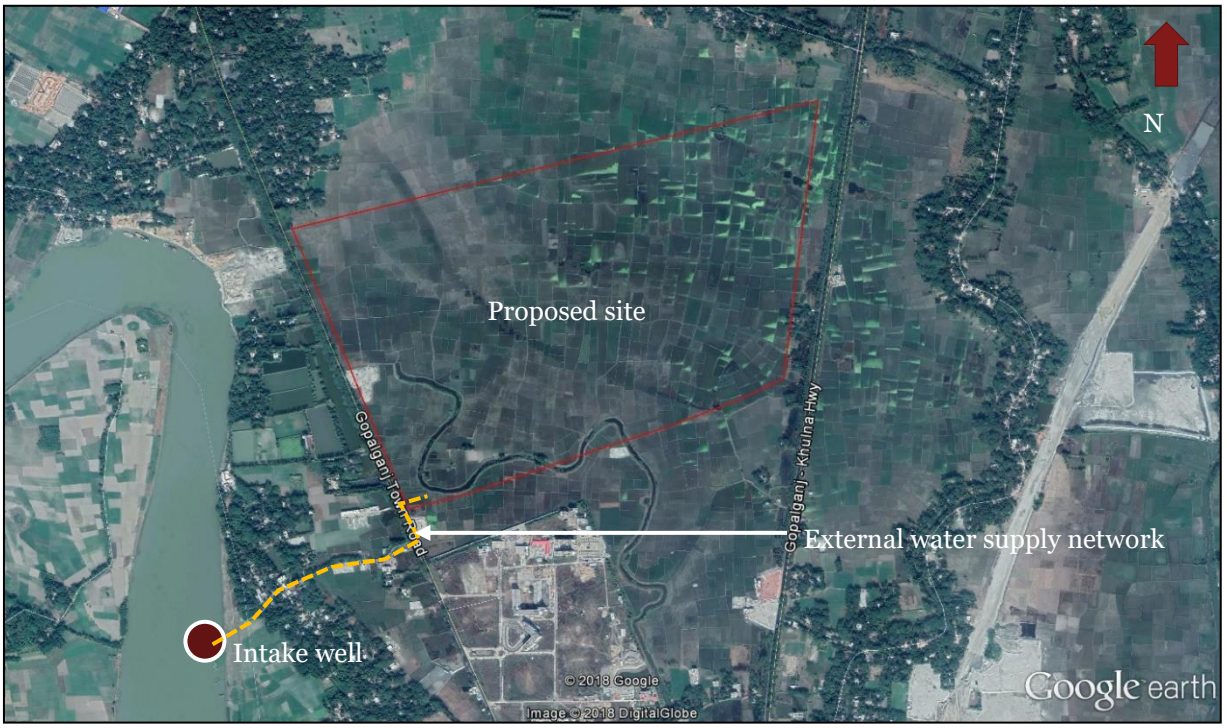
Water Supply to Economic Zone

Our assessment suggests that basis industrial assessment and demand forecasting for the proposed EZ, total water demand for the proposed EZ would be about 7.33 MLD. This figure is indicative in nature and may vary based on ground implementation of the project. The developer may undertake a separate industry assessment and master planning exercise in order to validate this figure.

River Madhumoti is a perennial fresh water source, which is 700 m away from EZ site. Infiltration gallery/well, collection well and pump house near the river basin at an approximate distance of 700 m from the site can be established to meet the water demand of EZ on a long-term basis. Detailed hydrogeological investigations need to be carried out based on which, a water treatment plant shall be provided near the intake structure.

However, secondary data reveals that the ground water table in and around the proposed site for EZ has a safe drawdown of 0.5 MLD/per tube well. For the initial demand it is planned to build three to four new bore wells within the proposed site to draw the ground water. Exact location of water intake (i.e., the locations of the tube wells) within the site needs to be finalized during the construction stage.

Figure 50: Details of External Water Supply System



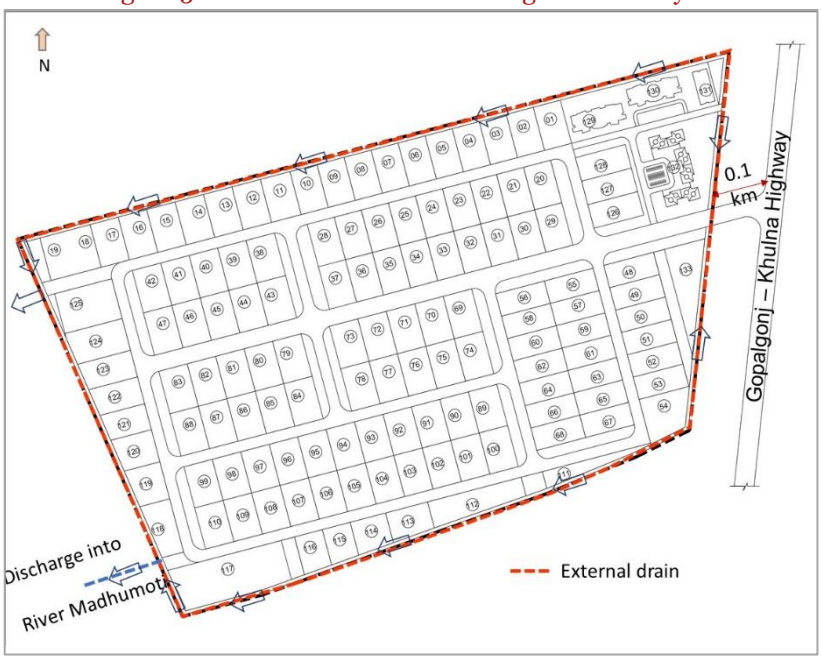
Source: MACE analysis

Drainage

River Madhumoti flows on the west side of the site at a distance of 700 m from the proposed site. It is recommended to connect the discharge from the drain to the river by identifying suitable drain discharge points.

In order to prevent the storm water entering from adjacent areas to the development area, a cut-off drain all along the periphery of the site is considered and connected to the existing water channels serving the surrounding farm lands and River Madhumoti to the west side of the site.

Figure 51: Details of External drainage network System



Source: MACE analysis

Boundary Wall

Construction of a boundary wall is required in order to earmark the EZ site and prevent unauthorized access to the EZ site. Presently, there is no boundary wall at the EZ site, earmarking the EZ boundary. Basis our discussion with BEZA officers during the presentation on findings of draft final report at BEZA office on 27th September 2018, it was decided that boundary wall would be developed by BEZA as a part of offsite infrastructure. Hence a boundary wall having brickwork height of 2.9 m + 0.9 m height of barbed wire and width of 150 mm is recommended at the EZ site.

7.4. Required improvements or upgrades

Based on the above study, recommendations have been provided below on developing various components of infrastructure in order to support development and operation of the EZ site.

Site filling

To avoid inundation during monsoon season, land filling depth of average 2 m from the existing ground level above the existing natural ground level needs to be carryout.

Approach road

An Approach road of 100 m length to be constructed from the existing Gopalgonj – Khulna highway till the project site. While connecting the approach road with the highway, necessary turning radius should be provided and the junction of the highway should be provided with necessary traffic management measures in safety aspects.

Power supply

A new 33 kV dedicated power transmission line can be established from the nearby Tungipara sub station (6 km) to EZ site for catering to the needs of industries occupying the EZ along with 33/11 KV substation within EZ. The existing capacity of the Tungipara substation is 10 MVA having surplus of 4 MVA. Further, for catering the need of the proposed EZ, the existing Tungipara sub-station needs to be upgraded to 30 MVA.

Water supply

An intake system and water treatment plant can be established to extract water from Madhumoti River located at 700 m towards the western boundary of the proposed EZ.

Drainage

Separate drain network with discharge points can be developed. A cut-off drain along the periphery of the site has been considered and are connected to the water channel serving the Farm lands to the north side and Madhumoti River to the west side of the site. The internal drain network has been planned with the discharge to Madhumoti River.

7.5. Last Mile Off-site infrastructure action plan

The infrastructure action plan for the proposed EZ is provided in the table at next page.

Table 56: Offsite infrastructure action plan

Key Assets	Existing Condition	Issues	Recommendations	Cost Implication	Timeframe for Improvement	Jurisdictional responsibility
Site filling	average natural ground level +4 m AMSL	inundation during monsoon season	land filling depth of average 2 m from the existing ground level	300 million BDT	4 months	BEZA
Access road	Highway at 100 m distance.	No connectivity to site.	Establish 100 m approach road from Gopalgonj – Khulna highway.	7.00 million BDT	2 months	BEZA
Power supply	Existing 33 kV sub-station available at Tungipara at a distance of 6 km.		To build a new 33 kV dedicated power transmission line from Tungipara substation during initial phase development. Ultimate Power requirement shall be met with 132 kV OHT line from Gopalgonj Grid substation and 132 kV substation shall be installed at site.	37.50 million BDT	3 months	REB
Water supply network with Infiltration gallery	Does not exist.		Draw external water supply network lines from Madhumoti River.	118.49 million BDT	10 months	BWDB
Drainage	Does not exist.		Cut-off drain all along the periphery of the site along with drainage pattern connected to Madhumoti river and existing water channel serving the farm lands with suitable discharge points.	150.00 million BDT	12 months	BEZA
Boundary wall	Does not exist.		Boundary wall having brickwork height of 2.9 m + 0.9 m height of barbed wire and width of 150 mm is recommended at the EZ site.	40.00 million BDT	6 months	BEZA

Source: MACE analysis

In addition to the table displayed on the previous page, a breakdown of developing off-site infrastructure components has been outlined in the table next page.

Table 57: Off-Site Infrastructure cost estimates

Description of Item	Quantity	Unit	Price without tax (In million Taka)	Price without tax (In million USD)
Site filling	304,321,240	Cum	300	3.66
Right of Way (Approach Road) (30m)	100	RM	7	0.09
Storm Water drain Network	6	KM	150	1.83
Power Network	6	KM	37.5	0.46
Water Supply Network	0.9	KM	22.07	0.27
Infiltration Gallery	6.3	MLD	96.42	1.18
Fencing	3.8	KM	40	0.49
Project Sub-total			**652.99**	**7.96**

Source: MACE analysis

The off-site infrastructure cost estimates have been arrived at after taking into considerations benchmark costs as prevalent in the construction sector of Bangladesh. Development of off-site infrastructure is the responsibility of BEZA.

7.6. Key Takeaway

Off-site infrastructure captures the external basic infrastructure facilities which need to be developed. Development of off-site infrastructure is the responsibility of BEZA. The major off-site infrastructure considered for the proposed EZ are Boundary wall, water supply, power supply, access road and drainage. These external infrastructure facilities and sources have been identified and well-integrated with the proposed EZ based on site visit, data collection, stakeholder consultations with various government agencies (such as RHD, REB, and DPHE).

Key recommendations formulated from this exercise are outlined below-

- It is proposed to carry out the land filling depth of average 2 m from the existing ground level.
- Subject site has good access to trunk connectivity. Proposed EZ is located adjacent to Gopalgonj-Khulna highway (which connects the project site to Khulna, third major urban node of the country). An approach road of length 100 m could be constructed from this highway to the entry/ exit points of the proposed EZ.
- Groundwater sources may be tapped to meet the water demand during construction stage. In order to meet the water requirements during operation stage, surface water source needs to be relied, which is sustainable and perennial in nature.
- Madhumoti River (located at a distance of 700 m from the proposed EZ) can act as the perennial source of surface water.
- Tungipara substation (located at a distance of 6 km from the proposed EZ) could be upgraded to 132 kV in order to shape up as a sustainable source of power for the proposed EZ.
- To ensure smooth collection and discharge of the surface runoff, River Madhumoti and water channel serving the agricultural land on the northern side of the site have been identified as the suitable discharge points.

8. Master Planning

8.1. Purpose and objective

The aim of setting up an EZ in Gopalgonj is to develop Food and Beverages, Electrical and electronics, Agro based products, Light Machinery, Equipment & Furniture industries in the region along with excellent state-of-the art infrastructure facilities and professional management to attract and support investments in industrial sectors.

While short-listing the above industries, for master planning purpose, entire processing area has been considered as a single industrial zone having varied plot sizes. However, this zoning plan is indicative in nature and may vary based on on-ground implementation of the project. The developer may undertake a separate industry assessment and master planning exercise in order to validate the same.

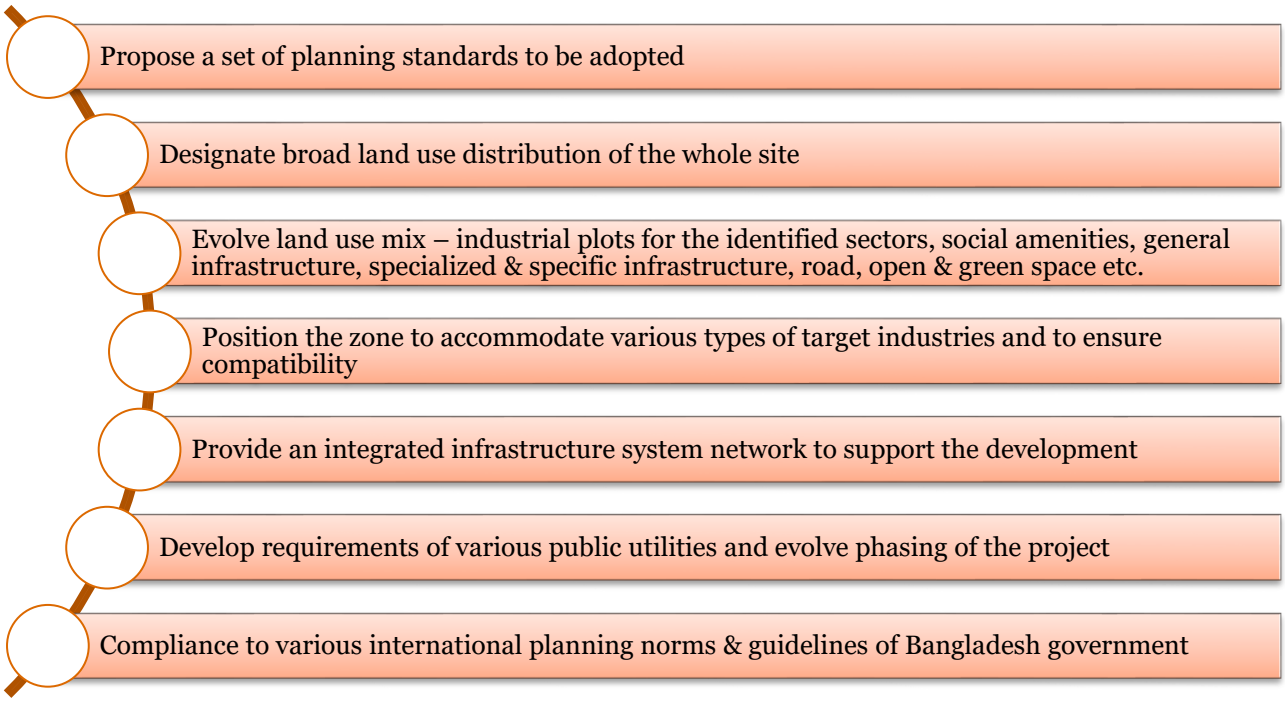
Hence, Gopalgonj EZ, in the form of prepared land, is planned to be developed with general and specialized infrastructure facilities. This EZ focuses on development of large, medium and small-scale industries. All facilities required for target industries have been planned and identified in this chapter. This will enable the proposed EZ to function as an integrated package having the required facilities and service activities with sufficient provision for future growth and expansion.

Given the industrial base and the concept of EZ which has evolved to leverage the cluster advantage of industries, the proposed project will strengthen Gopalgonj district's position in the industrial sector map of Bangladesh and will contribute to the economy. A careful planning exercise has been undertaken to position the project taking into account the geographic, demographic, raw material resources, industrial, economic and social characteristics of region and it is in this context that master planning of the project assumes significance.

The purpose of creating a master plan is to create a thriving place where investors in the targeted sectors, plant managers, support staff and their family can work, live and lead a wholesome life. It is important to develop the master plan to accommodate both the user industries area requirements and requirements of the various identified non-industrial components of the proposed EZ.

In order to implement this uniquely conceived EZ as a fully integrated and functional facility, as well as to develop confidence for foreign and local developers to undertake the development of the project and subsequent operation of their businesses, certain planning objectives/principles are envisioned as depicted in the figure next page.

Figure 52: Principles adopted for Master Planning



8.2. Methodology of Master Planning

Based on industry assessment and demand forecast

The industries which would be envisaged for this EZ site were shortlisted after an extensive study on the macro-economic parameters of Bangladesh, combined with regional and site level assessment in order to identify and leverage the raw materials and market demand which would assist the industries in the EZ site. This was further validated through primary interactions and stakeholder consultations. Demand forecast for land space from each industry identified during industry assessment, was calculated based on the country level growth trend of the identified industry after taking into consideration the regional level investments, development of mega infrastructure and other green field EZs planned in the region.

Methodology adopted in preparing the Master Plan

The methodology adopted in preparing the master plan is provided below –

Step 1: Study of existing features and constraints

As a preliminary step of preparing the master plan, existing features in and around the proposed site were studied in detail to understand the beneficial features and constraints at the EZ site. It was also necessary to understand the site on basic factors such as existing connectivity, the predominant wind direction and general slope of the terrain.

Step 2: Zoning

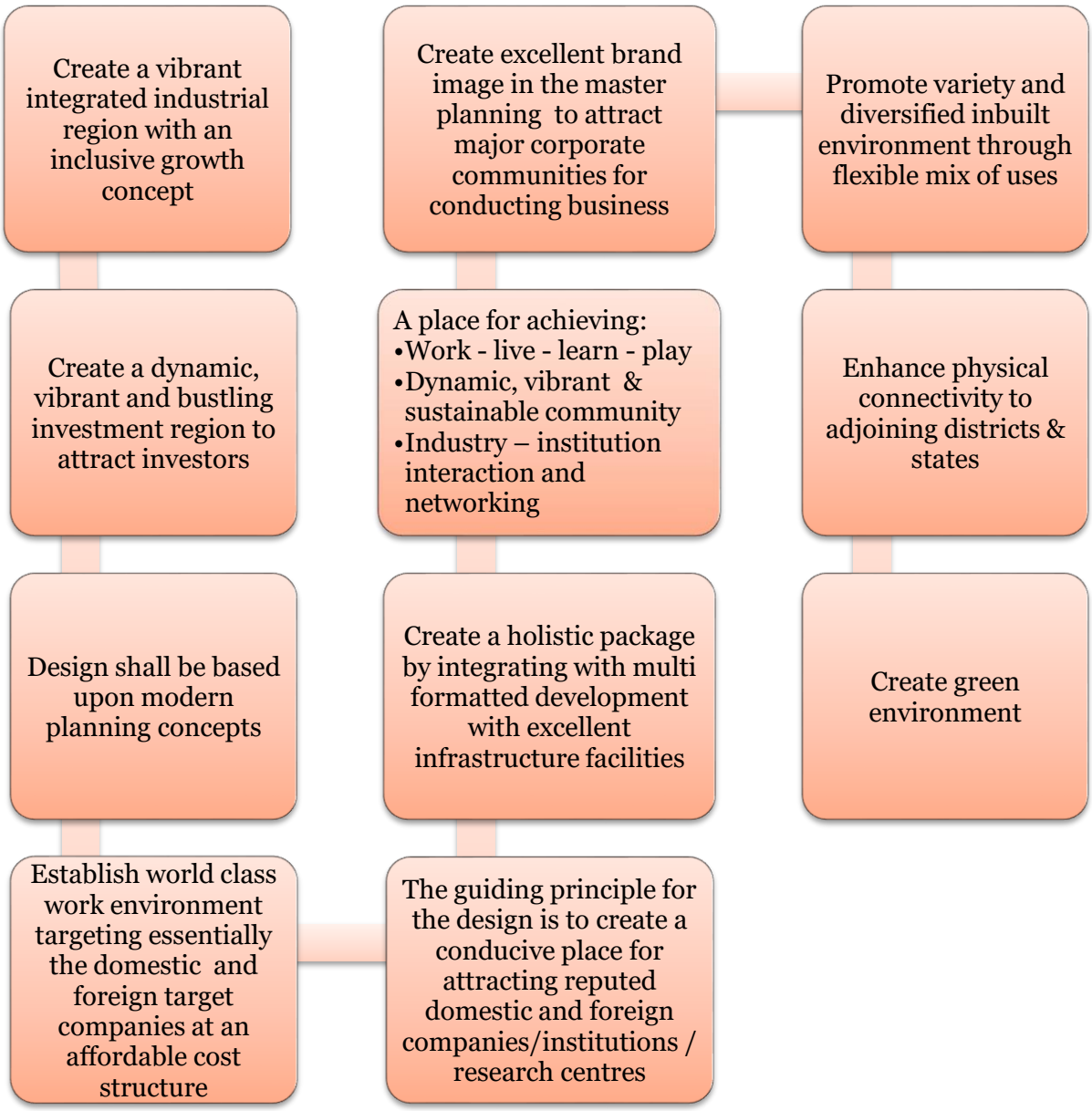
The preliminary step of Zoning is planning of entry/exit to the proposed site. During the zoning stage, entire site area would be divided into different Zones.

Step 3: Preparation of master plan

As a preliminary step of preparing a zoning based master plan, major road network inside the EZ site was planned based on entry/exit points. This was followed by sub-zoning, land parcellation, planning of internal access road based on land parcellation, planning of utilities & amenities and Phasing.

The planning concept for the proposed EZ has been created after considering the above steps and is depicted on the next page. The EZ shall be a self-contained region with a salubrious surrounding and is envisaged to be developed as "Sustainable-holistic-smart intelligent-eco-Economic zone".

Figure 53: EZ planning concept



8.3. Master Planning consideration

The planning for the proposed EZ is based on the broad objective of establishing a world class business environment targeted essentially at high growth manufacturing and processing industrial & related infrastructure sectors.

Each zone within the EZ has been planned to be dedicated to the specific sub sector and would be a self-sufficient unit in terms of facilities, ability to attract investors and revenue generation.

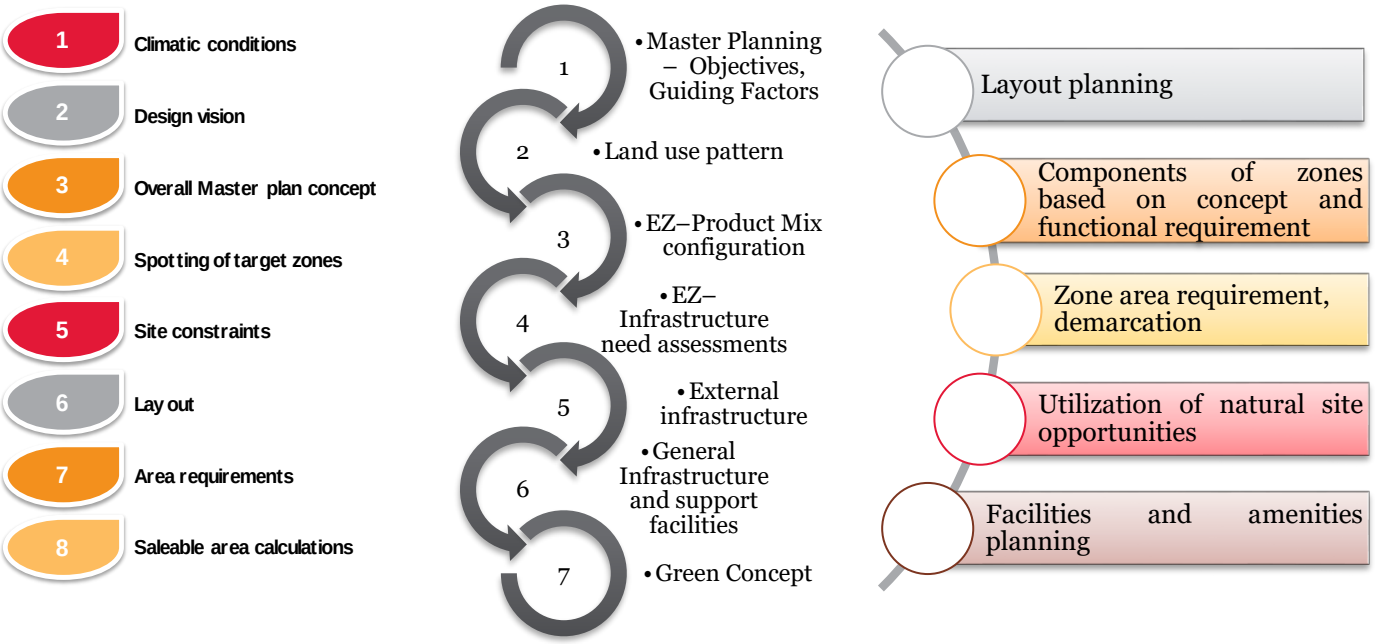
Social and commercial amenities are also planned to provide convenience to visitors as well as to the working population within the EZ. The project is planned to be housed in a lush green environment and accordingly, landscaping and greenery are planned.

While creating master plan for the EZ, following vital issues were addressed along with strategies for successful implementation and sustained operation of EZ:

- **Land use and layout:** The whole area is suitably divided into a number of identified activity centres of different sizes. The layout is developed with complete understanding of the phasing program. Integration of the financial aspects with physical planning aspects is the most important factor for success in implementation.
- **Constraints and core offering of the site**: As explained in "description of site location" section of this report, all the site-specific constraints are fully respected and mitigation measures are fully taken into consideration while developing the master plan. Similarly, the planning fully leverages the core and supplementary offering of the site.
- **Services and amenities**: The master plan takes into account planning for services and amenities.
- **Addressing shortage of housing for the workforce**: Provision is made for sustainable integrated township with multi-format development enabling a strong work live play concept.
- **Lack of enforcement / control on land use and growth of unapproved housing / layouts**: Well-conceived EZ implementation framework shall be suggested to address these issues.
- **Non- uniform distribution / concentration of industrial growth pockets**: A structured industrial zoning in terms of raw material, effluent generations, pollution level category, end product distribution etc. is done and accordingly sub zones in EZ are suggested.
- **Conservation of ground water & surface water resources**: Sustainable infrastructure planning, incorporation of eco-friendly concepts and environment sustainability, water conservation schemes, environmental infrastructure, recycling and reuse options etc. are incorporated in the EZ development program.
- **Transportation**: The master plan looks at the transport linkages. As the EZ will have regional, national as well as international linkages for freight movement, it generates lot of traffic. A well-developed logistic hub for both raw material and finished product is planned to cater to the transport systems.
- **Poor quality of roads & unplanned road junctions leading to traffic congestions**: EZ development plan identifies the constraints and appropriate road network including the approach roads, road congestion removal by the provision of grade separators and hinterland connectivity, augmentation / widening of existing roads are being suggested.
- **Environmental management**: Various aspects such as adherence to pollution control norms & standards control over goods, storage and handling of industrial waste, common treatment, etc. are given paramount importance while planning.

The summary of considerations for master planning is depicted below.

Figure 54: Master Planning Considerations



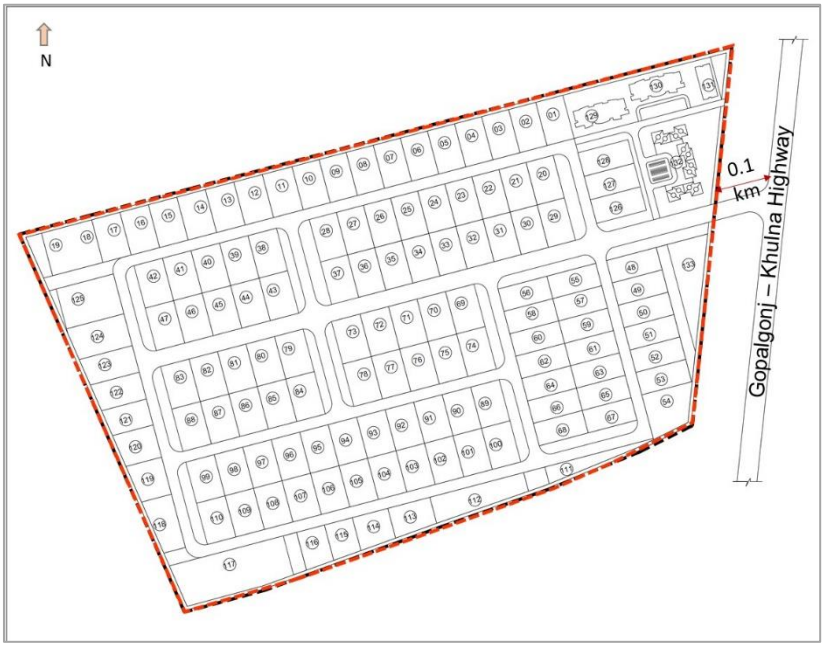
Source: MACE analysis

8.4. Zoning Plan

The preliminary step of zoning is planning of entry/exit to the proposed site. During the stage of Zoning, the whole area was divided into various zones. The major factors considered while locating the zones are Wind direction, connectivity and demand forecast.

The entry/exit planned for the proposed EZ is from the proposed approach road connecting Gopalgonj – Khulna Highway and is depicted on the next page.

Figure 55: Entry/Exits of the proposed EZ



Source: MACE analysis

The zoning design has been done in order to have a smooth pedestrian circulation by simplifying the movement patterns and allowing the inter-zone movement. Parking has been planned at strategic locations catering to the visitor's vehicles.

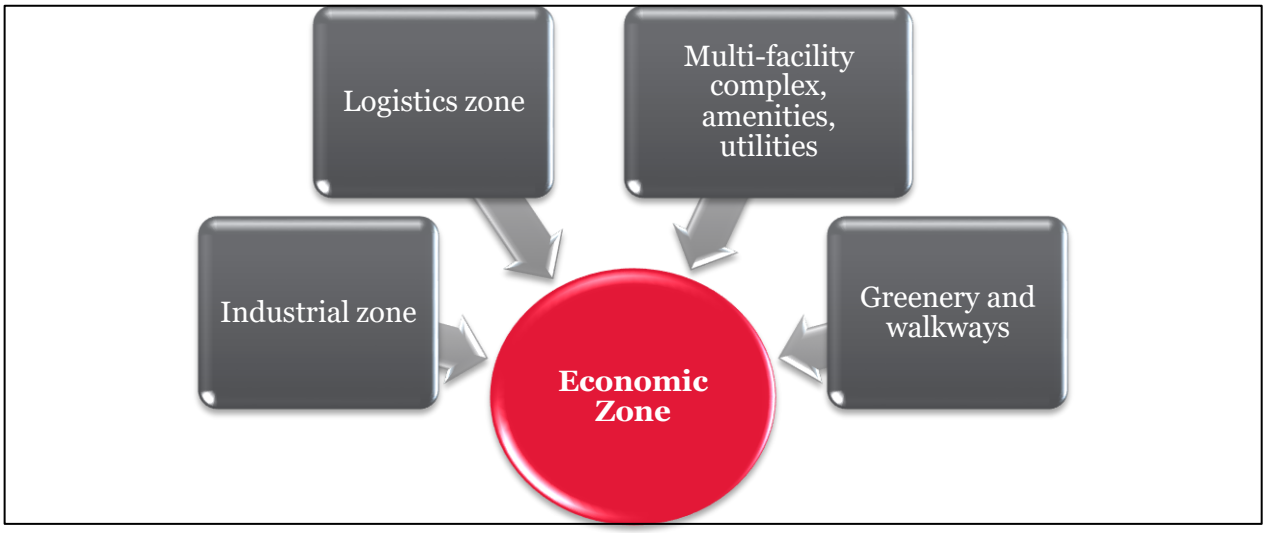
Following site parameters have been considered while performing the zoning exercise.

- Boundary shape
- Physical site features
- Area availability
- Environmental considerations
- Micro climatic conditions
- Compatibility issues
- Surrounding areas
- Accessibility
- Transportation issues
- Visibility

Zoning, product mix and facility configuration

A well-balanced land use has been envisioned with a judicial mix of business, commercial, social and residential zones as illustrated in the below figure.

Figure 56: Zoning, product mix and facility configuration



Source: MACE analysis

8.5. Zoning Principles

The development bound to occur within the EZ premises shall comply with competent local Bye-Laws. This shall ensure a uniform development of the structures and buildings planned within the EZ. BEZA has prepared a stand-alone development control regulation guideline which derives its essence from the local planning guidelines (As per BNBC). It shall be ensured that any tenant/occupant unit in the EZ while planning shall comply with all the norms as stipulated below

Floor Area Ratio (FAR)

Floor area ratio is defined as ratio between the total build-up area and total plot coverage.
In construction of building, FAR shall be 6:

Provided that internal roads, open to sky drive way and parking area, tanks, STP, ETP shall be excluded from FAR calculation.

Site coverage:

In the construction site the covered area shall be as follows

(a) maximum 50% of the total area shall be covered by factory building, power house, storage, covered parking, ETP, overhead STP etc;

(b) 30% of the site shall be covered by the drive way, open parking, 50 sqm guard room, fire command center, cycle stand, internal roads, underground water tank and septic tank and

(c) 20% of the site shall be open to sky soak area:

Provided that soaking soft pave may be used instead of green grass or naked earth in the open space.

Setback.

(1) A minimum front setback of 12 (twelve) meters shall apply to the primary street and a minimum setback of 4.5 (four point five) meters shall apply to the secondary street, or streets, unless otherwise determined by the Authority.

(2) Side and rear setbacks shall be 3.5 (three point five) meters.

(3) Notwithstanding anything contained in sub-rule (1) and (2), the Authority may, considering the following circumstances, make variation up to a reasonable limit in determining the setbacks, namely:

(a) general streetscape;

(b) properties and buildings near and surrounding the site;

(c) fire separation distance;

(d) solar aspect and prevailing breezes; and

(e) bulk of the development.

Community open space for industrial plots.

(1) For every industrial plot having an area of 1.0 hectare or more, a minimum of 10% of the total area, but not exceeding 0.25 hectare, shall be reserved as community open space and such area shall be contiguous to and shall have a means of access from every unit of the industry for recreational activities of the persons working in the industry and also linked to the external roads for safe exit during emergency.

(2) The adjacent road network and the internal open space together shall be used for the assembly area during emergency.

8.6. Master Plan

A best practice master plan based on zoning exercise has been created. This master plan comprises major road network which has been planned based on planned entry/exit. This was followed by sub-zoning, land parcellation, planning of internal access road based on land parcellation, planning of utilities & amenities and Phasing.

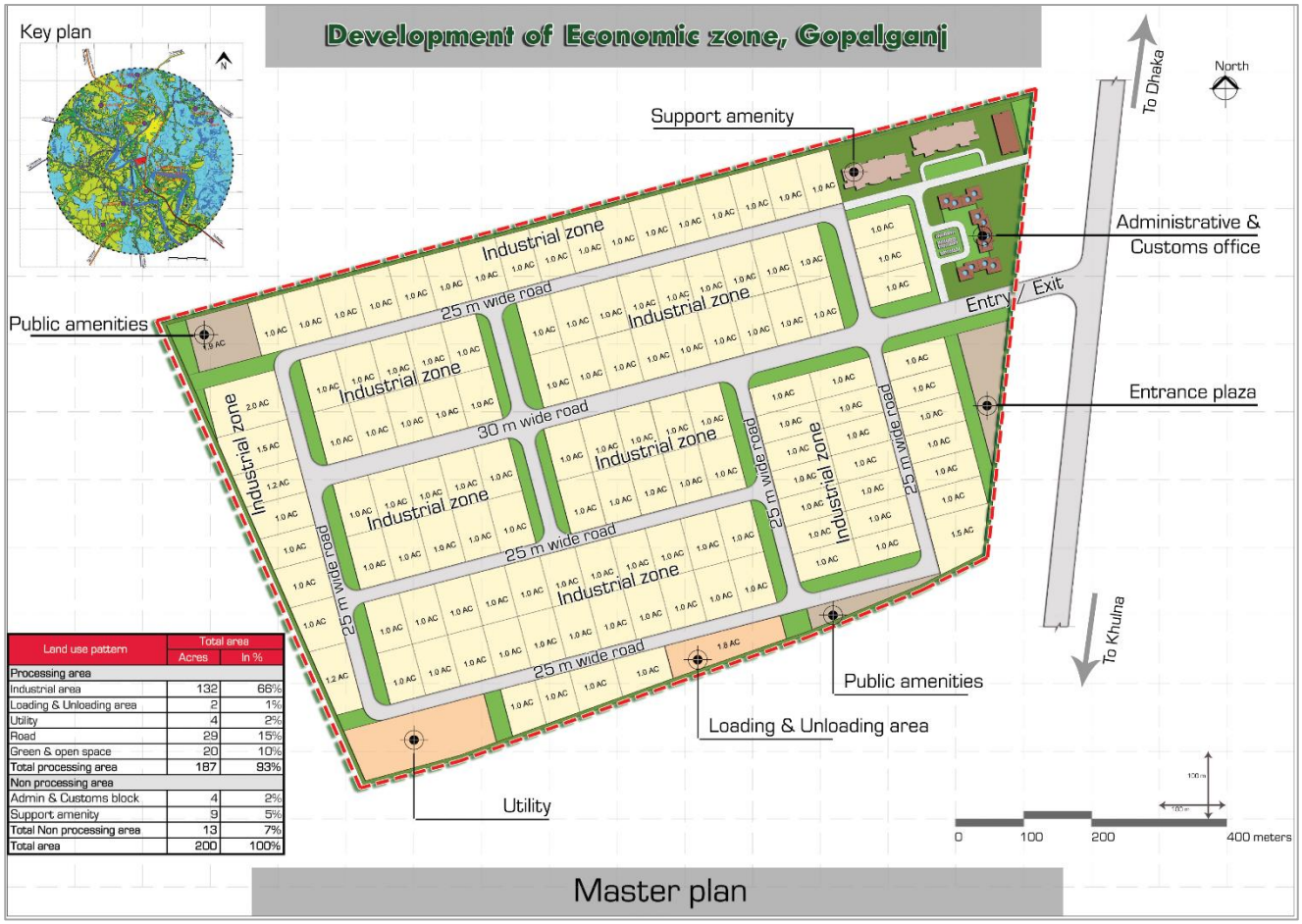
Detailed master planning is done on basis of a cluster wise approach covering the following components:

- Micro level zoning
- Land use plan
    - Detailing the locations and sizes of various land uses
- Land parcel plan

- Showing the subdivision of industrial land
- Phasing
- Utilities mapping
- Greenery and open space plan
- Road category

The master plan of EZ is given in the figure below.

Figure 57: Master plan of EZ



Land use pattern	Total area	
	Acres	In %
Processing area		
Industrial area	132	66%
Loading & Unloading area	2	1%
Utility	4	2%
Road	29	15%
Green & open space	20	10%
Total processing area	187	93%
Non processing area		
Admin & Customs block	4	2%
Support amenity	9	5%
Total Non processing area	13	7%
Total area	200	100%

Source: MACE analysis

Various type of industries to be accommodated within Industrial Zone arrived from market demand analysis are as follows-

1) Food processing and Beverages

2) Electrical and Electronics

3) Agro-based products

4) Light Machinery equipment and furniture

Within industrial zone, there should be a chance for establishing various type of industries according to the trend, wish and requirements of developer. In order to provide that flexibility during implementation stage, area for the Industrial Zone has been earmarked as whole and further earmarking of area for different type of industries listed above has been avoided. This will attract the developers towards EZ due to its high flexibility.

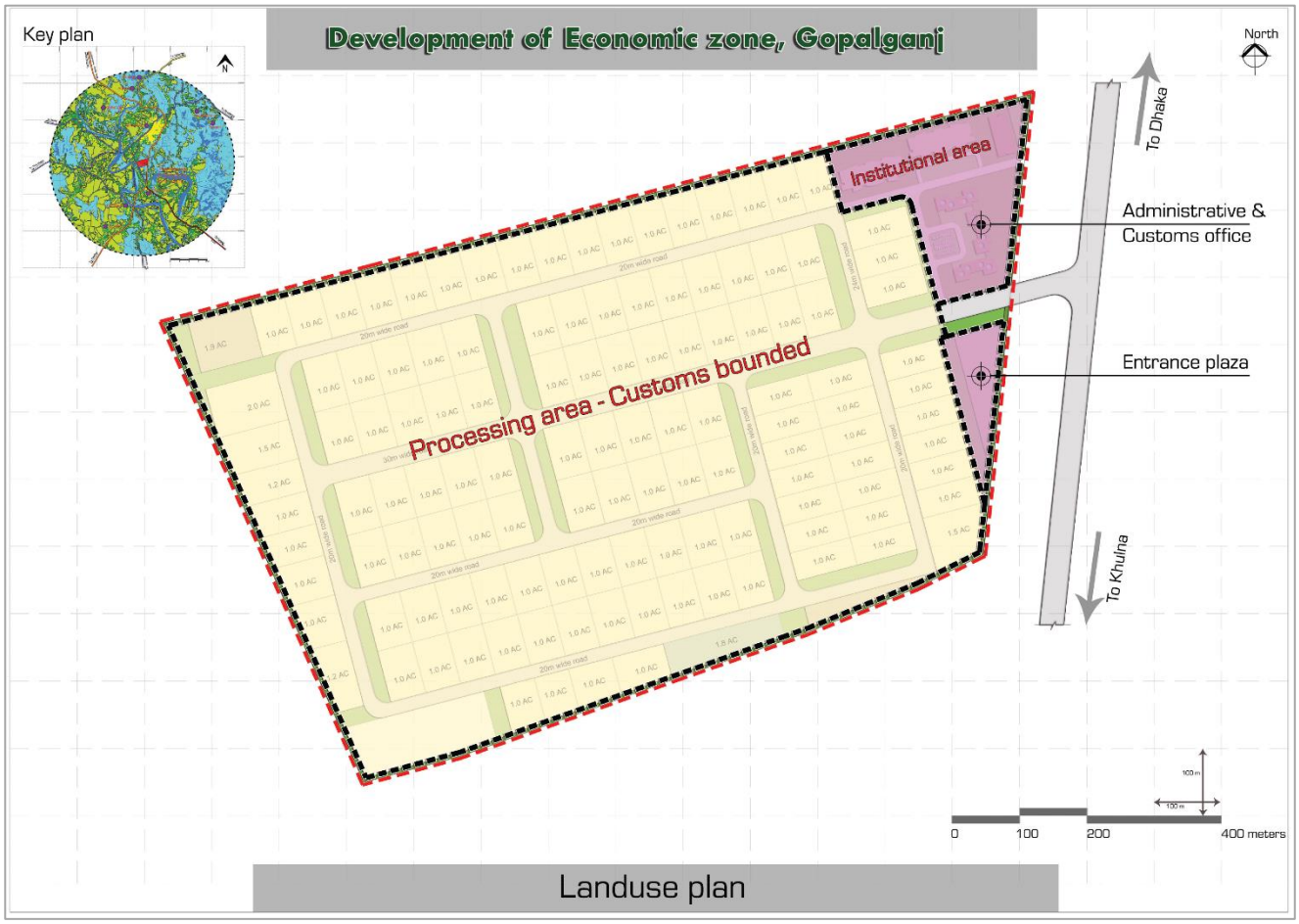
Also, area for utilities, amenities and supporting facilities have also been earmarked in the proposed master plan.

8.7. Land use Plan

The land use pattern of the EZ is determined considering the land requirement for various processing units, public amenities etc.

The different land use proposed in the master plan is depicted below.

Figure 58: Land use plan of EZ



Source: MACE analysis

Table below provides the land use pattern for the proposed EZ.

Table 58: Land use pattern for the proposed EZ

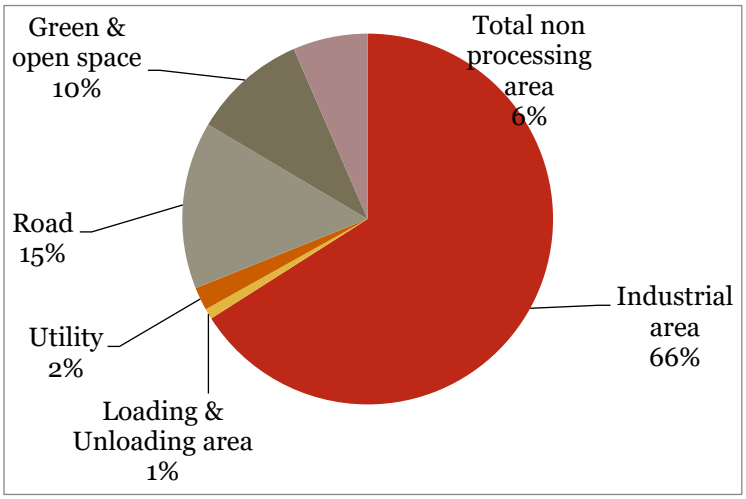
Land use pattern	Total area		Saleable area		Non- saleable area	
	Acres	In %	Acres	In %	Acres	In %
Processing area						
Industrial area	131.98	66%	131.98	66%		
Loading & Unloading area	1.84	1%	1.84	1%		
Utility	4.02	2%			4.02	2%
Road	29.18	15%			29.18	15%
Green & open space	19.94	10%			19.94	10%
Total processing area	**186.95**	**93%**	**133.81**	**67%**	**53.14**	**27%**

Land use pattern	Total area		Saleable area		Non- saleable area	
	Acres	In %	Acres	In %	Acres	In %
Non- processing area						
Admin & Customs block	3.71	2%				
Supporting Amenities	9.34	5%	9.34	5%	3.71	2%
Total Non-processing area	**13.05**	7%	**9.34**	**5%**	3.71	2%
Total area	**200.00**	**100%**	**143.15**	**72%**	**56.85**	**28%**

Source: MACE analysis

The land use pattern as elucidated in the table above covers the infrastructural components being planned to be developed inside the EZ site. Land for different industrial sectors has been allocated without keeping provision of Standard Factory Buildings (SFBs) that would be established for industries. Provision for SFBs has been kept in the Financial Model chapter. Due care has been taken to include provisions for adequate green and open space. Non-Processing area has been segregated into different blocks to include facilities like admin and customs blocks and supporting amenities.

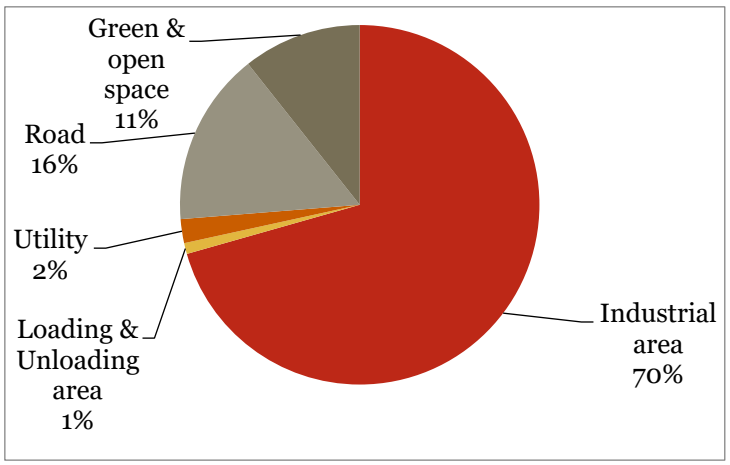
Figure 59: Land Use Pattern – EZ site



Source: MACE analysis

The above figure indicates a percentage wise breakup of land use pattern of the entire EZ site. An overview of this figure reveals that Industrial area has been allocated as maximum area in the EZ site, given the fact that Gopalgonj potential to establish industries with good access to raw materials. A further break up of land use pattern envisaged for processing area of the EZ site has been shown below.

Figure 60: Land Use Pattern - Processing Area



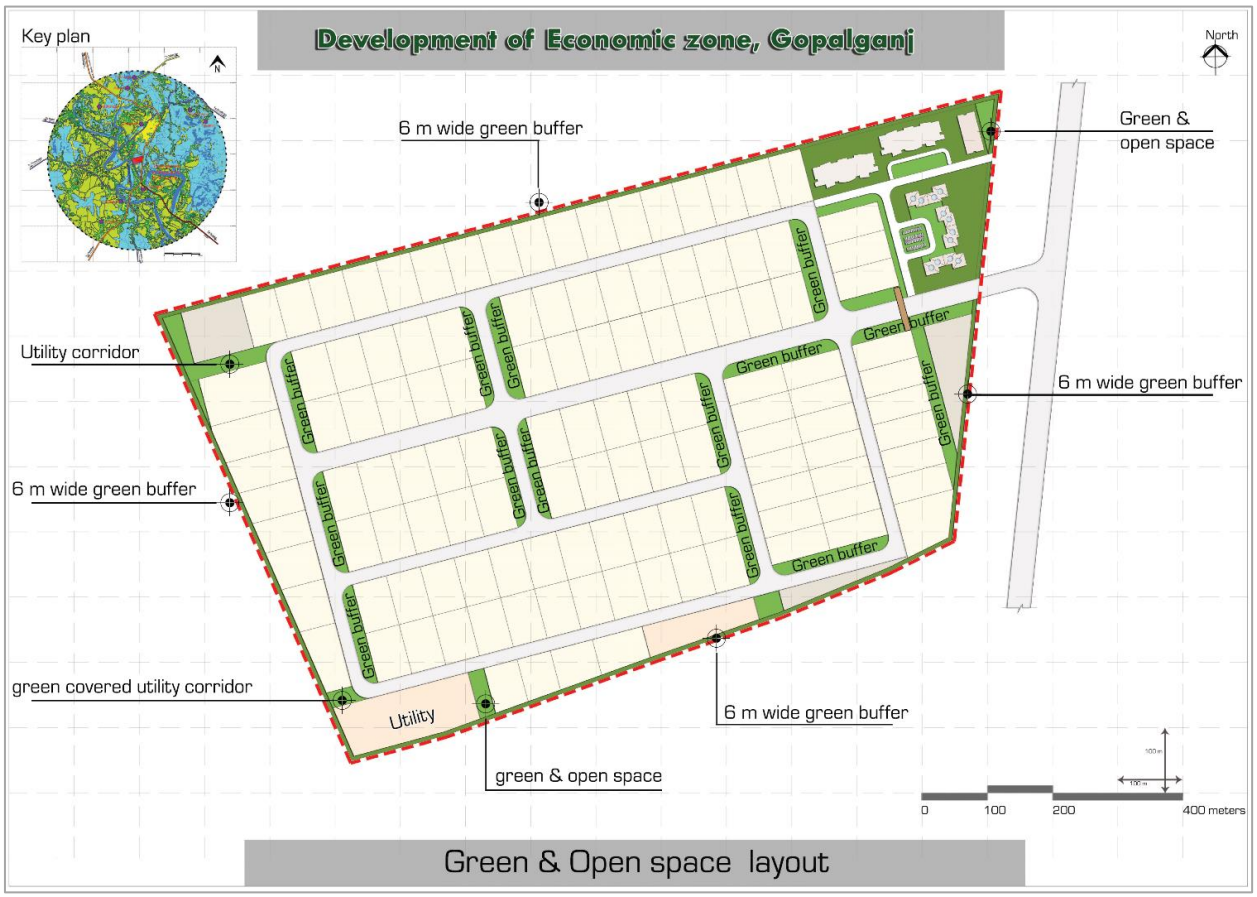
Source: MACE analysis

Based on the land use pattern shown in the previous page, 72% of land area accounts for saleable area and remaining 28% of land area accounts for non-saleable area. Out of 72% total saleable area, 67% is accounts for industrial use for targeted sector and loading and unloading activities. 5% of remaining saleable land area is earmarked for supporting amenities. Supporting amenities include all support infrastructure such as vocational training centres, R&D facilities, commercial and retail, healthcare, and childcare facilities.

Green space required as per international planning norms in practice has been earmarked at strategic locations in the master plan. Private Green within the industrial plots is not included in the computation of overall green area of EZ. The greenery will be concentrated at the boundary of zones and at pocket parks.

The layout showing earmarked area for Green/Open space within the proposed EZ is as follows:

Figure 61: Green and Open space



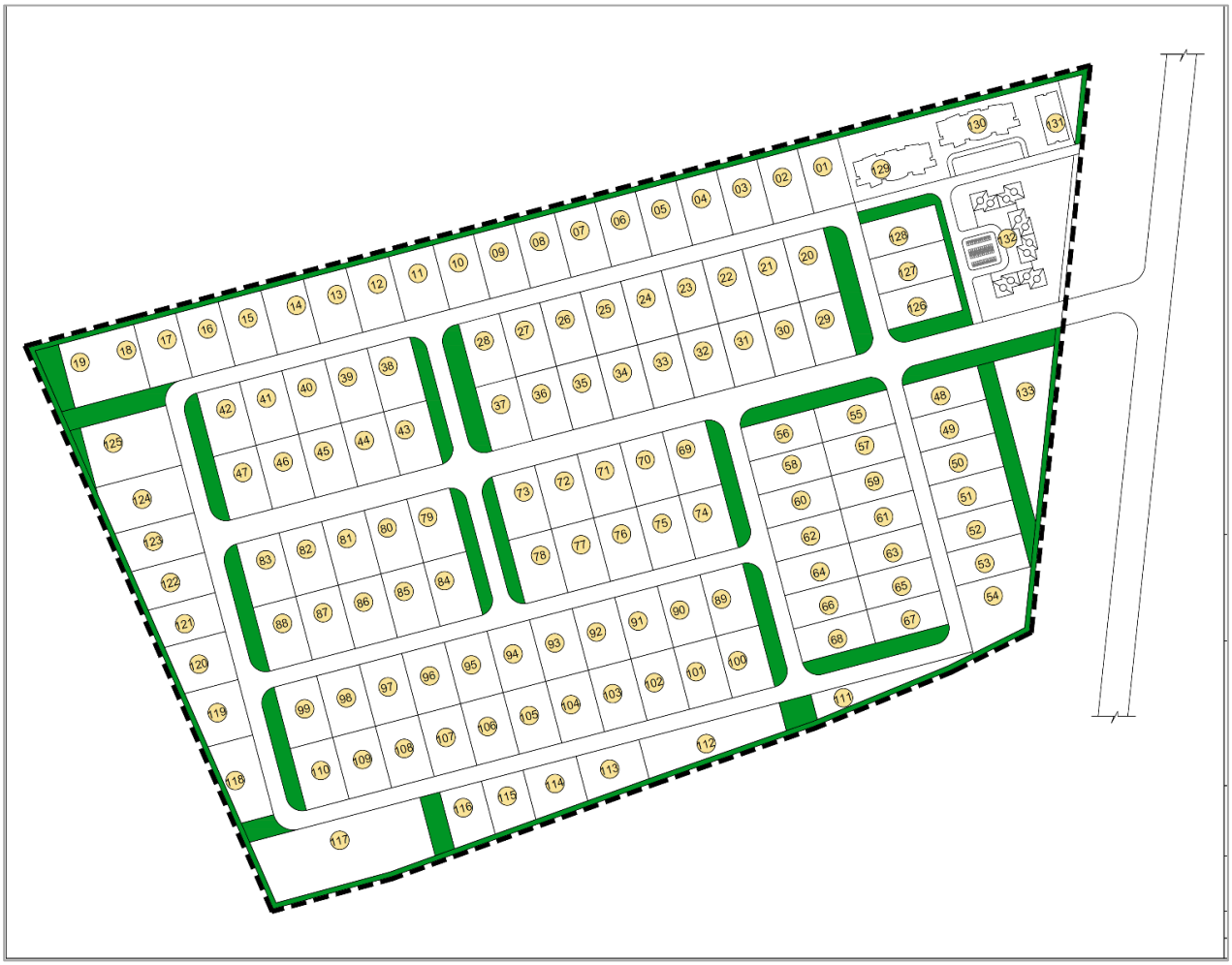
Source: MACE analysis

8.8. Plot details

There are totally 133 plots earmarked in the proposed master plan for different usage out of which 1 plot is for utilities, 4 for Amenities, 4 for supporting facilities and balance 124 plots are demarcated for industrial usage.

The number of plots and different configuration of plots provided in the master plan are shown on the next page.

Figure 62: Plot configuration of EZ



Source: MACE analysis

From the proposed land use distribution, it can be seen that industrial usage is the predominant land use.

Besides offering pleasant environment for people to work, the development will offer a variety of prepared land plots complete with infrastructure for clients to build their own factories. Industrial land will be marketed as prepared land sites complete with infrastructure.

The parcellation of plots is done with the aim of accommodating various type of industries according to the convenient of investors. Occupant units can merge or sub-divide the prepared land into appropriate sizes to meet their own requirements. Conversely, the larger plots can be subdivided by introducing some minor roads if the demand is for small plots. Prominent sites which normally command a slightly higher land premium are reserved for industrial brand names and multinational companies (MNCs) who desire these prime locations for enhancement of their corporate image and are ready to pay a premium price for the same. Apart from general infrastructure, specialised infrastructure required for a particular zone is also envisaged.

A variety of small and large plots are provided to meet the varied needs of the industrialists. A size wise breakup of the plot details envisaged for the EZ site is shown below.

Table 59: Area wise breakup of land plots

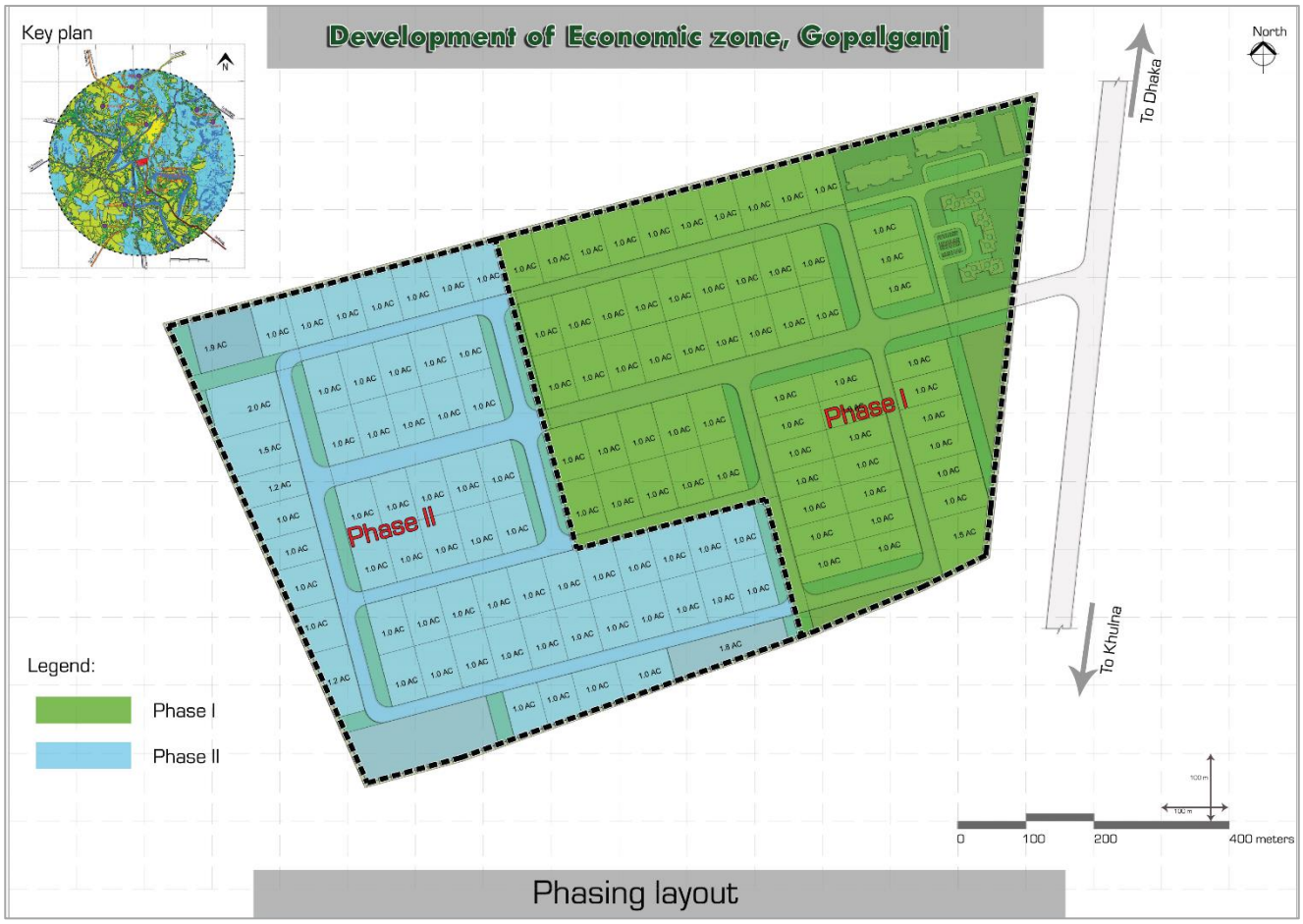
Site	Project Total	Phase I	Phase II
Land (Acres)	200.00	98.31	101.69
No of Plots	133	68	65
Size of Plots			

Site	Project Total	Phase I	Phase II
1 acres	120	61	59
> 1 acres	13	8	5
No and size of buildings to be constructed			
Building Type	**Total No in Project and Size**	**Phase I Total No and Size**	**Phase II Total No and Size**
EZ Entry/ Exit Gates	1 (500 Sqm)	1 (500 Sqm)	0
Admin Building	1 (1500 Sqm)	1 (1500 Sqm)	0
Supporting Amenities	2 (15378 Sqm)	1 (7689 Sqm)	1 (7689 Sqm)

8.9. Phasing Plan

The project is planned to be developed over 2 phases. The details of the phasing plan are as shown in following figure.

Figure 63: Phasing plan of EZ



Source: MACE analysis

The details of the phase wise industry breakup are as shown in table on the next page.

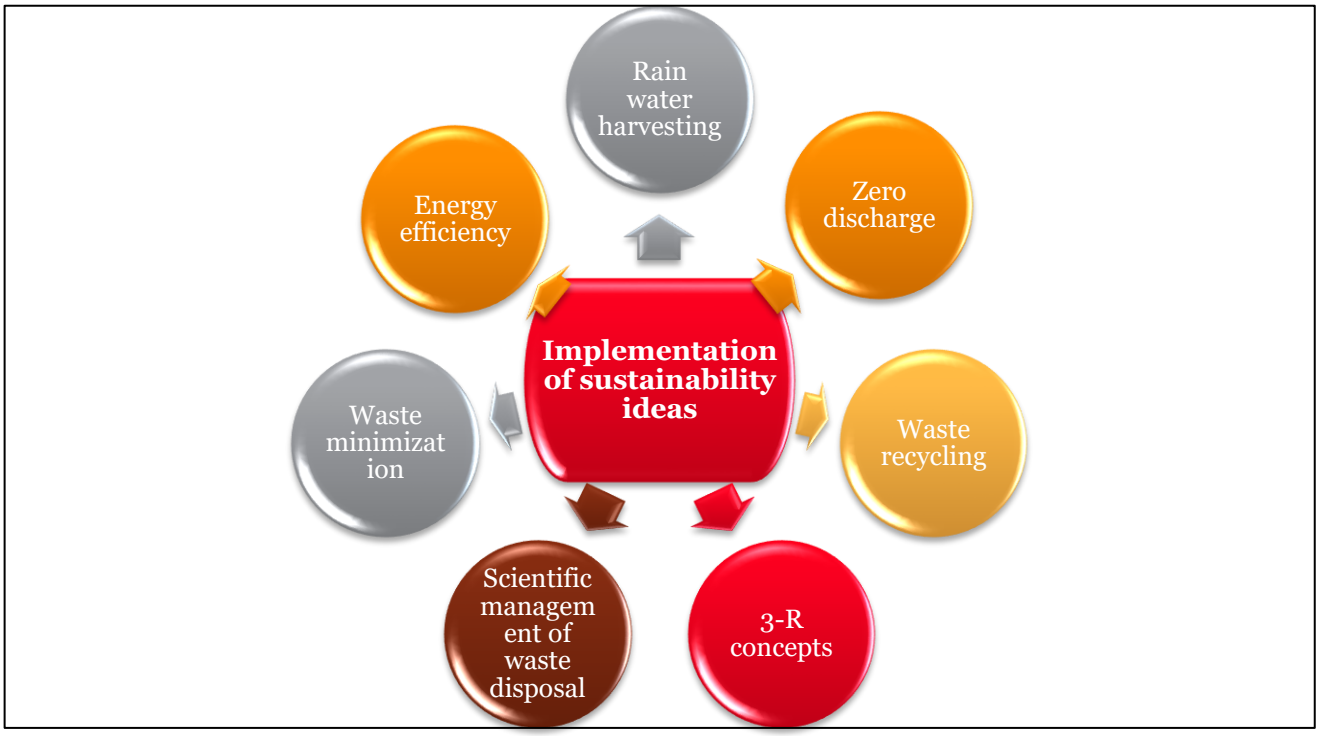
Table 60: Phase wise Industry breakup

Land use pattern	Total area (in Acres)	Phase 1 (in Acres)	Phase 2 (in Acres)
Industries	131.98	62.5	69.48
Loading & Unloading area	1.84		1.84
Utility	4.02		4.02
Road	29.18	14.59	14.59
Green and Open Spaces	19.94	9.97	9.97
Non-Processing area	13.05	11.26	1.80
Total	**200.00**	**98.31**	**101.69**

8.10. Sustainability Initiatives

The development of the EZ is driven on strong foundation of sustainability concepts and these needs were built right in the conceptualization stage itself. The sustainable elements conceived in the concept plan include use of eco-friendly materials, recyclable material, avoidance of toxic chemicals, usage of environmental friendly products, waste minimization technologies, scientific treatment of waste and energy recovery possibilities to reduce power consumption etc. as shown in the figure below.

Figure 64: Sustainability initiatives



Source: MACE analysis

Implementation of the above mentioned sustainability ideas inside the Economic Zone would enable an eco-friendly and holistic growth of the regional economy providing adequate benefits to local stakeholders and at the same time preserving the local fauna and flora in vicinity of EZ site.

8.11. Key Takeaway

Taking inputs from industry assessment and demand forecasting, best practice master planning has been carried out to enable state-of-the art infrastructure facilities in the proposed EZ to attract and support investments in industrial sectors.

Master planning takes into cognizance layout planning, zoning based on concept & functional requirements, facilities & amenities planning. Master plan comprising Zoning plan, Road network plan, detailed land use & land parcellation plan and phasing plan has been prepared.

Key recommendations formulated from this exercise are outlined below-

- During Zoning, entry/exits have been planned from the approach road connecting the site. The whole site area has been divided into various zones such as Industrial Zone, Institutional, Amenities and utilities Zones.
- After Zoning, internal road network has been planned based on planned entry/exit followed by sub-zoning, land parcellation; planning of internal access road based on land parcellation, planning of utilities & amenities and phasing.
- This project has been planned to be developed over 2 phases with each phase having a construction period of 2 years. 98.31 acres will be developed in phase I and 101.69 acres will be developed in phase II.
- Best practice master planning indicates that 70% of land area accounts for saleable area and remaining 30% of land area accounts for non-saleable area. This has been adhered and total saleable area % achieved is 72%. Out of 72% total saleable area, 67% is accounts for industrial use. 5% of total saleable land area is earmarked for supporting amenities.
- 133 plots have been earmarked in the proposed master plan for different usage out of which 1 plot is for utilities, 4 for Amenities, 4 for supporting facilities and balance 124 plots are demarcated for industrial usage.

9. Infrastructure Plans

9.1. Purpose and Objective

The industrial, environmental, physical & social infrastructure objectives of EZ are described in figure below.

Figure 65: EZ infrastructure objectives

Source: MACE analysis

A robust infrastructure is the key support system, which enables sustainable operation of the EZ. Infrastructure requirements are categorized as follows:

1) Infrastructure within EZ
2) Specialized infrastructure
3) External connectivity and offsite infrastructure for EZ.

All the necessary infrastructure facilities for the development are designed to create an ideal ambience and best environment.

9.2. Methodology of Infrastructure Plans

The basic considerations and the methodology adopted for planning various infrastructure components within the EZ are provided in the following table.

Table 61: Details of components covered under infrastructure plan

Components	Detailing of utilities, infrastructure within proposed EZ
➢ **Roads – General considerations**	○ Arterial, primary & secondary roads are planned to give access to the industries within EZ apart from catering to residential and commercial zones and shall be looped with inter connecting roads. ○ In order to maximize lead values and minimize land taken by major and minor roads, a proper hierarchy of roads is proposed to ensure smooth traffic movement inside EZ.

Components	Detailing of utilities, infrastructure within proposed EZ
➢ **Roads – categories**	○ Different categories of roads are proposed for the internal road transportation network ○ The details are given in **Table-Hierarchy of roads.**
➢ **Roads – pedestrian walkways**	○ Various routes and paths are provided for easy movement of visitors with sufficient care so that no transport system comes in the way of pedestrians. ○ Aesthetically designed walkways are provided along with lush green environment on either side of road. ○ Pedestrian walkways are provided for all categories of roads. ○ All services for drains, sewers, water, power and telecom are contained within the road right of way. ○ Necessary signage, street name boards, zone guiding maps and visitor's guidance map etc. are planned to be positioned at necessary locations, such as intersections and at various strategic locations in each zone. ○ No access is planned to be allowed near the road junctions and it is recommended that ingress / egress points will be with a set back at least 30 m from the road junction.
➢ **Roads - pavement structure**	○ Flexible pavement structure is recommended inside the proposed EZ, for the following reasons: • Ease of rehabilitation in consideration for anticipated long-term settlement. • Lower reinstatement cost to accommodate future laying of utility services. ○ The typical composition of flexible pavement structure is detailed in **Table- Composition of Flexible Pavement Structure** considering California Bearing Ratio (CBR) value of 9% and 5 Million Standard Axles (MSA). ○ Wherever necessary, the unsuitable soil at sub grade/below sub grade level shall be replaced with suitable materials as per standard specifications. The sub grade soil shall have CBR value of 9%. If the CBR value of the sub grade is less than 5%, a capping layer of 150 mm thickness of material with a minimum CBR of 5% shall be provided in addition to the sub-base. ○ The base course and surface wearing course should be delayed in the initial construction and could instead be laid 12 months later or in the subsequent road development program. This would minimize reinstatement costs during subsequent underground services laying, road crossings, connections and settlement in the filled areas.
➢ **Surface drainage – general considerations**	○ Based on the topography of the EZ, the drainage pattern has been decided. ○ In order to prevent the storm water entering from adjacent areas to the development area, a cut-off drain all along the periphery of the site is considered and connected to existing river / discharge points.
➢ **Surface drainage – Peak runoff**	○ The peak runoff and discharge capacities are computed based on the following design parameters. • The peak runoff is planned to be computed based on rational formula: -

Components	Detailing of utilities, infrastructure within proposed EZ
	1.0 Q = C * I * A / 360 **2.0** Where, Q = Quantity of runoff, m^3/s **3.0** C = Coefficient of runoff **4.0** I = Intensity of rainfall, mm/hr **5.0** A = Catchment area, hectare • Considering the nature of soil/ surface, the coefficient of runoff adopted in the drainage computation are given below: built-up area: 0.9 road and other paved area: 0.5 for greenery and open area: 0.2
➢ **Surface drainage – sizing**	• The sizing of the drains is designed based on the discharge capacity of Qc to cater adequately the estimated peak runoff using Manning's formula: - Qc = $(1/n) * A * R^{2/3} * S^{1/2}$ (m^3/sec) Where A = Area of cross-section of drain (m^2) R = Hydraulic mean radius (m) S = Hydraulic gradient n = roughness coefficient
➢ **Surface drainage – design & scheme**	• The drainage system is planned to cater for the entire EZ through gravity flow. • Drains are proposed to be provided on both sides of the roads. • Open trapezoidal drain is considered for the surface run off collection due to easy maintenance for the primary road. Stone pitching is considered for the side walls and PCC for the base. • Covered rectangular brick masonry drain is considered for the remaining areas for optimization of area under drainage. • RCC box / pipe culverts of suitable sizes are considered for road crossings. • Rainwater harvesting structures are envisaged all along the drain at every 30 m interval.
➢ **Water demand**	○ The water demand estimation norms considered for arriving the water demand is depicted in **Table-Water Demand Estimation Norms.**
➢ **Water losses**	○ Water losses occur in the distribution and transmission network. The percentage of loss depends on the pipe material, jointing system, etc. As this is a complete loss, it is attempted to keep these losses below 10% of the total demand. ○ Potable water has been considered to be used for processing, bathing and washing clothes, cooking, drinking and washing vessels. ○ Non- potable water has been considered to be used for gardening, cleaning, cooling and toilet flushing. ○ The water consumption pattern assumed is given in **Table-Water Consumption Pattern.**

Components	Detailing of utilities, infrastructure within proposed EZ
➢ **Fire protection demand - non-potable**	○ Fire demand in litres per minute has been calculated based on the following formula: $Q_{FD} = 4000 \times (P)^{0.5} \times (1-0.01 \times (P)^{0.5})$ *Where P = Population in thousands per hectare* Q_{FD} = *2226.96 lpm* = *133.6 cum/hr* ○ Considering two-hour fire demand requirement, the total quantity of water required for fire protection is 267.24 cum. ○ Demand for firefighting has not been considered under daily demand as one-time storage i.e. 2 hours of fire demand will be created and maintained.
➢ **Average water demand**	○ Based on the computation and analysis, the total average water demand is estimated and presented in **Table-Water Demand.** ○ The water demand estimation for different components in the processing and non-processing area is depicted in **Table- Estimation of Average Daily Water Demand.**
➢ **Water storage**	○ Based on the above estimates, the following infrastructure for the EZ is proposed. ○ **Underground storage tank** • The total storage capacity of the underground storage tank based on 24 hrs. Storage requirement is proposed is shown in **Table-Underground Sump Storage Capacity.** • Totally there will be 2 underground storage tanks for storing portable and non-portable water including fire demand for processing and non-processing area respectively. ○ ***Elevated level service reservoir (ELSR)*** • The total storage capacity of the overhead storage tank based on 2 hrs. Storage requirement is shown in **Table Overhead Tank Storage Capacity** • Totally there will be ELSR for storing portable and non-portable water including fire demand for processing and non-processing area respectively. • As per standard norms, the tail end should have a minimum residual pressure of 7.0 m. To meet the norms, the staging height of ELSR shall be fixed accordingly by the project implementation company.
➢ **Water pumping station**	○ Water pumping station for potable and non-potable water is required for pumping from the underground storage sump to respective ELSR. ○ The water supply scheme including distribution is planned based on the peak flow, minimum residual pressure and pipe material.
➢ **Water distribution network**	○ Separate water distribution network for potable and non-potable supply can be provided. ○ The design criteria for the design of water supply network are given below. • Demand computed based on the analysis. • Working hours per day - 24 • **Pipe material** ▪ For pumping main - DI (K9)

Components	Detailing of utilities, infrastructure within proposed EZ
	▪ For distribution up to 200 mm dia - HDPE (PE 100) ▪ For distribution above 200 mm dia - DI (K7) ▪ Pipe roughness coefficient - 140 for DI and - 150 for HDPE ▪ Formula used for friction loss - Hazen Williams ▪ Minimum residual pressure at all tapping points - 7.0 m ▪ ELSR staging height - as per design requirement ○ The proposed pipe size and pumping capacity are given in **Table Pipe Sizing for Processing Area and Table Pump Capacity.** ○ Proposed pump capacity for pumping the water from underground sump to ELSR is given in **Table-Waste Water Generation Pattern**
➢ **Sewage quantity estimation**	○ The sewerage system is planned to cater for the anticipated peak discharge requirements and to treat the waste to the required discharge standards. ○ The estimation of the sewage shall vary depending upon the land use distribution. ○ The domestic sewage to be generated has been assumed to be 80% of the domestic water consumption in addition to an infiltration of 10%. ○ Based on the general wastewater generation pattern, the quantity of wastewater generated in domestic premises is presented in **Table-Sewage and Sullage Generation Pattern** ○ Wastewater generated from toilets is considered as sewage and wastewater generated from bath / shower, laundry, hand basin and kitchen is considered as sullage (grey water). ○ The wastewater generation pattern is depicted in **Table-Sewage and Sullage Generation Estimation.** ○ The estimation of average daily sewage and sullage generation is detailed in **Table Pipe size- sewerage network** ○ Treated sewage water available @ 90% =4592.43 cum/day ○ Balance treated sewage water to be discharged as non-potable water ○ Following design criteria is proposed for sewerage, treated effluent collection system • Demand computed based on the analysis. • Working hours per day - 24 • Pipe material - NP2 RCC for all areas except road crossing and NP3 RCC for road crossing • Pipe roughness coefficient - 0.011 • Peak flow factor - 3 • Formula used to calculate friction loss - Manning's • Infiltration - 10% • Self-cleansing velocity - 0.6 m/s • Minimum cover - 1 m • Manhole spacing – 30 m up to pipe size 900 mm ○ It is presumed that each industry will treat their effluent into sewage standards prior to discharge into the sewerage network. ○ Collection of treated effluent, sewage & sullage through a single collection network is proposed, which is planned based on the above design criteria.

Components	Detailing of utilities, infrastructure within proposed EZ
	Sewerage network shall be established by the project implementation company considering the topography of the site. o The network is divided into trunk main and sub mains according to the natural topography and other site constraints. Minimum pipe size of 150 mm is considered for sewerage network. o Proposed pipe size of sewerage network is provided in **Table Sewage Quality.**
➢ **Quality of sewage**	o In general, the quality of domestic sewage generation shall be as per **Table STP- process and Components** o However, this is based on the condition that occupant units treat industrial trade effluent to required level of pre-treatment before discharging to common system o The design and treatment scheme has been worked out based on this assumption of input quality. Both sewage & sullage can be treated in a single treatment system.
➢ **Sewage treatment plant (STP) considerations**	o Sewage treatment is the process of removing contaminants from wastewater, comprising of storm run-off, domestic sewage and primary treated effluent. It includes physical, chemical and biological processes to remove various contaminants. o Various sewerage treatment systems considered for selection of treatment system for EZ and are given in **Table Estimation of MSW Generation.**
➢ **Sewage treatment plant technology selection**	o Factors considered for selection of appropriate treatment system: • Reliability • Vector nuisance • Area availability • Power requirement • Capital cost • Operation & maintenance cost o The above process technologies are analyzed in terms of the performance and both capital and operating cost. Based on the above analysis Sequencing Batch Reactor (SBR) system is proposed. o This system has been widely used for municipal and industrial wastewater treatment applications to meet specific discharge requirements. o SBR technology advantages/benefits – • Consistent high-quality, low nutrient level effluent • Tolerates wide swings in flow and organic loading • No clarifier required • Better control over filamentous growth and settling problems • Nutrient removal without chemicals - nitrification and de-nitrification, phosphate removal • The system can also work with sewage in flow of 20 to 30 percentage of designed capacity due to presence of variable frequency drive (VFD)

Components	Detailing of utilities, infrastructure within proposed EZ
	○ SBR system is a fill and draw activated sludge system. SBR process uses high-efficiency oxygen transfer aeration equipment to satisfy the high-rate oxygen consumption requirement at the beginning of the "fill" and "aeration" cycles. SBR is efficient in carbonaceous pollutant removal, and is easily modified to satisfy nutrient removal of nitrogen (N) and phosphorous (P). Because the fill, aeration, settlement and draw take place in the same reaction tank, SBR tank itself would serve as the clarifier. Refer **Figure-Waste Reduction by Integrated SWM** for process flow diagram. ○ One sewage treatment plant of capacity 5.1 MLD for processing area and non-processing area is proposed.
➢ **Solid waste management (SWM)**	○ SWM is one of the most essential services for maintaining the quality of life in EZ and for ensuring better standards of health and sanitation. ○ If properly collected at source, SWM would reduce a number of downstream problems related to transportation and disposal of the same. Solid waste (SW) generated in EZ can be broadly categorized as under: • Industrial non-hazardous waste • Industrial hazardous waste • Domestic wastes: kitchen and wood waste, plastic, paper, floor sweepings, etc. • Road sweeping & sanitary waste: human waste, etc. • Garden & agriculture waste, leaves, branches, plants etc. • Roads/building construction waste: earth, asphalt, concrete, brick, plaster, wood, glass, stones etc. • E-Waste: Computer systems, peripheral equipment, mobile phone sets, TVs, audio sets and also household appliances. • Hospital and biomedical waste. ○ The role of integrated SWM is to reduce the quantity of SW disposed of to land by recovering materials and energy from SW as depicted in **Figure Waste Reduction by Integrated SWM.** ○ The generation rates of industries, logistics, commercial & residential areas vary to such an extent that exact quantification of SW generation is not feasible. ○ However, an attempt has been made to quantify the municipal solid waste (MSW) that may be generated from various zones of EZ. • Industries – 200 gm /capita / day • Loading and unloading- 100 gm /capita / day • Utilities – 100 gm /per capita / day • Road – 10 kg / hectare / day is considered as street sweeping • Greenery – 30 kg / hectare / day is considered • Supporting amenities- 400 gm /per capita / day ○ Based on the above, MSW quantification has been carried out and depicted in **Table Estimation of MSW Generation.** ○ Total estimated MSW quantity – 22.43 TPD

Components	Detailing of utilities, infrastructure within proposed EZ
	○ Source segregation should be made mandatory and due care has to be taken while planning the collection, transportation of waste within the site area. Users will be required to segregate their waste in the following categories and put in colour coded bins. • Industrial non-hazardous waste • Industrial hazardous waste • Bio-degradable waste • Non-biodegradable waste • E-waste like parts of computer, floppies, monitor, cartridges, ribbons etc. • Construction debris, street sweepings etc. • Hospital and biomedical waste ○ From the above only bio-degradable waste can be treated in the SW treatment facility ○ The rate of MSW generation in the initial stages will be less than the estimated quantity and hence during the initial stage, the MSW generation rate can be considered as 50% of the estimated quantity. ○ The entire MSW is planned to be collected and treated in the composting plant within EZ and the rejects shall be disposed to suitable landfill outside the EZ. ○ Suitable area has been earmarked for development of composting plant within EZ to handle the MSW generated.
➢ **Power supply & distribution**	○ The system parameters are as follows: • Transmission line - 33 kV • Number of phases - 3 • System frequency - 50 Hz • Consumer supply voltage 33 kV /11kV/415/240 volt ○ As peak demand may vary for each facility in EZ, a diversity factor, which relates peak demand to rated load demand or calculated demand, is utilized in computation of maximum demand. ○ A simultaneous factor of 10 - 80% is normally considered. ○ Power losses generally occur in the distribution network depending upon the type of conductors and equipment installed. As this is a complete loss to the system, it is generally kept below 10% of the total load. ○ Estimated power demand is depicted in **Table-Estimation of Power Demand.** ○ Total estimated power demand is 22.43 MVA. ○ Distribution substation is proposed in a strategic location. Individual facilitation and all power reticulation are to be carried out at 11 kV. ○ The advantage with reticulation at 11 kV is that it is the standard voltage and therefore electrical reticulation equipment for 11 kV systems would be readily available including spares. ○ Distribution network is the main backbone of the reticulation system. It is most essential that the network must deliver uninterrupted power, in right quantity & quality to individual facilities continuously.

Components	Detailing of utilities, infrastructure within proposed EZ
	○ Power can be distributed by a network of overhead lines or underground cables. ○ An overhead distribution system is adopted for much more flexible for extension and for connection of new consumers and less expensive than an underground cable system.
➢ **Street lighting**	○ Street lighting has been conceived in 2 different forms. • Street lights for the road network • Solar street lighting ○ All the road and streets are provided with street lighting not only to assist pedestrians and traffic, but also to increase safety and security in the area. It is recommended that all lighting should be by high-pressure sodium lanterns mounted on power poles or on streetlight columns. For major roads the average illumination should be about 20 lux.
➢ **Landscaping**	○ This includes works associated with the landscaping within the EZ covering tree strips along the boundary, roads, public greenery etc.

Source: MACE analysis

9.3. Infrastructure requirements and concept drawings

9.3.1. Vehicular Traffic Assessment

The objective is to assess the traffic impact on the existing Highway for the future due to the development of EZ based on the present traffic characteristics and suggest appropriate remedial measures to address the project impacts. The following factors were taken into consideration for assessing the traffic impact.

1. Traffic generated due to the passenger movement from the proposed industries of EZ
2. Traffic generated due to the goods movement from the proposed industries of EZ.

Mode of share between all the goods movement vehicle like Truck, Medium Axle Vehicle (MAV), Light Commercial Vehicle (LCV) and Tractor is considered as 35%, 30%, 10% and 10% respectively as per the general practice for the industrial zone. Balance 15 % is considered traffic generated within the industrial area.

It is usual practice to express capacity in terms of "Passenger Car Units". The basic consideration behind this practice is that different types of vehicles different degrees of interference to other traffic and it is necessary to bring all types to a common unit. The common unit adopted is the Passenger Car Unit (PCU).

Table 62: PCU conversion values according to Vehicles Categories

Type of Vehicle	PCU Value	No. of travelling persons
Standard Bus	3	50
Other Bus	3	35
Mini Bus	1.5	20
Van	1	14
Cars	1	4
Two Wheeler	0.5	2
Auto Rickshaw	1	3
Truck	3	1
MAV	4.5	1
LCV	1.5	1
Tractor	4.5	1

Source: MACE analysis

Table 63: PCU Estimation Based on the Traffic

Description	Total Area		Type	Buses							Goods Vehicles				Total PCUs / day
	in Acres	in %		Standard bus	Other Bus	Mini Bus	Van	cars	Two-wheeler	Auto rickshaw	Truck	MAV	LCV	Tractor	
PCU Value			**PCU Value**	3	3	1.5	1	1	0.5	1	3	4.5	1.5	4.5	
No. of Passenger			**No. of Passenger**	50	35	20	14	4	2	3	1	1	1	1	
				45.00%	10.00%	15.00%	10.00%	10.00%	5.00%	5.00%	10.00%	30.00%	10.00%		
Industrial area	131.98	92%		78	41	108	103	359	359	239	6.60	10	3	0	1469
				40.00%		30.00%		20.00%	10.00%			100%			
Customs, Security, Admin, public amenities	10.8	8%		28	0	53	0	176	176	0	0.00	5.38	0.00	0.00	452
Grand Total	**142.74**	**100%**		**106**	**41**	**161**	**103**	**539**	**538**	**239**	**7**	**15**	**3**	**0**	**1926**

Source: MACE analysis

9.4. Roads

Hierarchy of roads

Arterial, primary & secondary roads are planned to give access to the industries within EZ apart from catering to residential and commercial zones and shall be looped with inter connecting roads. The hierarchy of roads planned within EZ are provided below.

Table 64: Hierarchy of roads

Category	Road width (m)	Number of lanes	Length (m)		
			Processing area	Non- processing area	Total
Arterial road	30	4 lanes two way	1174	-	1174
Primary road	25	4 lanes two way	4143	-	4143
Total			**5317**		**5317**

Source: MACE analysis

The composition of pavement structure is provided in the table below –

Table 65: Composition of flexible pavement structure

Layer	Composition details
Wearing course	Dense Bituminous surfacing wearing course of 25 mm thick laid with mechanical spreaders
Binding coat	A tack coat of 0.30 kg / sq. m. of 60/70 grade bitumen
Binder course	Dense bituminous surfacing base course of 50 mm thick, laid with mechanical spreaders
Binding coat	A prime and tack coat of 1.2 kg / sq. m & 0.25 kg/sq.m of 60/70 grade bitumen
Base course	Aggregate base (Type I & II) of 250 mm thickness
Sub-base	150 mm thick granular sub base to a soaked CBR of min. 30%
Sub-grade	Min. soaked CBR value of 2%

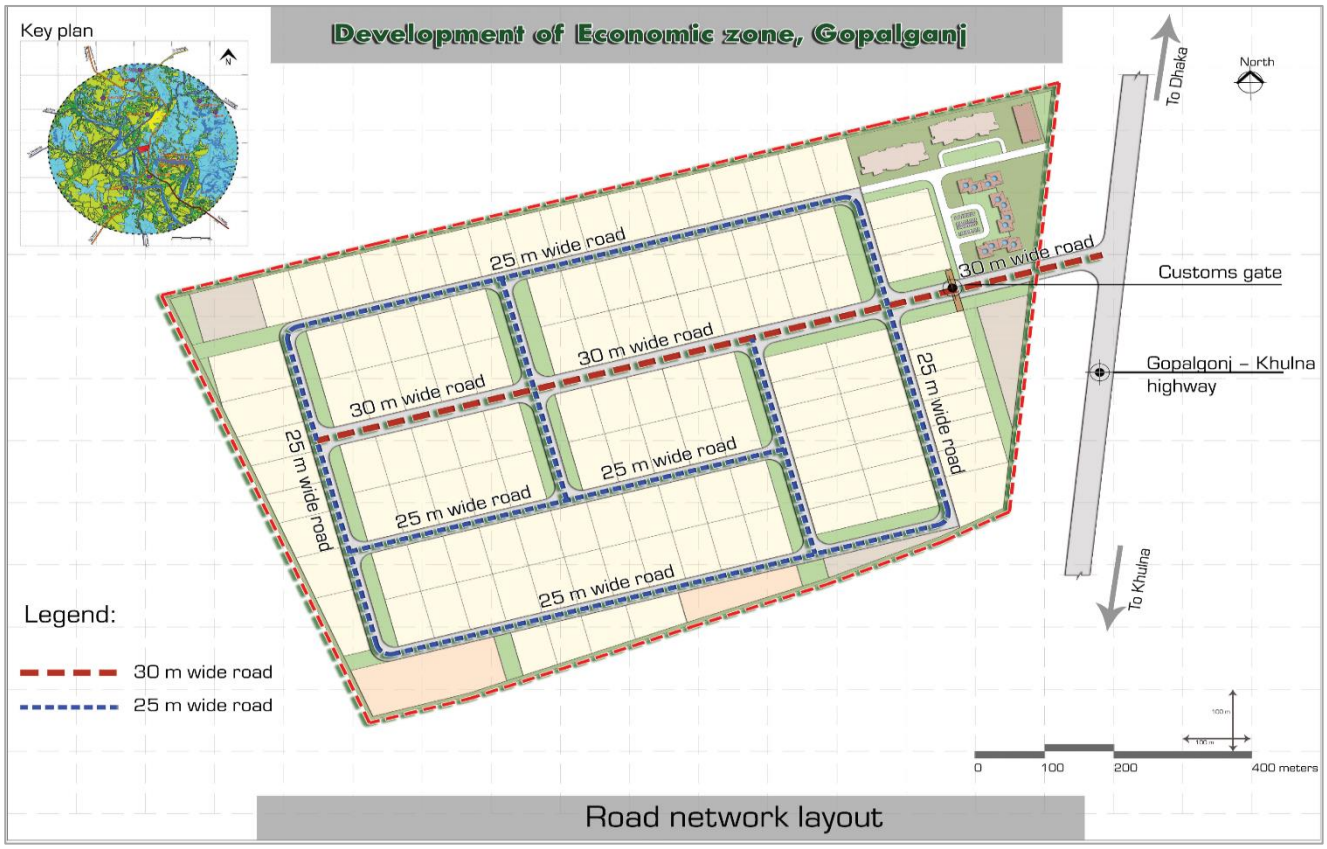
Source: MACE analysis

Adhering to the pavement structure outlined in the table above would ensure longevity of the road surface and minimize deterioration of road surface and need for frequent repair and maintenance works.

Road network drawing

The road network layout for the proposed EZ is shown in the figure on the next page.

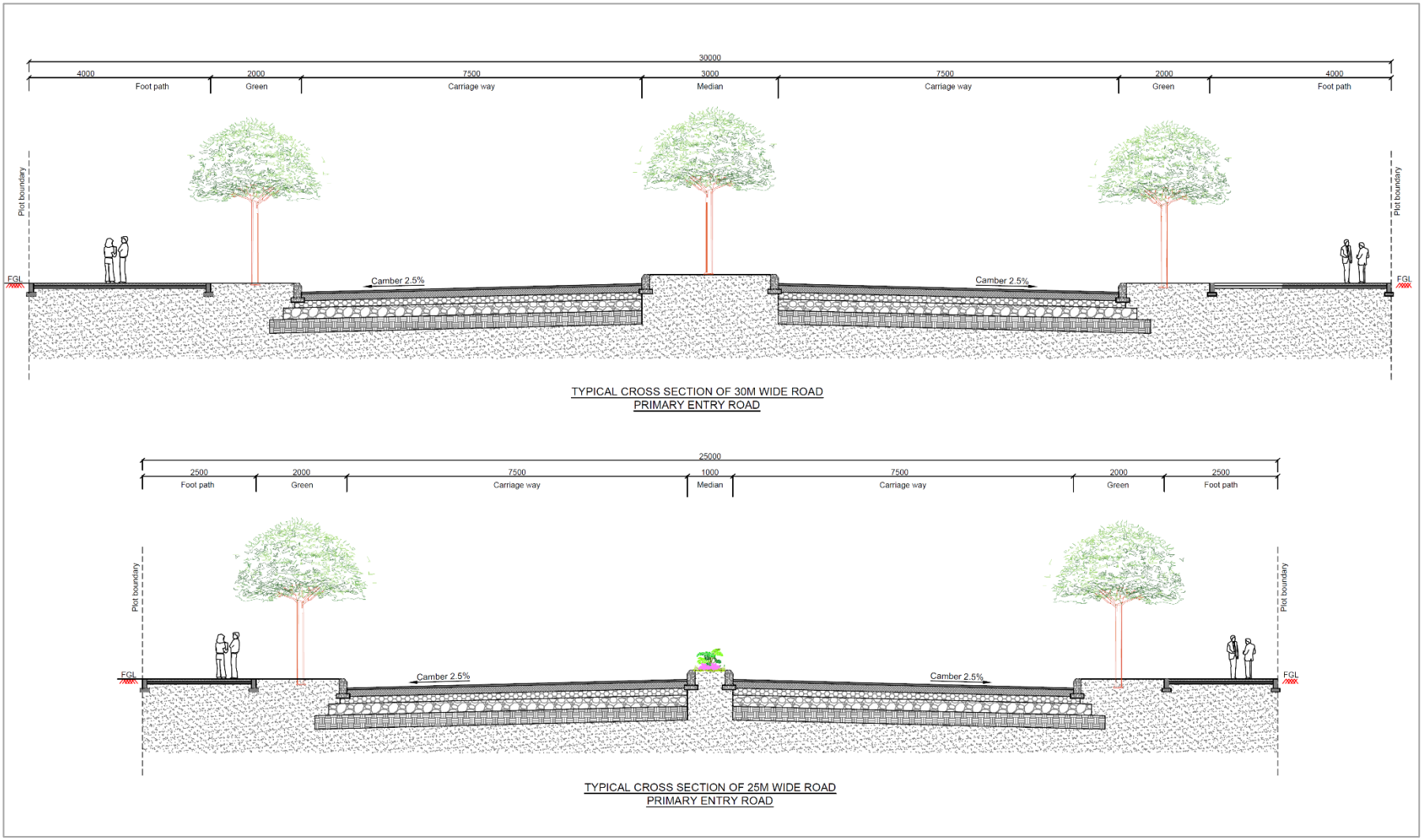
Figure 66: Road Network Diagram



Source: MACE analysis

The figure above outlines the top view of the road network diagram. As evident from the diagram above, road plan has been created to ensure last mile connectivity to all units inside the EZ site. Figure on the next page outlines the cross-sectional view of the road structure.

Figure 67: Typical Cross-Sectional view of road structure



Source: MACE analysis

The typical cross-sectional view of the road structure is shown in the figure on the previous page. As elaborated in the figure, provision has been kept for riding surface, drainage and street lighting facilities. This figure also captures each layer of the subgrade that would be laid in order to construct a durable road surface.

9.5. Power

Design basis

- **Electrical system - EHV / HV supply**

  Nominal voltage : 132/33 kV ± 5%
  Frequency : 50 Hz ± 2.5 %
  No. of phases : 3 phase, 3 W
  Fault level : 26 kA

- **Distribution supply**

  Nominal voltage : 11 kV / 415 V/230 V ± 6%
  Frequency : 50 Hz ± 3%
  No. of phases : 3 phase, 3/4 W

Power demand basis

The power demand estimation carried out on the next page is at ultimate level and based on prevailing development guidelines in Bangladesh context. This is different from the demand estimated during industrial space demand projection**.**

Table 66: Power demand estimation – basis

Description	Power requirement KVA/ha & KVA/sq.m	Simultaneous factor
Processing area		
Industrial area	450 .00	80%
Loading and unloading	250.00	10%
Utility	250.00	40%
Road	35.00	40%
Green & open space	4.00	40%
Non-processing area		
Admin & Customs block	250.00	60%
Supporting amenities	250.00	60%

Reference – published standards, guidelines and best industry standards

Power demand estimation

- The system parameters are as follows:
  - Consumer supply voltage 33/11 kV/415/240 Volt
  - Number of phases - 3
  - System frequency - 50 Hz
- As peak demand may vary for each facility in EZ, a simultaneous factor, which relates peak demand to rated load demand or calculated demand, is utilized in computation of maximum demand.
- A simultaneous factor ranging from 10 - 80% is generally considered based on the type of industry.
- Power losses generally occur in the distribution network depending upon the type of conductors and equipment installed. As this is a complete loss to the system, it is generally kept below 10% of the total load.

With considerations in the previous page, estimated power demand is worked out and the summary of load estimation is presented in the table below.

Table 67: Summary of electrical load estimate

SI.No	Type of development	Load in KVA
1	Processing area	**21,554**
2	Non-processing area	**872**
	Total estimated load in KVA	**22,426**
	Total estimated load in MVA	**22.43**

Source: MACE analysis

The above table provides a summarized view of total electricity requirement of the EZ site. A breakup of individual plot wise estimated electrical demand for this facility is given in the table below**.**

Table 68: Power demand calculation

Land use pattern	Total area			Load in KVA/ha & KVA/sq m of built up area	Plot area	Diversity factor	Loss factor	Load in kVA
	Acres	FSI	Sq. m					
Processing area								
Industrial area	131.98			450	50%	80%	1.1	21,159.00
Loading & Unloading area	1.84			250	40%	10%	1.1	20.00
Utility	4.02			250	20%	40%	1.1	179.00
Road	29.18			35	10%	40%	1.1	182.00
Green & open space	19.94			4	10%	40%	1.1	14.00
Total processing area	**186.95**							**21554.00**
Non- processing area								
Admin & Customs block	3.71	1.50	22501.00	250.00	60%	60%	1.1	248.00
Support amenity	9.34	1.50	56693.52	250.00	30%	60%	1.1	624.00
Total non-processing area	**13.05**							**872.00**
Total area	**200.0**						Load in KVA	**22,426.00**
							Load in MVA	**22.43**

Source: MACE analysis

Power Supply to Economic Zone

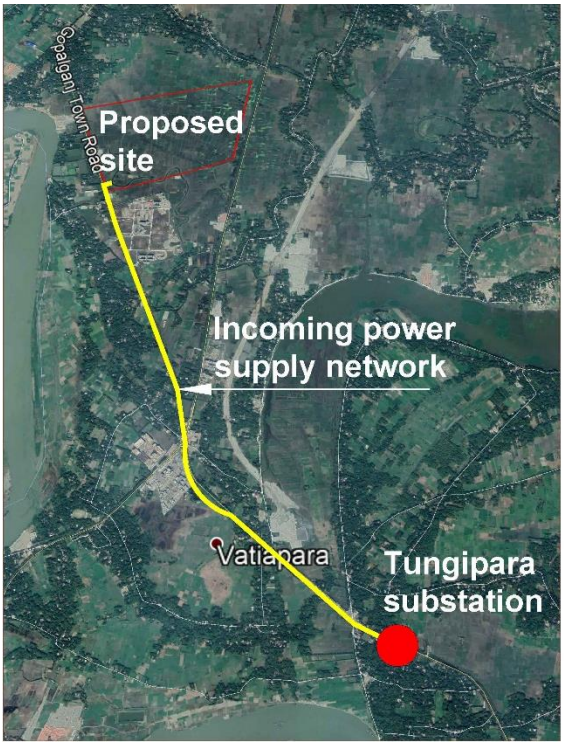
Calculations done in the above table indicates total power demand for the proposed EZ is about 22.43 MVA. However, this figure is indicative in nature and may vary based on ground implementation of the project. The developer may undertake a separate industry assessment and master planning exercise in order to validate this figure.

To cater this power demand a Main Receiving substation of 132 /33/11 kV substation has to be established in the site.

During the initial phase of development, the 33/11 kV components of the MRSS can be established. Power to this substation can be availed from the existing 33 kV substation at Tungipara substation at a distance of 6 km to EZ site. During the site visit and the discussions with authorities it is understood that the existing substation at Tungipara is has a spare capacity 4 MVA demand. Based on the load growth, the MRSS can be upgraded with 132 kV components and power supply at 132 kV level shall be tapped from 132 kV Gopalgonj sub-station.

The alignment of the proposed power transmission line and the location of substation is depicted below.

Figure 68: Details of external power supply system

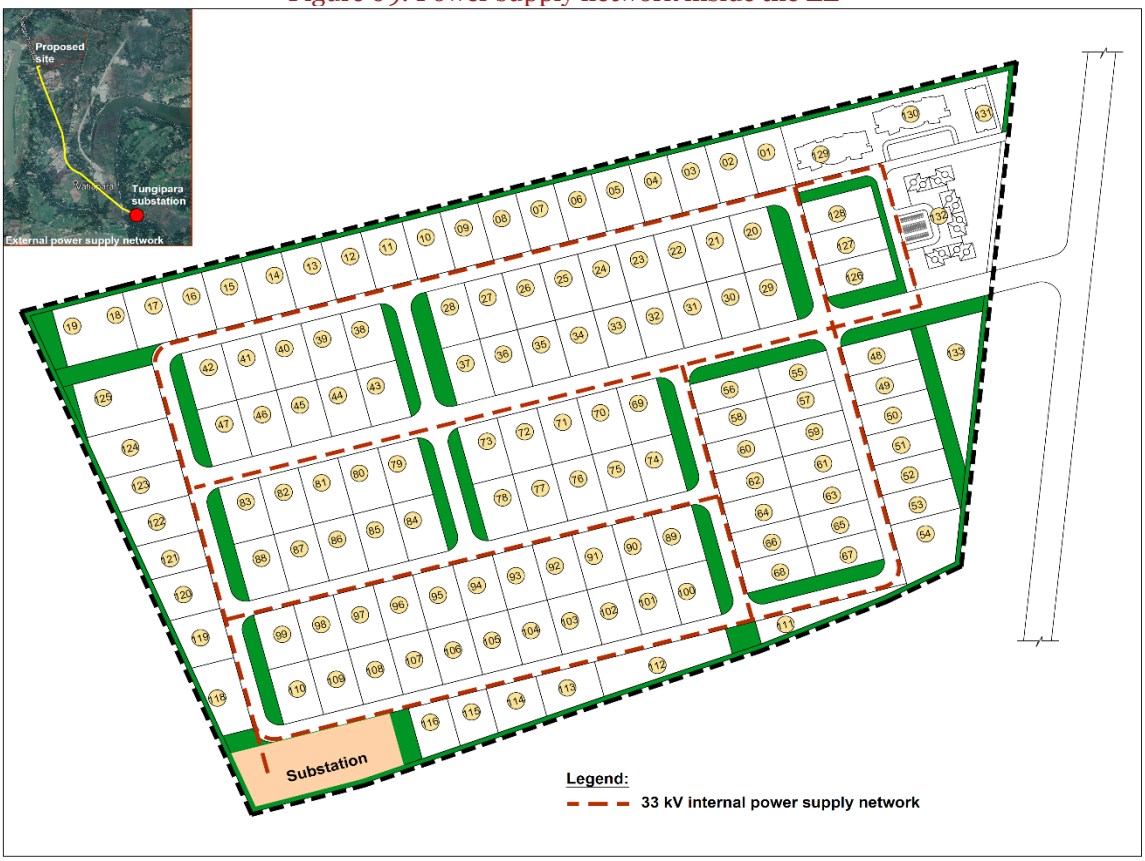


Source: MACE analysis

Power Supply network planned within EZ

Since the proposed feeder line from Tungipara sub-station enters the site in the NE side, it is planned to establish the proposed Main Receiving substation of 132 /33/11 kV substation at entry of feeder line. From the sub-station the transmission line network is planned along the proposed road network to feed the individual plots as shown in the figure on the next page.

Figure 69: Power supply network inside the EZ



Source: MACE analysis

9.6. Water

Demand estimation basis

The water demand estimation carried out below is at ultimate level and based on prevailing development guidelines in Bangladesh context. This is different from the demand estimated during industrial space demand projection.

Table 69: Water demand estimation norms

Description	Reference – published standards, guidelines and best industry norms
Industrial area	70 cum / ha / day - process water demand
Loading and unloading area	36 cum / ha / day
Utilities	45 litres per capita per day
Amenities (processing)	36 cum / ha / day
Road	1.8 cum / ha / day
Green	1.8 cum / ha / day
Non- processing area	
Description	Reference – published standards, guidelines and best industry norms
Supporting amenities, Admin and customs	45 litres per capita per day

Source: MACE analysis, published standards, guidelines and best industry norms

Table 70: Water consumption pattern

For areas with bathing facilities	
Potable water	70%
Non- potable water	30%
For areas without bathing facilities	
Potable water	45%
Non- potable water	55%

Source: MACE analysis

Water demand calculation

The summary of water demand for EZ is given below.

Table 71: Water demand

S.no.	Description	Processing area	Non-processing area	Total	Unit
1	Total average demand	4650	2685	7335	cum/day
2	Total potable water demand	4430	1879	6309	cum/day
3	Total non-potable water demand	220	805	1025	cum/day
4	Fire demand	251	18	269	cum

Source: MACE analysis

Table 72: Estimation of average daily water demand

Land use pattern	Total area	Proposed FSI	Population density /sq.ft / person	Population	Water demand					
					Process water	Domestic water	Loss @ 10 percentage	Total	Potable	Non-potable
	acres				In cum/day					
Processing area										
Industrial area	131.98	1	800	7,183	3740	323	406	4470	4310	160
Loading & Unloading area	1.84	1	200	400	66	18	8	92	84	9
Utility	4.02		200	876		39	4	43	24	20
Road	29.18					21	2	23	13	11
Green & open space	19.94					15	7	21		21
Total processing area	**186.95**			**8,459**	**3,806.31**	**416.45**	**427.36**	**4650.12**	**4430.10**	**220.02**
Non-processing area										
Admin & Customs block	3.71	2	100	3988		179.46	17.95	197.41	138.18	59.22
Support amenity	9.34	1	20	50,245		2,261.03	226.10	2487.13	1740.99	746.14
Total non-processing area	**13.05**			**54,233**		**2,440.49**	**244.05**	**2,684.53**	**1,879.17**	**805.36**
Total	**200.00**			**62,692**	**3806.31**	**2,856.94**	**671.41**	**7,334.65**	**6,309.27**	**1,025.38**

Source: MACE analysis

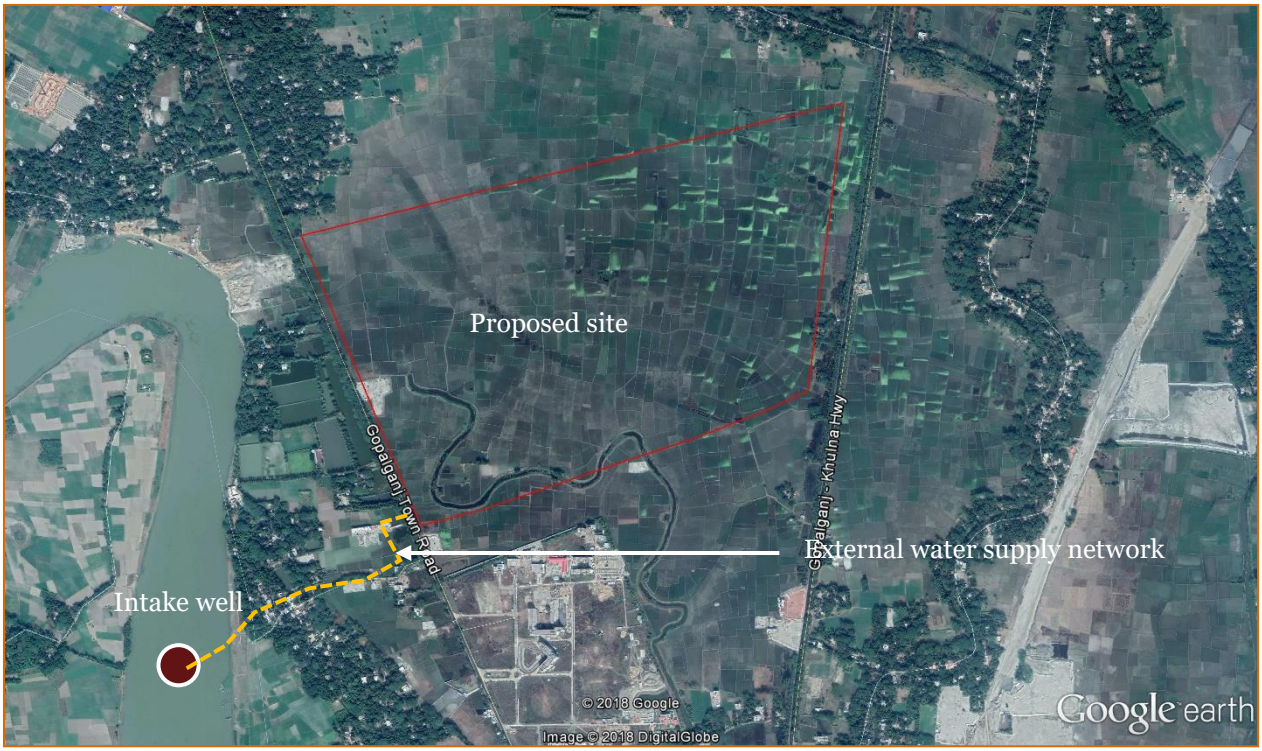
Water Supply to Economic Zone

Calculations from the previous table indicates that total potable water demand for the proposed EZ is 6.3 MLD. However, this figure is indicative in nature and may vary based on ground implementation of the project. The developer may undertake a separate industry assessment and master planning exercise in order to validate this figure.

River Madhumoti is a perennial fresh water source, which is 700 m away from EZ site. Infiltration gallery / well, collection well and pump house can be established near the river basin at an approximate distance of 700 m from the site to meet the water demand of EZ on a long-term basis. Detailed hydrogeological investigations need to be carried out based on which, a water treatment plant shall be provided near the intake structure.

However, secondary data reveals that the ground water table in and around the proposed site for EZ has a safe drawdown of 0.5 MLD/per tube well. For the initial demand it is planned to build three to four new bore wells within the proposed site to draw the ground water. Exact location of water intake (i.e., the locations of the tube wells) within the site needs to be finalized during the construction stage. Basis interaction with DPHE officials, the ground water is available at a depth of 200 m. approximately from natural ground level. The lithologic profile for the proposed area is provided in the annexure.

Figure 70: Details of External Water Supply System

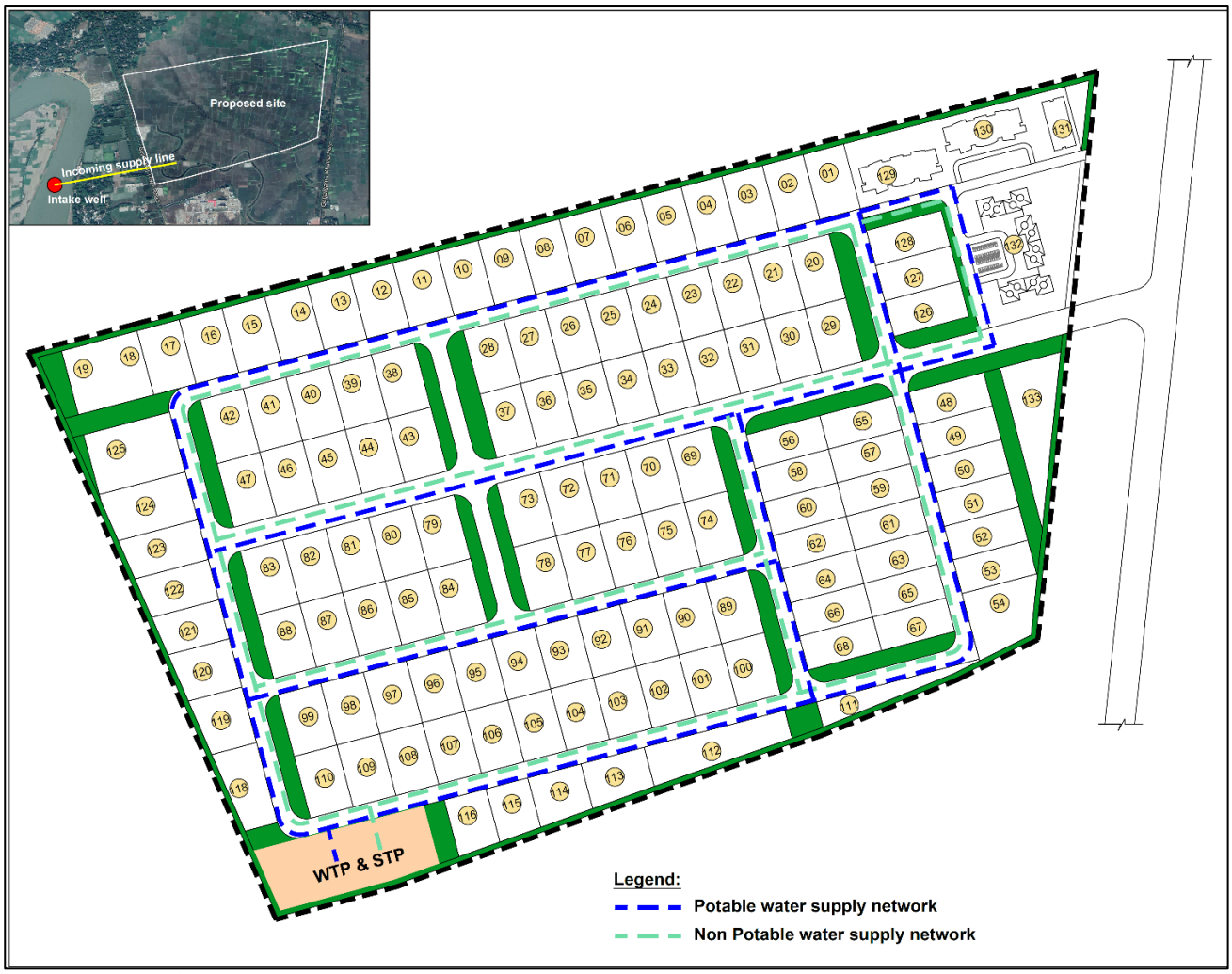


Source: MACE analysis

Potable water supply network

Infiltration gallery/well, collection well and pump house near the river basin can be provided along with the feeder line from the source to EZ.

Figure 71: Potable and Non-potable water supply network



Source: MACE analysis

Estimated water storage capacity

The estimated storage capacity calculated based on the arrived water demand is provided in the following table.

Table 73: Underground sump storage capacity

S. no.	Description	Processing area	Non processing area	Unit
1	Potable water	4430	1879	cum
2	Non potable water including fire demand	471	823	cum
	Total	4901	2702	**cum**

Source: MACE analysis

Table 74: Overhead tank storage capacity

S. no.	Description	Processing area	Non processing area	Unit
1	Potable water	369	157	cum
2	Non potable water	18	67	cum
	Total	387	224	**cum**

Source: MACE analysis

The above mentioned tables lists out the water storage capacity required to be established at the EZ site on basis of calculation of the water requirements. As per the table above, total underground sump storage capacity that would be required is 7603 cum. and total overhead storage capacity requirement would be 611 cum. However, this figure is indicative in nature and may vary based on ground implementation of the project. The developer may undertake a separate industry assessment and master planning exercise in order to validate this figure.

Required Pipe size and pump capacity

The required pipe size and pump capacity is provided in the following tables.

Table 75: Pipe sizing for processing area

Pipe size in mm	Length in m	
	Potable water	Non potable water
110	2127	5317
140	532	
160	532	
200	532	
250	532	
300	532	
350	266	
Total	**5,319**	**5,317**

Source: MACE analysis

Table 76: Pump capacity

Description		Processing area	Non processing area	Unit
Potable water	Capacity	0.10	0.04	cum/sec
	Number of pumps	2 W+1S	2 W+1S	
	Power requirement of each pump	25.00	11.00	Kw
Non- potable water	Capacity	0.01	0.019	cum/sec
	Number of pumps	2 W+1S	2 W+1S	
	Power requirement of each pump	1.00	5.00	Kw

Source: MACE analysis

The requirement of pipe size and pump capacity has been calculated in the above tables on basis of the water demand, water storage capacity and the size of the EZ site.

9.7. Waste water

The basis for calculating the waste water quantity is provided in the following tables –

Table 77: Waste water generation pattern

Description	Percentage
Bath / shower & laundry	55.97%

Description	Percentage
Hand basin, kitchen	12.29%
Toilet	31.74%

Source: MACE analysis, published standards, guidelines and best industry norms

Table 78: Sewage and sullage generation pattern

Sewage	Percentage
Grey water	27.91%
Gardening	19.53%
Cleaning	8.37%
Sewage	31.74%
Grey water	68.26%
Gardening	47.78%
Cleaning	20.48%

Source: MACE analysis, published standards, guidelines and best industry norms

As mentioned in the tables above, best industry practices and published standards have been adopted in order to calculate the percentage of waste water that would be generated from use of water for above mentioned non-industrial uses.

The calculated wastewater quantity is provided in the table on the next page.

Table 79: Sewage and sullage generation estimation

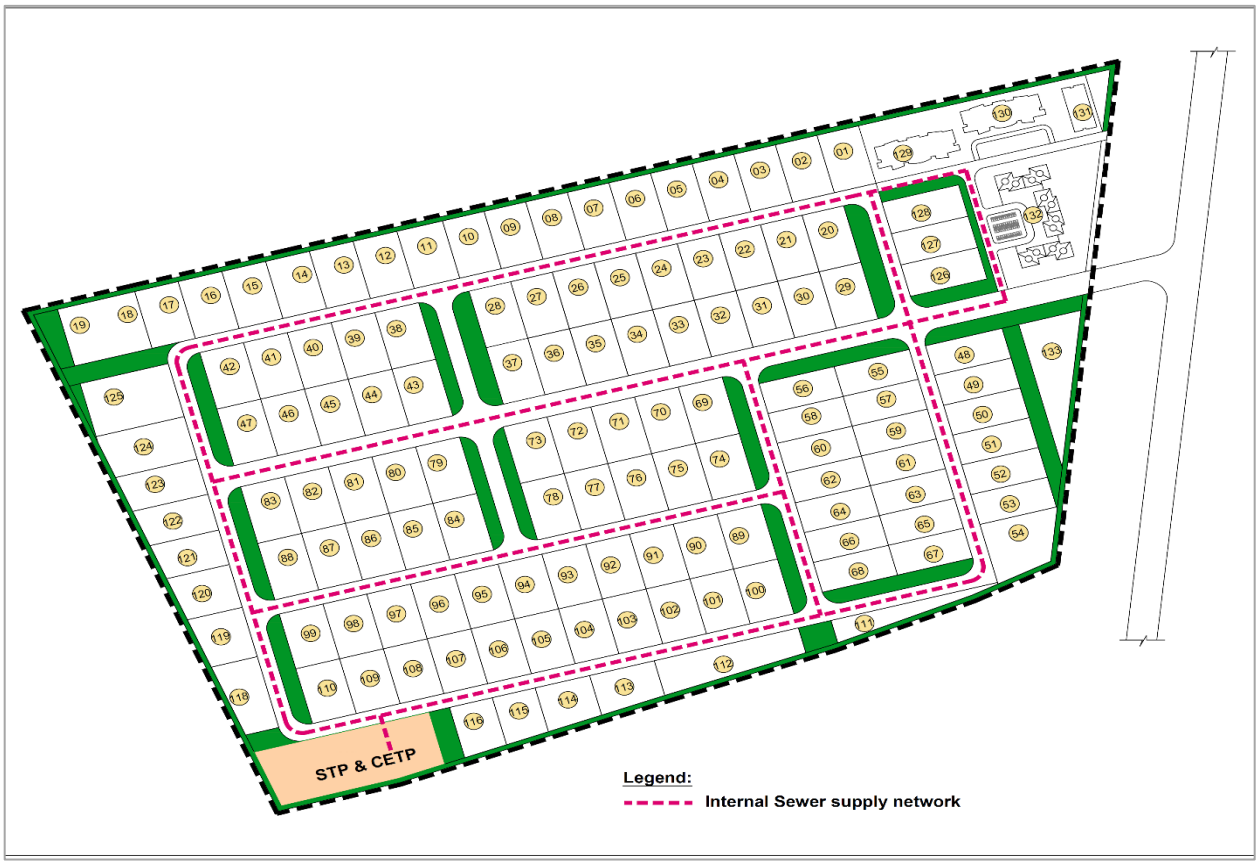
Land use pattern	Total area	Water demand				Effluent generation	Sewage generation	Sullage generation	Total effluent, sewage and sullage generation	Infiltration @10%	Total sewage quantity
		Process water	Domestic water	Potable	Non-potable						
	Acres	In cum/day									
Processing area											
Industrial area	131.98	3740.23	323.24	4309.81	160.00	1870.11	115.34	481.43	2466.89	446.98	2913.87
Loading & Unloading area	1.84	66.08	18.00	83.58	8.91	33.04	6.42	15.61	55.07	9.25	64.32
Utility	4.02		39.42	23.85	19.51		14.07	22.78	36.85	4.34	41.19
Road	29.18		21.26	12.86	10.53					2.34	2.34
Green & open space	19.94		14.53		21.07					2.11	2.11
Total processing area	186.95	3806.31	416.45	4430.1	220.02	1903.15	135.84	519.82	2558.81	465.01	3023.82
Non- processing area											
Admin & Customs block	3.71		179.46	138.18	59.22	-	18.80	120.98	139.77	19.74	159.51
Supporting amenities	9.34		2261.03	1740.99	746.14	-	236.82	1433.83	1,670.65	248.71	1,919.37
Total non-processing area	13.05		2440.49	1879.17	805.36		255.62	1554.81	1810.43	268.45	2078.88
Total	200.00	3806.31	2856.94	6309.27	1025.38	1903.15	391.46	2074.62	4369.23	733.47	5102.70

Source: MACE analysis

9.8. Sewer network

STP is located at lowest level in the SW corner of the site. The entire sewer network is planned along the proposed 30 m and 25 m wide roads of EZ. The sewer network and location of STP is shown below.

Figure 72: Sewerage Network



Source: MACE analysis

Required Pipe size

Table 80: Pipe size- sewerage network

Pipe size in mm	Processing area length in m
150	2393
200	1329
300	798
400	532
500	266
Total	**5,318**

Source: MACE analysis

The above table mentions the length of pipe that would be required for removal of sewage from the EZ site. This has been calculated after taking into consideration the perimeter of the EZ site.

Sewage quality

Table on the next page captures the quality of sewage that would be generated due to various industrial and non-industrial activities expected to take place inside the EZ site.

Table 81: Sewage quality

S. no.	Parameters	Unit	Concentration
1	PH	-	5.5 – 9.0
2	Suspended solids	Mg/l	300– 600
3	Biochemical oxygen demand	Mg/l	250 – 350
4	Chemical oxygen demand	mg /l	400 – 600
5	Oil & grease	mg /l	<20

Source: MACE analysis

STP components and process flow diagram

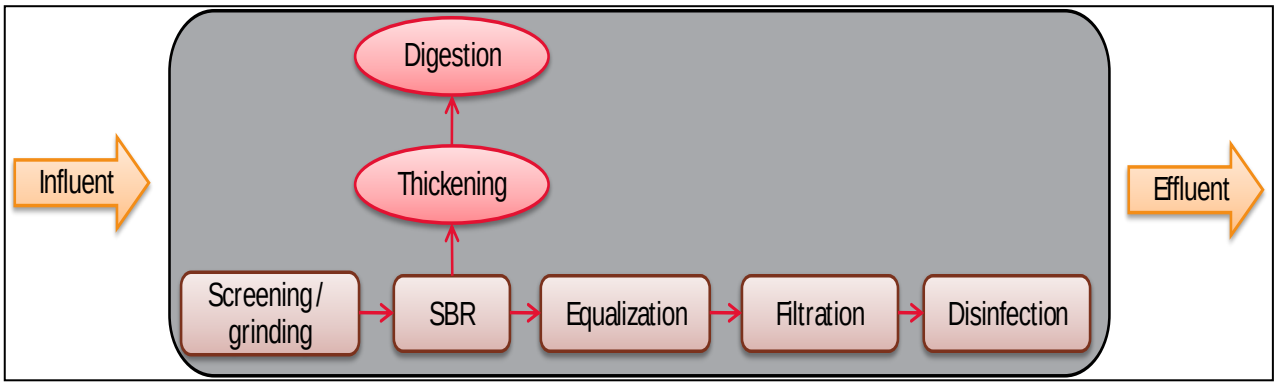
Table 82: STP- process and components

S. no.	Process	Units required	Accessories
1	Activated sludge – extended aeration	Aeration tank & secondary clarifier	Surface aerators or membrane diffuser system for oxygen supply
2	Aerated lagoon	Earthen bund basins	Fixed or floating aerators for oxygen supply
3	Up-flow Anaerobic Sludge Blanket (UASB)	Reactor with liquid, solid & gas separation facilities	Gas collector, burner and influent distribution system
4	Trickling filters	Circular tanks with media, under drain & secondary clarifier	Rotary distributor for influent and re-circulation pumps
5	Rotating Biological Contactors (RBC)	Trough with PVC/plastic discs, secondary clarifier	Drive mechanism for rotating the discs
6	Fluidized aerobic bio reactor	Reactor tank with poly propylene media and diffusers followed by secondary clarifier	Blowers for supply of oxygen through membrane diffusers
7	Sequencing Batch Reactor (SBR)	It uses deep RCC basins, and very efficient oxygen transfer equipment's (diffused aeration mechanism)	Diffusers, blowers and aeration grid, which provides highest aeration and oxygen transfer efficiency. Decanter assembly in Stainless steel equipped with variable frequency drive to automatically control rate of decanting based on input feed condition
8	Membrane Bio Reactor (MBR)	Aeration tanks followed by balancing tank and membrane bio reactor	Diffusers, blowers to supply oxygen, air compressors for backwashing, chemical dosing for pre-treatment.

Source: MACE analysis

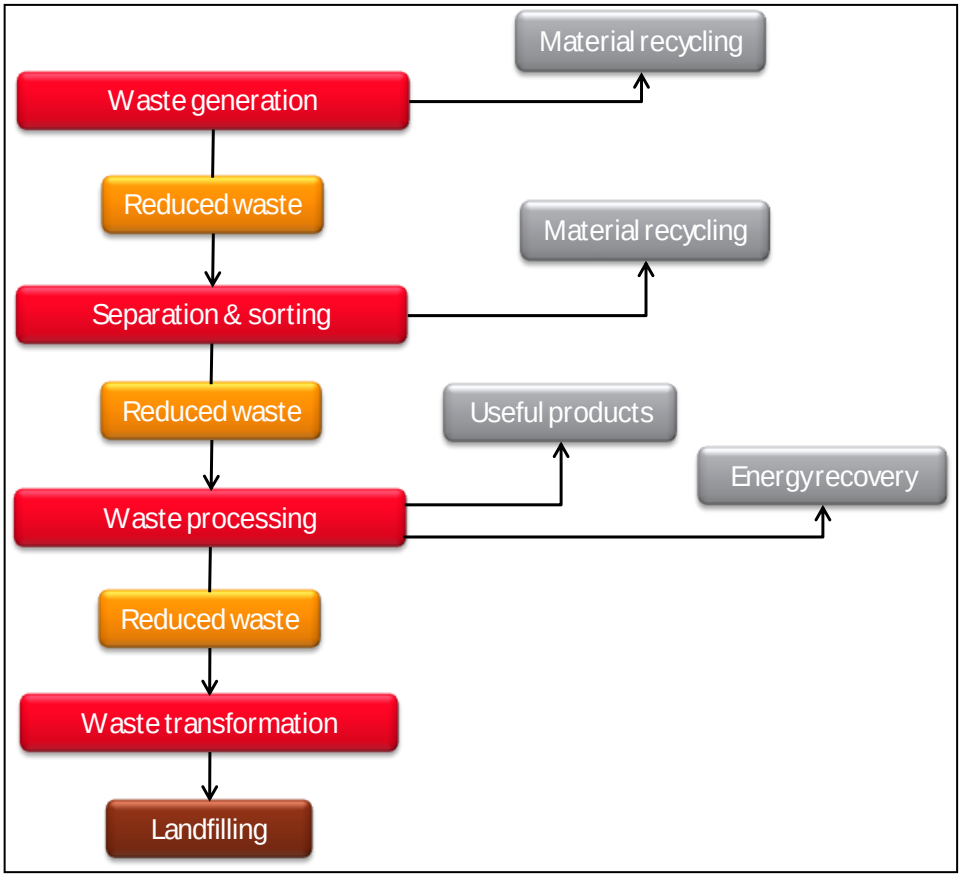
The table above captures the various components of the sewage treatment plant that would be required to set up in order to treat the sewage that would be generated from the EZ site. A process flow diagram elucidating the process of sewage treatment has been highlighted on the next page.

Figure 73: STP process flow diagram (SBR technology)



Source: MACE analysis

Figure 74: Waste reduction by integrated SWM



Source: MACE analysis

9.9. Drainage

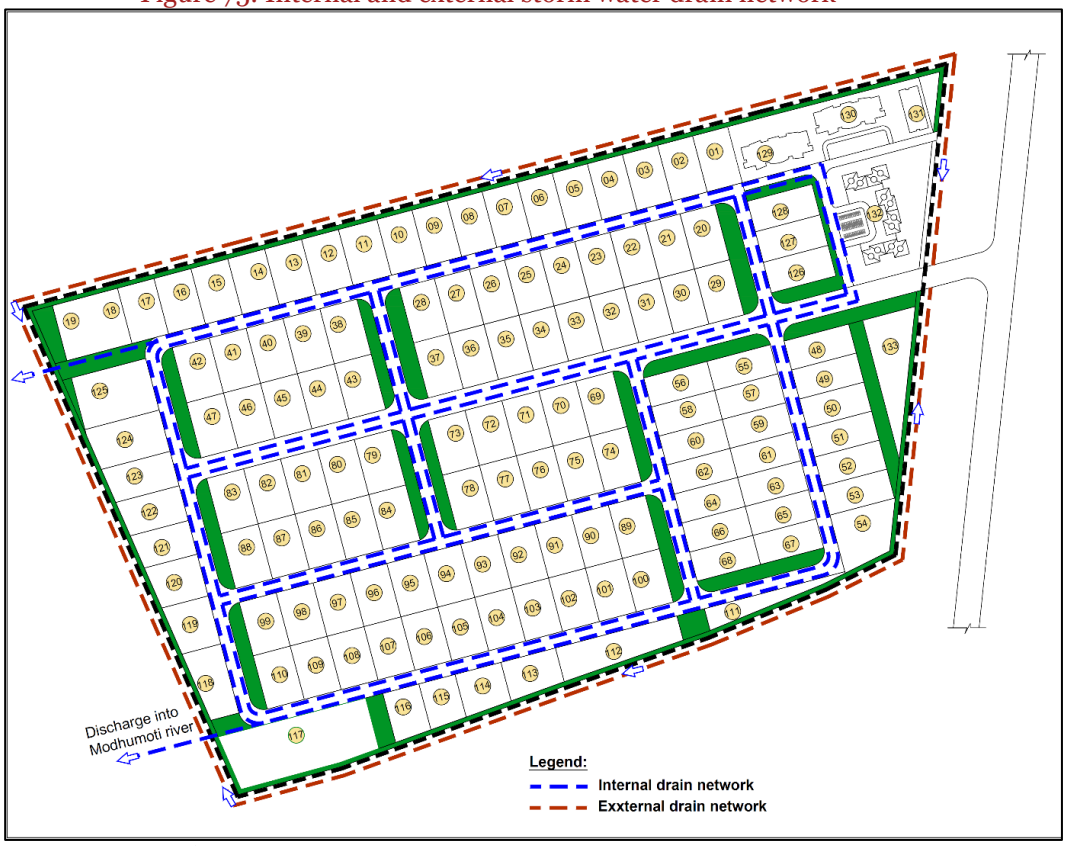
Based on the site gradient, the drainage pattern has been decided. In order to prevent the storm water entering from adjacent areas to the development area, a cut-off drain all along the periphery of the site is considered and connected to the water channel serving the agricultural lands in the north side of the site and River Madhumoti in the west side of the site. It has been planned to discharge the flow of the internal drain into nearby River Madhumoti.

- The drainage system is planned to cater for the entire EZ through gravity flow.

- Drains are proposed to be provided on both sides of the roads.
- Open trapezoidal drain is considered for the surface run off collection due to easy maintenance for the primary road. Stone pitching is considered for the side walls and PCC for the base.
- Covered rectangular brick masonry drain is considered for the remaining areas for optimization of area under drainage.
- RCC box / pipe culverts of suitable sizes are considered for road crossings.

Rainwater harvesting structures are envisaged all along the drain at regular intervals and the internal drain network is shown below–

Figure 75: Internal and external storm water drain network



Source: MACE analysis

9.10. Solid waste

The estimated solid waste quantity is 22.43 TPD and the calculation is provided in the following table.

Table 83: Estimation of MSW generation

Solid waste generation estimation					
Land use pattern	**Acres**	**Population**	**Msw generation**	**Unit**	**Kg/day**
Processing area					
Industrial area	131.98	7183	200	gm/capita/day	1436.60
Loading & Unloading area	1.84	400	100	gm/capita/day	40.00
Utility	4.02	876	100	gm/capita/day	87.60

Solid waste generation estimation					
Land use pattern	**Acres**	**Population**	**Msw generation**	**Unit**	**Kg/day**
Road	29.18		10.12	kg/ha/day	119.55
Green & open space	19.94		30.36	kg/ha/day	245.10
Total processing area	186.95	**8,459**			**1,928.85**
Admin & Customs block	3.71	3,988	100	gm/capita/day	398.80
Support amenities	9.34	50,245	400	gm/capita/day	20,098.00
Total Non-processing area	**13.05**	**54,233**			**20,496.80**
Total	**200.00**	**62,692**			**22,425.65**

Source: MACE analysis

Existing industry norms and benchmarks have been adopted to calculate the solid waste that would be generated from the EZ site as shown in the table above.

9.11. Telecom/ Internet connectivity to the proposed EZ

Optical fiber cables are available near the site and the bandwidth available is around 2 mbps. At present, the internet and telecom services are provided by private telecom subscribers such as Grameen Phone, Bharti Airtel, Banglalink, Teletalk and Robi in this region. Service by private operators has significantly improved the telecom connectivity in the region.

9.12. Infrastructure cost estimates

A component wise breakdown of the cost of developing on-site infrastructure as mentioned in this report has been elaborated in the table below.

Table 84: On-Site Infrastructure cost estimates

Description of Item	Quantity	Unit	Phase I Cost Breakdown	Phase II Cost Breakdown	Price without tax (In million Taka)	Price without tax (In million USD)
Road Network						
Road (30 m)	1174	RM	33	33	66	0.80
Road (25 m)	4143	RM	94	94	188	2.29
Total			**127**	**127**	**254**	**3.10**
Footpath and plot entry culvert			48.5	48.5	97	1.18
Total			**48.5**	**48.5**	**97**	**1.18**
Storm Water Network			21.5	21.5	**43**	0.52
Power Network						
Internal Power Distribution (OHT)			8.32	8.32	16.64	0.20
Distribution Transformer			16.55	16.55	33.09	0.40
Street Light	5,317.00	RM	6.46	6.46	12.92	0.16

Description of Item	Quantity	Unit	Phase I Cost Breakdown	Phase II Cost Breakdown	Price without tax (In million Taka)	Price without tax (In million USD)
Internal Substation	22.43	MVA	150	150	300	3.66
Fire Hydrant			0.25	0.25	0.5	0.01
Total			**181.58**	**181.6**	**363.15**	**4.43**
Water Network						
Water Supply Network			16.5	16.5	33	0.40
Sump, Overhead Tank, Pumps			64.65	64.65	129.31	1.58
Water Treatment Plant	6.31	MLD	30.59	30.59	61.18	0.75
Total			**111.74**	**111.7**	**223.49**	**2.73**
Sewer Network						
Sewer Network	5,317.00	RM	6.2	6.2	12.4	0.15
Waste Water Treatment Plant	5.1	MLD	92.78	92.78	185.55	2.26
Effluent Treatment Plant	4.37	MLD	163.85	163.85	327.69	4.00
Solid waste Management	22.43	TPD	174.81	174.81	349.62	4.26
Total			**437.64**	**437.6**	**875.26**	**10.67**
Telecom	5,317.00	RM	16.11	16.11	32.22	0.39
Sustainable Infrastructure elements						
Open Space/ Land scaping	59,823	Sqm	1.38	1.38	2.76	0.03
Greenery along road	5317	RM	0.08	0.08	0.16	0.00
Percolation Pits	354	Nos	0.26	0.26	0.51	0.01
Total			**1.72**	**1.71**	**3.43**	**0.04**
Support Amenities						
Admin Building	1,500.00	Sqm	52.5	0	52.5	0.64
Maintenance Buildings	100	Sqm	1.3	1.3	2.6	0.03
Total			**53.8**	**1.3**	**55.1**	**0.67**
Project Subtotal			**999.59**	**947.07**	**1,946.65**	**23.74**

Source: MACE Analysis

Apart from the costs considered in the above table, calculation of total project cost also takes into consideration the construction costs of standard factory buildings and implementing environmental management plan. The costs for these components are listed in the next page –

- Per sq. feet cost of constructing SFB has been taken to be 1,600 BDT/sq. ft. over an area of 13 acres having 60% coverage. The cost of constructing SFBs is 543.63 million BDT (i.e. USD 6.63 million).
- The cost of implementing environmental management plan during construction phase is taken to be 20.36 million BDT (i.e. USD 0.25 million). This cost covers expenses of environmental and social experts that developer would have to hire and social and environmental audit and studies that would have to be taken in order to prevent damages to local fauna, flora and residents during the construction period.

In view of considering these additional expenses, total cost of developing the EZ site would be BDT 2,510.7 million (i.e. USD 30.62 million).

9.13. Key Takeaway

On-site infrastructure captures the internal infrastructure facilities which need to be developed within the project site. Development of on-site infrastructure is responsibility of the developer. The major on-site infrastructure considered for the proposed EZ are internal road network, power substation, effluent treatment plant and other internal infrastructure facilities.

Key recommendations formulated from this exercise are outlined below-

- In accordance to the prevailing development guidelines of BEZA, a well-defined hierarchy of roads planned within the proposed EZ (such as arterial road of 30 m width and primary road of 25 m width). Local roads are planned only in the non-processing area.
- Since the proposed feeder line from Tungipara sub-station enters the site in the North Eastern side, infrastructure planning suggests locating the main Receiving substation of 132 /33/11 kV substation at entry point of feeder line. From the sub-station the transmission line network is aligned along the proposed road network to feed the individual plots.
- Water conveyance system including infiltration gallery / well, collection well and pump house near the river basin, and the feeder line from the identified water source (River Madhumoti) to be provided.
- Infrastructure planning takes into consideration an underground sump for storage purpose and for distribution, it is recommended to provide overhead tank (OHT) with distribution lines connecting each plot.
- Aligning the distribution pipeline individually for potable and non-potable along the road side with plot connection have been considered.
- Sewerage Treatment Plant (STP) is located at lowest level in the South West corner of the site. The entire sewer network is planned along the proposed 30 m and 25 m wide roads of EZ. It is proposed to use the treated water for non-potable purpose such as washing, watering to green areas etc.
- Infrastructure planning suggests adoption of Sequencing Batch Reactor (SBR) technology.

Block cost estimated based on the above outlined infrastructure components have been considered in the financial model.

10. Social Review

10.1. Purpose and Objective

As per the Resettlement and Social Management Framework (RSMF), which has been adopted to comply with the safeguards requirements of the World Bank's operational policy on Involuntary Resettlement (OP 4.12), the project is required to conduct a Social Impact Assessment Study. The policy requires that all unavoidable adverse impacts are mitigated with appropriate measures to enhance, or at least to preserve, the current living standards of those who would be affected by any subproject under PSDSP.

In the process of social review, an overall understanding of the social conditions of the project area was estimated. Broad idea about the number of PAPs, type of vegetation, presence of agricultural fields, type of crops and cropping patters, extent of compensation for land acquisition, livelihood restoration, identification of Common property Resources (CPR) falling within the proposed site, impact on structures were estimated broadly.

10.2. Methodology for Social Review

Social review is undertaken to ensure that potential social impacts/concerns are recognized at an early stage of project preparation, so that these concerns can be effectively addressed during subsequent stages.

The study for this project incorporates both secondary and primary information gathered through individual consultations, stakeholder interaction and interactions with people within the project influence area. The broad methodology followed by the team and the objective for undertaking the social impact assessment, are detailed below:

- To gather necessary information on existing socio-economic and cultural conditions in the project area and develop a baseline;
- Determine magnitude of (a) potential social impacts, positive as well as negative and (b) identify sensitive socio-economic cultural issues and vulnerable social groups.
- Identify key stakeholders and establish an appropriate framework for their participation in the project selection, design and implementation;
- Ensure that project objectives and incentives for change are acceptable to the range of people intended to benefit;
- Suggesting requisite feasible and cost-effective mitigation measures for each potentially significant adverse impact
- Identification of areas which might require further social analysis

The choice of methodology, sub-tasks/activities and their sequencing in respect of Social Impact Assessment has been determined by these specified objectives and is guided by the World Bank safeguard policy guidelines.

10.3. Socio–Economic Environment

The key parameters that are required to establish a baseline socio-economic profile of population within the project's area of influence include gender, ethnicity, social structure, employment patterns, sources of income, local tenure and property rights arrangements, use of community and natural resources. Primary information gathered by undertaking the screening survey, individual consultations and other stakeholder interaction and secondary information sourced from published references has been analyzed to establish the socio-economic baseline. As, the proposed economic zone is located in Gobra Union of Gopalgonj Sadar Upazila, Socio-economic profile of Gopalgonj Sadar Upazila is detailed below.

10.3.1. Geography

Gopalgonj is a district (zilla in Bengali) in the Dhaka division of Bangladesh. The district has about 1,172,415 civilians and its surface area is 1,490 km². The main city of the district is also called Gopalgonj. Gopalgonj is

subdivided into five sub-districts (upazila/thana). The district is surrounded by Faridpur in the North, Madaripur in the East, Barishal to the South-east, Khulna to the South East.

10.3.2. Demography

As per the 2011 census, Gopalgonj District has a total population of 1,172,415 and the total male and female population in the district is 577,868 and 594,547 respectively. The population density per sq km is 798. The literacy rate of the district is 58.09 while the sex ratio is 97. It is estimated that in the year of 2018 the total population of the district is approximately 1,177,440 (Male- 580,345; Female- 597,095).

As per the 2011 census, Gopalgonj Sadar upazila has a total population of 344,008 and the total male and female population at the Upazila is 172,991 and 171,017 respectively. It is estimated that in the year of 2018 the total population of the Upazila is approximately 360,354 (Male- 181,211); Female- 179,143)

Table 85: Demographic Profile of Gopalgonj District

District	Household			Population				Literacy in %			Sex ratio
	Total	Rural	Urban	Total	Male	Female	Density/ sq km	Total	Male	Female	
Gopalgonj	249,872	27,738	222,134	1,172,415	577,868	594,547	798	58.09	60.30	55.98	97

Source: Population & Housing Census 2011, Gopalgonj

10.3.3. Social Stratification

The majority population of Bangladesh is Muslim. According to Population & Housing Census 2011, Gopalgonj. Muslim population has been increasing since 1981 with a rate of 18.75%, 15.58% and 3.22% during intercensal periods 1981-1991, 1991-2001 and 2001-2011 respectively but the increasing rate shows a diminishing trend since1981. The opposite situation is prevailing with a constant decreasing trend in the population of Hindu community since 1981.

Table 86: Population by Religion

District Gopalgonj	Religion					
	Total	Muslim	Hindu	Christian	Buddhist	Others
No	**1172415**	805115	353794	12951	**80**	**475**
%	**100**	**68.67**	**30.18**	**1.10**	**0.01**	**0.04**

Source: Population & Housing Census 2011, Gopalgonj

10.3.4. Social Infra Structure

Gopalgonj Sadar Upazila has 210 primary, 44 high schools (2 Govt.), 6 Junior High schools, 3 Dakhil Madrasas, 2 Alim Madrasas, 01 Public University, 10 collage (03 Govt.), 5 Technical school & college, 01 Medical college etc. Gopalgonj Sadar Upazila has a 260 beds Govt. Hospital, 17 private Hospitals/Clinics, 17 diagnostic Centers, 21 Union Health centers. There are residential facilities available in the surrounding region.

10.3.5. Livelihood

The stakeholders' discussion with the local farmers and Upazilla Agricultural Officer indicated that crop rotation is being practiced in the region. Two crop cultivation (15702 hectors) and single crop cultivation (9265 hectors) being predominantly undertaken in the area. The proposed project area falls where single crop cultivation is being undertaken.

Based on Upazila statistic office information and details shared by UNO office, the agricultural produce is the substantial source of livelihood for the majority of the proposed EZ landowners.

10.3.6. Economy

According to District Statistics: Gopalgonj, 2011 the economy of Gopalgonj is predominantly agricultural. Out of total 230494 holdings of the district, 67.88 holdings are farms that produce varieties of crops namely local and HYV paddy, sugarcane, wheat, vegetables, spices, jute, pulses, and other minor cereals.

Various fruits like mango, banana, jackfruit, guava, coconut etc. are grown in the district. Alsomany kinds of vegetables like bitter gourd (karala), pumpkin (misti kumra), potato and brinjal are abundantly grown. Pisciculture and rearing of livestock and poultry adds an additional income to the rural households. Fish of different varieties are there. Varieties of fish are caught from rivers, tributary channels, even from paddy field during the rainy season.

Non-farm activities also play an important role in the economic development of Gopalgonj district. 59,975 persons are engaged in different types of non-farm activities. Female participation in non-farm activities is very poor and constitute about 8.59% as against 91.41% of the males.

10.3.7. Places of Historical Importance

St. Mathuranath AG Church (1875), Asram of Shukh Deva (1802), Kali Temple (1918), Gayela Mosque at Khagail of Gopalgonj Sadar Upazila, Bahulata Sikder Bari Mosque (200 years old) and Sree Sree Harinath Mandal are the notable archaeological Heritage and relics of the district. There are 2 Mass graves, 1 mass killing site and 2 memorial monuments which bear the testimony of the marks of war of liberation in the area. The Mazar of Bangabandhu Sheikh Mujibur Rahman, the Father of the Nation, is also located at Tungipara in Gopalgonj District.

10.4. Assessing Potential Impacts

For the development of EZ, the authority of BEZA proposes to acquire 200.00 acres land, of which the private land acquisition is for 199.70 acres and Khas land is 0.30 acres. Land cost has been considered after obtaining per decimal (0.01 acre) land cost of Gobra Mouza where the EZ site is located from the local AC land office which was found to BDT 72,710/ decimal. Post discussion with BEZA officers cost of land for private land was taken as 3 times the cost obtained from AC land office for private land and 1 time the cost for government land or Khas land. Based on Govt. mouza rate total land cost was found to be BDT 4.358 billion (including 200% premium). According to AC land office records, the proposed land for acquisition is mostly agricultural/Nul land.

Crop rotation is being practiced in and around the proposed project area. Two crop cultivations and single crop cultivation is being predominantly undertaken at the EZ site. Single crop cultivation is being practiced round the year in the area earmarked for proposed EZ. According to Upazila statistic office information and details shared by UNO office, the agricultural produce is the substantial source of livelihood for the majority of the owners. More than 200 persons are dependent on the land proposed for EZ development. There is no presence of household

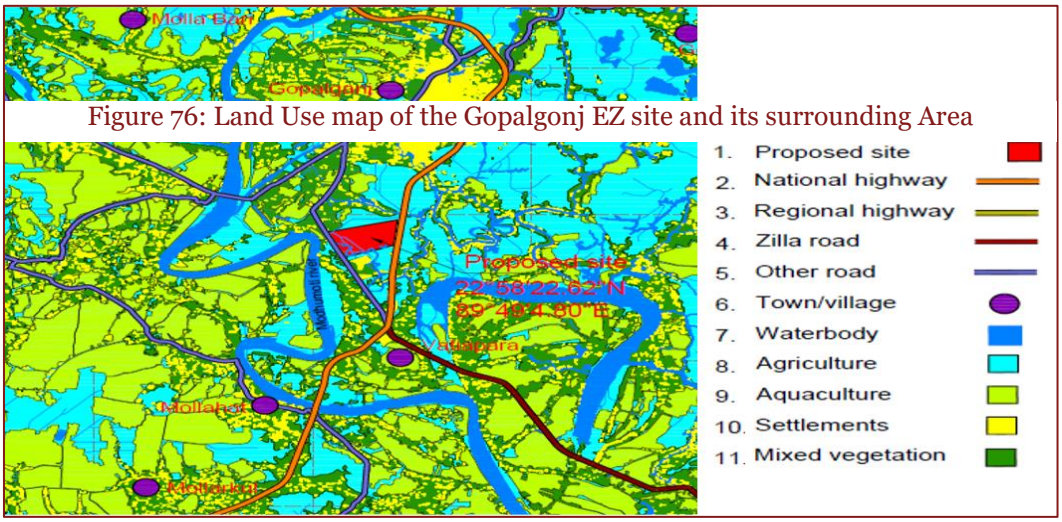


Figure 76: Land Use map of the Gopalgonj EZ site and its surrounding Area

structure and any institutions on the proposed site. Hence loss of structure due to the proposed development is not envisaged. The proposed site superimposed on Mouza Map and details of affected plots are furnished in Annexure at the end of this report. The land use pattern for the proposed EZ site is shown below –

Figure 77: Landscape of proposed site for Gopalgonj EZ

During videography recording in the month of November'18, it was observed that 2 new semi pucca houses are built and one multistoried building is being constructed within proposed EZ site. During the time social review survey in the month of January'18 and March'18, those structures were not there.

Figure 78:Newly Constrcuted building in the proposed Gopalgonj site

List of above indicated household within the proposed EZ site is given below:

Name	Father/ Husband Name	Mouza	Village	Union	Upazila	District	Mobile	Remarks
Ms Hamia Rahman	Mr Mahbubur Rahman	Gobra	Gobra	Gobra	Gopalgonj Sadar	Gopalgonj	01711-950156	Plot No. 952
MM Humayun Kabir	Mr Atahar Hossain Munshi	Gobra	Gobra	Gobra	Gopalgonj Sadar	Gopalgonj	01712-651746	Plot No. 951 (part)

10.5. Requirements for SIA and RAP

10.5.1. Social impact Assessment Requirements

The ideal situation for any project would be that it does not have any adverse impact on the population around. In practical, that is not always possible. The proposed EZ at Gopalgonj will cause acquisition of about 200 acres of agricultural land, thus loss of livelihood of the cultivators dependent on it. A detailed social impact assessment (SIA) should be carried out to assess the standard of living of this population, and hence arrive at an estimate of the losses that they will have to face in terms of assets- fixed and otherwise, loss of livelihood opportunities. The SIA report may be used further for putting together a resettlement action plan to diminish the adverse impacts to the affected population, as well as provide compensation as required. The SIA report can also be used to understand the existing social fabric amongst the affected population, and this can deepen the understanding of what an R&R plan will require.

Land Acquisition & Impact Mitigation Objectives

The principles and guidelines proposed in the RSMF are to avoid or minimize adverse impacts on private landowners and khas/public land users; mitigate the adverse impacts that are unavoidable; and assist the project affected persons (PAPs) to improve, or at least to restore, their living standards and income earning and production capacity to the pre-acquisition levels. To achieve these objectives, BEZA will consistently adhere to the following guidelines:

- Avoid or minimize private land acquisition;
- Avoid or minimize displacement from private homesteads;
- Avoid or minimize displacement of persons and households who may have been using khas/public lands for residential, commercial and other purposes; and

- Mitigate the adverse impacts associated with private land acquisition; displacement from khas/public lands; use of common property resources; and temporary displacement/closure of business and livelihood activities during implementation of the civil works.

RSMF & Impact Mitigation Plans

The principles, policies and guidelines as proposed in this RSMF will apply, irrespective of PSDSP components, to all EZs and similar sub-projects, and their off-site support infrastructures that will involve private land acquisition and use of khas/public lands.

10.5.2. Requirement of RAP

The development of the EZ is envisaged on land of 200 acres. Out of 200 acres, approximately 199.70 acres of land is private in nature where agricultural practices are going on currently. Agriculture is majorly practiced in the low land area. All the agricultural lands falling within the site boundary shall be acquired by BEZA and proper compensation based on present market rates to be provided. Based on Upazila statistic office information and details shared by UNO office, the agricultural produce is the substantial source of livelihood for the majority of the proposed EZ landowners. The project will not impact any household structure and any institutions. Based on AC land office proposed plots index, the total number of project affected persons (PAPs) are higher than 150, thus a Resettlement Action Plan (RAP) needs to be prepared for the PAPs in accordance to World Bank's safeguard standard and Government of Bangladesh's Social and Resettlement rules. According to Gopalgonj Zila sub-Registry office land price list, in 95 No. Gobra Mouse's per decimal Nul/Agricultural Land price is BDT 72710.00. Based on the principles proposed for impact mitigation, the following martrix defines the specific entitlements for different types of losses, entitled person, and the institutional responsibility to implement them.

Table 87: Entitlement Matrix for Loss of Lands

Ownership type	Entitled Person	Entitlement	Responsibility
Private	Legal Owners, as determined by DC*s, or by Courts in cases of legal disputes	Compensation-under–law (CUL) or replacement costs, whichever is greater If applicable (subject to difference between CUL & Current Market price) • Top-up equal to the difference between CUL and replacement costs. • Transition allowance (TA) for income loss	CUL paid by DC Top-up and TA paid by project
Khas and other public land under lease	Leaseholders	• Contractual obligations with the public agencies, as determined by DCs and or • Contractual obligations with the other GOB agencies	Paid by DC and/project

**DC will determine the market price of crops with assistance from district Department of Agricultural Extension and district Agricultural Marketing.*

Table 88: Loss of Agricultural Income

Impact Type	Entitlement Person	Entitlement	Responsibility
If acquisition amounts to 20% or more of the total productive area	Legal Owners, as determined by DCs, or by Courts in cases of legal disputes	Transition allowance equal to three times the harvest prices of one year's crops produced in the acquired parts of the lands	By Project

10.5.3. Current Market Price (CMP) of the proposed land

Generally, two steps are followed to determine replacement value for the land acquired. The first one is the 'Conventional' rule set by the law often called DC payments or Cash compensation under law (CUL). Second, the

project has provision for 'top up' payments to match replacement value for land acquired in the case of difference between DC valuation and current market price (CMP).

The CMP survey conducted for the proposed EZ was interview based. The interview was conducted with landowners, most recent buyers and sellers and Deed writers of the proposed mouza where land is proposed to be acquired. Based on three group's interview, we found that the current market price is on an average 10% higher than Govt rates (excluding registration cost and stamp duty).

For the development of this EZ, BEZA proposes to acquire 200.00 acres land, out of which the private land acquisition is for 199.70 acres and Khas land is 0.30 acres. In accordance to the current legislations governing land acquisition of Bangladesh is the Acquisition and Requisition of Immovable Property Act 2017 (hereinafter, "the Act") which replaces the old 1982 Ordinance on Acquisition and Requisition of Immovable Property and BEZA's RSMF, cost of land for private land was taken as 3 times the cost obtained from AC land office for private land and 1 time the cost for government land or *Khas land*. Based on Govt. mouza rate total land cost was found to be BDT 4.358 billion (including 200% premium). On the other hand, CMP survey result indicates difference between CMP and CUL, and the CMP survey findings recommended land cost to be BDT 4.794 billion (excluding registration cost and stamp duty).

Table 89: Average CMP and Mouza Rate of Land- Summary

Category of Land	Quantity (acre)	Average CMP of different land (million BDT)	Average Mouza Rate including 200% premium/CUL(million BDT)	Difference Between CMP & CUL (million BDT)	Ratio
Nul/Agricultural land (private)	199.7	4,791.66	435.6	4,356.06	100:110
Nul/Agricultural land (Govt. Land)	0.30	2.18	2.18	0	100:100
Total/Average	200	4,793,843,010.00	4,358,237,400.00	435,605,610.00	100:110

Note: Govt/khas land premium is 1 time and private land premium is 3 times

Based on AC land office records, the proposed land for acquisition is mostly agricultural/Nul land. More than 200 persons are dependent on the land proposed for EZ development. A detailed Social Impact Assessment (SIA) study should be carried out and Resettlement Action Plan (RAP) needs to be prepared for the PAPs in accordance to World Bank's safeguard standard and Government of Bangladesh's Social and Resettlement rules.

Challenges of Land Acquisition

- The proposed site is close to town and land price is quite high

To overcome challenges pertaining to acquisition of land, satisfactory compensation need to be awarded to the PAPs

10.5.4. Land Requirements and Resettlement Issues

One of the most important activities under PSDSP is identifying locations and making the required lands available for the Economic Zones. Although the land area for the individual EZs will vary in terms of location, land availability and the preferred economic activities, the required amounts are expected to develop support infrastructures like new access roads, or improving/widening the existing ones to connect the EZs with the major highways; sewerage systems; power distribution; water supply; and the like. In any case, BEZA has planned to obtain the lands from the khas under the Ministry of Land and unused lands belonging to various GOB agencies; and by acquisition from private ownerships. It is also possible that in rare situations, especially where the required private lands are very small in amounts and are to be urgently made available for civil works, BEZA may

as well go for direct purchase from the landowners. Barring those with direct purchase, the potential resettlement issues are expected to be associated with,

- Displacement of persons/households who may have been using, without authorization, the khas and other public lands to live in and/or earn a living (non-titled persons);
- Resumption of leased-out khas and other public lands from private citizens, which may have been in use for residential, commercial or other purposes; and
- Acquisition of private lands which may cause displacement from whatever economic activities presently are there, including loss of homesteads. Given that the EZ would use lands in large parcels, it is also possible that some households may become completely landless, if they have all their lands in the selected sites.

Considering the potential impacts, BEZA proposes to obtain khas/public lands which may have been under authorized and unauthorized private uses, and private lands by using the following means:

Khas and Other Public Lands

- Under Authorized Use: If the required lands are presently under lease from the Deputy Commissioner (in cases of khas) or any other GOB agencies, BEZA may seek to use them by fulfilling the lease stipulations.
- Under Unauthorized Use: BEZA will take them back by mitigating the associated adverse impacts consistent with the World Bank's OP 4.12 and OP 4.10.

Private Lands

- Wherever found absolutely necessary, BEZA will use the present Acquisition and Requisition of Immovable Property Act 2017 and any other applicable legislations, and mitigate the associated adverse impacts in compliance with the Bank's OP 4.12 on Involuntary Resettlement and OP 4.10 on Indigenous Peoples.
- Direct purchases from private landowners in compliance with the Bank's specified guidelines. Simplest of the means to obtain private lands is direct purchase from the landowners and resolve the resettlement issues, if any, in the transaction process. However, given the possibility that the private landowners would be quite large in number and not all would be willing to sell, the remaining means is to use the state's power of eminent domain and acquire the lands according to the established legal framework. While all private lands will be acquired, there might be occasions, however rare, when BEZA may need to urgently use small amounts of private lands that may not have been included in the LAPs submitted to the Acquiring Body and the legal acquisition process is already well underway or completed. In situations like this and considering the lengthy acquisition process, BEZA may decide to purchase the ladns directly from the owners in accord with the following guidelines:
- All direct purchases must be on a 'willing buyer-seller basis. That is, the landowners cannot be forced or intimidated directly or indirectly to sell and at prices that are lower than the current market rates for similar lands.
- Prices for lands and other assets created or grown on them are to be negotiated and paid transparently in the presence of community leaders and organizations, NGOs, and others who are respected by the local people for their fairness and integrity. BEZA will always try to avoid dealing with middle-men (dalal) and remain fair and transparent by having the communities and individuals, as suggested, participate in the transaction process.
- Documentations consisting of minutes of price negotiations indicating location, amount, and any assets built or grown (structures, trees, etc.); names, addresses and telephone numbers of persons participated in the negotiations; and the purchase records are required to be submitted to the Bank for its review and clearance.

10.6. Overview of Social Legal and Policy requirements

The current legislations governing land acquisition for Bangladesh is the Acquisition and Requisition of Immovable Property Act 2017 (hereinafter, "the Act") which replaces the old 1982 Ordinance on Acquisition and Requisition of Immovable Property. The Act provides safeguards for landowners and has provisions for payment of 'fair value' for the property acquired. The act also made provisions for payment of crop compensation to tenant cultivators. However, it does not cover project-affected persons without titles or ownership record and does not ensure replacement value of the property acquired. It does not permit the affected persons to take the salvageable materials for which compensation has been paid by the DC. It has no provision of resettlement assistance and transitional allowances for restoration of livelihoods of the non-titled affected persons.

In all cases, the Deputy Commissioner (DC) determines (i) market value of acquired assets on the date of notice of acquisition (based on the registered value of similar property bought and/or sold in the area over the preceding 12 months); and (ii) 200% premium on the assessed value (other than crops) due to compulsory acquisition. The DC payments "awarded" to owners is called cash compensation under law (CCL). The market value determined by DC is invariably less than the real market price as owners customarily report undervalued land transaction prices in order to pay lower stamp duty and registration fees. The premium paid by DC has been increased from 50% to 200% of market value for government land acquisition and to 300% in case of private land acquisition in the new act. However, even so in most cases the compensation remains less than the real market price or replacement value (RV).

World Bank's policy on involuntary settlement OP 4.12 covers direct economic and social impact caused by

(a) the involuntary taking of land resulting in (i) relocation or loss of shelter; (ii) lost of assets or access to assets; or (iii) loss of income sources or means of livelihood, whether or not the affected persons must move to another location; or

(b) the involuntary restriction of access to legally designated parks and protected areas resulting in adverse impacts on the livelihoods of the displaced persons

Table below shows the comparison of GOB's Ordinance and WB policy gaps between WB OP 4.12 and GOB 2017 Act.

Table 90: Gap Analysis: WB OP 4.12 and GOB 2017 Act

Gaps between WB OP 4.12 and GOB 2017 Act.	Recommendation to bridge the gaps
Gaps with regard to avoidance and minimised project impacts	The project designs including that of the associated facilities should aim to minimise impacts.
Existing GOB laws recognise title owners only; informal settlers are not covered.	All affected persons irrespective of titles will need to be identified for compensation and assistance
Existing laws and methods of assessments do not ensure full replacement costs. However, the 2017 Act has increased the provisions for compensation.	Provisions should be adopted for additional top-up payments to ensure replacement costs at current market price
Consultation with affected community is not legally required under the Act.	Extensive consultations will need to be carried out during the preparatory phase; similar consultation will continue during project implementation
The affected land owners can object to the acquisition in the beginning but once the hearing is done and settled, there is no scope of further complaint during the acquisition process.	There will be a provision of two-tier grievance redress mechanism in the project. One local level GRC (LGRC) and another project level GRC (PGRC).
No support or programme for income and livelihood restoration	The project benefits will include income and livelihood restoration

Gaps between WB OP 4.12 and GOB 2017 Act.	Recommendation to bridge the gaps
No provision for reconstruction or replacement of non-religious common property resources	The project will reconstruct all physical and cultural resources (PCRs) and common property resources if affected by the project.

10.7. Stakeholder Consultations

10.7.1. Introduction and Objectives

This section provides the stakeholder identification and analysis as well as a brief understanding of the engagement process for the project. "Stakeholder" refers to those who have plausible stake in the environmental/social impacts of the project or activity are ascertained with a view to taking into account all the material concerns in the project or activity design as appropriate. It is highly desirable for all key stakeholders to arrive at a consensus on sensitive features, impacts and remedial actions. Stakeholder identification was done by examining the potential impacts of the project in terms of:

- ✓ Who may be affected directly (project affected people);
- ✓ Which agencies might have responsibility for the impact management;
- ✓ Which other organizations might have an interest in monitoring proponent activities or have local knowledge to contribute; and
- ✓ Which private/non-government sector entities might face financial and social hardships if the predicted impacts occur

The stakeholders identified in the project comprise of project impacted people, project beneficiaries, various government officials.

The main objective of the consultation process is to minimize negative impacts of the project and to maximize the benefits from the project to the local populace. The objectives of public consultation as part of this project are:

- ✓ Promote public awareness and improve understanding of the potential impacts of proposed projects
- ✓ Identify alternative sites or designs, and mitigation measures
- ✓ Solicit the views of affected communities / individuals on environmental and social problems
- ✓ Improve environmental and social soundness
- ✓ Clarify values and trade-offs associated with the different alternatives
- ✓ Identify contentious local issues which might jeopardise the implementation of the project
- ✓ Establish transparent procedures for carrying out proposed works
- ✓ Inform the affected populace about the entitlement framework and to settle problems with mutual consent
- ✓ Create accountability and sense of local ownership during project implementation; and
- ✓ To obtain information on baseline environment

10.7.2. Methodology of Stakeholders Consultation

Different techniques of consultation with stakeholders were used during project preparation, viz., in-depth interviews, public meetings, group discussions etc. to understand the socio-economic profile of the community and the affected families, baseline environment, environmental/social concerns etc. A two-fold Stakeholder Consultation Meeting (SCM) was carried out simultaneously during the social review. In this regard, the SCMs

were conducted firstly with both the primary and secondary stakeholders and later, affected persons within the occupation and gender based groups were consulted through Focused Group Discussions (FGD). Three FGDs were carried out at three location of the Project area (a. Chawdhury para at Gobra village, b. Gobra Bazar and c. Madrasapara at Gobra village. FGDs were conducted at different locations of the Project areas with three different occupational/gender groups, e.g., businessmen/traders, youth, and women.

10.7.3. Level of Consultations

Public consultations in the form of institutional and focused group discussions were carried out during the period from 11th January 2017 till 6th April 2018. Types of consultations done with various participants using various tools including, interviews with government officials, focused group discussion etc. are presented in below table:

Table 91: Types of Consultations

Level	Type	Key Participants
Institutional	Stakeholder Meeting	Various Govt. Officials
Community	Focused Group Discussion	PAP, Women, marginalized people

10.7.4. Institutional Stakeholders Consultation

Consultation conducted at institutional level with various Government Officials are furnished in below section.

Date of Meeting: 11 January, 2017
Location of Meeting: Upazila Nirbahi Officer's Office in Gopalgonj Sadar
Officials Met: Listed on the next page.

Name of Person	Designation/Department	Contact Details	Date of Consultation
Shammi Akhter	UNO	01711312230	11-Jan-17
Jakuria Alam	Sub-Assistant Engineer (Gopalgonj Pourushava)	01711964099	11-Jan-17
Sayid Hasan	Junior Engineer (REB)	01714693568	11-Jan-17
Musharraf Hasan	Surveyor (AC Land's Office)	01511112277	11-Jan-17
Harun Al Rashid	Upazila Election Officer (Election Commission)	-	11-Jan-17
Md. Jahangir Alam Khan	Upazila Forester (Forest Department)	-	11-Jan-17
Md. Mizanur Rahman	UAO, Gopalgonj Sadar (Department of Agricultural Extension)	-	11-Jan-17
Fatema Junnat	Statistics Officer (Upazila Statistics Office, Gopalgonj Sadar)	-	11-Jan-17
A.K.M Shamsuzzoha	Sub-Divisional Engineer (RHD)	-	11-Jan-17
Badal Chandra Kirtania	Upazila Engineer (LGED)	-	11-Jan-17
A.B.M. Mamunul Haque	Retainer Engineer (Gopalgonj PBS)	-	11-Jan-17
Md. Mahashin	Senior Upazila Fisheries Officer (Department of Fisheries)	-	11-Jan-17

Salient Points of Discussion
At the onset, the officials from Upazila Nirbahi Office welcomed the idea of developing economic zone in the region and country by BEZA and expressed their consent on the same. The officers extended cooperation in identifying the proposed EZ site and nearby features. Discussions were held on various developmental aspects of the proposed EZ like land acquisition status, utility availability, road connectivity etc. The discussion was

concluded by a visit to the project site to gain an on-ground understanding of the various issues. Some of the key features discussed were as follows:

- The site is a 200 acre contiguous plot in the shape of a trapezium, with National Highway, N805 and Regional Highway, R850 forming its Eastern and Western boundaries. There is a proposal to expand both these road stretches to 4 lanes to cater flow of heavy vehicles. These roads are currently in good condition and can support movement of heavy vehicles as well.
- Bangabandhu Sheikh Mujibur Rahman Science and Technology University is near the southern boundary of the proposed EZ site, while on the north proposed EZ site is bordered by agricultural land.
- Currently the proposed EZ site location is under cultivation with 1-2 crop rotation being practiced.
- Currently the irrigation needs are being satisfied by using water from a small channel flowing through the site area. However for industrial purpose, water may need to be pumped from the Madhumati River flowing 1-2 km from the western boundary of the proposed EZ site. As per stakeholder discussion, it was understood that ground water is not suitable for industrial consumption. There is a proposal for construction of a new water pumping station near the southern boundary of the proposed EZ site, if that proposal is approved the pumping station can supply water to the proposed EZ site for industrial purpose.
- Currently there are 2 substations supplying power to Gopalgonj Sadar upazilla, Gopalgonj Sadar substation and Tungipara substation around 10 km and 7 km from proposed EZ site, respectively. Each of these substations are of 10 MVA capacity with voltage line of 33/11 KV. Combined present demand from these substations is 12 MVA and the rest 8 MVA can be provided for consumption at proposed EZ site. These substations draw power from Gopalgonj grid having a capacity of 2x41 MVA, voltage of 132/33 KV. Work is in progress to upgrade Tungipara substation to 20 MVA capacity by June 2018 and also to construct a new substation of 10 MVA capacity.

10.7.5. Focused Group Discussions (FGD)

The Focused Group Discussions (FGD) were carried out with different group at the proposed EZ area on 06 April, 2018. PwC personnel discussed about the future developments and benefits the community can have upon the development of the EZ. The details of the Focused Group Discussions are presented in below.

Table 92: Details of Focused Group Discussion

Stakeholders Categories	Relevant Stakeholders	Issues	Suggestion/Demand from participants	Remarks
Local Youth Group (9 Participants)	Affected and adjacent residential settlements	• Employment opportunity • Development social infrastructure • Skills training to enhance the competency • Priority for local population	• If the project is developed, various job opportunities will be created • For this project, the social organizations will be developed • The skill training should focus on soft skills development, community-oriented courses, craftsman training (for semi-skilled opportunities • They will be get an opportunity to learn, get trained and work during the beginning of the construction activities of EZ	Employment opportunities for the youths shall be provided on a priority

Stakeholders Categories	Relevant Stakeholders	Issues	Suggestion/Demand from participants	Remarks
			• The training system should lead to trained young people in employable skills who are open to immediate employment opportunities. • The project affected youths shall be prioritized for employment opportunities	
Women Group (10 Participants)	Affected and adjacent residential settlements	• Equal opportunity to get employment • Security assured from migrants • Keeping in mind the opportunities to the affected persons • Ensure Family security	• There will be arrangements for many women's employment for the development of the EZ. • There will be equal opportunity for women as well as men. • They will be also get an opportunity to learn, get trained and work during the beginning of the construction activities of EZ • The safety and security of the people especially the women shall be assured. There will be so many migrants during the construction activities of EZ, safety and security should be ensured.	Women shall be provided with equal opportunities . No gender bias shall be made

Stakeholders Categories	Relevant Stakeholders	Issues	Suggestion/Demand from participants	Remarks
Local Businessman Group (9 Participants)	Affected and adjacent residential settlements	• Constructions include the operation phase help the growth of business • Provide skills trainings and opportunities to get the employment • Develop of EZ have an impact on livelihoods	• Many people will come here on the construction and operation phase so many sales will increase, and business will improve • The unemployed youth in the area or family will able to develop skills on the job and get job opportunities anywhere. The unemployed of the shopkeepers shall equally be provided opportunities to learn and work in the activities of EZ • As the progresses, the standard of living of the family will be increased • From the business view, with the development of the EZ, there shall be surge in their sales. More workers and people will come to their shop to eat and drink something	Workers will come to shops serve their purposes of lunch, tea , snacks and dinner

People in the area were eagerly waiting and were enthusiastic for a development project. They expressed that the development of the Economic Zone will bring social and economic development in the region by providing permanent source of income to the nearby residents. The community expressed that the project will help in increasing better connectivity, promote better and sustained employment opportunities, better service facilities, and better transport.
Details of attendees of Focused Group Discussions are furnished in Annexure at the end of this report.

Summary of Social Impacts

- Requirement of private land acquisition - 199.70 acre
- Impact on livelihood for a population of more than 200

10.7.5.1. Training for skill development in Project Area

Based on consultation with community including potential PAPs of the project area, requirement of following pertinent training is suggested

Table 93: Training for skill development in Project Area

SL	Type of Trade	Course Duration	Institutions
1	Electrician	6 months	Department of Youth Development
2	Welding	3 months	Vocational Training Centre/NGO
3	Carpentry	6 months	Vocational Training Centre/NGO

10.8. Key Takeaway

For the development of EZ, the authority of BEZA proposes to acquire 200.00 acres land, of which the private land acquisition is for 199.70 acres and Khas land is 0.30 acres. As per CUL study, based on Govt. mouza rate, total land cost was found to be BDT 4.358 billion. However, CMP survey result indicates difference between CMP and CUL, and the CMP survey findings recommended land cost to be BDT 4.794 billion (excluding registration cost and stamp duty).

Based on AC land office records, the proposed land for acquisition is mostly agricultural/Nul land. More than 200 persons are dependent on the land proposed for EZ development. There is no presence of household structure and any institutions on the proposed site. Hence loss of structure due to the proposed development is not envisaged.

A detailed Social Impact Assessment (SIA) study should be carried out and Resettlement Action Plan (RAP) needs to be prepared for the PAPs in accordance to World Bank's safeguard standard and Government of Bangladesh's Social and Resettlement rules.

11. Environmental Review

11.1. Purpose and Objective

The Environmental Review has been undertaken with the following objectives:

- To facilitate an understanding of the elements of the existing baseline conditions of project's area of influence;
- To identify the aspects of the project likely to result in significant impacts to environmental and social resources/receptors;
- To analyse and map relevant stakeholders involved in the project;
- To predict the significance of the impacts of the Project;
- To develop an understanding for the management and monitoring of impacts; and
- Preparation of Environmental Management Plan (EMP)

11.2. Methodology of Environmental Review

The methodology for the initial environmental review of the proposed site are:

- Identification and review of applicable local, state, national and international environmental and social regulatory and institutional frameworks;
- Establishment of baseline conditions of the site and surrounding area through the following:
  - Detailed surveys to observe environmental and social characteristics of the project area;
  - Discussions with the stakeholders and identification key issues during planning, construction and operation phase of the project;
  - Baseline data collection of the site and project area with respect to water, ambient air and noise quality etc. and
  - Ecological assessment on flora and fauna of the site and project area through secondary data collection.
  - Assessment of the socio-economic environment through collation of secondary information of the site, supplemented by consultations with the local communities to understand community perception with regard to the project and its activities;
- Impact Assessment and Mitigation Measures for environmental components for pre-construction/construction and operation phases. To minimize the adverse impacts mitigations measures will also be suggested; and
- Development of Environmental Management Action Plan which includes the following:
  - Mitigations for adverse environmental impacts and associated risks;
  - Institutional arrangement - management tools and techniques for the implementation of environmental impacts and risk mitigations;
  - Monitoring and reporting of requirements and mechanisms for the effective implementation of the suggested mitigations;
  - Monitoring arrangements for effective implementation of suggested mitigations for the proposed project; and

11.3. Overview of Environmental Legal, Regulatory and Policy requirements for the project (GoB, WB etc.)

This section highlights the regulatory requirements set out by Government of Bangladesh (GoB) and World Bank (WB) in relation to protection of environment and its resources as well as protection of the social environment from adverse impacts associated with the project development. These requirements are summarized below.

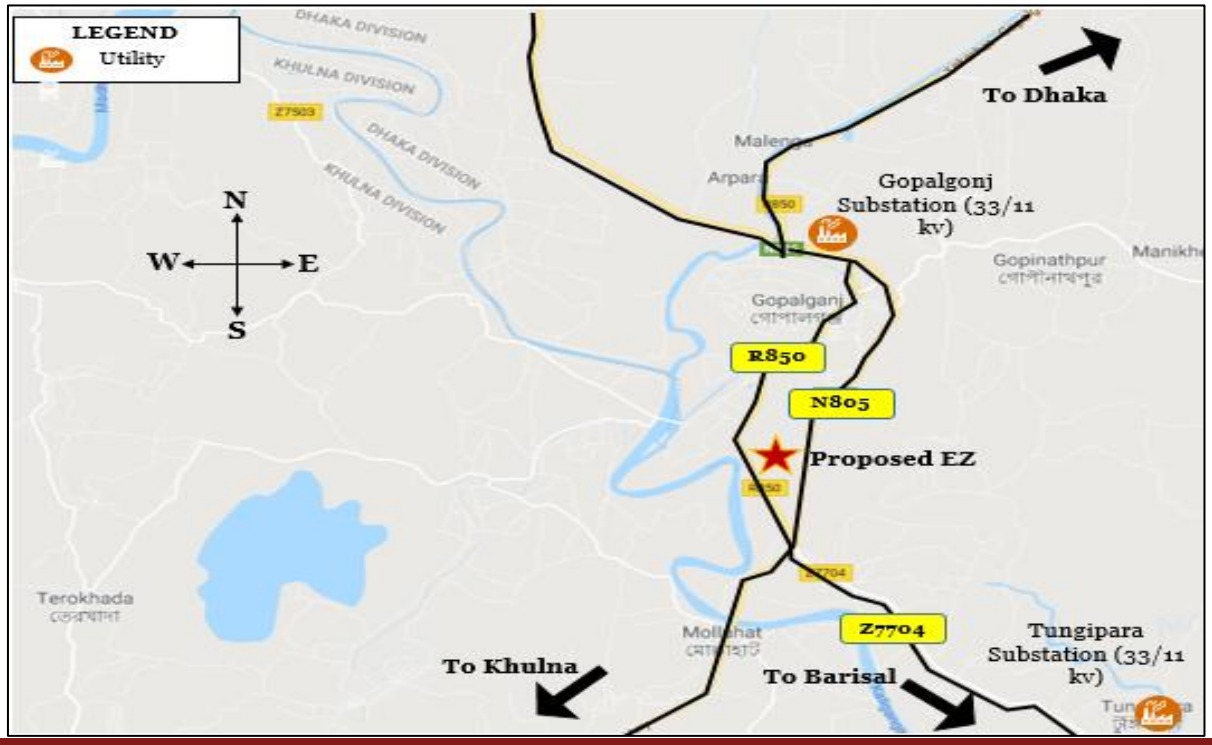
Table 94: Applicability of Key Environmental Legislation at a Glance

Name	Key Requirement	Applicability	Remarks
Acts/Rules			
The Environment Conservation Act, 1995 and subsequent amendments in 2000 and 2002 and 2010 Environment Conservation Rules, 1997 (Subsequent Amendments in 2002 and 2003)	Mandatory requirement of prior environment clearance for certain category of project for conservation and improvement of environment and control and mitigation of pollution of the environment. To ascertain responsibility for compensation in case of damage to ecosystem Restriction on polluting automobiles, sale and production of environmental harmful items. Promulgation of standards for quality of air, water, noise and soil for different areas for different purposes. Declaration of ecologically critical areas Promulgation of standard limit for discharging and emitting waste. Formulation and declaration of environmental guidelines. Categorization of industries, development projects and other activities on the basis of pollution activities of the existing or proposed industries/ development projects/ activities.	Applicable. The project is classified under red category EIA study required to be undertaken	Site approval certificate is to be obtained from DoE
Environment Court Act, 2000 and subsequent amendments in 2002	To give high priority to environment pollution prevention	Applicable as the project shall have environmental impacts	All the developments to be carried out as per ECA, 1995 & ECR, 1997 and amendments.
The Private Forests Ordinance Act, 1959	Conservation of private forests and for the afforestation on wastelands.	Applicable as the tree cutting is involved in	Tree cutting to be carried out after taking permission from

Name	Key Requirement	Applicability	Remarks
		development of off-site facilities	Regional Forest Officer, Forest Department
The Protection and Conservation of Fish Act, 1950 and subsequent amendments in 1982	Prohibit or regulate the construction, temporary or permanent of weirs, dams, bunds, embankment and other structures	Applicable. The project involves construction of embankment and other structures.	Necessary permission would need to be taken for construction of embankment.
Water Pollution Control Ordinance 1970	Prevention of water pollution	Applicable from the prospective of prevention of pollution	Applicable during both construction stage (e.g. sewage and equipment washing and maintenance liquid waste discharges at construction camps) and operation phase
The ground Water Management Ordinance 1985	Management of Ground Water Resources. Tube well shall not be dug in any place without permission from Upzilla parishad.	Applicable. 3-4 nos. tube wells will be dug to develop water supply system during initial phase	Permission should be taken before digging tube wells
The Embankment and Drainage Act 1952	An Act to consolidate the laws relating to embankment and drainage and to make better provision for the construction, maintenance, management, removal and control of embankments and water courses for the better drainage of lands and for their protection from floods, erosion and other damage by water.	Applicable. The project involves construction of embankment.	Regulatory authority Ministry of Water Resources and FCD
Wetland Protection Act 2000	Adhere to a formal environmental impact assessment (EIA) process, as set out in EIA guidelines and manuals for water sector projects or related to alteration of natural drainage. No construction of roads if likely to effect the flow of navigable water ways without clearance from concerned authorities Upland flow in water channels to preserve eco-system Protection against degradation and resuscitation of natural water-bodies such as lakes, ponds, beels, khals, tanks, etc. affected by man-made interventions or other causes.	Applicable. The proposed site location has low lying area.	Permission to be taken from the Ministry of Water Resources and DOE

Name	Key Requirement	Applicability	Remarks
	Completely stop the filling of publicly-owned water bodies and depressions in urban areas for preservation of the natural aquifers and environment. Stop unplanned construction on riverbanks and indiscriminate clearance of vegetation on newly accreted land.		
The Building Construction Act 1952 (with latest amendment 2006)	An Act to provide for the prevention of haphazard construction of building and excavation of tanks which are likely to interfere with the planning of certain areas in Bangladesh	Applicable as the project involves development of infrastructure	Regulatory authority is Ministry of Works
Bangladesh Economic Zones (Construction of Building) Rules, 2017	The rule states overall economic zone design requirements including zoning, open space requirement, green area, building orientation, accessibility and infrastructural requirements, access to fire appliances etc. The rule also elaborates the design requirements for individual building in the EZ , requirement of necessary permits, duties and responsibilities of developer, required qualification and responsibilities of the technical personnel involved, requirement of timely inspection etc.	Applicable as the project involves construction of buildings in the economic zones	In exercise of the powers conferred under section 38 of the Bangladesh Economic Zones Act, 2010, GoB made this rule
The Vehicle Act, 1927 The Motor Vehicles Ordinance, 1983 The Bengal Motor Vehicle Rules, 1940	To regulate vehicular exhaust emissions	Applicable as heavy vehicle movement is involved both during construction and operation phase	Regular maintenance and upkeeping of the vehicles should be carried out. Regulatory authority is Bangladesh Road Transport Authority
The Factories Act, 1965 Bangladesh Labour Law 2006, amendment 2013 Bangladesh Labour Rules 2015	This Act pertains to the occupational rights and safety of factory workers and the provision of a comfortable work environment and reasonable working conditions.	Applicable as the workers will be employed during construction and operation phase	Regulatory authority is Ministry of labour
Policies			

Name	Key Requirement	Applicability	Remarks
National Environment Policy, 1992	For sustainable development	Applicable for all development projects	Usage of energy efficient building material, fuel etc. should be encouraged
National Environment Management Action Plan 1995	Conservation of natural habitats, bio-diversity, energy, sustainable development and improvement of life of people	Applicable for all development projects	Usage of energy efficient material, green building techniques, reduction of carbon foot prints etc.
National Conservation Stratergy	Sustainable development of Industrial Sector	Applicable for all development projects	Usage of energy efficient material, green building techniques, reduction of carbon foot prints etc.
The National Energy Policy, 1995	Protecting the environment by requiring an EIA for any new energy development project, introduction of economically viable and environment friendly technology.	Applicable. EIA study is to be carried out	Energy efficient materials and techniques should be explored
The National Water Policy, 2000	To ensure efficient and equitable management of water resources, proper harnessing and development of surface and ground water, availability of water to all concerned and institutional capacity building for water resource management	Applicable. Ground water is required to be withdrawn for fulfilling water requirement at initial phase	Conjunctive use of water should be explored
The National Water Management Plan, 2001	Addresses options for water quality, considerations behind measures to clean up industrial pollution, where effluent discharge monitoring and zoning regulations for new industries are emphasized	Applicable as the proposed development will involve generation of sewage	Installation of sewage reatment facility within the premises
World Bank's Safeguards			
OP 4.01 Environmental Assessment	Ensures sustainability and environmental feasibility of the project. Projects are classified into A, B & C category depending on the nature and extent of the impact.	Triggered	Project classified as Category A considering impacts of project
OP 4.12 Involuntary Resettlement	Ensures safeguards to address and mitigate risks due to involuntary resettlement such as economic, social and environmental risks.	Triggered	The proposed land is devoid of any structures. However, acquisition of 199.70 acres of private land is proposed.
Private Sector Development Support Project			
Environment & Social Management	Describes all the mandatory environmental and social	Triggered	The framework sets out mitigation, monitoring and



Name	Key Requirement	Applicability	Remarks
Framework (ESMF)	clearances and purpose of the same required to be taken before development of the project		institutional measures to be taken during design, implementation and operation of the project activities to eliminate adverse environmental impacts, offset them, or reduce them to acceptable levels.

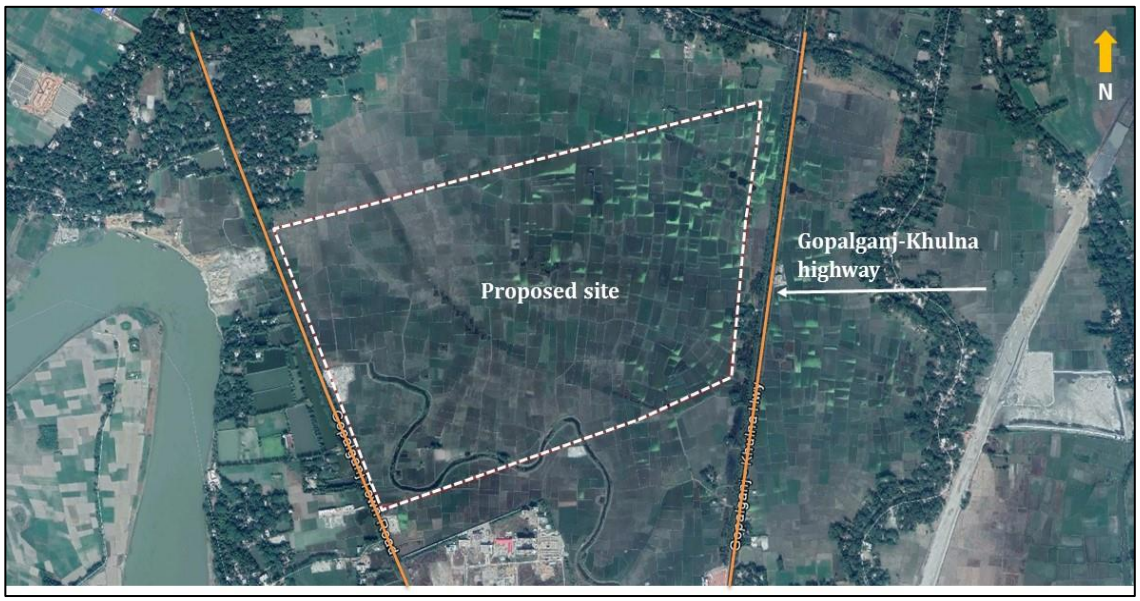
11.4. Existing Environmental context of EZ site and area of influence

The proposed EZ is located in Gopalgonj Sadar Upazila, Gopalgonj district of Dhaka division. Dhaka division, located at the central part of the country is economically most affluent division of Bangladesh and houses the capital city of the country, Dhaka. Dhaka division has 13 districts. Gopalgonj being one of them. Gopalgonj district is located on the south-western side of Dhaka division. It is surrounded by Faridpur district in the North, Madaripur in the East, Barisal in the South-East, Khulna & Bagerhat in the South-West and Narail in the West.

Figure 79: Location of the proposed Gopalgonj EZ

Source: PwC analysis

Figure 80: Location of the proposed Gopalgonj EZ on Google Earth



Source: Google Earth and MACE analysis

The proposed site is located in proximity to Madhumati River. The river flows to the west and southern side of the site at a varying distance of 0.4 Km to 4.000 Km. This River has been identified as key feature of the site surrounding and currently has a significant role on the topography of proposed site, since the site is located on the flood plain of the river. A radius of 5 km from proposed site boundary has been considered as zone of influence due to the proposed development. Hence 5 Km radius is considered as study area for carrying out Environmental and Social review. Zila/Upazila level secondary information was also collected for various environmental and social components irrespective of any demarcated boundary.

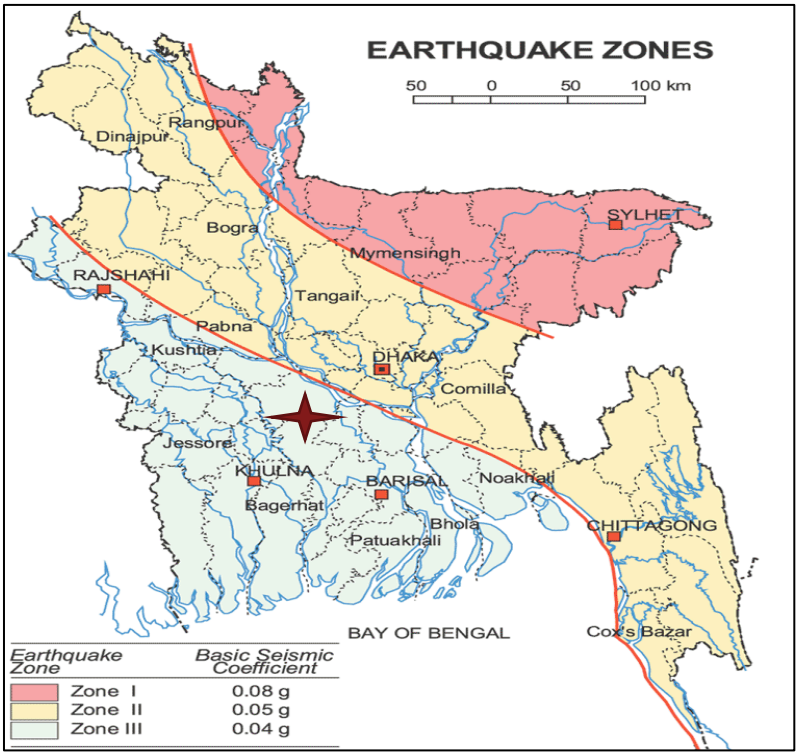
11.4.1. Topography and Seismology

Proposed EZ site is located in generally flat, low lying area. The land use of the project site is predominantly agricultural. Madhumati River is flowing within 500m on the west side and Borni Baor is flowing within 1-2 Km on the east side of the proposed EZ site. The site gets flooded (about 5 to 8 feet) during the monsoon.

Figure 81: Landscape view of the EZ site

Bangladesh has been divided into three generalized seismic zones. The northeastern regions of Bangladesh are the most active zones and belong to the zone-I. The zone II consists of the regions of recent uplifted Pleistocene blocks and considered as moderately active. The southwest Bangladesh is seismically quiet zone and represented by zone III. Proposed site is located in Zone III.

Figure 82: Seismic Zoning Map of Bangladesh



Source: Prime Minister's Office Library, Dhaka

11.4.2. Climatological Condition

Gopalgonj experiences a moderate climate throughout the year with temperature ranging from 23.3°C during summer to 8.6°C during winter. Such a moderate climate could support development of agro based and food processing industries in the region and also promote manufacturing activities which caters to the need of the farming community.

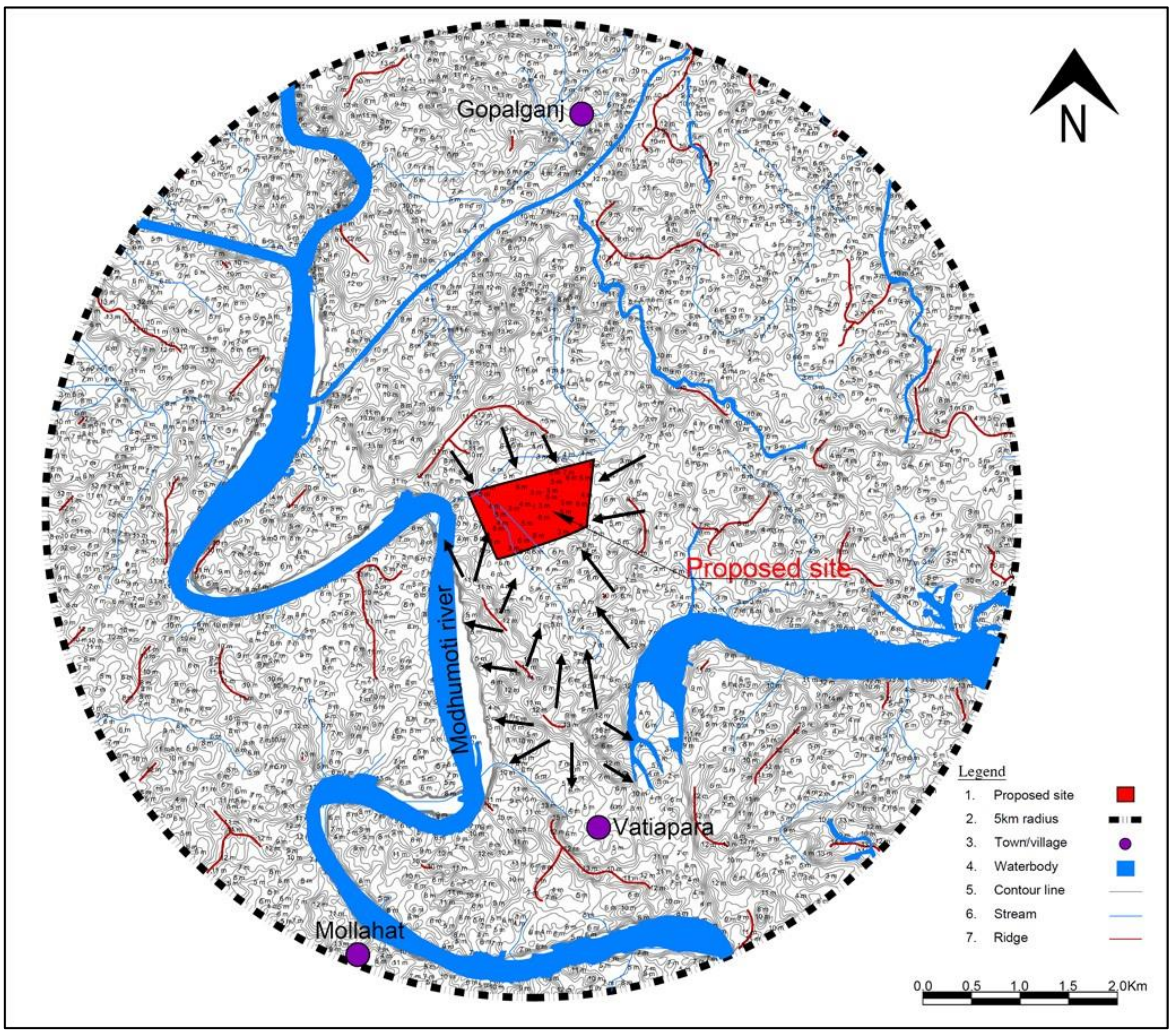
11.4.3. Land use Pattern

Based on Assistant Commissioner of land office record, the proposed site is mostly agricultural/Nul categories land. The stakeholders' discussion with the local farmers and Upazila Agricultural Officer indicated that, crop rotation is being practiced in the region. Two crop cultivations and single crop cultivation are being predominantly undertaken. Based on Upazila statistics office information and details shared by UNO office, the agricultural produce is the substantial source of livelihood for the majority of the proposed EZ landowners.

11.4.4. Drainage Pattern

The site lies on the east side of River Madhumoti. In general, the flow of surrounding area will be towards the river. To determine the vulnerability of site for flooding due to surface storm water runoff, detailed contour study of the surrounding area was carried out based on GIS data for the radius of about 2 km surrounding the site and the flow pattern of the surface storm water runoff based on the same is provided in the below figure.

Table 95: Drainage Pattern of Project Area



Source: Study of Drainage Pattern

In the figure shown on previous page, various details such as Ridge lines, Stream lines, Contours with levels and existing water body have been shown. Ridge lines are the lines connecting highest elevation points and the stream lines are the line connecting lowest elevation points. In general, the flow will be from the ridge line towards stream lines. It is observed that, the site falls on stream line which is running along west side of the site and there are ridge lines running along North, East and south side of the site. Hence, from these sides of the surrounding area, the surface runoff flow will be towards the site and therefore it is suggested to provide the peripheral drain along the North, East and south side of the site. From the flow pattern of the surrounding terrain provided in the Figure, it is observed that there is possibility of surface runoff flow from the surrounding area towards the site in the Southwest side. Also, the River is located at 0.2-0.7 km from the site in the western side. Hence, in order to safeguard the site from surface runoff and river overflow in western side, it is suggested to provide the peripheral drain along the western side also.

11.4.5. Soil Environment

Sandy loams with some black cotton soil is found at the project site and surrounding area.

11.4.6. Air Environment

Based on the secondary information and the site reconnaissance survey it was observed that baseline air quality was satisfactory. To establish the baseline of air environment monitoring was conducted by DoE, Bangladesh on 15th May'2018 from the northern side of project area. During the time of monitoring the direction of wind was

from south to north and weather condition was sunny. Concentration of Suspended Particulate Matter (SPM), SO2 and NOx was monitored. The results are furnished in below table.

Table 96: Ambient Air Quality of Project Area

Location	Date	Concentration of Pollutants (microgram/m3)			Remarks
		SPM	NOx	SO2	
Northern side of Project Area	15.05.2018	108	25	Not Detected	• Wind Direction- from South to North • Weather was sunny
Standard	-	200	100	365	-

Source: Primary monitoring conducted by DoE, Bangladesh

It was observed from the report that all the pollutant concentrations are well below than the stipulated standard of Bangladesh Environment Conservation Act, 1995 (amended in 2005)

11.4.7. Noise Environment

To establish the baseline condition of noise environment monitoring of noise level was carried out by DoE, Bangladesh at 2 locations. The level of noise found well within the standard of Noise Pollution (Control) Rules 2006 standard at both the locations. The results of ambient noise quality of the project area is presented in below table.

Table 97: Ambient Noise Quality of Project Area

Location	Date	Time	Sound Level in dBa
West side (outside of Project Area)	15.05.2018	12:05 pm	52.6
East Side (outside of Project Area)	15.05.2018	12:12 pm	54.2
Bangladesh Standard at day time (6:00 am to 09:00 pm) for mix area as per Noise Pollution (Control) Rules 2006			60

Source: Primary monitoring conducted by DoE, Bangladesh

11.4.8. Water Environment

11.4.8.1. Ground Water

According to the locals that the ground water level is around 400-500 ft deep. During the study it was observed that there is presence of two non-pervious layers (i.e., from 180 m BGL to 235 m BGL and from 270 m BGL to 335 m BGL). It is envisaged the aquifer in between (i.e., from 235 m BGL to 270 m BGL) will always contain water throughout the year. The proposed borehole depth can be limited up to 270 m BGL since there is silty clay beyond that point. Appropriate hydrological observations and tests need to be carried out within the proposed EZ site to determine the exact depth of groundwater. Bore well data collected from Department of Public Health and Engineering (DPHE) department in support of groundwater level is furnished in Annexure.

To understand the ground water quality of the study area ground water sampling was conducted by DoE on 13.05.2018 for further analysis. It was observed that the value for BOD is higher than the standards recommended by Department of Public Health Engineering, Bangladesh. Whereas TDS, Turbidity, chloride are within recommended limit.

Table 98: Ground Water Quality of Project Area

Date	Coliform	BOD (mg/l)	COD (mg/l)	TDS (mg/l)	Turbidity (NTU)	Chloride (mg/l)
13.05.2018	0.0.	2	Not Detected	622	7.32	114

Source: Primary monitoring conducted by DoE, Bangladesh

11.4.8.2. Surface Water

The Garai, the Madhumati, the Kaliganga and the Ghagar are the notable rivers of Gopalgonj district. Madhumati River is flowing around within 500 m on the west side of the EZ site location. Beside this, a small channel is flowing through the proposed site area. Madhumati River is a distributary of the upper Padma River.

Surface water sample from site area was drawn by DoE on 13.05.2018 for testing to get an idea about the surface water quality of the project area. pH, BOD, COD, TDS, EC and chloride parameters were tested. It was observed that BOD value exceeds the standard as stipulated in the Environmental Conservation Rules, 1997

Table 99: Surface Water Quality of Project Area

Location	Date	pH	BOD (mg/l)	COD (mg/l)	TDS (mg/l)	EC (µs/cm)	Chloride (mg/l)
Site area	13.05.2018	6.78	15	46	163	318	30
Standard		-	≤6	-	-	-	-

Source: Primary monitoring conducted by DoE, Bangladesh

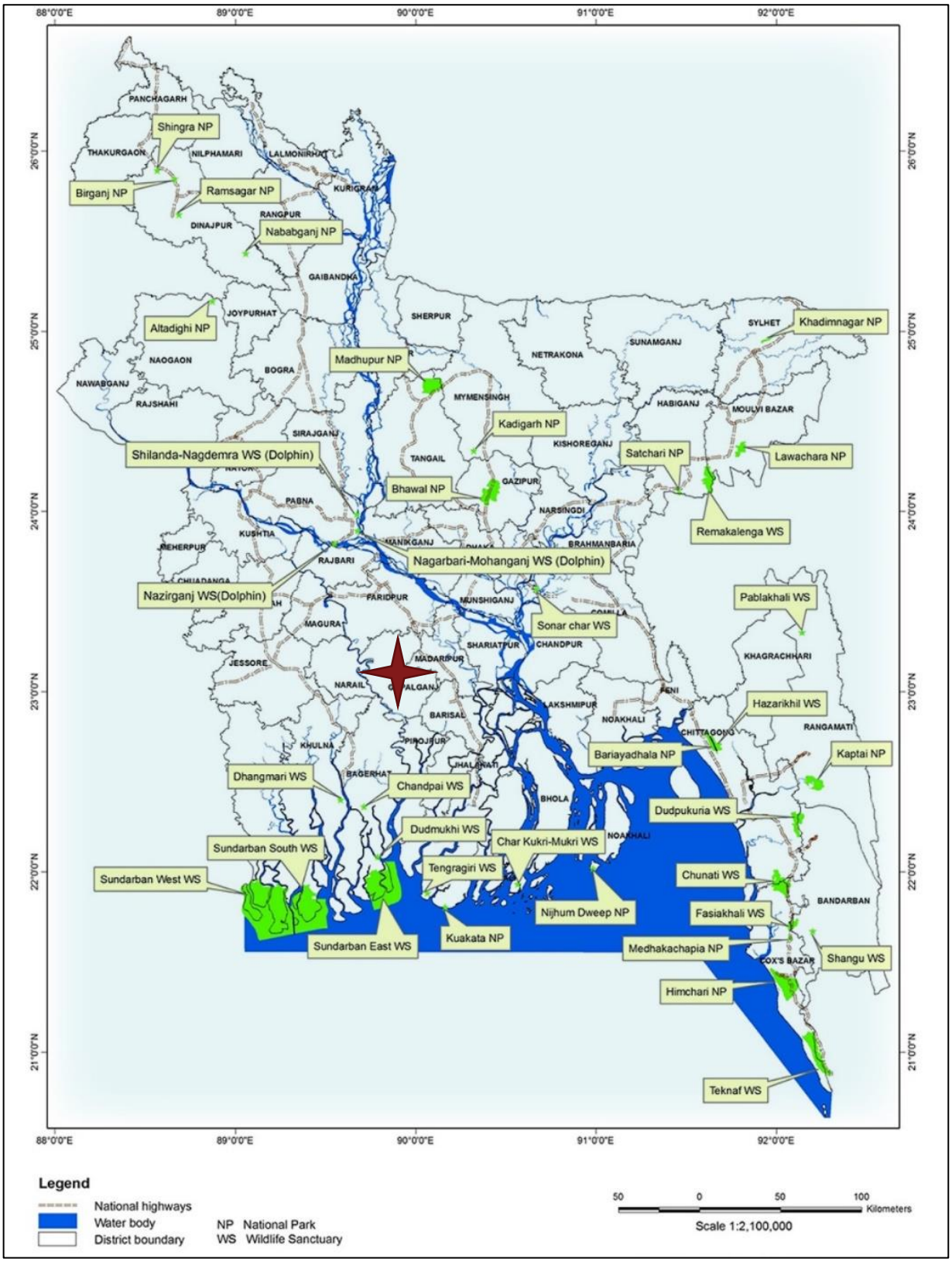
The Baseline Monitoring results have been attached as Annexure to this report.

11.4.9. Biological Environment

11.4.9.1. Protected Area

There is no protected area located within the study area. The map of Bangladesh showing location of protected areas across the country is presented in the figure on the next page.

Figure 83: Protected Areas of Bangladesh

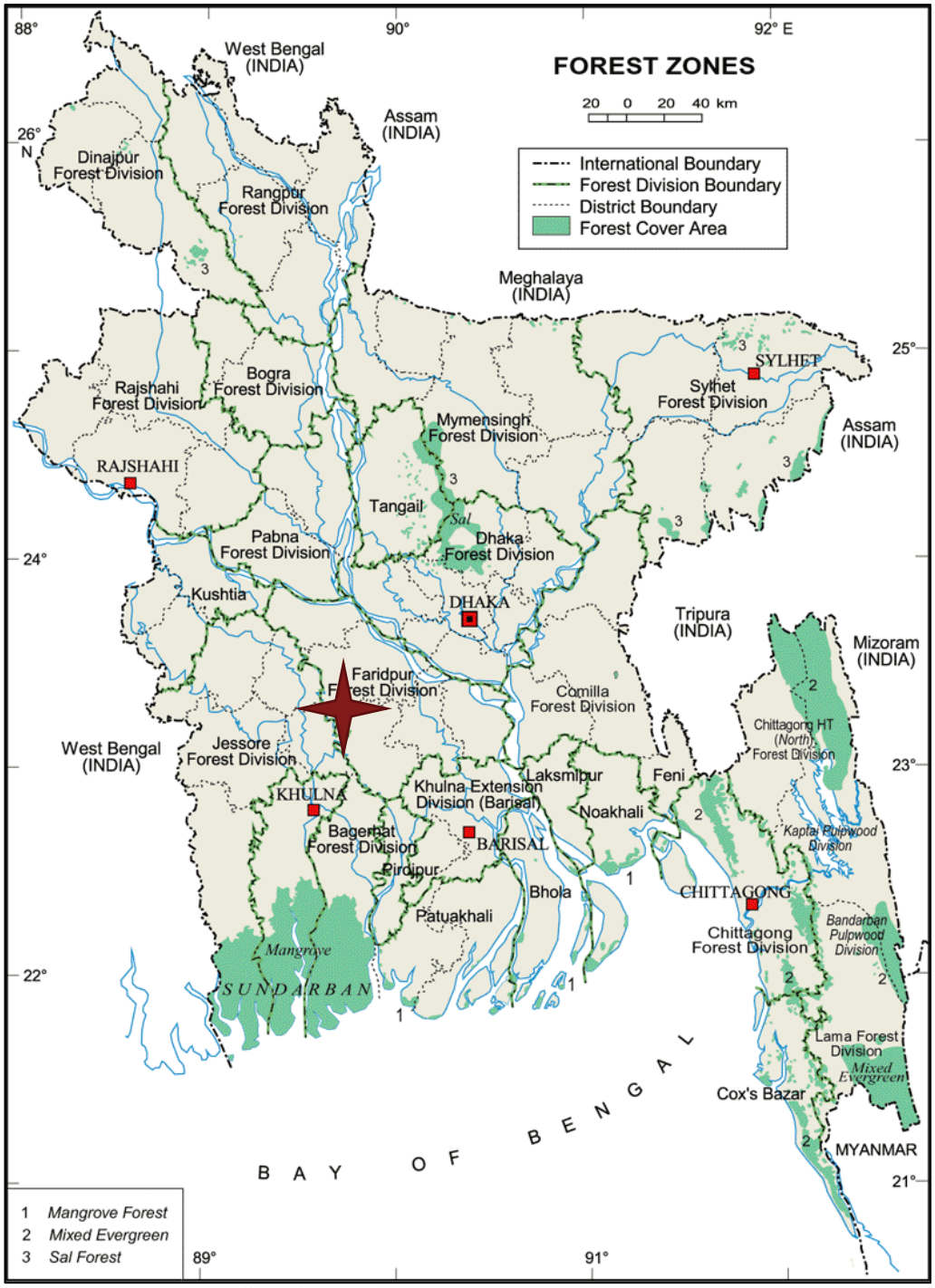


Source: Forest Department of Bangladesh

11.4.9.2. Forest Area/Vegetation Cover

The proposed site location is mostly agricultural in nature and devoid of trees. There is no presence of forest land in and around the proposed site. The forest map of Bangladesh is furnished in the figure below.

Figure 84: Forest Areas of Bangladesh



Source: Prime Minister's Office Library, Dhaka

11.4.9.3. Flora & Fauna

There is no forest area within the study area on the site. There is also no presence of any eco-fragile zone/protected area/Ramsar site or any other ecologically important wetland/nesting-breeding ground. There is

no record of any rare/endemic species or sighting of migratory species from the proposed project site and study area. Information pertaining to ecological resources were collected from Upazila Forest and Fisheries Officers and Local community. The flora and fauna recorded from study area is presented in following section.

Flora

Commonly found Herbs and grasses are *Bish-katali* (*Polygonum hydropiper*), *Bilai achra*, *Dubba ghas* (*Cynodon dactylon*), *Kata danga*, *Lajjabati* (*Mimosa pudica*), Telakucha (Coccinia grandis), *Gimashak* (*Glinus oppositifolius*), *Banna Marich,* Bamboo (Bambuseae); among shrubs *Venna*, *Bet*, *Dhaincha*, *Gagra*, *Chitki* (*Phyllanthus reticulatus*), *Pepe* (Carica papaya), *Titabegun are common.*

Banyan (*Ficus benghalensis*), Ashwath (*Ficus religiosa*), *Bandar Lathi* (*Cassia fistula*), *Debdaru* (*Polyanlthia longifera*), Dumur (*Ficus glomerata*), *Kadam* (*Neolamarckia cadamba*), *Gab*, *Shaora* (*Glycosmis arborea*), *Titijam* (*Eugenia grandis*), *Pitraj* (*Aphananiixis polystachya*), *Jarul (Lagerstroemia flos reginae*), *Nim* (*Azadirachta indica*), *Shimul* (*Bombax ceiba*), *Hijal* (*Barringtonia acutangula Gaertn*), *Akashmoni* (*Acacia auriculiformis)*, , *Shil koroi* (*Albizia procera*), *Mahogany* (*Swietenia mahagony*), *Eucalyptus* (*Eucalyptus sp*), *Shegun* (*Tectona grandis*), *Shishu* (*Dalbergia sissoo*), *Aam* (*Mangifera indica*), *Amloki* (*Phyllanthus emblica*), *Ata* (*Annona reticulata*), *Bel* (*Aegle marmelos*), *Borai* (*Zizyphus mauritiana*), *Jambura* (*Citrus grandis*), *Jamrul* (*Syzygium samarangense*), *Kamranga* (*Averrhoa carambola*), *Chalta* (*Dillenia indica*), *Kadbel* (*Limonia acidissima*), *Narikel* (*Cocos nucifera*), *Peyra* (*Psidium guajava*), *Sajna* (*Moringa oleifera*), *Supari* (*Areca catechu*), Khajur (*Phoenix dactylifera*), *Safeda* (*Manilkara zapota*), *Tal* (*Borassus flabellifer*), *Tetul* (*Tamarindus indica*), *Arjun* (*Terminalia arjuna*), *Kishnachura* (Delonix regia), *Mandar* (*Calotropis gigantean*), etc. are commonly seen trees

The aquatic species like Azolla (*Azolla pinnata*), *Dhol Kamli* (*Ipomea carnea*), *Helencha* (*Enhydra fluctuens*), *Kachuri Pana* (*Eichhornia crassipes*), *Kalmi* (*Ipomea aquatic*), *Khudipana* (*Lemna menor*), *Shapla (Nymphaea stellate*), *Topapana* (*Pistia stratiotes*) are common.

Bandar Lathi (*Cassia fistula*)

Debdaru (*Polyanlthia longifera*)

Paddy Cultivation

Fauna

Since the proposed site and study area is located away from forest/protected / ecologically sensitive area, no rare or endangered species is recorded from there. Among faunal community *Shial* (*Canis aureus indicus*), *Beji* (*Herpestes edwardsii*), *Banbiral* (*Felis silvestris*), *Katbirali* (*Funambulus palmarum*), Indur (Golunda ellioti), *Chika* etc. are commonly found mammals. *Teya* (*Psittacula krameri*), *Kokil* (Eudynamys scolopacea), Owls, Woodpeckers, *Pati kak* (*Corvus splendens*), *Cheel* (*Gyps indicus*), Dove (*Spilopelia chinensis*), *Doyal* (*Copsychus saularis*), *Tuntuni (Orthotomus sutorius),* Pati kak (*Corvus splendens*), *Dar kak* (*Corvus acrorhynchos*), *Salik* (*Acridotheres tristis*), *Chorui* (*Passer domesticus*), Kutum pakhi, *Pancowri* (*Phalacrocorax sulcirostris*), Kani bok (*Ardeola grayii*), *Sada bok* (*Ardea alba*), *Shamuk banga (Anastomus oscitans)*, *Choto Machranga*(Alcedo atthis) etc. are the recorded avifaunal species. Among retiles and amphibian species *Tiktiki* (*Hemidactylus frenatus*), *Gui shap* (*Varanus bengalensis*), *Dora shap* (*Amphiesma tolatum*), *Daras shap* (*Ptyas mucosa*), Cobra (*Naja naja*), *Baiya Bang*, Kunobang (*Bufo melanostictus)*, *Sonalibang* (*Hoplobatrachus tigerinus*)

Fishes recorded from Madhumati River and nearby water bodies are *Rui* (*Labeo rohita*), *Catla* (*Labeo catla*), *Shol* (*Channa striata*), *Taki* (*Channa punctate*), *Gazar* (*Channa marulius*), Silver crap (*Hypophthalmichthys molitrix*), Grass carp (*Ctenopharyngodon idella*), *Punti* (*Punctius ticto*), *Magur* (*Clarias batrachus*), *Boal* (*Wallago attu*), *Kakila* (*Xenentodon cancila*), *Mrigal* (*Cirrhinus cirrhosis*), *Gutum* (*Lepidocephalichthys guntea*), *Tengra* (*Mystus tengara*), *Pabda* (*Callichrus pabda*), Foli (*Notopterus notopterus)*, *Chapila* (*Gudusia chapra*), *Koi* (*Anabas testudineus*), Tilapia (*Oreochromis mossambicus*), *Baila* (*Awaous guamensis*), *Taposhi* (*Polynemus paradiseus*), *Chitol* (*Chitala chitala*), *Khalisha* (*Colisa fasciata*). Other species like *Golda Chingri* (*Macrobrachium rosenbergii*), *Badga Chingri* (*Penaeus monodon*), *Harina Chingri* (*Metapenaeus Monoceros*), various crabs, snails, clams etc. are also recorded.

Katbirali (Funambulus palmarum)

Patsalikh (Sturnia malabarica)

Kokil (Eudynamys scolopacea)

Black Drongo (Dicrurus macrocercus)

Chorui (Passer domesticus)

Mohonchura (Upupa sp)

11.5. Social Environment

For the development of EZ, the authority of BEZA proposes to acquire 200.00 acres land, of which the private land acquisition is for 199.70 acres and Khas land is 0.30 acres. Land cost has been considered after obtaining per decimal (0.01 acre) land cost of Gobra Mouza where the EZ site is located from the local AC land office which

was found to BDT 72,710/ decimal. Post discussion with BEZA officers cost of land for private land was taken as 3 times the cost obtained from AC land office for private land and 1 time the cost for government land or *Khas land*. Total land cost obtained from AC land office and as per discussions with BEZA officers was found to be BDT 1.8 billion and BDT 4.358 billion respectively. Based on AC land office records, the proposed land for acquisition is mostly agricultural/Nul land. Crop rotation is being practiced in and around the proposed project area. Two crop cultivations and single crop cultivation being predominantly undertaken on the EZ site. Single crop cultivation is being practiced round the year in the area earmarked for proposed EZ. According to Upazila statistics office information and details shared by UNO office, the agricultural produce is the substantial source of livelihood for the majority of the owners. More than 200 persons are dependent on the land proposed for EZ development. There is no presence of household structure and any institutions on the proposed site.

The proposed site superimposed on Mauza Map and details of affected plots are furnished in Annexure at the end of this report.

11.5.1. Demography

As per the 2011 census, Gopalgonj District has a total population of 11,72,415 and the total male and female population in the district is 5,77,868 and 5,94,547 respectively. The population density per sq km is 798. The literacy rate of the district is 58.09% while the sex ratio is 97% males as compared to females. The detailed demography of project district has been presented in below table.

Table 100: Demographic Profile of Gopalgonj District

District	Household			Population				Literacy in %			Sex ratio
	Urban	Rural	Total	Total	Male	Female	Density/ sq km	Total	Male	Female	
Gopalgonj	249,872	27,738	222,134	1,172,415	577,868	594547	798	58.09	60.30	55.98	97

Source: Population & Housing Census 2011, Gopalgonj

11.5.2. Social Stratification

The majority population of Bangladesh is Muslim. According to Population & Housing Census 2011, Gopalgonj Muslim population has been increasing since 1981 with a rate of 18.75%, 15.58% and 3.22% during intercensal periods 1981-1991, 1991-2001 and 2001-2011 respectively but the increasing rate shows a diminishing trend since1981. The opposite situation is prevailing with a constant decreasing trend in the population of Hindu community since 1981.

Table 101: Population by Religion

District Gopalgonj	Religion					
	Total	Muslim	Hindu	Christian	Buddhist	Others
No	1,172,415	805,115	353,794	12,951	80	475
%	100	68.67	30.18	1.10	0.01	0.04

Source: Population & Housing Census 2011, Gopalgonj

11.5.3. Economy

According to District Statistics: Gopalgonj, 2011 the economy of Gopalgonj is predominantly agricultural. Out of total 230494 holdings of the district, 67.88 holdings are farms that produce varieties of crops namely local and HYV paddy, sugarcane, wheat, vegetables, spices, jute, pulses, and other minor cereals.

Various fruits like mango, banana, jackfruit, guava, coconut etc. are grown in the district. Alsomany kinds of vegetables like bitter gourd (*karala*), pumpkin (*misti kumra*), potato and brinjal are abundantly grown. Pisciculture and rearing of livestock and poultry adds an additional income to the rural households. Fish of different varieties are there. Varieties of fish are caught from rivers, tributary channels, even from paddy field during the rainy season.

Non-farm activities also play an important role in the economic development of Gopalgonj district. 59,975 persons are engaged in different types of non-farm activities. Female participation in non-farm activities is very poor and constitute about 8.59% as against 91.41% of the males.

11.5.4. Places of Historical Importance

St. Mathuranath AG Church (1875), Asram of Shukh Deva (1802), Kali Temple (1918), Gayela Mosque at Khagail of Gopalgonj Sadar Upazila, Bahulata Sikder Bari Mosque (200 years old) and Sree Sree Harinath Mandal are the notable archaeological Heritage and relics of the district. There are 2 Mass graves, 1 mass killing site and 2 memorial monuments which bear the testimony of the marks of war of liberation in the area. The Mazar of Bangabandhu Sheikh Mujibur Rahman, the Father of the Nation, is also located at Tungipara in Gopalgonj District.

11.6. Impact assessment and proposed mitigation

The environmental impacts assessment was carried out considering present environmental setting of the project area, and nature and extent of the proposed activities. The proposed project involves development of EZ and off-site facilities for upcoming EZ at Gopalgonj. Potential environmental impacts associated with EZ and each of the proposed off-site facility are classified as:

- Impacts during design/preconstruction phase
- Impacts during construction phase and
- Impacts during operation phase.

At pre-feasibility stage, based on the nature of upcoming industries, the likely impact on surrounding environment have been covered in the report. However, the detailed analysis of specific impacts on basis of scale and magnitude of the individual industry should be carried out at later phase of design along with more specific mitigation measures. During the study Sensitive environmental components were identified during the site visits and qualitative and quantitative techniques have been applied for direct and indirect assessment of impacts on these components. The classification of environmental components is provided in table below.

Table 102: Classification of Social and Environmental Components

Components	Sub-component	Parameters
PHYSICAL		
Water	Surface water	Hydrology, water quality
	Ground water	
Air	Air, noise	Air quality, noise level
Land	Soil	Erosion, soil quality
ECOLOGICAL		
Aquatic	Fisheries/ Aquatic species	Species, diversity, economic value
	Aquatic Biology	Density, species
Terrestrial	Vegetation	Species, population
	Wildlife	Species, population
INFRASTRUCTURE		
Water Supply	Surface/ground water	Frequency, quality

Components	Sub-component	Parameters
Electricity	—	Generation, Transmission, requirement,
Transport	Highways/Roads	Access, availability, type, utility of each mode
Land use	Rail	
Drainage	Air	—
	Water	Flooding, drainage

11.7. Impact Identification

During the site visit, various environmental sensitive features were identified which may potentially be impacted by the project at various stages. Identified impacts of the project activities on the environment components are given below along with the associated activities.

Table 103: Impact Matrix for Proposed Off-site Infrastructure

S. No.	Activities	Impacts	Negative Impact		Positive Impact		Not Applicable
			Short Term	Long Term	Short Term	Long Term	
A	**Pre-Construction Phase**						
i	Land Acquisition for site, access road and utility supply system	Change in land use pattern of existing agricultural land		√			
		Impact on livelihood		√			
		Shifting of Utilities					√
ii	Site Preparation	Removal of Vegetation.	√				
		Impact on aesthetic aspects		√			
B	**Construction Phase**						
i	Development of EZ and Construction of Boundary wall, embankment, Access Road, electrical & water supply system and administration building	Loss of Top soil		√			
		Soil contamination due to spillage of material	√				
		Surface water contamination	√				
		Air pollution	√				
		Noise pollution	√				
		Increase in traffic	√				
		Un pleasant view	√				
		Impact on Health & safety	√				
		Social impact	√			√	
		Felling of Trees		-			
C	**Operational Phase**						
i	Development of Off-site Infrastructure, i.e. Boundary wall, embankment, access road, water supply system, electrical	Impact on the ambient Air Quality		√			
		Noise Pollution	√				
		Potential for surface water pollution due to industrial waste		√			

S. No.	Activities	Impacts	Negative Impact		Positive Impact		Not Applicable
			Short Term	Long Term	Short Term	Long Term	
	supply line and administration building and operation of industries	discharge Impact on river hydrology due to construction of long embankment along the river		√			
		Economic Development				√	
		Accessibility				√	
		Groundwater depletion		√			
		Potential for land contamination due to industrial activities		√			
		Improved drainage				√	
		Electrification of the area		√		√	
		Improved health and sanitation facilities				√	
		Increased Run-off		√			
		Generation of Employment				√	
		Natural drainage pattern	√				
Ii	Green Buffer development around each industrial plot	Improved Ecology				√	
		Air Quality Improvement				√	
		Aesthetics				√	

11.7.1. Impact on Climate and Meteorology

11.7.1.1. Pre-Construction, Construction and Operation Phase

Proposed project site is located in tropical region where summers are much rainier than winter. Though no change in the macro-climatic setting (precipitation, temperature and wind) is envisaged due to the project, the microclimate is likely to be temporarily modified by vegetation removal and the addition of increased pavement surface which in turn might lead to formation of heat islands especially during the daytime.

Mitigation Measures

- 10% Greenery/Open Space inside the EZ has been recommended
- Suitable plantation shall be carried out to minimize impact on micrometeorology

11.8. Impact on Land and Natural Drainage

11.8.1. Pre-Construction and Construction Phase

Site gets flooded during monsoon. The preconstruction and construction phase will involve backfilling of the land to a level higher than the High Flood Line (HFL) of the adjacent Madhumati River with respect to the site to keep the eventual site ground level more than the high flood level ever recorded. At present, the land is predominantly agricultural in nature and a canal is flowing inside the proposed boundary of EZ. If the canal is restricted, the cultivator of the nearby area may get affected due to not having access to water for agricultural purpose.

The impacts on land due to the project are as follows:

- Dredging and landfilling activity

- Soil erosion due to vegetation clearance and excavation activities;
- Topsoil degradation
- Generation of waste (hazardous and non-hazardous) from site clearance, excavations, civil works and activities of construction workers (general waste and sewage); and
- Possible contamination of soil due to potential spills of lubricating oil, fuel oil, concrete etc.
- There could be alteration with the natural water flow pattern of the subject site due alteration of the natural contours. It may create problem pertaining to water logging, soil erosion, contamination of soil

11.8.1.1. Soil Erosion

During the pre-construction and construction phase, the site clearance activities including clearing of vegetation, construction of the structures, labour camps, storage area, toilets will involve removal of top soil which will result in slope destabilization and the land will be more susceptible to soil erosion.

The soil erosion will result in the run-off of the silt to surface water impacting aquatic ecosystem of receiving water bodies with increased suspended sediment load and associated nutrients.

Most importantly after landfilling, if the land is be kept for long without further development, it leads to soil erosion due to loose top soil.

11.8.1.2. Soil Compaction

During construction activities, there will be compaction of soil in the project area due to construction of the internal access roads, movement of vehicles/ construction machinery and work force movement. The soil compaction would impact the soil physical properties such as reduction in pore spaces, water infiltration rate and soil strength etc. The extent of soil compaction is primarily limited to the Project foot print area and surroundings within 100 m distance. The impact is restricted to the construction phase of the project.

11.8.1.3. Landfilling with dredged material

The project site is located in low lying area and landfilling up to 5-6 feet will be done during site development activity. About 304,321,240 cum filling material is required for landfilling. Sand for the backfilling operations can be obtained by dredging from the Madhumati River. Dredging activity may be carried out near the site location or away from site. Dredging activity will have two fold impacts - firstly as a result of the dredging process itself and secondly as a result of the landfilling of the dredged material. Impacts during dredging are given in the later section.

In case the soil quality at dumping sites is different from the sediment from the dredging sites, the ultimate soil quality of the disposal site can be affected. The soil used for landfilling should be free of any type of contamination and have similar characteristics as that of native soil to avoid impacts on the soil quality.

11.8.1.4. Waste Generation

The construction waste generated onsite comprises of materials such as excavated soil, rocks, concrete, wooden pallets, steel cuttings/filings, packaging paper or plastic, wood, metals etc. Municipal domestic wastes consisting of food waste, plastic, glass, aluminum cans and waste paper will also be generated by the construction workforce and labor camp site.

The waste generated during the construction phase will also include hazardous waste such as used oil, hydraulic fluids, waste fuel, grease and waste oil containing rags. If improperly managed, solid waste could create impacts not only to land but also to local air quality, water quality, and human health. Since the site will be elevated about 5-6 feet, it is likely that the surface run off from site surrounding area will be drawn to the Madhumati River or other neighbouring waterbodies. From the drainage pattern study it is observed that in present scenario also surface runoff from North, East and south side of the site will be towards the site in the southwestern side and eventually to Madhumati River. If the wastes are poorly managed, it will also be carried away by surface run off which will eventually contaminate the water bodies.

11.8.1.5. Soil Contamination

Soil contamination during the construction phase may result from filling activity, leaks and spills of oil, lubricants, or fuel from heavy equipment and wastewater. Such spills could have a long-term impact on soil quality, but are expected to be localized. Storm water run-off from the contaminated area can pollute the downstream soil and water quality of adjacent river or other waterbodies.

Spill control measures such as the storage and handling of chemicals and fuel in concrete areas with secondary containment will be implemented to minimize impacts in the event of a spill.

The soil characteristics of the native soil may also be changed due to import of soil for filling and levelling purpose. It is envisaged that the filling activity may impact the native soil due to spillages during transportation of soil and run-off during filling and compaction.

Apart from the embedded controls to be included in project design, the following mitigation measures will reduce the negative impacts on soil environment:

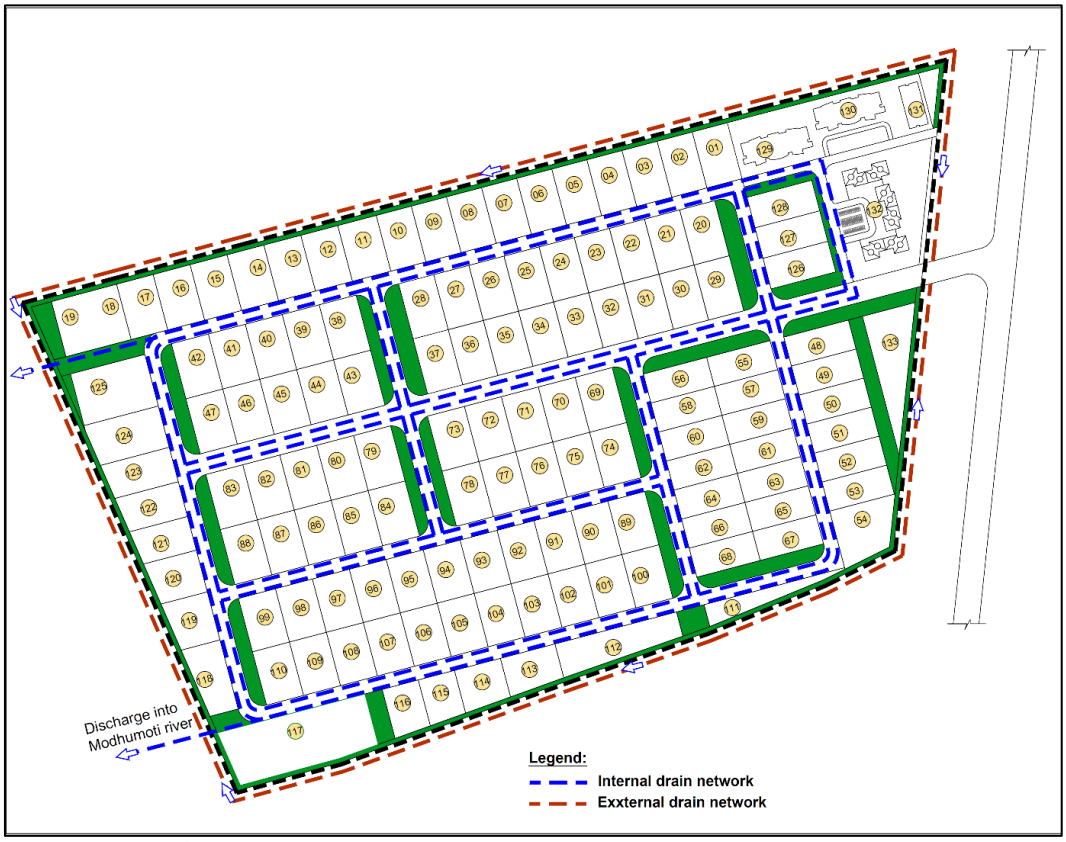
Mitigation Measures

- Stripping of topsoil should be scheduled as the last mile activity (maintain vegetation cover for as long as possible) in order to prevent the erosion (wind and water) of soil;
- Top soil should be preserved and should be reused in borrow area or green area development
- Care should be taken to minimize percolation of soil used for filling to adjacent rivers during filling operations. Proper embankment may be provided in the downstream areas to minimize soil percolation to rivers.
- Vegetation should be planned and maintained for slope stabilization and to prevent soil erosion after construction period;
- The disturbed areas and soil stock piles should be maintained moist to avoid wind erosion of soil;
- The routes for movement of heavy machinery should be designated to avoid the soil compaction in other areas;
- Transport vehicles and equipment should undergo regular maintenance to avoid any oil leakages; designate routes for bringing construction material and outside soil;
- Construction contractor should designate the sites to be used for storage of hazardous wastes including waste oils, solvents, paint and batteries;
- The Contractor should ensure that no unauthorized dumping of hazardous waste are undertaken and contractor should dispose of hazardous waste through licensed traders ;
- Fuel and other hazardous substances should be stored in areas provided with roof, impervious flooring and bund/containment wall;
- The soil used for landfilling should have similar characteristics to the native soil and free of any type of contamination.
- Prior to dredging activity, analyse the soil sample to prevent impacts on the receiving environment as a result of mismatch in soil characteristics;
- During dredging activity, physical barriers such as silt screen/ curtains should be employed to prevent the spread of suspended sediments;
- The storm water drainage system shall be designed in synchronization with the existing natural drainage pattern. The direction of the flow shall be engineered to be same as that of the natural flow direction of storm and rain water;
- The construction debris and high silt content of the virgin soil, post excavation, should be kept in a designated location so as to prevent leaching during monsoons. Storm water drains shall be designed and shall be connected with rainwater harvesting pits. All the construction wastes and excavated soil shall be temporarily stacked on tarpaulin sheet (in order to prevent leaching to groundwater) and a temporary tin sheet shall be

placed on the top to prevent rainwater to maximum extent to carry the soil and construction wastes to the adjacent river

- To demonstrate the commitment towards better environment, 10.00% of total area has been designated for green and open spaces. These green area shall be declared as the green zone of the EZ
- Based on drainage and contour study it is suggested to provide the peripheral drain along the North, East, west and south side of the site.
- River Madhumati is running on the west side of the site at a distance of 0.2 km from the proposed site. It is recommended to connect the discharge from the drain to the River. Also, it is suggested to discharge the water to the Agricultural land existing to the north side of the proposed site. These can be considered as drain discharge points
- In order to prevent the storm water entering from adjacent areas to the development area, a cut-off drain all along the periphery of the site is considered and connected to the agricultural lands in the north side of the site and River Madhumati to the west side of the site.

Figure 85: Provision of Peripheral Drain



Source: MACE Analysis

11.8.2. Operation Phase

11.8.2.1. Impact on Soil Quality

After development of economic zone, disposal of industrial domestic and process waste may contaminate land and soil quality of the area. The impact can be significant and long term in case of uncontrolled discharges. Improper disposal of waste (hazardous and non-hazardous waste) may degrade soil, water, air quality and ecology of the area. As per the preliminary planning, Agro based, Food & Beverage, Electrical and Electronics, Light Machinery are being envisaged for this EZ. These industries are anticipated to be polluting to some extent and hence discharge of the generated sludge, e-waste shall be done in a structured manner.

11.8.2.2. Waste Generation

Process dry sludge, e-waste from electrical/electronic industries, domestic dry sludge, agro based waste (like rice husk, bran, waste from food processing etc.), packaging material from food processing industries etc. have been envisaged as the major source of waste. All these wastes shall be segregated depending upon the source of its generation. Sludge generated from STP shall be dried using a filter-press and the dried sludge could be used as manure. There are authorized vendor for recycling E-waste in Bangladesh. E-waste generating units shall disposed their e-waste to e-waste authorized vendors. General practice followed in Bangladesh regarding the process waste is storage in a dedicated room. As the country doesn't have a concrete rules and regulations guiding the process waste disposal, practice to design and execute a localized landfill unit could be helpful. Like construction phase, the waste generated during operation will also include hazardous waste such as used oil, waste fuel, grease and waste oil containing rags. If improperly managed, waste could pollute not only to land but also to local air quality, water quality, and human health. Effluent generated from agro based industrial operations contains high concentration of organic and inorganic substance causing significant polluting phenomena. The characteristics of wastewater from food processing industries are characterized by high BOD, Suspended Solids and oil concentrations as well as emitting smells from acidification. Effluent from light machinery, electronic/electrical industry may contain heavy metals, paint residue etc.

The estimation of solid and sewage waste likely to be generated have been presented in subsequent tables.

Table 104: Estimated Quantity of Municipal Solid Waste Generation

Solid waste generation estimation					
Land use pattern	**Acres**	**Population**	**Msw generation**	**Unit**	**Kg/day**
Processing area					
Industrial area	131.98	7183	200	gm/capita/day	1436.60
Loading & Unloading area	1.84	400	100	gm/capita/day	40.00
Utility	4.02	876	100	gm/capita/day	87.60
Road	29.18		10.12	kg/ha/day	119.55
Green & open space	19.94		30.36	kg/ha/day	245.10
Total processing area	186.95	**8,459**			**1,928.85**
Admin & Customs block	3.71	3,988	100	gm/capita/day	398.80
Support amenities	9.34	50,245	400	gm/capita/day	20,098.00
Total Non-processing area	**13.05**	**54,233**			**20,496.80**
Total	**200.00**	**62,692**			**22,425.65**

Source: MACE analysis

Table 105: Sewage and sullage generation estimation

Land use pattern	Total area	Water demand				Effluent generation	Sewage generation	Sullage generation	Total effluent, sewage and sullage generation	Infiltration @10%	Total sewage quantity
	Acres	Process water	Domestic water	Potable	Non-potable	In cum/day					
Processing area											
Industrial area	131.98	3740.23	323.24	4309.81	160.00	1870.11	115.34	481.43	2466.89	446.98	2913.87
Loading & Unloading area	1.84	66.08	18.00	83.58	8.91	33.04	6.42	15.61	55.07	9.25	64.32
Utility	4.02		39.42	23.85	19.51		14.07	22.78	36.85	4.34	41.19
Road	29.18		21.26	12.86	10.53					2.34	2.34
Green & open space	19.94		14.53		21.07					2.11	2.11
Total processing area	186.95	3806.31	416.45	4430.1	220.02	1903.15	135.84	519.82	2558.81	465.01	3023.82
Non- processing area											
Admin & Customs block	3.71		179.46	138.18	59.22	-	18.80	120.98	139.77	19.74	159.51
Supporting amenities	9.34		2261.03	1740.99	746.14	-	236.82	1433.83	1,670.65	248.71	1,919.37
Total non-processing area	13.05		2440.49	1879.17	805.36		255.62	1554.81	1810.43	268.45	2078.88
Total	200.00	3806.31	2856.94	6309.27	1025.38	1903.15	391.46	2074.62	4369.23	733.47	5102.70

Source: Mace analysis

Mitigation Measures

- Provision shall be made for proper storage and disposal of industrial waste by receptive industries.
- Provisions shall be made to segregate e-waste with rest of the wastes generated.
- Alliance shall be done with e-waste recycling vendor and the segregated e-waste shall be send to the vendor for recycling purposes
- ETP shall be mandatory for all the industries. Every unit shall have its own ETP unit.
- A Common waste storage areas shall be designated for industrial domestic waste.Waste should be segregated at source into hazardous and non-hazardous waste. Further the waste should be segregated into recyclable and rejected waste. Recyclable waste should be sent to licensed traders for recycling and rejected waste should be disposed off as per the best industrial practice for particular waste
- Industrial waste generated should be stored on sealed surfaces and should be disposed off as per the best industrial practice
- Local environmental bodies shall be consulted for the initiation for the designing and constructing localized landfill for the disposal of process waste.
- No chemical/hazardous raw material should be allowed to spill over the land and should be operated in covered systems
- Excessive packaging should be reduced and recyclable products such as aluminum, glass, and high-density polyethylene (HDPE) should be used where applicable.
- Organic waste should be resold to value addition industries or can be feeded to live stock.
- Sludge generated in effluent treatment plant should be sold to authorized recyclers or could be dried into cakes and used as manure for green belt

11.9. Impacts due to Dredging

11.9.1. Pre-Construction and Construction Phase

The preconstruction and construction phase will involve backfilling of the land to a level higher than the High Flood Line (HFL) of the adjacent Madhumati River with respect to the site to keep the eventual site ground level more than the high flood level ever recorded. Sand for the backfilling operations can be obtained by dredging from the Madhumati River. According to Bangladesh Water Development Board (BWDB) the bank of Madhumati River adjacent to proposed EZ in between *Gobra Madrasapara* to *Gobra Chawdhuri* para is prone to soil erosion. The possible physical impacts due to dredging are as follows:

- Resuspension of bottom sediments, thereby increasing turbidity
- Riverbank erosion
- Dispersion from and accumulation into bottom sediment of toxic substances
- Reduced primary productivity due to decrease in the depth of the euphotic zone
- Impact on habitat and breeding/spawning ground of fishes and other aquatic fauna due to bottom disturbances
- Temperature alteration
- Increase in nutrient levels
- If the dredged material is polluted, it may affect the ecosystem, and fisheries activities at both dredging and dumping locations

The extent of impacts due to dredging activity is highly varied and site specific, depending upon a number of factors shown below:

- Method of dredging and disposal

- Channel size and depth
- The size, density and quality of the material
- Background levels of water and sediment quality, suspended sediment and turbidity
- Current direction and speed
- Rate of mixing
- Presence and sensitivity of animal and plant communities (including birds, sensitive benthic communities, fish and shellfish)

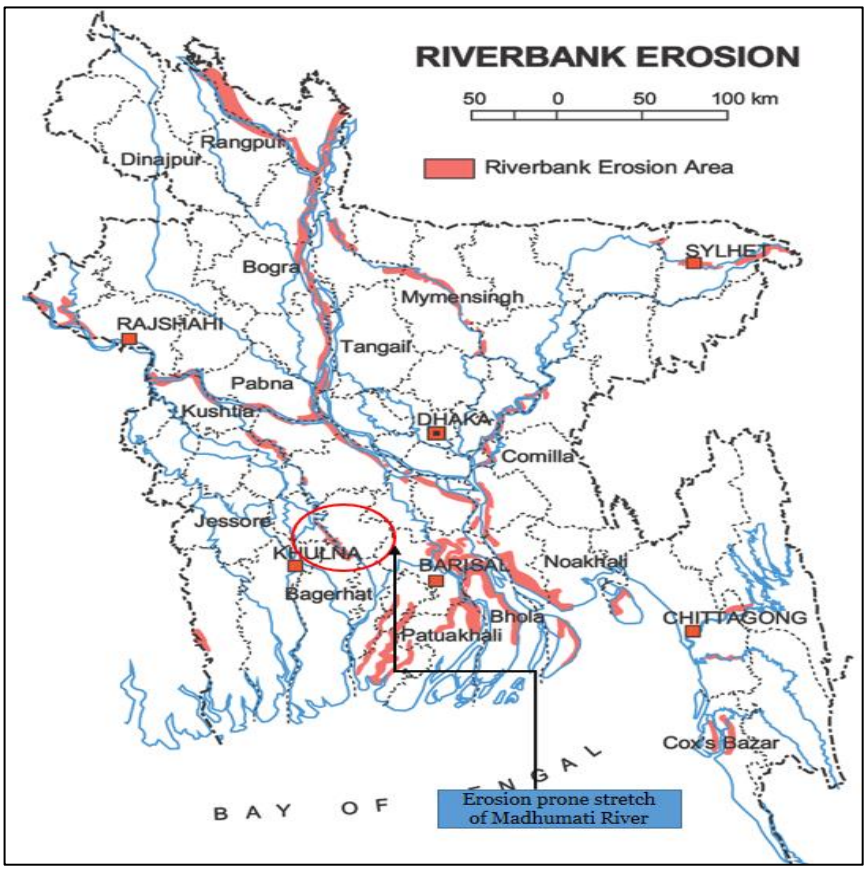
Mitigation Measures

- Prior to dredging activity, analyse the soil sample to prevent impacts on the receiving environment as a result of mismatch in soil characteristics;
- During dredging activity, physical barriers such as silt screen/ curtains should be employed to prevent the spread of suspended sediments;
- Maintain the extent of the turbidity plumes close to the dredging and disposal areas to minimise impacts on aquatic fauna habitat;
- Visually inspect for aquatic life and terrestrial organisms and stop dredging activity in case of any organism in the vicinity;

It is recommended that material for the backfilling should be sourced from borrow sites rather than through dredging. In the instance if dredging is necessary, it is recommended to adopt river bank protection work in the dredging stretches and along the bank of Madhumati River to protect the site and surrounding area from flooding.

As an alternate of dredging along Madhumati River, Borrow areas are required to be identified in order to supply earth materials for backfilling activity. At the time of selection of borrow areas priority should be given to barren or non-agricultural land. The site should be devoid of major trees /vegetation cover. The borrow sites should also be away from ecologically sensitive areas and surface waterbody to avoid impact on water quality due to borrow site operation. On completion of borrowing activity the site should be restored to its original condition or should be redeveloped (like pond) as per the need of local community/site owner.

Figure 86: River Bank Erosion Map of Bangladesh



Source: Prime Minister's Office Library

11.10. Impact on Air Environment

11.10.1. Pre-construction phase

The pre-construction phase will involve site clearance activity for development of EZ, access road and water supply system which will lead to dust generations and other fugitive emissions. But these emissions will be localized and have impact for short duration only during clearance activity. Currently the proposed site doesn't have presence of trees. The proposed site is covered by crops since at present agricultural activity is going on.

Mitigation Measures

To minimize the dust generation, water should be sprinkled regularly at the site and low sulphur diesel should be used in land levelling equipment to control the SO_2 emissions.

11.10.2. Construction Phase

Air quality will be impacted from the following sources during the construction phase:

- Fugitive dust emissions from site clearing, excavation work, cutting and levelling work at sites and access/ internal roads, stacking of soils, handling of construction material, transportation of material, emission due to movements of vehicles, plying of heavy construction machinery etc.;
- Vehicular emissions due to traffic movement on site and on the connecting roads;
- Exhaust emissions (containing PM10, PM2.5, SPM, CO, HC, NOx, SO2 etc.) from construction machineries, other heavy equipment as bull dozers, excavators, compactors; and
- Emissions from diesel generator required for emergency power during construction period.

Mitigation Measures

To mitigate the construction impacts, project proponent should have contract agreements with contractors as well as sub-contractors to ensure implementation of mitigation measures.

- Sprinkling of water at construction site and haul roads
- Transportation of Raw materials in covered trucks
- Construction of barricades between the settlements and the site to minimize travel of fugitive emissions towards settlements
- Shrub Plantation (native species) on either side of the approach road to mitigate the fugitive dust emissions
- Construction vehicles and machinery should be regularly serviced and check for pollution control
- Prohibit usage of adulterated fuel in vehicles for running construction equipment and vehicles
- Covering the scaffolding (in case of administration building) to reduce the dust emission in outside environment
- Speed of vehicles on site is recommended to be 10-15 km/hr which will help in minimizing fugitive dust emissions due to vehicular movement

11.10.3. Operation Phase

Post development of the EZ & setting up of industries, the impacts on the air quality of the area will be from (a) air emissions from the proposed industries and (b) emissions from increased vehicular movements. These altogether may have overall negative impact on the air quality of the site and the nearby areas. For this EZ Agro based, Food & Beverage, Electrical and Electronics, Light Machinery industries are proposed. It is envisaged that particulate matter, sulphur dioxide, ozone, oxides of nitrogen and carbon monoxide will be generated due to increased vehicular movement, DG Operation and various industrial operations. Air emissions due to various industrial operations are furnished in below table-

Table 106: Emissions from various industries

Industry Type	Nature of Emissions
Food & Beverage Sector	Air emissions from food processing industry contains some volatile organic compounds but do not contain any hazardous compounds. These industries emit low process-air emissions. Most of the processes uses electrical power and rarely emit harmful compounds to environment. But air emissions from effluent treatment plant of these industries are a major concern. Beside this, Chlorofluorocarbons (CFCs) used as cooling agents in many refrigeration and cooling systems in food and beverage industries are having potential to damage ozone layer of atmosphere. Emission from boiler (if applicable)
Agro based Sector	The air pollution in agro based industries (like jute mills) is mainly due to generation of solid wastes such as dust, dirt, and short fibre. The endotoxin analysis indicates that dust zone concentrated with fungi and grame negative bacteria is responsible for frequent / prevalent occurrence of byssinosis in workers engaged in high dust zone. Emission from boiler (if applicable)
Electrical and Electronics	Chlorofluorocarbons (CFCs) used manufacturing of refrigerators, freezers, chillers, and air conditioners in electrical and electronic industries are having potential to damage ozone layer of atmosphere.
Light Machinery, Equipment and Furniture Sector	No significant air emissions is generated from light machinery industries.

Mitigation Measures

- Provision should be made for peripheral green belt with 2-3 rows of local tree species all along the EZ boundary. Tree species should be selected such that first inside row is of smaller height, middle row of tree is of medium height and last row of tree is of higher height so that green belt formed appears like a cascading canopy.
- Development of thick green belt and organized greens within each industrial plots. Broad-leaved species, which can absorb pollutants, should be planted as they help settle particulates with their higher surface areas along with thick foliage
- Power Generators should be provided with stacks of adequate height (higher than nearest building) to allow enough dispersion of emission.
- Process emission if any should be controlled with the installation of adequate air pollution control systems like Venturi scrubbers, wet scrubbers, Electrostatic precipitator, bag filter etc. as applicable to the individual industry
- All industries should obtain clearance from DoE, Bangladesh as applicable. Air pollution control measures shall be adopted by respective industries in line with DOE permission
- Air pollution monitoring should be carried out quarterly by all industries to check the air pollution level.
- Preference of usage of clean fuel like LPG, low sulphur diesel should be explored
- Odour should be managed at the site using odour suppressant and planting fragnant flowering trees.
- Periodic checkups should be conducted for the workers to reduce exposure levels, rotate the shifts of the workers.

11.11. Impact on Noise Environment

11.11.1. Preconstruction and Construction Phase

Pre-construction phase will involve site clearance activity for development of access road and utilities. The site clearance will involve removal of vegetation and land levelling activities. Operation of different machineries and equipments for construction activities, running of heavy load traffic for construction materials transportation, and regular traffic movement may generate noise during construction period. The heavy equipment, machineries, transportation and earthworks used for the construction activities are the major sources of noise. It is envisaged that there will be an increase in traffic and thereby in traffic noise impacts on the receptors near the approach road from the transportation of equipment, construction materials. The residents of Gobra Madrasha para/ Khal Gobra located in the vicinity of the site, Bangabandhu Sheikh Mujibur Rahman Science and Technology University located at southern side, Shekh Fazilatunessa Eye Hospital etc. are likely to be exposed to higher level of noise due to construction activity if proper mitigation measures are not taken.

Mitigation Measures

The following mitigation measures should be implemented to minimize potential noise impacts during preconstruction and construction phases:

- Regular maintenance of equipment such as lubricating moving parts, tightening loose parts and replacing worn out components should be conducted;
- Machinery and construction equipment that may be in intermittent use should be shut down or throttled down during idle time;
- Acoustic enclosure should be provided for the DG set;
- Equipment known to generate noise strongly in one direction should be orientated so that the noise is directed away from nearby sensitive receptors as far as practicable;
- Honking should be avoided;
- Construction work should be carried out only during day time (from 8.00am to 6 pm);

- Machinery to be used should comply with the noise standards prescribed by DoE.
- To deal with noise exposure by construction workers in construction site, pocket guide by OSHA is helpful.

At individual worker level, the construction contractor should be insisted to provide earmuffs to the workers exposed to high noise levels.

11.11.2. Operation Phase

After development of offsite infrastructure and economic zone, the noise levels may rise due to vehicular movement, DG set, pump sets, Boilers, mechanical and industrial operations, Auxilliary activities like operation of water pumps, booster pumps etc. Operations of ventilation units and fans can also add up to the noise generation. The major noise generating source of agro/food processing industries could be Boiler, Motors and pumps Distillation units etc. In light machinery and Electrical/Electronic industries noise generated mostly due to vehicular and machinery operation. The following mitigation measures are proposed to mitigate the noise pollution during operation phase.

Mitigation Measures

- Pumps should be fitted in close room, preferably acoustic enclosure to reduce the noise generation
- Green buffer should be developed all along the project boundary. Green buffer should compose of the 2-3 rows of plants of variable height and thick canopy so as to form continuous barrier. This will help in reducing the noise level significantly.
- Noise regulators must put a strong mandate and fine on vehicle operators which are not properly maintained, produce noise (silencers not proper).
- All industries should obtain clearance from DoE before establishing industrial unit and should comply with all the conditions mentioned in the letter of environment clearance
- All industries should install the new machinery of modern make which complies with the noise standards prescribed by DoE.
- Job rotations should be practiced for workers in working at noise intensive locations to prevent prolonged exposure to high noise level as it may lead to deafness, fatigue, head ache, nausea and drowsiness. Propose PPEs must be made compulsory for workers working at locations where the intensity of noise is high.
- Acoustic design with sound proof glass paneling will be provided for critical operator cabins / control rooms of individual modules as well as central control facilities.
- Proper greasing, periodic checkups for frictionless movements.
- Honking should be regulated within the economic zone

11.12. Impact on Water Environment

11.12.1. Pre-Construction and Construction Phase

11.12.1.1. Impact on Surface Water and Groundwater Resource

The total potable water demand for the proposed EZ is 6.3 MLD. River Madhumati is a perennial fresh water system, which is 700 m away from EZ site. Infiltration gallery / well, collection well and pump house near the river basin at an approximate distance of 700 m from the site can be established to meet the water demand of EZ on a long-term basis. Detailed hydrogeological investigations need to be carried out based on which, a water treatment plant shall be provided near the intake structure.

However, secondary data reveals that the ground water table in and around the proposed site for EZ has a safe drawdown of 0.5 MLD/per tube well. For the initial demand it is planned to build three to four new bore wells within the proposed site to draw the ground water. Exact location of water intake (i.e., the locations of the tube wells) within the site needs to be finalized during the construction stage.

11.12.1.2. Impact on Surface Water and Groundwater Quality

The major source of wastewater generation during construction phase is from the labour camp, which will be established for project construction activity. There is a potential for contamination of surface and groundwater resources resulting from improper management of sewage. The storage of used engine oil and lubricants as waste materials has a potential to create impacts if spillage occurs.

The quality of water bodies including Madhumati River could also be affected due to surface runoff from contaminated soil (soil contamination due to oil/ fuel spillage and leakages), particularly during monsoon season. The surface runoff carrying the loose top soil will lead to increased sedimentation in the receiving water bodies. Contamination to water bodies may also result due to oil spilling during construction activities and/or surface runoff from the construction site to the adjacent water body. Thus measures are required to be taken to minimize the surface water pollution.

Mitigation Measures

- To avoid excavation activities during rains
- To prevent piling up of excavated soil, raw material and construction debris at site by proper management and disposal
- Construction of storm water drains along with sedimentation tanks with sand bags as partition as barrier for direct flow of run off to river.
- Check dams should be provided to prevent construction runoff from the site to the surrounding water bodies.
- Minimize run-off by using sprays for curing
- Construction of adequate nos. of toilets and proper sanitation system for workers to prevent open defecation along the river banks/water supply lines
- Construction of soak pits/septic tanks to dispose-off the domestic wastewater generated from labour camps to prevent disposal of sewage in surface water bodies. Alternatively collect labour camp sewage and connect to nearby municipal sewers.
- Proper collection, management and disposal of construction and municipal waste from site to prevent mixing of the waste in run-off and entering the water bodies
- Use of licensed contractors for management and disposal of waste and sludge;
- Labourers should be given training towards proactive use of designated areas/bins for waste disposal and encouraged for use of toilets. Open defecation and random disposal of sewage will be strictly restricted;
- To prevent surface and ground water contamination by oil/grease, leak proof containers shall be used for storage (preferably in paved area) and transportation of oil/grease
- Spill/ leakage clearance plan to be adopted for immediate cleaning of spills and leakages.

11.12.2. Operation Phase

The total water requirement for operational phase is estimated at about 7.3 MLD. To cater the industrial water requirement surface water from Madhumati River will be used. The development of economic zone shall lead to the generation of process and domestic effluent. Liquid waste from the proposed industries will be having potentiality to affect the water quality. The direct discharge of the untreated process and domestic effluent waste will lead to impacts in the surface water quality. Also, it is anticipated that surface run-off may significantly increase post development of economic zone which may impact surface water quality.

Following measures should be adopted during operation phase to minimize impacts of development of Economic zone on water quality:

Mitigation Measures

- Each industry should obtain consent of DoE Bangladesh before construction and operation and should comply to the conditions laid by them
- The Industry should also obtain the consent of the water abstraction limit from DoE, Bangladesh.

- No leachate, waste water and waste material should be stored in pervious unlined area/pond.
- Efficient Rain water Management Plan will be adopted to reduce the impact due to surface runoff
- ETP shall be mandatory for all the industries. Every unit shall have its own ETP unit.
- Each industry should treat the effluent and sewage generated by them so as to achieve zero discharge and no untreated effluent should be discharged into any water body
- Sludge should be dried into cakes and used as manure for green belt
- A water balance between the abstracted water and the water diverted for process purposes and domestic purpose shall be developed and based on the volume of the process and domestic waste, ETP and STP shall be designed.
- Monitoring of surface and ground water quality should be done. Analysis of the process waste water should also be done on regular basis to check efficiency of ETP and STP.
- The effluent treated process waste water shall be analysed and the analysed parameter shall be well below the Bangladesh Standard (ECR, 1997).
- Each industry should practice rain water harvesting to minimize the water consumption and reduce run-off from the site

11.13. Impact on Biodiversity

The proposed site location is mostly agricultural in nature and devoid of trees. Hence tree felling or associated impact like habitat loss of avifaunal/smaller mammals/ reptile community is not envisaged. However, due to loss of agricultural field habitat loss of associated invertebrates, reptile, smaller pisces etc. is envisaged. Dredging along Madhumati River is also a threat to habitat and breeding/spawning ground of fishes and other aquatic fauna. Discharge of solid and liquid waste in rivers/waterbodies, shall also impact the aquatic life. Therefore, proper mitigation measures should be taken to minimize the impacts on biodiversity.

No infrastructure development activities shall be encouraged close to the river shore line.

Mitigation Measures

- Provision should be made for peripheral green belt with 2-3 rows of local fruit bearing tree species all along the EZ boundary. These will attract and support avifaunal and other faunal community
- Suitable green area should be proposed inside the EZ
- Dredging from river may be avoided
- No waste shall be discharged in water bodies

11.14. Impacts on Occupation Health and Safety

The lack of adequate mitigation measures on the health and safety of the workers will result in accidents and injuries leading to loss of life or property. Following mitigation measures are proposed to ensure safe work place for the construction labor.

Mitigation Measures:

- The project proponent should ensure that the contractor (make part of contractors contract) to have and occupational health and safety plan. The contractor should provide accidental insurance and medical insurance to all the workers.
- The contractor should conduct daily tool box meeting for all workers to discuss potential work related hazards and other safety aspects.

- The contractor should conduct training for all workers on safety and environmental hygiene at no cost to the employees.
- The contractor should maintain first aid facilities for the workers and will instruct and induct all workers in health and safety matters (induction course) including construction camp rules and site agents/foremen will follow up with toolbox talks on a weekly basis. Workforce training for all workers starting on site will include safety and environmental hygiene.
- Fencing on all areas of excavation greater than 1m deep and sides of temporary works should be observed.
- Workers should be provided with appropriate personnel safety equipment such as safety boots, helmets, gloves, protective clothes, dust mask, goggles, and ear protection at no cost to the workers.
- Reversing signals (visual and audible) should be installed on all construction vehicles and plant.
- Contractor should be responsible for evacuation injured person to the nearest medical center
- Pertinent H&S trainings should be provided to all the workers with respect to hazards linked to the activities. Additionally, the workers will be informed of precautions to be taken to avoid impacts to the local community;
- Monitoring of the PPE usage can be strengthened, in that, a mechanism can be adopted whereby defaulters receive a warning on non-usage and stringent actions can be taken on subsequent offences;
- Maintain H&S records of occupational H&S incidents, accidents, diseases and dangerous occurrences
- The contractors should ensure H&S standards of labour camps. The labour camps will be established in the proposed site area. Additionally, the representative of project proponent should conduct random spot checks to determine any issues related to improper waste disposal or the living conditions in these camps (i.e. presence of secure shelter and flooring, number of persons per room, number of toilets for the manpower, water availability etc.);
- Strong protocols should be built as part of contractual obligations around zero tolerance of child labour or harassment of women workers and even health and safety aspects. These should also be monitored by supervision and monitoring team.

11.15. Flood Risk

The project site is in proximity to Madhumati *River*. Based on the stakeholder interactions, the flood level during monsoon season varies from 5 feet to 8 feet depth inside the proposed EZ area. To avoid inundation during monsoon season, minimum land filling of 5-6 feet is considered. It is recommended to adopt river bank protection work in the dredging stretches and along the bank of Madhumati River to protect the site and surrounding area from flooding.

11.16. Sanitation and Disease Vectors

Potential sanitation and impacts from disease need to be controlled by maintaining hygienic conditions in the EZ area throughout the operational phase as well during construction by implementing appropriate social and health programs for the Project. BEZA should ensure that improvements are made to site sanitation and should implement the mitigation measure below for all operational activities and also that the contractor (during construction phase)/ industries (during operation phase) ensures that:

- Measures to prevent malaria should be implemented by installation of proper drainage to avoid water stagnation, etc.
- Standing water should not be allowed to accumulate in the drainage facilities or along the warehouse sides to prevent proliferation of mosquitoes.

- Temporary and permanent drainage facilities should be designed to facilitate the rapid removal of surface water from all areas and prevent the accumulation of surface water ponds.
- Malaria controls should be implemented in line with social plans for the Project.
- HIV/AIDS awareness and HIV-AIDS education and prevention program should be implemented in line with social plans under the social development work stream.

11.17. Public Consultations

This section provides the stakeholder identification and analysis as well as a brief understanding of the engagement process for the project. "Stakeholder" refers to those who have plausible stake in the environmental/social impacts of the project or activity are ascertained with a view to taking into account all the material concerns in the project or activity design as appropriate. It is highly desirable for all key stakeholders to arrive at a consensus on sensitive features, impacts and remedial actions. Stakeholder identification was done by examining the potential impacts of the project in terms of:

- ✓ Who may be affected directly (project affected people);
- ✓ Which agencies might have responsibility for the impact management;
- ✓ Which other organizations might have an interest in monitoring proponent activities or have local knowledge to contribute; and
- ✓ Which private/non-government sector entities might face financial and social hardships if the predicted impacts occur

The stakeholders identified in the project comprise of project impacted people, project beneficiaries, various government officials.

The main objective of the consultation process is to minimize negative impacts of the project and to maximize the benefits from the project to the local populace. The objectives of public consultation as part of this project are:

- ✓ Promote public awareness and improve understanding of the potential impacts of proposed projects
- ✓ Identify alternative sites or designs, and mitigation measures
- ✓ Solicit the views of affected communities / individuals on environmental and social problems
- ✓ Improve environmental and social soundness
- ✓ Clarify values and trade-offs associated with the different alternatives
- ✓ Identify contentious local issues which might jeopardise the implementation of the project
- ✓ Establish transparent procedures for carrying out proposed works
- ✓ Inform the affected populace about the entitlement framework and to settle problems with mutual consent
- ✓ Create accountability and sense of local ownership during project implementation; and
- ✓ To obtain information on baseline environment

11.17.1. Methodology of Stakeholder Consultations

Different techniques of consultation with stakeholders were used during project preparation, viz., in-depth interviews, public meetings, group discussions etc. to understand the socio-economic profile of the community and the affected families, baseline environment, environmental/social concerns etc.

11.17.2. Level of Consultations

Public consultations in the form of institutional and focused group discussions were carried out during the period from 11th January 2017 till 6th April 2018. Types of consultations done with various participants using various tools including, interviews with government officials, focused group discussion etc. are presented in the table on the next page:

Table 107: Types of Consultations

Level	Type	Key Participants
Institutional	Stakeholder Meeting	Various Govt. Officials
Community	Focused Group Discussion	PAP, Women, marginalized people

11.17.3. Institutional Stakeholders Consultation

Consultation conducted at institutional level with various Government Officials are furnished in below section.

Date of Meeting: 11 January, 2017
Location of Meeting: Upazila Nirbahi Officer's Office in Gopalgonj Sadar
Officials Met:

Name of Person	Designation/Department	Contact Details	Date of Consultation
Shammi Akhter	UNO	01711312230	11-Jan-17
Jakuria Alam	Sub-Assistant Engineer (Gopalgonj Pourushava)	01711964099	11-Jan-17
Sayid Hasan	Junior Engineer (REB)	01714693568	11-Jan-17
Musharraf Hasan	Surveyor (AC Land's Office)	01511112277	11-Jan-17
Harun Al Rashid	Upazila Election Officer (Election Commission)	-	11-Jan-17
Md. Jahangir Alam Khan	Upazila Forester (Forest Department)	-	11-Jan-17
Md. Mizanur Rahman	UAO, Gopalgonj Sadar (Department of Agricultural Extension)	-	11-Jan-17
Fatema Junnat	Statistics Officer (Upazila Statistics Office, Gopalgonj Sadar)	-	11-Jan-17
A.K.M Shamsuzzoha	Sub-Divisional Engineer (RHD)	-	11-Jan-17
Badal Chandra Kirtania	Upazila Engineer (LGED)	-	11-Jan-17
A.B.M. Mamunul Haque	Retainer Engineer (Gopalgonj PBS)	-	11-Jan-17
Md. Mahashin	Senior Upazila Fisheries Officer (Department of Fisheries)	-	11-Jan-17

Salient Points of Discussion

At the onset, the officials from Upazila Nirbahi Office welcomed the idea of developing economic zone in the region and country by BEZA and expressed their consent on the same. The officers extended cooperation in identifying the proposed EZ site and nearby features. Discussions were held on various developmental aspects of the proposed EZ like land acquisition status, utility availability, road connectivity etc. The discussion was concluded by a visit to the project site to gain an on-ground understanding of the various issues. Some of the key features discussed were as follows:

- The site is a 200 acre contiguous plot in the shape of a trapezium, with National Highway, N805 and Regional Highway, R850 forming its Eastern and Western boundaries. There is a proposal to expand both these road stretches to 4 lanes to cater flow of heavy vehicles. These roads are currently in good condition and can support movement of heavy vehicles as well.
- Bangabandhu Sheikh Mujibur Rahman Science and Technology University is near the southern boundary of the proposed EZ site, while on the north proposed EZ site is bordered by agricultural land.
- Currently the proposed EZ site location is under cultivation with 1-2 crop rotation being practiced.
- Currently the irrigation needs are being satisfied by using water from a small channel flowing through the site area. However for industrial purpose, water may need to be pumped from the Madhumati River flowing 1-2 km from the western boundary of the proposed EZ site. As per stakeholder discussion, it was understood that ground water is not suitable for industrial consumption. There is a proposal for construction of a new water pumping station near the southern boundary of the proposed EZ site, if that proposal is approved the pumping station can supply water to the proposed EZ site for industrial purpose.
- Currently there are 2 substations supplying power to Gopalgonj Sadar upazilla, Gopalgonj Sadar substation and Tungipara substation around 10 km and 7 km from proposed EZ site, respectively. Each of these substations are of 10 MVA capacity with voltage line of 33/11 KV. Combined present demand from these substations is 12 MVA and the rest 8 MVA can be provided for consumption at proposed EZ site. These substations draw power from Gopalgonj grid having a capacity of 2x41 MVA, voltage of 132/33 KV. Work is in progress to upgrade Tungipara substation to 20 MVA capacity by June 2018 and also to construct a new substation of 10 MVA capacity.

11.17.4. Focused Group Discussions (FGD)

The Focused Group Discussions (FGD) were carried out with different group at the proposed EZ area on 06 April, 2018. PwC personnel discussed about the future developments and benefits the community can have upon the development of the EZ. The details of the Focused Group Discussions are presented in below.

Table 108: Details of Focused Group Discussion

Stakeholders Categories	Relevant Stakeholders	Issues	Suggestion/Demand from participants	Remarks
Local Youth Group (9 Participants)	Affected and adjacent residential settlements	• Employment opportunity • Development social infrastructure • Skills training to enhance the competency • Priority for local population	• If the project is developed, various job opportunities will be created • For this project, the social organizations will be developed • The skill training should focus on soft skills development, community-oriented courses, craftsman training (for semi-skilled opportunities • They will be get an opportunity to learn, get	Employment opportunities for the youths shall be provided on a priority

Stakeholders Categories	Relevant Stakeholders	Issues	Suggestion/Demand from participants	Remarks
			trained and work during the beginning of the construction activities of EZ • The training system should lead to trained young people in employable skills who are open to immediate employment opportunities. • The project affected youths shall be prioritized for employment opportunities	
Women Group (10 Participants)	Affected and adjacent residential settlements	• Equal opportunity to get employment • Security assured from migrants • Keeping in mind the opportunities to the affected persons • Ensure Family security	• There will be arrangements for many women's employment for the development of the EZ. • There will be equal opportunity for women as well as men. • They will be also get an opportunity to learn, get trained and work during the beginning of the construction activities of EZ • The safety and security of the people especially the women shall be assured. There will be so many migrants during the construction activities of EZ, safety and security should be ensured.	Women shall be provided with equal opportunities .No gender bias shall be made

Stakeholders Categories	Relevant Stakeholders	Issues	Suggestion/Demand from participants	Remarks
Local Businessman Group (9 Participants)	Affected and adjacent residential settlements	• Constructions include the operation phase help the growth of business • Provide skills trainings and opportunities to get the employment • Develop of EZ have an impact on livelihoods	• Many people will come here on the construction and operation phase so many sales will increase, and business will improve • The unemployed youth in the area or family will able to develop skills on the job and get job opportunities anywhere. The unemployed of the shopkeepers shall equally be provided opportunities to learn and work in the activities of EZ • As the progresses, the standard of living of the family will be increased • From the business view, with the development of the EZ, there shall be surge in their sales. More workers and people will come to their shop to eat and drink something	Workers will come to shops serve their purposes of lunch, tea , snacks and dinner

People in the area were eagerly waiting and were enthusiastic for a development project. The people expressed that the development of the Economic Zone will bring social and economic development in the region by providing permanent source of income to the nearby residents. The community expressed that the project will help in increasing better connectivity, promote better and sustained employment opportunities, better service facilities, and better transport.

The details attendees of Focussed Group Discussions are furnished in Annexure at the end of this report.

Figure 87: Stakeholders Consultation

FGD with Youth group at the project site


FGD with women group at the project site


FGD with Local Business group at the project site

Summary of Environmental Impacts

- Impact on existing drainage: An Agricultural Canal within project site will be affected. The proposed drainage network need to be followed
- Site gets flooded during monsoon: backfilling of the land to a level higher than the HFL of Madhumati River is proposed. During construction /operation stage, surface runoff from EZ area may contaminate nearby surface water bodies if proper mitigation not taken
- Impact due to dredging from Madhumati River: May cause erosion of river bank, bottom (river) disturbance, impact on habitat of fish, benthos and other aquatic fauna
- Erosion: Bank of Madhumati River adjacent to proposed EZ in between Gobra Madrasapara to Gobra Chawdhuri para prone to soil erosion. Bank protection work at dredging stretches to be undertaken
- Pollution: Sensitive locations like Bangabandhu Sheikh Mujibur Rahman Science and Technology University, Shekh Fazilatunessa Eye Hospital etc. are located in the vicinity. Proper mitigation measures for Noise and Air Emission, especially during operation stage to be undertaken
- Proposed acquisition of 200.00 acres of land (private- 199.70 acres ; Khas- 0.30 acres) which is mostly agricultural/Nul in nature

11.18. Environmental Management Plan and Monitoring Indicator

The environmental impacts associated with any development project are eliminated or minimized to an acceptable level through development of appropriate mitigation measures based on most suitable techno-economic options. The Environmental Management Plan (EMP) is a well-established tool to ensure effective implementation of the recommended mitigations measures throughout the subsequent project development stages. The EMP also ensures that the positive impacts are conserved and enhanced. An EMP provides location and time specific actions to be taken with defined responsibility.

11.18.1. Institutional Arrangement

BEZA has developed Environmental Social Management Framework (ESMF[255]) with the help of World Bank. The institutional arrangement of EZ shall be aligned as per this framework. Proposed EZ will have an Environmental and social cell which will coordinate with site engineers and PMC.

Overall Project Implementation Arrangements

The overall management of the project will be carried out by EZ which is the project implementing unit (PIU).

Institutional Set Up For Environment Management

The institutional arrangements for the implementation of various aspects of ESMF and environment management of the proposed project envisaged to be implemented as part of the Private Sector Development and Support Project (PSDSP) comprise the following.

- Project Environment Cell (PEC) at PIU to ensure adequate integration of environment management measures in the design phase and supervise implementation of ESMF and specific requirements of EMP
- Environment Management Unit (EMU) at EZ to implement EMP and other regulatory requirements during construction & operation phase of EZ.

Project Environment Management Cell (PEC) at PIU

The Project Implementation Unit (PIU) will establish a Project Environmental Cell (PEC) headed by a 'Manager – Environment' and supported by environmental engineers. The PEC will function to:

- Supervise implementation of ESMF throughout project implementation period;
- Ensure integration of the EA and the EMP measures into the sub-project design and implementation plans such as contract documents, maintenance contracts, tenant lease agreements, etc;
- Supervise the implementation of the mitigation measures by the Master developers / Contractors;
- Assist the engineering staff and other PIU staff in addressing environmental issues during planning, design and implementation of the sub-projects;
- Prepare periodic progress reports on the implementation of the EMP throughout the project period.

Environment Management Unit (EMU)

In order to implement various environmental management measures at EZ, the master developer / contractor / operator will set up an Environment Management Unit (EMU). The EMU will consist of environmental engineers with relevant experience on environmental issues associated with EZ. The EMU will function all through construction and operation phase of the EZ and perform the following functions.

- Identify regulatory requirements of the sub-project and initiate necessary actions / studies to ensure compliance to the same;
- Co-ordinate with DoE and PIU and ensure securing SCC and ECC as applicable for the project(s);
- Co-ordinate with the contractors / sub-contractors and all other agencies involved in the development and operation of EZ / EPZ and ensure that all the requirements of EMP are fully complied;
- Ensure that all the common environmental infrastructure in EZ / EPZ is operated and maintained in compliance with the regulatory requirements of GoB;

[255] http://www.beza.gov.bd/wp-content/uploads/2015/10/ESMF-of-BEZA.pdf

- Liaise with individual enterprise/tenants and ensure that all environmental management conditions of the tenant lease agreement are fully complied;
- Prepare regular reports on environment management and submit to PIU/GoB.

11.19. Monitoring Indicators

The physical, biological and social components which are of particular significance to the proposed project are listed below:

- Air quality
- Water quality
- Noise levels
- Soil quality
- Solid & Hazardous Waste Management
- Plantation success / survival rate
- Soil Erosion
- Siltation
- Contamination of area surrounding to the project site
- Record of accidents
- Recorded public grievance

These indicators will evaluated periodically based on the monitoring results, baseline conditions, predicted impacts and mitigation measures.

11.20. Monitoring Plan

The objective of environmental monitoring during the preconstruction, construction and operation phases is to compare the monitored data against the baseline condition collected during the study period to assess the effectiveness of the mitigation measures and the protection of the surrounding environment based on national standards. A monitoring schedule has been sketched based on the environmental components that may be affected during the various phases of the project and is given below.

Table 109: Environmental Monitoring Plan

S. No.	Aspect	Source of Impact	Monitoring Methods and Parameters	Frequency	Executing Agency	Enforcement Agency
1.0	**Preconstruction and Construction Phase**					
1.1	Local Manpower Absorption	Construction Works	Contractor's report No. of people working in the project	Monthly	Contractor	BEZA & PMC
1.2	Soil Erosion	Excavation, disposal, cut & fill and land clearing activities for site levelling and internal roads, disposal	Survey & observation; Extent and degree of erosion; Structures for controlling soil erosion	Monthly	Contractor	BEZA & PMC
1.3	Greenbelt Development	-	Survival rate of species planted; Density of vegetation	Half Yearly	Contractor	BEZA & PMC
1.4	Air Quality	Transportation of construction materials, road construction,	Survey & observations; Levels of PM_{10},	Once in each season for two	Contractor	BEZA & PMC

S. No.	Aspect	Source of Impact	Monitoring Methods and Parameters	Frequency	Executing Agency	Enforcement Agency
		construction of utilities	$PM_{2.5}$, SO_2, NOx, CO	weeks at 3 locations		
1.5	Waste Management	Restoration of disposal sites and construction areas	Status of protection measures	Quarterly	Contractors	BEZA & PMC
1.6	Noise Level	Noise levels compliance with respect to industrial standards	Ambient Equivalent continuous Sound Pressure Levels (Leq) at day and Night time at 6 to 8 locations	Monthly	Contractors	BEZA & PMC
1.7	Drinking Water	Contamination due to seepage	All physio-chemical & biological parameters	Monthly	Contractor	BEZA & PMC
1.8	Surface Water	Transportation of construction materials, various construction works, runoff from camp	All physio-chemical & biological parameters	Monthly	Contractor	BEZA & PMC
2.0	**Operation Phase**					
2.1	Noise Levels	Noise levels compliance with respect to industrial standards	Ambient Equivalent continuous Sound Pressure Levels (Leq) at day and Night time at 6 to 8 locations	Monthly	Individual Industrial Units	BEZA
			Plant periphery and near noise generation sources	Monthly	Individual Industrial Units	BEZA
2.2	Biological Environment	Horticulture/ Greenbelt Development	Survival rate of plants and shrubs	Quarterly	BEZA	BEZA
			Survival rate of plants and shrubs at individual unit	Quarterly	Individual unit	BEZA
2.3	Ambient air quality	Ambient air quality levels compliance with respect to industrial standards	Ambient air quality monitoring at individual industries – Monitor levels of PM_{10}, $PM_{2.5}$, SO_2, NOx, CO	Monthly	Individual Industrial Units	BEZA
2.4	Ground /Drinking water quality	water quality levels compliance with respect to industrial standards	Bore-wells installed/ Drinking water source at site (All physio-chemical & biological parameters)	Monthly	Individual Industrial Units/BEZA	SEZL

S. No.	Aspect	Source of Impact	Monitoring Methods and Parameters	Frequency	Executing Agency	Enforcement Agency
2.5	Surface Water quality	To cross check accidental contamination	Madhumati River (All physio-chemical & biological parameters)	Quarterly	BEZA	BEZA
2.6	Soil Erosion	Madhumati River	Survey & observation;	Monthly	BEZA	BEZA

11.21. Community development plan

It is recommended the EZ owners to involve the local community during the project development. The EZ owner/its contractors may recruit local workforce to the extent possible during construction phase. The EZ owner would identify technically qualified unemployed youth around the project location and other nearby areas, and employ as far as practical. The EZ owner should form a forum/ association/ trust along with its industrial units to look after community development activities of EZ. All the industrial units should periodically contribute to this Trust. The Trust would represent EZ and its industries for all matters related to community and its development. This would act as interface between EZ and community. The Trust should encourage its industrial units to recruit local unemployed youth in the jobs during operational phase. For this if required arrange training for the local people to develop skilled manpower required if sufficient skilled manpower is not available to carry out technical work in the industrial units during operational phase.

The Trust will organise a community advisory group involving local representatives, representatives from EZ industries and neighbouring industries; that would help them in finding ways to participate with its neighbours in addressing socio-economic concerns. With the advice of its community advisory panel, local officials, and other key individuals and groups, the Trust along with its constituent industries may sponsor appropriate programs and projects to benefit its community as a whole.

Some specific community development programs that could be considered by the Trust in coordination with other industries in the locality are suggested here:

- Conducting awareness programs in surrounding villages on health impacts due to environmental pollution (air, noise, water, solid waste, etc.), and precautions to be taken to minimise health impacts.
- Conducting periodic health check-ups to the EZ (including industries) staff and in the surrounding villages to identify pollution related diseases.
- Encouragement to residents in the nearby localities for self-employment ventures, such as by assisting them in arranging micro finances to develop them as artisans/ skilled personnel.
- Periodic training programs on health and sanitary education, women and child development, and income generation schemes.
- Participation in improving the existing medical and educational facilities of the area - for this purpose, it is suggested that the Trust provide funds for facilities improvement (providing toilets, furniture, additional space creation, any other needed) to the local hospitals and schools
- Development of greenbelt/greenery or tree plantation in the nearby vacant government lands to build a green and clean environment in the surrounding areas and to reduce pollution impacts to some extent.
- Sponsoring fellowships to students in surrounding villages to encourage them to go for higher education
- Construction of a hospital in collaboration with other industries to improve health status
- Conduct or sponsor camps to clean up river ghats, jetties and terminals in the surrounding areas.

11.22. Compensation Plan

The development of the EZ is envisaged on land of 200 acres. Out of 200 acres, approximately 199.70 acres of land is private in nature where agricultural practices are going on currently. Agriculture is majorly practiced in the low land area. All the agricultural lands falling within the site boundary shall be acquired by BEZA and proper compensation based on present market rates to be provided.

11.23. Emergency Preparedness Plan (Contingency Plan)

In order to be in a state of readiness to face adverse effects of accidents, an emergency preparedness plan is required to be prepared which includes on-site and off-site emergency plan by the individual industry and industrial estate.

The Emergency Preparedness Plan will have the following minimal components:

- Accidents preventions procedures/ measures
- Fire prevention planning and measures
- Fire water storage and foam system
- Accident/emergency response planning procedure
- Grievance redressal mechanism
- Emergency control centre
- Emergency information system with role & responsibility and command structure
- Recovery procedure
- Assessment of damages and rectification
- Evaluation of functioning of disaster management plan
- Accident investigation
- Clean-up and restoration

11.24. Cost of EMP

The cost of EMP given here includes only that for the CETP, Environmental Monitoring, Audit, and greenbelt development. The costs are approximate and need calibration at the time of detailed design and estimation stage.

Table 110: Cost for EMP Implementation

S. No	Components	Unit Cost (Tk)	Cost (million BDT)
A	**Fixed Cost**		
A.1.	**Construction Phase (4 Years)**		
A.1.1.	PPEs for staffs of Project Proponent	40,000/year	.16
A.1.2.	CETP/STP construction	To be covered under engineering cost	-
A.1.3.	Enviornmental Monitoring (Quarterly) from site and surrounding area Ambient Air Ambient Noise Surface Water Ground/Drinking Water Soil Quality	200000/Quarter	3.20
A.1.4.	Greenbelt along the boundary and plantation along the roads	Lumpsum	5.00
A.1.5.	Flora and Fauna study	Lumpsum	1.00
A.1.6.	Enviornmental Audit (Half Yearly)	50000/half	.40
A.1.7.	Environmental Specialist - Full Time	500000/year	2.00

S. No	Components	Unit Cost (Tk)	Cost (million BDT)
A.1.8.	Social Analyst- - Full Time	450000/year	1.80
A.1.9.	occupational health specialist and a safety specialist- Full Time	450000/year	1.80
A.2.	Fund for proposed community development activities	Lumpsum	5.00
	Total Fixed Cost (million BDT)		**20.36**
B	**Recurring Cost (Yearly)**		
B.1.	**Operation Phase (per year)**		
B.1.1.	PPEs for staffs of Project Proponent	50,000/year	.05
B.1.2.	Solid waste bins for common areas	15,000/year	.015
B.1.3.	CETP/STP operation	To be covered under project cost	0
B.1.4.	Enviornmental Monitoring (Quarterly) from site and surrounding area Ambient Air Ambient Noise Surface Water Ground/Drinking Water Soil Quality	225000/Quarter	.90
B.1.5.	Maintenance of Green Belt	Lumpsum	.70
B.1.6.	Enviornmental Audit (Half Yearly)	60000/half	.12
B.1.7.	Environmental Specialist - Full Time	600000/year	.60
B.1.8.	Social Analyst- - Full Time	550000/year	.55
B.1.9.	occupational health specialist and a safety specialist- Full Time	550000/year	.55
B.1.10.	One CETP/STP Incharge	500000/year	.50
	Total Yearly Recurring Cost (million BDT)		**3.985**

11.25. Conclusion and Recommendation

Overall the impacts from preconstruction, construction and operation phase have limited adverse environmental impacts, and can be readily addressed through wise mitigation measures as suggested as mitigation. BEZA will invest in land and related off-site infrastructure development so as to make zone accessible and resourceful. Thereafter economic zone development will be responsibility of private developers. The off-site facilities proposed to be developed by BEZA including development of administration building, boundary wall, electrical supply, and access road. The project falls under Red category as per ECA, 1995 and requires prior environment clearance from DoE, Bangladesh.

The recommendations made for the project development on the basis of Environmental and Social Review study are given below:

- A detailed Environmental and Social impact assessment should be carried out by BEZA prior to any site preparation/construction activity and prior environment clearance certificate from DoE, Bangladesh should be taken
- Proposed environment management plan should be implemented strictly during preconstruction, construction and operation phase of the project.
- Green area development should be carried out

- Proper training of maintaining environment, health and safety should be given to Project management unit in preconstruction, construction and operation phase
- Provision of garland drain, thick green belt, ETP, STP, segregated storm water shall be adhered to.
- Environmental monitoring should be conducted as suggested in environment management plan
- Separate environment impact assessment study is to be carried out by developer for whole zone before developing the EZ.
- Ecological survey should be conducted before developing the EZ.

12. Financial Modelling

12.1. Purpose and Objective

Establishing of economic zone regime in Bangladesh is an effort by the GoB to boost manufacturing activity and employment in the country. BEZA intends to attract manufacturers who are interested in setting up manufacturing plants in Bangladesh through development of plug and play infrastructure, industrial land, supply of utilities (water, power and gas), transport connectivity and business friendly policies.

However, in order to develop the infrastructure it is paramount to understand the financial costs involved in developing such infrastructure and the expected returns that could be expected from operating economic zones. This chapter assesses the financial feasibility of developing the proposed economic zone which has been determined based on net financial benefits under different scenarios (conservative, base and aggressive) of land uptake in the proposed EZ and level of cash flows accruing to the developer. The rate of land uptake has been captured in the demand forecasting chapter of this report.

The major sources of revenue accruing to the developer of this proposed EZ has been considered from (1) lease rental for land uptake and (2) charges on utility (power, water, gas, effluent) provided to manufacturers. In addition, the developer could earn revenue from support amenities such as leasing out the land plot for logistics zone and commercial projects, and from economic zone service fees charged from the industrial tenants. In addition to the capital expenditure for developing this project, the developer also needs to incur operational expenditure towards operation and maintenance (O&M) of this project. Assumptions with respect to inputs for the model taken with due consultations with BEZA officers have been listed out in the later part of this chapter.

This model is developed to analyze revenues generating sources and consequently Internal Rate of Return (IRR) & Debt Service Coverage Ratio (DSCR) to the PPP developer of this economic zone. In this case, BEZA shall transfer the land to the PPP developer (preferred bidder selected through competitive bidding) on leasehold basis and develop off-site infrastructure as condition precedent.

While analyzing the returns accured from the above stated scenario, impact assessment of the following project structuring options will also be undertaken:

- BEZA acquiring equity stake (in lieu of providing EZ land to the PPP developer) in the Special Purpose Company (SPC) formed by the developer.
- BEZA acting as a developer of the Economic Zone i.e. BEZA undertaking construction and operation of the EZ.

12.2. Methodology of Financial Modelling

The financial model created as a part this engagement takes into consideration financial return to the private developer when the developer is selected by BEZA to finance, develop and operate the EZ

This scenario captures the rate of return earned by the developer after considering the costs incurred and revenue generated over a period of 50 years.[256] Following table captures the key responsibilities of the private developer in this project.

Table 111: Responsibilities of private developer

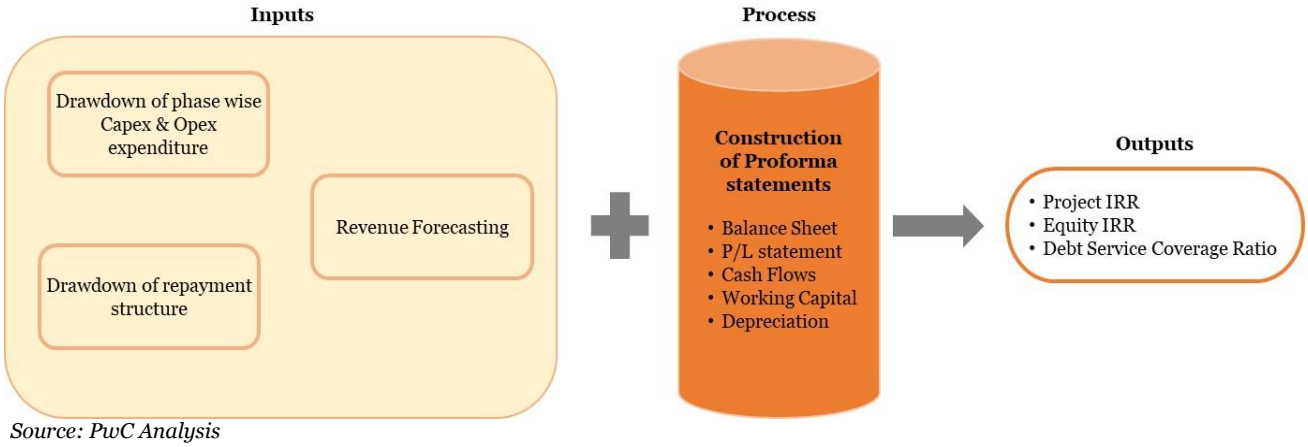
Aspects	Private Developer through PPP route
Land acquisition and ownership	BEZA would acquire the land parcel and transfer the land parcel to the private developer on leasehold basis

[256] *As per the Governing Board of BEZA approved guidelines*

Aspects	Private Developer through PPP route
Off-site infrastructure development	Responsibility of BEZA as condition precedent
On-site infrastructure development	Responsibility of the private developer
Financing	Responsibility of the private developer
O&M	Responsibility of the private developer

To have a robust model in place, an exhaustive list of assumptions has been developed which duly indicates all the inputs considered for determining the expected return on the investment. Consent has been obtained from BEZA officers about these assumptions. A graphical diagram depicting the functionalities of financial model is shown below.

Figure 88: Process flow of the Financial Model



Source: PwC Analysis

Inputs

A quarterly model has been developed to depict the capex and opex expenses along with debt (both commercial borrowing and concessional loan) drawdown structure, in order to have a granular insight into the capital cash outflows. Revenue Forecasting has been done on an annual basis to understand the cash inflows accruing to the developer through lease of industrial land, Standard Factory Buildings (SFBs), support amenities like Vocational Training Centre, Child care and healthcare units, commercial space, logistics zone etc., surcharge on supply of utility services (like water, power, gas, and effluent treatment), and EZ service fees.

Process

Considering the expenses and revenue sources above, pro-forma statements have been calculated which captures the assets, liabilities, profits/loss and cash flows accruing to the developer. This process forms the backbone of the financial model which is used to determine the returns to the developer.

Outputs

As a measure of calculating returns to the developer on its investment in this project, parameters that have been considered are Rate of Return to providers of capital (debt + equity) i.e. project IRR, Rate of Return to providers of Equity i.e. equity IRR, and Debt Service Coverage Ratio (DSCR) of the cash flows.

Three scenarios (viz. conservative, base and aggressive) have been considered in this model based on the anticipated occupancy (land demand uptake) of the proposed economic zone in order to make provision for a

dynamic investment climate. These scenarios would assist the developer in assessing the range of expected return that it could anticipate through its investment in the proposed EZ.

Aggressive case assumes macro-economic conditions of Bangladesh and the region are improving; Potential infrastructure projects are commencing prior to Commercial Date of Operations (CoD). Base case assumes macro-economic conditions of Bangladesh and the region are showing steady trend and behaving as expected; potential infrastructure projects are commencing as scheduled. Conservative case considers macro-economic conditions of Bangladesh and the region are showing declining trend; potential infrastructure projects are delayed.

The broad level commercial aspects considered while developing this model are –

- Economic zone developer is responsible for financing, constructing and developing the project site and consequently the O&M.
- Complete ownership of the land demarcated for this project belongs to BEZA. The private developer who would be contracted to develop the EZ would be required to pay BEZA an upfront fees, annual fees and a share of the gross revenue during the concession period for developing and operating the EZ.
- Cost of land acquisition has been considered to be the prerogative of BEZA and not the private developer.
- Construction of the EZ site would take place in 2 phases, each phase is of 2 years.
- The project would be financed by developer's own equity and loans from commercial lenders & financial institutions (i.e. concessional loan).
- The developer will market the plot to industrial units.
- The developer will enter into lease agreement with the industrial units. These industrial units will be the end users/tenants at the plots in economic zone.
- Major sources of revenue earned from economic zone operations are: (i) land lease rental from land plots, (ii) land lease rental from standard factory buildings (SFB), (iii) revenue from support amenities (such as logistics zone, healthcare, vocational training institute, and commercial space), and (iv) mark-up on utility connections.
- Sources of revenue for providing utility connections to the developer from economic zone include:
    - Power and Water tariffs from tenants
    - Water Treatment and Effluent Treatment charges from industries
- In addition to rentals, EZ Service fee will be charged by developer as per industry practice.

In the light of methodology elaborated above, a detailed guide on how to operate the financial model is captured in the next section.

A guide on how to operate the financial model is placed as annexure to this report. Assumptions in the financial model is captured in the next section.

12.3. Assumptions, Inputs and Variables

In this section, the key assumptions used in developing the financial model (to assess the financial viability of the proposed project) have been elucidated.

12.3.1. Revenue Assumptions

Developer will earn revenues through land leasing, provision of utilities and overall maintenance and operation of the economic zone related activities. This includes- (i) revenue from industrial space (i.e. industrial land and SFB), (ii) revenue from support amenities (like commercial space, healthcare space, vocational training institute, and logistics zone), (iii) EZ Service Fees, (iv) utility charges (Power tariff, Water tariff, sewerage and effluent treatment charges).

Assumptions for revenue generating from industrial space

In order to arrive at annual land lease rent that the developer may charge from tenants, prevailing rentals of all the export processing zones (EPZs) under BEPZA were analysed.

Table 112: BEPZA operated EPZ land plot tariffs

Sl. No	EPZ	Tariff[257] (USD /sq.mt./year)	Tariff[258] (BDT /sq. ft./year)
1	Chittagong, Dhaka, Comilla, Karnaphuli & Adamjee	2.20	~17
2	Ishwardi, Uttara and Mongla	1.25	~10

Source: Data obtained from BEPZA

Based on the above data the prevailing land lease rental at Dhaka EPZ has been considered as the base since it is envisaged that the developer would provide facilities within the EZ which is at par with Dhaka EPZ. Land Lease Rental of Dhaka EPZ is USD 2.20/ sq. m. / year i.e. ~17 BDT/ sq. ft. / year (1 USD=82 BDT).

Considering the private sector service quality, land lease rental charged by the developer for the proposed EZ have been considered as 21 BDT/ sq. ft. / year (i.e. 0.26 USD/ sq. ft. / year) in the financial model. This lease rental is in line with the prevailing market rate as offered by private EZ developers elsewhere in the country.

In addition to the land lease rental, rental can also be charged from operations of the SFBs. Table below shows the rental of SFB facilities at the EPZs under BEPZA.

Table 113: BEPZA operated EPZ SFB plot tariffs

Sl. No	EPZ	Tariff[259]	Tariff[260]
1	Chittagong, Dhaka, Comilla, Karnaphuli & Adamjee	2.75 USD/ sq. mt. / month	~251 BDT/ sq. ft./ year
2	Ishwardi, Uttara and Mongla	1.60 USD/ sq. mt. / month	~147 BDT/ sq. ft./ year

Source: Data obtained from BEPZA

Based on the above data the prevailing SFB lease rental at Dhaka EPZ has been considered as the base since it is envisaged that the developer would provide facilities within the EZ which is at par with Dhaka EPZ. SFB plot Lease Rental of Dhaka EPZ is USD 2.75/ sq. m. / month i.e. ~251 BDT/ sq. ft. / year (1 USD=82 BDT).

Considering the private sector service quality, SFB plot rental charged by the developer for the proposed EZ have been considered as 300 BDT/ sq. ft. / year (i.e. 3.66 USD/ sq. ft. / year) in the financial model. This lease rental is in line with the prevailing market rate as offered by private EZ developers elsewhere in the country.

The annual escalation of lease rent (for both industrial land and SFB) has been considered as 12% in a block of 3 years (i.e. after every 3 years, the land lease rental value would be inflated by 12%). This assumption has been drawn based on prevailing charges in economic zones worldwide and taking consent from BEZA officers. It may however be noted that the land rent for EPZs under BEPZA increased several times; 2001, 2007 and 2011

[257] *for average 2,000 sq. m. plot size*
[258] *USD to BDT conversion= 82*
[259] *for Standard Factory Building Facilities*
[260] *USD to BDT conversion= 82*

respectively in Bangladesh. The escalation rate was in the range of 10%-25%. Accordingly, this assumption has been on the conservative side.

After running the financial model and sensitivity analysis on the same, these revenue drivers can be adjusted in order to arrive at a sound financial return accruing from the project.

Assumptions for revenue generating from support amenities

In addition to the land lease rental and SFB rental, base assumptions of revenue generating from support amenities have been considered as below:

- Rent from logistics zone- BDT 20/ sq. ft. per annum i.e. USD 0.24/ sq. ft. per annum (subjected to inflation of 10% in a block of three years). It has been assumed that the developer would sublet the land parcel to a logistics players for developing the logistics zone.
- Rent other support amenities – BDT 22/sq. ft. per annum i.e. USD 0.27/ sq. ft. per annum (subjected to inflation of 10% in a block of three years). Land parcel measuring an area of 9.3 acres has been earmarked for development of support amenities like Child care and healthcare units, vocational training centre, commercial space etc.

The above stated assumptions have been finalised based on market information obtained through secondary sources in the context of Khulna and Jessore area.

Assumptions for utility tariffs

Other revenue streams to the developer include utility tariffs on water, power, gas and effluent treatment. The model is built on the assumption that Power and Water will be supplied to the Developer by the local nodal agency such as Rural Electrification Board (REB), City Corporation, Water Supply and Sewerage Authority (WASA).

Energy Regulatory Commission Bangladesh has fixed the electricity tariff for industrial connection. **This fixed tariff is BDT 7.90 per kWh (i.e. USD 0.10 per kWh)**.

Since no pertinent data is available for water supply in the region surrounding Gopalgonj, prevailing water tariff of Mongla EPZ has been considered. **This tariff is BDT 37,560 per MLD (i.e. USD 458 per MLD)**.[261]

Effluent treatment will also be charged by developer as per prevailing rates. Effluent volume for treatment as % of water intake is considered at 60%. Based on prevailing effluent treatment charges in Dhaka EPZ, **base tariff of BDT 36,950 per MLD (i.e. USD 451 per MLD) of sewage treated has been considered**.

Owing to lack of information of industrial gas supply tariff in this region, **prevailing gas supply tariff for Dhaka EPZ has been considered i.e. BDT 8.54 per cum (i.e. USD 0.10 per cum)**.

Developer will be responsible for operation and maintenance of these utilities and in turn sell to the industrial tenants with 10% surcharge as service fees.

The above utility tariffs are subjected to inflation rate of 15% applicable in a block of every three years (i.e. the utility tariffs would be increased by 15% after every three years).

Assumptions for economic zone service fees

Economic Zone service fees has been considered as BDT 2/ sq. ft. / year (i.e. USD 0.02/ sq. ft. / per annum) considering the private sector efficiency factor. This is based on the standard benchmarking and it is subjected to the discretion of the developer. On ground scenario could be different than this assumption. Escalation rate has not been considered while estimating the revenues arising from the economic zone service fees.

[261] *Data obtained from BEPZA*

12.3.2. Cost Assumptions

Capital Expenditure

Capital costs are based on the market value of developing the land demarcated for development of the proposed EZ, which includes the costs of infrastructure development for the proposed EZ, including earthworks, roads, institutional buildings, utilities, water supply system and waste water treatment plant in line with the master plan. As per the master plan for this EZ site, the capital cost has been divided into 2 phases of 2 years each. Breakup of the cumulative capital cost is mentioned in the table below.

Table 114: Break-up of Project Cost

Description of Item	Quantity	Unit	Phase I Cost Breakdown	Phase II Cost Breakdown	Price without tax (In million Taka)	Price without tax (In million USD)
Road Network						
Road (30 m)	1174	RM	33	33	66	0.80
Road (25 m)	4143	RM	94	94	188	2.29
Total			**127**	**127**	**254**	**3.10**
Footpath and plot entry culvert			48.5	48.5	97	1.18
Total			**48.5**	**48.5**	**97**	**1.18**
Storm Water Network			21.5	21.5	**43**	0.52
Power Network						
Internal Power Distribution (OHT)			8.32	8.32	16.64	0.20
Distribution Transformer			16.55	16.55	33.09	0.40
Street Light	5,317.00	RM	6.46	6.46	12.92	0.16
Internal Substation	22.43	MVA	150	150	300	3.66
Fire Hydrant			0.25	0.25	0.5	0.01
Total			**181.58**	**181.6**	**363.15**	**4.43**
Water Network						
Water Supply Network			16.5	16.5	33	0.40
Sump, Overhead Tank, Pumps			64.65	64.65	129.31	1.58
Water Treatment Plant	6.31	MLD	30.59	30.59	61.18	0.75
Total			**111.74**	**111.7**	**223.49**	**2.73**
Sewer Network						
Sewer Network	5,317.00	RM	6.2	6.2	12.4	0.15
Waste Water Treatment Plant	5.1	MLD	92.78	92.78	185.55	2.26
Effluent Treatment Plant	4.37	MLD	163.85	163.85	327.69	4.00

Description of Item	Quantity	Unit	Phase I Cost Breakdown	Phase II Cost Breakdown	Price without tax (In million Taka)	Price without tax (In million USD)
Solid waste Management	22.43	TPD	174.81	174.81	349.62	4.26
Total			**437.64**	**437.6**	**875.26**	**10.67**
Telecom	5,317.00	RM	16.11	16.11	32.22	0.39
Sustainable Infrastructure elements						
Open Space/ Land scaping	59,823	Sqm	1.38	1.38	2.76	0.03
Greenery along road	5317	RM	0.08	0.08	0.16	0.00
Percolation Pits	354	Nos	0.26	0.26	0.51	0.01
Total			**1.72**	**1.71**	**3.43**	**0.04**
Support Amenities						
Admin Building	1,500.00	Sqm	52.5	0	52.5	0.64
Maintenance Buildings	100	Sqm	1.3	1.3	2.6	0.03
Total			**53.8**	**1.3**	**55.1**	**0.67**
Standard Factory Building						
Total	13	Acres	326.18	217.45	543.63	**6.63**
EMP						
Total			10.18	10.18	20.36	**0.25**
Project Subtotal			**1,335.94**	**1,174.71**	**2,510.65**	**30.62**

Source: MACE Analysis (sum total figures could show minor aberrations due to rounding off effect)

Above elucidated project costing has been estimated considering 13 acres of SFB construction. This project cost may vary depending on the area of SFB.

Cost of SFB development has been considered as BDT 1,600/ sq. ft. (i.e. USD 19.51/ sq. ft.) as per the prevailing market rates. Ground coverage for SFB has been considered as 60% as per the prevailing practices.

Interest during construction for this project has been estimated as BDT 203 million (i.e. ~USD 2.5 million).

Above stated estimated capital expenses have been adjusted for inflation. Historical trend of Consumer Price Index (CPI) available in Bangladesh Bank has been synthesized with long term inflation rate data available in World Bank database. Based on this, yearly inflation rate of 5% has been applied on the estimated capital expenses.

Off-site infrastructure development is the responsibility of BEZA and not part of project cost (which is to be incurred by the PPP developer). Table in the next page elucidates the off-site infrastructure cost estimation.

Table 115: Break-up of off-site infrastructure Cost

Description of Item	Quantity	Unit	Price without tax (In million Taka)	Price without tax (In million USD)
Site filling	304,321,240	Cum	300	3.66
Right of Way (Approach Road) (30m)	100	RM	7	0.09
Storm Water drain Network	6	KM	150	1.83
Power Network	6	KM	37.5	0.46
Water Supply Network	0.9	KM	22.07	0.27
Infiltration Gallery	6.3	MLD	96.42	1.18
Fencing	3.8	KM	40	0.49
Project Sub-total			**652.99**	**7.96**

Source: MACE Analysis (sum total figures could show minor aberrations due to rounding off effect)

Operations and Maintenance Expenditure

In addition to this capital cost, Operation and Maintenance (O&M) costs during the operational stage of the project is presented in the table below. These expenses are assumed as certain percentage of the capital expenditure and the same to be incurred on yearly basis. These are based on standard industry benchmarks.

Table 116: Break-up of Operational Expenditure

Total Operation Cost	% of Capex
Roads and associated infrastructure	2%
Decentralized water supply, treatment and distribution	2.5%
Electrical, street lighting & fire fighting	2%
Telecom & communication systems	0%
Sustainable infrastructure elements, RW harvesting, summer storage tank & greenery	2%
Decentralized wastewater, network and solid waste management	4%
Buildings - industrial / business	0%
Buildings – commercial	0%
Buildings - R&D Centre cum VT centre and QA/QC lab	0%
Buildings – MEP	0%
SFB	0%
EMP	10%
Total Maintenance Cost	**% of Capex**
Roads and associated infrastructure	5%
Decentralized water supply, treatment and distribution	2%
Electrical, street lighting & fire fighting	5%
Telecom & communication systems	2%
Sustainable infrastructure elements, RW harvesting, summer storage tank & greenery	2%
Decentralized wastewater, network and solid waste management	2%
Buildings - industrial / business	5%

Total Operation Cost	% of Capex
Buildings – commercial	5%
Buildings – R&D Centre cum VT centre and QA/QC lab	5%
Buildings – MEP	5%
SFB	5%
EMP	10%

Source: MACE Analysis

Apart from the operating cost listed above, 2% of the opex expenditure has been considered as miscellaneous cost and 2 million BDT has been considered as pre-operating expenses.

Table below indicates the proposed organogram of the EZ and manpower remuneration related expenses.

Table 117: Details of Manpower Cost

Designation	Number of Manpower	Salary (BDT million per year)	Per annum cost (million BDT)
CEO	5	1	5
GM-Finance	3	1	3
GM-Marketing	3	1	3
GM-Engineering & Procurement	3	1	3
GM-HR and IT	3	1	3
GM-Operations	3	1	3
Manager-Finance	1.5	1	1.5
Manager-Marketing	1.5	1	1.5
Manager-Engineering & Procurement	1.5	1	1.5
Manager-HR and IT	1.5	1	1.5
Manager-Operations	1.5	1	1.5
Assistant Manager-Finance	0.72	2	1.44
Assistant Manager-Marketing	0.72	2	1.44
Assistant Manager-Engineering & Procurement	0.72	2	1.44
Assistant Manager-HR and IT	0.72	2	1.44
Assistant Manager-Operations	0.72	2	1.44
Security Supervisors	0.36	4	1.44
Security Staffs	0.24	24	5.76
Peons and Clerks	0.18	5	0.9
Office Boys	0.12	10	1.2
Total			**44.0**
Total (USD million)			**0.54**

Source: PwC Analysis

The cost elements constitute both; infrastructure development and Operation & Maintenance cost in processing area as well as non-processing area. The processing area consists of industrial buildings, specialized infrastructure, public amenities and utilities. The non-processing area has healthcare space, vocational training centre, retail & commercial space, and open spaces. The detailed land use planning has already been covered in Master Planning section of the report.

Above stated estimated operations and maintenance expenses have been adjusted for inflation. Historical trend of Consumer Price Index (CPI) available in Bangladesh Bank has been synthesized with long term inflation rate

data available in World Bank database. Based on this, yearly inflation rate of 5% has been applied on the estimated operations and maintenance expenses.

Revenue for BEZA

The 3 parameters considered as revenue to be paid to BEZA by the developer are i) Upfront Payment in lieu of license to develop EZ, ii) Annual fees and iii) Percentage share of the revenue accrued to developer.

Base values for these cost parameters are as listed below –

- Upfront payment to BEZA – 70 million BDT (i.e. USD 0.85 million)
- Annual fees – 13.25 million BDT/ year (USD 0.16 million/ year)
- Percentage gross revenue share – 5%

12.3.3. Financing Assumptions

Various financing assumptions in-built in this financial model have been outlined below:

- Interest on Working Capital- 14%
- Debt: Equity= 70:30; Debt could be sourced from either commercial borrowing or through concessional loan/ grant
- For commercial borrowing: moratorium period- 1 Year (after loan disbursement for the respective phase); rate of interest- 10% per year; repayment period- 10 years
- For concessional loan: moratorium period- 1 Year (after loan disbursement for the respective phase); rate of interest- 2% per year; repayment period- 20 years

An equal spread repayment of principal has also been assumed towards repayment of the loan (i.e. 10% principal repayment every year over 10 years of repayment period or 5% principal repayment every year over 20 years of repayment period).

Private Developer will have to pay income taxes on 'Income from Business or Profession' as per the Income Tax Ordinance, 1984. The ordinance allows deductions from total income or revenue for cash and non-cash expenses (i.e. depreciation and amortization), to arrive at Net Income before Tax (NIBT). The applicable corporate tax rate is then applied to NIBT to derive income tax to be paid. As per prevailing tax regulations, Income Tax rate of 35% has been considered in the financial model for calculating the income tax payable to National Board of Revenue, Bangladesh. According to the incentive package approved by the BEZA's Governing Board, economic zone developer shall have tax exemption for 10 years from COD, 70% tax exemption for 11th year and 30% tax exemption for 12th year. The same is incorporated in the model as fiscal benefit due to tax holiday.

Straight Line Method (SLM) of depreciation has been considered and annual depreciation rate of 2% has been taken in the model for a project tenure of 50 years. Depreciation assumptions for tax treatment are in line with prevailing corporate income tax ordinance 1984 guidelines in Bangladesh.

12.3.4. Other Assumptions

Timing related assumptions

It has been assumed that one year timeframe i.e. from present to 1st July 2019 (year 2020) would be required towards regulatory activities essential for kick starting the project. Construction would take place from 2020 to 2023 spread over two phases, each of two years. Industrial space uptake will commence from year 2021.

Usage Norms for utilities

In furtherance to the utility consumption data obtained from the primary survey, ultimate water and power requirement for each of the industries are based on the applicable industry norms in Bangladesh.

Since, this report captures only the tentative breakup of industries that could be established within the EZ site, utility consumption figures have been considered for the industry requiring the highest water and power supply

per acre for the entire industrial plot. This is a conservative assumption made to ensure adequate supply of utility within the site in future.

Table 118: Utility Usage Norms

Power Requirement (KVA per acre)	Water Requirement (MLD per acre)
182.11	0.028

Source: MACE Analysis

Based on standard industry benchmarks, 60% of water demand is considered as effluent generated.

Basis our primary interactions with manufacturers in Bangladesh and analysing the gas consumption information of unit investors in Chittagong and Dhaka EPZs of Bangladesh, gas requirement of 1,836 cum/ hectare/ day (i.e. 76.5 cum/ acre/ day) has been considered as gas requirement for industries in the proposed EZ.

Industrial space uptake rates

In line with the best practices prevailing in economic zone development, it has been assumed that developer will construct the basic shell infrastructure- public amenities, utilities and roads. This developed land in the proposed EZ will be provided on long-term lease to the industrial tenants. It has also been considered that during the construction period, developer will simultaneously undertake marketing activities for unit plots, to attract investors. Once all infrastructure development is complete, services installed and the proposed EZ is completely ready for operation, the industrial tenants will start moving onto their respective plots. Three scenarios have been created for the industrial space fill rate. Detailed calculation for each of these scenarios are duly captured in the Demand Forecasting chapter.

Aggressive case assumes macro-economic conditions of Bangladesh and the region are improving; Potential infrastructure projects are commencing prior to Commercial Date of Operations (CoD). Base case assumes macro-economic conditions of Bangladesh and the region are showing steady trend and behaving as expected; potential infrastructure projects are commencing as scheduled. Conservative case considers macro-economic conditions of Bangladesh and the region are showing declining trend; potential infrastructure projects are delayed.

As per demand forecasting exercise, complete industrial space (land and SFB) uptake would take place in 10 years, 6 years, and 4 years respectively for conservative, base, and aggressive cases.

Uptake rates for support amenities

For support amenities, full land uptake has been considered in the year 2021 (once the industries commence operations within the proposed EZ).

12.4. Sensitivity Testing on Key Inputs

Figure in the next page summarises the revenue and cost drivers, and decision making parameters of this financial model.

Figure 89: Revenue and Cost Drivers

Revenue Drivers
Parameters
Industrial Land annual lease rental
SFB annual lease rental
Rent from support amenities
Logistic Zone Rent
Surcharge on utility
Revenue from EZ service fees
Escalation rate on revenue

Cost Drivers
Parameters
Capital Expenditure (capex)
Interest Expenses
O&M Expenditure (opex)
Pre-Operating Expenses
Miscellaneous Cost
Cost of Manpower
Inflation rate on capex and opex
Upfront payment, annual fees and revenue share to be paid by PPP developer to BEZA

Source: PwC Analysis

Following parameters have been varied in the sensitivity analysis to assess the most sensitive variable in the financial model.

- Land lease rental for industrial land plots
- Land lease rental for SFB
- Area allocation for SFB
- Escalation rate for industrial land and SFB
- Upfront payment, land lease fees and % of gross revenue share paid by PPP developer to BEZA

Based on the same, a sensitivity check has been carried out to understand the most sensitive parameter, where each of the above mentioned parameters have been varied by +/- 25% (keeping the other parameters constant) to understand the impact on the project IRR.

On carrying out the above mentioned exercise, it was observed that owing to factors like change in logistics zone rent, upfront payment and allocation of SFB area no significant change took place in Project IRR (provided the other parameters remaining constant). However, on varying factors like % revenue share paid by developer, annual land lease fees, commercial space rent, escalation rates for rent, lease rentals for industrial land and SFB (keeping other parameters constant), returns generated from the project displayed significant variations. The tornado chart constructed to evaluate sensitivity of varying each parameter on a stand-alone basis is shown below.

Table 119: Sensitivity variation of Project IRR across the three scenarios

Parameters	Conservative Scenario			Base Scenario			Aggressive Scenario		
	-25%	0%	+25%	-25%	0%	+25%	-25%	0%	+25%
% revenue share by developer	*8.4%*	*8.2%*	*8.1%*	*10.6%*	*10.4%*	*10.2%*	*11.7%*	*11.5%*	*11.2%*
Land lease rental to BEZA	8.3%	8.2%	8.2%	10.5%	10.4%	10.3%	11.6%	11.5%	11.4%
Upfront payment to BEZA	8.3%	*8.2%*	8.2%	10.4%	10.4%	10.3%	11.5%	11.5%	11.4%
Logistics zone rental	8.2%	*8.2%*	8.2%	10.4%	10.4%	10.4%	11.5%	11.5%	11.5%
Support amenity rental	8.2%	*8.2%*	8.3%	10.3%	10.4%	10.5%	11.4%	11.5%	11.6%
Area allocation for SFB	7.9%	*8.2%*	8.5%	9.9%	10.4%	10.8%	11.0%	11.5%	11.9%
Escalation rate of rentals	7.7%	*8.2%*	8.8%	9.8%	10.4%	11%	10.9%	11.5%	12.1%
Lease rental for SFB	7.3%	*8.2%*	9.1%	9.2%	10.4%	11.6%	10.1%	11.5%	12.9%
Lease rental for industrial	7.7%	*8.2%*	8.8%	9.6%	10.4%	11.1%	10.6%	11.5%	12.4%

Source: PwC Analysis

Lease rental for SFB and % of gross revenue share paid by developer have emerged out to be the most sensitive revenue and cost driver determining the rate of return from the project

In order to maximise the return from this project, increasing the lease rentals for SFB and minimizing gross revenue share would result in maximum return (keeping all other parameters constant).

12.4.1. Project Return Calculations and Project Structuring

Based on the above stated methodology and assumptions, project return has been calculated from the financial model as per the three scenarios viz. (i) base, (ii) aggressive and (iii) conservative. These calculations have been done on basis of the base parameters, which were considered in line with the assumptions highlighted in the previous sub-section of this chapter.

Tables below captures the returns accruing from this project for the three scenarios and the base values considered for different revenue and cost drivers.

Table 120: Returns accruing to developer of EZ from cost and revenue drivers

Parameters	Conservative Scenario	Base Scenario	Aggressive Scenario
Project IRR	8.2%	10.4%	11.5%
Equity IRR	6.2%	9.5%	12.0%
Average DSCR	7.27	7.62	7.75
Minimum DSCR	1.00	1.00	1.00
Year of min. DSCR	2021	2021	2025

Source: PwC analysis

Revenue Drivers	Values	Cost Driver	Values
Industrial land lease rental	21 BDT/sq. ft. /year i.e. USD 0.26/ sq. ft. / year	**% Revenue Share paid by developer**	5%
SFB lease rental	300 BDT/ sq. ft. /year i.e. 3.66 USD/ sq. ft. / year	**Annual land lease fees paid by developer**	13.25 million BDT i.e. USD 0.85 million
Escalation rate of rentals	12% in a block of 3 years	**Upfront payment made by developer**	70 million BDT i.e. USD 0.16 million
Area allocation for SFB	13 acres		
Support Amenities rent	22 BDT/ sq. ft. /year i.e. 0.27 USD/ sq. ft. / year		
Logistics zone rent	20 BDT/sq. ft. /year i.e. 0.24 USD/ sq. ft. / year		

Source: PwC analysis

In order to assess the impact of revenue driver and cost driver on the returns of the project, most sensitive revenue and cost drivers have been varied and the results on Project IRR have been tabulated for all 3 cases i.e. i) Conservative ii) Base and iii) Aggressive.

Table 121: Impact on return due to revenue and cost drivers

Lease rent for SFB	Revenue Share with BEZA	Conservative Scenario		Base Scenario		Aggressive Scenario	
		Project IRR	Equity IRR	Project IRR	Equity IRR	Project IRR	Equity IRR
200	10%	7.0%	4.8%	8.8%	7.2%	9.6%	8.8%
230	7%	7.4%	5.3%	9.3%	7.9%	10.2%	9.8%
250	**5%**	**7.6%**	**5.6%**	**9.6%**	**8.3%**	**10.6%**	**10.4%**
270	3%	7.9%	5.8%	9.9%	8.8%	10.9%	11.1%
300	0%	8.2%	6.2%	10.4%	9.5%	11.5%	12.0%

Source: PwC analysis

The above table indicates the increasing returns generated as lease rent for SFB (revenue driver) is gradually increased and revenue share with BEZA (cost driver) is gradually decreased. All other parameters have been kept constant during the calculation of the above based scenarios.

Analysis of different project structuring options

Above calculations demonstrate the project returns accrued under different scenarios for the as-is case where the PPP developer would be developing the proposed EZ.

There could be three project structuring options for this project. These options are outlined in the following-

a) As-Is case where PPP developer would develop the EZ site
b) BEZA gets equity stake in developer's SPC
c) BEZA takes the responsibility of financing, constructing and operating the EZ through its own resources

Keeping other parameters as constant, following cost and revenue assumptions have been made to evaluate the project structuring outcomes under the options listed above.

Table 122: Cost and Revenue drivers for project structuring options

Scenarios	Cost	Revenue
a) As-is case where PPP developer would develop the EZ site	Hard cost of developing the EZ site - BDT 2,511 million (i.e. USD 30.61 million)	Sources of revenue remain unchanged across the three scenarios in line with "Revenue Assumption" section of this chapter.
b) BEZA gets equity stake in developer's SPC	Hard cost of developing the EZ site – BDT 2,511 million (i.e. USD 30.61 million) + Cost of acquiring land for EZ site – BDT 4,358 million* (i.e. USD 53.15 million)	
c) BEZA takes the responsibility of financing, constructing and operating the EZ through its own resources	Hard cost of developing the EZ site – BDT 2,511 million (i.e. USD 30.61 million) + Cost of acquiring land for EZ site – BDT 4,358 million* (i.e. USD 53.15 million) + Hard cost of developing offsite infrastructure – ~BDT 653 million (i.e. USD 7.96 million)	

**Using cash compensation under law method*

The returns calculated in this chapter under **option a)**, indicates the returns are moderate for the developer to undertake development of the EZ site. However, a comparison of the first option with other two options listed above, indicates that the returns could further deteriorate under **option b) and c)** since although the revenue drivers have remained unchanged under these options, other cost drivers i.e. cost of acquiring land for EZ site (BDT 4,358 million) and cost of developing offsite infrastructure (~BDT 653 million) is getting added to the cost of developing the EZ. Cost of acquiring the EZ land is found to be significantly higher than cost of developing the EZ site (which is BDT 2,511 million). **Thus, the as-is case (where PPP developer would be developing the EZ site) is financially a better option (generating comparatively higher returns) as compared to the other project structuring options.**

12.5. Conclusions and Recommendations

Financial modelling exercise highlights the entire gamut of cost and revenue assumptions taken in order to evaluate the financial feasibility for the PPP developer who would envisage construction and operation of the proposed EZ. Given the interest rate of borrowing fund for undertaking construction of Economic Zone, which is 10%, the return generated from the project (project IRR of 10.4% and equity IRR of 9.5% in the base scenario) is moderate in nature.

Given the positive impact on Bangladesh's economy (as discussed in Economic Modelling chapter) expected out of establishing an EZ site in Gopalgonj, private developer could also consider approaching donor agencies like World Bank, Asian Development Bank or applying for external commercial borrowing (ECB) to bring down the cost of debt. This would subsequently improve returns generating from the project.

Development of economic zones in Bangladesh is in line with BEZA's end objective of promoting industrial development and employment generation in Bangladesh. Getting a PPP private developer to construct and operate the EZ site would result in better quality and improved operational efficiency in the service provided to the manufacturers who would invest in the EZ site. PPP private developer has better access to following key resources as compared to BEZA:

- **Human Resources**: The Developer has a better access to human resources, and does not have to go through government bureaucracy for deployment of human resources, which gives it better access to human resources, and more efficient operations;
- **Finance:** The developer has full access to diversified project finance instruments with limited or no constraints. This provides flexibility on capital structures and capital costs;
- **Expertise:** The developer will have better access to resources such as the required expertise in project preparation, design, management and implementation;
- **Experience**: The developer's team may have better experience in developing and managing SEZs, especially on facility management and operation;
- **Technologies:** The Developer has better access to cutting edge technologies.

By dint of having better access to the above outlined resources, PPP private developer can provide BEZA the following advantages:

- **Better financial discipline**, since a developer has to operate efficiently to stay in business, while government agencies are protected against bankruptcy
- **Rapid project implementation** through better access to additional human resources and expertise
- **Removal of financial constraints** through better access to private finance
- **Ability to change plans and resources** during implementation/ operations of the project to adapt to changes in market conditions and other variables affecting the project.

As a private developer is better placed to finance, construct, and operate the proposed EZ, BEZA may explore the possibility of getting on-board a private developer through PPP route. This option is better placed with respect to other structuring options discussed earlier. In order to increase the returns from the project, private developer could consider possibilities of concessional borrowing.
In order to increase the returns from the project, private developer could consider possibility of obtaining concessional loans or BEZA could support the developer by adopting the following approaches –

- **Exploring possibility of obtaining concessional loan through external commercial borrowing and funding from multilaterals –** Lower the rate of borrowing, higher is the project returns. In order to increase the equity IRR, private developer may approach multilateral/ funding agencies and may also explore the possibility of obtaining commercial borrowing through External Commercial Borrowing (ECB) route.
- **BEZA deciding to modify bid parameters -** The financial model has provision for considering 3 parameters which could be used by BEZA for selection of developer, which are –
    - Upfront payment by developer to BEZA
    - Annual land lease to be paid by developer to BEZA during concession period
    - % of gross revenue accruing from the EZ to be shared by developer with BEZA

Key objective of this economic zone project is to generate employment and improve the overall socio-economic conditions of the region surrounding the project site. BEZA, keeping cognizance of the ultimate objective of this project, may decide to forego one of the bid parameters. Such modification in bid parameters would result in higher project return, thus making the project financially more profitable for the private developer.

Implementation of the recommendations outlined above would improve the returns accruing from this project for the private developer.

13. Economic Modelling

13.1. Purpose and Objective

The objective of this analysis is to quantify the impact of the development of the proposed EZ on the economy of Bangladesh. Financial analysis (or Financial IRR) estimates the return accruing to the project operating entity (EZ developer), whereas Economic Internal Rate of Return (EIRR) estimates the return on the investment to the national economy. Economic analysis is essential to develop a rationale for Government of Bangladesh to support the development of the proposed EZ and illustrate the measure of the accrued economic benefits.

13.2. Methodology of Economic Modelling

13.2.1. EIRR Framework

EIRR is a holistic approach which takes into consideration the following stakeholders (directly/ indirectly) associated with the project:

- The project financers (whose return was calculated as the financial internal rate of return),
- The employment (both direct and indirect employment) generated because of the project,
- The suppliers and customers of the project,
- Competitors of the project,
- Residents who are being affected by the implementation of the project and
- Others

Determination of EIRR is directly aligned with the objectives of the multilateral agencies i.e. alleviation of poverty, employment generation and overall development of the country.

A two-stage process has been adopted for the calculation of EIRR.[262]

EIRR= Private Returns+ Cost Gains

Where, Private Returns= Actual Revenues- Actual Costs

Cost Gains= Actual Cost- Opportunity Cost

All taxes and subsidies have been excluded for computation of EIRR. The impact of inflation has been excluded while calculating the EIRR.

Economic analysis requires quantification of various costs and benefits converted to 'economic equivalent' terms. EIRR also requires identification of 'externalities' and valuation of inputs and outputs at their true economic prices, or the 'opportunity costs'.

Financial analysis only looks at the project from the perspective of the implementing agency (the private developer). Financial analysis is only concerned with line items that entail monetary outlays. Economic analysis on the other hand looks at cost and associated benefits to the economy. In economic analysis, a resource must be priced at its opportunity cost (its value in the best possible use), even if it is obtained free since use of the resource is a cost to the economy. Economic analysis measures both the positive and negative impact of the project.

The economic cost reflects the degree to which the consumption elsewhere in the ecosystem is sacrificed due to the diversion of the resources required for the project. Whereas, the economic benefit portrays the extent to which the project contributes to the increasing value of consumption available to the society.

Some important aspects to be considered while undertaking economic analysis are:

[262] *Benjamin Esty, Frank Lysy, & Carrie Ferman, "An Economic Framework for Assessing Development Impact", Harvard Business School Case 9-202-052, February 7, 2003.*

- Economic analysis is considered at constant prices in local currency terms. Thus, in case of accounting for economic costs and benefits, all costs and benefits must be measured in 'real' terms. In such analysis, all the costs and benefits are considered at the commencement year i.e. 2018.
- For undertaking the economic analysis, financial costs are to be converted to their economic cost equivalents. By and large the financial components are capex (capital investment in land, construction cost etc.) and Opex (operational expenditure).
- Items like taxes, duties and subsidies included in the financial cost are excluded as these are market distortions.
- Debt service costs (interest during construction) are not included as economic cost in the analysis as the same doesn't require usage of resources.
- Cost owing to Environmental Management Plan has been included in the economic cost calculation.

13.2.2. Methodology adopted

The economic analysis for proposed EZ was undertaken in three major steps:

a) *Step 1:* In this step, the total economic cost for the project was calculated. All the direct costs (both capital expenditure and operational expenditure) associated with the project development were enlisted and broken down into the three factors of production viz. capital (material and equipment), land and labor. The pertinent financial costs were converted to the economic costs using conversion factors as elucidated above.

b) *Step 2:* The financial benefits from the proposed EZ project was calculated and converted to economic terms to capture the economic benefits which (directly/indirectly) impact the economy of Bangladesh. In this step, the cumulative economic benefit accrued from this project was computed.

Economic benefits considered are:

1) Value added in export owing to the industrial activities within the economic zone.
2) Economic benefit (through gains for the exchequer) as a result of the industrial operations within the proposed EZ
3) Employment generation owing to the development of the proposed economic zone. Minimum wage rate of BEPZA, SWRF, and SERF have been considered to arrive at the economic value of the total employment generated.
4) Tax incentive availed by the developer is a loss (economic cost) for the exchequer and tax paid by the developer is a gain (economic benefit) for the exchequer.

c) *Step 3:* Economic return for the project tenure was calculated by deducting the economic cost from the total economic benefit. IRR was calculated considering the base case.

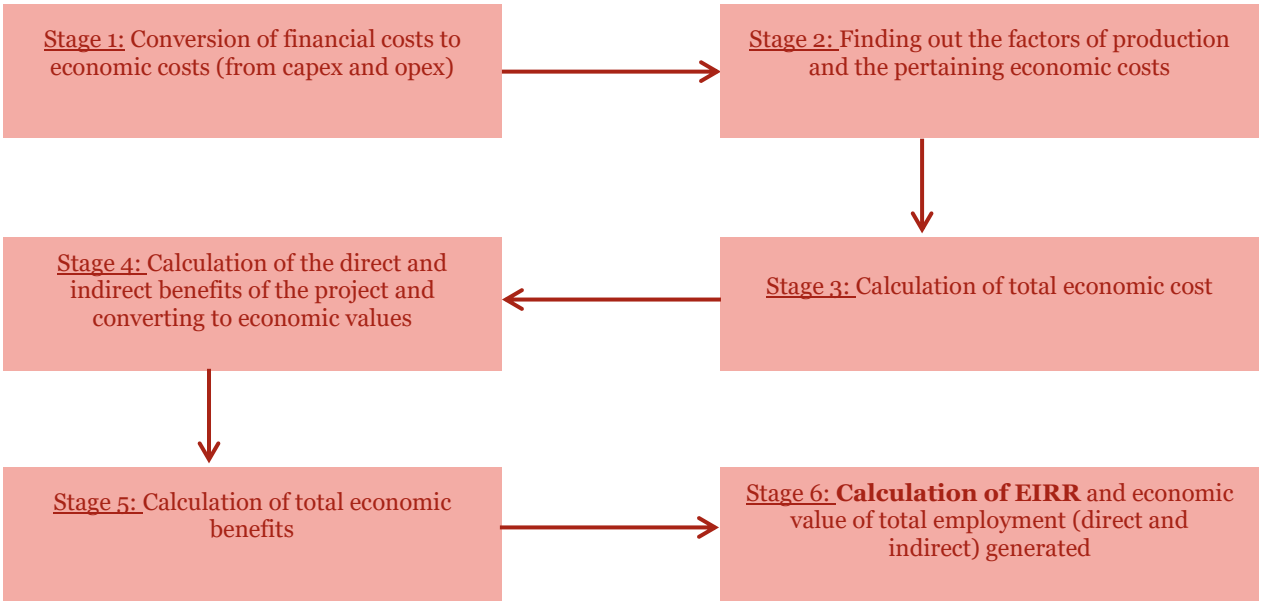
Economic modelling exercise has been undertaken for three scenarios as elucidated in the following-

- Aggressive scenario: Macro-economic conditions of Bangladesh and the region are improving; Potential infrastructure projects are commencing prior to CoD
- Base scenario: Macro-economic conditions of Bangladesh and the region are showing steady trend and behaving as expected; potential infrastructure projects are commencing as scheduled
- Conservative scenario: Macro-economic conditions of Bangladesh and the region are showing declining trend; potential infrastructure projects are delayed

Proceeds from the demand forecasting exercise have been taken into cognizance to undertake the economic modelling exercise for the above stated three scenarios. Industrial space uptake rates and number of industrial establishments have been considered to undertake this economic modelling.

The approach & methodology adopted for each of the three scenarios has been illustrated in the diagram on the next page.

Figure 90: Framework for Economic IRR calculation



13.3. Assumptions, Inputs and Variables

The Economic IRR for the project has been calculated considering economic costs and benefits generating out of the project over the project tenure. The assumptions adopted for computation of economic IRR are based on the assumptions as depicted in our financial analysis. Base case was used for calculating the EIRR for the project. In addition to the above, the following assumptions were considered for arriving at the EIRR:

- *Cost of land:* Since this project envisages land being transferred from BEZA to the private developer, cost of land has not been considered in this economic model.
- *Environmental costs:* Costs related to Environment have been also included in the model. Costs associated with technical support, development of green belt, solid and hazardous waste management, waste and waste water, construction safety etc. have been included as part of capital expenditure. In the operational expenditure section, maintenance costs for heads like operation of CETP/ STP/ waste facilities, establishment & training and monitoring of performance indicators have been considered.
- *Capital Expenditure (Capex):* The capex incurred for various components of the project is obtained from the financial model. This has further been segregated into three components:

  a) Material – 50% of total capex
  b) Equipment – 30% of total capex
  c) Labor – 20% of total capex

- *Operating Expenditure (Opex):* We have assumed that 90% Opex will generate on account of the materials and the consumables; 10% of opex will generate on account of the equipment. The operating cost for personnel is calculated separately in the economic model.
- *Land lease expenses:* Land lease expense is not included in the economic analysis
- *Import of Equipment:* We have assumed that 75% of the equipment and machinery used for the project would be imported. This is based on the standard practice and market benchmark of similar industries in Bangladesh.
- Capex and Opex have been converted to economic equivalents/ market costs using the following assumptions:

- *Shadow Exchange Rate Factor (SERF)* of 1.05 was considered. The basis is that BDT is overvalued by about 5%.[263]
  SERF is the ratio of economic price of foreign currency to its market price. Alternatively, it is the ratio of the shadow to the official exchange rate. For economic analysis using the domestic price numeraire, the SERF is applied to all outputs and inputs, including labor and land that have been valued at border price equivalent values, with project effects measured at domestic market price values left unadjusted.
- *Shadow Wage Rate Factor (SWRF)* of 1.00 for skilled labor and 0.75 for unskilled labor was assumed.[264] Further it was considered that the project will have a mix of 60% skilled labor and 40% unskilled labor. Hence, SWRF of 0.90 has been arrived.
  SWRF is the ratio of the shadow wage rate of a unit of a certain type of labor, measured in the appropriate numeraire, and the project wage for the same category of labor. Alternatively, the ratio of the economic and the SWRF can be used to convert the financial cost of labor into its economic cost.

These figures are in conformity with the information provided by Bangladesh Planning Commission and ADB economic analysis reports for Bangladesh. These were applied to tradable inputs and labor component to get domestic equivalents. It may be noted that since SERF is applied on the costs, factors such as the import duty is considered to be adjusted in the SERF and hence import duty has not been considered separately.

- VAT rate (for both capex and opex) has been considered as 15% according to the prevailing rate for Bangladesh.
- Estimation of indirect and induced employment generation (due to generation of downstream industries) is based on Employment Multiplier Coefficient of 0.7. The coefficient was extracted from Background Paper for World Development Report 2013 "Structural Transformation and Employment Creation"[265]. The indirect employment generation coefficient for several developing countries (size and geography similar to Bangladesh) was considered to arrive at this figure.
- *Tax Treatment:* Since tax, subsidies and incentives are distortionary in nature; their impact needs to be nullified by making necessary adjustments.
- It has been assumed that each of the industrial units will operate at 80% capacity utilization level and the plant efficiency level is 80%; export contribution of each of the industrial units is 25% of its Gross Value Added.

The guide for operating this economic model is placed in the annexure.

13.4. Results and Conclusions

Base case Economic Internal Rate of Return (EIRR) has been calculated as **25.75%**, which indicates that the project is providing attractive returns throughout the tenure of the project. Following table depicts the scenario analysis of the proposed EZ.

Table 123: Scenario Analysis of the Proposed EZ

Scenario	EIRR
Base Scenario	25.75%
Aggressive Scenario	32.54%
Conservative Scenario	18.58%

263 Additional Financing to the Third Primary Education Development Project RRP BAN 42122 by ADB (2015)

264 Similar assumption was taken for ADB-Khulna water supply project

265 Background Paper for World Development Report 2013 "Structural Transformation and Employment Creation" by Christian Kingombe and Dirk Willem te Velde, Overseas Development Institute

Table above indicates that in conservative case, project generates **18.58%** economic return which is good in nature. Aggressive scenario indicates that economic return of the project is **32.54**%, which is highly attractive.

It appears from the above analysis that the proposed EZ generates good to highly attractive economic return in the context of Bangladesh's economy and growth targets.

14. Way Forward

Through this section, we take this opportunity of highlighting our next steps to be undertaken in this project. The same are elucidated below:

- We have tried our best to address all the concerns raised by BEZA and World Bank in this Final report, however we request you to kindly provide any further comments that you might be having, so that we can incorporate the same in the Final Report for your kind perusal within 10 days from receipt of the same.
- A detailed Environmental and Social impact assessment should be carried out by BEZA prior to any site preparation/construction activity and to obtain environment clearance certificate from Department of Environment, Bangladesh.

15. Annexure

15.1. Annexure 1 – Site Photographs

The photographs taken during the site visits have been shown below –

View of Gopalgonj site

Water channel being used for agriculture in Gopalgonj site

Road towards east of Gopalgonj site

Road along west of Gopalgonj site

Substation towards south east of Gopalgonj site

Single track railway line under construction towards Gopalgonj

15.2. Annexure 2 – Import Trend of Bangladesh

Figures in USD million

Highlighted cells belong to top 75% products

Product label	Imported value in 2012	Imported value in 2013	Imported value in 2015	Imported value in 2016
Cotton	5,921	6,095	7,150	5,383
Machinery, mechanical appliances, nuclear reactors, boilers; parts thereof	3,405	3,321	4,792	5,314
Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television ...	1,941	1,799	2,451	3,059
Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral ...	3,216	2,858	5,220	2,079
Iron and steel	1,886	1,714	2,408	2,054
Plastics and articles thereof	1,293	1,380	1,795	1,958
Vehicles other than railway or tramway rolling stock, and parts and accessories thereof	885	759	1,144	1,675
Man-made staple fibres	1,090	1,206	1,624	1,509
Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal ...	2,971	2,705	2,770	1,459
Knitted or crocheted fabrics	297	300	590	1,003
Man-made filaments; strip and the like of man-made textile materials	660	728	1,103	912
Cereals	618	781	1,521	858
Fertilizers	1,107	956	1,256	736
Sugars and sugar confectionery	1,013	678	838	697
Paper and paperboard; articles of paper pulp, of paper or of paperboard	460	455	581	656
Tanning or dyeing extracts; tannins and their derivatives; dyes, pigments and other colouring ...	402	423	588	626
Edible vegetables and certain roots and tubers	371	517	705	606
Organic chemicals	499	458	657	599
Commodities not elsewhere specified	1	0	1	595
Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical ...	287	287	400	576
Articles of iron or steel	327	685	445	569
Miscellaneous chemical products	358	366	505	533
Natural or cultured pearls, precious or semi-precious stones, precious metals, metals clad ...	6	6	8	496
Salt; sulphur; earths and stone; plastering materials, lime and cement	759	778	992	483
Miscellaneous manufactured articles	192	182	258	430
Residues and waste from the food industries; prepared animal fodder	185	283	491	410
Special woven fabrics; tufted textile fabrics; lace; tapestries; trimmings; embroidery	98	95	163	386

Product label	Imported value in 2012	Imported value in 2013	Imported value in 2015	Imported value in 2016
Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal ...	339	394	592	375
Edible fruit and nuts; peel of citrus fruit or melons	132	103	274	313
Aluminium and articles thereof	192	223	262	307
Impregnated, coated, covered or laminated textile fabrics; textile articles of a kind suitable ...	85	86	138	305
Rubber and articles thereof	228	216	299	278
Inorganic chemicals; organic or inorganic compounds of precious metals, of rare-earth metals, ...	274	261	375	259
Pulp of wood or of other fibrous cellulosic material; recovered (waste and scrap) paper or ...	143	143	166	257
Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere ...	267	228	290	239
Articles of apparel and clothing accessories, not knitted or crocheted	683	707	887	236
Pharmaceutical products	198	169	187	230
Furniture; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings; ...	77	85	74	218
Miscellaneous articles of base metal	43	41	59	196
Footwear, gaiters and the like; parts of such articles	95	96	153	187
Copper and articles thereof	150	128	210	177
Soap, organic surface-active agents, washing preparations, lubricating preparations, artificial ...	129	131	161	174
Zinc and articles thereof	103	104	159	164
Ships, boats and floating structures	1,353	1,005	994	155
Other vegetable textile fibres; paper yarn and woven fabrics of paper yarn	14	15	42	151
Coffee, tea, maté and spices	92	114	230	150
Ceramic products	53	55	68	138
Raw hides and skins (other than furskins) and leather	69	80	169	137
Essential oils and resinoids; perfumery, cosmetic or toilet preparations	77	71	74	137
Railway or tramway locomotives, rolling stock and parts thereof; railway or tramway track fixtures ...	21	112	7	118
Glass and glassware	61	57	73	118
Wadding, felt and nonwovens; special yarns; twine, cordage, ropes and cables and articles thereof	28	28	46	110
Articles of leather; saddlery and harness; travel goods, handbags and similar containers; articles ...	19	12	29	100
Albuminoidal substances; modified starches; glues; enzymes	47	52	76	94
Articles of apparel and clothing accessories, knitted or crocheted	17	12	23	90

Product label	Imported value in 2012	Imported value in 2013	Imported value in 2015	Imported value in 2016
Miscellaneous edible preparations	49	42	74	89
Preparations of cereals, flour, starch or milk; pastrycooks' products	60	60	71	85
Tools, implements, cutlery, spoons and forks, of base metal; parts thereof of base metal	29	28	55	76
Wool, fine or coarse animal hair; horsehair yarn and woven fabric	52	46	43	62
Toys, games and sports requisites; parts and accessories thereof	19	17	24	62
Articles of stone, plaster, cement, asbestos, mica or similar materials	29	33	36	60
Aircraft, spacecraft, and parts thereof	237	138	201	59
Wood and articles of wood; wood charcoal	109	92	114	58
Other made-up textile articles; sets; worn clothing and worn textile articles; rags	40	28	34	56
Printed books, newspapers, pictures and other products of the printing industry; manuscripts, ...	59	35	297	54
Lead and articles thereof	39	39	55	42
Prepared feathers and down and articles made of feathers or of down; artificial flowers; articles ...	41	42	4	41
Photographic or cinematographic goods	22	24	29	41
Fish and crustaceans, molluscs and other aquatic invertebrates	17	30	55	41
Umbrellas, sun umbrellas, walking sticks, seat-sticks, whips, riding-crops and parts thereof	8	4	5	40
Products of animal origin, not elsewhere specified or included	12	12	60	32
Ores, slag and ash	58	64	72	31
Lac; gums, resins and other vegetable saps and extracts	6	5	8	28
Clocks and watches and parts thereof	4	4	6	27
Products of the milling industry; malt; starches; inulin; wheat gluten	26	27	32	26
Live animals	12	12	10	18
Headgear and parts thereof	2	2	3	18
Tobacco and manufactured tobacco substitutes	15	10	12	16
Cocoa and cocoa preparations	4	4	7	15
Beverages, spirits and vinegar	10	9	13	13
Preparations of vegetables, fruit, nuts or other parts of plants	10	7	8	13
Vegetable plaiting materials; vegetable products not elsewhere specified or included	1	2	5	13
Carpets and other textile floor coverings	3	4	5	12
Arms and ammunition; parts and accessories thereof	120	112	130	10
Silk	6	6	5	5
Tin and articles thereof	2	3	3	5
Nickel and articles thereof	3	2	1	4
Explosives; pyrotechnic products; matches; pyrophoric alloys; certain combustible preparations	2	1	2	4
Other base metals; cermets; articles thereof	6	5	5	4

Product label	Imported value in 2012	Imported value in 2013	Imported value in 2015	Imported value in 2016
Musical instruments; parts and accessories of such articles	2	1	0	2
Preparations of meat, of fish or of crustaceans, molluscs or other aquatic invertebrates	2	2	1	1
Meat and edible meat offal	1	1	1	1
Furskins and artificial fur; manufactures thereof	0	0	1	1
Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage	0	0	0	0
Works of art, collectors' pieces and antiques	1	1	0	0
Manufactures of straw, of esparto or of other plaiting materials; basketware and wickerwork	0	0	1	0
Cork and articles of cork	0	0	0	0

Source: ITC Trade Database

15.3. Annexure 3 – Export Trend of Bangladesh

Figures in USD million

Highlighted cells belong to top 75% products

Product label	Exported value in 2012	Exported value in 2013	Exported value in 2015	Exported value in 2016
Articles of apparel and clothing accessories, not knitted or crocheted	9,850	10,000	13,765	16,292
Articles of apparel and clothing accessories, knitted or crocheted	9,421	9,568	12,767	16,271
Other made-up textile articles; sets; worn clothing and worn textile articles; rags	1,067	876	819	987
Footwear, gaiters and the like; parts of such articles	349	429	697	912
Other vegetable textile fibres; paper yarn and woven fabrics of paper yarn	759	669	681	768
Fish and crustaceans, molluscs and other aquatic invertebrates	496	530	445	602
Headgear and parts thereof	51	43	76	279
Articles of leather; saddlery and harness; travel goods, handbags and similar containers; articles ...	139	164	293	257
Raw hides and skins (other than furskins) and leather	325	422	299	209
Vehicles other than railway or tramway rolling stock, and parts and accessories thereof	117	113	131	90
Tobacco and manufactured tobacco substitutes	55	49	49	88
Plastics and articles thereof	89	72	80	82
Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical ...	40	50	53	70
Pharmaceutical products	50	61	70	69
Toys, games and sports requisites; parts and accessories thereof	15	22	27	58
Prepared feathers and down and articles made of feathers or of down; artificial flowers; articles ...	8	9	15	58
Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television ...	76	45	60	57
Edible vegetables and certain roots and tubers	84	114	70	52
Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral ...	447	279	178	52
Ceramic products	36	40	37	47

Product label	Exported value in 2012	Exported value in 2013	Exported value in 2015	Exported value in 2016
Furniture; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings; ...	27	28	40	46
Commodities not elsewhere specified	0	2	1	42
Wadding, felt and nonwovens; special yarns; twine, cordage, ropes and cables and articles thereof	22	21	30	37
Preparations of cereals, flour, starch or milk; pastrycooks' products	36	45	85	35
Carpets and other textile floor coverings	7	9	19	35
Lead and articles thereof	7	2	12	28
Edible fruit and nuts; peel of citrus fruit or melons	48	50	27	27
Copper and articles thereof	63	51	26	24
Machinery, mechanical appliances, nuclear reactors, boilers; parts thereof	120	80	171	24
Inorganic chemicals; organic or inorganic compounds of precious metals, of rare-earth metals, ...	41	13	22	23
Preparations of vegetables, fruit, nuts or other parts of plants	36	52	70	23
Cotton	107	105	92	22
Coffee, tea, maté and spices	27	20	26	19
Ships, boats and floating structures	3	5	20	19
Preparations of meat, of fish or of crustaceans, molluscs or other aquatic invertebrates	2	7	2	18
Man-made staple fibres	44	37	26	15
Beverages, spirits and vinegar	7	7	25	15
Iron and steel	41	32	19	14
Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal ...	10	24	18	13
Salt; sulphur; earths and stone; plastering materials, lime and cement	4	4	2	13
Sugars and sugar confectionery	15	37	9	11
Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal ...	10	13	18	11
Manufactures of straw, of esparto or of other plaiting materials; basketware and wickerwork	6	6	8	11
Ores, slag and ash	20	18	8	10
Rubber and articles thereof	18	12	22	10
Articles of iron or steel	19	19	27	9
Man-made filaments; strip and the like of man-made textile materials	27	31	37	8
Knitted or crocheted fabrics	17	16	34	8

Product label	Exported value in 2012	Exported value in 2013	Exported value in 2015	Exported value in 2016
Miscellaneous edible preparations	1	0	0	7
Residues and waste from the food industries; prepared animal fodder	16	8	3	7
Miscellaneous manufactured articles	9	10	15	7
Miscellaneous chemical products	2	4	4	7
Cereals	4	4	6	7
Fertilisers	0	0	0	7
Wood and articles of wood; wood charcoal	1	2	4	6
Paper and paperboard; articles of paper pulp, of paper or of paperboard	29	33	36	6
Natural or cultured pearls, precious or semi-precious stones, precious metals, metals clad ...	0	2	5	5
Zinc and articles thereof	4	2	3	4
Special woven fabrics; tufted textile fabrics; lace; tapestries; trimmings; embroidery	84	81	49	4
Organic chemicals	0	0	1	3
Umbrellas, sun umbrellas, walking sticks, seat-sticks, whips, riding-crops and parts thereof	0	0	0	3
Glass and glassware	0	0	2	3
Products of animal origin, not elsewhere specified or included	7	11	15	3
Railway or tramway locomotives, rolling stock and parts thereof; railway or tramway track fixtures ...	1	1	1	2
Tools, implements, cutlery, spoons and forks, of base metal; parts thereof of base metal	4	5	6	2
Tanning or dyeing extracts; tannins and their derivatives; dyes, pigments and other colouring ...	0	0	0	2
Albuminoidal substances; modified starches; glues; enzymes	1	1	1	2
Articles of stone, plaster, cement, asbestos, mica or similar materials	0	2	0	2
Printed books, newspapers, pictures and other products of the printing industry; manuscripts, ...	1	1	1	2
Impregnated, coated, covered or laminated textile fabrics; textile articles of a kind suitable ...	9	9	13	2
Aluminium and articles thereof	0	0	2	2
Arms and ammunition; parts and accessories thereof	0	3	2	2

Product label	Exported value in 2012	Exported value in 2013	Exported value in 2015	Exported value in 2016
Aircraft, spacecraft, and parts thereof	26	8	15	2
Miscellaneous articles of base metal	0	0	0	1
Essential oils and resinoids; perfumery, cosmetic or toilet preparations	1	0	1	1
Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere ...	1	0	2	1
Soap, organic surface-active agents, washing preparations, lubricating preparations, artificial ...	2	2	3	1
Products of the milling industry; malt; starches; inulin; wheat gluten	1	1	2	1
Lac; gums, resins and other vegetable saps and extracts	0	0	0	1
Works of art, collectors' pieces and antiques	0	1	0	1
Vegetable plaiting materials; vegetable products not elsewhere specified or included	0	0	24	1
Meat and edible meat offal	1	7	1	1
Nickel and articles thereof	0	0	0	0
Cocoa and cocoa preparations	0	0	0	0
Other base metals; cermets; articles thereof	1	0	0	0
Clocks and watches and parts thereof	0	1	1	0
Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage	46	33	10	0
Silk	0	0	0	0
Explosives; pyrotechnic products; matches; pyrophoric alloys; certain combustible preparations	0	0	0	0
Furskins and artificial fur; manufactures thereof	0	0	0	0
Wool, fine or coarse animal hair; horsehair yarn and woven fabric	1	0	0	0
Musical instruments; parts and accessories of such articles	0	0	0	0
Pulp of wood or of other fibrous cellulosic material; recovered (waste and scrap) paper or ...	0	0	0	0
Photographic or cinematographic goods	0	0	0	0
Tin and articles thereof	0	0	0	0
Live animals	0	0	0	0
Cork and articles of cork	0	0	0	0

Source: ITC Trade Database

15.4. Annexure 4 – Gross Output of Manufacturing Sector in Bangladesh

Highlighted cells belong to top 80% products

BSIC code and description Total	Gross Output (in BDT Million) 5,394,902	Rank
10 Manufacture of food products	608777	4
11 Manufacture of beverages	52826	13
12 Manufacture of tobacco products	87197	9
13 Manufacture of textiles	715247	3
14 Manufacture of wearing apparel (Ready-made garments)	1819482	1
15 Manufacture of leather and related products	76147	10
16 Manufacture of wood and products of wood and cork,except furniture; manufacture of articles of straw and plaiting materials.	6912	22
17 Manufacture of paper and paper products	57187	12
18 Printing and reproduction of recorded media	10821	21
19 Manufacture of coke and refined petroleum products	3684	23
20 Manufacture of chemicals and chemical products	140184	7
21 Manufacture of pharmaceuticals, medicinal chemical and botanical products	113070	8
22 Manufacture of rubber and plastics products	51143	14
23 Manufacture of other non-metallic mineral products	351779	5
24 Manufacture of basic metals	905850	2
25 Manufacture of fabricated metal products, except machinery and equipment	71357	11
26 Manufacture of computer, electronic and optical products	39623	16
27 Manufacture of electrical equipment	145166	6
28 Manufacture of machinery and equipment n.e.c.	13141	19
29 Manufacture of motor vehicles, trailers and semitrailers	36780	17
30 Manufacture of other transport equipment	36291	18
31 Manufacture of furniture	39685	15
32 Other manufacturing	11263	20
33 Repair and installation of machinery and equipment	1134	24
34 Recycling	129	25

Source: Bangladesh Bureau of Statistics, Survey of Manufacturing Industries 2012

15.5. Annexure 5 – Respondents in Primary Survey

Sl. No.	Name of Company	Sector	Origin
1	Sarah Composite Mills Ltd	Textile & RMG	Domestic
2	Nassa Group	Textile & RMG	Domestic
3	Krishnachura Group	Textile & RMG	Domestic
4	SAASCO Group	Textile & RMG	Domestic
5	Babylon Group	Textile & RMG	Domestic
6	Mahmud Group	Textile & RMG	Domestic
7	Youth Spinning Mills Ltd.	Textile & RMG	Domestic
8	M S Enterprises	Textile & RMG	Domestic
9	NAF Garments	Textile & RMG	Domestic
10	Moon Star Jute Mills Ltd	Textile & RMG	Domestic
11	Advanced Chemical Industries Ltd	Food & Beverages	Domestic
12	Advanced Chemical Industries Ltd	Food & Beverages	Domestic
13	Oriental Fish Processing & Culture Ltd	Food & Beverages	Domestic
14	Ramna Salt Refinary Pvt Ltd	Food & Beverages	Domestic
15	JESSAN Fish Feed I.N. Ltd	Food & Beverages	Domestic
16	Baherhat Sea Food Industies Ltd	Food & Beverages	Domestic
17	Taiwan Food Ltd	Food & Beverages	Domestic
18	Putul Import Export Ltd	Food & Beverages	Domestic
19	Mejistic Group	Food & Beverages	Domestic
20	Virgo Fish	Food & Beverages	Domestic
21	ACI Pure Flour Ltd	Agro Based	Domestic
22	IFA Agro industries	Agro Based	Domestic
23	Platinum Jubilee Jute Mills Limited	Agro Based	Domestic
24	Daulatpur Jute Mills Limited	Agro Based	Domestic

Sl. No.	Name of Company	Sector	Origin
25	Best Golden Flour Mills Lit	Agro Based	Domestic
26	Joy Feed Mills Ltd	Agro Based	Domestic
27	Mazeda Jute Mills Limited	Agro Based	Domestic
28	Janata Jute Mills Limited	Agro Based	Domestic
29	Hazi Samsuddin Jute Mills Ltd	Agro Based	Domestic
30	Akij Jute Industries Ltd	Agro Based	Domestic
31	Quasem Group	Electrical and Electronics	Domestic
32	Walton Group	Electrical and Electronics	Domestic
33	Rancon Electronics	Electrical and Electronics	Domestic
34	Panna Group	Electrical and Electronics	Domestic
35	General Battery Company Ltd.	Electrical and Electronics	Domestic
36	Excel Technologies Ltd	Electrical and Electronics	Domestic
37	Red Sun Cables	Electrical and Electronics	Domestic
38	Sagar Cables	Electrical and Electronics	Domestic
39	T.B.S. Electrical Industries	Electrical and Electronics	Domestic
40	Faisal Electric Company	Electrical and Electronics	Domestic
41	M.M Ispahani Ltd	Light Engineering	Domestic
42	Khan Brothers Ltd	Light Engineering	Domestic
43	Nayem Engineering Works	Light Engineering	Domestic
44	Panch Bhai engineering Works	Light Engineering	Domestic
45	Gaffar Engineering Works	Light Engineering	Domestic
46	Brothers Molding Workd	Light Engineering	Domestic
47	Shundor Molding Works	Light Engineering	Domestic
48	Asian Tools	Light Engineering	Domestic
49	Habib Plastic Industries Ltd.	Light Engineering	Domestic
50	M/S Kadir Plastic Industries Ltd	Light Machinery, Equipment and Furniture	Domestic
51	VIP Industries Ltd	Textile & RMG	India

Sl. No.	Name of Company	Sector	Origin
52	Orient Processors Pvt. Ltd.	Textile & RMG	India
53	Madra Canvas Company	Textile & RMG	India
54	Lanka Milk Foods	Food & Beverages	Sri Lanka
55	Country Style Foods Ltd.	Food & Beverages	Sri Lanka
56	Harsha Products	Food & Beverages	Sri Lanka
57	Lank CoCo Products pvt. Ltd.	Agro Based	Sri Lanka
58	Thansher & co.	Agro Based	Sri Lanka
59	United Tobacco	Agro Based	Sri Lanka
60	Blakley Electrics	Electrical and Electronics	UK
61	Corvo Technoogy	Electrical and Electronics	France
62	Kik Lanka Pvt. Ltd.	Electrical and Electronics	Sri Lanka
63	Roma Mechanical Engineering Co.	Light Machinery, Equipment and Furniture	India
64	Metatherm Furnace Pvt. Ltd.	Light Machinery, Equipment and Furniture	India
65	Jagannath Plastic Industries	Light Machinery, Equipment and Furniture	India

15.6. Annexure 6 – Gross Value Added of Manufacturing Sector in Bangladesh

BSIC Code	Category	Gross Value Added ('000 BDT) 2012
10	Food products	173,959,169
11	Beverages	13,563,935
12	Tobacco products	24,103,009
13	Textiles	219,728,433
14	RMG	555,979,580
15	Leather & related products	22,180,319
16	Wood products & cork, except furniture; articles of straw & plaiting materials	2,305,861
17	Paper products	15,690,942
18	Printing and reproduction of recorded media	4,862,787
19	Coke & refined petroleum products	1,309,369
20	Chemical products	37,247,914
21	Pharmaceuticals, medicinal chemical & botanical products	33,880,955
22	Rubber & plastics products	16,903,205
23	Other non-metallic mineral products	110,552,682
24	Basic metals	216,992,159
25	Fabricated metal products, except machinery & equipment	22,258,815
26	Computer, electronic & optical products	10,776,985
27	Electrical equipment	41,146,392
28	Machinery & equipment n.e.c.	3,912,336
29	Motor vehicles, trailers & semi-trailers	9,970,559
30	Transport equipment	10,290,836
31	Furniture	11,321,651
32	Other manufacturing	3,497,927
33	Repair and installation of machinery and equipment	459,602
34	Recycling	51,653
Total		**1,562,947,075**

Source: Bangladesh Bureau of Statistics, Survey of Manufacturing Industries (2012) Table 5.2.2 (Page 35)

Based on the above table, following list of Gross Value Added for the initial bucket list of industries has been developed.

Industry Sectors	Gross Value Added ('000 BDT) at 2012
Textiles and RMG	775,708,013
Food and Beverages	187,523,104
Agro based products	24,103,009
Leather and Leather Products	22,180,319
Plastic and Rubber	16,903,205

Industry Sectors	Gross Value Added ('000 BDT) at 2012
Paper and Packaging	17,996,803
Chemicals	37,247,914
Non Metallic Minerals	110,552,682
Auto and Automobile Accessories	20,261,395
Heavy Machinery, Iron & Steel and Metals	239,250,974
Electrical & Electronics	51,923,377
Ship Building and Ship Breaking	511,255
Petroleum Products including Bottling	1,309,369
Pharmaceuticals	33,880,955
Light Machinery and Equipment & Furniture	18,731,914

15.7. Annexure 7 – Estimation of Industrial Growth Rate

Industrial growth rate (organic) has been derived based on data available in secondary domains.

Quantum Index of Major Industries:

BSIC Code	Category	2013-14	2014-15	2015-16	2016-17 (Jul-Dec)
10	Food products	241.52	333.07	385.10	360.82
11	Beverages	243.19	230.06	269.75	261.03
12	Tobacco products	149.65	147.37	135.48	136.82
13	Textiles	139.68	122.81	138.90	156.49
14	RMG	293.70	304.76	338.73	332.28
15	Leather & related products	147.83	140.48	125.44	160.23
16	Wood products & cork, except furniture; articles of straw & plaiting materials	243.39	269.88	301.72	321.11
17	Paper products	151.95	174.68	181.08	183.29
18	Printing and reproduction of recorded media	127.73	140.91	147.83	154.18
19	Coke & refined petroleum products	92.76	96.79	112.00	173.35
20	Chemical products	80.41	77.49	92.73	97.95
21	Pharmaceuticals, medicinal chemical & botanical products	230.60	290.98	319.26	359.37
22	Rubber & plastics products	263.84	292.69	338.14	360.10
23	Other non-metallic mineral products	144.18	182.78	258.34	298.31
24	Basic metals	150.20	187.13	202.85	171.74
25	Fabricated metal products, except machinery & equipment	164.33	182.30	200.53	229.84
26	Computer, electronic & optical products	105.46	148.37	231.89	219.00
27	Electrical equipment	132.06	164.56	214.12	352.52
28	Machinery & equipment n.e.c.	172.68	204.89	279.14	360.95
29	Motor vehicles, trailers & semi-trailers	205.84	178.83	331.63	744.63
30	Transport equipment	152.88	340.12	592.41	493.28
31	Furniture	101.12	116.35	132.02	148.71
Overall manufacturing sector growth (CAGR from 13-14 to 16-17)=		**8.9%**			

Source: Quantum Index of major industries (base: 2005-06) based on National Accounts Statistics May' 2017

Growth Rates based on secondary research:

Industry Sectors	Annual Growth Rate	Annual Growth Rate
Textiles and RMG	13%	https://www.textiletoday.com.bd/overview-bangladesh-rmg-2016/
Food and Beverages	8%	http://katalyst.com.bd/wp-content/uploads/2017/01/Roles-and-Opportunities-for-Private-Sector-in-Agro-food-Processing-Industry-of-Bangladesh.pdf
Agro based products		
Leather and Leather Products	44%	https://sourcingjournalonline.com/bangladesh-aims-grow-leather-exports-5-billion-2021/

Industry Sectors	Annual Growth Rate	Annual Growth Rate
Plastic and Rubber	20%	http://bida.gov.bd/plastic-industry
Paper and Packaging		Not Available
Chemicals	9%	http://www.thedailystar.net/supplements/painting-the-future-bright-1331338 https://factsweek.com/160464/asia-textile-chemicals-market-is-projected-to-exhibit-a-cagr-of-7-6-from-2014-2020/ https://advancedtextilessource.com/2014/07/23/bangladesh-textile-chemicals-market-growth-continues/
Non Metallic Minerals	24%	http://www.thedailystar.net/supplements/overview-bangladeshs-ceramics-industry-1498489
	9.60%	http://today.thefinancialexpress.com.bd/print/outlook-for-cement-industry-in-bangladesh-1510666253
Auto and Automobile Accessories		Not Available
Heavy Machinery, Iron & Steel and Metals	15%	http://www.thedailystar.net/business/bangladeshs-steel-sector-beating-global-market-186499
Electrical & Electronics		Not Available
Ship Building and Ship Breaking		Not Available
Petroleum Products including Bottling	10%	http://fpd-bd.com/wp-content/uploads/2016/10/Research-Report-on-Energy-Sector-of-Bangladesh-Initiation-Mar-15-11.pdf
Pharmaceuticals	15%	https://www.jetro.go.jp/ext_images/world/asia/bd/seminar_reports/20160413/p4.pdf
Light Machinery and Equipment & Furniture		Not Available

Rationale behind the assumptions related to Infrastructure Induced Industrial growth rates are indicated below.

Infrastructure Project	Project Cost (USD billion)	Forecasted boost in GDP and industrial growth	Source
Padma Bridge	3.77	1%-2%	• http://www.dhakatribune.com/business/2017/02/22/tofail-bangladeshs-gdp-8-padma-bridge-built-2015/ • https://mpra.ub.uni-muenchen.de/37904/ • http://www.thedailystar.net/round-tables/padma-bridge-new-lifeline-development-203326 • http://www.dhakatribune.com/bangladesh/development/2017/09/18/padma-bridge-cost-shoot/
Dhaka Chittagong Highway	0.48		• https://textiletoday.com.bd/dhaka-chittagong-economic-corridor-new-economic-lifeline/ • https://bdnews24.com/economy/2016/02/16/cost-of-four-lane-dhaka-chittagong-highway-escalates
Payra Port	20.00		• https://www.joc.com/regulation-policy/infrastructure-news/asia-

Infrastructure Project	Project Cost (USD billion)	Forecasted boost in GDP and industrial growth	Source
			infrastructure-news/bangladesh-opts-make-payra-deep-sea-port_20171121.html • http://www.theindependentbd.com/printversion/details/71603

15.8. Annexure 8 – Assumptions related to Investment Inflow

Greenfield Investment Inflow:

In developing countries, Greenfield investment inflow is 57.85% of total investment inflow.

Source:
http://documents.worldbank.org/curated/en/628261468781753575/110510322_20041117173021/additional/325780wps3192.pdf

GDP Share of Dhaka Division as a proxy of Investment share with respect to the country:

District	Per capita GDP at current price (2010-11)	Population (2011)	Total GDP (billion)
Dhaka	66548	12517361	833.01
Faridpur	30405	1988697	60.47
Gazipur	45481	3548115	161.37
Gopalgonj	31984	1218319	38.97
Kishoreganj	29325	3028706	88.82
Madaripur	33895	1212198	41.09
Manikganj	35347	1447298	51.16
Munshiganj	29713	1502449	44.64
Narayanganj	47707	3074078	146.66
Narsinghdi	37021	2314889	85.70
Rajbari	32615	1091263	35.59
Shariatpur	30277	1201464	36.38
Tangail	30957	3749086	116.06
Bangladesh	37610	149772364	5632.94
		25.3%	**30.9%**

Source: http://www.plancomm.gov.bd/wp-content/uploads/2015/02/15_Lagging-Regions-Study.pdf

Incremental Capital Investment to Value Addition

Industry Sectors	Fixed Asset to Value added ratio	Total Fixed Assets ('000 BDT)	Gross Value added ('000 BDT)
Textiles and RMG	0.74	573,327,458	775,708,013
Food and Beverages	0.84	158,186,759	187,523,104
Agro based products	0.45	10,944,170	24,103,009
Leather and Footwear	1.29	28,594,792	22,180,319
Plastic and Rubber	0.98	16,570,442	16,903,205
Paper and Packaging	1.05	18,811,995	17,996,803
Chemicals	1.40	52,263,666	37,247,914
Non Metallic Minerals	0.80	44,420,459	55,276,341
Auto and Automobile Accessories	0.67	13,660,300	20,261,395
Heavy Machinery, Iron & Steel and Metals	0.47	112,121,753	239,250,974
Electrical, Electronics and ICT	0.48	25,151,531	51,923,377
Ship Building and Ship Breaking	0.63	324,044	511,255
Petroleum Products including Bottling	1.71	2,240,206	1,309,369
Pharmaceuticals	2.05	69,381,054	33,880,955
Light Machinery and Equipment & Furniture	0.76	14,144,530	18,731,914

Source: Survey of Manufacturing Industries 2012

15.9. Annexure 9 – Competition Phase Out Plan

Name of EZs	Location	Area (acres)	Industrial Area (acres)	2017	2018	2019	2020	2021	2022	2023	2024
Dhaka EZ	Dhohar	316	206					10%	10%	10%	20%
Dhaka SEZ	Karanigonj	105	68						10%	10%	15%
Shreepur EZ	(Nayanpur), Shreepur	510	332								10%
Gopalgonj EZ	Kotalipara	202	131						10%	10%	10%
Shariatpur EZ	Jajira, Shariatpur	525	341						5%	5%	10%
Manikgnnj EZ	(BIWTA old Aricha Ferighat), Shibaloy	300	195							10%	10%
Munshiganj Gazaria EZ	Gazaria	98	64						10%	10%	10%
Araihazar -2 Economic Zone	Araihazar	413	268								
Araihazar EZ	Araihazar	1011	657						10%	10%	10%
Narayanganj EZ	Bandar & Sonarga	876	569								
Narsingdi EZ	Narsingdi Sadar	690	449								
Shariatpur EZ	Gosharhat	750	488								
Narayanganj EZ Sonargaon	Sonargaon	1000	650								
Madaripur EZ	Madaripur	667	434								
Faridpur EZ	Faridpur	888	577								
A K Khan PEZ	Polash	200	130					10%	10%	10%	15%
Megna Industrial Economic Zone PEZ	Sonargaon	80	52	5%	5%	10%	15%	20%	20%	10%	15%
Megna PEZ	Sonargaon	68	44		5%	5%	10%	20%	20%	20%	15%
Aman Private EZ	Sonargaon	150	98		5%	10%	10%	10%	15%	15%	20%
Abdul Monem PEZ,	Gojaria	197	128		5%	10%	10%	10%	15%	15%	25%
Bay Private EZ	Gazipur	65	42		5%	15%	15%	20%	20%	25%	
Arisha Private EZ	Keranigonj, Savar	85	55			5%	15%	15%	20%	15%	30%
East-West Special EZ	Keranigonj	54	35			5%	15%	15%	20%	15%	30%

Name of EZs	Location	Area (acres)	Industrial Area (acres)	2017	2018	2019	2020	2021	2022	2023	2024
Bosundhora Special EZ	Keranigonj	56	36			5%	15%	15%	20%	15%	30%
City EZ	Narayangonj	92	60			5%	15%	15%	20%	15%	30%
City SEZ	Dhaka	110	72				5%	15%	20%	20%	40%
Sonargaon EZ	Narayangonj	350	228				5%	15%	20%	20%	40%

Source: BEZA website and discussion with BEZA officials

Name of EZs	Location	Area (acres)	Industrial Area (acres)	2025	2026	2027	2028	2029	2030	2031	2032
Dhaka EZ	Dhohar	316	206	15%	15%	10%	10%				
Dhaka SEZ	Karanigonj	105	68	15%	15%	15%	10%	10%			
Shreepur EZ	(Nayanpur), Shreepur	510	332	10%	10%	10%	10%	10%	10%	10%	10%
Gopalgonj EZ	Kotalipara	202	131	10%	10%	10%	10%	10%	10%	10%	
Shariatpur EZ	Jajira, Shariatpur	525	341	10%	10%	10%	10%	10%	10%	10%	10%
Manikgnnj EZ	(BIWTA old Aricha Ferighat), Shibaloy	300	195	10%	10%	10%	10%	10%	10%	10%	10%
Munshiganj Gazaria EZ	Gazaria	98	64	10%	10%	10%	15%	15%	10%		
Araihazar -2 Economic Zone	Araihazar	413	268		5%	5%	10%	15%	15%	15%	15%
Araihazar EZ	Araihazar	1011	657	10%	10%	10%	10%	10%	10%	10%	
Narayanganj EZ	Bandar & Sonarga	876	569			5%	10%	10%	10%	10%	10%
Narsingdi EZ	Narsingdi Sadar	690	449		5%	10%	10%	10%	10%	10%	10%
Shariatpur EZ	Gosharhat	750	488				5%	10%	10%	10%	10%
Narayanganj EZ Sonargaon	Sonargaon	1000	650		5%	10%	10%	10%	10%	10%	10%
Madaripur EZ	Madaripur	667	434				5%	10%	10%	10%	10%
Faridpur EZ	Faridpur	888	577						5%	10%	10%
A K Khan PEZ	Polash	200	130	15%	15%	15%	10%				

Name of EZs	Location	Area (acres)	Industrial Area (acres)	2025	2026	2027	2028	2029	2030	2031	2032
Megna Industrial Economic Zone PEZ	Sonargaon	80	52								
Megna PEZ	Sonargaon	68	44	5%							
Aman Private EZ	Sonargaon	150	98	15%							
Abdul Monem PEZ,	Gojaria	197	128	10%							
Bay Private EZ	Gazipur	65	42								
Arisha Private EZ	Keranigonj, Savar	85	55								
East-West Special EZ	Keranigonj	54	35								
Bosundhora Special EZ	Keranigonj	56	36								
City EZ	Narayangonj	92	60								
City SEZ	Dhaka	110	72								
Sonargaon EZ	Narayangonj	350	228								

Source: BEZA website and discussion with BEZA officials

Name of EZs	Location	Area (acres)	Industrial Area (acres)	2033	2034	2035	2036	2037	2038	2039	2040
Dhaka EZ	Dhohar	316	206								
Dhaka SEZ	Karanigonj	105	68								
Shreepur EZ	(Nayanpur), Shreepur	510	332	10%							
Gopalgonj EZ	Kotalipara	202	131								
Shariatpur EZ	Jajira, Shariatpur	525	341								
Manikgnnj EZ	(BIWTA old Aricha Ferighat), Shibaloy	300	195								
Munshiganj Gazaria EZ	Gazaria	98	64								

Name of EZs	Location	Area (acres)	Industrial Area (acres)	2033	2034	2035	2036	2037	2038	2039	2040
Araihazar -2 Economic Zone	Araihazar	413	268	20%							
Araihazar EZ	Araihazar	1011	657								
Narayanganj EZ	Bandar & Sonarga	876	569	10%	10%	10%	10%	5%			
Narsingdi EZ	Narsingdi Sadar	690	449	10%	10%	10%	5%				
Shariatpur EZ	Gosharhat	750	488	10%	10%	10%	10%	10%	5%		
Narayanganj EZ Sonargaon	Sonargaon	1000	650	10%	10%	10%	5%				
Madaripur EZ	Madaripur	667	434	10%	10%	10%	10%	10%	5%		
Faridpur EZ	Faridpur	888	577	10%	10%	10%	10%	10%	10%	10%	5%
A K Khan PEZ	Polash	200	130								
Megna Industrial Economic Zone PEZ	Sonargaon	80	52								
Megna PEZ	Sonargaon	68	44								
Aman Private EZ	Sonargaon	150	98								
Abdul Monem PEZ,	Gojaria	197	128								
Bay Private EZ	Gazipur	65	42								
Arisha Private EZ	Keranigonj, Savar	85	55								
East-West Special EZ	Keranigonj	54	35								
Bosundhora Special EZ	Keranigonj	56	36								
City EZ	Narayangonj	92	60								
City SEZ	Dhaka	110	72								
Sonargaon EZ	Narayangonj	350	228								

Source: BEZA website and discussion with BEZA officials

15.10. Annexure 10 – Demand Forecasting Calculations

Cumulative power demand (Conservative) - figures in MVA

Industry	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Food & Beverages	2.9	4.0	5.5	5.5	8.6	12.0	14.2	15.1	16.2	18.0
Agro based	0.2	0.2	0.2	0.2	0.4	0.5	0.7	0.7	0.7	0.9
Electrical and electronics	0.4	0.5	0.7	0.7	1.3	1.8	2.2	2.4	2.5	2.9
Light Machinery & Equipment	0.2	0.4	0.5	0.5	0.7	1.1	1.5	1.5	1.6	1.8
Total	**3.6**	**5.1**	**6.9**	**6.9**	**10.9**	**15.5**	**18.6**	**19.7**	**21.1**	**23.7**

Cumulative power demand (Base) - figures in MVA

Industry	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Food & Beverages	4.2	7.1	10.2	11.8	17.3	18.4	18.4	18.4	18.4	18.4
Agro based	0.2	0.4	0.5	0.5	0.7	0.9	0.9	0.9	0.9	0.9
Electrical and electronics	0.5	0.9	1.3	1.6	2.5	2.7	2.7	2.7	2.7	2.7
Light Machinery & Equipment	0.4	0.5	0.9	1.1	1.6	1.6	1.6	1.6	1.6	1.6
Total	**5.3**	**8.9**	**12.9**	**15.1**	**22.2**	**23.7**	**23.7**	**23.7**	**23.7**	**23.7**

Cumulative power demand (Aggressive) - figures in MVA

Industry	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Food & Beverages	5.8	10.6	15.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8
Agro based	0.2	0.5	0.7	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Electrical and electronics	0.7	1.3	2.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Light Machinery & Equipment	0.5	0.9	1.3	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Total	**7.3**	**13.3**	**19.8**	**23.7**	**23.7**	**23.7**	**23.7**	**23.7**	**23.7**	**23.7**

Cumulative water demand (Conservative) - figures in thousand cum/ day (MLD)

Industry	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Food & Beverages	0.5	0.6	0.8	0.8	1.3	1.9	2.2	2.4	2.5	2.8
Agro based	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Electrical and electronics	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
Light Machinery & Equipment	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Total	**0.5**	**0.7**	**1.0**	**1.0**	**1.5**	**2.2**	**2.6**	**2.8**	**3.0**	**3.3**

Cumulative water demand (Base) - figures in thousand cum/ day (MLD)

Industry	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Food & Beverages	0.7	1.1	1.6	1.8	2.7	2.9	2.9	2.9	2.9	2.9

Industry	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Agro based	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Electrical and electronics	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2
Light Machinery & Equipment	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Total	**0.8**	**1.3**	**1.8**	**2.1**	**3.1**	**3.4**	**3.4**	**3.4**	**3.4**	**3.4**

Cumulative water demand (Aggressive) - figures in thousand cum/ day (MLD)

Industry	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Food & Beverages	0.9	1.6	2.5	2.9	2.9	2.9	2.9	2.9	2.9	2.9
Agro based	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Electrical and electronics	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Light Machinery & Equipment	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Total	**1.0**	**1.9**	**2.8**	**3.4**	**3.4**	**3.4**	**3.4**	**3.4**	**3.4**	**3.4**

Cumulative employment generation (Conservative) - figures in nos.

Industry	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Food & Beverages	368	506	690	690	1081	1518	1794	1909	2047	2277
Agro based	119	119	119	119	238	357	476	476	476	595
Electrical and electronics	506	759	1012	1012	1771	2530	3036	3289	3542	4048
Light Machinery & Equipment	186	372	558	558	744	1116	1488	1488	1674	1860
Total	**1179**	**1756**	**2379**	**2379**	**3834**	**5521**	**6794**	**7162**	**7739**	**8780**

Cumulative employment generation (Base) - figures in nos.

Industry	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Food & Beverages	529	897	1288	1495	2185	2323	2323	2323	2323	2323
Agro based	119	238	357	357	476	595	595	595	595	595
Electrical and electronics	759	1265	1771	2277	3542	3795	3795	3795	3795	3795
Light Machinery & Equipment	372	558	930	1116	1674	1674	1674	1674	1674	1674
Total	**1779**	**2958**	**4346**	**5245**	**7877**	**8387**	**8387**	**8387**	**8387**	**8387**

Cumulative employment generation (Aggressive) - figures in nos.

Industry	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Food & Beverages	736	1334	2001	2369	2369	2369	2369	2369	2369	2369

Industry	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Agro based	119	357	476	595	595	595	595	595	595	595
Electrical and electronics	1012	1771	2783	3542	3542	3542	3542	3542	3542	3542
Light Machinery & Equipment	558	930	1302	1488	1488	1488	1488	1488	1488	1488
Total	**2425**	**4392**	**6562**	**7994**	**7994**	**7994**	**7994**	**7994**	**7994**	**7994**

Cumulative no. of establishments (Conservative) - figures in nos.

Industry	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Food & Beverages	8	11	15	15	24	33	39	42	45	50
Agro based	1	1	1	1	2	3	4	4	4	5
Electrical and electronics	2	3	4	4	7	10	12	13	14	16
Light Machinery & Equipment	1	2	3	3	4	6	8	8	9	10
Total	**12**	**17**	**23**	**23**	**37**	**52**	**63**	**67**	**72**	**81**

Cumulative no. of establishments (Base) - figures in nos.

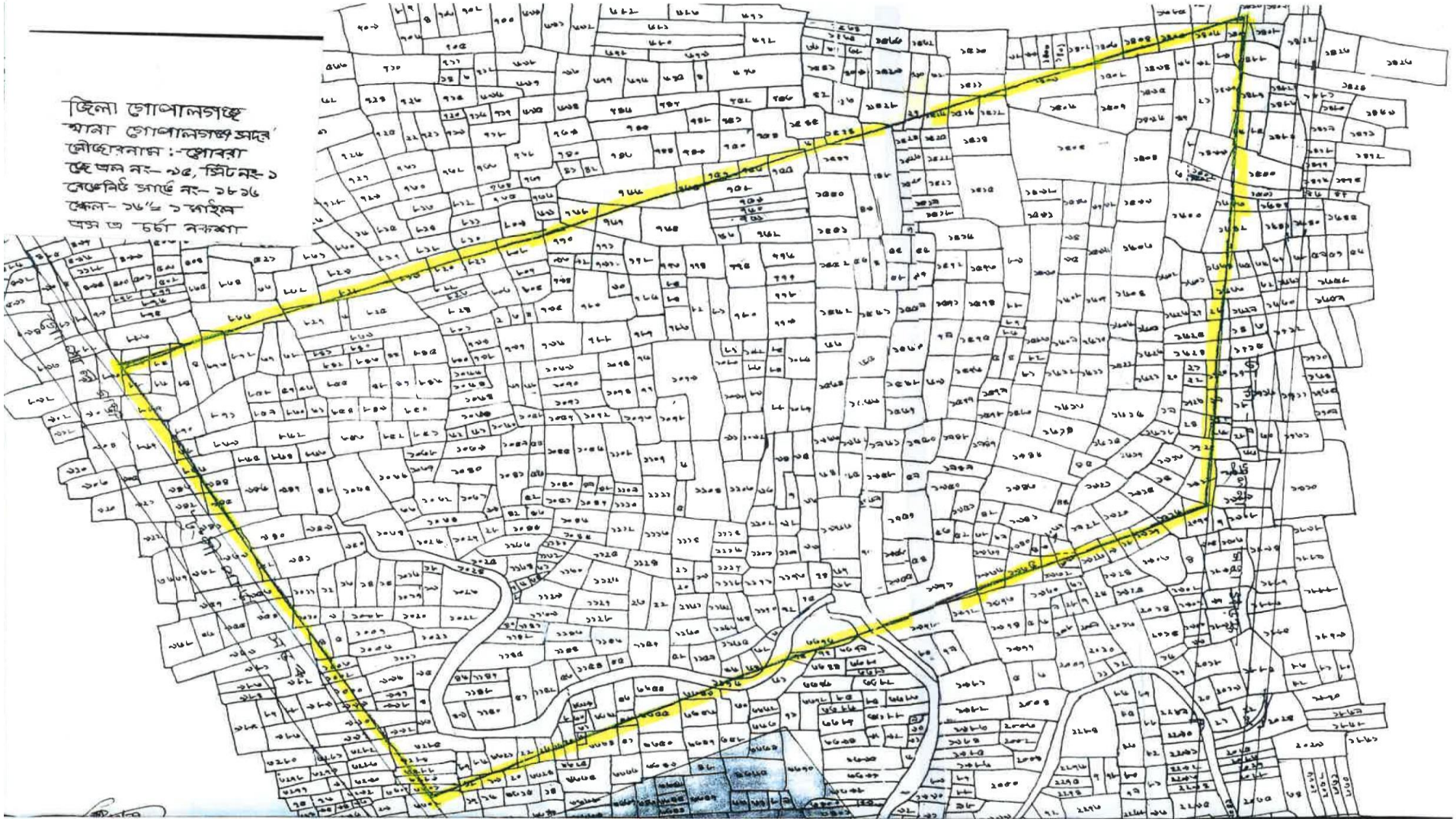
Industry	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Food & Beverages	12	20	28	33	48	51	51	51	51	51
Agro based	1	2	3	3	4	5	5	5	5	5
Electrical and electronics	3	5	7	9	14	15	15	15	15	15

Industry	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Light Machinery & Equipment	2	3	5	6	9	9	9	9	9	9
Total	**18**	**30**	**43**	**51**	**75**	**80**	**80**	**80**	**80**	**80**

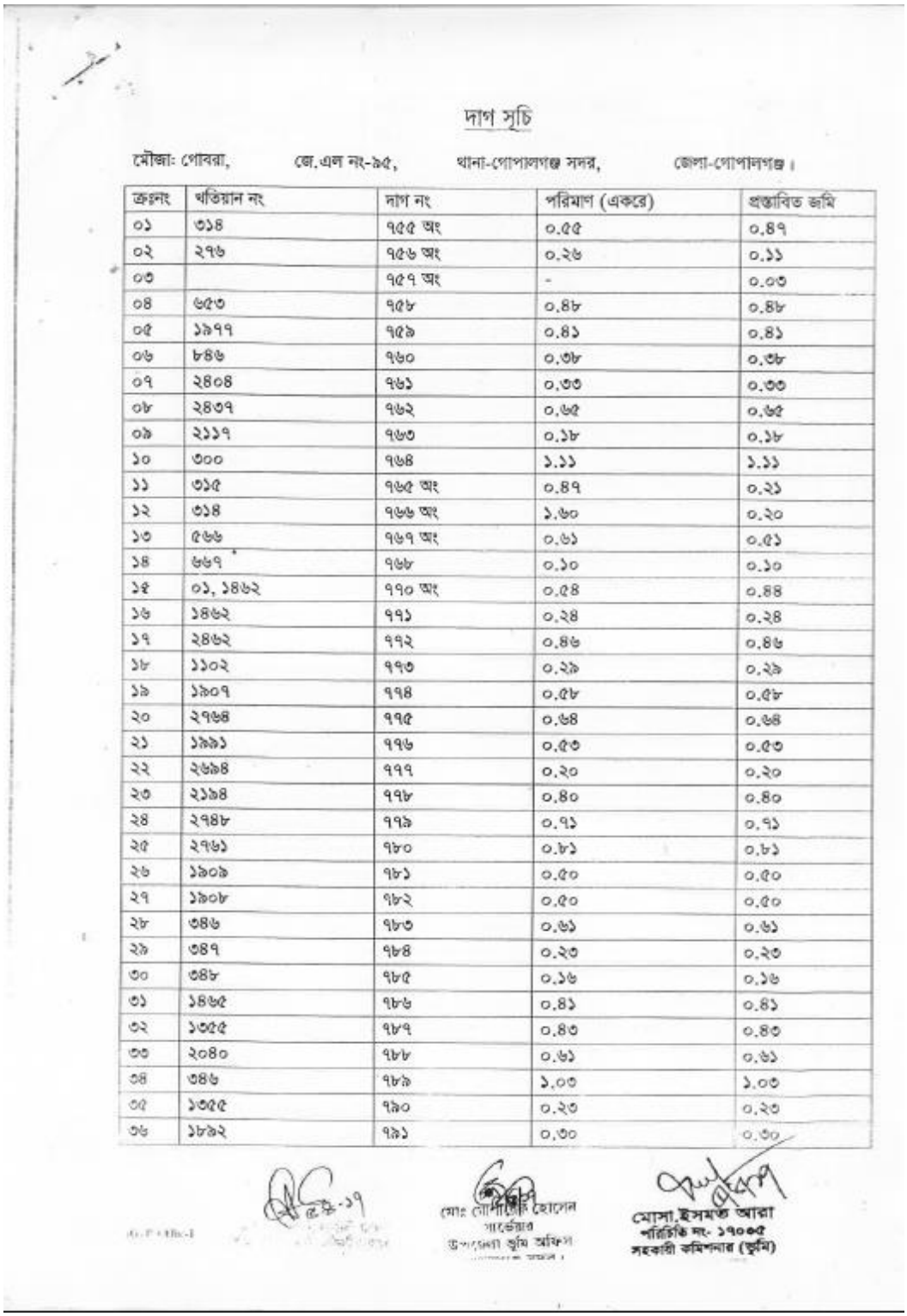
Cumulative no. of establishments (Aggressive) - figures in nos.

Industry	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Food & Beverages	16	29	44	52	52	52	52	52	52	52
Agro based	1	3	4	5	5	5	5	5	5	5
Electrical and electronics	4	7	11	14	14	14	14	14	14	14
Light Machinery & Equipment	3	5	7	8	8	8	8	8	8	8
Total	**24**	**44**	**66**	**79**	**79**	**79**	**79**	**79**	**79**	**79**

15.11. Annexure 11 – Mouza Map



15.12. Annexure 12 – Affected Plot Details



দাগ সূচি

মৌজা: গোবরা, জে.এল নং-৯৫, থানা-গোপালগঞ্জ সদর, জেলা-গোপালগঞ্জ।

ক্রমনং	খতিয়ান নং	দাগ নং	পরিমাণ (একরে)	প্রস্তাবিত জমি
০১	৩১৪	৭৫৫ অং	০.৫৫	০.৪৭
০২	২৭৬	৭৫৬ অং	০.২৬	০.১১
০৩		৭৫৭ অং	-	০.০৩
০৪	৬৫৩	৭৫৮	০.৪৮	০.৪৮
০৫	১৯৭৭	৭৫৯	০.৪১	০.৪১
০৬	৮৪৬	৭৬০	০.৩৮	০.৩৮
০৭	২৪০৪	৭৬১	০.৩৩	০.৩৩
০৮	২৪৩৭	৭৬২	০.৬৫	০.৬৫
০৯	২১১৭	৭৬৩	০.১৮	০.১৮
১০	৩০০	৭৬৪	১.১১	১.১১
১১	৩১৫	৭৬৫ অং	০.৪৭	০.২১
১২	৩১৪	৭৬৬ অং	১.৬০	০.২০
১৩	৫৬৬	৭৬৭ অং	০.৬১	০.৫১
১৪	৬৬৭	৭৬৮	০.১০	০.১০
১৫	০১, ১৪৬২	৭৭০ অং	০.৫৪	০.৪৪
১৬	১৪৬২	৭৭১	০.২৪	০.২৪
১৭	২৪৬২	৭৭২	০.৪৬	০.৪৬
১৮	১১০২	৭৭৩	০.২৯	০.২৯
১৯	১৯০৭	৭৭৪	০.৫৮	০.৫৮
২০	২৭৬৪	৭৭৫	০.৬৪	০.৬৪
২১	১৯৯১	৭৭৬	০.৫৩	০.৫৩
২২	২৬৯৪	৭৭৭	০.২০	০.২০
২৩	২১৯৪	৭৭৮	০.৪০	০.৪০
২৪	২৭৪৮	৭৭৯	০.৭১	০.৭১
২৫	২৭৬১	৭৮০	০.৮১	০.৮১
২৬	১৯০৯	৭৮১	০.৫০	০.৫০
২৭	১৯০৮	৭৮২	০.৫০	০.৫০
২৮	৩৪৬	৭৮৩	০.৬১	০.৬১
২৯	৩৪৭	৭৮৪	০.২৩	০.২৩
৩০	৩৪৮	৭৮৫	০.১৬	০.১৬
৩১	১৪৬৫	৭৮৬	০.৪১	০.৪১
৩২	১৩৫৫	৭৮৭	০.৪৩	০.৪৩
৩৩	২০৪০	৭৮৮	০.৬১	০.৬১
৩৪	৩৪৬	৭৮৯	১.০৩	১.০৩
৩৫	১৩৫৫	৭৯০	০.২৩	০.২৩
৩৬	১৮৯২	৭৯১	০.৩০	০.৩০

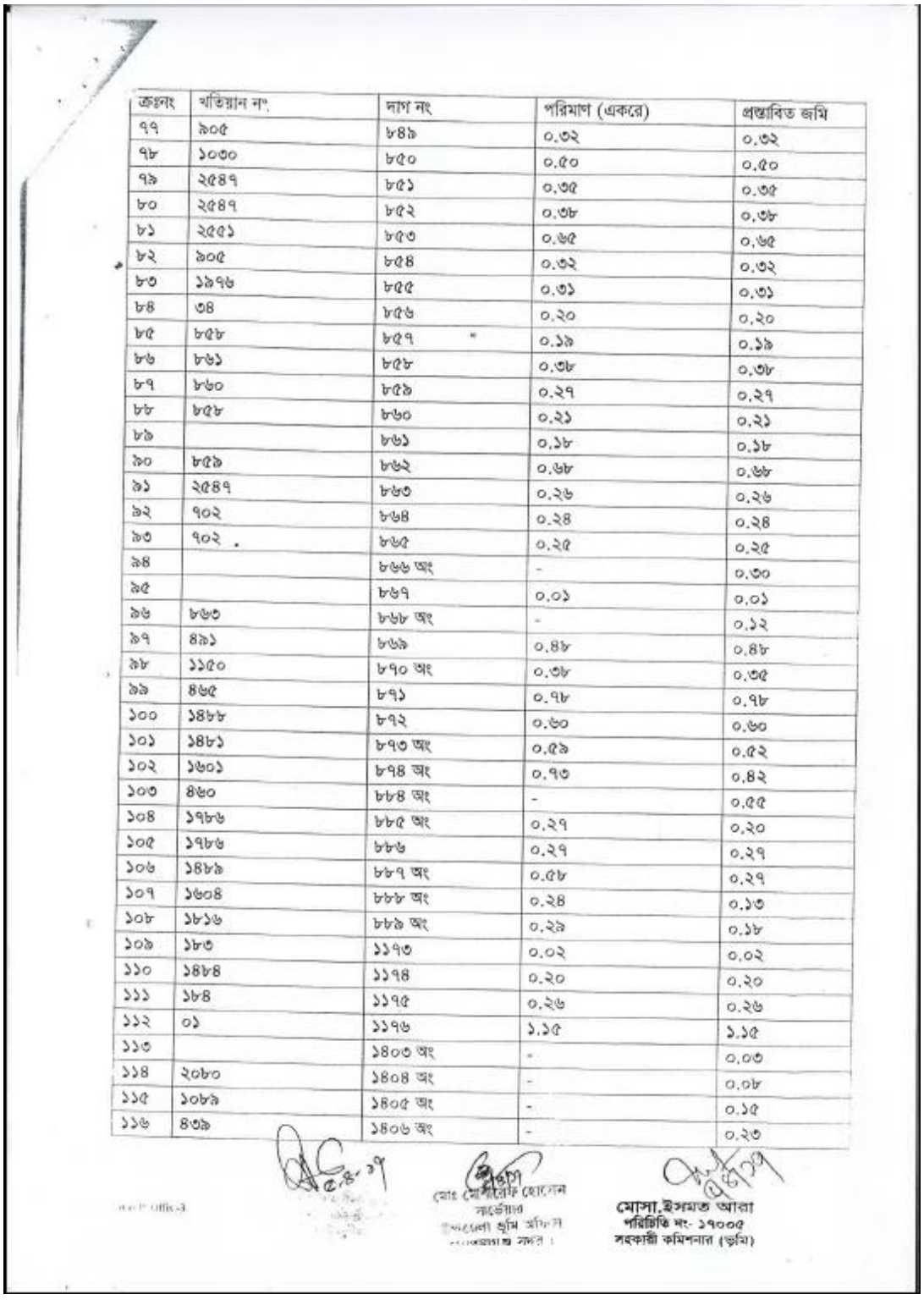
মোঃ গোলাম হোসেন
সার্ভেয়ার
উপজেলা ভূমি অফিস

মোসা.ইসমত আরা
পরিচিতি নং- ১৭০০৫
সহকারী কমিশনার (ভূমি)

ক্রঃনং	খতিয়ান নং	দাগ নং	পরিমাণ (একরে)	প্রস্তাবিত জমি
৩৭	১৯০৩	৭৯২	০.১৩	০.১৩
৩৮	১৪৬২	৭৯৩	০.১৫	০.১৫
৩৯	১৬১২	৭৯৪	০.২৬	০.২৬
৪০	১৩৫৬	৭৯৫	০.৩৩	০.৩৩
৪১	১০২১	৭৯৬	০.৭৫	০.৭৫
৪২	২০৩৭	৭৯৭	০.৫৭	০.৫৭
৪৩	১৫৮৯	৭৯৮	০.২৩	০.২৩
৪৪	২৩৭২	৭৯৯	০.২৮	০.২৮
৪৫	২০৩৭	৮০০	০.২৯	০.২৯
৪৬	২০৮০	৮০১	০.৩৪	০.৩৪
৪৭	১৪৫৩	৮০২	০.১২	০.১২
৪৮	১৩৭৬	৮০৩	০.১৩	০.১৩
৪৯	১৩৭৬	৮০৪	০.১৩	০.১৩
৫০	১৭৬৩	৮০৫	০.৩৯	০.৩৯
৫১	১৭৬০	৮০৬	০.৪৭	০.৪৭
৫২	১৭৬৫	৮০৭	০.২২	০.২২
৫৩	৪৩৬ .	৮০৮ অং	০.৫৪	০.৪২
৫৪	২৫৫২	৮১৯ অং	০.৪৪	০.২৪
৫৫	৭৪	৮২০ অং	০.৪২	০.২৫
৫৬	১৯৭৩	৮২১ অং	০.৫১	০.৩২
৫৭	১৩৮১	৮২২	০.৩৬	০.৩৬
৫৮	২০১১	৮২৩	০.২২	০.২২
৫৯	১৮৯৮	৮২৪	০.৫৭	০.৫৭
৬০	২৫৪৩	৮২৫	০.৯২	০.৯২
৬১	১৩১৫	৮২৬	০.১৩	০.১৩
৬২	১৯৮০	৮২৭ অং	০.৬৩	০.৫৭
৬৩		৮২৮ অং	-	০.১০
৬৪		৮৩৬ অং	-	০.১৩
৬৫	২৩৮৬	৮৩৭	০.৪৪	০.৪৪
৬৬	১১৬৪	৮৩৮	০.৪৭	০.৪৭
৬৭	২৪০৪	৮৩৯	০.৭৭	০.৭৭
৬৮	৪৭১	৮৪০	০.১৭	০.১৭
৬৯	৪৭৬	৮৪১	০.১৭	০.১৭
৭০	৪৭৭	৮৪২	০.২৬	০.২৬
৭১	৪৭৬	৮৪৩	০.২৩	০.২৩
৭২	৪৭৯	৮৪৪	০.১৯	০.১৯
৭৩	৪৭৫	৮৪৫	০.৫৭	০.৫৭
৭৪	১৩৪৮	৮৪৬	০.৫০	০.৫০
৭৫		৮৪৭	০.৩৮	০.৩৮
৭৬	১৩৪৮	৮৪৮	০.৩৪	০.৩৪

মোঃ মোশারিফ হোসেন

মোসা. ইসমত আরা
পরিচিতি নং- ১৭০৩৩
সহকারী কমিশনার (ভূমি)
গোপালগঞ্জ সদর।



ক্রঃনং	খতিয়ান নং	দাগ নং	পরিমাণ (একরে)	প্রস্তাবিত জমি
৭৭	৯০৫	৮৪৯	০.৩২	০.৩২
৭৮	১০৩০	৮৫০	০.৫০	০.৫০
৭৯	২৫৪৭	৮৫১	০.৩৫	০.৩৫
৮০	২৫৪৭	৮৫২	০.৩৮	০.৩৮
৮১	২৫৫১	৮৫৩	০.৬৫	০.৬৫
৮২	৯০৫	৮৫৪	০.৩২	০.৩২
৮৩	১৯৭৬	৮৫৫	০.৩১	০.৩১
৮৪	৩৪	৮৫৬	০.২০	০.২০
৮৫	৮৫৮	৮৫৭	০.১৯	০.১৯
৮৬	৮৬১	৮৫৮	০.৩৮	০.৩৮
৮৭	৮৬০	৮৫৯	০.২৭	০.২৭
৮৮	৮৫৮	৮৬০	০.২১	০.২১
৮৯		৮৬১	০.১৮	০.১৮
৯০	৮৫৯	৮৬২	০.৬৮	০.৬৮
৯১	২৫৪৭	৮৬৩	০.২৬	০.২৬
৯২	৭০২	৮৬৪	০.২৪	০.২৪
৯৩	৭০২	৮৬৫	০.২৫	০.২৫
৯৪		৮৬৬ অং	-	০.৩০
৯৫		৮৬৭	০.০১	০.০১
৯৬	৮৬৩	৮৬৮ অং	-	০.১২
৯৭	৪৯১	৮৬৯	০.৪৮	০.৪৮
৯৮	১১৫০	৮৭০ অং	০.৩৮	০.৩৫
৯৯	৪৬৫	৮৭১	০.৭৮	০.৭৮
১০০	১৪৮৮	৮৭২	০.৬০	০.৬০
১০১	১৪৮১	৮৭৩ অং	০.৫৯	০.৫২
১০২	১৬০১	৮৭৪ অং	০.৭৩	০.৪২
১০৩	৪৬০	৮৮৪ অং	-	০.৫৫
১০৪	১৭৮৬	৮৮৫ অং	০.২৭	০.২০
১০৫	১৭৮৬	৮৮৬	০.২৭	০.২৭
১০৬	১৪৮৯	৮৮৭ অং	০.৫৮	০.২৭
১০৭	১৬০৪	৮৮৮ অং	০.২৪	০.১৩
১০৮	১৮১৬	৮৮৯ অং	০.২৯	০.১৮
১০৯	১৮৩	১১৭৩	০.০২	০.০২
১১০	১৪৮৪	১১৭৪	০.২০	০.২০
১১১	১৮৪	১১৭৫	০.২৬	০.২৬
১১২	০১	১১৭৬	১.১৫	১.১৫
১১৩		১৪০৩ অং	-	০.০৩
১১৪	২০৮০	১৪০৪ অং	-	০.০৮
১১৫	১০৮৯	১৪০৫ অং	-	০.১৫
১১৬	৪৩৯	১৪০৬ অং	-	০.২৩

মোঃ মোশারেফ হোসেন
সার্ভেয়ার
গোপালগঞ্জ ভূমি অফিস

মোসা.ইসমত আরা
পরিচিতি নং- ১৭০০৫
সহকারী কমিশনার (ভূমি)

ক্রমনং	খতিয়ান নং	দাগ নং	পরিমাণ (একরে)	প্রস্তাবিত জমি
১১৭		১৪০৭ অং	-	০.১২
১১৮		১৪১০ অং	-	০.০১
১১৯		১৪১১ অং	-	০.০১
১২০	১২১৯	১৪৮৬ অং	০.২৬	০.০৪
১২১		১৪৮৭ অং	০.০১	০.০১
১২২	৩৩৪	১৪৮৮ অং	-	০.১২
১২৩	১৮৭০	১৪৮৯	০.১৮	০.১৮
১২৪	৭২৫	১৪৯০	০.৬০	০.৬০
১২৫	১৫৫৯	১৪৯১	০.৪৮	০.৪৮
১২৬	১৫৯২	১৪৯২	০.৪২	০.৪২
১২৭	২৮০৩	১৪৯৩	০.২৪	০.২৪
১২৮	১৬৭৩	১৪৯৪	০.৪৩	০.৪৩
১২৯	৫৬৮	১৪৯৫	০.৩৫	০.৩৫
১৩০	৫৫৫	১৪৯৬	০.৩৬	০.৩৬
১৩১	১২১২	১৪৯৭	০.৬০	০.৬০
১৩২	১৫২৯	১৪৯৮	০.১৭	০.১৭
১৩৩	১৪১২*	১৪৯৯	০.৫৬	০.৫৬
১৩৪	১২১৯	১৫০০ অং	-	০.১০
১৩৫	১২২৪	১৫০১	০.৩২	০.০৭
১৩৬	১৪১২	১৫০২	০.২৩	০.২৩
১৩৭	১৫২৯	১৫০৩	০.২৬	০.২৬
১৩৮	৫৫৭	১৫০৪	১.০১	১.০১
১৩৯	১২৬	১৫০৫	২.৯৭	২.৯৭
১৪০	২০৭৭	১৫০৬	০.৫৯	০.৫৯
১৪১	২০৯৪	১৫০৭	০.৭৪	০.৭৪
১৪২	২২১১	১৫০৮	০.৪৭	০.৪৭
১৪৩	১২৩৯	১১২৫	০.৩৯	০.৩৯
১৪৪		১১২৬	০.৫২	০.৫২
১৪৫		১১২৭	০.৪২	০.৪২
১৪৬	২৬৩৭	১১২৮	০.১৪	০.১৪
১৪৭	২৬৩৮	১১২৯	০.৪৮	০.৪৮
১৪৮	২৮২২	১১৩০	০.৪৭	০.৪৭
১৪৯	১৬৬১	১১৩১	০.০৯	০.০৯
১৫০	১৬৮৬	১১৩২	০.১৮	০.১৮
১৫১	২৭৯৮	১১৩৩	০.৫২	০.৫২
১৫২	১৩০৮	১১৩৪	০.৩০	০.৩০
১৫৩	২৬৩৭	১১৩৫	০.০৮	০.০৮
১৫৪	১৩০৮	১১৩৬	০.০৬	০.০৬
১৫৫	২৬৩৭	১১৩৭	০.০৪	০.০৪
১৫৬	২৮২০	১১৩৮	০.০৪	০.০৪

ক্রঃনং	খতিয়ান নং	দাগ নং	পরিমাণ (একরে)	প্রস্তাবিত জমি
১৫৭	১৬৮৬	১১৩৯	০.৪৩	০.৪৩
১৫৮	১৮৬৫	১১৪০	০.০৭	০.০৭
১৫৯	১৬২২	১১৪১	০.১৮	০.১৮
১৬০	৭৩২	১১৪২	০.২৯	০.২৯
১৬১	৫২২	১১৪৩	০.৩৭	০.৩৭
১৬২	২৬৭৩	১১৪৪	০.২৩	০.২৩
১৬৩	১২১৭	১১৪৫	০.৭৭	০.৭৭
১৬৪	৮০৬	১১৪৬	০.১২	০.১২
১৬৫	৮০৭	১১৪৭	০.১৯	০.১৯
১৬৬	২০৭	১১৪৮	০.৪৮	০.৪৮
১৬৭	১০০৭	১১৪৯	০.২৫	০.২৫
১৬৮	১০০৫	১১৫০	০.৫৮	০.৫৮
১৬৯	৩৩৭	১১৫১	০.৫৩	০.৫৩
১৭০	৫৯৬	১১৫২	০.১৪	০.১৪
১৭১	৫৮৭	১১৫৩	০.২০	০.২০
১৭২	৩৯৮	১১৫৪	০.২৮	০.২৮
১৭৩	২৩০৫	১১৫৫	০.১৫	০.১৫
১৭৪	২৩০৫	১১৫৬	০.৪১	০.৪১
১৭৫	১১৯৯	১১৫৭	০.৬৯	০.৬৯
১৭৬	২২৩৬	১১৫৮	০.২০	০.২০
১৭৭	৪৪১	১১৫৯	০.৩৮	০.৩৮
১৭৮	২৩৮	১১৬০	০.৫০	০.৫০
১৭৯	১২৫৬	১১৬১	০.৩৬	০.৩৬
১৮০	৪৪১	১১৬২	০.২৫	০.২৫
১৮১	৪৪১	১১৬৩	০.২৬	০.২৬
১৮২	১৩০৭	১১৬৪	০.২৯	০.২৯
১৮৩	১১৬৪	১১৬৫	০.৪৫	০.৪৫
১৮৪	১১৫৬	১১৬৬	০.১৬	০.১৬
১৮৫		১১৬৭	০.১৬	০.১৬
১৮৬	১২৫৭	১১৬৮	০.১৬	০.১৬
১৮৭	১৮৭০	১১৬৯	০.০৭	০.০৭
১৮৮	২১৭৪	১১৭০	০.৩৯	০.৩৯
১৮৯	১৮৩০	১১৭১	০.৩৫	০.৩৫
১৯০	১৪৮২	১১৭২	০.২৬	০.২৬
১৯১	২৬৩০	১৫৮৩	০.৩৯	০.৩৯
১৯২	১৯৬৬	১৫৮৪	০.১৮	০.১৮
১৯৩	১৯৬৭	১৫৮৫	০.২২	০.২২
১৯৪	১০০০	১৫৮৬	০.১১	০.১১
১৯৫	১০	১৫৮৭	০.১১	০.১১
১৯৬	৯৬৩	১৫৮৮	০.২৩	০.২৩

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মোসা. ইসমত আরা
পরিচিতি নং- ১৭০০৫
সহকারী কমিশনার (ভূমি)

ক্রমনং	খতিয়ান নং	দাগ নং	পরিমাণ (একরে)	প্রস্তাবিত জমি
১৯৭	১৩২০	১৫৮৯	০.৭৪	০.৭৪
১৯৮	৮১৭	১৫৯০	১.২০	১.২০
১৯৯	১২৯১	১৫৯১	০.৩৭	০.৩৭
২০০	২১০০	১৫৯২	০.৩৭	০.৩৭
২০১	২৩০৪	১৫৯৩	০.৫৩	০.৫৩
২০২	১৭৯৬	১৫৯৪	০.২৭	০.২৭
২০৩	১৭৯২	১৫৯৫	০.২৭	০.২৭
২০৪	১২৪২	১৫৯৬	০.৫১	০.৫১
২০৫	১১৯৯	১৫৯৭	০.২৫	০.২৫
২০৬	১৯৯২	১৫৯৮	০.২৬	০.২৬
২০৭	২১১৫	১৫৯৯	০.৭৯	০.৭৯
২০৮	১২০৬	১৬০০	১.১৮	১.১৮
২০৯	১৫২০	১৬০১	০.৫৪	০.৫৪
২১০	২৫৮২	১৬০২	০.৪৯	০.৪৯
২১১	৫৭০	১৫০৯ অং	১.২৯	০.৯৫
২১২		১৫১১	-	০.০২
২১৩	২১২৮	১৫১২	০.৩৬	০.৩৬
২১৪	২৩২২	১৫১৩ অং	০.৩৮	০.৩০
২১৫	২৬৯৪	১৫১৪	০.৭২	০.৭২
২১৬	১৯১২	১৫১৫	০.৬৭	০.৬৭
২১৭	১৬৭০	১৫১৬	০.৮৪	০.৮৪
২১৮	৮৮৯	১৫১৭	০.০৭	০.০৭
২১৯	৪৯৮	১৫১৮	০.৩৫	০.৩৫
২২০	২৫৫৪	১৫১৯	০.৩৫	০.৩৫
২২১	৮৮৯	১৫২০	০.১৮	০.১৮
২২২	৮৮৯	১৫২১	০.১৮	০.১৮
২২৩	১৫৪২	১৫২২	০.২৬	০.২৬
২২৪	৮৮৯	১৫২৩	০.২৭	০.২৭
২২৫	৮৮৯	১৫২৪	০.২৬	০.২৬
২২৬	৪৯৮	১৫২৫	০.২৪	০.২৪
২২৭	১৭৪৮	১৫২৬ অং	০.৩৪	০.১৮
২২৮		১৫২৭ অং	-	০.০৮
২২৯		১৫২৮ অং	-	০.০৩
২৩০	১৪৩৩	১৫৪৪ অং	০.৪৪	০.০৫
২৩১	১৪৪১	১৫৪৬ অং	০.১৭	০.১০
২৩২	১১৮	১৫৪৭ অং	০.৫৮	০.৫০
২৩৩	১১৩৯	১৫৪৮ অং	১.০৯	১.০০
২৩৪	৯৫১	১৫৪৯	০.৫৭	০.৫৭
২৩৫	৯৫০	১৫৫০	০.৭৬	০.৭৬
২৩৬	৯৪৯	১৫৫১	০.৩৮	০.৩৮

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ক্রঃনং	খতিয়ান নং	দাগ নং	পরিমাণ (একরে)	প্রস্তাবিত জমি
২৩৭	১৪৯৪	১৫৫২	০.৩৮	০.৩৮
২৩৮	২৫৩৯	১৫৫৩	০.৩৫	০.৩৫
২৩৯	২৭৪৫	১৫৫৪	০.৩২	০.৩২
২৪০	৪৭	১৫৫৫	০.৩০	০.৩০
২৪১	৮৪৭, ৮৩	১৫৫৬	০.৩০	০.৩০
২৪২	১০২৬	১৫৫৭	০.২৬	০.২৬
২৪৩	১৭৪৫	১৫৫৮	০.২৩	০.২৩
২৪৪	১২৯৪	১৫৫৯	০.৪৫	০.৪৫
২৪৫	১২৯০	১৫৬০	০.৮৩	০.৮৩
২৪৬	১০৮৮	১৫৬১	০.৭৪	০.৭৪
২৪৭	২৩৪১	১৫৬২	০.৭৩	০.৭৩
২৪৮	২৬৯৫	১৫৬৩	০.২৪	০.২৪
২৪৯	২৯১১	১৫৬৪	০.৯৭	০.৯৭
২৫০	২৫৩৯	১৫৬৫	০.৬৪	০.৬৪
২৫১	৮৪৭	১৫৬৬	০.৮৩	০.৮৩
২৫২		১৫৬৭	০.৪৮	০.৪৮
২৫৩		১৫৬৮	০.৪২	০.৪২
২৫৪	৫৫০	১৫৬৯	০.৯৮	০.৯৮
২৫৫	৩১৭	১৫৭০	০.৪০	০.৪০
২৫৬	৫৫৪	১৫৭১	০.৪৮	০.৪৮
২৫৭	৫৫৪	১৫৭২	০.৩৮	০.৩৮
২৫৮	১৯৬৬	১৫৭৩	০.৫২	০.৫২
২৫৯	১৭৩২	১৫৭৪	০.৬৪	০.৬৪
২৬০	১৯৬১	১৫৭৫	০.৫২	০.৫২
২৬১	২৩৮৯	১৫৭৬	০.৪৬	০.৪৬
২৬২	১৩৮৮	১৫৭৭	০.৪২	০.৪২
২৬৩	১৯৫৯	১৫৭৮	০.২৪	০.২৪
২৬৪	১৭৩২	১৫৭৯	০.৩১	০.৩১
২৬৫	১১২৪	১৫৮০	০.৫৮	০.৫৮
২৬৬	২৬৩১	১৫৮১	০.২৬	০.২৬
২৬৭	২৬৩০	১৫৮২	০.১৩	০.১৩
২৬৮	৯৪৭	৯৩৯ অং	-	০.০২
২৬৯	৯৪৭	৯৪০	০.৫৪	০.৫৪
২৭০	২১, ২৯৬	৯৪১ অং	০.৮৮	০.২৫
২৭১	৮৬৫	৯৪৪ অং	০.৩১	০.২৯
২৭২	৪৯১	৯৪৫ অং	০.৩৩	০.২৩
২৭৩	৯৪৮	৯৪৬	০.৬৭	০.৬৭
২৭৪	২৫৪৮	৯৪৭	০.৮১	০.৮১
২৭৫	২৫৫২	৯৪৮	০.৫২	০.৫২
২৭৬	১৭৩৯	৯৪৯	০.৩১	০.৩১

মোসা. ইসমত আরা
পরিচিতি নং- ১৭০৩৫
সহকারী কমিশনার (ভূমি)

ক্রঃনং	খতিয়ান নং	দাগ নং	পরিমাণ (একরে)	প্রস্তাবিত জমি
২৭৭	২৫৩৪	৯৫০	০.২৮	০.২৮
২৭৮	১৫৫৬	৯৫১	০.৯১	০.৯১
২৭৯	২৫৩৪	৯৫২ অং	০.২৪	০.২১
২৮০	২৩০৬	৯৫৩ অং	০.৪০	০.১২
২৮১	১০৬৭	৯৫৪ অং	০.৬৮	০.০৩
২৮২	১৭২০	৯৯০ অং	০.৭৫	০.৩০
২৮৩	১৩৪০	৯৯১ অং	০.৩৪	০.০১
২৮৪	৪৫৫	৯৯২	০.১৫	০.১৫
২৮৫	২৬১৩	৯৯৩	০.১৮	০.১৮
২৮৬	১৭৪৪	৯৯৪	০.১৩	০.১৩
২৮৭	৬৪৩	৯৯৫	০.২৯	০.২৯
২৮৮	১৬৫৯	৯৯৬	০.৪৪	০.৪৪
২৮৯	২৩০৭	৯৯৭	০.২০	০.২০
২৯০	২৩০৮	৯৯৮	০.২০	০.২০
২৯১	২২৯৫	৯৯৯ অং	-	০.১৯
২৯২	২৭৯৯	১০০০ অং	০.৪০	০.১৮
২৯৩	১১৬৭	১০০১	০.৫৩	০.৫৩
২৯৪	৪৮	১০০২ অং	০.১৮	০.০৮
২৯৫	১৯৫০	১০০৩ অং	০.২১	০.১১
২৯৬	৩৯২	১০০৪ অং	০.২৭	০.১৮
২৯৭	১০৩১	১০০৫	০.২৭	০.২৭
২৯৮	৪৫০	১০০৬	০.৪৩	০.৪৩
২৯৯	২৫৫৬	১০০৭	০.৪৯	০.৪৯
৩০০	২২০৮	১০০৮	০.৩৩	০.৩৩
৩০১	১২৪৩	১০০৯	০.২০	০.২০
৩০২	৭০০	১০১০ অং	০.২৬	০.২১
৩০৩	১২৬২	১০১১	০.৩২	০.৩২
৩০৪	১৮৬৮	১০১২	০.২৯	০.২৯
৩০৫	২৩৮৬	১০১৩	০.৩৩	০.৩৩
৩০৬	৪৪১	১০১৪	০.৫৩	০.৫৩
৩০৭	২২৩৪	১০১৫	০.৩৫	০.৩৫
৩০৮	২৭২০	১০১৬	০.২৫	০.২৫
৩০৯	২৭২১	১০১৭	০.২৫	০.২৫
৩১০	১৯১১	১০১৮	০.১২	০.১২
৩১১	২৩৪১	১০১৯	০.২৮	০.২৮
৩১২	২৩১৫	১০২০	০.৪৩	০.৪৩
৩১৩	১৮৮৭	১০২১	০.৩২	০.৩২
৩১৪	২৩১৫	১০২২	০.৪৪	০.৪৪
৩১৫	২৭২৩	১০২৩	০.৮৪	০.৮৪
৩১৬	২৮৬৭	১০২৪	২.৭৯	২.৭৯

ক্রমনং	খতিয়ান নং	দাগ নং	পরিমাণ (একরে)	প্রস্তাবিত জমি
৩১৭	২৬৩০	১০২৫	০.২৯	০.২৯
৩১৮		১০২৬	০.৪০	০.৪০
৩১৯	১১৮৯	১০২৭	০.৪০	০.৪০
৩২০	২৭৯৮	১০২৮	০.১৮	০.১৮
৩২১	১৯৩৭	১০২৯	০.১৬	০.১৬
৩২২	৪৫৩	১০৩০	০.৩৭	০.৩৭
৩২৩	১৯২১	১০৩১	০.৩৩	০.৩৩
৩২৪	৪৫৩	১০৩২	০.৫১	০.৫১
৩২৫	২৫৫২	১০৩৩	০.২০	০.২০
৩২৬	২৫৫২	১০৩৪	০.৬৬	০.৬৬
৩২৭	২৫৪৭	১০৩৫	১.৪০	১.৪০
৩২৮	২৫৪৭	১০৩৬	০.৬৯	০.৬৯
৩২৯	১৪৪১	১০৩৭	০.২৪	০.২৪
৩৩০	১৫০৪	১০৩৮	০.২৫	০.২৫
৩৩১		১০৩৯	০.৪৩	০.৪৩
৩৩২		১০৪০	০.৬২	০.৬২
৩৩৩	২১৪১	১০৪১	০.৫৯	০.৫৯
৩৩৪	১১৫	১০৪২	০.১৬	০.১৬
৩৩৫	৬২২	১০৪৩	০.১৭	০.১৭
৩৩৬	২৬৩৩	১০৪৪	০.৩১	০.৩১
৩৩৭	১৩০৬	১০৪৫	০.২২	০.২২
৩৩৮	১৫২২	১০৪৬	০.৪৮	০.৪৮
৩৩৯		১০৪৭	০.২৩	০.২৩
৩৪০	৭৬৪	১০৪৮	০.১২	০.১২
৩৪১	১৬৩	১০৪৯	০.১২	০.১২
৩৪২	৯১০	১০৫০	০.২৫	০.২৫
৩৪৩	৬১০	১০৫১	০.২৫	০.২৫
৩৪৪	১০০০	১০৫২	০.১৫	০.১৫
৩৪৫		১০৫৩	০.২২	০.২২
৩৪৬	২১১০	১০৫৪	০.০৮	০.০৮
৩৪৭	১২৩৯	১০৫৫	০.৬৪	০.৬৪
৩৪৮		১০৫৬	০.৬৫	০.৬৫
৩৪৯	১২৩৯	১০৫৭	০.২০	০.২০
৩৫০	১৯৩৯	১০৫৮	০.২৩	০.২৩
৩৫১	৬২২	১০৫৯	০.৩৫	০.৩৫
৩৫২	১০৬১	১০৬০	০.২০	০.২০
৩৫৩	১০৩২	১০৬১	০.১৭	০.১৭
৩৫৪	১৫২০	১০৬২	০.১৩	০.১৩
৩৫৫	১৯৭৩	১০৬৩	০.৪২	০.৪২
৩৫৬	১৪২৯	১০৬৪	০.৫৬	০.৫৬

মোসা.ইসমত আরা
পরিচিতি নং- ১৭০০৫

ক্রঃনং	খতিয়ান নং	দাগ নং	পরিমাণ (একরে)	প্রস্তাবিত জমি
৩৫৭	১৯৬৯	১০৬৫	০.২০	০.২০
৩৫৮	১৮৭৫	১০৬৬	০.১৭	০.১৭
৩৫৯	১৮৮৭	১০৬৭	০.২৮	০.২৮
৩৬০		১০৬৮	০.৩২	০.৩২
৩৬১	১৫২০	১০৬৯	০.৫৫	০.৫৫
৩৬২	২৩৫৯	১০৭০	০.৪৩	০.৪৩
৩৬৩	১২৩৫	১০৭১	০.৪৬	০.৪৬
৩৬৪	১৮৮৭	১০৭২	০.২৯	০.২৯
৩৬৫	৬১২	১০৭৩	০.৪৬	০.৪৬
৩৬৬	১৬৬	১০৭৪	০.৫০	০.৫০
৩৬৭	১০৩১	১০৭৫	০.৪৪	০.৪৪
৩৬৮	১৩০৬	৭০৭৬	০.২৪	০.২৪
৩৬৯	১৫২২	১০৭৭	০.২৪	০.২৪
৩৭০	২৫৭৫	১০৭৮	০.৫৮	০.৫৮
৩৭১	২৫৭৫	১০৭৯	২.০৪	২.০৪
৩৭২	৩৭০	১০৮০	০.৩৭	০.৩৭
৩৭৩	২৩৭০	১০৮১	০.১৪	০.১৪
৩৭৪	৩৯৯	১০৮২	০.২০	০.২০
৩৭৫	৩৯৯	১০৮৩	০.১৬	০.১৬
৩৭৬	১৯১১	১০৮৪	০.১৬	০.১৬
৩৭৭	১৯১১	১০৮৫	০.১৬	০.১৬
৩৭৮	২৩৪৯	১০৮৬	০.৫৫	০.৫৫
৩৭৯	২৭০০	১০৮৭	০.৫১	০.৫১
৩৮০	১১৭৫	১০৮৮	০.৫৫	০.৫৫
৩৮১	১১৭৫	১০৮৯	০.২৭	০.২৭
৩৮২	১৯৬৯	১০৯০	০.৩৩	০.৩৩
৩৮৩	২৭৯৩	১০৯১	০.৪০	০.৪০
৩৮৪	১১৮৫	১০৯২	০.৪৬	০.৪৬
৩৮৫	৬৫৫	১০৯৩	০.৪৩	০.৪৩
৩৮৬	৯৯১	১০৯৪	০.৪৬	০.৪৬
৩৮৭	২৪৩১	১০৯৫	০.৩৯	০.৩৯
৩৮৮	২৩২২	১০৯৬	০.৪৫	০.৪৫
৩৮৯	৮৯	১০৯৭	০.১৯	০.১৯
৩৯০	৯৯১	১০৯৮	০.২৫	০.২৫
৩৯১	৮৩	১০৯৯ অং	-	০.২৮
৩৯২	৮৯	১১০০ অং	-	০.২১
৩৯৩	১৮৭০	১১০১	০.৩৯	০.৩৯
৩৯৪	১৭৭৫	১১০২ অং	-	০.৩৬
৩৯৫	১১৭৭	১১০৩ অং	-	০.৭০
৩৯৬	১৯৫১	১১০৪ অং	-	১.১৪

(G).P. Offis:-10

মোঃ মোশারফ হোসেন
সার্ভেয়ার
উপজেলা ভূমি অফিস

মোছা. ইসমত আরা
পরিচিতি নং- ১৭০০৫

ক্রয়নং	খতিয়ান নং	দাগ নং	পরিমাণ (একরে)	প্রস্তাবিত জমি
৩৯৭	১৮৭৬	১১০৫	০.১৫	০.১৫
৩৯৮		১১০৬	০.২৫	০.২৫
৩৯৯		১১০৭	০.৪৭	০.৪৭
৪০০	১২৪০	১১০৮	০.৪৪	০.৪৪
৪০১	১৩২২	১১০৯	০.১৮	০.১৮
৪০২	২১৯৯	১১১০ অং	-	০.২৪
৪০৩	১১৫	১১১১	০.৫২	০.৫২
৪০৪	১০০১	১১১২	০.৫৪	০.৫৪
৪০৫	২১৯৯	১১১৩	০.৪৮	০.৪৮
৪০৬	১৮০	১১১৪	০.৭১	০.৭১
৪০৭	২৫৮০	১১১৫	০.২৭	০.২৭
৪০৮	১১৭৭	১১১৬	০.২২	০.২২
৪০৯	১১৭৯	১১১৭	০.২৩	০.২৩
৪১০	১৯৩৬	১১১৮	০.২৬	০.২৬
৪১১	১৯১২	১১১৯	০.২৬	০.২৬
৪১২	১২০৪	১১২০	০.১৩	০.১৩
৪১৩	১৪৪১·	১১২১	০.১৭	০.১৭
৪১৪	১২৩২	১১২২	০.৫৫	০.৫৫
৪১৫	২৫৫৮	১১২৩	০.৫৩	০.৫৩
৪১৬	১২৩৯	১১২৪	০.৪৫	০.৪৫
৪১৭	১০৬৫	১৬০৩	১.০৮	১.০৮
৪১৮	২৩১৯	১৬০৪	০.৬৪	০.৬৪
৪১৯	১৭২৮	১৬০৫	০.৩৩	০.৩৩
৪২০	২৭২৮	১৬০৬	০.৩৮	০.৩৮
৪২১	১১৯৯	১৬০৭	০.৫৯	০.৫৯
৪২২	২৮০০	১৬০৮	০.৪৯	০.৪৯
৪২৩	১৭১৯	১৬০৯	০.৪২	০.৪২
৪২৪	১২০২	১৬১০	০.৪০	০.৪০
৪২৫	২২৯৬	১৬১১	০.৪৭	০.৪৭
৪২৬	১২০২	১৬১২	০.৫৮	০.৫৮
৪২৭	১১৯৯	১৬১৩	০.৭২	০.৭২
৪২৮	২২৯৬	১৬১৪	০.৭০	০.৭০
৪২৯	২৬১৯	১৬১৫	০.৭০	০.৭০
৪৩০	২৬২৭	১৬১৬	০.৯০	০.৯০
৪৩১	২৬৪৮	১৬১৭	০.৬৫	০.৬৫
৪৩২	২৬৪৮	১৬১৮	০.২২	০.২২
৪৩৩	২২০৯	১৬১৯	০.২৭	০.২৭
৪৩৪	২৩০২	১৬২০	০.২৪	০.২৪
৪৩৫	১৭৯৫	১৬২১	০.৩০	০.৩০
৪৩৬	১২০২	১৬২২	০.৬১	০.৬১

মোঃ মোশারফ হোসেন
সার্ভেয়ার
জরিপ ভূমি অফিস
গোপালগঞ্জ সদর।

মোসা. ইসমত আরা
পরিচিতি নং- ১৭০০৫
সহকারী কমিশনার (ভূমি)

ক্রঃনং	খতিয়ান নং	দাগ নং	পরিমাণ (একরে)	প্রস্তাবিত জমি
৪৩৭	১২৪৩	১৬২৩	০.২৮	০.২৮
৪৩৮	১৪৩৮	১৬২৪ অং	০.৫৪	০.৪৮
৪৩৯	১৪১৯	১৬২৫ অং	-	০.৫০
৪৪০	১৫২০	১৬২৬	০.২৯	০.২৯
৪৪১	২৩৭২	১৬২৭	০.১৬	০.১৬
৪৪২	২৩৭২	১৬২৮ অং	০.১৮	০.১২
৪৪৩	১৯৯৯	১৬৩৩ অং	০.৩৭	০.১২
৪৪৪	২৫৮২	১৬৩৪ অং	০.৩৭	০.২৮
৪৪৫	১২৩৮	১৬৪২ অং	০.৯০	০.৪০
৪৪৬	১৯৫২	১৬৪৩ অং	-	০.১২
৪৪৭	২২৯৭	১৭২০ অং	০.১২	০.১২
৪৪৮	১৭৬০	১৭২১	০.১৩	০.১৩
৪৪৯	১৭৬১	১৭২২	০.১৩	০.১৩
৪৫০	১৭৬২	১৭২৩	০.২৫	০.২৫
৪৫১	১৭৬৭	১৭২৪	০.২৬	০.২৬
৪৫২	১৭৬৬	১৭২৫ অং	০.০৯	০.০৬
৪৫৩	১৭৬৯	১৭২৬ অং	-	০.১৬
৪৫৪	২৫৮০	১৭২৭ অং	০.৫৩	০.৩৩
৪৫৫	১৭২০	১৯১২ অং	০.৫২	০.৪৫
৪৫৬	২৬২৪	১৯১৩	০.৩৭	০.৩৭
৪৫৭	২২৯৩	১৯১৪	০.২৮	০.২৮
৪৫৮	২৭৯৯	১৯১৫	০.৫৪	০.৫৪
৪৫৯	২৬৫৬	১৯১৬ অং	-	০.২৬
৪৬০	১৭৮৫	১৯১৭ অং	০.৩৪	০.১২
৪৬১	৪০৩	১৯১৮ অং	০.১৭	০.০৬
৪৬২	৮৪৭	১৯১৯ অং	-	০.১৬
৪৬৩	১৭৩৯	১৯২০	০.৬৩	০.৬৩
৪৬৪	১১৯৯	১৯২১	০.৫৬	০.৫৬
৪৬৫	২১৯৯	১৯২২	০.৫৯	০.৫৯
৪৬৬	২৫৪৬	১৯২৩ অং	০.৩২	০.০৮
৪৬৭	২৫৯০	১৯৩২ অং	০.৩১	০.০৮
৪৬৮	৩৩৮	১৯৩৩	০.০৭	০.০৭
৪৬৯	৫৯৮	১৯৩৪	০.০৫	০.০৫
৪৭০	২৫৫৪	১৯৩৫ অং	০.৫৬	০.৩০
৪৭১	২৫৫৪	১৯৩৬ অং	-	০.৩০
৪৭২	৮২৪	১৯৩৭	০.১৮	০.১৮
৪৭৩	১১২৭	১৯৩৮	০.১৭	০.১৭
৪৭৪	৫৯৭	১৯৩৯	০.১৬	০.১৬
৪৭৫	৬৯৯	১৯৪০	০.২৫	০.২৫
৪৭৬	৪০০	১৯৪১	০.৬৯	০.৬৯

মোঃ মোশফিকুর হোসেন

ক্রঃনং	খতিয়ান নং	দাগ নং	পরিমাণ (একরে)	প্রস্তাবিত জমি
৪৭৭		১৭১৯	০.০৮	০.০৮
৪৭৮	৬৯৯	১৯৪২	০.২২	০.২২
৪৭৯	৩৩৮	১৯৪৩	১.০৪	১.০৪
৪৮০	৩৪১	১৯৪৪	০.১৮	০.১৮
৪৮১	১২৪৩	১৯৪৫	০.২৬	০.২৬
৪৮২	৫৯৩	১৯৪৬	১.১৩	১.১৩
৪৮৩	১০০৪	১৯৪৭	০.৪৫	০.৪৫
৪৮৪	২০৭	১৯৪৮	০.৪৮	০.৪৮
৪৮৫	৮১০	১৯৪৯	০.৪০	০.৪০
৪৮৬	২০৭	১৯৫০	০.৬১	০.৬১
৪৮৭	৮০৬	১৯৫১	০.৩১	০.৩১
৪৮৮	১০০৪	১৯৫২	০.১৭	০.১৭
৪৮৯	২০৭	১৯৫৩	০.১৮	০.১৮
৪৯০	৪৩১	১৯৫৪	০.৩৯	০.৩৯
৪৯১	৫৮৯	১৯৫৫	০.৩৩	০.৩৩
৪৯২	৫৮৭	১৯৫৬	০.২৮	০.২৮
৪৯৩	৯২৫	১৯৫৭	১.০০	১.০০
৪৯৪	২৮৯	১৯৫৮	০.৫০	০.৫০
৪৯৫	৫৮৮	১৯৫৯	০.২৭	০.২৭
৪৯৬	৩৯৮	১৯৬০	০.৬২	০.৬২
৪৯৭	৩৩৪	১৯৬১	০.৪৮	০.৪৮
৪৯৮	১৪৮৩	১৯৬২	০.২৯	০.২৯
৪৯৯	১৮৮৭	১৯৬৩	০.৩১	০.৩১
৫০০	১৪৮৭	১৯৬৪	০.৫০	০.৫০
৫০১	১৮৬১	১৯৬৫	০.৩৮	০.৩৮
৫০২	১৮৫৮	১৯৬৬	০.৯৭	০.৯৭
৫০৩	৬৫৬	১৯৬৭	০.২৪	০.২৪
৫০৪	১৭৭৩	১৯৬৮	০.১৮	০.১৮
৫০৫	৬৯৯	১৯৬৯	০.১২	০.১২
৫০৬	৬৯৯	১৯৭০	০.৮৩	০.৮৩
৫০৭	১০৩	১৯৭১ অং	১.৭৯	১.৭৫
৫০৮	৩৪০	২০৬৭	০.১১	০.১১
৫০৯	২৫৯১	২০৬৮ অং	০.১২	০.০৬
৫১০	২৬৫৮	২০৭০ অং	০.৪২	০.১২
৫১১		৩২৮৫ অং	-	০.৫৮
৫১২		৩২৮৪ অং	-	০.২৮
৫১৩	১৩২০	৩২৮৮ অং	-	০.২০
৫১৪	২৪৩২	৩২৮৯ অং	-	০.১৬
৫১৫		৩২৮৭	০.১৫	০.১৫
৫১৬		৩২৮৬	০.১৯	০.১৯

মোসা.ইসমত আরা
পরিচিতি নং- ১৭০০৫
সহকারী কমিশনার (ভূমি)

ক্রঃনং	খতিয়ান নং	দাগ নং	পরিমাণ (একরে)	প্রস্তাবিত জমি
৫১৭	১৭২৭	৩৩০১ অং	-	০.০৬
৫১৮		৩৩২১ অং	-	০.৩৫
৫১৯	৮৪৭	৩৩২২ অং	-	০.৩৪
৫২০	২৫৩৯	৩৩২৩ অং	-	০.১৬
৫২১	২২৯৫	৩৩২৬ অং	-	০.১২
৫২২		৩৩২৭ অং	-	০.১৫
৫২৩		৩৩২৮	০.০৬	০.০৬
৫২৪	১৭১৭	৩৩২৯	০.১৮	০.১৮
৫২৫	৯৯০	৩৩৩০	০.০৮	০.০৮
৫২৬	৯৯০	৩৩৩১	০.০৮	০.০৮
৫২৭		৩৩৩২ অং	-	০.৩৮
৫২৮	১৭১৭	৩৩৫২ অং	-	০.০৫
৫২৯	১৮৩১	৩৩৫৩	০.২৬	০.২৬
৫৩০	২৩০৩	৩৩৫৪	০.৩০	০.৩০
৫৩১	২৩১০	৩৩৫৫ অং	-	০.১৮
৫৩২	১৪৫৪	৩৩৫৯ অং	-	০.১২
৫৩৩	২৮১৩	৩৩৭৫ অং	-	০.০২
৫৩৪		৩৩৭৬ অং	-	১.২৫
৫৩৫		৩৩১৮	০.০২	০.০২
			মোট =	২০০ একর (প্রায়)

মোঃ মোশাররফ হোসেন
সার্ভেয়ার
উপজেলা ভূমি অফিস
গোপালগঞ্জ সদর।

মোসা.ইসমত আরা
পরিচিতি নং- ১৭০০৫
সহকারী কমিশনার (ভূমি)
গোপালগঞ্জ সদর।

15.13. Annexure 13 – Attendee Details of Focused Group Discussions

List of Participants

Participants of Youth Group

SL	Name of Participants	Mobile Number	Occupation
1	Chowdhury Osman Gony Shohag	01714825943	Small Business
2	Md Shofiqul Islam Chowdhury	01791434532	Unemployed
3	Notun Biswas	01680545734	Unemployed
4	Ibdita Rahman Chowdhury	01763562054	Unemployed
5	Liyon Chowdhury	01633692242	Unemployed
6	Chowdhury Mahmud	01758892241	Unemployed
7	Md Mostain Meridha	01778079699	Unemployed
8	Md Kamal Shekh	01948054933	Unemployed
9	Asif Naeem	01748630344	Unemployed

Participants of Women Group

SL	Name of Participants	Mobile Number	Occupation
1	Habiba Akhter Dolly	01721932978	UP-Ward Member
2	Afroza Beagum	01793342178	Housewife
3	Anwara Beagum	01711487671	Housewife
4	Masuda Parvin	01729140592	Ex- member
5	Maslima Beagum	01760512819	Housewife
6	Jesmin Beagum	01706170261	Housewife
7	Khadija Beagum	01702682708	Housewife
8	Sabina Akhter Asha	01783440128	Housewife
9	Shamima chowdhury	01719412883	Student
10	Rahela Beagum	01703567037	Housewife

FGD Participants of local businessman Group

SL	Name of Participants	Mobile Number	Occupation
1	Md Milton Mollah	01912412928	Business
2	Rana Chowdhury	01754505023	Business
3	Gaus Meridha	01828228570	Business
4	Siraj Kafi	01767248881	Business
5	Mufti Harun Chowdhury	01711560494	Business

SL	Name of Participants	Mobile Number	Occupation
6	Fayajul Chawdhury	01724004152	Business
7	Shamim Biswas	01710155992	Business
8	Dulu Mollah	01706444724	Business
9	Harun Biswas	01911837381	Business

15.14. Annexure 14 – Baseline Monitoring Results

শেখ হাসিনার নির্দেশ
জলবায়ু সহিষ্ণু বাংলাদেশ

শেখ হাসিনার বাংলাদেশ
পরিচ্ছন্ন পরিবেশ

Dhaka Laboratory

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
পরিবেশ অধিদপ্তর
ঢাকা গবেষণাগার
ই-১৬, আগারগাঁও, শেরে বাংলা নগর, ঢাকা-১২০৭
www.doe.gov.bd

স্মারক নং-২২.০২.০০০০.১১১.৬৮.০০১.১৩. ৮৪৭

তারিখঃ ৯০/০৬/১৮ইং

প্রাপক ঃ ব্যবস্থাপনা পরিচালক
প্রাইস ওয়াটারহাউজ কোপারস্ বাংলাদেশ প্রাঃ লিঃ
গোবরা, সদর, গোপালগঞ্জ।

বিষয় ঃ গোবরা, সদর, গোপালগঞ্জ -এ অবস্থিত " প্রাইস ওয়াটারহাউজ কোপারস্ বাংলাদেশ প্রাঃ লিঃ " এর পরিবেশ্টক বায়ুর নমুনা বিশ্লেষিত ফলাফল।

সূত্র ঃ- আবেদন নং:T-১২০৩; তারিখ-২১/০৩/১৮ ইং।

Sample Location	Date	Ambient Air Pollutant Concentration in micro gram/cubic meter			Remarks
		SPM	NO_x	SO_2	
North side of Project Area	15.05.18	108	25	ND	• Wind direction was from south to north. • Weather was Sunny.
Air Quality Standard		200	100	365	-------

Note:- 1. SPM- suspended Particulate Matter 2. SO_2 - Sulfur dioxide 3. NO_X - Oxides of Nitrogen 4. ND-Not detected.

- বাংলাদেশ পরিবেশ সংরক্ষণ বিধিমালা, ১৯৯৭(সংশোধনী-২০০৫) অনুযায়ী, সকল প্যারামিটার এর মান গ্রহণযোগ্য মানমাত্রার মধ্যে আছে ।

(এস, এম, শরীফুর রহমান)
জুনিয়র কেমিস্ট

(সৈয়দ আহম্মদ কবীর)
সিনিয়র কেমিস্ট

(মোঃ মোস্তাফিজুর রহমান আখন্দ)
উপপরিচালক

(ড. মুঃ সোহরাব আলি)
পরিচালক

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
পরিবেশ অধিদপ্তর
ঢাকা গবেষণাগার
ই-১৬, আগারগাঁও, শেরে বাংলা নগর, ঢাকা-১২০৭
www.doe.gov.bd

স্মারক নং-২২.০২.০০০০.১১১.৬৮.০০১.১৩.৮৪ ৮- তারিখঃ ১০/০৬/১৮ইং

প্রাপক ঃ ব্যবস্থাপনা পরিচালক
প্রাইস ওয়াটারহাউজ কোপারস্ বাংলাদেশ লিঃ
গোবরা, সদর, গোপালগঞ্জ।

বিষয় ঃ গোবরা, সদর, গোপালগঞ্জ -এ অবস্থিত " প্রাইস ওয়াটারহাউজ কোপারস্ বাংলাদেশ লিঃ" এর শব্দ পরিমাপের ফলাফল।

সূত্র ঃ- আবেদন নং:T-১২০৩; তারিখ-২১/০৩/১৮ ইং

উপর্যুক্ত বিষয় ও সূত্রের বরাতে পত্রের চাহিদা মোতাবেক শব্দ পরিমাপের ফলাফলের উপাত্তসীট নিম্নে প্রদত্ত হলোঃ

Location	Date	Time	Sound Level in dBa	Remarks.
West side (Outside of Area)	15.05.18	12.05 pm	52.6	
East side (Outside of Area)	15.05.18	12.12 pm	54.2	
Bangladesh Standard at day time for mixed Area as per Noise pollution (control) rules, 2006.			**6:00 AM to 9:00 PM**	

- শব্দ দূষণ নিয়ন্ত্রণ বিধিমালা-২০০৬ অনুযায়ী, সকল পার্শ্বের শব্দের মান গ্রহণযোগ্য মানমাত্রার মধ্যে আছে।

(এস, এম, শরীফুর রহমান)
জুনিয়র কেমিস্ট

(সৈয়দ আহম্মদ কবীর)
সিনিয়র কেমিস্ট

(মোঃ মোস্তাফিজুর রহমান আখন্দ)
উপপরিচালক

(ড. মুঃ সোহরাব আলি)
পরিচালক

শেখ হাসনার নির্দেশ
জলবায়ু সহিষ্ণু বাংলাদেশ

Dhaka Laboratory

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
পরিবেশ অধিদপ্তর
ঢাকা গবেষণাগার
ই/১৬, আগারগাঁও, শেরেবাংলা নগর, ঢাকা-১২০৭।
www.doe.gov.bd

শেখ হাসিনার বাংলাদেশ
পরিচ্ছন্ন পরিবেশ

স্মারক নং-২২.০২.০০০০.১১১.৬৮.০০৯.১৩. ৯০৬৬

তারিখ- ৯ ১/০৬/১৮ইং

প্রাপকঃ ব্যবস্থাপনা পরিচালক

প্রাইস ওয়াটারহাউজ কুপারস বাংলাদেশ প্রাঃ লিঃ

লায়লা টাওয়ার (১২তম তলা), ৮ গুলশান এভিনিউ, গুলশান-১, ঢাকা।

বিষয়ঃ গোপালগঞ্জ ও জাজিরা ইকোনোমিক জোনের ভূপৃষ্ঠস্থ পানির নমুনা বিশ্লেষিত ফলাফল।

সূত্র ঃ- আবেদন নং: T-১২০৩, ১২০৪ তারিখ- ২১/০৩/১৮ইং

উপর্যুক্ত বিষয় ও সূত্রের বরাতে পত্রের চাহিদা মোতাবেক পানির নমুনা সংগ্রহপূর্বক বিশ্লেষিত ফলাফলের উপাত্তসীট নিম্নে প্রদত্ত হলো-

Sample Location	Type of Sample	Date	Lab code No	pH	BOD mg/L	COD mg/L	TDS mg/L	EC µS/cm	Chloride mg/L
Gopalgonj Economic Zone, Gobra Union, Gopalgonj	Surface Water	13.05.18	Y-45	6.78	15	46	163	318	30
Zajira Economic Zone at Saner chor, Uttar Duboldia, Khagutia, Gopalpur, Shariatpur.	Surface Water	13.05.18	Y-47	7.62	15	46	333	636	35
STD for surface water				**6.5-8.5**	**≤ 6**	--	--	--	--

- বাংলাদেশ পরিবেশ সংরক্ষণ বিধিমালা, ১৯৯৭ অনুযায়ী BOD প্যারামিটার গ্রহণযোগ্য মানমাত্রার বাহিরে আছে।

(সুমাইয়া)
সহকারী বায়োকেমিস্ট

(শাহেদা বেগম)
সিনিয়র কেমিস্ট

(মোঃ মোস্তাফিজুর রহমান আখন্দ)
উপপরিচালক

(ড. মুঃ সোহরাব আলি)
পরিচালক

শেখ হাসিনার নির্দেশ
জলবায়ু সহিষ্ণু বাংলাদেশ

শেখ হাসিনার বাংলাদেশ
পরিচ্ছন্ন পরিবেশ

Dhaka Laboratory

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
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www.doe.gov.bd

স্মারক নং-২২.০২.০০০০.১১১.৬৮.০০৯.১৩. ২০৫৭

তারিখ- ১১/০৬/১৮ইং

প্রাপকঃ ব্যবস্থাপনা পরিচালক
প্রাইস ওয়াটার হাউজ কুপারস বাংলাদেশ প্রাঃ লিঃ
লায়লা টাওয়ার (১২তম তলা), ৮ গুলশান এভিনিউ, গুলশান-১, ঢাকা।

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সূত্র ঃ- আবেদন নং: T-১২০৩, ১২০৪ তারিখ- ২১/০৩/১৮ইং

উপর্যুক্ত বিষয় ও সূত্রের বরাতে পত্রের চাহিদা মোতাবেক পানির নমুনা সংগ্রহপূর্বক বিশ্লেষিত ফলাফলের উপাত্তসীট নিম্নে প্রদত্ত হলো-

Sample Location	Type of Sample	Date	Lab code No	Coliform	BOD mg/L	COD mg/L	TDS mg/L	Turbidity NTU	Chloride mg/L
Gopalgonj Economic Zone, Gobra Union, Gopalgonj	Ground Water	13.05.18	Y-46	0.0	02	N.D	622	7.32	114
Zajira Economic Zone at Saner chor, Uttar Duboldia, Khagutia, Gopalpur, Shariatpur.	Ground Water	13.05.18	Y-48	0.0	02	N.D	1034	98.1	440

- বাংলাদেশ পরিবেশ সংরক্ষণ বিধিমালা, ১৯৯৭ এ ভুগর্ভস্থ পানির জন্য কোন মানমাত্রা দেওয়া নেই।

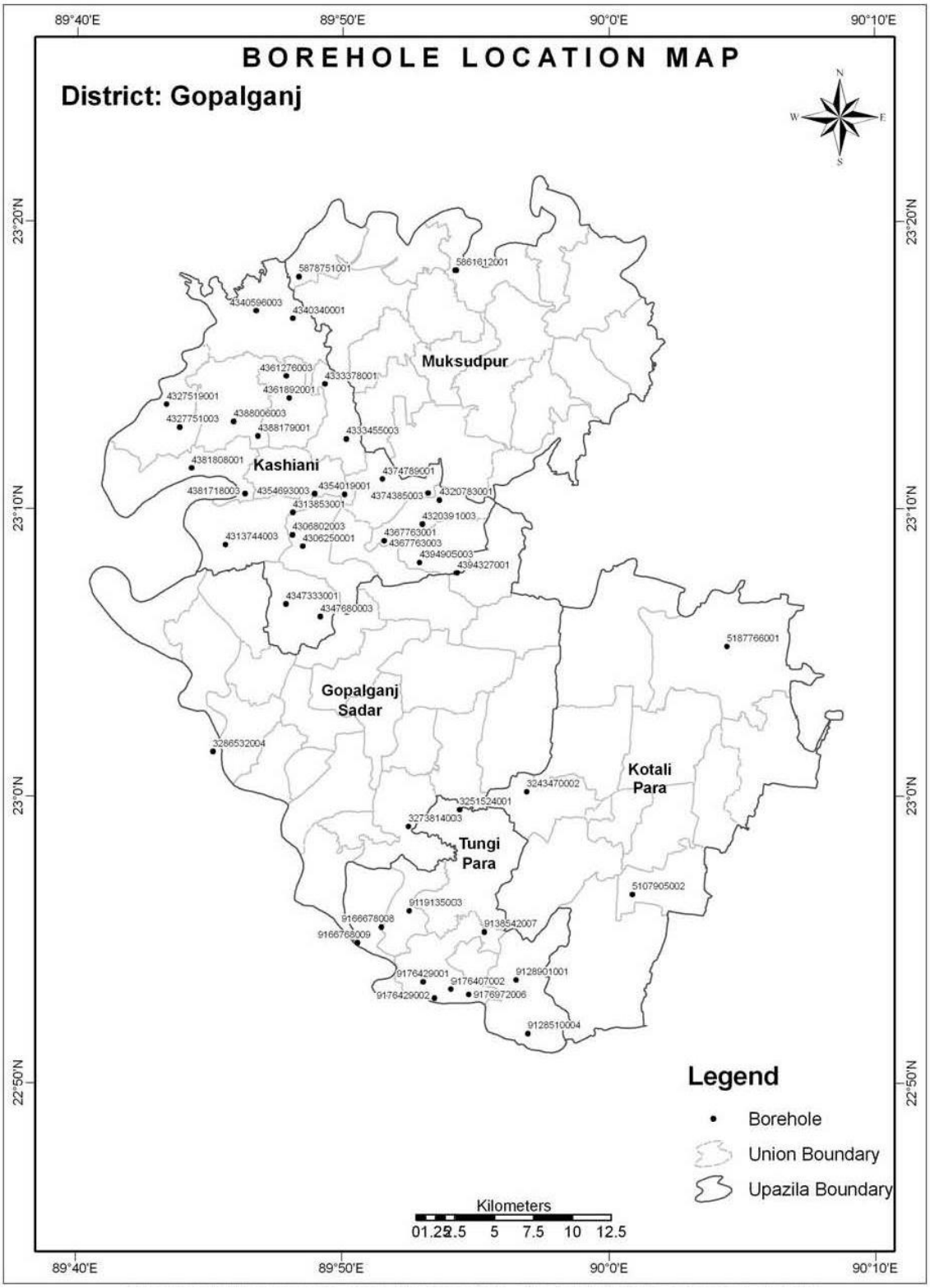
10-06-18
(সুমাইয়া)
সহকারী বায়োকেমিস্ট

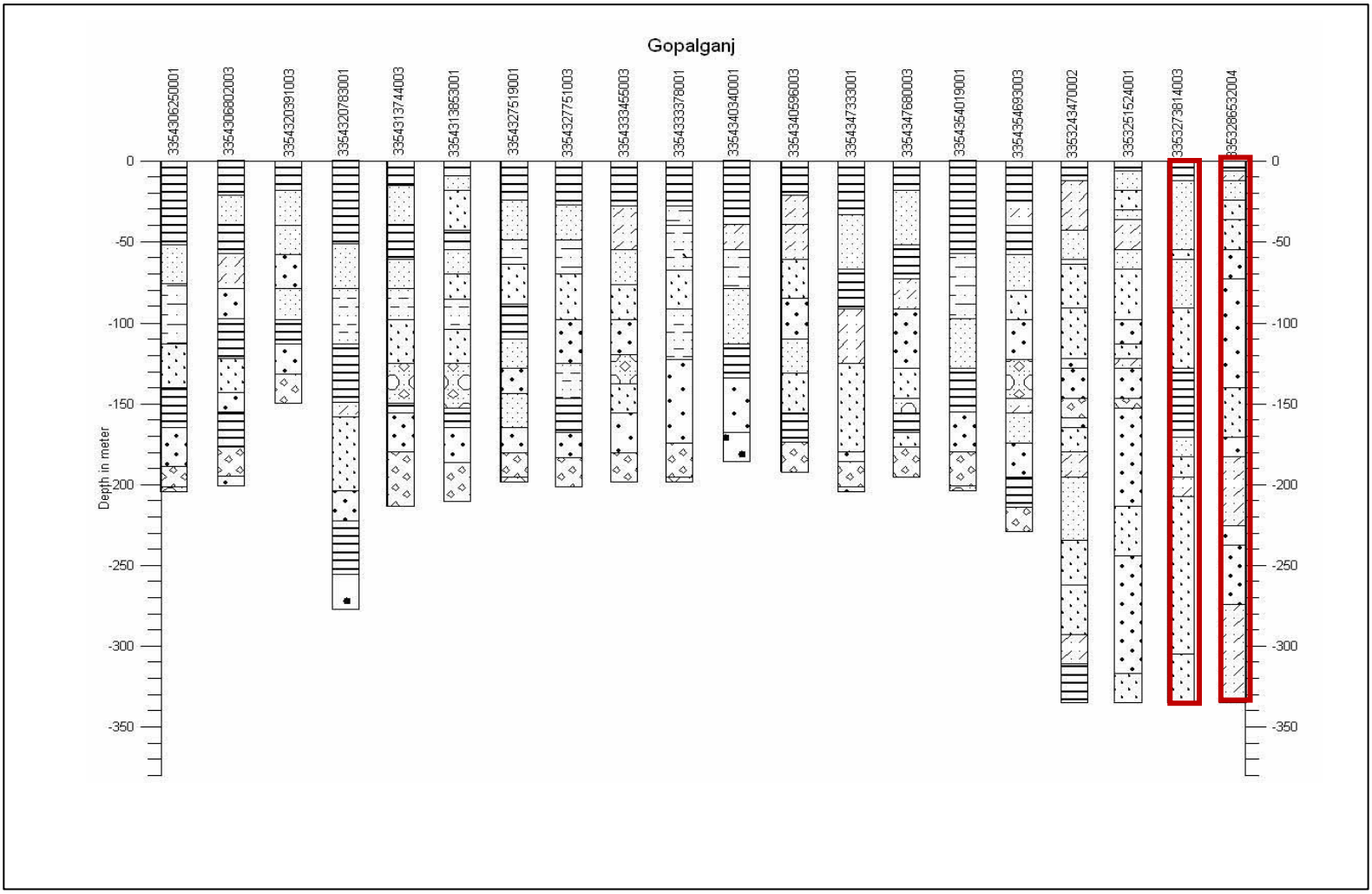
11.06.18
(শাহেদা বেগম)
সিনিয়র কেমিস্ট

১১/০৬/১৮
(মোঃ মোস্তাফিজুর রহমান আখন্দ)
উপপরিচালক

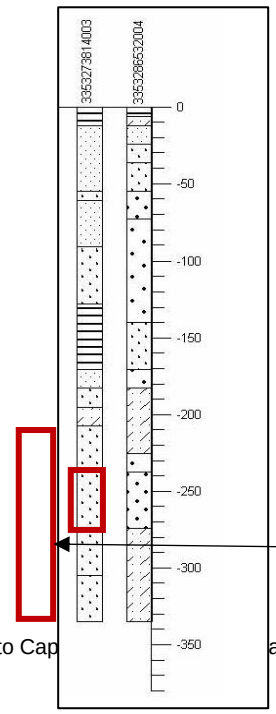
১১.৬.১৮
(ড. মুঃ সোহরাব আলি)
পরিচালক

15.15. Annexure 15 – Borewell Information





Bore Well Profile of Project Area - 22°59'0.96"N, 89°52'29.64"E & 23° 1'37.20"N, 89°45'7.56"E



Pervious layer having water potential

Lithologic Legend
Clay
Silty clay
Sandy clay
Silt
Very fine sand
Fine sand
Fine to medium sand
Medium sand
Medium to coarse sand
Coarse sand
Very coarse sand
Coarse sand with gravel
Gravel

Page-43 of 54 (Dhaka Division)

GeoCode	District	Upazila	Union	Mouza	Village	OwnerName	Year of Insta-llation	Boring Depth (m)	Screen Centre Depth (m)	Long	Lat
3296244412005	Faridpur	Nagarkanda	Jadunandi	Jadunandi	Jadunandi	Md. Rezaul Karim	2005	219.45	181.50	89.8073	23.3259
3296255432003	Faridpur	Nagarkanda	Laskardia	Jangurdi	Jangurdi	Md. Mohiuddin Khan	2005	201.16	189.42	89.8746	23.4360
3296267303001	Faridpur	Nagarkanda	Nagarkanda	Gang Jagdia	Gang Jagdia	Upazila Dormitory	2005	237.73	214.42	89.9029	23.4192
3296267303002	Faridpur	Nagarkanda	Nagarkanda	Gang Jagdia	Gang Jagdia	Thana Parishad Mosque	1998	182.87	106.07	89.9025	23.4042
3296267624001	Faridpur	Nagarkanda	Nagarkanda	Madhya Jagdia	Madhya Jagdia	Kazi Aftab Hossain	2007	216.41	209.84	89.9018	23.4126
3296233865001	Faridpur	Nagarkanda	Phulsuti	Salitha	Salitha	Shamima Akhter	2007	185.93	179.36	89.9035	23.4307
3296283358002	Faridpur	Nagarkanda	Ramnagar	Gopalpur	Gopalpur	Md. Yunus Mia	2005	201.16	192.47	89.9191	23.5426
3298419726003	Faridpur	Sadarpur	Bhashanchar	Paschim Amirabad	Paschim Amirabad	Ishaque Mridha	2005	195.06	188.20	90.0464	23.4933
3298428376005	Faridpur	Sadarpur	Char Bishnupur	Dakshin Char Bishnupur	Char Bishnupur	Md. Shirajul Islam	2005	213.35	205.58	90.0079	23.5025
3298457457002	Faridpur	Sadarpur	Dheukhali	Dubail	Dubail	Md. Delwar Hossain	1998	182.87	167.02	90.0673	23.4278
3298457901006	Faridpur	Sadarpur	Dheukhali		Dulal Matborer Denga	Kazi Nazrul Islam	2005	213.41	204.05	90.0635	23.4626
3298457430320	Faridpur	Sadarpur	Dheukhali	Dheukhali	Charkugharia	Md. Razu Ahamed	2007	190.54	183.46	90.0635	23.4626
3298466685007	Faridpur	Sadarpur	Krishnapur	Nayakandi	Nayakandi	Sarowar Sharif	2005	201.16	188.51	89.9282	23.4825
3298466537389	Faridpur	Sadarpur	Krishnapur	Jatrabari	Jatrabari	Munshi Md. Isharat	2007	195.12	188.50	89.9540	23.4939
3298485040001	Faridpur	Sadarpur	Sadarpur	Atrashi	Atrashi		1989	298.69		90.0261	23.4500
3298485833002	Faridpur	Sadarpur	Sadarpur	Satara Rashi	Satara Rashi	Sadarpur Bazar	2005	213.35	204.05	90.0362	23.4622
3298485833003	Faridpur	Sadarpur	Sadarpur	Satara Rashi	Satara Rashi	Sub Assistant Engineer / DPHE	1998	206.64	202.99	90.0332	23.4455
3298485040392	Faridpur	Sadarpur	Sadarpur	Atrashi	Atrashi	Shantosh Chokrobarti	2007	176.82	167.22	90.0274	23.4508
3333460491003	Gazipur	Kaliganj	Jamalpur	Jamalpur	Jamalpur	Jamalpur R.M. Bidyapith	2005	158.49	147.43	90.5112	23.9773
3333486072001	Gazipur	Kaliganj	Kaliganj	Baligaon	Baligaon	Abdul Quader Morol	2005	146.30	132.19	90.5774	23.9202
3333486910002	Gazipur	Kaliganj	Kaliganj			Durbati Madrasa	2005	146.30	132.19	90.5822	23.9314
3333625325002	Gazipur	Kapasia	Durgapur	Dalinagar	Dalinagar	Md. Tamij Uddin	2005	158.49	145.71	90.6123	24.0556
3333625410001	Gazipur	Kapasia	Durgapur	Durgapur	Durgapur	Md. Qasuddin	2005	164.58	145.00	90.6018	24.0740
3333634627005	Gazipur	Kapasia	Ghagotia	Kshirati		Rakibul Hasan	2004	152.39	149.95	90.6801	24.1356
3333643578001	Gazipur	Kapasia	Kapasia	Kapasia		Shah Reza	2004	152.39		90.5534	24.1181
3333643578002	Gazipur	Kapasia	Kapasia	Kapasia	Kapasia	Fazlul Haque	2005	164.58	148.96	90.5534	24.1181
3333669247004	Gazipur	Kapasia	Sanmania	Char Alinagar		Mohammad Shahidullah	2004	152.39	132.56	90.6915	24.1059
3333669277003	Gazipur	Kapasia	Sanmania	Char Sanmania		Md. Nazrul Islam	2004	152.39	149.95	90.7013	24.1059
3353243470002	Gopalganj	Gopalganj Sadar	Kajulia	Kajulia	Kajulia	Abdul Aziz Sheikh	1996	335.26	231.94	89.9483	23.0038
3353251524001	Gopalganj	Gopalganj Sadar	Kati	Kati	Kati	Md.Nasir Uddin Molla	1996	335.26	132.89	89.9061	22.9933
3353273814003	Gopalganj	Gopalganj Sadar	Raghunathpur	Raghunathpur	Raghunathpur	Sri Ram Biswas	1997	335.26		89.8749	22.9836
3353286532004	Gopalganj	Gopalganj Sadar	Suktail	Kekania	Kekania	Mr. Sheikh Mohammad Abdullah	1997	335.26	263.94	89.7521	23.0270
3354306250001	Gopalganj	Kashiani	Bethuri	Dakshin Dhirail	Dakshin Dhirail	Mr. Shakhawat Hossain	2007	204.22	196.43	89.8083	23.1460
3354306802003	Gopalganj	Kashiani	Bethuri	Ramdia	Ramdia	Mr. Enam Ahmed	2008	201.17	191.57	89.8018	23.1527
3354313853001	Gopalganj	Kashiani	Fukura	Saphildanga	Saphildanga	Mr. Chitta Ranjan Biswas	2007	210.31	201.31	89.8020	23.1656
3354313744003	Gopalganj	Kashiani	Fukura	Fukura	Fukura	Mr. Kaisur Rahman	2008	213.36	204.67	89.7598	23.1469
3354320783001	Gopalganj	Kashiani	Hatisra	Rahuthar	Rahuthar	Dr. Tapan Mazumdar	2007	277.37	270.20	89.8940	23.1730
3354320391003	Gopalganj	Kashiani	Hatisra	Hatisra	Hatisra	Mr. Atul Pathak	2008	149.35	142.49	89.8833	23.1589

15.16. Annnexure 16 – Guide to Economic Model

As part of our deliverable, we have submitted the excel files of the economic modelling. The calculations are self-explanatory where there are two tabs:

a) **Economic assumptions:** This tab outlines all the key assumptions which drive the modelling exercise. Calculation of economic benefits for the three mentioned scenarios also form part of this tab.

b) **EIRR calculations:** This tab calculates the economic cost and EIRR for the three scenarios.

Figures in the subsequent pages elaborate the functionalities of these tabs.

Figure 91: Functionalities of "Economic Assumptions" tab (Part -1)

Assumptions

Assumptions			
Shadow Exchange Rate Factor	1.05		Refer section 1.1
Shadow Wage Rate	0.9		Refer section 1.2
Economic Discount Rate	0.12		Assumed
Currency conversion rate (BDT to US$)	82		
	Capex	Opex	
Material	0.5	0.9	
Equipment	0.3	0.1	
Labor	0.2	N/A	
Equipment imported (% of total import)	0.75		
VAT Rate (for Capex and Opex)	0.15		Refer section 1.3
Income multiplier for indirect employment	0.7		Refer section 1.4
Capacity Utilization of Industrial Units	80%		
Plant efficiency factor of industrial units	80%		
Export contribution	25%		

Section	Details
1.1	*Shadow Exchange Rate Factor:* From "Additional Financing to the Third Primary Education Development Project RRP BAN 42122 by ADB (2015), the taka is overvalued by about 5%, hence the Shadow Exchange rate is 1.05
1.2	*Shadow Wage Rate:* For the ADB-Khulna Water supply Project, shadow wage rate considered was 1.00 for skilled labour and 0.75 for unskilled labour. Assuming in this project 75% skilled labor and 25% unskilled labor have been used. Net Shadow Wage Rate= 0.60*1.00+0.40*0.75=0.90
1.3	*VAT Rate for Capex and Opex:* As applicable for Bangladesh
1.4	*Income multiplier for indirect employment:* The figure has been extracted from the report "Structural Trasformation and Employment Creation" authored by Overseas Development Institute

As per the figure above, the coloured cells contain the assumptions. The model is operated by changing values in these cells.

Figure 92: Functionalities of "Economic Assumptions" tab (Part-2)

Calculation of economic benefits

Figure above captures a snapshot of the economic benefit calculations. Based on the inputs/ assumptions provided, the calculations take place automatically.

Economic Benefit Calculations										
Gain of exchequer from Industrial Production										
Source: Survey of Manufacturing Industries 2012										
Number of establishments	42732									
Gain for the exchequer (BDT million)	75872				1.69	Contribution to economy per establishment (BDT million per establishment)				
	2020	2021	2022	2023	2024	2025	2026	2027	2028	
Conservative Case (no. of establishments)	0	12	16	22	22	37	53	53	66	
Gain for the exchequer in conservative case (BDT million)	0	20	28	38	38	62	89	106	112	
Base Case (no. of establishments)	0	17	23	43	50	74	79	79	79	
Gain for the exchequer in base case (BDT million)	0	29	43	72	84	125	134	134	134	
Aggressive Case (no. of establishments)	0	24	43	66	79	79	79	79	79	
Gain for the exchequer in aggressive case (BDT million)	0	40	73	112	133	133	133	133	133	
Export Boost from Industrial Production										
Source: Survey of Manufacturing Industries 2012										
Gross Value Added (BDT million)=	1562947									
Net Fixed Asset (BDT million)=	1188108									
Net Value Added (BDT million)=	374839									
Net Value Added (BDT million) per industrial Unit=	5.34									
Export boost (BDT million) per industrial unit=	1.33									
Conservative Case (BDT million)	0	16	22	30	30	43	71	84	89	
Base Case (BDT million)	0	23	39	57	66	99	106	106	106	
Aggressive Case (BDT million)	0	32	58	88	105	105	105	105	105	
Total Contribution to economy by industrial production in the SEZ										
Conservative case	0	36	50	68	68	112	160	190	201	
Base case	0	53	88	130	150	225	240	240	240	
Aggressive case	0	72	131	200	238	238	238	238	238	

Figure 93: Functionalities of "EIRR calculations" tab (Part-1)

EIRR Calculation

 # All figures are in BDT million unless otherwise specified

Total Economic Cost

Capital Expenditure:

0	1	2	3	4	5	6	7	8	9	10
1	1.1	1.1	1.2	1.2	1.3	1.3	1.4	1.5	1.6	1.6
Details	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
Capex expenses	724	812	702	788	0	0	0	0	0	0
Total (cost of the private developer)	689	737	606	648	0	0	0	0	0	0
(1) Material	293	313	258	275	0	0	0	0	0	0
(2) Equipment	208	222	183	195	0	0	0	0	0	0
(3) Labor	211	225	185	198	0	0	0	0	0	0

Operating Expenditure:

Details	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
O&M Cost	0	64	101	137	150	150	150	150	150	150
Manpower Cost	0	44	44	44	44	44	44	44	44	44
(4) Material	0	49	77	105	115	115	115	115	115	115
(5) Equipment	0	6	10	14	15	15	15	15	15	15
(6) Labor (Cost of Personnel)	0	44	44	44	44	44	44	44	44	44
(A) Total Economic Costs (=1+2+3+4+5+6)	712	860	757	831	174	174	174	174	174	174

Above figure elucidates the economic cost calculations. As per the assumptions/ inputs entered in the earlier tab, the calculations take place.

Figure 94: Functionalities of "EIRR Calculations" tab (Part-2)

Conservative Case

	2020	2021	2022	2023	2024	
Economic Return = (B) - (A)	(620.6)	(696.8)	(530.1)	(585.7)	198.4	3

Economic Internal Rate of Return (EIRR)=	18.58%	**Cost Benefit Ratio**	4.84

Base Case

	2020	2021	2022	2023	2024	
Economic Return = (C) - (A)	(577.1)	(581.7)	(330.2)	(303.6)	588.8	7

Economic Internal Rate of Return (EIRR)=	25.75%	**Cost Benefit Ratio**	4.89

Aggressive Case

	2020	2021	2022	2023	2024	
Economic Return = (D) - (A)	(527.1)	(449.6)	(101.1)	(1.8)	692.8	6

Economic Internal Rate of Return (EIRR)=	32.54%	**Cost Benefit Ratio**	4.83

In addition to the economic cost calculations, calculation of EIRR is also undertaken in this tab. Figure above indicates a screenshot of the same.

15.17. Annexure 17 – Guide to Financial Model

A user guide has been prepared below in order to assist any individual who would use the financial model to determine the input parameters that could be modified and the impact of changing different parameters on the financial outputs.

The financial model has been constructed, keeping provisions for considering varying land uptake scenarios, phasing of the construction activity on the proposed EZ site and a quarterly drawdown of capex and repayment of debt taken for capex.

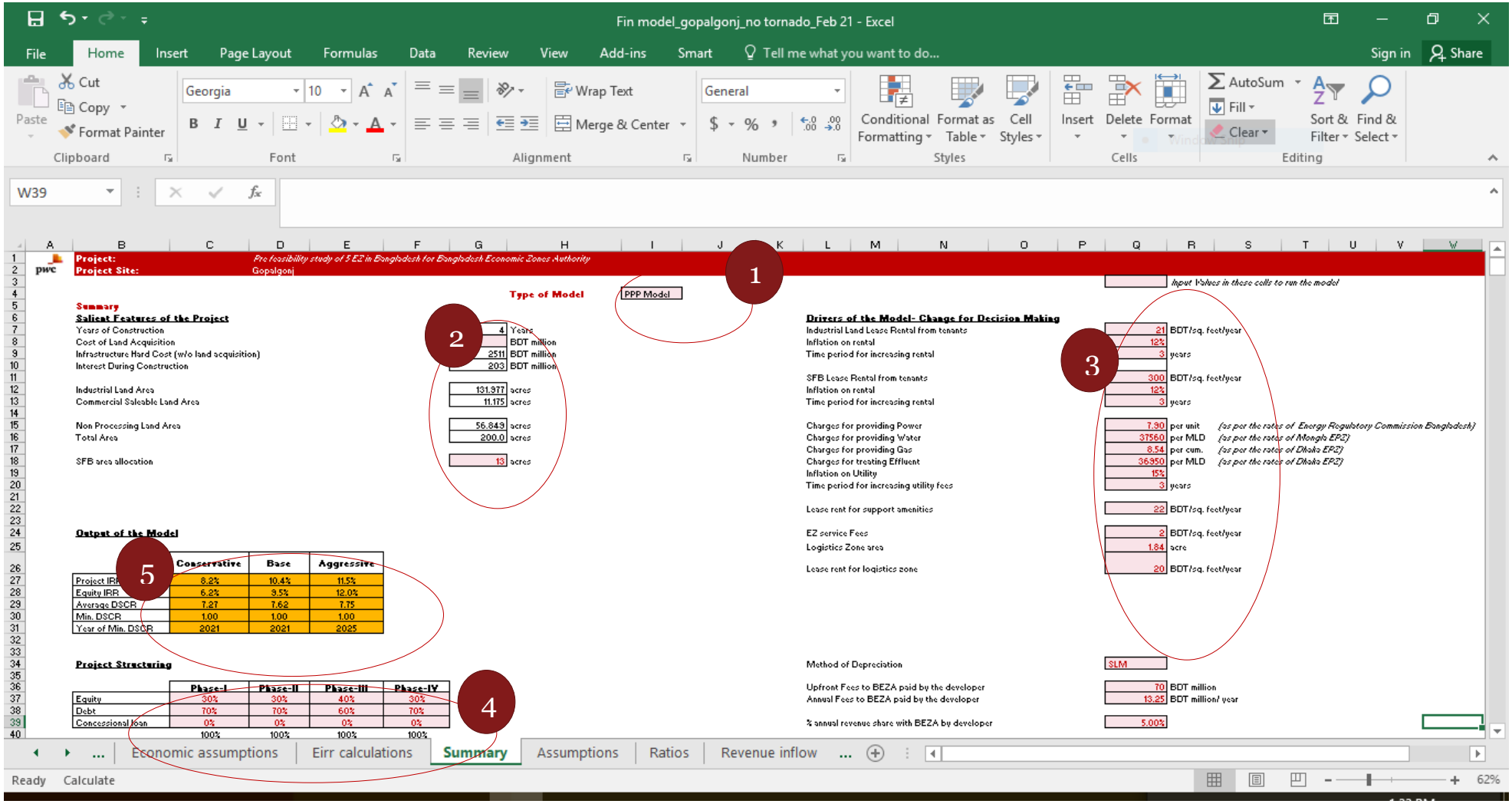
The financial model workbook comprises several worksheets performing specific functions, these worksheets have been listed below –

- Summary sheet: Captures the salient features of the EZ project, input parameters which would drive the returns for the financial model, project structuring and output of the financial model (like IRR, DSCR).
- Assumptions sheet: This sheet captures the gamut of assumptions and forecast made for the financial model. There are 15 major blocks in which the assumptions have been segregated, each of these blocks impact the outflow and inflow of resources for the project under consideration.
- Ratios sheet: This sheet calculates the expected returns accruing to the developer. Returns over a period of 50 years have been calculated, considerations have been made to keep provision to calculate returns for different case scenarios (conservative, base, and aggressive) of land uptake.
- Revenue Inflow sheet: This sheet takes into consideration all possible revenue streams from this project and calculates the revenue accrued to the developer.
- BS Conservative, BS Base, BS Aggressive sheets: These are the 3 balance sheets developed to capture the liability and assets of the developer over a period of fifty years for three different land uptake scenario.
- PL Conservative, PL Base, PL Aggressive sheets: These are the 3 P/L sheets developed to capture the profit and loss accruing to the developer over a period of fifty years for three different land uptake scenario.
- WC Conservative, WC Base, WC Aggressive sheets: These are the 3 working capital sheets developed to capture the changes in working capital required by the developer to operate the EZ site over a period of fifty years for three different land uptake scenario.
- CF Conservative, CF Base, CF Aggressive sheets: These are the 3 cash flow sheets developed to capture the cash flow generated from the EZ project over a period of fifty years for three different land uptake scenario.
- Depreciation sheet: This sheet performs the calculations required to understand the depreciation that takes place on the fixed assets constructed by the developer. Depreciation is calculated as per book value and also as per applicable Income Tax Act.
- Tax Calculation sheet: This sheet calculates the tax liability of the developer, over the period of fifty years on income generated from operating the EZ site for all three land uptake scenario. Applicable tax incentives to the developer has also been considered for purpose of tax calculation.
- Capex Cost sheet: This sheet captures the capex cost that would have to be borne by the developer for construction of different components of EZ site in 2 phases. Capital expenditure incurred by the developer in each quarter of the construction period has been charted out.
- Timing sheet: This sheet draws out the phase wise capex and opex expenditure incurred by the developer over the period of fifty years and also captures the repayment schedule of the debt taken to meet the capex expenses.
- Phase I – Repayment details, Phase II – Repayment details, Phase III – Repayment details, Phase IV – Repayment details sheets: This sheet contains the details of the repayment schedule of the loan taken during each phase of construction.

Calculations performed in the excel worksheets listed above, are interlinked to each other and flow from one sheet into another to deliver the final expected financial outcome of developing the proposed EZ site.

A detailed description of the significant parts of the financial model has been provided in this section, through screenshots of the relevant worksheets and further elaboration of various components.

Figure 95: Summary Sheet of the Financial Model



The screenshot of the summary table in the previous page shows the various input parameters taken for developing the financial model and the output parameters obtained through this model. These input parameters can be modified in order to obtain the desired output from the financial model. Different blocks of inputs and outputs have been encircled and numbered for detailed description, as shown below.

1. This cell reveals that the user of the financial model would evaluate returns on basis of the EZ being developed by a private developer.
2. This contains macro level details about the EZ site, in terms of cost of developing the site, years required for construction and details regarding break up of EZ site area into different components.
3. This contains inputs taken for lease rental, rate and time period over which rents would be increased, charges for utility that would be paid by the developer and upfront fees that would be paid by developer to BEZA.
4. This contains capital structure of the entity that would be developing the EZ site, in terms of debt, equity and grant and interest rate of debt and grant.
5. This contains returns that would earned by the developer over his investments in developing the EZ site over a period of 50 years. It also captures the debt servicing ability of the developer during the same time period.

The user of this financial model can make modifications to the 2nd, 3rd and 4th block of parameters in order to obtain the desired outcome captured in 5th block of parameters.

The inputs and outputs obtained in this summary worksheet is dependent on the assumptions made regarding different aspects related to different rate of land uptake, timing of construction phases, escalation rates, land use pattern, tax considerations, repayment schedule, revenue assumptions etc.

The components captured in the assumption sheet have been elaborated on the next page along with supporting screen shots of the same.

1 Timing Assumptions

Tenure of the Model (Years)		50	
Model Start Date		July 1, 2019	
Model End Date		June 30, 2069	
Construction Start Date		July 1, 2019	
Construction End Date		June 30, 2023	1461 Days
Years of Construction		4	
Number of Phases		2	
Phase I Start Date		July 1, 2019	
Phase I End Date	1	June 30, 2021	731 Days
Phase II Start Date		July 1, 2021	
Phase II End Date	2	June 30, 2023	730 Days
Phase III Start Date		January 0, 1900	
Phase III End Date	3	January 0, 1900	1 Days
Phase IV Start Date		January 0, 1900	
Phase IV End Date	4	January 0, 1900	1 Days
			1463 Days
Quarterly Model (Months)		3	
Operation Start Date (CoD)		July 1, 2020	

Timing Assumptions – This block captures the tenure for which the financial model has been built, along with start and end dates of each construction phase. Quarterly model parameter captures number of months in each quarter. Operation Start Date captures the CoD date.

2 Escalation Rates

Escalation Rate (annual) for capex and opex	5.0%	Price Label	March 15, 2019

Escalation Rate – This block captures the escalation rate forecasted for the tenure of the project duration and base price considerations.

3 Project Cost (in BDT million)

Cost of land acquisition	0.0
Site grading and other land development expenses	0.0
Compound wall, fencing and gates	0.0
Roads, culverts & drainage	394.0
Decentralized water supply, treatment and distribution	223.5
Electrical, street lighting & fire fighting	363.2
Telecom & communication systems	32.2
Sustainable infrastructure elements, RW harvesting, summer storage tank & greenery	3.4
Decentralized wastewater, network and solid waste management	875.3
Admin Building	52.5
Support Amenities	0.0
Buildings - MEP	2.6
SFB	543.6
EMP Cost	20.4
Offsite infra	0.0

Total Hard Cost (without land acquisition)	2510.65
Total Cost (Including land acquisition)	2511
Interest During Construction	203.48
Project Cost (without land acquisition)	2714.14
Project Cost (Including land acquisition)	2714

Project Cost – This block captures the break-up of construction expenditure for different components of the EZ site. Considering the scope of BEZA also developing the EZ site, provision has been kept to capture the land cost as well as a part of construction costs.

4. Industrial Land Use Pattern

Industrial Space (area in acres)- allocate higher area at the first	
Textile & RMG	0
Food & Beverage	103
Agro Based Products	5
Leather & Leather Products	0
Plastic & Rubber	0
Paper & Packaging	0
Chemicals	0
Non-Metallic Minerals	0
Automobile & Accessories	0
Heavy Machinery, Iron & Steel	0
Electrical & Electronics	15
Shipbuilding & Ship breaking	0
Petroleum Products	0
Pharmaceuticals	0
Light Machinery, Equipment & Furniture	9
Number of Industries Input	15
Total Industrial Area (acres)	131.98

SFB to be allocated from (Input Yes OR No):	
Textile & RMG	No
Food & Beverage	Yes
Agro Based Products	No
Leather & Leather Products	No
Plastic & Rubber	No
Paper & Packaging	No
Chemicals	No
Non-Metallic Minerals	No
Automobile & Accessories	No
Heavy Machinery, Iron & Steel	No
Electrical & Electronics	Yes
Shipbuilding & Ship breaking	No
Petroleum Products	No
Pharmaceuticals	No
Light Machinery, Equipment & Furniture	No
Number of Industries for SFB	2

Industrial Land Use Pattern – This block captures the breakup of industrial land into different industries and area allocation for each industry that would be expected to come up in the EZ site. This block also keeps provision for allocating SFBs for shortlisted industries.

5. Commercial and Other Land Use Pattern

Saleable Land Use Pattern (figures in acres):

Logistics Zone	1.84
Component-2	
Support Amenities	9.333
Component-4	
Component-5	
Component-6	
Component-7	
Component-8	11.175

Non-Processing Land Use Pattern (figures in acres):

Utility	4.02
Road	29.18
Green & Open Space	19.34
Admin & Customs	3.71
Component-5	
Component-6	
Component-7	
Component-8	56.843
Total Area (acres)	**200.0**

Commercial and Other Land Use Pattern – This block captures the area occupied by other components of the EZ site and sum total of all land occupied.

6 O&M expenses for hard infrastructure (% of capex)

To commence from the start day of operation (CoD)

		Operations	Maintenance
Site grading and other land development expenses	0%	0%	0%
Compound wall, fencing and gates	0%	0%	0%
Roads, culverts & drainage	2%	2%	5%
Decentralized water supply, treatment and distribution	1%	2.5%	2%
Electrical, street lighting & fire fighting	2%	2%	5%
Telecom & communication systems	1%	0%	2%
Sustainable infrastructure elements, RW harvesting, summer storage tank & greenery	1%	2%	2%
Decentralized wastewater, network and solid waste management	2%	4%	2%
Admin Building	1%	0%	5%
Support Amenities	1%	0%	5%
0	1%	0%	5%
Buildings - MEP	1%	0%	5%
SFB	1%	0%	5%
EMP Cost	5%	10%	10%
Offsite infra	0%	0%	0%
Miscllaneous Cost (% of Opex)	2%		
Pre operating expenses (BDT million)	2		

Operations & Maintenance Expenses – This block captures the Operations and Maintenance expenditure for the fixed assets taken as a percentage of capital expenditure.

7 Cost of Manpower

Designation	Salary (BDT million/ year)	Nos.	Total (BDT million)
CEO	5	1	5
GM-Finance	3	1	3
GM-Marketing	3	1	3
GM-Engineering & Procurement	3	1	3
GM-HR and IT	3	1	3
GM-Operations	3	1	3
Manager-Finance	1.5	1	1.5
Manager-Marketing	1.5	1	1.5
Manager-Engineering & Procurement	1.5	1	1.5
Manager-HR and IT	1.5	1	1.5
Manager-Operations	1.5	1	1.5
Assistant Manager-Finance	0.72	2	1.44
Assistant Manager-Marketing	0.72	2	1.44
Assistant Manager-Engineering & Procurement	0.72	2	1.44
Assistant Manager-HR and IT	0.72	2	1.44
Assistant Manager-Operations	0.72	2	1.44
Security Supervisors	0.36	4	1.44
Security Staffs	0.24	24	5.76
Peons and Clerks	0.18	5	0.9
Office Boys	0.12	10	1.2
			44

Cost of Manpower – The block above captures the annual expense to be incurred by the developer on account of hiring personnel for management and operations of the EZ site.

8 Financing Inputs

% of Equity	30%
% of Grant	0%
% of Debt (Commercial Borrowings)	70%
Cost of Equity	
Interest Rate (Grant)	2%
Interest Rate (Commercial Borrowings	10%
CB Repayment Period (quarters)	40
Negligible Amount	0.0001
% of debt paid in each installment	2.5%

Working Capital margin	0%

Grant Repayment Period (quarters)	80
Negligible Amount	0.0001
% of debt paid in each installment	1.25%

Financing Inputs – This block captures the assumptions taken regarding the capital structure for this project, interest rate, Debt repayment period, % of debt paid and working capital margin. Project Structuring data flows into this block from the summary worksheet.

Industries	Utility Requirement (per acre)				Manpower Requirement
	Power/acre (MW)	Water/acre (MLD)	Gas/acre (cum/day)	Effluent/acre (MLD)	(Number/acre)
Textile & RMG	0.16	0.012	76.50	0.01	0.00
Food & Beverage	0.18	0.028	76.50	0.02	0.00
Agro Based Products	0.18	0.028	76.50	0.02	0.00
Leather & Leather Products	0.11	0.012	76.50	0.01	0.00
Plastic & Rubber	0.11	0.012	76.50	0.01	0.00
Paper & Packaging	0.16	0.013	76.50	0.01	0.00
Chemicals	0.16	0.013	76.50	0.01	0.00
Non-Metallic Minerals	0.13	0.007	76.50	0.00	0.00
Automobile & Accessories	0.13	0.009	76.50	0.01	0.00
Heavy Machinery, Iron & Steel	0.16	0.013	76.50	0.01	0.00
Electical & Electronics	0.18	0.028	76.50	0.02	0.00
Shipbuilding & Ship breaking	0.13	0.011	76.50	0.01	0.00
Petroleum Products	0.16	0.009	76.50	0.01	0.00
Pharmaceuticals	0.13	0.012	76.50	0.01	0.00
Light Machinery, Equipment & Furniture	0.18	0.028	76.50	0.02	0.00

Million Units per MW	8.76

Utility Requirements – This block captures the per acre utility requirements for different industries, these utilities are power, water, gas and effluent treatment. Provision has also been kept to calculate manpower requirement per acre for different industries.

Revenue Assumptions

Industrial land lease per year	314760	BDT/ year/acre
Inflation on rent	12%	
Time period for increasing rentals	3	years
Revenue from utility		
Power Supply	0.73	per Unit
Water Supply	3756	per MLD
Gas Supply	0.854	per cum.
Effluent Treatment	3635	per MLD
Mark Up		
Power Supply	10%	
Water Supply	10%	
Gas Supply	10%	
Effluent Treatment	10%	
Real Estate Uptake		
Space available for dwelling units	0	sq. feet
Size of each dwelling unit	1200	sq. feet
Total number of Dwelling Units	0	
Rate of Real Estate uptake		
Conservative	25%	
Base	35%	
Aggressive	50%	
Sale Price	0	BDT/Dwelling Unit

SFB lease per quarter	13068000	BDT/ year/acre
Inflation on rent	12%	
Time period for increasing rentals	3	years
EZ service Fees	87120	BDT/ year/acre
Inflation on utility	15%	
Time period for increasing utility fees	3	years
Land area of logistics zone	1.836	acre
Years Post COD	0	
Rent from logistics zone	871200	BDT/year/acre
Lease from	2021	
Land area of Real Estate (without FSI)	0	acre
Years Post COD	0	
Rent from Real Estate	0	BDT/year/acre
Lease from	2021	
Area of support amenities	406806.84	sq. feet
Area of Vocational Training Centre	0	sq. feet
FSI for support amenities	1	

Revenue Assumptions – This block captures the assumptions taken for all the sources of revenue that would flow to the developer of the EZ site. These are lease rent from industrial land, SFB, real estate, logistics zone, commercial space and supply of utility. Furthermore, rate of real estate uptake has been modified keeping in mind different real estate uptake scenarios.

Tax & Depreciation Assumptions

SLM Depreciation Rate	2%
WDV Depreciation Rate	5%
Built Up Area Depreciation as per inco	10%
SFB depreciation as per income tax	20%
Corporate Income Tax (PPP model)	35%
Working Capital Interest	14%
Income Tax (BEZA model)	25%

Cost of developing SFB	1600	BDT/sq. ft
Ground coverage under SFB	60%	
Total cost of developing SFB	543.6288	million BDT

Tax & Depreciation Assumptions – This block captures the assumptions taken depreciation rates and rate of tax applicable.

Apart from the assumption blocks listed in this section, assumptions worksheet also captures the debt repayment schedule, rate of land uptake for industrial land and SFB.

The values from these parameters flow into the pro-forma sheets, revenue inflow calculations, capital expenditure calculations and debt repayment calculations in order to present the return that could be expected by the developer for designing, financing, constructing and operating this EZ site.

15.18. Annexure 18 – Proforma Statements

Conservative Scenario Balance Sheet

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Liabilities										
Grant	0	0	0	0	0	0	0	0	0	0
Equity	217	461	671	908	908	908	908	908	908	908
Equity Infusion	0	64	248	522	898	1278	1506	1652	1749	1749
Equity infusion to meet operating expenses	91	91	91	91	91	91	91	91	91	91
Reserves & surplus	-91	-175	-390	-595	-902	-1110	-1166	-1139	-1064	-851
Long term loan	507	1075	1566	2010	1903	1691	1479	1267	1055	844
Working Capital Loan	0	56	68	56	63	0	0	0	0	0
Total liabilities	**724**	**1572**	**2255**	**2992**	**2960**	**2857**	**2818**	**2778**	**2739**	**2740**
Assets										
Fixed Assets	724	1536	2217	2975	2936	2896	2857	2818	2778	2739
Less: Depreciation	0	20	30	39	39	39	39	39	39	39
Net Block	724	1516	2188	2936	2896	2857	2818	2778	2739	2700
Net Working Capital	0	56	68	56	63	0	0	0	0	0
Cash and bank balance	0	0	0	0	0	0	0	0	0	40
Total assets	**724**	**1572**	**2255**	**2992**	**2960**	**2857**	**2818**	**2778**	**2739**	**2740**

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Liabilities										
Grant	0	0	0	0	0	0	0	0	0	0
Equity	908	908	908	908	908	908	908	908	908	908
Equity Infusion	1749	1749	1749	1749	1749	1749	1749	1749	1749	1749
Equity infusion to meet operating expenses	91	91	91	91	91	91	91	91	91	91
Reserves & surplus	-557	-258	144	544	935	1298	1601	1888	2243	2581
Long term loan	632	420	208	104	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total liabilities	**2823**	**2909**	**3100**	**3395**	**3682**	**4045**	**4349**	**4636**	**4991**	**5328**

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Assets										
Fixed Assets	2700	2660	2621	2582	2542	2503	2464	2424	2385	2346
Less: Depreciation	39	39	39	39	39	39	39	39	39	39
Net Block	2660	2621	2582	2542	2503	2464	2424	2385	2346	2306
Net Working Capital	0	0	0	0	0	0	0	0	0	0
Cash and bank balance	162	288	518	853	1179	1582	1924	2251	2645	3022
Total assets	**2823**	**2909**	**3100**	**3395**	**3682**	**4045**	**4349**	**4636**	**4991**	**5328**

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Liabilities										
Grant	0	0	0	0	0	0	0	0	0	0
Equity	908	908	908	908	908	908	908	908	908	908
Equity Infusion	1749	1749	1749	1749	1749	1749	1749	1749	1749	1749
Equity infusion to meet operating expenses	91	91	91	91	91	91	91	91	91	91
Reserves & surplus	2900	3297	3674	4031	4476	4898	5298	5796	6270	6716
Long term loan	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total liabilities	**5648**	**6044**	**6422**	**6779**	**7223**	**7646**	**8045**	**8544**	**9017**	**9463**
Assets										
Fixed Assets	2306	2267	2228	2188	2149	2110	2070	2031	1992	1952
Less: Depreciation	39	39	39	39	39	39	39	39	39	39
Net Block	2267	2228	2188	2149	2110	2070	2031	1992	1952	1913
Net Working Capital	0	0	0	0	0	0	0	0	0	0
Cash and bank balance	3381	3817	4233	4630	5114	5575	6014	6552	7065	7551
Total assets	**5648**	**6044**	**6422**	**6779**	**7223**	**7646**	**8045**	**8544**	**9017**	**9463**

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Liabilities										
Grant	0	0	0	0	0	0	0	0	0	0
Equity	908	908	908	908	908	908	908	908	908	908

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Equity Infusion	1749	1749	1749	1749	1749	1749	1749	1749	1749	1749
Equity infusion to meet operating expenses	91	91	91	91	91	91	91	91	91	91
Reserves & surplus	7276	7806	8305	8933	9526	10084	10787	11451	12074	12861
Long term loan	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total liabilities	**10023**	**10553**	**11053**	**11680**	**12273**	**12831**	**13535**	**14199**	**14821**	**15609**
Assets										
Fixed Assets	1913	1874	1834	1795	1756	1716	1677	1638	1598	1559
Less: Depreciation	39	39	39	39	39	39	39	39	39	39
Net Block	1874	1834	1795	1756	1716	1677	1638	1598	1559	1520
Net Working Capital	0	0	0	0	0	0	0	0	0	0
Cash and bank balance	8149	8719	9258	9924	10557	11155	11897	12600	13263	14089
Total assets	**10023**	**10553**	**11053**	**11680**	**12273**	**12831**	**13535**	**14199**	**14821**	**15609**

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Liabilities										
Grant	0	0	0	0	0	0	0	0	0	0
Equity	908	908	908	908	908	908	908	908	908	908
Equity Infusion	1749	1749	1749	1749	1749	1749	1749	1749	1749	1749
Equity infusion to meet operating expenses	91	91	91	91	91	91	91	91	91	91
Reserves & surplus	13604	14298	15179	16008	16781	17766	18690	19550	20650	21680
Long term loan	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total liabilities	**16351**	**17046**	**17926**	**18755**	**19529**	**20513**	**21437**	**22298**	**23398**	**24427**
Assets										
Fixed Assets	1520	1480	1441	1401	1362	1323	1283	1244	1205	1165
Less: Depreciation	39	39	39	39	39	39	39	39	39	39
Net Block	1480	1441	1401	1362	1323	1283	1244	1205	1165	1126
Net Working Capital	0	0	0	0	0	0	0	0	0	0
Cash and bank balance	14871	15605	16525	17393	18206	19230	20193	21093	22232	23301

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Total assets	**16351**	**17046**	**17926**	**18755**	**19529**	**20513**	**21437**	**22298**	**23398**	**24427**

Base Scenario Balance Sheet- Figures in BDT million

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Liabilities										
Grant	0	0	0	0	0	0	0	0	0	0
Equity	217	461	671	908	908	908	908	908	908	908
Equity Infusion	0	15	101	208	363	464	464	464	464	464
Equity infusion to meet operating expenses	91	91	91	91	91	91	91	91	91	91
Reserves & surplus	-91	-127	-242	-281	-368	-296	-116	72	267	556
Long term loan	507	1075	1566	2010	1903	1691	1479	1267	1055	844
Working Capital Loan	0	14	0	0	0	0	0	0	0	0
Total liabilities	**724**	**1529**	**2188**	**2936**	**2896**	**2857**	**2826**	**2802**	**2785**	**2862**
Assets										
Fixed Assets	724	1536	2217	2975	2936	2896	2857	2818	2778	2739
Less: Depreciation	0	20	30	39	39	39	39	39	39	39
Net Block	724	1516	2188	2936	2896	2857	2818	2778	2739	2700
Net Working Capital	0	14	0	0	0	0	0	0	0	0
Cash and bank balance	0	0	0	0	0	0	8	24	46	162
Total assets	**724**	**1529**	**2188**	**2936**	**2896**	**2857**	**2826**	**2802**	**2785**	**2862**

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Liabilities										
Grant	0	0	0	0	0	0	0	0	0	0
Equity	908	908	908	908	908	908	908	908	908	908
Equity Infusion	464	464	464	464	464	464	464	464	464	464
Equity infusion to meet operating expenses	91	91	91	91	91	91	91	91	91	91
Reserves & surplus	850	1135	1444	1708	1964	2283	2587	2874	3228	3566
Long term loan	632	420	208	104	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Total liabilities	**2944**	**3018**	**3115**	**3275**	**3427**	**3746**	**4049**	**4336**	**4691**	**5029**
Assets										
Fixed Assets	2700	2660	2621	2582	2542	2503	2464	2424	2385	2346
Less: Depreciation	39	39	39	39	39	39	39	39	39	39
Net Block	2660	2621	2582	2542	2503	2464	2424	2385	2346	2306
Net Working Capital	0	0	0	0	0	0	0	0	0	0
Cash and bank balance	284	397	533	733	924	1282	1625	1951	2345	2722
Total assets	**2944**	**3018**	**3115**	**3275**	**3427**	**3746**	**4049**	**4336**	**4691**	**5029**

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Liabilities										
Grant	0	0	0	0	0	0	0	0	0	0
Equity	908	908	908	908	908	908	908	908	908	908
Equity Infusion	464	464	464	464	464	464	464	464	464	464
Equity infusion to meet operating expenses	91	91	91	91	91	91	91	91	91	91
Reserves & surplus	3886	4282	4660	5016	5461	5884	6283	6781	7255	7701
Long term loan	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total liabilities	**5348**	**5745**	**6122**	**6479**	**6924**	**7346**	**7745**	**8244**	**8718**	**9164**
Assets										
Fixed Assets	2306	2267	2228	2188	2149	2110	2070	2031	1992	1952
Less: Depreciation	39	39	39	39	39	39	39	39	39	39
Net Block	2267	2228	2188	2149	2110	2070	2031	1992	1952	1913
Net Working Capital	0	0	0	0	0	0	0	0	0	0
Cash and bank balance	3081	3517	3934	4330	4814	5276	5714	6253	6765	7251
Total assets	**5348**	**5745**	**6122**	**6479**	**6924**	**7346**	**7745**	**8244**	**8718**	**9164**

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Liabilities										
Grant	0	0	0	0	0	0	0	0	0	0
Equity	908	908	908	908	908	908	908	908	908	908

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Equity Infusion	464	464	464	464	464	464	464	464	464	464
Equity infusion to meet operating expenses	91	91	91	91	91	91	91	91	91	91
Reserves & surplus	8261	8791	9290	9918	10511	11069	11773	12436	13059	13847
Long term loan	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total liabilities	**9723**	**10254**	**10753**	**11380**	**11974**	**12532**	**13235**	**13899**	**14522**	**15309**
Assets										
Fixed Assets	1913	1874	1834	1795	1756	1716	1677	1638	1598	1559
Less: Depreciation	39	39	39	39	39	39	39	39	39	39
Net Block	1874	1834	1795	1756	1716	1677	1638	1598	1559	1520
Net Working Capital	0	0	0	0	0	0	0	0	0	0
Cash and bank balance	7850	8419	8958	9625	10258	10855	11598	12301	12963	13790
Total assets	**9723**	**10254**	**10753**	**11380**	**11974**	**12532**	**13235**	**13899**	**14522**	**15309**

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Liabilities										
Grant	0	0	0	0	0	0	0	0	0	0
Equity	908	908	908	908	908	908	908	908	908	908
Equity Infusion	464	464	464	464	464	464	464	464	464	464
Equity infusion to meet operating expenses	91	91	91	91	91	91	91	91	91	91
Reserves & surplus	14589	15283	16164	16993	17767	18751	19675	20536	21636	22665
Long term loan	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total liabilities	**16052**	**16746**	**17627**	**18455**	**19229**	**20214**	**21138**	**21998**	**23098**	**24128**
Assets										
Fixed Assets	1520	1480	1441	1401	1362	1323	1283	1244	1205	1165
Less: Depreciation	39	39	39	39	39	39	39	39	39	39
Net Block	1480	1441	1401	1362	1323	1283	1244	1205	1165	1126
Net Working Capital	0	0	0	0	0	0	0	0	0	0
Cash and bank balance	14571	15305	16225	17093	17906	18930	19894	20794	21933	23002

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Total assets	**16052**	**16746**	**17627**	**18455**	**19229**	**20214**	**21138**	**21998**	**23098**	**24128**

Aggressive Scenario Balance Sheet- Figures in BDT million

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Liabilities										
Grant	0	0	0	0	0	0	0	0	0	0
Equity	217	461	671	908	908	908	908	908	908	908
Equity Infusion	0	0	7	7	7	84	84	84	84	84
Equity infusion to meet operating expenses	91	91	91	91	91	91	91	91	91	91
Reserves & surplus	-91	-88	-125	-21	70	165	346	534	728	1017
Long term loan	507	1075	1566	2010	1903	1691	1479	1267	1055	844
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total liabilities	**724**	**1539**	**2211**	**2995**	**2978**	**2939**	**2908**	**2884**	**2866**	**2944**
Assets										
Fixed Assets	724	1536	2217	2975	2936	2896	2857	2818	2778	2739
Less: Depreciation	0	20	30	39	39	39	39	39	39	39
Net Block	724	1516	2188	2936	2896	2857	2818	2778	2739	2700
Net Working Capital	0	0	0	0	0	0	0	0	0	0
Cash and bank balance	0	23	23	59	82	82	90	105	127	244
Total assets	**724**	**1539**	**2211**	**2995**	**2978**	**2939**	**2908**	**2884**	**2866**	**2944**

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Liabilities										
Grant	0	0	0	0	0	0	0	0	0	0
Equity	908	908	908	908	908	908	908	908	908	908
Equity Infusion	84	84	84	84	84	84	84	84	84	84
Equity infusion to meet operating expenses	91	91	91	91	91	91	91	91	91	91
Reserves & surplus	1311	1581	1890	2154	2411	2729	3033	3320	3675	4012
Long term loan	632	420	208	104	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Total liabilities	**3026**	**3084**	**3181**	**3341**	**3494**	**3812**	**4116**	**4403**	**4758**	**5095**
Assets										
Fixed Assets	2700	2660	2621	2582	2542	2503	2464	2424	2385	2346
Less: Depreciation	39	39	39	39	39	39	39	39	39	39
Net Block	2660	2621	2582	2542	2503	2464	2424	2385	2346	2306
Net Working Capital	0	0	0	0	0	0	0	0	0	0
Cash and bank balance	366	463	600	799	991	1349	1691	2018	2412	2789
Total assets	**3026**	**3084**	**3181**	**3341**	**3494**	**3812**	**4116**	**4403**	**4758**	**5095**

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Liabilities										
Grant	0	0	0	0	0	0	0	0	0	0
Equity	908	908	908	908	908	908	908	908	908	908
Equity Infusion	84	84	84	84	84	84	84	84	84	84
Equity infusion to meet operating expenses	91	91	91	91	91	91	91	91	91	91
Reserves & surplus	4332	4728	5106	5463	5907	6330	6729	7228	7701	8148
Long term loan	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total liabilities	**5415**	**5811**	**6189**	**6546**	**6990**	**7413**	**7812**	**8311**	**8784**	**9231**
Assets										
Fixed Assets	2306	2267	2228	2188	2149	2110	2070	2031	1992	1952
Less: Depreciation	39	39	39	39	39	39	39	39	39	39
Net Block	2267	2228	2188	2149	2110	2070	2031	1992	1952	1913
Net Working Capital	0	0	0	0	0	0	0	0	0	0
Cash and bank balance	3148	3584	4000	4397	4881	5342	5781	6319	6832	7318
Total assets	**5415**	**5811**	**6189**	**6546**	**6990**	**7413**	**7812**	**8311**	**8784**	**9231**

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Liabilities										
Grant	0	0	0	0	0	0	0	0	0	0
Equity	908	908	908	908	908	908	908	908	908	908

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Equity Infusion	84	84	84	84	84	84	84	84	84	84
Equity infusion to meet operating expenses	91	91	91	91	91	91	91	91	91	91
Reserves & surplus	8707	9237	9737	10364	10957	11515	12219	12883	13506	14293
Long term loan	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total liabilities	**9790**	**10320**	**10820**	**11447**	**12040**	**12598**	**13302**	**13966**	**14589**	**15376**
Assets										
Fixed Assets	1913	1874	1834	1795	1756	1716	1677	1638	1598	1559
Less: Depreciation	39	39	39	39	39	39	39	39	39	39
Net Block	1874	1834	1795	1756	1716	1677	1638	1598	1559	1520
Net Working Capital	0	0	0	0	0	0	0	0	0	0
Cash and bank balance	7916	8486	9025	9691	10324	10922	11664	12367	13030	13856
Total assets	**9790**	**10320**	**10820**	**11447**	**12040**	**12598**	**13302**	**13966**	**14589**	**15376**

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Liabilities										
Grant	0	0	0	0	0	0	0	0	0	0
Equity	908	908	908	908	908	908	908	908	908	908
Equity Infusion	84	84	84	84	84	84	84	84	84	84
Equity infusion to meet operating expenses	91	91	91	91	91	91	91	91	91	91
Reserves & surplus	15035	15730	16610	17439	18213	19197	20121	20982	22082	23111
Long term loan	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total liabilities	**16118**	**16813**	**17693**	**18522**	**19296**	**20280**	**21204**	**22065**	**23165**	**24194**
Assets										
Fixed Assets	1520	1480	1441	1401	1362	1323	1283	1244	1205	1165
Less: Depreciation	39	39	39	39	39	39	39	39	39	39
Net Block	1480	1441	1401	1362	1323	1283	1244	1205	1165	1126
Net Working Capital	0	0	0	0	0	0	0	0	0	0
Cash and bank balance	14638	15372	16292	17160	17973	18997	19960	20860	21999	23068

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Total assets	**16118**	**16813**	**17693**	**18522**	**19296**	**20280**	**21204**	**22065**	**23165**	**24194**

Conservative Scenario P&L Statement- Figures in BDT million

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Revenue										
From Industrial Land	0	16	23	35	35	57	90	107	113	137
From SFB	0	17	34	57	76	95	128	149	170	215
From Utility	0	37	52	83	86	135	216	257	273	341
From EZ service Fees	0	2	2	3	3	5	7	8	9	9
From Logistics Zone	0	2	2	2	2	2	2	2	2	2
From Support Amenities	0	9	9	10	10	10	11	11	11	13
Total Revenue	**0**	**82**	**122**	**190**	**212**	**303**	**454**	**534**	**579**	**717**
Operating Expenses										
O&M Cost	0	71	117	166	191	201	211	221	232	244
Upfront Fees to BEZA	70									
Annual Fees paid to BEZA	13	13	13	13	13	13	13	13	13	13
Revenue Share	0	4	6	9	11	15	23	27	29	36
Pre-operating Cost	8	0	0	0	0	0	0	0	0	0
Misc. Cost	0	1	2	3	4	4	4	4	5	5
Cost of Manpower	0	48	51	53	56	59	62	65	68	71
Total Cost	**91**	**138**	**190**	**245**	**275**	**292**	**313**	**331**	**348**	**370**
EBITDA	-91	-56	-68	-56	-63	11	142	204	231	347
Depreciation	0	20	30	39	39	39	39	39	39	39
EBIT	-91	-76	-97	-95	-103	-28	102	165	192	308
Interest expenses	0	0	108	102	196	180	159	137	116	95
Interest on W/C	0	8	9	8	9	0	0	0	0	0
Profit Before Tax	-91	-84	-214	-205	-308	-208	-56	27	75	213
Tax	0	0	0	0	0	0	0	0	0	0
Profit After Tax	-91	-84	-214	-205	-308	-208	-56	27	75	213

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Revenue										
From Industrial Land	153	153	171	171	171	192	192	192	215	215
From SFB	239	239	267	267	267	299	299	299	335	335

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
From Utility	380	380	437	437	437	503	503	503	578	578
From EZ service Fees	10	10	10	10	10	10	10	10	10	10
From Logistics Zone	2	2	3	3	3	3	3	3	3	3
From Support Amenities	13	13	14	14	14	16	16	16	18	18
Total Revenue	**797**	**797**	**903**	**903**	**903**	**1023**	**1023**	**1023**	**1159**	**1159**
Operating Expenses										
O&M Cost	256	269	283	297	312	327	344	361	379	398
Upfront Fees to BEZA										
Annual Fees paid to BEZA	13	13	13	13	13	13	13	13	13	13
Revenue Share	40	40	45	45	45	51	51	51	58	58
Pre-operating Cost	0	0	0	0	0	0	0	0	0	0
Misc. Cost	5	5	6	6	6	7	7	7	8	8
Cost of Manpower	75	79	83	87	91	96	101	106	111	116
Total Cost	**390**	**406**	**430**	**448**	**467**	**494**	**516**	**538**	**568**	**593**
EBITDA	407	390	473	455	435	529	508	485	591	566
Depreciation	39	39	39	39	39	39	39	39	39	39
EBIT	368	351	434	415	396	490	468	445	552	527
Interest expenses	74	53	32	16	5	0	0	0	0	0
Interest on W/C	0	0	0	0	0	0	0	0	0	0
Profit Before Tax	294	298	403	400	391	490	468	445	552	527
Tax	0	0	0	0	0	126	165	158	197	189
Profit After Tax	294	298	403	400	391	364	303	287	355	338

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Revenue										
From Industrial Land	215	241	241	241	269	269	269	302	302	302
From SFB	335	376	376	376	421	421	421	471	471	471
From Utility	579	665	665	665	765	764	764	879	880	879
From EZ service Fees	10	10	10	10	10	10	10	10	10	10
From Logistics Zone	3	4	4	4	4	4	4	4	4	4
From Support Amenities	18	20	20	20	22	22	22	25	25	25
Total Revenue	**1160**	**1315**	**1315**	**1315**	**1492**	**1491**	**1491**	**1692**	**1692**	**1692**

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Operating Expenses										
O&M Cost	418	439	461	484	508	533	560	588	617	648
Upfront Fees to BEZA										
Annual Fees paid to BEZA	13	13	13	13	13	13	13	13	13	13
Revenue Share	58	66	66	66	75	75	75	85	85	85
Pre-operating Cost	0	0	0	0	0	0	0	0	0	0
Misc. Cost	8	9	9	10	10	11	11	12	12	13
Cost of Manpower	123	128	135	141	149	156	164	172	181	190
Total Cost	**620**	**655**	**683**	**714**	**755**	**788**	**823**	**869**	**909**	**949**
EBITDA	540	660	631	601	737	703	668	822	784	743
Depreciation	39	39	39	39	39	39	39	39	39	39
EBIT	501	621	592	562	698	664	629	783	744	704
Interest expenses	0	0	0	0	0	0	0	0	0	0
Interest on W/C	0	0	0	0	0	0	0	0	0	0
Profit Before Tax	501	621	592	562	698	664	629	783	744	704
Tax	181	224	215	205	253	242	230	284	271	257
Profit After Tax	320	397	377	357	445	422	399	499	473	447

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Revenue										
From Industrial Land	338	338	338	379	379	379	424	424	424	475
From SFB	528	528	528	591	591	591	662	662	662	741
From Utility	1011	1011	1012	1163	1163	1163	1338	1337	1337	1537
From EZ service Fees	10	10	10	10	10	10	10	10	10	10
From Logistics Zone	5	5	5	6	6	6	6	6	6	7
From Support Amenities	28	28	28	31	31	31	35	35	35	39
Total Revenue	**1920**	**1920**	**1921**	**2179**	**2179**	**2179**	**2476**	**2474**	**2474**	**2810**
Operating Expenses										
O&M Cost	681	715	750	788	827	869	912	958	1006	1056
Upfront Fees to BEZA										
Annual Fees paid to BEZA	13	13	13	13	13	13	13	13	13	13

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Revenue Share	96	96	96	109	109	109	124	124	124	141
Pre-operating Cost	0	0	0	0	0	0	0	0	0	0
Misc. Cost	14	14	15	16	17	17	18	19	20	21
Cost of Manpower	199	209	220	231	242	254	268	280	294	309
Total Cost	**1003**	**1047**	**1095**	**1156**	**1208**	**1262**	**1335**	**1394**	**1457**	**1540**
EBITDA	917	872	826	1023	971	917	1140	1080	1017	1270
Depreciation	39	39	39	39	39	39	39	39	39	39
EBIT	878	833	786	983	932	877	1101	1041	978	1231
Interest expenses	0	0	0	0	0	0	0	0	0	0
Interest on W/C	0	0	0	0	0	0	0	0	0	0
Profit Before Tax	878	833	786	983	932	877	1101	1041	978	1231
Tax	318	303	287	356	338	319	398	377	355	444
Profit After Tax	559	530	500	627	594	558	703	664	623	787

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Revenue										
From Industrial Land	475	475	532	532	532	596	596	596	667	667
From SFB	741	741	830	830	830	930	930	930	1041	1041
From Utility	1539	1537	1768	1768	1770	2033	2033	2033	2340	2338
From EZ service Fees	10	10	10	10	10	10	10	10	10	10
From Logistics Zone	7	7	8	8	8	9	9	9	10	10
From Support Amenities	39	39	44	44	44	49	49	49	55	55
Total Revenue	**2811**	**2810**	**3192**	**3192**	**3194**	**3627**	**3627**	**3627**	**4124**	**4122**
Operating Expenses										
O&M Cost	1109	1164	1223	1284	1348	1416	1486	1561	1639	1721
Upfront Fees to BEZA										
Annual Fees paid to BEZA	13	13	13	13	13	13	13	13	13	13
Revenue Share	141	141	160	160	160	181	181	181	206	206
Pre-operating Cost	0	0	0	0	0	0	0	0	0	0
Misc. Cost	22	23	24	26	27	28	30	31	33	34
Cost of Manpower	325	341	358	376	396	414	435	457	481	504

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Total Cost	**1610**	**1682**	**1778**	**1858**	**1944**	**2053**	**2146**	**2243**	**2372**	**2478**
EBITDA	1201	1128	1414	1334	1250	1574	1481	1384	1752	1644
Depreciation	39	39	39	39	39	39	39	39	39	39
EBIT	1162	1088	1375	1295	1211	1535	1442	1344	1713	1604
Interest expenses	0	0	0	0	0	0	0	0	0	0
Interest on W/C	0	0	0	0	0	0	0	0	0	0
Profit Before Tax	1162	1088	1375	1295	1211	1535	1442	1344	1713	1604
Tax	420	394	494	466	437	550	518	484	613	575
Profit After Tax	742	695	881	828	774	984	924	861	1100	1029

Base Scenario P&L Statement- Figures in BDT million

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Revenue										
From Industrial Land	0	24	40	67	77	114	137	137	137	153
From SFB	0	34	68	114	152	190	213	213	213	239
From Utility	0	55	94	159	187	271	330	330	331	380
From EZ service Fees	0	2	4	6	7	10	10	10	10	10
From Logistics Zone	0	2	2	2	2	2	2	2	2	2
From Support Amenities	0	9	9	10	10	10	11	11	11	13
Total Revenue	**0**	**127**	**216**	**357**	**435**	**597**	**704**	**704**	**704**	**797**
Operating Expenses										
O&M Cost	0	71	117	166	191	201	211	221	232	244
Upfront Fees to BEZA	70									
Annual Fees paid to BEZA	13	13	13	13	13	13	13	13	13	13
Revenue Share	0	6	11	18	22	30	35	35	35	40
Pre-operating Cost	8	0	0	0	0	0	0	0	0	0
Misc. Cost	0	1	2	3	4	4	4	4	5	5
Cost of Manpower	0	48	51	53	56	59	62	65	68	71
Total Cost	**91**	**140**	**194**	**254**	**286**	**307**	**325**	**339**	**354**	**374**
EBITDA	-91	-14	22	103	149	290	378	365	350	423

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Depreciation	0	20	30	39	39	39	39	39	39	39
EBIT	-91	-34	-8	64	109	251	339	325	311	384
Interest expenses	0	0	108	102	196	180	159	137	116	95
Interest on W/C	0	2	0	0	0	0	0	0	0	0
Profit Before Tax	-91	-36	-115	-38	-87	71	181	188	194	289
Tax	0	0	0	0	0	0	0	0	0	0
Profit After Tax	-91	-36	-115	-38	-87	71	181	188	194	289

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Revenue										
From Industrial Land	153	153	171	171	171	192	192	192	215	215
From SFB	239	239	267	267	267	299	299	299	335	335
From Utility	380	380	437	437	437	503	503	503	578	578
From EZ service Fees	10	10	10	10	10	10	10	10	10	10
From Logistics Zone	2	2	3	3	3	3	3	3	3	3
From Support Amenities	13	13	14	14	14	16	16	16	18	18
Total Revenue	**797**	**797**	**903**	**903**	**903**	**1023**	**1023**	**1023**	**1159**	**1159**
Operating Expenses										
O&M Cost	256	269	283	297	312	327	344	361	379	398
Upfront Fees to BEZA										
Annual Fees paid to BEZA	13	13	13	13	13	13	13	13	13	13
Revenue Share	40	40	45	45	45	51	51	51	58	58
Pre-operating Cost	0	0	0	0	0	0	0	0	0	0
Misc. Cost	5	5	6	6	6	7	7	7	8	8
Cost of Manpower	75	79	83	87	91	96	101	106	111	116
Total Cost	**390**	**406**	**430**	**448**	**467**	**494**	**516**	**538**	**568**	**593**
EBITDA	407	390	473	455	435	529	508	485	591	566
Depreciation	39	39	39	39	39	39	39	39	39	39
EBIT	368	351	434	415	396	490	468	445	552	527
Interest expenses	74	53	32	16	5	0	0	0	0	0
Interest on W/C	0	0	0	0	0	0	0	0	0	0
Profit Before Tax	294	298	403	400	391	490	468	445	552	527

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Tax	0	13	94	135	134	171	165	158	197	189
Profit After Tax	294	285	309	264	256	319	303	287	355	338

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Revenue										
From Industrial Land	215	241	241	241	269	269	269	302	302	302
From SFB	335	376	376	376	421	421	421	471	471	471
From Utility	579	665	665	665	765	764	764	879	880	879
From EZ service Fees	10	10	10	10	10	10	10	10	10	10
From Logistics Zone	3	4	4	4	4	4	4	4	4	4
From Support Amenities	18	20	20	20	22	22	22	25	25	25
Total Revenue	**1160**	**1315**	**1315**	**1315**	**1492**	**1491**	**1491**	**1692**	**1692**	**1692**
Operating Expenses										
O&M Cost	418	439	461	484	508	533	560	588	617	648
Upfront Fees to BEZA										
Annual Fees paid to BEZA	13	13	13	13	13	13	13	13	13	13
Revenue Share	58	66	66	66	75	75	75	85	85	85
Pre-operating Cost	0	0	0	0	0	0	0	0	0	0
Misc. Cost	8	9	9	10	10	11	11	12	12	13
Cost of Manpower	123	128	135	141	149	156	164	172	181	190
Total Cost	**620**	**655**	**683**	**714**	**755**	**788**	**823**	**869**	**909**	**949**
EBITDA	540	660	631	601	737	703	668	822	784	743
Depreciation	39	39	39	39	39	39	39	39	39	39
EBIT	501	621	592	562	698	664	629	783	744	704
Interest expenses	0	0	0	0	0	0	0	0	0	0
Interest on W/C	0	0	0	0	0	0	0	0	0	0
Profit Before Tax	501	621	592	562	698	664	629	783	744	704
Tax	181	224	215	205	253	242	230	284	271	257
Profit After Tax	320	397	377	357	445	422	399	499	473	447

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Revenue										
From Industrial Land	338	338	338	379	379	379	424	424	424	475
From SFB	528	528	528	591	591	591	662	662	662	741
From Utility	1011	1011	1012	1163	1163	1163	1338	1337	1337	1537
From EZ service Fees	10	10	10	10	10	10	10	10	10	10
From Logistics Zone	5	5	5	6	6	6	6	6	6	7
From Support Amenities	28	28	28	31	31	31	35	35	35	39
Total Revenue	**1920**	**1920**	**1921**	**2179**	**2179**	**2179**	**2476**	**2474**	**2474**	**2810**
Operating Expenses										
O&M Cost	681	715	750	788	827	869	912	958	1006	1056
Upfront Fees to BEZA										
Annual Fees paid to BEZA	13	13	13	13	13	13	13	13	13	13
Revenue Share	96	96	96	109	109	109	124	124	124	141
Pre-operating Cost	0	0	0	0	0	0	0	0	0	0
Misc. Cost	14	14	15	16	17	17	18	19	20	21
Cost of Manpower	199	209	220	231	242	254	268	280	294	309
Total Cost	**1003**	**1047**	**1095**	**1156**	**1208**	**1262**	**1335**	**1394**	**1457**	**1540**
EBITDA	917	872	826	1023	971	917	1140	1080	1017	1270
Depreciation	39	39	39	39	39	39	39	39	39	39
EBIT	878	833	786	983	932	877	1101	1041	978	1231
Interest expenses	0	0	0	0	0	0	0	0	0	0
Interest on W/C	0	0	0	0	0	0	0	0	0	0
Profit Before Tax	878	833	786	983	932	877	1101	1041	978	1231
Tax	318	303	287	356	338	319	398	377	355	444
Profit After Tax	559	530	500	627	594	558	703	664	623	787

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Revenue										
From Industrial Land	475	475	532	532	532	596	596	596	667	667
From SFB	741	741	830	830	830	930	930	930	1041	1041
From Utility	1539	1537	1768	1768	1770	2033	2033	2033	2340	2338
From EZ service Fees	10	10	10	10	10	10	10	10	10	10

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
From Logistics Zone	7	7	8	8	8	9	9	9	10	10
From Support Amenities	39	39	44	44	44	49	49	49	55	55
Total Revenue	**2811**	**2810**	**3192**	**3192**	**3194**	**3627**	**3627**	**3627**	**4124**	**4122**
Operating Expenses										
O&M Cost	1109	1164	1223	1284	1348	1416	1486	1561	1639	1721
Upfront Fees to BEZA										
Annual Fees paid to BEZA	13	13	13	13	13	13	13	13	13	13
Revenue Share	141	141	160	160	160	181	181	181	206	206
Pre-operating Cost	0	0	0	0	0	0	0	0	0	0
Misc. Cost	22	23	24	26	27	28	30	31	33	34
Cost of Manpower	325	341	358	376	396	414	435	457	481	504
Total Cost	**1610**	**1682**	**1778**	**1858**	**1944**	**2053**	**2146**	**2243**	**2372**	**2478**
EBITDA	1201	1128	1414	1334	1250	1574	1481	1384	1752	1644
Depreciation	39	39	39	39	39	39	39	39	39	39
EBIT	1162	1088	1375	1295	1211	1535	1442	1344	1713	1604
Interest expenses	0	0	0	0	0	0	0	0	0	0
Interest on W/C	0	0	0	0	0	0	0	0	0	0
Profit Before Tax	1162	1088	1375	1295	1211	1535	1442	1344	1713	1604
Tax	420	394	494	466	437	550	518	484	613	575
Profit After Tax	742	695	881	828	774	984	924	861	1100	1029

Aggressive Scenario P&L Statement- Figures in BDT million

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Revenue										
From Industrial Land	0	34	61	103	122	122	137	137	137	153
From SFB	0	42	85	143	190	190	213	213	213	239
From Utility	0	76	138	240	288	287	330	330	331	380
From EZ service Fees	0	3	6	9	10	10	10	10	10	10
From Logistics Zone	0	2	2	2	2	2	2	2	2	2
From Support Amenities	0	9	9	10	10	10	11	11	11	13
Total Revenue	**0**	**165**	**299**	**507**	**622**	**622**	**704**	**704**	**704**	**797**

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Operating Expenses										
O&M Cost	0	71	117	166	191	201	211	221	232	244
Upfront Fees to BEZA	70									
Annual Fees paid to BEZA	13	13	13	13	13	13	13	13	13	13
Revenue Share	0	8	15	25	31	31	35	35	35	40
Pre-operating Cost	8	0	0	0	0	0	0	0	0	0
Misc. Cost	0	1	2	3	4	4	4	4	5	5
Cost of Manpower	0	48	51	53	56	59	62	65	68	71
Total Cost	**91**	**142**	**198**	**261**	**296**	**308**	**325**	**339**	**354**	**374**
EBITDA	-91	23	101	245	326	314	378	365	350	423
Depreciation	0	20	30	39	39	39	39	39	39	39
EBIT	-91	3	71	206	287	274	339	325	311	384
Interest expenses	0	0	108	102	196	180	159	137	116	95
Interest on W/C	0	0	0	0	0	0	0	0	0	0
Profit Before Tax	-91	3	-36	104	91	95	181	188	194	289
Tax	0	0	0	0	0	0	0	0	0	0
Profit After Tax	-91	3	-36	104	91	95	181	188	194	289

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Revenue										
From Industrial Land	153	153	171	171	171	192	192	192	215	215
From SFB	239	239	267	267	267	299	299	299	335	335
From Utility	380	380	437	437	437	503	503	503	578	578
From EZ service Fees	10	10	10	10	10	10	10	10	10	10
From Logistics Zone	2	2	3	3	3	3	3	3	3	3
From Support Amenities	13	13	14	14	14	16	16	16	18	18
Total Revenue	**797**	**797**	**903**	**903**	**903**	**1023**	**1023**	**1023**	**1159**	**1159**
Operating Expenses										
O&M Cost	256	269	283	297	312	327	344	361	379	398
Upfront Fees to BEZA										
Annual Fees paid to BEZA	13	13	13	13	13	13	13	13	13	13

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Revenue Share	40	40	45	45	45	51	51	51	58	58
Pre-operating Cost	0	0	0	0	0	0	0	0	0	0
Misc. Cost	5	5	6	6	6	7	7	7	8	8
Cost of Manpower	75	79	83	87	91	96	101	106	111	116
Total Cost	**390**	**406**	**430**	**448**	**467**	**494**	**516**	**538**	**568**	**593**
EBITDA	407	390	473	455	435	529	508	485	591	566
Depreciation	39	39	39	39	39	39	39	39	39	39
EBIT	368	351	434	415	396	490	468	445	552	527
Interest expenses	74	53	32	16	5	0	0	0	0	0
Interest on W/C	0	0	0	0	0	0	0	0	0	0
Profit Before Tax	294	298	403	400	391	490	468	445	552	527
Tax	0	28	94	135	134	171	165	158	197	189
Profit After Tax	294	270	309	264	256	319	303	287	355	338

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Revenue										
From Industrial Land	215	241	241	241	269	269	269	302	302	302
From SFB	335	376	376	376	421	421	421	471	471	471
From Utility	579	665	665	665	765	764	764	879	880	879
From EZ service Fees	10	10	10	10	10	10	10	10	10	10
From Logistics Zone	3	4	4	4	4	4	4	4	4	4
From Support Amenities	18	20	20	20	22	22	22	25	25	25
Total Revenue	**1160**	**1315**	**1315**	**1315**	**1492**	**1491**	**1491**	**1692**	**1692**	**1692**
Operating Expenses										
O&M Cost	418	439	461	484	508	533	560	588	617	648
Upfront Fees to BEZA										
Annual Fees paid to BEZA	13	13	13	13	13	13	13	13	13	13
Revenue Share	58	66	66	66	75	75	75	85	85	85
Pre-operating Cost	0	0	0	0	0	0	0	0	0	0
Misc. Cost	8	9	9	10	10	11	11	12	12	13
Cost of Manpower	123	128	135	141	149	156	164	172	181	190
Total Cost	**620**	**655**	**683**	**714**	**755**	**788**	**823**	**869**	**909**	**949**

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
EBITDA	540	660	631	601	737	703	668	822	784	743
Depreciation	39	39	39	39	39	39	39	39	39	39
EBIT	501	621	592	562	698	664	629	783	744	704
Interest expenses	0	0	0	0	0	0	0	0	0	0
Interest on W/C	0	0	0	0	0	0	0	0	0	0
Profit Before Tax	501	621	592	562	698	664	629	783	744	704
Tax	181	224	215	205	253	242	230	284	271	257
Profit After Tax	320	397	377	357	445	422	399	499	473	447

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Revenue										
From Industrial Land	338	338	338	379	379	379	424	424	424	475
From SFB	528	528	528	591	591	591	662	662	662	741
From Utility	1011	1011	1012	1163	1163	1163	1338	1337	1337	1537
From EZ service Fees	10	10	10	10	10	10	10	10	10	10
From Logistics Zone	5	5	5	6	6	6	6	6	6	7
From Support Amenities	28	28	28	31	31	31	35	35	35	39
Total Revenue	**1920**	**1920**	**1921**	**2179**	**2179**	**2179**	**2476**	**2474**	**2474**	**2810**
Operating Expenses										
O&M Cost	681	715	750	788	827	869	912	958	1006	1056
Upfront Fees to BEZA										
Annual Fees paid to BEZA	13	13	13	13	13	13	13	13	13	13
Revenue Share	96	96	96	109	109	109	124	124	124	141
Pre-operating Cost	0	0	0	0	0	0	0	0	0	0
Misc. Cost	14	14	15	16	17	17	18	19	20	21
Cost of Manpower	199	209	220	231	242	254	268	280	294	309
Total Cost	**1003**	**1047**	**1095**	**1156**	**1208**	**1262**	**1335**	**1394**	**1457**	**1540**
EBITDA	917	872	826	1023	971	917	1140	1080	1017	1270
Depreciation	39	39	39	39	39	39	39	39	39	39
EBIT	878	833	786	983	932	877	1101	1041	978	1231
Interest expenses	0	0	0	0	0	0	0	0	0	0

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Interest on W/C	0	0	0	0	0	0	0	0	0	0
Profit Before Tax	878	833	786	983	932	877	1101	1041	978	1231
Tax	318	303	287	356	338	319	398	377	355	444
Profit After Tax	559	530	500	627	594	558	703	664	623	787

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Revenue										
From Industrial Land	475	475	532	532	532	596	596	596	667	667
From SFB	741	741	830	830	830	930	930	930	1041	1041
From Utility	1539	1537	1768	1768	1770	2033	2033	2033	2340	2338
From EZ service Fees	10	10	10	10	10	10	10	10	10	10
From Logistics Zone	7	7	8	8	8	9	9	9	10	10
From Support Amenities	39	39	44	44	44	49	49	49	55	55
Total Revenue	**2811**	**2810**	**3192**	**3192**	**3194**	**3627**	**3627**	**3627**	**4124**	**4122**
Operating Expenses										
O&M Cost	1109	1164	1223	1284	1348	1416	1486	1561	1639	1721
Upfront Fees to BEZA										
Annual Fees paid to BEZA	13	13	13	13	13	13	13	13	13	13
Revenue Share	141	141	160	160	160	181	181	181	206	206
Pre-operating Cost	0	0	0	0	0	0	0	0	0	0
Misc. Cost	22	23	24	26	27	28	30	31	33	34
Cost of Manpower	325	341	358	376	396	414	435	457	481	504
Total Cost	**1610**	**1682**	**1778**	**1858**	**1944**	**2053**	**2146**	**2243**	**2372**	**2478**
EBITDA	1201	1128	1414	1334	1250	1574	1481	1384	1752	1644
Depreciation	39	39	39	39	39	39	39	39	39	39
EBIT	1162	1088	1375	1295	1211	1535	1442	1344	1713	1604
Interest expenses	0	0	0	0	0	0	0	0	0	0
Interest on W/C	0	0	0	0	0	0	0	0	0	0
Profit Before Tax	1162	1088	1375	1295	1211	1535	1442	1344	1713	1604
Tax	420	394	494	466	437	550	518	484	613	575
Profit After Tax	742	695	881	828	774	984	924	861	1100	1029

Conservative Scenario Working Capital Statement- Figures in BDT million

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Receivables										
Revenue Collection	0	82	122	190	212	303	454	534	579	717
Payables										
Operating Expenses	91	138	190	245	275	292	313	331	348	370
Working Capital	0	56	68	56	63	0	0	0	0	0
Working Capital Loan	0	56	68	56	63	0	0	0	0	0
Interest on W/C Loan	0	8	9	8	9	0	0	0	0	0

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Receivables										
Revenue Collection	797	797	903	903	903	1023	1023	1023	1159	1159
Payables										
Operating Expenses	390	406	430	448	467	494	516	538	568	593
Working Capital	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Interest on W/C Loan	0	0	0	0	0	0	0	0	0	0

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Receivables										
Revenue Collection	1160	1315	1315	1315	1492	1491	1491	1692	1692	1692
Payables										
Operating Expenses	620	655	683	714	755	788	823	869	909	949
Working Capital	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Interest on W/C Loan	0	0	0	0	0	0	0	0	0	0

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Receivables										
Revenue Collection	1920	1920	1921	2179	2179	2179	2476	2474	2474	2810
Payables										
Operating Expenses	1003	1047	1095	1156	1208	1262	1335	1394	1457	1540
Working Capital	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Interest on W/C Loan	0	0	0	0	0	0	0	0	0	0

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Receivables										
Revenue Collection	2811	2810	3192	3192	3194	3627	3627	3627	4124	4122
Payables										
Operating Expenses	1610	1682	1778	1858	1944	2053	2146	2243	2372	2478
Working Capital	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Interest on W/C Loan	0	0	0	0	0	0	0	0	0	0

Base Scenario Working Capital Statement- Figures in BDT million

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Receivables										
Revenue Collection	0	127	216	357	435	597	704	704	704	797
Payables										
Operating Expenses	91	140	194	254	286	307	325	339	354	374
Working Capital	0	14	0	0	0	0	0	0	0	0
Working Capital Loan	0	14	0	0	0	0	0	0	0	0
Interest on W/C Loan	0	2	0	0	0	0	0	0	0	0

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Receivables										
Revenue Collection	797	797	903	903	903	1023	1023	1023	1159	1159
Payables										
Operating Expenses	390	406	430	448	467	494	516	538	568	593
Working Capital	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Interest on W/C Loan	0	0	0	0	0	0	0	0	0	0

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Receivables										
Revenue Collection	1160	1315	1315	1315	1492	1491	1491	1692	1692	1692
Payables										
Operating Expenses	620	655	683	714	755	788	823	869	909	949
Working Capital	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Interest on W/C Loan	0	0	0	0	0	0	0	0	0	0

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Receivables										
Revenue Collection	1920	1920	1921	2179	2179	2179	2476	2474	2474	2810
Payables										
Operating Expenses	1003	1047	1095	1156	1208	1262	1335	1394	1457	1540
Working Capital	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Interest on W/C Loan	0	0	0	0	0	0	0	0	0	0

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Receivables										
Revenue Collection	2811	2810	3192	3192	3194	3627	3627	3627	4124	4122
Payables										
Operating Expenses	1610	1682	1778	1858	1944	2053	2146	2243	2372	2478
Working Capital	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Interest on W/C Loan	0	0	0	0	0	0	0	0	0	0

Aggressive Scenario Working Capital Statement- Figures in BDT million

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Receivables										
Revenue Collection	0	165	299	507	622	622	704	704	704	797
Payables										
Operating Expenses	91	142	198	261	296	308	325	339	354	374
Working Capital	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Interest on W/C Loan	0	0	0	0	0	0	0	0	0	0

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Receivables										
Revenue Collection	797	797	903	903	903	1023	1023	1023	1159	1159
Payables										
Operating Expenses	390	406	430	448	467	494	516	538	568	593
Working Capital	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Interest on W/C Loan	0	0	0	0	0	0	0	0	0	0

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Receivables										
Revenue Collection	1160	1315	1315	1315	1492	1491	1491	1692	1692	1692
Payables										
Operating Expenses	620	655	683	714	755	788	823	869	909	949
Working Capital	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Interest on W/C Loan	0	0	0	0	0	0	0	0	0	0

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Receivables										
Revenue Collection	1920	1920	1921	2179	2179	2179	2476	2474	2474	2810
Payables										
Operating Expenses	1003	1047	1095	1156	1208	1262	1335	1394	1457	1540
Working Capital	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Interest on W/C Loan	0	0	0	0	0	0	0	0	0	0

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Receivables										
Revenue Collection	2811	2810	3192	3192	3194	3627	3627	3627	4124	4122
Payables										
Operating Expenses	1610	1682	1778	1858	1944	2053	2146	2243	2372	2478
Working Capital	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Interest on W/C Loan	0	0	0	0	0	0	0	0	0	0

Conservative Scenario Cash Flow Statement- Figures in BDT million

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Cash inflow										
PAT	-91	-84	-214	-205	-308	-208	-56	27	75	213
Depreciation	0	20	30	39	39	39	39	39	39	39
Grant	0	0	0	0	0	0	0	0	0	0
Equity	217	244	210	236	0	0	0	0	0	0
Equity infused to meet pre-operating expenses	91	0	0	0	0	0	0	0	0	0
Increase in debt	507	569	491	551	0	0	0	0	0	0
Working Capital Loan	0	56	68	56	63	0	0	0	0	0
Total cash inflow	**724**	**804**	**585**	**678**	**-205**	**-168**	**-17**	**67**	**115**	**252**
Cash outflow										
Capital Expenditure	724	812	702	788	0	0	0	0	0	0
Repayment of debt	0	0	0	108	108	212	212	212	212	212
Working Capital	0	56	68	56	63	0	0	0	0	0
Total cash outflow	**724**	**868**	**769**	**951**	**171**	**212**	**212**	**212**	**212**	**212**
Net Cash generation	**0**	**-64**	**-185**	**-273**	**-376**	**-380**	**-229**	**-145**	**-97**	**40**
Opening Balance of Cash and Bank Balance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Closing Balance of Cash and Bank Balance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**40**
Equity Infusion	0	64	185	273	376	380	229	145	97	0

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Cash inflow										
PAT	294	298	403	400	391	364	303	287	355	338
Depreciation	39	39	39	39	39	39	39	39	39	39
Grant	0	0	0	0	0	0	0	0	0	0

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Equity	0	0	0	0	0	0	0	0	0	0
Equity infused to meet pre-operating expenses	0	0	0	0	0	0	0	0	0	0
Increase in debt	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total cash inflow	**333**	**338**	**442**	**439**	**430**	**403**	**343**	**326**	**394**	**377**
Cash outflow										
Capital Expenditure	0	0	0	0	0	0	0	0	0	0
Repayment of debt	212	212	212	104	104	0	0	0	0	0
Working Capital	0	0	0	0	0	0	0	0	0	0
Total cash outflow	**212**	**212**	**212**	**104**	**104**	**0**	**0**	**0**	**0**	**0**
Net Cash generation	**122**	**126**	**230**	**335**	**326**	**403**	**343**	**326**	**394**	**377**
Opening Balance of Cash and Bank Balance	**40**	**162**	**288**	**518**	**853**	**1179**	**1582**	**1924**	**2251**	**2645**
Closing Balance of Cash and Bank Balance	**162**	**288**	**518**	**853**	**1179**	**1582**	**1924**	**2251**	**2645**	**3022**
Equity Infusion	0	0	0	0	0	0	0	0	0	0

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Cash inflow										
PAT	320	397	377	357	445	422	399	499	473	447
Depreciation	39	39	39	39	39	39	39	39	39	39
Grant	0	0	0	0	0	0	0	0	0	0
Equity	0	0	0	0	0	0	0	0	0	0
Equity infused to meet pre-operating expenses	0	0	0	0	0	0	0	0	0	0
Increase in debt	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total cash inflow	**359**	**436**	**417**	**396**	**484**	**462**	**438**	**538**	**513**	**486**

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Cash outflow										
Capital Expenditure	0	0	0	0	0	0	0	0	0	0
Repayment of debt	0	0	0	0	0	0	0	0	0	0
Working Capital	0	0	0	0	0	0	0	0	0	0
Total cash outflow	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Net Cash generation	**359**	**436**	**417**	**396**	**484**	**462**	**438**	**538**	**513**	**486**
Opening Balance of Cash and Bank Balance	**3022**	**3381**	**3817**	**4233**	**4630**	**5114**	**5575**	**6014**	**6552**	**7065**
Closing Balance of Cash and Bank Balance	**3381**	**3817**	**4233**	**4630**	**5114**	**5575**	**6014**	**6552**	**7065**	**7551**
Equity Infusion	0	0	0	0	0	0	0	0	0	0

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Cash inflow										
PAT	559	530	500	627	594	558	703	664	623	787
Depreciation	39	39	39	39	39	39	39	39	39	39
Grant	0	0	0	0	0	0	0	0	0	0
Equity	0	0	0	0	0	0	0	0	0	0
Equity infused to meet pre-operating expenses	0	0	0	0	0	0	0	0	0	0
Increase in debt	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total cash inflow	**599**	**569**	**539**	**667**	**633**	**597**	**743**	**703**	**662**	**827**
Cash outflow										
Capital Expenditure	0	0	0	0	0	0	0	0	0	0
Repayment of debt	0	0	0	0	0	0	0	0	0	0

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Working Capital	0	0	0	0	0	0	0	0	0	0
Total cash outflow	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Net Cash generation	**599**	**569**	**539**	**667**	**633**	**597**	**743**	**703**	**662**	**827**
Opening Balance of Cash and Bank Balance	**7551**	**8149**	**8719**	**9258**	**9924**	**10557**	**11155**	**11897**	**12600**	**13263**
Closing Balance of Cash and Bank Balance	**8149**	**8719**	**9258**	**9924**	**10557**	**11155**	**11897**	**12600**	**13263**	**14089**
Equity Infusion	0	0	0	0	0	0	0	0	0	0

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Cash inflow										
PAT	742	695	881	828	774	984	924	861	1100	1029
Depreciation	39	39	39	39	39	39	39	39	39	39
Grant	0	0	0	0	0	0	0	0	0	0
Equity	0	0	0	0	0	0	0	0	0	0
Equity infused to meet pre-operating expenses	0	0	0	0	0	0	0	0	0	0
Increase in debt	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total cash inflow	**782**	**734**	**920**	**868**	**813**	**1024**	**963**	**900**	**1139**	**1069**
Cash outflow										
Capital Expenditure	0	0	0	0	0	0	0	0	0	0
Repayment of debt	0	0	0	0	0	0	0	0	0	0
Working Capital	0	0	0	0	0	0	0	0	0	0
Total cash outflow	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Net Cash generation	**782**	**734**	**920**	**868**	**813**	**1024**	**963**	**900**	**1139**	**1069**

Opening Balance of Cash and Bank Balance	**14089**	**14871**	**15605**	**16525**	**17393**	**18206**	**19230**	**20193**	**21093**	**22232**
Closing Balance of Cash and Bank Balance	**14871**	**15605**	**16525**	**17393**	**18206**	**19230**	**20193**	**21093**	**22232**	**23301**
Equity Infusion	0	0	0	0	0	0	0	0	0	0

Base Scenario Cash Flow Statement- Figures in BDT million

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Cash inflow										
PAT	-91	-36	-115	-38	-87	71	181	188	194	289
Depreciation	0	20	30	39	39	39	39	39	39	39
Grant	0	0	0	0	0	0	0	0	0	0
Equity	217	244	210	236	0	0	0	0	0	0
Equity infused to meet pre-operating expenses	91	0	0	0	0	0	0	0	0	0
Increase in debt	507	569	491	551	0	0	0	0	0	0
Working Capital Loan	0	14	0	0	0	0	0	0	0	0
Total cash inflow	**724**	**810**	**616**	**788**	**-48**	**111**	**220**	**227**	**234**	**328**
Cash outflow										
Capital Expenditure	724	812	702	788	0	0	0	0	0	0
Repayment of debt	0	0	0	108	108	212	212	212	212	212
Working Capital	0	14	0	0	0	0	0	0	0	0
Total cash outflow	**724**	**826**	**702**	**895**	**108**	**212**	**212**	**212**	**212**	**212**
Net Cash generation	**0**	**-15**	**-86**	**-107**	**-155**	**-101**	**8**	**16**	**22**	**117**
Opening Balance of Cash and Bank Balance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**8**	**24**	**46**
Closing Balance of Cash and Bank Balance	**0**	**0**	**0**	**0**	**0**	**0**	**8**	**24**	**46**	**162**

Equity Infusion	0	15	86	107	155	101	0	0	0	0

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Cash inflow										
PAT	294	285	309	264	256	319	303	287	355	338
Depreciation	39	39	39	39	39	39	39	39	39	39
Grant	0	0	0	0	0	0	0	0	0	0
Equity	0	0	0	0	0	0	0	0	0	0
Equity infused to meet pre-operating expenses	0	0	0	0	0	0	0	0	0	0
Increase in debt	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total cash inflow	**333**	**325**	**348**	**304**	**296**	**358**	**343**	**326**	**394**	**377**
Cash outflow										
Capital Expenditure	0	0	0	0	0	0	0	0	0	0
Repayment of debt	212	212	212	104	104	0	0	0	0	0
Working Capital	0	0	0	0	0	0	0	0	0	0
Total cash outflow	**212**	**212**	**212**	**104**	**104**	**0**	**0**	**0**	**0**	**0**
Net Cash generation	**122**	**113**	**136**	**200**	**191**	**358**	**343**	**326**	**394**	**377**
Opening Balance of Cash and Bank Balance	**162**	**284**	**397**	**533**	**733**	**924**	**1282**	**1625**	**1951**	**2345**
Closing Balance of Cash and Bank Balance	**284**	**397**	**533**	**733**	**924**	**1282**	**1625**	**1951**	**2345**	**2722**
Equity Infusion	0	0	0	0	0	0	0	0	0	0

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Cash inflow										
PAT	320	397	377	357	445	422	399	499	473	447

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Depreciation	39	39	39	39	39	39	39	39	39	39
Grant	0	0	0	0	0	0	0	0	0	0
Equity	0	0	0	0	0	0	0	0	0	0
Equity infused to meet pre-operating expenses	0	0	0	0	0	0	0	0	0	0
Increase in debt	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total cash inflow	**359**	**436**	**417**	**396**	**484**	**462**	**438**	**538**	**513**	**486**
Cash outflow										
Capital Expenditure	0	0	0	0	0	0	0	0	0	0
Repayment of debt	0	0	0	0	0	0	0	0	0	0
Working Capital	0	0	0	0	0	0	0	0	0	0
Total cash outflow	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Net Cash generation	**359**	**436**	**417**	**396**	**484**	**462**	**438**	**538**	**513**	**486**
Opening Balance of Cash and Bank Balance	**2722**	**3081**	**3517**	**3934**	**4330**	**4814**	**5276**	**5714**	**6253**	**6765**
Closing Balance of Cash and Bank Balance	**3081**	**3517**	**3934**	**4330**	**4814**	**5276**	**5714**	**6253**	**6765**	**7251**
Equity Infusion	0	0	0	0	0	0	0	0	0	0

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Cash inflow										
PAT	559	530	500	627	594	558	703	664	623	787
Depreciation	39	39	39	39	39	39	39	39	39	39
Grant	0	0	0	0	0	0	0	0	0	0
Equity	0	0	0	0	0	0	0	0	0	0
Equity infused to meet pre-operating expenses	0	0	0	0	0	0	0	0	0	0
Increase in debt	0	0	0	0	0	0	0	0	0	0

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total cash inflow	**599**	**569**	**539**	**667**	**633**	**597**	**743**	**703**	**662**	**827**
Cash outflow										
Capital Expenditure	0	0	0	0	0	0	0	0	0	0
Repayment of debt	0	0	0	0	0	0	0	0	0	0
Working Capital	0	0	0	0	0	0	0	0	0	0
Total cash outflow	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Net Cash generation	**599**	**569**	**539**	**667**	**633**	**597**	**743**	**703**	**662**	**827**
Opening Balance of Cash and Bank Balance	**7251**	**7850**	**8419**	**8958**	**9625**	**10258**	**10855**	**11598**	**12301**	**12963**
Closing Balance of Cash and Bank Balance	**7850**	**8419**	**8958**	**9625**	**10258**	**10855**	**11598**	**12301**	**12963**	**13790**
Equity Infusion	0	0	0	0	0	0	0	0	0	0

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Cash inflow										
PAT	742	695	881	828	774	984	924	861	1100	1029
Depreciation	39	39	39	39	39	39	39	39	39	39
Grant	0	0	0	0	0	0	0	0	0	0
Equity	0	0	0	0	0	0	0	0	0	0
Equity infused to meet pre-operating expenses	0	0	0	0	0	0	0	0	0	0
Increase in debt	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total cash inflow	**782**	**734**	**920**	**868**	**813**	**1024**	**963**	**900**	**1139**	**1069**
Cash outflow										
Capital Expenditure	0	0	0	0	0	0	0	0	0	0

Repayment of debt	0	0	0	0	0	0	0	0	0	0
Working Capital	0	0	0	0	0	0	0	0	0	0
Total cash outflow	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Net Cash generation	**782**	**734**	**920**	**868**	**813**	**1024**	**963**	**900**	**1139**	**1069**
Opening Balance of Cash and Bank Balance	**13790**	**14571**	**15305**	**16225**	**17093**	**17906**	**18930**	**19894**	**20794**	**21933**
Closing Balance of Cash and Bank Balance	**14571**	**15305**	**16225**	**17093**	**17906**	**18930**	**19894**	**20794**	**21933**	**23002**
Equity Infusion	0	0	0	0	0	0	0	0	0	0

Aggressive Scenario Cash Flow Statement- Figures in BDT million

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Cash inflow										
PAT	-91	3	-36	104	91	95	181	188	194	289
Depreciation	0	20	30	39	39	39	39	39	39	39
Grant	0	0	0	0	0	0	0	0	0	0
Equity	217	244	210	236	0	0	0	0	0	0
Equity infused to meet pre-operating expenses	91	0	0	0	0	0	0	0	0	0
Increase in debt	507	569	491	551	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total cash inflow	**724**	**836**	**695**	**931**	**130**	**134**	**220**	**227**	**234**	**328**
Cash outflow										
Capital Expenditure	724	812	702	788	0	0	0	0	0	0
Repayment of debt	0	0	0	108	108	212	212	212	212	212
Working Capital	0	0	0	0	0	0	0	0	0	0
Total cash outflow	**724**	**812**	**702**	**895**	**108**	**212**	**212**	**212**	**212**	**212**

Net Cash generation	**0**	**23**	**-7**	**36**	**23**	**-78**	**8**	**16**	**22**	**117**
Opening Balance of Cash and Bank Balance	**0**	**0**	**23**	**23**	**59**	**82**	**82**	**90**	**105**	**127**
Closing Balance of Cash and Bank Balance	**0**	**23**	**23**	**59**	**82**	**82**	**90**	**105**	**127**	**244**
Equity Infusion	0	0	7	0	0	78	0	0	0	0

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Cash inflow										
PAT	294	270	309	264	256	319	303	287	355	338
Depreciation	39	39	39	39	39	39	39	39	39	39
Grant	0	0	0	0	0	0	0	0	0	0
Equity	0	0	0	0	0	0	0	0	0	0
Equity infused to meet pre-operating expenses	0	0	0	0	0	0	0	0	0	0
Increase in debt	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total cash inflow	**333**	**309**	**348**	**304**	**296**	**358**	**343**	**326**	**394**	**377**
Cash outflow										
Capital Expenditure	0	0	0	0	0	0	0	0	0	0
Repayment of debt	212	212	212	104	104	0	0	0	0	0
Working Capital	0	0	0	0	0	0	0	0	0	0
Total cash outflow	**212**	**212**	**212**	**104**	**104**	**0**	**0**	**0**	**0**	**0**
Net Cash generation	**122**	**98**	**136**	**200**	**191**	**358**	**343**	**326**	**394**	**377**
Opening Balance of Cash and Bank Balance	**244**	**366**	**463**	**600**	**799**	**991**	**1349**	**1691**	**2018**	**2412**
Closing Balance of Cash and Bank Balance	**366**	**463**	**600**	**799**	**991**	**1349**	**1691**	**2018**	**2412**	**2789**

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Equity Infusion	0	0	0	0	0	0	0	0	0	0

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Cash inflow										
PAT	320	397	377	357	445	422	399	499	473	447
Depreciation	39	39	39	39	39	39	39	39	39	39
Grant	0	0	0	0	0	0	0	0	0	0
Equity	0	0	0	0	0	0	0	0	0	0
Equity infused to meet pre-operating expenses	0	0	0	0	0	0	0	0	0	0
Increase in debt	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total cash inflow	**359**	**436**	**417**	**396**	**484**	**462**	**438**	**538**	**513**	**486**
Cash outflow										
Capital Expenditure	0	0	0	0	0	0	0	0	0	0
Repayment of debt	0	0	0	0	0	0	0	0	0	0
Working Capital	0	0	0	0	0	0	0	0	0	0
Total cash outflow	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Net Cash generation	**359**	**436**	**417**	**396**	**484**	**462**	**438**	**538**	**513**	**486**
Opening Balance of Cash and Bank Balance	**2789**	**3148**	**3584**	**4000**	**4397**	**4881**	**5342**	**5781**	**6319**	**6832**
Closing Balance of Cash and Bank Balance	**3148**	**3584**	**4000**	**4397**	**4881**	**5342**	**5781**	**6319**	**6832**	**7318**
Equity Infusion	0	0	0	0	0	0	0	0	0	0

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Cash inflow										

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
PAT	559	530	500	627	594	558	703	664	623	787
Depreciation	39	39	39	39	39	39	39	39	39	39
Grant	0	0	0	0	0	0	0	0	0	0
Equity	0	0	0	0	0	0	0	0	0	0
Equity infused to meet pre-operating expenses	0	0	0	0	0	0	0	0	0	0
Increase in debt	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total cash inflow	**599**	**569**	**539**	**667**	**633**	**597**	**743**	**703**	**662**	**827**
Cash outflow										
Capital Expenditure	0	0	0	0	0	0	0	0	0	0
Repayment of debt	0	0	0	0	0	0	0	0	0	0
Working Capital	0	0	0	0	0	0	0	0	0	0
Total cash outflow	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Net Cash generation	**599**	**569**	**539**	**667**	**633**	**597**	**743**	**703**	**662**	**827**
Opening Balance of Cash and Bank Balance	**7318**	**7916**	**8486**	**9025**	**9691**	**10324**	**10922**	**11664**	**12367**	**13030**
Closing Balance of Cash and Bank Balance	**7916**	**8486**	**9025**	**9691**	**10324**	**10922**	**11664**	**12367**	**13030**	**13856**
Equity Infusion	0	0	0	0	0	0	0	0	0	0

	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Cash inflow										
PAT	742	695	881	828	774	984	924	861	1100	1029
Depreciation	39	39	39	39	39	39	39	39	39	39
Grant	0	0	0	0	0	0	0	0	0	0
Equity	0	0	0	0	0	0	0	0	0	0
Equity infused to meet pre-operating expenses	0	0	0	0	0	0	0	0	0	0

Increase in debt	0	0	0	0	0	0	0	0	0	0
Working Capital Loan	0	0	0	0	0	0	0	0	0	0
Total cash inflow	**782**	**734**	**920**	**868**	**813**	**1024**	**963**	**900**	**1139**	**1069**
Cash outflow										
Capital Expenditure	0	0	0	0	0	0	0	0	0	0
Repayment of debt	0	0	0	0	0	0	0	0	0	0
Working Capital	0	0	0	0	0	0	0	0	0	0
Total cash outflow	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Net Cash generation	**782**	**734**	**920**	**868**	**813**	**1024**	**963**	**900**	**1139**	**1069**
Opening Balance of Cash and Bank Balance	**13856**	**14638**	**15372**	**16292**	**17160**	**17973**	**18997**	**19960**	**20860**	**21999**
Closing Balance of Cash and Bank Balance	**14638**	**15372**	**16292**	**17160**	**17973**	**18997**	**19960**	**20860**	**21999**	**23068**
Equity Infusion	0	0	0	0	0	0	0	0	0	0

15.19. Annexure 19 - BOQ and Rationale behind Project Costs

Cost Abstract

Roads

Description	Unit	Quantity	Rate in Taka	Amount	Amount in Million Taka
Earth work excavation / by mechanical means (Hydraulic Excavator)/ manual means in trenches and over areas for foundations of columns, walls, rafts, beams, steps etc., in all types of soil except hard rock requiring chiseling, blasting but including Existing building foundation dismantling, shoring, strutting, de-watering, refilling in foundations, plinth etc., wherever necessary in layers not exceeding 15cm with approved excavated soil, including watering and compaction etc., Surplus / rejected excavated material shall be disposed off to the contractor's own dump yard outside the work site or as per the requirements of local authorities or as directed by the Engineer-in-charge. - All kinds of soil	Cum	30465	279.00	8,499,596.90	**8.50**
Supplying and filling in basement with good quality earth and compacting in layers including all materials and labours as required for satisfactory completion of work and and as directed.	Cum	2711.67	1768.00	4,794,232.60	**4.79**
Construction of granular sub-base by providing close graded material, spreading in uniform layers with motor grader on prepared surface, mixing by mix in place method with rotavator at OMC, and compacting with vibratory roller to achieve the desired density, complete as per clause 401 of MORT & H For Grading-11 Material	Cum	9620	6738.00	64,822,053.10	**64.82**
Providing, laying, spreading and compacting graded stone aggregate to wet mix macadam specification including premixing the Material with water at OMC in mechanical mix plant carriage of mixed Material by tipper to site, laying in uniform layers with paver in sub- base / base course on well prepared surface and compacting with vibratory roller to achieve the desired density. Material (Table 400-11) Clause: 406 of MORT & H	Cum	16034	5715.00	91,634,024.30	**91.63**
Providing and applying primer coat with bitumen emulsion on prepared surface of granular Base of low porosity such as WBM and WMM including including clearing of road surface and spraying primer at the rate of 1.05 kg/sqm using mechanical means. (Bitumen Emulsion = 1.05 kglsqmt.)	Sqm	64136	82.00	5,259,135.60	**5.26**
Providing and applying tack coat with bitumen emulsion using emulsion pressure distributor at the rate of 0.4 kg per sqm on the prepared on granular surface cleaned with mechanical broom such as WBM and WMM surfaces treated with primer and dry and bituminous surface as per MORT&H specification clause No.503 complete in all respects.	Sqm	64136	31.00	1,988,209.80	**1.99**
Providing and applying tack coat with bitumen emulsion using emulsion pressure distributor at the rate of 0.25 kg per sqm on the prepared on normal bituminous surface cleaned with mechanical broom. (Bitumen Emulsion = 0.25 kg/sqmt.)	Sqm	62009	20.00	1,240,180.00	**1.24**
Providing and laying dense graded bituminous macadam 60-75mm thick with 40-60 TPH HMPusing crushed aggregates of specified grading, premixed with bituminous binder @ 4.25 percent by weight of total mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MoRTH specification clause No.507 complete in all respects. (Bitumen = 0.0981 Metal = 1.401).	Cum	3100	13848.00	42,935,031.60	**42.94**
Providing and laying Semi dense bituminous concrete using crushed aggregates of specified grading, premixed with bituminous binder @ 5.00 per cent of mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level, and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MORT & H specification clause No.509 complete in all respects (Bitumen = 0.109 Metal = 1.36, Cement 0.0469)	Cum	1550	11113.50	17,228,425.50	**17.23**
Providing and fixing Pre cast solid concrete kerb stones made out of CC 1 :1.5:3 of size 450 x 200 x 400 mm and finished with CM 1 :3 plastering and finishing cutting etc., complete.	Rm	21268	692.00	14,717,456.00	**14.72**
Total Cost in Million Taka					**253.12**

Cost Abstract

Foot Path & Road culvert

Description	Unit	Quantity	Rate in Taka	Amount	Amount in Million Taka
Earth work excavation / by mechanical means (Hydraulic Excavator)/ manual means in trenches and over areas for foundations of columns, walls, rafts, beams, steps etc., in all types of soil except hard rock requiring chiseling, blasting but including Existing building foundation dismantling, shoring, strutting, de-watering, refilling in foundations, plinth etc., wherever necessary in layers not exceeding 15cm with approved excavated soil, including watering and compaction etc., Surplus / rejected excavated material shall be disposed off to the contractor's own dump yard outside the work site or as per the requirements of local authorities or as directed by the Engineer-in-charge. - All kinds of soil	Cum	1246	279.00	347,501.48	**0.35**
Supplying and filling in basement with good quality earth and compacting in layers including all materials and labours as required for satisfactory completion of work and and as directed.	Cum	1245.53	1768.00	2,202,088.20	**2.20**
Providing and laying in position plain cement concrete of mix 1:4:8 using 40mm and down size graded granite metal, machine mixed, concrete laid in layers not exceeding 15 cms. thick, well compacted, in foundation and plinth, including cost of all materials, labour, HOM of machinery, curing complete as per specifications.	Cum	614	8092.00	4,971,421.35	**4.97**
Providing and laying in position specified grade of reinforced cement concrete excluding the cost of centring, shuttering, finishing and reinforcement - All work upto plinth level : 1:1.5:3 (1 cement: 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)	Cum	3808	7982.00	30,394,458.25	**30.39**
Providing H.Y.S.D steel (Cold, Twisted) /TMT reinforcement for RCC work including straightening, cutting, bending, hooking, placing in position, lapping and /or welding wherever required, tying with binding wire and anchoring to the adjoining members wherever necessary complete as per design (laps, hooks and wastage shall not be measured and paid) including cost of materials, binding wire, labour, HOM of machinery complete as per specifications. - upto floor VIII level. Grade Fe500	MT	448	77000.00	34,488,685.00	**34.49**
Providing and fixing at site precast cement concrete M15 grade kerb, 450mm wide and 10 cms thick using 20mm and down granite metal including cost of materials, labour, curing complete as per specifications.	Sqm	8304	1607.00	13,343,724.50	**13.34**
Providing and laying heavy duty cobble stones 60mm thick interlock pavers, using cement and course sand for manufacture of blocks of approved size, shape and colour with a minimum compressive strength of 281 kg per sqm over 50mm thick sand bed (average thickness) and compacting with plate vibrator having 3 tons compaction force thereby forcing part of sand underneath to come up in between joints, final compaction of paver surface joints into its final level, including cost of materials, labour and HOM of machineries complete as per specifications.	Sqm	8304	1252.00	10,395,982.00	**10.40**
Total Cost in Million Taka					**96.14**

Cost Abstract

Drains, Culverts

Description	Unit	Quantity	Rate in Taka	Amount	Amount in Million Taka
Earth work excavation / by mechanical means (Hydraulic Excavator)/ manual means in trenches and over areas for foundations of columns, walls, rafts, beams, steps etc., in all types of soil except hard rock requiring chiseling, blasting but including Existing building foundation dismantling, shoring, strutting, de-watering, refilling in foundations, plinth etc., wherever necessary in layers not exceeding 15cm with approved excavated soil, including watering and compaction etc., Surplus / rejected excavated material shall be disposed off to the contractor's own dump yard outside the work site or as per the requirements of local authorities or as directed by the Engineer-in-charge. - All kinds of soil	Cum	6944.67	279.00	1937563.97	1.94
Providing and laying in position plain cement concrete of mix 1:4:8 using 40mm and down size graded granite metal, machine mixed, concrete laid in layers not exceeding 15 cms. thick, well compacted, in foundation and plinth, including cost of all materials, labour, HOM of machinery, curing complete as per specifications.	Cum	1556.82	8092.00	12597821.97	12.60
Providing and laying in position specified grade of reinforced cement concrete excluding the cost of centring, shuttering, finishing and reinforcement - All work upto plinth level : 1:2:4 (1 cement: 2 coarse sand : 4 graded stone aggregate 20 mm nominal size)	Cum	386.96	11868.00	4592436.53	4.59
Providing H.Y.S.D steel (Cold, Twisted) /TMT reinforcement for RCC work including straightening, cutting, bending, hooking, placing in position, lapping and /or welding wherever required, tying with binding wire and anchoring to the adjoining members wherever necessary complete as per design (laps, hooks and wastage shall not be measured and paid) including cost of materials, binding wire, labour, HOM of machinery complete as per specifications. - upto floor VIII level. Grade Fe500	MT	7.27	77000.00	560047.95	0.56
Brick work with common burnt clay bricks of class designation 35 conforming IS : 2222 in exposed brick work including making horizontal and vertical grooves 10mm wide 12 mm deep complete in cement mortar 1:6 (1 cement : 6 coarse sand).	Cum	2745.52	6636.00	18219239.46	18.22
Providing and laying coping and Screed concrete with 1 :2:4 cement concrete, 40 mm thickSqm 150.09 using broken granite metal of 20mm and down size laid to line and level in one layer and finish with a floating coat of neat cement, including cost of materials, labour, curing, complete as per specifications.	Sqm	4774.40	296.00	1413222.40	1.41
Providing 12mm thick cement plaster in single coat with cement mortar 1 :4, to brick masonry including rounding off corners wherever required smooth rendering, : Providing and removing scaffolding, including cost of materials, labour, curing complete as per specifications.	Sqm	15694.69	109.00	1710721.14	1.71
Providing Weep holes using 75mm dia PVC pipes for abutments, wing walls, return walls and drain as per drawings and specification including cost of material, labour, complete as per specifications.	Nos	1558.00	187.00	291346.00	0.29
Providing and layiing non pressure NP 2 class (light duty) RCC pipes with collars jointed with stiff mixture of the cement mortor..etc					
300mm dia RCC pipe	Rm	80.00	495.00	39600.00	0.04
500mm dia RCCpipe	Rm	120.00	880.00	105600.00	0.11
Providing, stone pitching on slopes using stone of approved size and packing with quarry spalls as per drawings including cost of materials, labour, complete as per specifications.	Sqm	1756.76	743.00	1305274.66	1.31
Total Cost in Million Taka					**42.77**

Cost Abstract

Water supply

Description	Unit	Quantity	Rate in Taka	Amount	Amount in Million Taka
Excavating trenches of required width for pipes, cables, etc including excavation for sockets and dressing of sides, ramming of bottoms, depth upto 1.5m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20cm in depth, including consolidating..etc : Pipes,cables etc.exceeding 80mm dia but not exceeding 300mm dia	Cum	9196.38	325.00	2988822.79	**2.99**
Supplying and filling with river sand including watering,ramming consolidating and dressing complete.	Cum	795.85	1715.00	1364889.61	**1.36**
PN - 10 110mm dia pipe	Rm	7444	1230.00	9156120.00	**9.16**
PN - 10 160mm dia pipe	Rm	532	1314.00	699048.00	**0.70**
PN - 10 200mm dia pipe	Rm	532	1700.40	904612.80	**0.90**
Providing and laying S& Scentrifugally cast (spun) / Ductile iron 250mm dia pipes (classK7)	0	532	5304.00	2821728.00	**2.82**
Providing and laying S& Scentrifugally cast (spun)/ Ductile iron 300mm dia pipes (classK7)	Rm	532	10123.00	5385436.00	**5.39**
Providing and laying S& Scentrifugally cast (spun)/ Ductile iron 350mm dia pipes (classK7)	Rm	266	11736.00	3121776.00	**3.12**
Providing and laying S& Scentrifugally (spun) / Dutile iron 400mm dia pipes (classK7)	Rm	266	13818.00	3675588.00	**3.68**
PN - 16 110mm Butterfly valve	Each	3.00	17074.80	51224.40	**0.05**
PN - 16 160mm Butterfly valve	Each	1.00	21513.60	21513.60	**0.02**
PN - 16 200mm Butterfly valve	Each	1.00	44820.00	44820.00	**0.04**
250mmdia Butterfly valve - Ductile iron	Each	1.00	57967.20	57967.20	**0.06**
300mmdia Butterfly valve - Ductile iron	Each	1.00	79480.80	79480.80	**0.08**
350mmdia Butterfly valve - Ductile iron	Each	1.00	122508.00	122508.00	**0.12**
400mmdia Butterfly valve - Ductile iron	Each	1.00	236052.00	236052.00	**0.24**
PN - 16 110mm Air valve	Each	13	40338.00	524394.00	**0.52**
PN - 16 160mm Air valve	Each	1.00	40836.00	40836.00	**0.04**
PN - 16 200mm Air valve	Each	1.00	41035.20	41035.20	**0.04**
250mm dia Air valve - Ductile iron	Each	1	42240.00	42240.00	**0.04**
300mm dia Air valve - Ductile iron	Each	1	42480.00	42480.00	**0.04**
350mm dia Air valve - Ductile iron	Each	1.00	43320.00	43320.00	**0.04**
400mm dia Air valve - Ductile iron	Each	1.00	45240.00	45240.00	**0.05**
PN - 16 110mm Gate valve	Each	9.00	8605.20	77446.80	**0.08**
PN - 16 160mm Gate valve	Each	1.00	9852.00	9852.00	**0.01**
PN - 16 200mm Gate valve		1.00	10806.00	10806.00	**0.01**
250mm dia Gate valve - Ductile iron	Each	1	14760.00	14760.00	**0.01**
300mm dia Gate valve - Ductile iron	Each	1.00	17400.00	17400.00	**0.02**
350mm dia Gate valve - Ductile iron	Each	1	18000.00	18000.00	**0.02**
400mm dia Gate valve - Ductile iron	Each	1.00	24000.00	24000.00	**0.02**
Constructing masonry chamber 120x120x100cm inside,in brickwork in cement mortar 1:4 for sluice valve with CI surface box 100mmm top diameter, 160mm bottom diameter and 180mm deep inside with chain lid and RCC top slab 1:2:4 mix including necessary excavation, foundation .. etc	Each	10.00	2000.00	20000.00	**0.02**
Constructing masonry chamber 90x90x100cm inside,in brickwork in cement mortar 1:4 for sluice valve with CI surface box 100mmm top diameter, 160mm bottom diameter and 180mm deep inside with chain lid and RCC top slab 1:2:4 mix including necessary excavation, foundation .. etc	Each	16.00	1800.00	28800.00	**0.03**
Constructing masonry chamber 60x60x75cm inside,in brickwork in cement mortar 1:4 for sluice valve with CI surface box 100mmm top diameter, 160mm bottom diameter and 180mm deep inside with chain lid and RCC top slab 1:2:4 mix including necessary excavation, foundation .. etc	Each	20.00	1600.00	32000.00	**0.03**
Total Cost in Million Taka					**32.44**

Cost Abstract for OHT, Sump and Pumps

Cost Abstract	Unit	Qty.	Rate in Taka	Amount in Taka	Amount in Million Taka
Sump - Potable - Processing	Lit	4430000	15.00	66,450,000.00	66.45
OHT - Potable - Processing	Lit	369000	19.00	7,011,000.00	7.01
Potable water pump - Processing	nos	3.00	454546.00	1,363,638.00	1.36
Pump house for potable water-Processing	Sqm	60	18182.00	1,090,920.00	1.09
Sump - Non Potable - Processing	Lit	471000	15.00	7,065,000.00	7.07
OHT - Non Potable - Processing	Lit	18000	19.00	342,000.00	0.34
Non Potable water pump - Processing	nos	3.00	18182.00	54,546.00	0.05
				83,377,104.00	83.38
Sump - Potable - Non Processing	Lit	1879000	15.00	28,185,000.00	28.19
OHT - Potable - Non Processing	Lit	157000	19.00	2,983,000.00	2.98
Potable water pump - Non processing	nos	3.00	200000.00	600,000.00	0.60
Pump house for potable water - Non processing	sqm	15	18182.00	272,730.00	0.27
Sump - Non Potable - Non Processing	Lit	823000	15.00	12,345,000.00	12.35
OHT - Non Potable - Non Processing	Lit	67000	19.00	1,273,000.00	1.27
Non Potable water pump-Non Processing	nos	3.00	90910.00	272,730.00	0.27
				45,931,460.00	45.93
Water Treatment plant	MLD	6.31	9696970.00	61,180,832.99	61.18

Cost Abstract

Overhead Transmission Line

Description	Unit	Qty	Rate in Rs.	Amount in Taka	Amount in Million Taka
Supply, Erection Testing, Commissioning of **33KV Single circuit** transmission lines using ISMB200, ACSR conductor along with cross arm, Porcelain disc insulator, Pin insulator, stray set , earth pit & hardware accessories of adequate sizes including civil works along with necessary materials as required	KM	0.67	1,364,097	913,945	0.91
Supply, Erection Testing, Commissioning of **33KV Double circuit** transmission lines using ISMB200, ACSR conductor along with cross arm, Porcelain disc insulator, Pin insulator, stray set , earth pit & hardware accessories of adequate sizes including civil works along with necessary materials as required	KM	1.33	2,346,261	3,120,527	3.12
Supply, Erection Testing, Commissioning of **11 KV Single circuit** transmission lines using ISMB175, ACSR conductor along with cross arm, Porcelain disc insulator, Pin insulator, stray set , earth pit & hardware accessories of adequate sizes including civil works along with necessary materials as required	KM	3.32	1,411,224	4,685,264	4.69
Supply, Erection Testing, Commissioning of **11 KV Double circuit** transmission lines using ISMB175, ACSR conductor along with cross arm, Porcelain disc insulator, Pin insulator, stray set , earth pit & hardware accessories of adequate sizes including civil works along with necessary materials as required	KM	2.49	2,230,198	5,553,192	5.55
Supply, Erection Testing, Commissioning of **415 V Single circuit** transmission lines using ISMB175, ACSR conductor along with cross arm, Porcelain disc insulator, Pin insulator, stray set , earth pit & hardware accessories of adequate sizes including civil works along with necessary materials as required	KM	1.66	1,427,473	2,369,605	2.37
			Internal transmission line	**16,642,533**	**16.64**
Supply, Erection Testing, Commissioning of 11kV/415 V, 500kVA outdoor distribution Transformer along with earth pit, hardware accessories of adequate sizes including civil works along with necessary materials as required	Nos	21.00	1,333,333	28,000,000	28.00
Supply, Erection, Commissioning of four pole structure using ISMB 175, '0' gauge copper conductor along with cross arm, Porcelain disc insulator, Pin insulator, stray set , earth pit & hardware accessories of adequate sizes including civil works along with necessary materials as required	Nos	21.00	242,424	5,090,909	5.09
			LT transmission transformer	**33,090,909**	**33.09**

Cost Abstract

Street Light

Description	Unit	Qty	Rate	Amount in Taka	Amount in Million Taka
Design, manufacture, testing and inspection at places of manufacturer, painting, supplying delivery at site, installation, final painting, testing and commissioning of 415 v street lighting **feeder pillar panel** suitable for outdoor installation, made up of CRCA sheets steel of thickness not less than 2 mm with a weather proof canopy of top, double door construction, IP 55 production, anti corrosive chemical resistant paint with 300 A switch fuse unit with 100 A fuses and 63 A TP Contactor in the incoming and 8 nos. 100 A switch fuse unit with 63 A fuses and adequate plate to terminate 3.5 x 185 sq. mm. cable as incomer and 8 Nos. 3.5 c x 35 sq.mm. cable as outgoing. 24 Hrs. timer for automatic switching ON/OFF as per pre-sets time cycle including concrete pedestal and associated civil works.	Nos.	1.00	155,000	155,000	0.16
Design, manufacture, testing and inspection at places of manufacturer, painting, supplying, delivery at site, installation, final painting, testing and commissioning of **415V EB incoming metering panel** suitable for outdoor installation, made up of CRCA sheets steel of thickness not less than 2 mm with a weather proof canopy of top, double door construction, IP 55 production, anti corrosive chemical resistant paint with 3 nos. of 300 A porcelain cut-out, neutral link, locking facility with necessary interconnection as per local Electricity Board.	Nos.	1.00	31,000	31,000	0.03
Design, manufacture, testing and inspection at places of manufacturer, painting, with anti corrosive chemical resistant paint as per IS:157 of approved brand and supplying, delivery at site, installation, final painting, testing and commissioning of **street lighting poles** suitable for mounting **2 nos. street light fixture** with total height of **12.0 Mtr.** along with base plate, cross arm bracket & GI pipe sleeves for cable protection, earthing terminals, complete with painting. All civil works required such as excavation, concrete foundation, coping, removal of surplus earth etc.,	Nos.	-	27,309	-	-
Design, manufacture, testing and inspection at places of manufacturer, painting, with anti corrosive chemical resistant paint as per IS:157 of approved brand and supplying, delivery at site, installation, final painting, testing and commissioning of **street lighting poles** suitable for mounting **2 nos. street light fixture** with total height of **9.0 Mtr.** along with base plate, cross arm bracket & GI pipe sleeves for cable protection, earthing terminals, complete with painting. All civil works required such as excavation, concrete foundation, coping, removal of surplus earth etc.,	Nos.	185.00	21,902	4,051,778	4.05
Design, manufacture, testing and inspection at places of manufacturer, painting and supplying, delivery at site, installation, final painting, testing and commissioning of **outdoor weather proof junction boxes** with 10 A DP MCB per fixture and terminals for terminating two cables. Junction box will be suitable for looping in and out one incoming and 2 out going cables on strategic locations wherever required.	Nos.	185.00	2,067	382,333	0.38
Design, manufacture, testing and inspection at places of manufacturer, and supplying, delivery at site, unloading, storing, transporting directly to site or through transit stores as the case may be, installation, final painting, testing and commissioning of **street lighting fixtures** suitable for 250 W SONT along with control gear, capacitor and 250 W SONT lamps	Nos.	370.00	11,367	4,205,667	4.21
3½ x 300 Sq.mm. AYFY	Mtr	-	1,364	-	-
			-	-	-
3½ x 185 Sq.mm. AYFY	Mtr	250.00	827	206,667	0.21
			-	-	-
3½ x 35 Sq.mm. AYFY	Mtr	6,865.00	238	1,631,582	1.63
			-	-	-
Supply, installation. Testing & Commissioning of cable and termination along with Single compression type brass cable glands, aluminium / copper cable **end sockets** etc. of following sizes of cables			-	-	-
3½ x 300 Sq.mm. AYFY	Nos	-	806	-	-
			-	-	-
			-	-	-
3½ x 35 Sq.mm. AYFY	Nos.	392.00	258	101,267	0.10
			-	-	-
Supply, Installation, Testing & Commissioning, of epoxy resin cast **straight through joint** of 3½ x 185 Sq.mm. AYFY of XLPE insulated, PVC sheathed, PVC overall insulated aluminium conductor, armoured cable.	Nos.	-	4,650	-	-
Supply, erection, testing and commissioning of **High Mast Light** system confirming to IS 875, 30 Mtr height with the following:-	Nos	2.00	1,033,333	2,066,667	2.07
Supply, Installation, Testing and Commissioning of Earthing station consisting of **GI Pipe earth** electrode, with suitable chemical back filling compound, brick masonry work for chamber 300 x 300 mm. CI cover, watering pipe, funnel and earthing conductor as per IS:3043. All civil works required such as excavation in all types of soils, rocks, PCC Earthing Chamber foundation, reinstatement and making good the surface to match original, removal of surplus earth etc. are included.	Nos.	2.00	5,167	10,333	0.01
Supply, Installation, Testing & Commissioning of 25 x 6 mm. Size hot dip **G.I. Earthing strip**, for feeder pillar panel / metering panel earth stations and in between two lengths of strips are included. All civil works required such as excavation in all types of soils, rocks, reinstatement and making good the surface to match original, removal of surplus earth etc. are included.	Mtr	100.00	103	10,333	0.01
Supply, installation, testing & commissioning of **150 mm dia. hume pipe** across the road wherever cables are crossing the roads. All civil works required such as excavation in all types of soils, rocks, bitumen road, WBM layers, reinstatement and making good the surface to match original, removal and disposal of surplus earth etc. are included.	Mtr	53.00	362	19,168	0.02
Supply, installation, Testing & Commissioning of **Cable markers** made of galvanised CI circular 100 mm. dia. with "LT CABLE" markers on same by 30 mm. size letter. The cable marked shall be firmly installed with 450 mm anchoring below ground level.	Nos.	137.00	362	49,548	0.05
Total				**12,922,583**	**12.92**

Cost Abstract

Sewer Network

Description	Unit	Quantity	Rate in Taka	Amount	Amount in Million Taka
Excavating trenches of required width for pipes, cables, etc including excavation for sockets and dressing of sides, ramming of bottoms, depth upto 1.5m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20cm in depth, including consolidating..etc : Pipes,cables etc.exceeding 80mm dia but not exceeding 300mm dia	Cum	16409.77	325.00	5333176.06	5.33
Constructing brickmasonry circular manhole 0.91m internal dia at bottom and 0.56m dia at top in cement mortar 1:4 inside cement plaster 12mm thick in cement mortar 1:3 foundation concrete 1:3:6 mix and making ..etc	Each	80.00	2371.00	189680.00	0.19
Constructing brickmasonry circular manhole 1.22m internal dia at bottom and 0.56m dia at top in cement mortar 1:4 inside cement plaster 12mm thick in cement mortar 1:3 foundation concrete 1:3:6 mix and making ..etc	Each	71.00	2534.00	179914.00	0.18
Constructing brickmasonry circular manhole 1.52m internal dia at bottom and 0.56m dia at top in cement mortar 1:4 inside cement plaster 12mm thick in cement mortar 1:3 foundation concrete 1:3:6 mix and making ..etc	Each	27.00	2755.00	74385.00	0.07
Providing, laying and jointing of pipe approved material and brand for sewer network including transporting to the spot, handling, lifting, etc all including jointing of pipes as per standard, testing, ancillary materials, labour all complete and as directed by the engineer-in-charge					
Sewer pipe - RCC hume pipe 150mm dia	Rm	2393	795.60	1903870.80	1.90
Sewer pipe - RCC hume pipe 200mm dia	Rm	1329	1216.80	1617127.20	1.62
Sewer pipe - RCC hume pipe 250mm dia	Rm	798	1456.00	1161888.00	1.16
Sewer pipe - RCC hume pipe 300mm dia	Rm	532	1761.50	937118.00	0.94
Sewer pipe - RCC hume pipe 450mm dia	Rm	266	2171.00	577486.00	0.58
Sewer pipe - RCC hume pipe 500mm dia	Rm	0	2574.00	0.00	0.00
Sewer pipe - RCC hume pipe 500mm dia	Each	135	3138.00	423630.00	0.42
					12.40

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