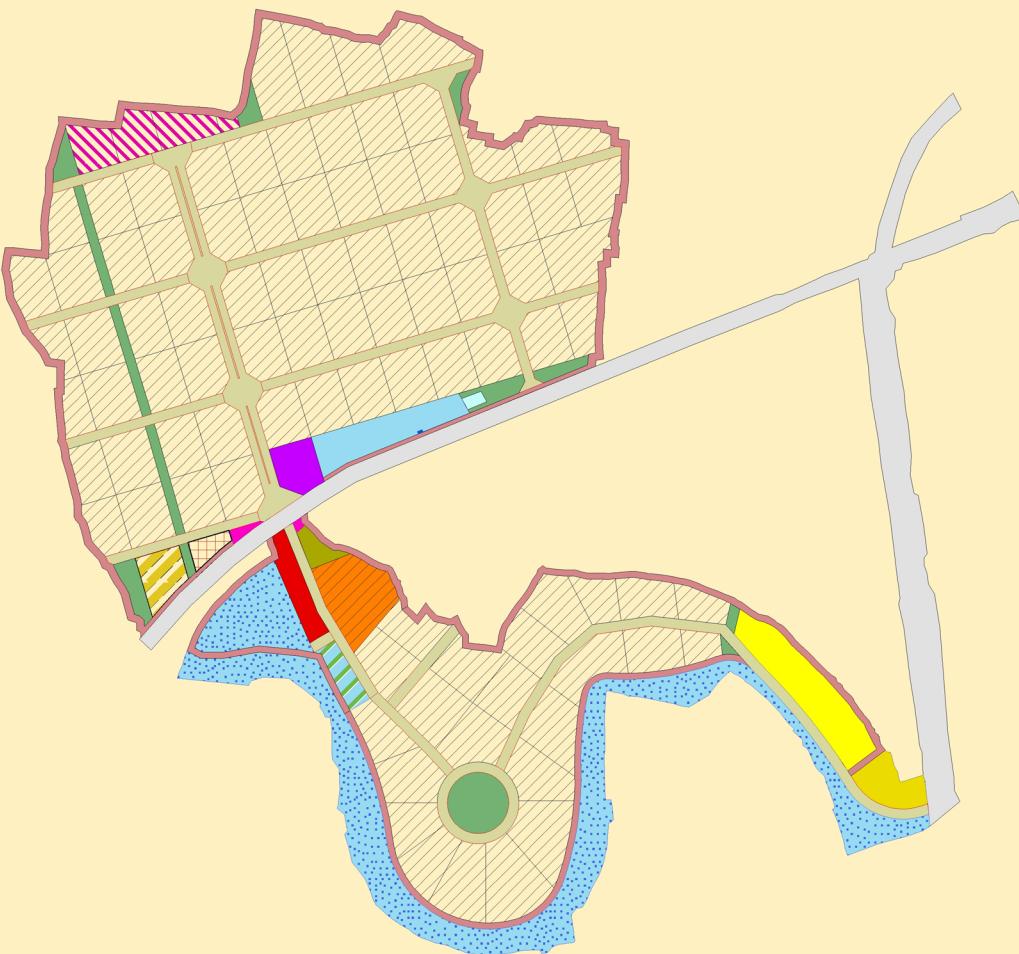




Feasibility Study for SHERPUR ECONOMIC ZONE

AUGUST, 2014



FEASIBILITY STUDIES FOR ECONOMIC ZONES
SUPPORT TO CAPACITY BUILDING OF
BANGLADESH ECONOMIC ZONES AUTHORITY PROJECT
UNDER PRIVATE SECTOR DEVELOPMENT SUPPORT PROJECT

Supported By the World Bank
Implemented By Bangladesh Economic Zones Authority (BEZA)
Under Office of Prime Minister, GoB.



Consultants

JDI Japan Development Institute

MAXWELL STAMP I LTD

শেল্টেক *Since 1988* SHELTECH

Executive Summary

1. The proposed Sherpur Economic Zone (EZ) has the potential to become a successful economic zone. Once developed, it will be a small, but a fast track EZ covering an area of 143 hectares (353.53 acres). It is expected that there will be a huge demand for plots in the Sherpur zone, from both local and foreign investors.

Site Justification:

2. With the presence of a power plant, gas field, and fresh water source nearby, the proposed EZ site provides a very good prospect for the establishment of a successful economic zone. Moreover, the site is located by the side of the Dhaka – Sylhet Highway, and as such, has a good road link with Dhaka and Chittagong. The proposed EZ site is 435 Km away from Chittagong Port and 208 Km away from the Dhaka Inland Clearance Depot (ICD). It also has road connectivity with major destinations within the country. The location of the site, with all infrastructural facilities and a good road and rail network, is the main justification for setting up an EZ at Sherpur.

Location and Present Condition:

2. The proposed EZ is located in the Maulvibazar District of the Sylhet Division, at the point at which Dhaka – Sylhet Highway and Sylhet – Maulvibazar Highway converge at Sherpur. The site is 35 Km from Sylhet and 23 Km from Maulvibazar. Sreemangal Railway Station is 43 Km away from the proposed site.

3. Presently, the land is used for rice paddy production, with some residential units arrayed in a low density pattern around the site. The present infrastructure condition is as follows:

- (i) A 230KV high voltage line passing through the site
- (ii) A Power line of 0.4 KV is also available
- (iii) A Gas supply source is available at 6 Km from the site.
- (iv) The Dhaka-Sylhet Highway passes through the site dividing it into North and South.
- (v) An optical fibre line passes through the highway. A telephone exchange (Tajpur Exchange) is 13 Km from the site.
- (vi) Surface water is available from the Kushiyara River within 1 Km.
- (vii) There is a large water body in the southern part of the site.

Study Findings:

4. The study team has developed the results of the competitive comparison exercise by aggregating the information on seventeen (out of more than fifty) largely quantitative indicators. Variables aggregated included price, capacity, and zone-size variables that have been appropriately standardized. Although not yet built, Sherpur EZ achieved the second highest rating when all indicator variables are accounted for according to this comparison exercise. First, third, and fourth billing in the exercise went to Mirershorai EZ, Vietnam-Singapore Industrial Park (VSIP), and Anwara EZ respectively.

Potential Industries:

5. Bangladesh suffers from a severe shortage of fully serviced industrial plots, particularly in the Dhaka and Chittagong Industrial Corridors. Therefore, establishing an Economic Zone at the Sherpur site, with all necessary utilities, will open up good opportunities for potential investors to establish their entities. Although the competitive analysis indicates that Sherpur EZ is struggling to attract FDI due to its location far from the urban city of Dhaka and Port city of Chittagong, and, lacks living

amenities for foreigners, it can attract domestic investors who have waited for a long time for fully serviced industrial plots on which to set up their industries.

6. The study team's intensive market investigation shows that domestic industries, for which demand is increasing rapidly in sectors such as Textiles (spinning, weaving, dyeing, and finishing) and Ceramics, etc. are looking for fully serviced industrial land, and the proposed Sherpur EZ could be one such location. The international market trend indicates that the Garment and Textile sector will dominate industrial production in Bangladesh for at least the next 20 years. According to the discussion with the Bangladesh Textile Mills Association (BTMA), their members are presently looking for more than 120 hectares (300 acres) of land, and will be willing to invest in Sherpur if the EZ offers fully serviced plots.

7. Selection of industries has been made on the basis of the nature and type of the market investigation. A detailed market survey was undertaken with 107 local and foreign operating industries inside and outside of the country covering a wide range of products. A careful scrutiny of the demand by these industries indicates that there is a high demand for Sherpur plots, particularly for integrated textiles and other backward linkage industries of the garment sector. The Food processing industries and ceramic industries also have shown interest in Sherpur plots with similar intensity, followed by the Pharmaceuticals and Paint and Chemicals industries. In short, the industry mix has been determined on the basis of the demand for power, gas, water, and other logistical access for the current industries with high potentials.

8. At full build-out and occupation, Sherpur EZ is expected to employ directly an estimated 25,446 people within 1.5 to 2.0 years after the land is leased. The Project is also expected to create an additional 12,723 jobs indirectly, due to its spillover effects. Therefore, combined total direct and indirect employment attributable to Sherpur EZ is expected to reach 38,169 workers, and have an average number of jobs per hectare of 287 - less than half of Dhaka EPZ and three fifths that of Chittagong EPZ.

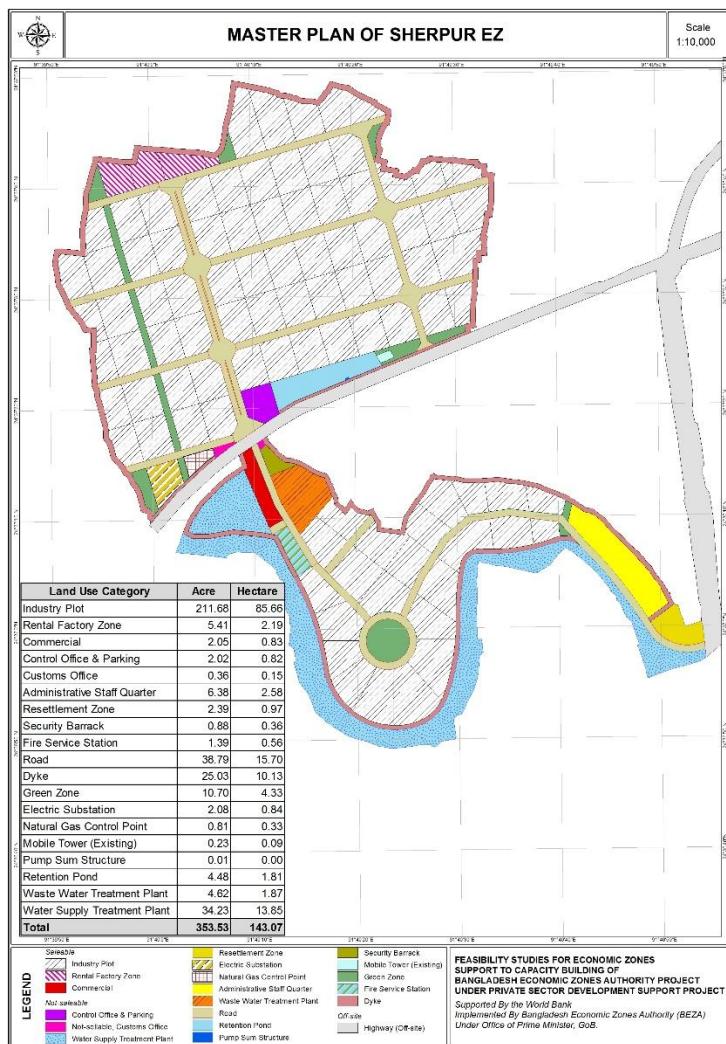
Master Plan:

9. Of the total 143 hectare (353.53 acre) land area, 88 hectare (217.37 acre) is privately owned and needs to be acquired before the initiation of the construction of the EZ. The optimal mechanism that would produce an efficient land acquisition is addressed in the report along with a viable grievance redress of any and all people affected in the transaction the details of that transaction can be found in Chapter 4. The remaining land is owned by the government and can be used without needing any further acquisition process.

10. Summary of distribution of this land under different uses is estimated to be as follows. Detail can be found in Chapter 3.

| Land Use | Total | | Percentage |
|-------------------------|---------------|----------------|-------------------|
| | Acre | Hectare | |
| Leasable Land | 219.14 | 88.68 | 61.98 |
| Land for Administration | 11.02 | 4.46 | 3.12 |
| Infrastructure | 110.04 | 44.53 | 31.12 |
| Green Zone & Other | 10.94 | 4.43 | 3.10 |
| Resettlement Zone | 2.39 | 0.97 | 0.68 |
| Total | 353.53 | 143.07 | 100.00 |

The Master Plan is shown in the figure below.



11. The Master Plan allocates the maximum possible space for industrial use, taking into account the other basic requirements of the Project. Sherpur Economic Zone will have a modern infrastructure, including a power supply connection, water supply treatment system, waste water treatment system, a telecommunications system, and a flood protection/control system of international standard. "A Fully Packaged Utilities and Environmentally-Friendly Industrial Zone" is the development concept of the Master Plan. The industrial area will be fragmented into 01 hectare (2.47 acre) plots for the convenience of the investors.

12. Based on the team's study, the indications are that the proposed Sherpur EZ will attract a good number of investors within 3-4 years. If the Sherpur EZ Project starts as a fast track EZ from 2016, the entire EZ is expected to be leased out to the investors by 2018, and the Bangladesh Economic Zone Authority (BEZA) may consider additional land for expansion. It is, therefore, imperative that the Project be implemented successfully as early as possible. The approval of the EZ, land acquisition, and other primary activities may be completed within 2015 and construction may start from 2016. If the land acquisition and planning/design works are not completed according to schedule, the Project development will risk significant delay.

13. Utility demand per hectare per day has been ascertained from an equivalent demand survey of 107 industries. Using this number the utility demand for the zone has been estimated. It was found that the total annual power demand in 2022 will be 33.04 MW, water demand - 59,011 m³/day, and gas demand - 655,312 m³/day. These numbers have been used to finalize the capacity of the electric

supply system, the natural gas control point, the water supply treatment plant, and the waste water treatment plant in the Master Plan.

14. The construction cost estimates have been assessed for the single phase (2016 – 2019). The Sherpur Economic Zone requires BDT 5,611,646,315 (US\$70,145,579) for the on-site infrastructure and BDT 617,531,899 (US\$7,719,149) for the off-site infrastructure in the single phase. About 162.80 acres (65.91 hectare) of land will become available for sale in 2017 and another 56.24 acres (22.77 hectare) of land will become available for sale in 2018.

15. Building guidelines are prepared for the proposed EZ site, and these include Architectural Plans, Compulsory Open Space Requirements, Compulsory Exterior Requirements, Utility Connections, and approval of the General Contractor. Specific figures have been proposed for designating the high quality standard of the proposed Economic Zones.

Transportation System Proposal:

16. The scope of Railway transportation of goods is also promising for the proposed EZ. The nearest Railway Stations are Sreemangal 43 Km and Sylhet 35 Km distance from the site. A rail-based Inland Clearance Depot (ICD) at Sreemangal Railway Station is proposed and detailed layout and estimated budget is given. It is proposed that the ICD facility be developed by the Government of Bangladesh (GoB) and leased out on a long-term basis to any private experienced Terminal Management Company (TMC) with the responsibility of equipping, operating and managing the Terminal. In addition, the scope of waterway transport has been elaborated taking into account the proposed development of an Ashuganj River (Transit) Terminal, currently under study. Since the products of this proposed EZ will be destined to reach both domestic and international markets, a logistical solution along with multimodal transport platforms for cargo handling are suggested in detail in the body of the report.

Environmental Assessment:

17. The possible environmental impact of Sherpur EZ has been identified in the following areas:

1. Loss of paddy land and marshy areas due to EZ development.
2. Reduction in surface area leading to death of mother fisheries and other aquatic habitats (beels) due to sedimentation, drainage and river diversion for water extraction.
3. Minor risk of degradation of aquatic habitat due to potential chemical pollution from the proposed Economic Zone.

18. This Initial Environmental Examination (IEE) has been developed in compliance with the GoB legal requirement and the World Bank environmental assessment guidelines for infrastructure projects. The methodology of the IEE includes review of data from the engineering design, surface and groundwater, aquatic and terrestrial ecology, and stakeholder consultation. Environmental impacts and mitigation measures are considered for soils and geology, air quality, noise and vibration, surface water and hydrology, flora and fauna.

19. Since the proposed Sherpur EZ is relatively small, and the intention is to install international standard water, air, and solid waste treatment facilities, so the negative impact on the above area is likely to be minimal. Therefore, implementation of this Project is not likely to affect the environment of the Sherpur area.

Social Aspects:

20. The social analysis has been carried out considering the World Bank's policies on involuntary resettlement, gender and tribal issues, physical and cultural resource issues, and also considering the Land Acquisition and Requisition of Immovable Property Ordinance, 1982. Potential social impacts

on people living on the designated site of the EZ, and affected by off-site infrastructure development for the EZ are also assessed in the study. Stakeholders in the consultation stressed the positive impacts of the EZ on the livelihoods of the people of the adjacent areas. The prevailing food situation is likely to be affected, but the benefits of job creation and income levels will outweigh the loss to be incurred. Presently, the site consists of five homesteads with a population of 39 and their resettlement has been taken into consideration in the project by providing a resettlement zone. The EZ will provide job opportunities with better wages, and this poor population will benefit from that.

Institutional and PPP Scheme:

21. The institutional structure and Public Private Partnership (PPP) Scheme must be tailored to accommodate the existing conditions and achieve the project development objectives. Considering all aspects, the "concession PPP model" is recommended. The detail of this model is discussed in the report. In order to implement the EZ program successfully, BEZA should follow a workable legal framework and implementation process. The responsibility of BEZA associated with the PPP model is highlighted in the body of the report. Though the legal framework is present, the Authority is yet to formulate detailed guidelines and regulations in all major areas, and that is to be completed prior to operation of this EZ. Capacity building for BEZA officials is essential for the successful supervision and operation of the PPP Scheme. It may be mentioned that, the present land regulation of 30 years lease may act as a barrier to attracting private developers/investors. The Government has to increase the lease period up to 99 years or at least 50 years and give permission to transfer the leased-in properties. Details of this are given in the body of the report. One-Stop Service (OSS) needs to be carried out properly while a 'Steering Committee' is recommended for efficient and successful operation of the proposed EZ.

Project Financing:

22. Financing of the EZ may be accomplished in one of two ways - equity by private sector, and loans by local financial institutions and multilateral agencies guaranteed by the Government of Bangladesh (GoB). Innovative loan packages created by the Bangladesh Government and multilateral agencies are needed for: (1) EZ and infrastructure concessional loan (two-steps or direct loan) to developer/operator of EZ, and (2) a package loan for off-site infrastructure, and (3), a loan for land acquisition.

Financial and Economic Analysis of the Project:

23. The total cost of the Project is estimated to be US\$94.68 million (including acquisition), excluding off-site costs. The EZ will generate revenue from the long term lease of EZ land and commercial plots and from the lease of the rental factory building space. It will also earn revenue as full charge from supplying water and waste water effluent treatment, and as service charges from supplying gas and maintaining the EZ. The total amount of revenue to be generated from the lease on sale of industrial plots and commercial plots is estimated to be US\$48.17 million.

24. According to the estimation regarding costs of the project and revenue earnings, the Project IRR stands at 17.27% and 20.67% respectively in the base case and alternative scenario – 2. The above IRR could be achieved by funding all capital expenditures through cash instead of debt. With the debt/equity ratio utilized by a Special Purpose Vehicle (SPV) company, equity investors could potentially secure a rate of return (equity IRR of 27.78% and 40.18% in base case and scenario-2 respectively) – appreciably higher than the targeted/benchmark equity IRR of 18-20% for investment. The reason for this is that, the IRR of the Project is above the interest rate on long term concessional commercial debt. This study concludes, based on financial analysis, that the Sherpur EZ is a financially feasible project for a developer &/or operator.

25. BEZA may provide support in terms of land acquisition and arrangement of soft long term commercial loans guaranteed by the GoB and financing the off-site infrastructure by public funding.

The study considers lease on sale rather than lease on rent having lease period of 30 years and transferability conditions as well for the purpose of SPV Company.

26. The Economic IRR (EIRR) in the base-case is found to be 27.7% showing that the Project is economically viable. This conclusion is found to be quite robust throughout the ‘what-if’ scenarios involving: (i) a 10% increase in all costs; (ii) a 10% rollback in all benefits; and (iii) a combination of (i) and (ii).

Conclusion:

27. Although this study was carried out over a short period of time as a preliminary Feasibility Study & Master Plan, taking all the information collected and evidence assembled into consideration, the conclusion may be drawn that the proposed site is likely to be viable for the establishment of an Economic Zone and recommend BEZA/Bangladesh Government should consider for the next steps: (1) Initiation of the land purchase process, (2) Discussion with local residents who may require relocation, (3) Commencement of the off-site infrastructure provision process, and, (4) Identification of a potential developer. Once the potential developer is identified, that developer would: a) add further detail market analysis, b) conduct necessary soil borings to understand the stability of the soil, and, c) carry out a hydrological survey and review of the Master Plan & Feasibility Study in direct accord with the detailed survey result. Considering the severe shortage of fully-equipped economic zones in Bangladesh and the potential high demand for economic zones, the Sherpur EZ project is likely to be implemented successfully. However, the benefits of the Project will greatly depend on how quickly and efficiently the proposed EZ moves forward in the development process.

Matrix Summary (Using Log-frame)

| | Narrative Summary | Objectively Verifiable Indicators (OVI) | | | Means of Verification (MOV) | Assumptions | |
|-------------------------|--------------------------|---|---|--|-----------------------------|--|--|
| Development Hypotheses | If Purpose, Then Goal | Project Goal: <ul style="list-style-type: none">Enhancement of Industrial Production and National Export. <i>Note- the present Goods worth US\$ 2,040 million is produced and exported from Dhaka EPZ.</i> | <ul style="list-style-type: none">Goods worth US\$ 1,000 million to be produced, out of which US\$ 500 million to be exported after 2023. | | | <ul style="list-style-type: none">BEZA Project Record.Record from Bangladesh BankRecord from BBS | |
| | | Project Purpose: <ul style="list-style-type: none">Sherpur EZ operational. | <ul style="list-style-type: none">Five integrated textile industries functional within 2019.4 - No. of pharmaceutical industries within 2019.3 - ceramic industries within 2019.9 - food processing industries within 20194 Other industry (Packaging, Leather etc.) within 2019. | | | <ul style="list-style-type: none">BEZA Project Record.SPV Company Record <ul style="list-style-type: none">International market for Bangladeshi garments does not fall and present growth rate is maintained.No work stoppage and unruly behaviour of workers.No severe natural calamities.The national growth rate of production and export remain the same. | |
| Manageable Interest | If Outputs, Then Purpose | Output: | Quality | Quantity | Time (Year) | <ul style="list-style-type: none">BEZA Project Record.Maulvibazar Registry Office and AC Land Office RecordSPV Company Record <ul style="list-style-type: none">Export growth rate of Bangladesh does not fall.No political disturbance like continuous blockade or hartal, etc.Government of Bangladesh provides continuous support to BEZA and allows connection of power and gas from national grid during project operation time. | |
| | | • Land Acquisition and Zone Approved by Government for EZ | Private Land Acquisition Public Land Under Control | 217.37 Acres (88 Hectares) 135.52 Acres (54.87 Hectares) | 2014 2014 | | |
| | | • Selection and Engagement of SPV Company. | Zone approval by SRO publication Experienced Developer | - 1 No. | 2014 | | |
| | | • All infrastructure facilities developed. | Land Development, Road, Water Supply System etc. | - | | | |
| | | (i) Land Development | Site Clearing, Dredging, Levelling | 353.53 Acre (143.07 Hectare) | 2015 - 2017 | | |
| | | (ii) Road | 33 m wide Main Road (Bituminous Carpet) 19.5 m wide Minor Road (Bituminous Carpet) | Length 746 m Length 6,315 m | 2016 2018 | | |
| | | (iii) Water Supply System | Treatment Plant (60,000m³ Capacity), Pipe Work (Upvc), Water Tower, River Intake System, Hydrant, Valve etc. | Treatment Plant 1 No, Pipe Work 8,082 m, Water Tower 1 No, River Intake System 1 set. & Others | 2016- 2018 | | |
| | | (iv) Electrical System | 33/11 KV SS, 11/0.4 KV TP, Internal Networking, Street Lighting, Testing & Commissioning etc. | 33/11 KV SS 1 set, 11/0.4 KV TP 16 set, 10,488 m Internal Network, etc. | 2016-2018 | | |
| | | (v) Dike System | Traditional Dike, Ditch, Retention Pond, Pumps, Fencing etc. | Dike & Ditch 148,250 m³, Fencing 10,149 m etc. | 2015- 2017 | | |
| | | (vi) Drainage System | U-Drain inside (W= 70cm, 1.0m, 1.5m, 2.0m, 3.0m) Outside (W=2.0m) | Inside 15,844m, Outside 3,000m length | 2016-2018 | | |
| If Inputs, Then Outputs | | (vii) Plantation | Tall tree along the road and dike | 4,634 Nos. | 2015-2017 | <ul style="list-style-type: none">BEZA Project Record.Maulvibazar Registry Office and AC Land Office RecordSPV Company Record <ul style="list-style-type: none">Export growth rate of Bangladesh does not fall.No political disturbance like continuous blockade or hartal, etc.Government of Bangladesh provides continuous support to BEZA and allows connection of power and gas from national grid during project operation time. | |
| | | (viii) Waste Water Collection and Treatment System | Pipe works, Tower, Treatment Plant etc. | Pipe works 35,016 m, Tower & Pump 1 set. | 2016-2018 | | |
| | | (ix) Residential, Administrative Buildings and Rental Factory Buildings Constructed | Staff Quarter (2500, 1500, 1000 & 600 sft Buildings), Control Office 4000 m² Rental Factory Total Floor Space 28,000 m² | Control Office 1 set, Staff Quarter Building 9 set, Rental Factory Buildings 7 set | 2016-2018 | | |
| | | (x) Gas Pipeline | Pipe Network (1-4" dia MS Pipe) | 10,619 m | 2016- 2018 | | |
| | | (xi) Telecommunication System | FTTc 512 subscribers, OFC Network, Router, ODF, Power System etc. | FTTc 1 set, Router 1 set, OFC network 9842 m etc. | 2016-2018 | | |
| | | Land Leased out to local and foreign investors by SPV company | Local & foreign investors of different categories | Minimum 34 investors are allowed to setup their industries in EZ | 2017- 2019 | | |
| | | Inputs: Activities and Type of Resources | Quality | Quantity | Time (Year) | <ul style="list-style-type: none">BEZA Project Record.Maulvibazar Registry Office and AC Land Office Record <ul style="list-style-type: none">Private land owners cooperate with BEZA and handover their land for EZ.Land regulation is changed by the government (longer leasing period for 50 years and transferability condition)Good response from local and foreign developer company.Present level of attraction for Bangladesh as investment destination remains unchanged. | |
| | | • Meeting of Board of Governors of BEZA arranged and decision to publish SRO for declaring proposed site as Sherpur EZ | Meeting of Board of Governors of BEZA | 1 Meeting | Early 2014 | | |
| | | • Floating tenders for selection of SPV Company | Tendering Process | 1 | End 2014 | | |
| | | • Development of Infrastructure | Detail Design | 1 | Early 2015 | | |
| | | (i) Land Development | Site Clearing, Dredging, Levelling | BDT 978,357,183 (US\$12,229,465) | 2016 | | |

| | | Narrative Summary | Objectively Verifiable Indicators (OVI) | | Means of Verification (MOV) | Assumptions |
|--|--------|--|---|------------------------------------|------------------------------------|--------------------|
| | (ii) | Road Constructed | 19.5 m and 33 m wide road | BDT 484,270,252 (6,053,378) | 2017 – 2019 | |
| | (iii) | Water Supply System Developed | Treatment Plant (60,000m ³ Capacity), Pipe Work, Water Tower, River Intake System, Hydrant, Valve etc. | BDT 1,263,383,182 (US\$15,792,290) | 2016 – 2018 | |
| | (iv) | Electrical System Established | 33/11 KV SS, 11/0.4 KV TP, Internal Networking, Street Lighting, Testing & Commissioning etc. | BDT 59,865,128 (US\$748,314) | 2016- 2019 | |
| | (v) | Dike System Constructed | Dike, Ditch, Retention Pond, Pumps, Fencing etc. | BDT 173,052,000 (US\$2,163,150) | 2016- 2017 | |
| | (vi) | Drainage System Established | U-Drain inside (W= 70cm, 1.0m, 1.5m, 2.0m, 3.0m) Outside (2.0m) | BDT 299,144,502 (US\$3,739,306) | 2017-2018 | |
| | (vii) | Plantation Completed | Tall tree along the road | BDT 3,459,194 (US\$43,240) | 2018-2019 | |
| | (viii) | Waste Water Collection and Treatment System Installed | Pipe works, Tower, Treatment Plant etc. | BDT 903,956,163 (US\$11,299,452) | 2016-2018 | |
| | (ix) | Residential, Administrative Buildings and Rental Factory Buildings Constructed | Staff Quarter (2500, 1500, 1000 & 600 sft Buildings), Control Office 4000 m ² Rental Factory Total Floor Space 28,000 m ² | BDT 1,409,983,568(US\$17,624,795) | 2016-2019 | |
| | (x) | Gas Pipeline Installed | Pipe Network (1-4" dia MS Pipe) | BDT 15,472,546 (US\$193,407) | 2016-2017 | |
| | (xi) | Telecommunication System Installed | FTTC 512 subscribers, OFC Network, Router, ODF, Power System etc. | BDT 20,702,597 (US\$258,782) | 2018-2019 | |
| | (xii) | Total Construction Cost | All infrastructure | BDT 5,611,646,315 (US\$70,145,579) | 2016-2019 | |

Note: Land regulations should be included as one of the inputs, as it is a critical assumption.

Carefully choosing experienced and capable SPV Company and supervision and monitoring development works are needed.

Training of BEZA Officials is essential.

Offsite is not included into the matrix. Total offsite cost is BDT 617,531,899 (7,719,149 US\$). This cost should be borne by the government simultaneously with the project.

Abbreviations

| | |
|--------|---|
| ADB | Asian Development Bank |
| ASEAN | Association of Southeast Asian Nations |
| BB | Bangladesh Bank |
| BEPZA | Bangladesh Export Processing Zone Authority |
| BEZA | Bangladesh Economic Zone Authority |
| BG | Broad Gauge |
| BIAM | Bangladesh Institute of Administration and Management |
| BIFFL | Bangladesh Infrastructure Finance Fund Limited |
| BIWTA | Bangladesh Inland Water Transport Authority |
| BOI | Board of Investment |
| BPDB | Bangladesh Power Development Board |
| BTMA | Bangladesh Textile Manufacturers Association |
| BWDB | Bangladesh Water Development Board |
| CCI&E | Chief Controller of Imports and Exports |
| CCT | Chittagong Container Terminal |
| CDs | Customs Duties |
| CDSP | Char Development and Settlement Project |
| CEPZ | Chittagong Export Processing Zone |
| CNG | Compressed Natural Gas |
| CNN | Cable News Network |
| CPA | Chittagong Port Authority |
| DBFOOT | Design-Build-Finance-Own-Operate-Transfer |
| DC | District Commissioner |
| DG | Double Gauge |
| DoE | Department of Environment |
| EA | Environmental Assessment |
| EBRIDP | Eastern Bangladesh Rural Infrastructure Development Project |
| ECC | Environmental Clearance Certificate |
| ECR | Environmental Conservation Rules |
| EIA | Environmental Impact Assessments |
| EIRR | Economic Internal Rates of Return |
| EMP | Environmental Management Plan |
| ENPVs | Economic Net Present Values |
| EPZ | Export Processing Zone |
| ETP | Effluent Treatment Plant |
| EZs | Economic Zones |
| FDI | Foreign Direct Investment |
| FGD | Focus Group Discussions |
| FOC | Fiber Optic Cable |
| Ft/ft. | Foot/foot |
| FY | Financial Year |
| GCB | General Cargo Berth |
| GDP | Gross Domestic Product |
| GoB | Government of Bangladesh |
| Ha/ha | Hectare |
| HH | Household |
| HS | Harmonic-systems |
| ICD | Inland Clearance Depot |
| ICT | Inland Container Terminal |
| ICZM | Integrated Coastal Zone Management |
| IDCOL | Infrastructure Development Company Limited |
| IFC | International Finance Corporation |

| | |
|--------|---|
| IPFF | Investment Promotion and Financing Facility |
| IPP | Independent Power Producer |
| IPs | Industrial Parks |
| IRR | Internal Rate of Return |
| JBIC | Japan Bank for International Cooperation |
| JETRO | Japan External Trade Organization |
| JICA | Japan International Cooperation Agency |
| Km | Kilometre |
| KV | Kilo-volt |
| KWH | Kilo-watt Hour |
| LGED | Local Government Engineering Department |
| LIBOR | London Interbank Offered Rate |
| m | metre |
| MES | Minimum-Efficient-Scales |
| MMCFD | Millions of Cubic Feet per Day (of gas) |
| MPa | Megapascal |
| MSL | Mean Sea Level |
| MTD | Multimodal Transport Document |
| MTO | Multimodal Transport Operator |
| MW | Mega-watt |
| NCS | National Conservation Strategy |
| NCT | New Mooring Container Terminal |
| NEMAP | National Environmental Management Plan |
| NPV | Net Present Value |
| O&M | Operation and Maintenance Costs |
| ODA | Official Development Assistance |
| ODF | Optical Distribution Frame |
| OSS | One-Stop-Service |
| PAP | Project Affected People |
| PFI | Participating Financial Institution |
| PGCB | Power Grid Company of Bangladesh |
| PIU | Project Implementation Unit |
| PPP | Public-Private Partnership |
| PRG | Partial Risk Guarantees |
| QOL | Quality-of-Life |
| RAP | Resettlement Action Plan |
| RD | Regulatory Duty |
| REA | Rapid Environmental Assessment |
| REB | Rural Electrification Board |
| RMG | Ready-made Garments |
| SCF | Standard Conversion Factor |
| SD | Supplementary Duty |
| SEZ | Special Economic Zone |
| SME | Small and Medium-sized Enterprises |
| SOB | Survey of Bangladesh |
| SPV | Special Purpose Vehicle |
| SS | Substation |
| SWOT | Strength, Weakness, Opportunity, and Threat |
| TEU | Twenty-foot Equivalent Unit |
| UNO | Upazila Nirbahi Officer |
| VAT | Value-added Taxes |
| VGF | Viability Gap Financing |
| WARPO | Water Resources Planning Organization |
| WATSAN | Water Supply and Sanitation |
| WB | World Bank |

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Distance Table

Distance Table: Sherpur

| Distance (in Km) | Location (from Sherpur) |
|-------------------------|------------------------------------|
| 20 | District Headquarter (Maulvibazar) |
| 25 | Upazila Headquarter |
| 35 | Sylhet Railway Station |
| 43 | Sreemangal Railway Station |
| 55 | Osmani Airport in Sylhet |
| 208 | Dhaka City |
| 435 | Chittagong Port |

| Exchange Rate used in this report | |
|-----------------------------------|--------|
| US \$ 1 | BDT 80 |

CHAPTER 1

INTRODUCTION

1.1 Background

Bangladesh had achieved sustained annual GDP growth of approximately 6.3% during the Financial Years (FY) 2005-2009, even after the global financial crisis and global food price shock. This growth was nurtured by stable macro-economic and prudent monetary policies, rising industry and service outputs, and continuous high levels of remittances coming into the country. Going forward, the objective of the Government of Bangladesh (GoB) is to develop a growth trajectory that will generate an overall increase in the real GDP growth to 8% per annum and reduce the number of people living in poverty in the country from 40% down to 15% by 2021.

The uninterrupted growth in Bangladesh's labour force of nearly 2 million per year is an asset that simultaneously increases the country's vulnerability. Creating productive employment will largely depend on creating an environment conducive to private sector investment, particularly for establishing labour-intensive manufacturing and service industries.

The Government of Bangladesh has successfully provided tailored infrastructure services and a business environment through operation of the Export Processing Zones (EPZs). The Bangladesh Export Processing Zone Authority (BEPZA) was established in 1980. The EPZ Programme was the first systematic initiative to provide fully-serviced land and a better business environment for investors, targeting establishment of large-scale export-oriented manufacturing industries in the country.

But, the hard fact remains that, Bangladesh's EPZ Model has its limitations, both in terms of generating any cumulative positive impacts or creating any vertical or horizontal ripple effects in the domestic economy. As export enclaves, EPZs have provided little in the way of linked spillover benefits within the domestic economy, either up-stream or down-stream, resulting in a negligible technology multiplier effect, that usually accompanies foreign investment. Investments in other sectors beyond the low capital investment RMG sub-sector have also not materialized.

The Government's objective is, therefore, to maximize potential direct and indirect impacts through a more modern, generalized regime for Economic Zones (EZs) development. The Government has launched an effort to establish a new EZ paradigm for Bangladesh drawing vastly on successful examples from around the world, as well as Bangladesh's positive experience with the EPZ model. The expectation is that, more spillover benefits will come to local firms from foreign direct investment, and with that, additional investment will be encouraged within value chains, more local products will be procured, and closer linkages will be established between firms and educational institutions. A newly formulated EZ policy would also encourage faster private sector adaptation to the best international environmental and social practices.

The new EZ regime provides for a new approach, both in management and in investment. The policy allows the Government to develop and pilot an approach that is less reliant on Government subsidies, while leveraging comparative advantages and private sector capability wherever possible.

The Economic Zone Act was passed in the Parliament in August 2010, providing the overall framework for establishing EZs all over Bangladesh.

1.2 Objectives of the Project

Against the backdrop of the above scenario, the objective of the Project is to attract and leverage private investment in the development of Economic Zones. Specific investors will act as the Zone developers or operators and in the provision of tailored infrastructure services, i.e. private provision of electric power, effluent treatment, etc., on a Public-Private Partnership (PPP) basis.

1.3 Objectives of the Study

The objective of the study is to provide clear-cut (preliminary) data, information, and analysis of the feasibility status of the proposed Sherpur EZ on one of the three initially selected locations for the study, including (if found feasible): Transport Assessment, Industry/Market Assessment, Demand Forecasting, Master Planning, Infrastructure Requirements, and Institutional Framework including Financial and Economic analysis and an Environmental and Social Study.

1.4 Scope of the Study

This feasibility study is specifically for the Sherpur site only. It comprises all the following components.

- Component – 01: A Competitive Analysis, including Transport Assessment, Industry/Market Assessment and Demand Forecast;
- Component – 02: Master Planning, Infrastructure Requirements, and Environmental and Social Review;
- Component – 03: Institutional Framework; and
- Component – 04: Economic and Financial Modeling.

1.5 Study Methodology Adopted

The study will follow a market-driven approach and the methodology followed will comprise a collection of both qualitative and quantitative data and information from both primary and secondary sources, as has been indicated in the ‘Description of Approach, Methodology and Work Plan’ submitted in response to the Terms of Reference, with emphasis on the technical, economic, marketing, and financial soundness of the proposed Project sites.

1.6 Stakeholders’ Meetings and Workshops Organized

1.6.1 Organization of Stakeholders’ Meetings:

During the interim period, stakeholders’ meetings were held at the following places/locations:

- a) Maulvibazar Chamber of Commerce and Industry on August 31, 2013.
- b) Sylhet Chamber of Commerce and Industry on August 31, 2013.
- c) Chittagong Chamber of Commerce & Industry on September 02, 2013 at 10 AM (meeting minutes can be viewed in the annex to the report)

1.6.2 Organization of Workshops

The first workshop was organized in Dhaka in the auditorium of the Bangladesh Institute of Administration and Management (BIAM) on September 10, 2013. The Workshop was presided over by Mr Abul Kashem, Executive Member, BEZA, in which Mr Fakhrul Islam, Executive Chairman, BEZA, remained present as the Chief Guest. The Workshop agenda was as follows:

- a) Addresses by the distinguished guests.

- b) Presentation of Inception Report by Dr. Shoichi Kobayashi, Team Leader of the Feasibility Study Project.
- c) Open discussion.
- d) Address by the chief guest

The second workshop was held on November 28, 2013 in the Ball Room of Ruposhi Bangla Hotel. The workshop was presided over by Mr Fakhrul Islam, Executive Chairman, BEZA while Mr Shaikh Md. Wahid-uz-Zaman, Principal Secretary, Prime Minister's Office, attended the workshop as the chief guest. The minutes of the meeting may be reviewed in Annex-1. The agenda of the workshop was as follows:

- a) Address by the distinguished guest & Project Director, BEZA office
- b) Paper presentation by Dr. Shoichi Kobayashi, Team Leader of the Feasibility Study Project
- c) Address by the Principal Secretary, Prime Ministers' Office, and chief guest of the function
- d) Question and answering session
- e) Address by the BEZA Chairman & Secretary (in charge)

The third and final workshop was held on February 23, 2014 in the Ball Room of The Westin Hotel, Gulshan. The workshop was presided over by Mr. Fakrul Islam, Executive Chairman (Secretary in Charge), BEZA whereas the Honorable Minister, Ministry of Housing and Private Works, Engineer Mosharraf Hossain MP attended the workshop as the chief guest. Honorable Advisor to the Honorable Prime Minister, Dr. Mashiur Rahman, Honorable State Minister, Ministry of Land Mr. Saifuzzaman Chowdhury (Javed), and Secretary to the Prime Minister's Office Mr. Abul Kalam Azad attended the workshop as special guests. Among others, the President, FBCCI & the President, Chittagong Chamber of Commerce and Industry were also present. The agenda of the workshop was as follows:

- a) Welcome address by the Executive Chairman, BEZA
- b) Power Point presentation on Draft Final Report by the team leader Dr. Shoichi Kobayashi.
- c) Address of the special guests
- d) Address of the Chief guest
- e) Open discussion on the Draft Final Report
- f) Vote of thanks by the Project Director

1.7 Location of Sherpur EZ in Bangladesh

Sherpur EZ is located in Maulvibazar District of Sylhet Division. It falls under the jurisdiction of Maulvibazar Sadar Upazila. The EZ site is located combining part of Sherpur and Brahmangaon Mouza (Cadastral Unit). The figure in the next page shows the location of Sherpur EZ in Bangladesh.

Figure 1.7 - 1: Location of Sherpur EZ in Bangladesh

CHAPTER 2: COMPETITIVE ADVANTAGE AND INDUSTRY ASSESSMENT (COMPONENT 1)

CHAPTER 2

COMPETITIVE ADVANTAGE AND INDUSTRY ASSESSMENT

(COMPONENT 1)

2.1 Competitive analysis of Sherpur Economic Zone

The material in the two following subsections assesses the relative competitiveness and other related issues in the context of the proposed Sherpur Economic Zone (EZ) project. The assessment touches upon each of global (national), regional (Sylhet-related) and local (site-related) dimensions of competitiveness. Some aspects of competitiveness, including the overall regulatory performance, are best assessed at a national level of aggregation. Some other aspects---for example, operating costs, or the user-cost of the services of infrastructure---is best assessed using site-level data. Both methods have been utilized in the course of this competitiveness assessment.

In a market-driven roll-out of the EZ, prospective sites must pass the test of satisfactory competitiveness with regard to rival economic zones. This makes the case for carefully assessing competitiveness a compelling one. Competitiveness is about a collection of enabling capabilities that regions and, more specifically, sites, must have to pass as a test. Sometimes, such capabilities are called ‘investment factors.’ In a feasibility study, the characteristics of the region as well as the intra-region site are both in focus. Given the strong likelihood of heterogeneous physical and economic endowments within a regional setting, the readings for the site per se could potentially be markedly different compared with those for the region in question. Likewise, the latter could have different implications compared with a national reading. In the ultimate analysis, it is the characteristics of the sites that are of greater specific relevance to the constituents of the investment program to be adopted by an Economic Zone program.

Some investment factors are globally operative, capable of inserting themselves into the location strategies of key players embedded in global value chains. Case in point: the existence of large pools of human skills, whether in the form of information-technology (IT) or skilled petroleum engineers, the services of which could be exported on some scale. Similarly, the existence of abundant supplies of raw material(s), such as high-grade silica sands in substantial volumes, that are complementary to the volume production of high-value manufactured products would be an investment factor with global ramifications. Likewise, certain other investment enablers have, geographically, relatively narrower zones of influence. Their role and place in the international value-chain is such that they can’t quite impact upon locational strategies on a truly global scale, but rather on a regional scale. The incentives that have massively powered the very rapid growing intra-ASEAN trade in raw materials, parts, components, accessories, and other intermediate goods are examples of such more limited investment factors. The mix of investment factors that shape entrepreneurial perceptions thus depends upon the specific nature of country competitive and comparative advantage.

In the analysis that follows, regional competitiveness is deemed to correspond to the endowments of the greater Sylhet region. That region comprises the four districts of Habiganj, Sunamganj, Maulvibazar, and Sylhet. By ‘local’ we have in mind the situation prevailing at the project site.

The following write-up will be structured as follows. The next section will discuss the approach we take in this analysis. Our approach to the assessment of the competitive capabilities will address issues as appropriate at each of (a) national (global); (b) regional; and (c) local (site) levels. The attractiveness of an investment site is ultimately a combination of country branding, the net effects of the region’s traits, and then the traits of the site itself. At the country level, we shall take advantage of economy-wide competitive comparison based on the work of the World Economic Forum’s Global Competitiveness Index. The following categories of traits will be accounted for in this aggregative measurement of competitiveness: (i) macro- and micro-economic environment; (ii) infrastructure; (iii) policies. Two other investment factors, viz. (iv) incentives and (v) operating costs will also be quantified either in the aggregate in a country-wide manner, or, if the data permits, in terms of the individual sites. Two other classes of comparison factors, namely, (vi) choice of industry; and, (vii) quality-of-life (QOL) factors will only be quantified at the level of the economic-zone (EZ) sites.

At the suggestion of the World Bank, the entire narrative will be one large material in which a detailed comparison would be followed by a largely economic-geographic narrative that speaks to each

Bangladeshi region's strengths and weaknesses. Because neither the study terms of reference (TORs), nor JDI's technical proposal, had invoked strength-weakness-opportunity-threat as a part of the terms of reference of the competitiveness comparison, we shall also not use the SWOT model in the ensuing report.

The final section will compare the proposed Sherpur site against the background of seven Economic Zones (EZs)/Industrial Parks (IPs).

Bangladesh's national competitiveness

Globally two prestigious international organizations bring out country ratings with regard to what essentially amounts to competitiveness, although only one of them uses the word eponymously in the title of the publication in question. The first one is the most blue-ribbon league table of international competitiveness, namely, the Global Competitiveness Report, compiled by the World Economic Forum (WEF) in Geneva. The GCI uses measurements or expert characterizations in terms of as much as twelve pillars of modern economic systems which between them traverse the entire range of competitive capabilities. This analysis comprehensively measures the microeconomic and macroeconomic foundations of national competitiveness, by leveraging twelve pillars. They are (i) institutions; (ii) infrastructure; (iii) macro-economic environment; (iv) health and primary education; (v) higher education and training; (vi) goods market efficiency; (vii) labour-market efficiency; (viii) financial market development; (ix) technological readiness; (x) market size; (xi) business sophistication; and (xii) innovation. Competitiveness is seen as the composite effect of institutions, policies, and factors that determine country productivity. The level of productivity, in turn, sets the level of prosperity that can be earned by an economy. The productivity level also determines the rates of return obtained by investments in an economy, which, in turn, are the fundamental drivers of its growth rates. In other words, a more competitive economy is one that is likely to sustain growth. The concept of competitiveness thus involves static and dynamic components. Although the productivity of a country determines its ability to sustain a high level of income, it is also one of the central determinants of its returns to investment, which is one of the key factors explaining an economy's growth potential. In contrast to GCI, the Doing Business compilation brought out by the International Finance Corporation (IFC) of the World Bank Group, revolves around the pillars of country regulatory performance.

A national reading, however, could be quite beside the point - the readings could be materially different when it comes to the region, i.e. greater Sylhet region, within which the proposed site is embedded. This is because aggregation is, by design, prone to paper over the heterogeneities---both of the desirable and undesirable variety---- of individual regions. One therefore needs to temper this brief national snapshot with a much more detailed presentation of the physico-economic characteristics of the broader Sylhet region in order to come to terms with the economic potential of the hinterland---the regional economy--- that will provide the backdrop to the proposed EZ site. This is the subject of the next section.

This section will formulate the approach we take to competitively comparing the Sherpur EZ site against seven other Economic Zones/Industrial Parks. Seven comparative Economic Zones have been selected for this evaluation exercise, viz. Mingaladon and Kyauk Pyu SEZs in Myanmar; Amata EZ in Thailand; Amata and Viet Nam-Singapore Industrial Park (VSIP) in Viet Nam; MM2100 in Indonesia; Phnom Penh EZ in Cambodia; and Mahindra World City (MWC) in Chennai, India. These locations were selected for the following reasons.

- They all are broadly comparable in terms of the stage of economic growth through which any given economy typically passes;
- They compete for foreign investment in South Asia;
- They are home to some foreign investors in Bangladesh;
- They were cited by existing companies in Bangladesh as being competitive locations to produce products and/or services.

The Choice of Benchmarks

The economic environment, in both its macro and micro dimensions, will be evaluated using a combination of Global Competitiveness Index (GCI) and the indices of regulatory performance compiled by the World Bank's Doing Business (DB) indicators.

The point of infrastructure is to facilitate the movement of people and goods, provide safe water in the quantities required, provide energy when and where needed, remove wastes, and enable rapid communications. Assessing the affordability provided by infrastructure would be yet another dimension for evaluation. For that, a combination of measures including the dollar cost of shipping goods by road and rail from the project site to the nearest sea-port would be ideal, but not attempted in this draft. Instead, the distances between the EZs and nearest spatial landmarks with iconic commercial, or economic, or industrial importance (such as a major sea-port, largest metropolis, the important airport) are used as a proxy for the cost of access spatially.

Policy and interventions will largely be benchmarked using a combination of tax treatment of companies measured by the rate of corporate tax, the rate of value-added tax (VAT), and by whether streamlined bureaucratic treatment is to be meted out to entrepreneurs.

Incentives will be evaluated using the length of tax holidays meted out by the internal revenue service in the countries in question.

Sector composition will be captured largely in terms of the industries that locate themselves in the EZs in question.

The selection from among individual operating cost items will be confined to (i) wage rates; (ii) logistics costs as measured by the World Bank *Logistics Performance Survey*, 2012.

Quality of Life (QOL) factors will be evaluated using qualitative information, including whether satisfactory facilities of expatriate housing, healthcare provisioning, schooling, and recreation commensurate with an active life-style exist.

Evaluating national competitiveness of comparator countries

Table-2.1-1 presents the performance of the seven countries in question for 2012 and 2013. With the exception of Myanmar, Bangladesh is the worst performer in terms of national competitiveness measurement. In terms of regulatory performance, it is among the worst four performers, and has, for additional company, Indonesia and India, in that same category.

Table-2.1-1: Ranking for the six countries on global competitiveness and regulatory best-practices, 2013

| Countries | GCI, 2012 | 2013 | |
|----------------------------|-----------|------|-----|
| | | GCI | DB |
| Bangladesh | 107 | 110 | 129 |
| Cambodia | 86 | 88 | 133 |
| Indonesia | 38 | 38 | 128 |
| India | 60 | 60 | 132 |
| Myanmar | NA | 139 | NA |
| Thailand | 37 | 37 | 18 |
| Vietnam | 70 | 70 | 99 |
| Number of countries ranked | 144 | 148 | 185 |

Note: While seven countries are assigned a placeholder, six set of values are inserted, because Myanmar, with the exception of the *Global Competitiveness Index, 2013-2014*, does not rate a citation in the Doing Business for 2013-14 or the GCI rankings for 2012-13.

Source: WEF (2013, p. 15); IFC (2013, p. 3).

Table-2.1-2 presents certain institutional traits across the six comparator countries, using Doing Business ratings. These again are by way of nationally applicable assessments made by the IFC. All of them---such as registering property, or enforcing contracts, or protecting investors---- are clearly regulatory and institutional. Thailand comes off as the one country with consistently higher ratings in the table compared with all other countries. Bangladesh and India are the ‘problem cases’ in the table when it comes to enforcing contracts or getting electricity or starting a business, compared with the other institutional aspects. Vietnam also attracts a negative billing when it comes to protecting investors and getting electricity. The upshot is that, while useful in themselves, these ratings cannot really bring to closure the overall ranking of any given country in terms of its regulatory attractiveness.

Table-2.1-2: Ratings of the seven comparative countries using various Doing-Business metrics

| Doing business | Bangladesh | Cambodia | India | Indonesia | Myanmar | Thailand | Vietnam |
|-----------------------------------|------------|----------|-------|-----------|---------|----------|---------|
| Starting a business | 95 | 175 | 173 | 166 | NA | 85 | 108 |
| Dealing with construction permits | 83 | 149 | 182 | 75 | NA | 16 | 28 |
| Securing electricity | 185 | 132 | 105 | 147 | NA | 10 | 155 |
| Registering property | 175 | 115 | 94 | 98 | NA | 26 | 48 |
| Getting credit | 83 | 53 | 23 | 129 | NA | 70 | 40 |
| Protecting investors | 25 | 82 | 49 | 49 | NA | 13 | 169 |
| Trading across borders | 119 | 118 | 127 | 37 | NA | 20 | 74 |
| Enforcing contracts | 182 | 142 | 184 | 144 | NA | 23 | 44 |

Note: The sample of countries for Doing Business, 2013 was 183. The IFC does not as yet include Myanmar in the coverage of the countries for its Doing Business. While seven countries are assigned a placeholder, six sets of values are inserted, because Myanmar still does not rate a citation in the Doing Business or GCI rankings.

Source: IFC, Doing Business, 2012-2013

Economic and financial risks

The WEF ranks countries annually in terms of economic and financial dimensions of competitiveness. A high rank, especially when it is a composite to the value of which several stand-alone pillars contribute, typically translated into low investment risks, and conversely. Even though the ranks themselves are *levels* and not *changes therein*, the GCI ranks as levels are taken here as a measure of risks. Of the twelve pillars used by the WEF, as many as, ten are largely economic outcomes. The two exceptions are (i) financial development, and, (ii) health and primary education. The rankings of the seven study countries based on the ten economic pillars are not separately calculated. Given the numerical weight of the economic pillars, the purely economic ranks would be highly correlated with the overall ones. The findings of Table-2.1.1 would presumably suffice to address issues related to the comparative levels of economic risks in the study countries.

Financial risks, again based on the WEF’s numbers for 2013-2014, are, however, separately shown in the next table. Both sets of rankings present Bangladesh’s economic and financial risks to be among the highest of the six comparator countries.

Table-2.1-3: Level of financial risks to investors

| Country | Financial development rank, 2013-2014 |
|------------|---------------------------------------|
| Bangladesh | 102 |
| Cambodia | 65 |
| India | 19 |
| Indonesia | 60 |
| Myanmar | 144 |
| Thailand | 32 |

| Country | Financial development rank, 2013-2014 |
|---------------------------|---------------------------------------|
| Viet Nam | 93 |
| Total number of countries | 144 |

Source: WEF, 2013, p. 20-21

Political risk, broadly defined, is the probability of disruption of the operations of companies by political forces and events, whether they occur in host countries or result from changes in the international environment. In host countries, political risk is largely determined by uncertainty over the actions not only of governments and political institutions, but also of minority groups and separatist movements. It will be readily conceded that Bangladesh's politics have become overly confrontational, compared with virtually all the other compared countries. That implies a relatively high degree of political risk. The MIGA-EIU survey for both 2011 and 2012 have shown that political risk has the most negative billing by FDI originating global firms when tapped about their perceptions about what most constrains FDI in developing countries (MIGA, 2012; MIGA, 2013,). As well, question number 7 in the MIGA-EIU questionnaire asked: In which country is your firm investing at present? The percentages reported in response to this question were as follows: 40% for China; 37% for India; 36% for Brazil and 24% by Russian Federation (<http://www.miga.org/documents/WIPR12.pdf>, page 63). A large number of country-level positives, including relatively little political risk, take the credit for this reality.

Bangladesh's litany of negative ratings should, on the face of it, make it a foregone conclusion that Bangladesh's report card on growth, achievement of manufacturing output share, reduction of poverty, etc. must be unattractive. The evidence to the contrary, however, gives one a pause. Let us examine some evidence on that score, as follows:

- In a December 12, 2005 research paper, Goldman Sachs and economist James O'Neill included Bangladesh among the next-eleven (N-11) countries after the BRIC quartet as having a high potential of becoming one of the world's largest economies in the 21st century. The criteria used included macroeconomic stability, openness of trade, investment policies, the quality of education, and political maturity (http://en.wikipedia.org/wiki/Next_Eleven).
- A Harvard University study to measure Bangladesh's economic performance against six other N-11 countries (Egypt, Indonesia, Nigeria, Pakistan, Philippines, and Vietnam) and Thailand between 1990 and 2006 found Bangladesh to exceed expectation. Between 1990 and 2006, Bangladesh's economy grew by over 120 per cent, more than any of the countries in the group except Vietnam. (Rahman, 2009).
- In a major empirical study by two ADB professionals, the authors found that over the long run, Bangladesh's manufacturing output share exceeded expectations pivoted by a logistics equation driven by population, income per capita and trade share. The same was true of China, Taiwan, South Korea, Singapore, Thailand, Viet Nam, Indonesia, and Malaysia. The opposite was true for India (Jesus and Estrada, 2008).
- Bangladesh is an outlier in cross-country comparisons relating governance to economic growth -- a phenomenon that has been termed Bangladesh's 'development paradox' (Mahmud et al., 2011).¹ Bangladesh's negative rankings are powerfully pushed back by several aspects of her economic performance which seem to spring forth from some subtle mainsprings not captured fully by the usual measurements.

Investment trends

Our reporting on the investment trends would include the following:

- How much FDI was registered against each of the five major sectors during the last five years;

¹Mahmud's coauthors included two well-known economists from the World Bank, Drs. Sadiq Ahmed and Mahajan.

- How much employment was going to be associated with the amount of investment during the last five years;
- How many new investment projects were registered with the BOI during the last five years;
- What were the trend growth rates of investment, in millions of US dollars, registered with the BOI, and the ‘employment’ that such investment were putatively to create²;
- What, if anything, special feature had characterized the process of industrial capital formation in Bangladesh during the last two decades---features that might become an important backdrop for the subsequent competitiveness analysis to follow.

Investment Trends in Bangladesh from 2006/07 – 2011/12

In Table-2.1.1-4, we turn to the data related to six recent years of data on FDI, by year and by sector. The data, focusing on FDI sector destinations, is in US dollars in millions. The six-year period has been divided into two sub-periods, each comprised of three years³. Total FDI in the second sub-period is about 8% higher than in the first. Two further aspects of the FDI scene deserve further discussions. First, FDI in telecommunications’ relative share was down in the second period compared to the first---from almost a half in the first sub-period to a little over a quarter. The second loser among the sectors is the energy sector, down from 21% to 14%. The second major discernable trend is about a gain in the relative share of textiles and weaving as a destination of industrial FDI, from 12% upto 20%.

Table-2.1-4: FDI Inflows by major Sectors (in US\$ millions)

| Sector | 2006-09 | Column % | 2010-12 | Column % |
|------------------------|---------|----------|---------|----------|
| Telecommunication | 1,190 | 47 | 791 | 29 |
| Banking | 340 | 13 | 555 | 20 |
| Textiles & weaving | 298 | 12 | 551 | 20 |
| Power, gas & petroleum | 525 | 21 | 381 | 14 |
| Food products | 42 | 2 | 61 | 2 |
| Agriculture & fishery | 22 | 1 | 32 | 1 |
| Others | 127 | 5 | 380 | 14 |
| Total FDI | 2,544 | 100 | 2,749 | 100 |

Source: Statistics Department, Bangladesh Bank

Table-2.1-5 presents the number of new investment projects in domestic investment and FDI during the same six-year span. But this time, we also present available information concerning the number of investment projects as well. Several aspects of the results in the following table are noteworthy. First, whereas the most vivid impression triggered by the series on domestic investment is about its steady, unbroken, growth from one year to the next over the entire six-year stretch, the series on foreign investment reminds one of a ‘bumpy ride.’ This series is quite unstable. Secondly, the value/project, which stands for the intended scale of investment, for both domestic-investment and foreign-investment activities clearly appear to be bulking up. The average scale of domestic investment gains by a factor of 2.6 during the six-year span---from the equivalent of US\$1.5 million to US\$3.94 million. The unit project value related to foreign investment intentions seems to fluctuate wildly on an annual basis. Even so, the unit project size is estimated, after some smoothing of the data through averaging on a bi-annual basis, to have risen from the equivalent of US\$7.2 million during 2006-8 to US\$21.9 million during 2010-2012 --- again, by a factor of more than three. The

²Time-trends are calculated using the equation of the form $N_t = N_0 e^{kt}$, where N represents investment, k denotes steady growth, t stands for a time-counter which begins with the value of 1 and continues on up to the last year in the data-series.

³Given the relative shortness of the overall six-year period, using the nominal, as opposed to inflation-adjusted US dollars as the currency is still valid. This is because the focus is on sectoral composition, and any change in US price-levels treats each underlying sector symmetrically. Note that data on investment, employment and number of projects are all based on what the prospective investor records in the ‘registration form’ to be his/her investment intent. The BOI is unable to provide anything beyond that kind of information.

suggestion is inescapable, that especially in matters involving FDI, planned scale of investment is bulking up quite considerably.

The generation of employment

How much employment is generated by the investment registered with the BOI is not known with any statistical confidence. There has not been any monitoring or evaluation survey of the employment effects of the investments thus registered. All employment ‘effects’ reportedly in any of the BOI publications are by way of those investments’ ‘expected’ effects, arrived at through multiplying planned investment by ‘best-guess’ multipliers. Table-2.1.1-5 presents these putative employment effects, too.

Table-2.1-5: Private Investment Proposals Registered with BOI from FY 2006-07 to FY 2011-12) in billion BDT

| Fiscal year | Local investment | | | Foreign/JV investment | | | Total | | | Total employment opportunities (persons) |
|--------------------|-------------------------|----------------------|----------------------|------------------------------|----------------------|----------------------|-----------------|----------------------|----------------------|---|
| | Projects | project value | Value/project | Projects | project value | Value/project | Projects | project value | Value/project | |
| 2006-07 | 1,930 | 197 | 102 | 191 | 119 | 623 | 2,121 | 316 | 149 | 458,478 |
| 2007-08 | 1,615 | 194 | 120 | 143 | 54 | 378 | 1,758 | 248 | 141 | 410,744 |
| 2008-09 | 1,336 | 171 | 128 | 132 | 147 | 1,114 | 1,468 | 319 | 217 | 308,037 |
| 2009-10 | 1,470 | 274 | 186 | 160 | 63 | 394 | 1,630 | 337 | 207 | 330,663 |
| 2010-11 | 1,746 | 554 | 317 | 196 | 365 | 1,862 | 1,942 | 919 | 473 | 503,662 |
| 2011-12 | 1,735 | 535 | 308 | 221 | 344 | 1,557 | 1,956 | 879 | 449 | 451,150 |
| Total | 9,832 | 1,925 | | 1,043 | 1,092 | | 10,875 | 3,018 | | |

Note: Value/project is in Taka millions.

Source: Policy and Planning Wing, Board of Investment

Table-2.1-6 presents FDI by its country origins during two recent years.

Table-2.1-6: FDI by country-sources

(All values are in millions of US dollar)

| Countries | 2009-10 | | | 2011-12 | | |
|------------------|-----------------|-------------------|----------------------|-----------------|-------------------|----------------------|
| | Projects | Investment | Value/project | Projects | Investment | Value/project |
| China | 12 | 21.0 | 1.75 | 25 | 183.1 | 7.32 |
| Denmark | 1 | 1.2 | 1.22 | 6 | 7.4 | 1.23 |
| France | 0 | 0.0 | 0.00 | 7 | 9.9 | 1.42 |
| Hong Kong | 5 | 14.8 | 2.96 | 6 | 24.1 | 4.02 |
| India | 9 | 8.5 | 0.94 | 19 | 1,823.7 | 95.98 |
| Japan | 8 | 2.6 | 0.33 | 27 | 65.5 | 2.43 |
| Malaysia | 3 | 3.1 | 1.02 | 6 | 5.6 | 0.94 |
| South Korea | 12 | 33.8 | 2.81 | 22 | 18.7 | 0.85 |
| Singapore | 4 | 1.9 | 0.48 | 10 | 9.4 | 0.94 |
| Thailand | 0 | 0.0 | 0.00 | 13 | 45.5 | 3.50 |
| UK | 5 | 3.5 | 0.70 | 10 | 59.6 | 5.96 |
| USA | 5 | 3.0 | 0.60 | 11 | 104.1 | 9.46 |
| Aggregate | 64 | 93.347 | 1.46 | 162 | 2,356.6 | 14.55 |

Source: BOI data

Time-trends

The data both registered investment and ‘putative employment generated’ we use are from the BOI Annual Report for the year 2012 to estimate semi-logarithmic (time) trends. Such data are only

available for five industry sectors, namely, textiles, agro-processing, engineering, telecommunications, and services. These estimates are presented in Exhibit-1. The estimated time-trends of telecoms/ engineering and textiles are, statistically, significantly different from zero, while the remaining coefficients could have arisen due to chance factors. FDI into Bangladesh has significantly clustered itself in telecommunications, engineering and metal-working segments on the one hand, and in textiles (integrated textiles, spinning, weaving and dyeing, and apparels-making) on the other hand. FDI has been demonstrably prominent in triggering a statistically significant change in the trends of investment in the telecommunications and engineering industries.

Exhibit-1: Exploring investment and employment trends, Bangladesh, 1992-2010 (Time-trends are percent per year)

| Sector(s) | Investment | | Employment | |
|----------------------|--------------------|---------------------|--------------------|---------------------|
| | Time-trends | t-statistics | Time-trends | t-statistics |
| Agro-based | 0.039 | 0.469 | 0.093 | 1.401 |
| Chemical | 0.007 | 0.067 | 0.126 | 2.323 |
| Telecoms/engineering | 0.154 | 4.289 | 0.142 | 5.535 |
| Services | -0.027 | -0.148 | 0.134 | 2.213 |
| Textile | 0.156 | 3.626 | 0.212 | 5.194 |

Source: Calculations are based on annual data obtained from BOI (2010, pp. 58-73). Occasional gaps in what were very largely a body of annual data were plugged using, rough-and-ready but on the whole, accurate methods.

The sectoral distribution of investment projects

Trends in the structural change

As well as the trends of investment taken as a whole, it is also necessary to form certain informed perspectives about the structure of demand for investment goods in place in Bangladesh. Per-capita income of Bangladesh has been growing at a little over 4% per year. Strong export growth fueled GDP growth, both directly and indirectly, by providing growth stimulus to other parts of the economy. Besides garments exports, growth impulses have come from workers' remittances and from agriculture and small-scale industries and services. The growth of urban centers, foremost among them Dhaka, has contributed. Very rapid expansion of microcredit since the early 1990s has also played an important part in the growth process.

Remittances to Bangladesh by migrant workers and the Bangladeshi diaspora grew from US\$1.706 billion in 1999 to US\$6.486--compound annual growth rate of 12.9%. Land is much-cherished space where proceeds from remittance are parked. Next in importance is building a home. Home-building and home-ownership have grown rapidly, as can be gauged from the rapid growth in municipal revenues. Investment in industries catering to the booming demand from the construction industry took off. Investment for producing building materials ---- mild-steel rods, galvanized-iron and corrugated-iron products, angles and deformed bars, cement, bricks, building tiles, mosaic and stone chips, etc. have all staged strong growth, as have the output of both plastics and iron piping materials, electrical cables, fixtures, fans, air-conditioners, paint, and home-grown machines to mix the mortar, break the bricks. Growing demand coupled with quick diffusion of the knowledge of the production techniques led to a relative swelling of the ranks of the manufacturers of steel products. The ensuing increase in the degree of competition then instigated stimulus towards automation of steel re-rolling and galvanizing mills. Automatic steel-making improves the quality of the product, can ramp up production capacities and lower production costs by spreading overheads more thinly over volume production. Plans are afoot to domestically produce white-billets by using a hot-rolled plant, the basic industry of the steel sector abroad. Currently, out of about 150 steel-producers, whether small or large, only about 35 are automated in nature.

Gains in the price of land stoke wealth effects in fueling demand for investment goods and consumer durables, providing the impulses for industrial upgrading in the mix of manufactures produced. Motorable road-mileage has grown at double-digit rates, albeit from a low historical base. That translates into strong demand for two-wheelers, and also three-wheelers. The total number of motor-cycles sold in Bangladesh as a whole is 200,000 recently. Given that the age-group of 15 years to 34 years is likely to grow at the fastest rate of any age-group, the demographic transition will propel brisk demand for motor cycles. That quantity is widely expected to grow rapidly. Manufacturing capacities preparatory to assembly of motor-cycles has risen recently. Rangs Group in 2012 broke the ground-breaking for a US dollar 10 million plant near Dhaka where Suzuki brands of relatively budget versions of their most popular types of motor-cycles will be assembled. Honda, in partnership with a profitable subsidiary of state-owned Bangladesh Steel and Engineering Corporation (BSEC), has also announced plans to expand production.

According to an entrepreneur in the corrugated-iron industry, the price of the product depends on the district's economic condition. Customers from Dhaka and its outskirts generally buy comparatively high priced products, while customers from relatively poor regions buy low priced products (Director Mr. Khan, quoted in the *Financial Express* of January 15, 2011). Production capacities and manufacturing practices in place are calibrated to produce goods differentiated by quality and pricing. Similar discernment in the deployment of capacity and practices is also evident in the pursuit of export versus domestic markets.

As mechanization inexorably penetrates deeper into the manufacturers' playbook, stable supply of electricity as an arbiter of competitiveness becomes all the more important. With the timeline for exhaustion of the nation's reserve of natural gas becomes more proximate, a coal-centric generation of power is increasingly becoming a pivotal datum in any investment discourse. Because domestic coal-extraction capacity is and will remain deficient, sustained but massive reliance on imported coal for power generation will become a necessity, despite all the angst of the 'greens.' The likely bulge in the importance of coal will affect the transportation options before the logistics industry. Because especially the Dhaka-Chittagong corridor is already exceedingly busy, but also because inland river transportation is likely to remain cheaper compared to road-transportation, the coal will need to be carried from the deep-sea port under implementation at Sonadia in Cox's Bazar district by small vessels. That will play into the order-book of Bangladesh's shipbuilders. That incremental demand will be additive towards the prospective increase in export demand already discussed in a recent World Bank report on Bangladesh's shipbuilding industry (World Bank, 2013).

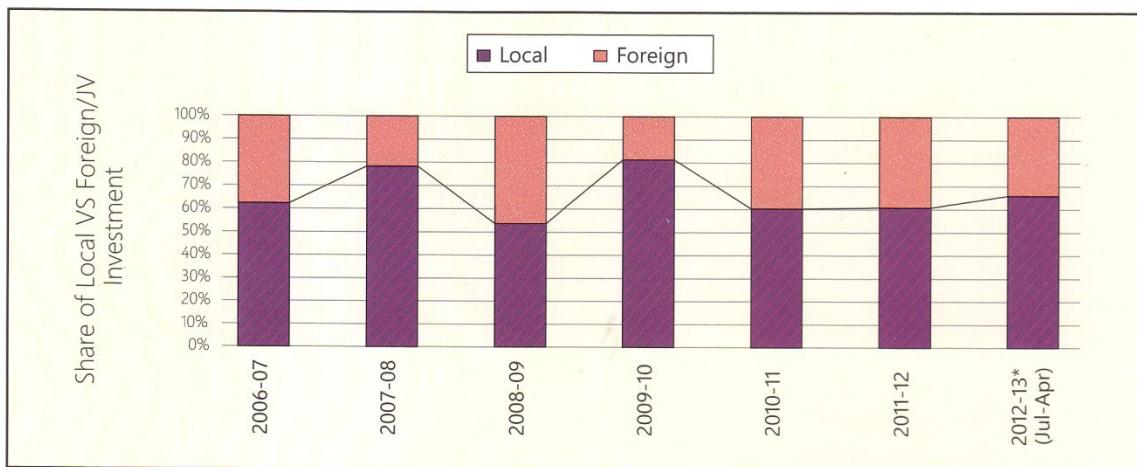
In general, the importance of industrial location on the coast compared with inland can only continue to grow in Bangladesh in the years to come.

Exhibit-3 compares the pattern of the sectoral targets of 'local investors' versus FDI-originators for the year 2012 (July, 2011-June 2012). The value of the information lies in its ability to compare and contrast the pattern of incentives and preferences of local investors versus foreign investors, as measured by the declared sectoral targets of investment. One standout difference between the two classes of investors is as follows -the relative share of 'services', which includes telecommunications and mobile telephony sectors, overwhelms the entire range of FDI-originators in investment. The FDI in Bangladesh on this reading is mono-polar, preponderantly dominated by telecommunications in that particular year. In contrast, the investment intentions of Bangladesh's own investors tend to betray an welcome degree of diversity, with four of the sectoral categories coming through with double-digit percentage shares. These are services (24%), textiles (29%), chemicals (20%), and agro-industries (11%). Engineering, with more than 7% of the investment registrations, is also a non-negligible sectoral target.

We should note that the Census of Manufacturing Industry (CMI) data of Bangladesh show that ready-made garments (RMG), pharmaceuticals, textiles, food processing, tobacco, and pottery & china-ware are, in that order, are the most important sub-sectors within Bangladesh manufacturing.

Among these, RMG contributes sixty per cent of all formal manufacturing employment. Textiles appeared as third since the mid-1990s.

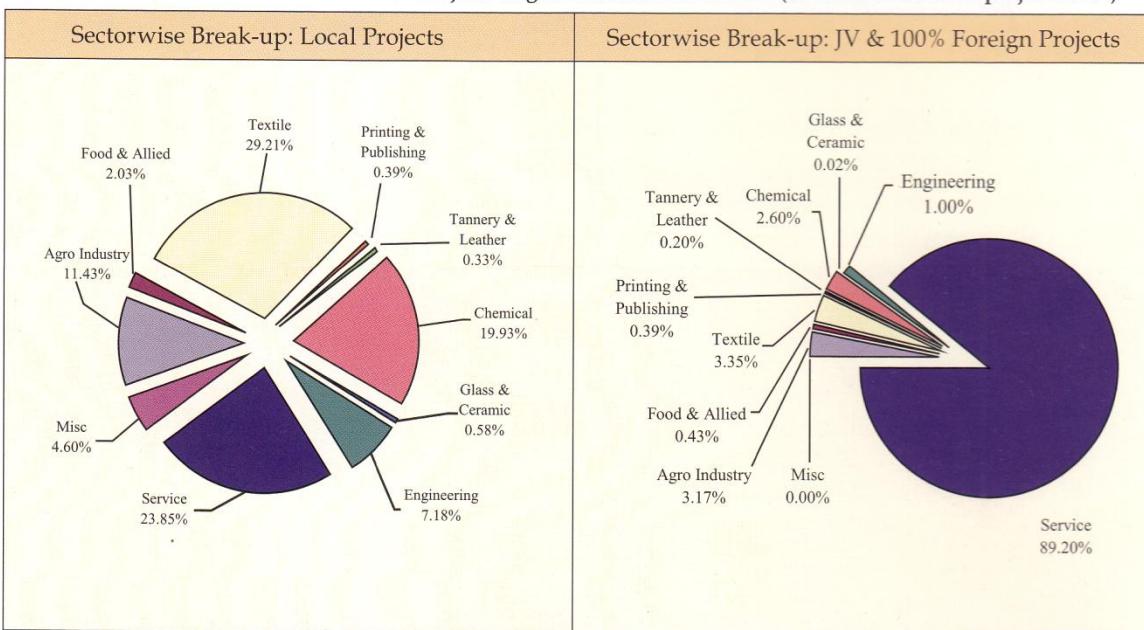
Exhibit-2: Share of Local VS Joint venture & 100% Foreign Investment Projects Registered with BOI from FY 2006-07- FY 2012-13 (in terms of nominal project value) (Million Taka)



Source: Policy and Planning Wing, Board of Investment

*Provisional

Exhibit-3: Sectorwise Distribution of Projects Registered with BOI in 2012 (in terms of nominal project value)



Source: Policy and Planning Wing, Board of Investment

2.1.1 Competitiveness analysis of the Sherpur Economic Zone (EZ)

The following subsections assess the relative competitiveness of the proposed Sherpur Economic Zone (EZ) project, it being remembered that the focus of the following material is about the results of a competitive benchmarking exercise. The material in the subsections is structured as follows - the next subsection discusses the methods and data chosen to perform the evaluation. There, we devote ourselves to presenting the detailed data generated, while an annex goes into the minutiae of the sources by individual EZ/Industrial Park (IP). Towards the end of that subsection, we present, in Table-2.1.1-2, the results from our exercise that ranks the economic zones (EZs)/Industrial Parks (IPs) under examination. Section 2.1.2 is about the strengths, weaknesses, and threats for the site selected for the Sherpur EZ.

The JDI/MSL team did not only conduct very extensive desk research and internet searches, but also wrote to the authorities of each of the foreign SEZ or Industrial Parks or Economic Zones requesting information. In fact, we do attach the filled-in questionnaire from Ms. Kim of Amata Viet Nam. None of our correspondents offered any cooperation to JDI's survey. Indeed, had we received the cooperation of the SEZ/IP authorities in every case, the provenance of each of the more than sixty variables of data would have been from the authorities themselves. We never heard back from any of the SEZ/IP except the Bien Hoa Amata Viet Nam Industrial Park. That information was included in the quantitative ranking score done.

2.1.2 Comparative Assessment

2.1.2.1 Our methods

Comparative assessment usually yields a summary measure that fuses together a large number of quantitative investment or locational factors. One needs a scheme for aggregation across a number of quantitative variables. In all, we have tried to Marshall Data on more than fifty variables, presented, with occasional blanks for reasons cited in an annex to this chapter, in Table-2.1.1-1 below.

The following benchmarking factors are utilized here:

- (1) Size of each zone;
- (2) Number of plots;
- (3) The unit lease-price and fee on account of maintenance of infrastructure;
- (4) If land is leased or sold, or if a mix prevails;
- (5) If the zone-developer offers pre-built facilities as well as land on the zone, and unit costs of such facilities;
- (6) Availability and access-costs of treated and piped water, ready and reliable power supply, telecommunications network;
- (7) Availability of treated waste-water;
- (8) Solid-waste removal facilities;
- (9) Piped supply of natural gas;
- (10) The entire range of incentives defining the package for the economic zones;
- (11) Wages of each of three categories of workers, i.e. management, skilled and largely unskilled workers;
- (12) Labour indicators (rigidity of working hours index, difficulty in hiring);
- (13) International freight rates
- (14) Telecommunications rates;
- (15) A comprehensive battery of zone-related economic and financial incentives (including the tenure of tax-holiday on the corporate income tax (CIT); the extent, if any, of CIT rate-relief after tax-holiday expiry; the extent of tax-relief, if any, accorded to export-oriented firms in the zone/park on account of imported materials and components; exemptions from import duties, in years; partial waivers of import duties, in years);
- (16) A more comprehensive bundle of quality-of-life (QOL) factors including whether 24*7 security is provided by the zone-management or has to be tenants-arranged, the percentage of open space (roads, parks, golf-course, etc.) in the total zone area; the existence and the proximity of educational facilities from the residential blocks.

2.1.2.2 The choice of an aggregator

Now that quite a good number of data fragments have been generated, one needs a scheme for aggregation. We propose a number of quantitative variables to underlie this aggregation exercise:

- zone size;
- lease duration;
- power-charges;

- water-charges;
- waste-water charges;
- land-lease charges;
- cargo rates;
- telecom rates;
- wage rates;
- Water-treatment plant capacity per hectare;
- Waste-water treatment plant capacity per hectare;
- Whether a high-quality school exists on the economic zone
- The length of the tax-holiday allowed in the tax-code of the country;
- Country rank per World Economic Forum's Global Competitiveness Index, 2013.

The foregoing competitive indicators come in two categories. First, there are the unit charges that need to be paid, like the unit user-cost for using power. The lower they are, the more attractive is the EZ in question. In contrast, then there are the indicators, such as average capacity of the water-treatment plant per hectare of land in the EZ. The higher they are, the more attractive is the EZ in question.⁴ The two kinds of indicators ought to enter into the averaging scheme differently from each other. More specifically, the indicators whose values correlate inversely with the degree of attractiveness sought to be subtracted from 1 before being inserted into the averaging scheme, whereas no similar compulsion exists for the other series of indicators.

Each price-like variable is standardized, and expressed as a percentage difference relative to the highest value observed.⁵ That is, each cost variable value is a measure of the cost-advantage it represents relative to the highest-cost zone. That advantage is measured as 0 for the highest-cost zone in a given case, and it is the highest for the lowest-cost zone. In symbols,

$$I_{ij} = \frac{X_{ij} - \text{Min}(X_{ij})}{\text{Max}(X_{ij}) - \text{Min}(X_{ij})}$$

where I_{ij} is the I'th economic zone's value for the j'th attribute.

Where X_{ij} is the index value i of country j, Min is the smallest value in the sample and Max the largest. The top country in the sample has the value 1 while the worst performing country has the value 0.

The foregoing formulation is appropriate when attractive is a direct function of the I_{ij} above. Where the converse is the case, we need to invoke the expression of $1-I_{ij}$.

$$I_{ij} = 1 - \frac{X_{ij} - \text{Min}(X_{ij})}{\text{Max}(X_{ij}) - \text{Min}(X_{ij})}$$

Aggregative competitiveness of i'th economic zone/industrial park is therefore average value of the two sets of I_{ij} 's over a desired domain of attributes. At its most inclusive state, our domain of choice includes seventeen (out of a total of some fifty-one) attributes, all quantitative.

⁴It might be asked that retaining both unit user-cost of treated water and WTP capacity per hectare might represent 'double-counting'. We respond that societies do not always succeed in pricing its industrial water resources rationally. Besides, at every given level of the user-charge, a large quantity of water-availability per unit of land carries with it an autonomous quotient of convenience-yield. Capacity might therefore be worth a weight for its own sake.

⁵This basic method is adapted here from UNIDO, "Viet Nam Industrial Competitiveness Report.", Vienna, 2011 available at http://www.unido.org/fileadmin/user_media/Publications/Research_and_statistics/Branch_publications/Research_and_Policy/Files/Reports/Other_Reports/VICR2011%20final.pdf, box-1, page 25) accessed February 27, 2014)

Both I_{ij} and $1-I_{ij}$ are mirror images of each other, and have the same range of values, ie between 0 and 1. The index is calculated as the arithmetic mean of the standardized values of those two indicators, namely, the I_{ij} s . and the $1-I_{ij}$ s . Averaging can meaningfully be done because both indexes fall in the same range of values. All indicators are given equal weight.

2.1.2.3 Our data

We have made a very diligent effort to locate the information from the following sources: (i) a large number of ‘official’ web-sites, including those hosted by the authorities that had developed these comparator industrial parks or special economic zones (SEZ); (ii) a quite exhaustive collection of research report papers brought out by agencies as JETRO, JICA, UNESCP, Board of Investment, Government of Bangladesh, IFC’s Doing Business reports series, in particular the volume published for 2011, other World Bank documents, such as annual volume of logistics performance, 2012; (iii) academic outputs that presented relevant scraps of information.

A very large proportion of the data we use comprises quantitative ones, such as the unit leasing price of land per square-meter, for example. Units are always cited with regard to such quantitatively recorded data in the interest of complete transparency. Some of the data, however, also happen to be qualitative, for example: case in point is whether the economic zone in question provides for solid-waste removal, pipeline for natural gas, pre-built factories, an one stop service (OSS) in the EZ in question. The valid responses to such categorical questions happen to be ‘1’, ‘0’, and ‘NA (not applicable)’. For such situations calling for qualitative answers, the domain of valid answers includes three values, 1 to denote unconditionally yes, 0 to denote no. NA denotes ‘not available’, which is a valid value.

We present the sources of a large proportion of the data/information as footnotes. The annex to this chapter provides additional clarifications or details. The extensive Web-based research proved to be not entirely satisfactory. We took the initiative of sending by email a questionnaire to each of the management of each of the comparator IPs, with a request that the authorities return the courtesy by filling up and sending back the questionnaires. Out of the respondents, the management of Amata, Vietnam, responded with full disclosure. Despite reminders, none of the other EZs/IPs has responded to our questionnaire. The filled-in questionnaire from the Amata Viet Nam is attached in the Annex-2.1 (c) to this section. Despite our best efforts, there still, as can be seen in the comparison chart below, are some gaps in the background information. That said, informational coverage for the fundamental variables used in the quantitative ranking presented below is a total one.

Data related to the rigidity of working hours index and difficulty of hiring index are both from Doing Business 2011. The 2011 report of Doing Business did not include any information relating to the difficulty-of-firing index. Information on non-wage labour costs in % of salary was looked for. With exception of Viet Nam, Thailand, and Cambodia reported for the first two countries in admittedly dated sources of MIGA (for 2003) and by New York Times in 2012 for Cambodia, the incidence of such non-wage labour costs are negligible in the other countries. There have been reports that employers on Cambodian SEZs such as the Manhattan SEZ avoid paying such social security costs. In fact, as the authors of the report at <http://www.sciencespo.fr/coesionet/sites/default/files/GMS%20Capstone%20Report%20May%2017.pdf> show, Taiwanese bi-cycle producer, Bestway Bi-cycle Factory, located on Cambodia’s Manhattan SEZ, do not even pay the country’s minimum wage of US dollar 61 per month to its workers. It only pays US\$31 to many of its workers. This is probably because this particular Taiwanese firm does not allow its workers to form unions. Exception does exist, too, in some of Cambodia’s other well-known SEZs. For example, the same authors report that yet another, large, Taiwanese exporter of ready-made garments to the United States located on the Phnom Penh SEZ, Evergreen Garments, pays US\$61 per month to their workers. For the foregoing reasons, we did not include non-wage labour costs in our quantitative exercise. As well, next to nothing in information is available for the industrial park Kyaikpyu in Myanmar, largely because the latter is still and will remain under implementation for some time to come. We therefore dropped Kyaikpyu from our reckoning.

The acronym NA, that stands for not available occurs at several places in the table. One of our respondents from AMATA Viet Nam, Ms. Kim (kim@amata.com) had this to write to us in an email, dated November 21, 2013: "Please kindly understand that there are several "Not Available" (NA) figures, which means cases in which our tenants contact the supplier and deal directly with them. Figures vary year by year. Thus, these figures are only valid this year."⁶

⁶ In comments made by the World Bank, exception was taken to the use by the member of a JDI team, in an earlier draft, of 'personal communications', reproducing a part of an email message that was sent by a JDI correspondent in official capacity. As well as a very exhaustive desk- and Web-based research we also contacted authorities that had originally developed the seven Industrial Parks: a questionnaire soliciting all needed information was sent by email. Ms Kim alone filled in the entire questionnaire: no one else did. Her ownership in this World Bank sponsored study was stellar. Her testimony therefore was to be valued and disseminated. She shared an important *institutional* detail shedding critically-important light on how much to lean on the kind of data that we had solicited. How were we expected to cite her testimony? We quote guidance from the University of Chicago Press in its answers to frequently asked questions: "Q: Do I need to cite everything I use in the paper? A: Pretty much. Cite anything you rely on for data or authoritative opinions. Cite both quotes and paraphrases. Cite *personal communications* such as e-mails, interviews, or conversations with professors if you rely on them for your paper (italics added)" <http://www.press.uchicago.edu/books/lipson/honestcollege/citationfaq.html>. Many similar endorsement of our practice of citing Kim's testimony as 'personal communication' is being omitted due to space limitations. Out of our regard for the World Bank, the words 'personal communications' has been expunged from the narrative related to the testimony of Mr. Kim. In sum, the JDI team did everything humanly possible to comprehensively corral the data needed for the competitiveness benchmarking exercise.

Table 2.1.2.3-1: Multivariate competitive comparison across eight EZs/IPs

(All monetary values in this table are in US dollars)

| Items Compared | Sherpur ⁷ | Cambodia | India | Indonesia | Myanmar | Viet Nam | | Thailand |
|---------------------------------------|----------------------|---------------------|----------------------|----------------------|------------------|----------------------|---------------------|---------------------|
| | | Phnom Penh | Mahindra City | MM2100 | Mingaladon | Amata | VSIP | Amata |
| Size (ha) | 143 ⁸ | 350 ⁹ | 607 ¹⁰ | 805 ¹¹ | 90 ¹² | 700 ¹³ | 500 ¹⁴ | 1353 ¹⁵ |
| No. of plots | 88 | NA | 62 ¹⁶ | 336 ¹⁷ | 41 ¹⁸ | 112 ¹⁹ | 238 ²⁰ | 695 ²¹ |
| Employment | 38169 ²² | 20000 ²³ | 131000 ²⁴ | 135000 ²⁵ | NA | 33,576 ²⁶ | 96367 ²⁷ | 28866 ²⁸ |
| Major economic characteristics | | | | | | | | |
| Leased-tenure (yrs) | 30 | 99 ²⁹ | 99 ³⁰ | 70 ³¹ | 49 ³² | 50 ³³ | 50 ³⁴ | 50 ³⁵ |
| Power-plant | | 15 ³⁶ | 230 KV ³⁷ | 350 ³⁸ | 20 ³⁹ | 12.8 ⁴⁰ | 173 ⁴¹ | 22 KV ⁴² |

⁷All information in this column are sourced from elsewhere in this report.⁸JDI/MSL/Sheltech Final Report for Sherpur.⁹<http://www.skyscrapercity.com/showthread.php?t=1133119>¹⁰http://www.mahindraworldcity.com/Docs/downloads/Mwc_Brochure_Press_19_DEC_2007.pdf Size (ha)¹¹http://www.ubs.com/microsites/ib-conferences/apac/aseanconf2013/en/material/_jcr_content/par/table.1958697584.file/dGFibGVUZXh0PS9jb250ZW50L2Rh_bS91YnMvbWljcm9zaXRlcy9JQiBldml0ZS9hcGFjL2FzZWFWuMjAxMy9jb3JwLW1hdGVyaWFsL0Jla2FzaSBGYWphci5wZGY=Bekasi%20Fajar.pdf¹²<http://mingaladon.com/introduction.htm>¹³http://www.amata.com/eng/industrial_amatavietnam_factsheet.html¹⁴http://www.vsip.com.vn/out-project/industrial-park/vsip-ii-binh-duong-vsip_project-9.html¹⁵http://www.amata.com/eng/industrial_amatacity.html¹⁶<http://www.thehindubusinessline.com/markets/expectation-of-tax-sops-sends-mahindra-lifespaces-higher/article6119252.ece>¹⁷http://www.ubs.com/microsites/ib-conferences/apac/aseanconf2013/en/material/_jcr_content/par/table.1958697584.file/dGFibGVUZXh0PS9jb250ZW50L2Rh_bS91YnMvbWljcm9zaXRlcy9JQiBldml0ZS9hcGFjL2FzZWFWuMjAxMy9jb3JwLW1hdGVyaWFsL0Jla2FzaSBGYWphci5wZGY=Bekasi%20Fajar.pdf¹⁸No. of plots¹⁹http://www.mingaladon.com/land_use_plan_lease_terms.htm No. of plots²⁰http://www.amata.com/eng/industrial_amatavietnam_factsheet.html No. of plots²¹http://www.vsip.com.vn/out-project/industrial-park/vsip-ii-binh-duong-vsip_project-9.html²²JDI/MSL/Sheltech Final Report for Sherpur²³http://www.nytimes.com/2013/04/09/business/global/wary-of-events-in-china-foreign-investors-head-to-cambodia.html?hpw&_r=1&²⁴http://www.mahindralifespaces.com/pdf/1_Mahindra_World_City_Developers_Ltd_2013.pdf²⁵http://www.ubs.com/microsites/ib-conferences/apac/aseanconf2013/en/material/_jcr_content/par/table.1958697584.file/dGFibGVUZXh0PS9jb250ZW50L2Rh_bS91YnMvbWljcm9zaXRlcy9JQiBldml0ZS9hcGFjL2FzZWFWuMjAxMy9jb3JwLW1hdGVyaWFsL0Jla2FzaSBGYWphci5wZGY=Bekasi%20Fajar.pdf²⁶Annex-3 to this section based on responses by Ms. Kim to the questionnaire sent to this *industrial park* by JDI team²⁷http://www.vsip.com.vn/out-project/industrial-park/vsip-ii-binh-duong-vsip_project-9.html²⁸http://www.amata.com/eng/industrial_amatanacity_factsheet.html²⁹<http://www.sciencespo.fr/coesionet/sites/default/files/GMS%20Capstone%20Report%20May%202017.pdf>³⁰<http://www.thehindu.com/todays-paper/tp-national/tp-tamilnadu/cag-finds-irregularities-in-land-deals-involving-two-sez-properties/article4719483.ece>³¹[http://lnweb90.worldbank.org/ECA/Transport.nsf/ExtECADocByUnid/B9A56DE687D977AD85256BFB007248E1/\\$file/industrial%20parks.pdf](http://lnweb90.worldbank.org/ECA/Transport.nsf/ExtECADocByUnid/B9A56DE687D977AD85256BFB007248E1/$file/industrial%20parks.pdf)³²http://mingaladon.com/land_use_plan_lease_terms.htm³³http://www.vsip.com.vn/out-project/industrial-park/vsip-bac-ninh-vsip_project-11.html³⁴http://www.vsip.com.vn/out-project/industrial-park/vsip-ii-binh-duong-vsip_project-9.html³⁵‘freehold’ mentioned in http://www.amata.com/eng/industrial_utilities.html³⁶<http://www.cambodiainvestment.gov.kh/investment-enviroment/cost-of-doing-business/utility-cost.html>³⁷http://www.mahindraworldcity.com/Docs/downloads/Mwc_Brochure_Press_19_DEC_2007.pdf³⁸[http://lnweb90.worldbank.org/ECA/Transport.nsf/ExtECADocByUnid/B9A56DE687D977AD85256BFB007248E1/\\$file/industrial%20parks.pdf](http://lnweb90.worldbank.org/ECA/Transport.nsf/ExtECADocByUnid/B9A56DE687D977AD85256BFB007248E1/$file/industrial%20parks.pdf)³⁹http://www.ide.go.jp/English/Publish/Download/Brc/pdf/06_chapter5.pdf⁴⁰http://www.amata.com/eng/industrial_utilities.html

| Items Compared | Sherpur ⁷ | Cambodia | India | Indonesia | Myanmar | Viet Nam | | Thailand |
|--|----------------------|-------------------------|-----------------------|-------------------------|--------------------|-----------------------|-------------------------|------------------------|
| | | Phnom Penh | Mahindra City | MM2100 | Mingaladon | Amata | VSIP | Amata |
| (MW) | | | | | | | | |
| Power-supply nature | Limited | Unlimited ⁴³ | Limited ⁴⁴ | Unlimited ⁴⁵ | Limited | Limited ⁴⁶ | Unlimited ⁴⁷ | Limited ⁴⁸ |
| Water treatment unit (m ³) | 59011 | 5300 ⁴⁹ | 22932 | 72000 ⁵⁰ | 5000 ⁵¹ | 30000 ⁵² | 42000 ⁵³ | 18000 ⁵⁴ |
| Wastewater TP (m ³) | 48000 | 4000 ⁵⁵ | 17640 | 64800 ⁵⁶ | 5000 ⁵⁷ | 7,000 ⁵⁸ | 18000 ⁵⁹ | 14000 ⁶⁰ |
| Solid-waste removal | 1 | 1 ⁶¹ | 1 ⁶² | 1 | 1 ⁶³ | 0 ⁶⁴ | 1 | 1 |
| Natural gas | 1 | 0 | 0 | 1 ⁶⁵ | 0 | 0 ⁶⁶ | 1 | 1 ⁶⁷ |
| Other gas | 0 | 0 | 0 | 1 ⁶⁸ | 0 | 1 ⁶⁹ | 1 | 1 |
| No. of tel. lines | 512 | 530 ⁷⁰ | FOC backbone | 10000 ⁷¹ | 300 ⁷² | 960 ⁷³ | 6000 ⁷⁴ | FOC/ISDN ⁷⁵ |
| Pre-built | 1 | 1 ⁷⁶ | 1 | 1 | | 1 ⁷⁷ | 1 | 1 ⁷⁸ |

⁴¹<http://www.sembcorp.com/en/src/docx/usrdocx/FacilitiesAtAGlance.pdf>⁴²http://www.amata.com/eng/industrial_utilities.html⁴³<http://www.opendevelopmentcambodia.net/tag/electricity-price/> about the Power-supply nature and electricity charges in Cambodia as of 2013⁴⁴http://www.mahindraworldcity.com/chennai_mwc_chennai_sustainable_initiatives.aspx⁴⁵<http://www.balidiscovery.com/messages/message.asp?Id=9266>⁴⁶http://www.amata.com/eng/industrial_utilities.html⁴⁷<http://www.sembcorp.com/en/src/docx/usrdocx/FacilitiesAtAGlance.pdf>⁴⁸http://www.amata.com/eng/industrial_utilities.html⁴⁹<http://www.cambodiainvestment.gov.kh/investment-enviroment/cost-of-doing-business/utility-cost.html>⁵⁰[http://lnweb90.worldbank.org/ECA/Transport.nsf/ExtECADocByUnid/B9A56DE687D977AD85256BFB007248E1/\\$file/i ndustrial%20parks.pdf](http://lnweb90.worldbank.org/ECA/Transport.nsf/ExtECADocByUnid/B9A56DE687D977AD85256BFB007248E1/$file/i ndustrial%20parks.pdf)⁵¹http://mingaladon.com/infrastructure_services.htm⁵²http://www.amata.com/eng/industrial_utilities.html⁵³<http://www.sembcorp.com/en/src/docx/usrdocx/FacilitiesAtAGlance.pdf>⁵⁴http://www.amata.com/eng/industrial_utilities.html⁵⁵<http://www.cambodiainvestment.gov.kh/investment-enviroment/cost-of-doing-business/utility-cost.html>⁵⁶[http://lnweb90.worldbank.org/ECA/Transport.nsf/ExtECADocByUnid/B9A56DE687D977AD85256BFB007248E1/\\$file/i ndustrial%20parks.pdf](http://lnweb90.worldbank.org/ECA/Transport.nsf/ExtECADocByUnid/B9A56DE687D977AD85256BFB007248E1/$file/i ndustrial%20parks.pdf) (page 50) Wastewater TP (m³)⁵⁷http://mingaladon.com/infrastructure_services.htm⁵⁸http://www.amata.com/eng/industrial_utilities.html⁵⁹http://www.vsip.com.vn/out-project/industrial-park/vsip-ii-binh-duong-vsip_project-9.html⁶⁰http://www.amata.com/eng/industrial_utilities.html⁶¹<http://www.ppsez.com/the-zone/facilities-a-services.html>⁶²http://www.mahindraworldcity.com/Docs/downloads/Mwc_Brochure_Press_19_DEC_2007.pdf⁶³http://www.uncrcd.or.jp/env/3r_02/presentations/BG1/1-3%20Myanmar-2nd-3R-Forum.pdf⁶⁴Annex-3 to this section based on responses by Ms. Kim to the questionnaire sent to this *industrial park* by JDI team⁶⁵[http://lnweb90.worldbank.org/ECA/Transport.nsf/ExtECADocByUnid/B9A56DE687D977AD85256BFB007248E1/\\$file/i ndustrial%20parks.pdf](http://lnweb90.worldbank.org/ECA/Transport.nsf/ExtECADocByUnid/B9A56DE687D977AD85256BFB007248E1/$file/i ndustrial%20parks.pdf),⁶⁶Annex-3 to this section based on responses by Ms. Kim to the questionnaire sent to this *industrial park* by JDI team⁶⁷<http://amata.com/site/inside.php?m=utilities&p=9&sub=28>⁶⁸http://www.mm2100.co.id/main_industrialtown.php?id=2⁶⁹Annex-3 to this section based on responses by Ms. Kim to the questionnaire sent to this *industrial park* by JDI team⁷⁰http://en.wikipedia.org/wiki/Telecommunications_in_Cambodia#cite_note-CIA-Factbook-Cambodia-2013-1⁷¹http://www.mm2100.co.id/main_industrialtown.php?id=2⁷²http://mingaladon.com/infrastructure_services.htm⁷³http://www.amata.com/eng/industrial_utilities.html⁷⁴http://www.vsip.com.vn/out-project/industrial-park/vsip-ii-binh-duong-vsip_project-9.html⁷⁵http://www.amata.com/eng/industrial_utilities.html⁷⁶<http://www.phnompenhpost.com/business/made-here-owned-there>⁷⁷Annex-3 to this section based on responses by Ms. Kim to the questionnaire sent to this *industrial park* by JDI team

| Items Compared | Sherpur ⁷ | Cambodia | India | Indonesia | Myanmar | Viet Nam | | Thailand |
|--|----------------------|----------------------------|---------------|---------------------|------------------|-------------------------|-----------------|-------------------|
| | | Phnom Penh | Mahindra City | MM2100 | Mingaladon | Amata | VSIP | Amata |
| factories? | | | | | | | | |
| Sewage-treatment (KLD) | | 1 ⁷⁹ | 9000 | | | 1(NA) ^{80, 81} | 1 ⁸² | |
| Land price | 50 ⁸³ | 60 ⁸⁴ | 65 | 175 ⁸⁵ | 58 | 90 | 117 | 125 |
| Maintenance charge/m ² /month | 0.16 | 0.06+10% VAT ⁸⁶ | | 0.06 ⁸⁷ | | 0.08 ⁸⁸ | 0.07 | 0.047 |
| Infrastructure | | | | | | | | |
| Distance(1) | 215 | 226 ⁸⁹ | 57 | 30 | 50 ⁹⁰ | 25 ⁹¹ | 16 | 27 ⁹² |
| Distance(2) | 142 | 20 ⁹³ | 50 | 32 | 23 ⁹⁴ | 30 ⁹⁵ | 20 | 114 ⁹⁶ |
| Distance(3) | 142 | 20 ⁹⁷ | 36 | 50 | 7 ⁹⁸ | 35 ⁹⁹ | 20 | 99 ¹⁰⁰ |
| Electricity (/kWh) | 0.066 | 0.28 | 0.105 | 0.1354 | 0.12 | 0.077 ¹⁰¹ | 0.078 | 0.15 |
| Water (/cu.-m) | 0.30 | 0.30 | 0.60 | 0.40 ¹⁰² | 0.05 | 0.218 ¹⁰³ | 0.310 | 0.65 |

⁷⁸<http://www.pattayapropertynews.com/thailand-property-news/eia-approval-amata-for-its-3500rai-expansion-in-thailand>

⁷⁹<http://www.ppsez.com/the-zone/infrastructure.html>

⁸⁰<http://www.semcorp.com/en/src/docx/usrdocx/FacilitiesAtAGlance.pdf>

⁸¹Annex-3 to this section based on responses by Ms. Kim to the questionnaire sent to this *industrial park* by JDI team

⁸²http://www.vsip.com.vn/out-project/industrial-park/vsip-ii-binh-duong-vsip_project-9.html

⁸³Unit land lease price over the four years for Sherpur ranges between 50-70US\$/m². In this table we're only using 50US\$/m² for presentational purposes. That said, in our detailed calculations, preparatory to ranking we used a weighted average of 56US\$/m² (This is shown in the Excel spreadsheet submitted with this report).

⁸⁴<http://www.emergingfrontiers.com/2013/04/26/cambodias-first-dairy-plant/#more-14002>

⁸⁵http://www.ubs.com/microsites/ib-conferences/apac/aseanconf2013/en/material/_jcr_content/par/table.1958697584.file/dGFibGVUZXh0PS9jb250ZW50L2Rhbs91YnMvbWljcm9zaXRlc9JQiBldml0ZS9hcGFjL2FzZWFlMjAxMy9jb3JwLW1hdGVyaWFsL0Jla2FzaSBGYWphci5wZGY=Bekasi%20Fajar.pdf

⁸⁶<http://www.sciencespo.fr/coesinet/sites/default/files/GMS%20Capstone%20Report%20May%202017.pdf>

⁸⁷[http://lnweb90.worldbank.org/ECA/Transport.nsf/ExtECADocByUnid/B9A56DE687D977AD85256BFB007248E1/\\$file/industrial%20parks.pdf](http://lnweb90.worldbank.org/ECA/Transport.nsf/ExtECADocByUnid/B9A56DE687D977AD85256BFB007248E1/$file/industrial%20parks.pdf)

⁸⁸http://www.amata.com/eng/industrial_utilities.html

⁸⁹http://www.acledabank.com.kh/kh/assets/pdf_zip/Conference2007_08.pdf

⁹⁰http://mingaladon.com/location_map.htm

⁹¹http://www.amata.com/eng/industrial_amatavietnam_map.html

⁹²<http://amata.com/site/inside.php?m=locations&p=7>

⁹³http://www.acledabank.com.kh/kh/assets/pdf_zip/Conference2007_08.pdf

⁹⁴http://mingaladon.com/location_map.htm

⁹⁵http://www.amata.com/eng/industrial_amatavietnam_map.html

⁹⁶<http://amata.com/site/inside.php?m=locations&p=7>

⁹⁷http://www.acledabank.com.kh/kh/assets/pdf_zip/Conference2007_08.pdf

⁹⁸http://mingaladon.com/location_map.htm

⁹⁹http://www.amata.com/eng/industrial_amatavietnam_map.html

¹⁰⁰<http://amata.com/site/inside.php?m=locations&p=7>

¹⁰¹<http://www.miga.org/documents/asiareport.php>

¹⁰²[http://lnweb90.worldbank.org/ECA/Transport.nsf/ExtECADocByUnid/B9A56DE687D977AD85256BFB007248E1/\\$file/industrial%20parks.pdf](http://lnweb90.worldbank.org/ECA/Transport.nsf/ExtECADocByUnid/B9A56DE687D977AD85256BFB007248E1/$file/industrial%20parks.pdf)

¹⁰³Annex-3 to this section based on responses by Ms. Kim to the questionnaire sent to this *industrial park* by JDI team

| Items Compared | Sherpur ⁷ | Cambodia | India | Indonesia | Myanmar | Viet Nam | | Thailand |
|--|----------------------|---------------------------------------|-------------------|---------------------------------|-------------------|---|-------------------|----------------------------|
| | | Phnom Penh | Mahindra City | MM2100 | Mingaladon | Amata | VSIP | Amata |
| Waste-water (/cu.-m/mth) | 0.35 | 0.26 | 0.01 | 0.55 ¹⁰⁴ | NA | 0.28 ¹⁰⁵ | 0.190 | 0.233 |
| Government policy | | | | | | | | |
| Corporate tax rate (%) | 28 | 20 ¹⁰⁶ | 34 | 25 ¹⁰⁷ | 30 ¹⁰⁸ | 22 ¹⁰⁹ | 22 ¹¹⁰ | 20 ¹¹¹ |
| VAT (%) | 15 | 10 ¹¹² | NA ¹¹³ | 10 | | 10 ¹¹⁴ | 10 ¹¹⁵ | 0 |
| OSS | 1 | 1 ¹¹⁶ | 1 | 1 | 1 ¹¹⁷ | 1 ¹¹⁸ | 1 ¹¹⁹ | 1 ¹²⁰ |
| Incentives | | | | | | | | |
| Tax h'day (yrs) | 7 | 9 ¹²¹ | 5 ¹²² | | 5 ¹²³ | 0 ¹²⁴ | 4 ¹²⁵ | 8 ¹²⁶ |
| Lower tax rate (yrs) | 0 | 3-6 ¹²⁷ | 5 ¹²⁸ | | 3 ¹²⁹ | 0 ¹³⁰ | 9 ¹³¹ | 5 ¹³² |
| Industrial percentages, where available, calculated relative to total built-up area | | | | | | | | |
| Most dominant | Pharma | Apparels & Accessories ¹³³ | IT ¹³⁴ | Automotives (30) ¹³⁵ | Garments (32.2) | Chemicals /plastics/paint ¹³⁶ (23) | Apparel | Steel/metal /plastics (32) |

¹⁰⁴[http://lnweb90.worldbank.org/ECA/Transport.nsf/ExtECADocByUnid/B9A56DE687D977AD85256BFB007248E1/\\$file/industrial%20parks.pdf](http://lnweb90.worldbank.org/ECA/Transport.nsf/ExtECADocByUnid/B9A56DE687D977AD85256BFB007248E1/$file/industrial%20parks.pdf),

¹⁰⁵Annex-3 to this section based on responses by Ms. Kim to the questionnaire sent to this *industrial park* by JDI team

¹⁰⁶<http://www.pwc.com/th/en/publications/download/south-east-asia-web.pdf>

¹⁰⁷<http://www.deloitte.com/assets/Dcom-Indonesia/Local%20Assets/Documents/Tax/Taxation%20&%20Investment%20Guide%20Indonesia%202013.pdf> (page 7)

¹⁰⁸http://www.rd.go.th/publish/fileadmin/user_upload/AEC/AseanTax-Myanmar.pdf

¹⁰⁹Annex-3 to this section based on responses by Ms. Kim to the questionnaire sent to this *industrial park* by JDI team

¹¹⁰<http://www.vsip.com.vn/assets/uploads/myfiles/files/Leaflet/Brochure/VSIP-brochure-English-Vietnam-2014.pdf> (page 2)

¹¹¹<http://asiafoundation.org/in-asia/2013/01/30/thailand-adopts-nationwide-minimum-wage-policy-amid-controversy/>

¹¹²<http://www.tax.gov.kh/en/bvat.php>

¹¹³http://www.mahindraworldcity.com/docs/chennai/special_economic_zones.pdf

¹¹⁴Annex-3 to this section based on responses by Ms. Kim to the questionnaire sent to this *industrial park* by JDI team

¹¹⁵<http://www.gbs.com.vn/index.php/en/faq/business-registration/597-vietnam-val-value-added-tax-rates>

¹¹⁶http://www.ide.go.jp/English/Publish/Download/Brc/pdf/06_chapter1.pdf

¹¹⁷http://mingaladon.com/infrastructure_services.htm

¹¹⁸Annex-3 to this section based on responses by Ms. Kim to the questionnaire sent to this *industrial park* by JDI team

¹¹⁹<http://www.vsip.com.vn/investment-guide/one-stop-service.html>

¹²⁰http://www.ide.go.jp/English/Publish/Download/Brc/pdf/06_chapter1.pdf

¹²¹<http://www.opendevelopmentcambodia.net/briefing/special-economic-zones-2/>

¹²²<http://commerce.nic.in/annual2006-07/html/chapter6.html>

¹²³http://mingaladon.com/investment_incentives.htm

¹²⁴Annex-3 to this section based on responses by Ms. Kim to the questionnaire sent to this *industrial park* by JDI team

¹²⁵<http://www.vsip.com.vn/investment-guide/investment-incentives.html>

¹²⁶http://www.amata.com/eng/why_economic_%20incentives.html

¹²⁷http://www.pwc.com/en_KH/kh/publications/2012/assets/cambodia-tax-book2012-05042012.pdf

¹²⁸<http://www.mahindraworldcity.com/docs/mwcsezbooklet.pdf>

¹²⁹http://mingaladon.com/investment_incentives.htm

¹³⁰Annex-3 to this section based on responses by Ms. Kim to the questionnaire sent to this *industrial park* by JDI team

¹³¹<http://www.vsip.com.vn/investment-guide/investment-incentives.html>

¹³²http://www.amata.com/eng/why_economic_%20incentives.html

¹³³http://www.acledabank.com.kh/kh/assets/pdf_zip/Conference2007_08.pdf

¹³⁴http://www.mahindraworldcity.com/chennai_business_overview.aspx

¹³⁵http://www.ubs.com/microsites/ib-conferences/apac/aseanconf2013/en/material/_jcr_content/par/table.1958697584.file/dGFibGVUZXh0PS9jb250ZW50L2RhbS91YnMvbWIjem9zaXRlc9JQjBldml0ZS9hcGFjL2FzZWtFuMjAxMy9jb3JwLW1hdGVyaWFsL0Jla2FzaSBGYWphci5wZGY=Bekasi%20Fajar.pdf

¹³⁶http://www.amata.com/eng/industrial_amatavietnam_factsheet.html

| Items Compared | Sherpur ⁷ | Cambodia | India | Indonesia | Myanmar | Viet Nam | | Thailand |
|---|----------------------|-------------------------------|--------------------------------|-----------------------------------|-----------------------|--|-------------|-------------------------------|
| | | Phnom Penh | Mahindra City | MM2100 | Mingaladon | Amata | VSIP | Amata |
| Next | Food processing | Footwear ¹³⁷ | Autos ¹³⁸ | Logistics (10 ¹³⁹) | Optical lenses (23.8) | Auto/machinery parts, steel, metal ¹⁴⁰ (18) | Engineering | Auto-making (24) |
| Next | Textiles | Electronics ¹⁴¹ | Apparels ¹⁴² | Electronics (7) ¹⁴³ | Foodstuff (16.2) | Textiles/apparel ¹⁴⁴ (16) | Automotive | Consumption goods (18) |
| Next | Ceramics | Food items ¹⁴⁵ | Gems/ ¹⁴⁶ Jewellery | Metals ¹⁴⁷ (7) | Shoes (9.1) | Electric ¹⁴⁸ (11) | NA | Electronics (14) |
| Next | Paint | Plastics goods ¹⁴⁹ | | Steel ¹⁵⁰ (6) | Watch-dial (6.49) | Beverage ¹⁵¹ (7) | NA | Service and Infrastructure(7) |
| Next | NApp | NA | N.A | Food-beverages ¹⁵² (6) | Electronics (3.99) | Miscellaneous ¹⁵³ (14) | NA | Chemicals (4) |
| Next | NApp | NA | NA | Printing ¹⁵⁴ (4) | NApp | NApp | NA | NApp |
| Individual operating costs¹⁵⁵ | | | | | | | | |

¹³⁷http://www.acledabank.com.kh/kh/assets/pdf_zip/Conference2007_08.pdf

¹³⁸http://www.mahindraworldcity.com/chennai_business_overview.aspx

¹³⁹http://www.ubs.com/microsites/ib-conferences/apac/aseanconf2013/en/material/_jcr_content/par/table.1958697584.file/dGFibGVUZXh0PS9jb250ZW50L2RhbS91YnMvbWljcm9zaXRlc9JQiBldml0ZS9hcGFjL2FzZWFWuMjAxMy9jb3JwLW1hdGVyaWFsL0Jla2FzaSBGYWphci5wZGY=Bekasi%20Fajar.pdf

¹⁴⁰http://www.amata.com/eng/industrial_amatavietnam_factsheet.html

¹⁴¹http://www.acledabank.com.kh/kh/assets/pdf_zip/Conference2007_08.pdf

¹⁴²http://www.mahindraworldcity.com/chennai_business_overview.aspx

¹⁴³http://www.ubs.com/microsites/ib-conferences/apac/aseanconf2013/en/material/_jcr_content/par/table.1958697584.file/dGFibGVUZXh0PS9jb250ZW50L2RhbS91YnMvbWljcm9zaXRlc9JQiBldml0ZS9hcGFjL2FzZWFWuMjAxMy9jb3JwLW1hdGVyaWFsL0Jla2FzaSBGYWphci5wZGY=Bekasi%20Fajar.pdf

¹⁴⁴http://www.amata.com/eng/industrial_amatavietnam_factsheet.html

¹⁴⁵http://www.acledabank.com.kh/kh/assets/pdf_zip/Conference2007_08.pdf

¹⁴⁶http://www.mahindraworldcity.com/chennai_business_overview.aspx

¹⁴⁷http://www.ubs.com/microsites/ib-conferences/apac/aseanconf2013/en/material/_jcr_content/par/table.1958697584.file/dGFibGVUZXh0PS9jb250ZW50L2RhbS91YnMvbWljcm9zaXRlc9JQiBldml0ZS9hcGFjL2FzZWFWuMjAxMy9jb3JwLW1hdGVyaWFsL0Jla2FzaSBGYWphci5wZGY=Bekasi%20Fajar.pdf

¹⁴⁸http://www.amata.com/eng/industrial_amatavietnam_factsheet.html

¹⁴⁹http://www.acledabank.com.kh/kh/assets/pdf_zip/Conference2007_08.pdf

¹⁵⁰http://www.ubs.com/microsites/ib-conferences/apac/aseanconf2013/en/material/_jcr_content/par/table.1958697584.file/dGFibGVUZXh0PS9jb250ZW50L2RhbS91YnMvbWljcm9zaXRlc9JQiBldml0ZS9hcGFjL2FzZWFWuMjAxMy9jb3JwLW1hdGVyaWFsL0Jla2FzaSBGYWphci5wZGY=Bekasi%20Fajar.pdf

¹⁵¹http://www.amata.com/eng/industrial_amatavietnam_factsheet.html

¹⁵²http://www.ubs.com/microsites/ib-conferences/apac/aseanconf2013/en/material/_jcr_content/par/table.1958697584.file/dGFibGVUZXh0PS9jb250ZW50L2RhbS91YnMvbWljcm9zaXRlc9JQiBldml0ZS9hcGFjL2FzZWFWuMjAxMy9jb3JwLW1hdGVyaWFsL0Jla2FzaSBGYWphci5wZGY=Bekasi%20Fajar.pdf

¹⁵³http://www.amata.com/eng/industrial_amatavietnam_factsheet.html

¹⁵⁴http://www.ubs.com/microsites/ib-conferences/apac/aseanconf2013/en/material/_jcr_content/par/table.1958697584.file/dGFibGVUZXh0PS9jb250ZW50L2RhbS91YnMvbWljcm9zaXRlc9JQiBldml0ZS9hcGFjL2FzZWFWuMjAxMy9jb3JwLW1hdGVyaWFsL0Jla2FzaSBGYWphci5wZGY=Bekasi%20Fajar.pdf

¹⁵⁵ Board of Investment, Bangladesh, Annual Report, 2012, citing results about many capitals of Asian countries

| Items Compared | Sherpur ⁷ | Cambodia | India | Indonesia | Myanmar | Viet Nam | | Thailand |
|---|----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| | | Phnom Penh | Mahindra City | MM2100 | Mingaladon | Amata | VSIP | Amata |
| Mgmt wage rates | 578 | 700 ¹⁵⁶ | 1510 | 995 | 600 | 1146 | 1146 | 1565 |
| Skilled wage rates | 251 | 180 ¹⁵⁷ | 607 | 414 | 145 | 521 | 521 | 641 |
| Semiskilled wage rates | 78 | 120 ¹⁵⁸ | 264 | 209 | 92 | 128 | 128 | 286 |
| Min. wage | 39 | 61 ¹⁵⁹ | 120 | 167 | 68 | 111 | 111 | 230 |
| Rigidity of working hours ¹⁶⁰ | | | | | | | | |
| Premium-1 | 0 | 30 | 0 | 0 | N.A. | 30 | 30 | 0 |
| Premium-2 | 0 | 100 | 0 | 0 | N.A. | 100 | 100 | 0 |
| Difficulty in hiring workers ¹⁶¹ | | | | | | | | |
| Curbs on hiring-1 | Yes | No | No | Yes | N.A. | No | No | Yes |
| Curbs on hiring-1 | NL | 24 | NL | 36 | N.A. | 72 | 72 | NL |
| Curbs on hiring-1 | 23.2 | 41.0 | 24.1 | 105.9 | N.A. | 40.7 | 40.7 | 78.9 |
| Curbs on hiring-1 | 0.30 | 0.3 | 0.16 | 0.38 | N.A. | 0.33 | 0.33 | 0.33 |
| Non-labour wage% of salary | 0 | 10 ¹⁶² | 6 | 5 | N.A. | 20 ¹⁶³ | 20 | 20 |
| Operating costs | | | | | | | | |
| Cargo rates-1 ¹⁶⁴ | 900 | 1500 | 979 | 800 | 1600 | 500 | 500 | 1162 |
| Cargo rates-2 ¹⁶⁵ | 3675 | 4000 | 2817 | 2600 | 6500 | 2600 | 2600 | 3863 |
| Telecom rate (/line) ¹⁶⁶ | 24 | 15 ¹⁶⁷ | 9.3 | 69 | 2000 | 22 | 22 | 106 |
| Use (/min) | 1.12 | 5 | 21 | 6.28 | 0.15 | 1.05 | 1.05 | 3.16 |
| Logistics perf. (score) | 2.74 ¹⁶⁸ | 2.56 ¹⁶⁹ | 3.08 ¹⁷⁰ | 2.94 ¹⁷¹ | 2.37 ¹⁷² | 3.00 ¹⁷³ | 3.00 ¹⁷⁴ | 3.18 ¹⁷⁵ |
| Quality-of-life (QOL) ratings | | | | | | | | |

¹⁵⁶<http://www.sciencespo.fr/coesionet/sites/default/files/GMS%20Capstone%20Report%20May%202017.pdf>

¹⁵⁷<http://www.sciencespo.fr/coesionet/sites/default/files/GMS%20Capstone%20Report%20May%202017.pdf>

¹⁵⁸<http://www.sciencespo.fr/coesionet/sites/default/files/GMS%20Capstone%20Report%20May%202017.pdf>

¹⁵⁹<http://www.ssez.com/en/company.asp?Ilt=4&Ione=2>

¹⁶⁰ International Finance Corporation (IFC), *Doing Business, 2011*, background tables

¹⁶¹ International Finance Corporation (IFC), *Doing Business, 2011*, background tables

¹⁶²http://www.nytimes.com/2013/04/09/business/global/wary-of-events-in-china-foreign-investors-head-to-cambodia.html?hpw&r=1&_r=1

¹⁶³<http://www.miga.org/documents/asiareport.pdf>

¹⁶⁴ Board of Investment, Bangladesh, Annual Report, 2012, citing results about many capitals of Asian countries

¹⁶⁵ Board of Investment, Bangladesh, Annual Report, 2012, citing results about many capitals of Asian countries

¹⁶⁶ Board of Investment, Bangladesh, Annual Report, 2012, citing results about many capitals of Asian countries

¹⁶⁷<http://www.cambodiainvestment.gov.kh/investment-enviroment/cost-of-doing-business/telecommunication-cost.html>

¹⁶⁸World Bank, Logistics Performance Survey, 2012.

¹⁶⁹World Bank, Logistics Performance Survey, 2012.

¹⁷⁰World Bank, Logistics Performance Survey, 2012.

¹⁷¹World Bank, Logistics Performance Survey, 2012.

¹⁷²World Bank, Logistics Performance Survey, 2012.

¹⁷³World Bank, Logistics Performance Survey, 2012.

¹⁷⁴World Bank, Logistics Performance Survey, 2012.

¹⁷⁵World Bank, Logistics Performance Survey, 2012.

| Items Compared | Sherpur ⁷ | Cambodia | India | Indonesia | Myanmar | Viet Nam | | Thailand |
|-----------------|----------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| | | Phnom Penh | Mahindra City | MM2100 | Mingaladon | Amata | VSIP | Amata |
| Security (24*7) | 1 | 1 ¹⁷⁶ | 1 ¹⁷⁷ | 1 ¹⁷⁸ | 1 ¹⁷⁹ | 1 ¹⁸⁰ | 1 | 1 ¹⁸¹ |
| Open-space (%) | 30. 4 | | 30 | | | 14 | | |
| Entertainment | 0 | 0 ¹⁸² | 1 ¹⁸³ | 1 ¹⁸⁴ | 0 | 1 | 1 | 1 ¹⁸⁵ |
| Golf-course | 0 | 0 ¹⁸⁶ | 0 ¹⁸⁷ | 1 ¹⁸⁸ | 0 | 0 | 0 | 2 ¹⁸⁹ |
| Qty Housing | 1 | 1 ¹⁹⁰ | 1 ¹⁹¹ | 1 ¹⁹² | 0 | 1 | 1 ¹⁹³ | 1 ¹⁹⁴ |
| High school | 0 | 0 ¹⁹⁵ | 1 ¹⁹⁶ | 0 | 0 | 1 ¹⁹⁷ | 1 | 1 ¹⁹⁸ |
| University | 0 | 0 ¹⁹⁹ | 0 ²⁰⁰ | 0 | 0 | 1 ²⁰¹ | 1 ²⁰² | 0 |

Note: The sources of the information presented in the cells of foregoing table are, wherever available, are presented here in this table. FOC denotes fiber-optics cabling. ISDN denotes International Subscribers' Digital Network. KLD denotes kilo-liter per day.

Distance(1) is about distance from nearest sea-port or deep-sea port, measured in kilometres; distance (2) is about distance from the largest commercial metropolis, in km; distance(3) is about distance from the largest airport in the country, in km. Land-price is for industrial land and measured per sq.-meter. The destination port with respect to the cargo rate-1 is Yokohama in Japan, and that for cargo rate-2 is Los Angeles. Both rates relate to the shipping rates per tonne by sea.

Logistics performance is measured using quantitative scores published by the World Bank in its Logistics Performance Survey, 2012. NA denotes 'Not available despite a very diligent search'. NApp denotes 'Not applicable.'

Based on the calculations, the proposed zone of Sherpur is found to be the most competitive, with the next higher three billings going to VSIP, Amata City Bien Hoa Viet Nam, and PPSEZ, in that order. In a second iteration, we take the land area in the industrial parks out of the equation. The billings remain unchanged.

That Sherpur should overhaul the rest of the entire field could be perceived as counter-intuitive to many, essentially as their initial expectations about Bangladesh have been dampened by Bangladesh's

¹⁷⁶<http://www.ppsez.com/the-zone/facilities-a-services.html>

¹⁷⁷http://www.mahindraworldcity.com/Docs/downloads/Mwc_Brochure_Press_19_DEC_2007.pdf

¹⁷⁸http://www.mm2100.co.id/main_industrialtown.php?id=3

¹⁷⁹http://mingaladon.com/infrastructure_services.htm

¹⁸⁰http://www.amata.com/eng/industrial_standard.html

¹⁸¹<http://amata.com/site/inside.php?m=utilities&p=11>

¹⁸²<http://www.ppsez.com/the-zone/facilities-a-services.html>

¹⁸³http://www.mahindraworldcity.com/Docs/downloads/Mwc_Brochure_Press_19_DEC_2007.pdf

¹⁸⁴http://www.mm2100.co.id/main_industrialtown.php?id=3

¹⁸⁵<http://www.amata.com/site/inside.php?m=locations&p=7&sub=28>

¹⁸⁶<http://www.ppsez.com/the-zone/facilities-a-services.html>

¹⁸⁷http://www.mahindraworldcity.com/Docs/downloads/Mwc_Brochure_Press_19_DEC_2007.pdf

¹⁸⁸http://www.mm2100.co.id/main_industrialtown.php?id=3

¹⁸⁹<http://www.amata.com/site/inside.php?m=locations&p=7&sub=28>

¹⁹⁰<http://www.ppsez.com/about-us/overview.html>

¹⁹¹http://www.mahindraworldcity.com/chennai_living_residential_zone.aspx

¹⁹²http://www.mm2100.co.id/main_industrialtown.php?id=3

¹⁹³http://www.vsip.com.vn/out-project/industrial-park/vsip-ii-binh-duong-vsip_project-9.html

¹⁹⁴<http://www.amata.com/site/inside.php?m=locations&p=7&sub=28>

¹⁹⁵<http://www.ppsez.com/the-zone/facilities-a-services.html> High school

¹⁹⁶http://www.mahindraworldcity.com/Docs/downloads/Mwc_Brochure_Press_19_DEC_2007.pdf High school

¹⁹⁷http://www.amata.com/eng/industrial_amatavietnam_factsheet.html High School

¹⁹⁸<http://www.amata.com/site/inside.php?m=locations&p=7&sub=28>

¹⁹⁹<http://www.ppsez.com/the-zone/facilities-a-services.html> University

²⁰⁰http://www.mahindraworldcity.com/Docs/downloads/Mwc_Brochure_Press_19_DEC_2007.pdf University

²⁰¹http://www.amata.com/eng/industrial_amatavietnam_factsheet.html University

²⁰²<http://www.vsip.com.vn/assets/uploads/myfiles/files/Media/Location%20Map.pdf> (page 1)

absolutely dismal ranking per World Economic Forum or the World Bank, presented earlier in this chapter. However, bear in mind that land is going to be offered at a strategic price of only US\$ 50 per sq-meter when comparable prices for Amata City, VSIP and MM2100 are US dollar 125, 175 and 117, respectively. That addresses one part of the answer. As well, power costs for tenants at Sherpur, at less than seven cents, compared with 15 and 14 cents, respectively, in Thailand and Indonesia. In fact, power charges in Thailand are soon going to enjoy parity with Singapore, according to one of Thailand's top bureaucrats in charge of electricity generation, as Thailand is unwilling to burn coal for its power. There is nothing counter-intuitive in these results. Sherpur is more attractive due to its strategic land pricing, the cheap power from the national power grid in Bangladesh it is planned to have access to, and the cheaper international shipping rates from Chittagong to Yokohama. By comparison, land prices in the more mature capitalist economies of Thailand and Indonesia, land prices are between two-and-a-half times to almost three times more expensive. Finally, bear in mind that Sherpur being in its planning stage, the numbers used for it are at times forecasts, whereas the corresponding numbers for the EZs compared are actual. Time will tell if the actual experience at Sherpur's implementation exceeds or falls short of those 'forecasts.'

Of course, the aggregation scheme used does matter. One could argue that Japanese FDI originations into any country is very powerfully influenced by how much of Japanese investment had already been made into the destination country. To quote: "A common finding in recent studies is that regions with a relatively higher existing stock of foreign investment are more likely to attract further investments, after controlling for various other regional characteristics affecting locational choice" (Bederbos and Carree, 2001). This behaviour has been demonstrated time and again on the part of Japanese FDI originations in the United States and Europe. It has also been documented that Japanese auto-parts originators in the US have also been influenced by the amount of prior FDI in the same auto-cluster from the same Japanese auto keiretsus as the one that FDI originators themselves belonged. Agglomeration benefits are greater when proximate manufacturing plants are operated by other Japanese firms and, in for automotive investments, when Japanese firms belong to the same vertical keiretsu within Japan. The collection of investment factors considered here is not comprehensive as it does not include, for example, FDI inflow per capita of the countries in question. That said, FDI inflow is typically included in the coverage of variables with which competitiveness is measured in World Economic Forum's Global Competitiveness Index (GCI). The last-noted has been used in the exercise preparatory to the foregoing table. We have accommodated the criticism, at least indirectly. It is undeniable that Sherpur is at present an unknown quantity among the aspiring FDI originators. However, if stable, adequate and sustainable power, treated water and wastewater, protection from the sea-surges, better connectivity, and a functioning One-Stop Service were to be guaranteed, Sherpur could most likely become a competitor to reckon with among the majors among South-east Asia's IPs.

Table-2.1.2.3-2: Competitive ranking of the nine economic zones/industrial parks

| Serial No. | Economic zones/industrial parks | Average of standardized values over all indicators | | Average of standardized values over all indicators, except land area of the EZ/IP | |
|------------|---------------------------------|--|------|---|------|
| | | Quantitative score | Rank | Quantitative score | Rank |
| (1) | Sherpur | 0.655 | 1st | 0.695 | 1st |
| (2) | Phnom Penh SEZ | 0.518 | 4th | 0.545 | 4th |
| (3) | Mahindra World City | 0.477 | 6th | 0.497 | 6th |
| (4) | MM2100 Industrial Prak | 0.458 | 7th | 0.473 | 7th |
| (5) | Mingaladon Industrial Park | 0.510 | 5th | 0.542 | 5th |
| (6) | Amata Bien Hoa IP Viet Nam | 0.536 | 3rd | 0.559 | 3rd |
| (7) | VSIP | 0.579 | 2nd | 0.607 | 2nd |
| (8) | Amata City Thailand | 0.421 | 8th | 0.424 | 8th |

Source: JDI/MSL/Sheltech calculations based on the sources cited in the foregoing.

EPZ in Bangladesh: Its Performance and Contribution for Employment Creation & Export

Developed zoned land on five export-processing zones (EPZs) has completely been sold out in the past 10 years. Demand for three other EPZs remains strong, and they too are nearly sold out.

EPZ Progress

Between those eight EPZs, the total area under development had been 2,372 acres (949 ha), with 2,256 plots developed.

Ninety-three percent of the plots have already been taken up by lease-holders. Vacancies exist for eighteen plots at Uttara EPZ, 116 plots at Ishwardi (newly expanded in 2010) and thirteen plots at Mongla.

Currently, investors keep visiting Bangladesh Export Processing Zone Authority (BEPZA) and the three EPZS to discuss preparatory to leasing plots. The remaining 147 plots will likely be occupied in the near future.

Investment at EPZ

Time-series data related to investment in the EPZs shows that, until 2000, investment ranged between \$30 and \$50 million. However, there was a marked upswing in the rate of investment at EPZs to the \$100-\$110 million range around 2002-2004 and further increased to \$300 million level from 2010. Because annual data suffers from random fluctuations, one needs to smooth out the data-series using moving average. Three-year moving averages show the same trends. Compound annual growth rate based on the smoothed investment series is found to be 14.2% annually. Investment is forecast to fall off significantly as vacancies fall off.

Employment by EPZ

Employment on the EPZs was at the 10,000 jobs level around 2001 to 2003, increasing to 15,000-20,000 jobs level for 2004-2008 period, and rising further to the 30,000-40,000 jobs level during 2009-2012.

Export from EPZ

Export from EPZs increased from \$1.0 billion level in the early 2000 to \$2.0 billion level from 2006 and to the \$4.0 billion level in 2010. The cumulative export from EPZ reached \$35 billion by August 2013. Export from EPZ has been contributing 17-18 % of the total national export.

Pent-up demand for land on the EPZs

BEPZA's activities were suspended in 2009, which slowed the supply of well-prepared industrial land virtually to zero. Because however there is a fairly strong pent-up demand for ready-to-build industrial land, this led to a backlog for meeting such demand.

Visitors at BPZA for asking EPZ plots are increasing in recent years -over 100 visitors per month recently. Investor enquiries at BOI are also increasing. However, BOI is not in a position to do anything about guiding or referring investors to suitable industrial land with necessary infrastructure. Investor enquiries at JETRO's Dhaka office has also been growing recently -over 200 enquiries/visitors per month are making enquiries about developed industrial land fitted out with appropriate infrastructure. All-in-all, EPZs are generating investor-enquiries for all their inland locations far away from the main port at Chittagong, and major constellations of demand.

Factors behind for the growing investor enquiries

Important reasons why there is growing number of enquiries in Bangladesh's EPZ include rapidly rising wages and cost of production in China and some of the other ASEAN countries. Bangladesh's plentiful supply of both unskilled and skilled labour, and its competitive wages have their attractive strengths.

1. Type of Industries for Bangladesh

- Labour-intensive industries required less power such as ready-made garments (RMG), leather-shoes, toys, garments' accessories, and electronics parts.
- Backward-linkage industries complementing RMGs such as textile weaving and accessories.
- Leather-goods
- Shipbuilding(to build small to medium-sized ships) and ship-components
- Ceramics
- IT-enabled services
- Light-engineering

2. New industries for the domestic market in the future

- Motorbikes and automobiles plus parts and components
- Electronic appliances plus parts and components
- Precision machinery plus parts and components
- Basic industries such as steel, steel alloy, non-ferrous metal, chemicals, and,
- Construction materials and components

3. Use of the EPZ experiences for the competitive analysis

EPZs located in relatively remote districts in the Western part of Bangladesh are attracting enquiries from investors from China, India, and Pakistan plus domestic companies. This is most likely due to the shortage of suitable industrial land in the near Dhaka-Chittagong corridor. The proposed sites of the three EZs under study represent much better locations than the three EPZs with vacancies on their watch. It is a foregone conclusion that BEZA will readily attract foreign direct investment (FDI) and domestic investment (DI).

Table-2.1.2.3-3: Comparative Analysis of EPZ with Sherpur EZ

| EPZ & EZ | Sherpur EZ | Mongla EPZ | Uttara EPZ | Ishwardi EPZ |
|--------------------------------|--------------------------|---------------------|----------------------|-------------------------|
| Area (Acre) | 353.53 | 255 | 212 | 309 |
| Plot Area | 90 Plots (1 ha) | 124 Plots | 20 Plots | 158 Plots |
| Available Plot | 90 | 17 | 11 | 116 |
| Distance from Chittagong (Km) | 435 | 664 | 650 | 484 280 Mongla P |
| Distance from Dhaka (Km) | 142 | 379 | 401 | 220 |
| Utilities &Services | E, W, Ws, Te, Gs, OSS | E, W, Ws, Te OSS | E, W, Ws, Te, OSS | E, W, Ws, Te Gs, OSS |
| Distance from airport (Km) | 55 | 105 | 18 | 11 |
| Land price (\$)/m ² | 50 (in 2017) | 1.25/yr | 1.25 /yr | 1.25 /yr |

Note: Land-lease price quotes for Sherpur are for the first year of land-sale

Table-2.1.2.3-4: Comparative Analysis of EPZ with Anwara EZ

| EPZ & EZ | Anwara EZ | Mongla EPZ | Uttara EPZ | Ishwardi EPZ |
|-------------------------------|---------------------|-------------------|-------------------|---------------------|
| Area (Acre) | 1,389.50 | 255 | 212 | 309 |
| Plot Area | 115 Plots (1 ha) | 124 Plots | 20 Plots | 158 Plots |
| Available Plot | 115 | 17 | 11 | 116 |
| Distance from Chittagong (Km) | 45 Own Port | 664 | 650 | 484 280 Mongla P |
| Distance from Dhaka (Km) | 235 | 379 | 401 | 220 |

| | | | | |
|--------------------------------|-----------------------|------------------|-------------------|----------------------|
| Utilities & Services | E, W, Ws, Te, Gs, OSS | E, W, Ws, Te OSS | E, W, Ws, Te, OSS | E, W, Ws, Te Gs, OSS |
| Distance from airport (Km) | 46 | 105 | 18 | 11 |
| Land price (\$)/m ² | 60 (Year 2018-2019) | 1.25/yr | 1.25 /yr | 1.25 /yr |

Note: Land-lease price quotes for Anwara are for the first year of land-sale

Table-2.1.2.3-5: Comparative Analysis of EPZ with Mirershori EZ

| EPZ & EZ | Mirershori EZ | Mongla EPZ | Uttara EPZ | Ishwardi EPZ |
|--------------------------------|---------------------|------------------|-------------------|----------------------|
| Area (Acre) | 7,195.30 | 255 | 212 | 309 |
| Plot Area | 1240 Plots | 124 Plots | 20 Plots | 158 Plots |
| Available Plot | 1,240 | 17 | 11 | 116 |
| Distance from Chittagong (Km) | 70 Own port | 664 | 650 | 484 280 Mongla P |
| Distance from Dhaka (Km) | 165 | 379 | 401 | 220 |
| Utilities & Services | E, W, Ws, Te, OSS | E, W, Ws, Te OSS | E, W, Ws, Te, OSS | E, W, Ws, Te Gs, OSS |
| Distance from airport (Km) | 70 | 105 | 18 | 11 |
| Land price (\$)/m ² | 50 (Year 2017-2019) | 1.25/yr | 1.25 /yr | 1.25 /yr |

Note: Land-lease price quotes for Mirershori are for the first year of land-sale

Promising industries of Bangladesh:

1. RMG

With 5,000 factories with 3.6 million workers, RMG is the largest industry of Bangladesh, and accounts for 75% of the export-receipts of the country. Cheap and skilled workers make Bangladesh highly competitive globally and many factories are shifting from China and ASEAN countries. This trend is likely to continue for some time making Bangladesh the second-largest producer next to China.

2. Pharmaceuticals

Pharmaceuticals have staged strong growth during the last decade. Exports have commenced, and have been running at the US\$50 million level since 2009. Some recent entrants, such as Incepta Pharmaceuticals, have earned blue-ribbon international certification and recognition.

3. IT Services

Compared with the neighboring countries of India and Pakistan, Bangladesh is lagging behind in the IT sector. Being an English speaking country, Bangladesh has a good opportunity to expand this IT service sector. IT service sector has grown fast (over 25%) recently, reaching \$56 million in 2011-12. Currently 50 software and IT service companies are exporting to 30 countries. This sector can grow fast if the stable power and reliable fiber communication facilities are provided.

4. Agro-Based & Frozen Foods

5. The agro-processing and frozen-food industry is another growing sector in Bangladesh. As Exhibit-3 shows, agro and frozen-food processing is the third-largest recipient of domestic investment.

6. Leather Goods

The leather industry has been mainly servicing the domestic market using local animal skins from cattle and goat stocks which are 1.8 % and 3.7% of the global stocks. Having the basic raw materials and cheap & skilled labour, Bangladesh started capturing the global market in the 1990s. In FY2011/2012, it exported \$451 million. This leather sector also has a great opportunity to

expand, again due to the cheap but well-experienced and skillful labour, plus GSP applied to this sector.

7. Light Engineering

Approximately 40,000 mostly SME companies produce bicycles, import substitution parts for machinery, plants, small tools, toys, consumer items, and paper products for the domestic market. This industry produces over 10,000 items which in 2012 was estimated to be worth \$120 million.

8. Textiles -Spinning

Due to the fast growing RMG sector, Bangladesh's spinning industry is growing rapidly. Currently 387 spinning factories (22 are public and 365 are private) producing 1,711 million kgs of yarn in 2012. By comparison, yarn output in 2004 was 384 million kgs, the growth between those two years being one of a factor of 4.7. Despite such rapid growth, imports have continued apace, too. As the next table shows, between 2007 and 2012, the value of yarn imports has more than doubled, to US\$1.38 billion. This industry has the potential to grow strongly if provided with sufficient and reliable power.

9. Ceramics

Due to natural gas availability and cheap labour, high quality bone-China technology was transferred in the 1980s by the Japanese to Bangladesh. Since then, the ceramic-ware industry has grown. Data from Export Promotion Bureau show that exports receipts have fluctuated between 2007 and 2012 between US\$30 million and US\$38 million.

10. Shipbuilding

Shipbuilding breached the export market for small ships in the early 1980s and has since grown to a US\$0.4 billion industry by 2012. The prospects of the industry are sufficiently good to have rated the commissioning of a full sector-assessment report by the World Bank in 2013. The industry believes that its potential size, relative to the global production value, could represent:

- 1% share by 2015 to US\$0.5 billion
- 2% share by 2018 to US\$1.0 billion
- 4% share by 2020 to US\$2.0 billion

Due to cheap and skillful workers, Bangladesh is competitive in small ships with major shipbuilding countries like China, Korea, and India. Bangladesh can unlock its potential to expand its shipbuilding industry in the near future if the Government provides suitable shipbuilding sites with utilities and other infrastructure.

11. Home appliances/telecommunications gear

This sector is still in its infancy and producing for the domestic market. The products are air conditioners, TVs, radios, refrigerators, washing machines, and ovens. Fast-changing technology and the need for branded overseas partners to produce white goods that are globally competitive products constitute the challenge before this industry. Probably, a start by producing labour-intensive components and parts and gradually shifting to assembly in the future will be appropriate. This sector, too, requires a stable and reliable power supply and skilled labour/engineers.

12. Motor-cycles and automobiles

Three companies----Honda with Bangladesh Steel & Engineering Corporation (BSEC), Runners Group and Walton---are already manufacturing motor-cycles for the domestic market. However, due to the large population and future market, Suzuki has teamed up with a large Bangladeshi conglomerate, the Rangs Group, and is currently planning to assemble for the domestic market.

For the automobile, starting with the production of labour-intensive components and parts may be practicable, and as the domestic car market grows, local assembly by one of the global majors may become a realistic prospect in the near future. Pertinently, two car assemblers such as Suzuki and Nissan decided to construct car assembly factories in Myanmar. For a global auto maker, a location in Myanmar will be in large part motivated by the very large, essentially landlocked, market of China's south-western provinces, more than a thousand miles from the South-China Sea. China is the chief backer of the large gap-pipeline and highway to connect itself more thoroughly with Myanmar. Bangladesh would not ordinarily be able to duplicate such a strategic advantage for any global auto maker. Even so, given the current size of 50,000 vehicles a year, growth in demand for autos running at some 7-8 percent, and a still low probability of an automobile purchase in the profile of most typical middle-class Bangladeshi households, several years will be needed to attract one of the global auto-makers to assemble cars in Bangladesh.

Major characteristics of Japanese originators of FDI

The rest of this chapter presents some salient results from surveys of prospective Japanese FDI originators. The underlying data have been sourced by a questionnaire survey, conducted by JICA in 2013 among Japanese manufacturing firms with the following traits:

- Japanese manufacturing companies with bases in China, and,
- Annual turnover above US\$50 million.

The questionnaire was distributed to the following categories of companies.

- Electric machinery and apparatus manufacturing (325 companies)
- General tools and machinery (321 companies)
- Chemical (213 companies)
- Transportation machine (178 companies)
- Metal goods (126 companies)
- Foods and beverages (123 companies)
- Steel and nonferrous metal (110 companies)
- Precision / medical machine (66 companies)

Table 2.1.2.3-6: Number of valid responses

| Sectors | No. of companies |
|---------------------------|------------------|
| Transportation machine | 25 |
| Chemical / Pharmaceutical | 19 |
| Electronics / device | 18 |
| Electric machine | 16 |
| Foods and beverage | 15 |
| Steel and nonferrous | 15 |
| Production machine | 12 |
| Other manufacturing | 34 |
| Others | 20 |
| Total | 179 |

Source: JICA survey, 2013

The respondents were asked to identify countries they were actively considering to pick as destinations for their own foreign direct investment during a forth-coming three year period. The responses to this question form the basis for Figure 2.1.2.3-1 below. The highlight of the figure is that ten percent of the firms had been actively considering investment in Bangladesh.

Figure 2.1.2.3-1: The percentage of companies that pointed at different countries as prospective destinations.

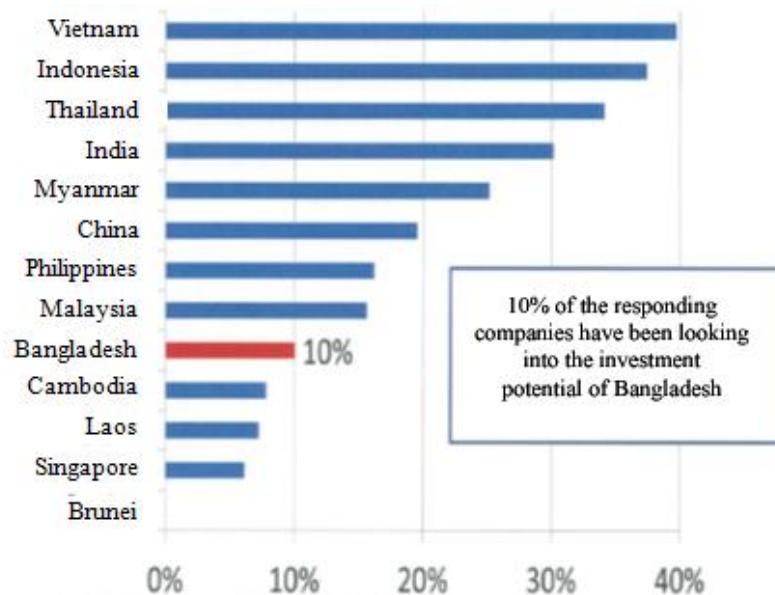


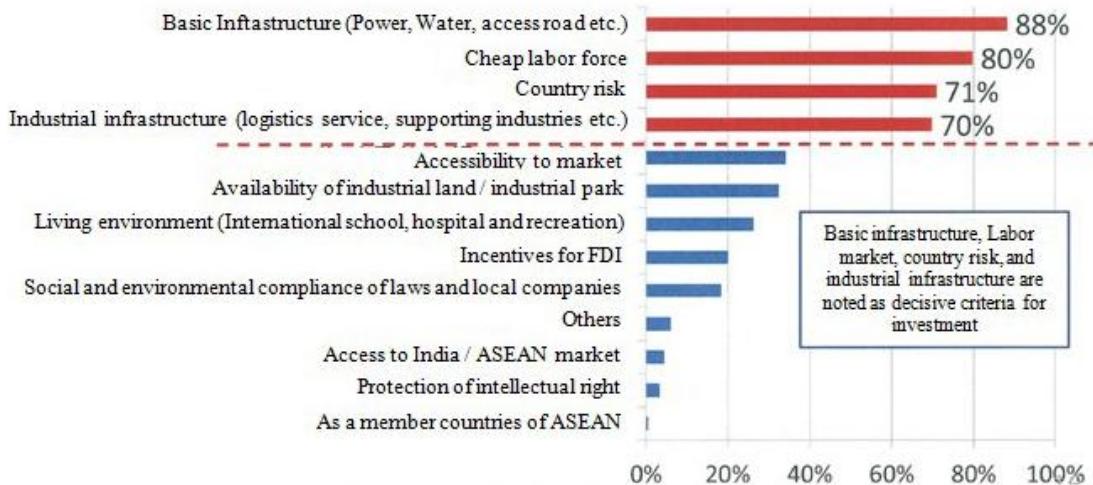
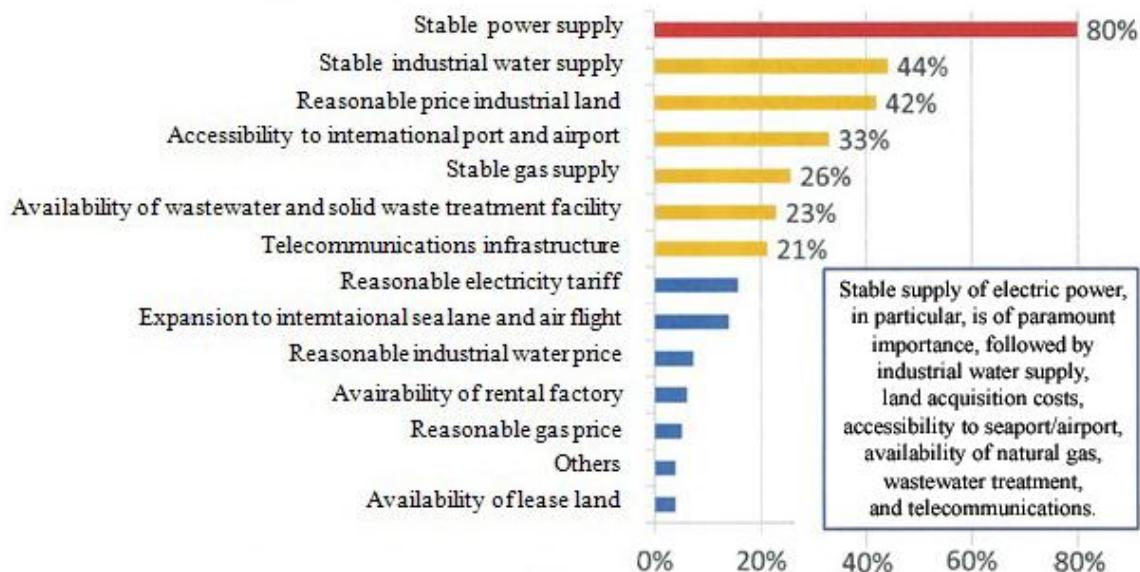
Table-2.1.2.3-7: Profile of Japanese companies (with production bases in China) considering investing in Bangladesh

| Industrial sectors | No. of companies |
|---------------------------|------------------|
| Electronics / device | 4 |
| Textiles | 3 |
| Chemical / pharmaceutical | 3 |
| Rubber / leather | 2 |
| Steel / nonferrous metals | 2 |
| Food and beverage | 1 |
| Glass / ceramics | 1 |
| Production of machinery | 1 |
| Others | 1 |
| Total | 18 |

Table-2.1.2.3-8: Planned investment size of prospective Japanese investors in Bangladesh

| Capital | No. of companies |
|----------------------------------|------------------|
| US\$100 thousand – US\$1 million | 8 |
| US\$1 million – US\$3 million | 2 |
| US\$3 million – US\$10 million | 2 |
| More than US\$10 million | 6 |

Figure 2.1.2.3-2 is about what locational factors are among the most potent drivers of these firms picking a destination for their investment. A quartet of investment factors are the most prominent in motivating selection of destinations of FDI by Japanese companies in China, viz. basic infrastructure, cheap labour costs, country risk, and industrial infrastructure.

Figure 2.1.2.3-2: Decisive factors in selection of countries for investment**Figure 2.1.2.3-3:** Decisive factors in selection of investment project sites

In addition to the above, the following factors are also of importance for foreign investors to consider the selection of project site for investment.

- Procurement of raw materials and intermediates can be possible near the project site.
- Availability of logistics companies in and around the project site
- Accessibility to a large domestic market, so that sales business structure can be considered
- Availability of subcontracting companies

Competitiveness of Economic Zone (EZ) Conclusions:

- 1) Investment climate of Bangladesh appears perennially stuck in the bottom half in any global league table. Her position is 110th per the DB, and, 129th according to World Economic Forum's global competitiveness index (GCI) in 2013.
- 2) That said, site-specific comparative evaluation can potentially be out of alignment with highly aggregative rankings with a nation-wide footprint. As well, one is entitled to embed planned

values of benchmarks when it comes to an EZ which is at a planning stage. Such a comparison exercise including Sherpur EZ shows that it is highest among successful international EZs in South-east Asia. At first sight, the result seems to be counter-intuitive. On looking more closely, several benchmarks tip the scale in favour of Sherpur. These include land-lease price per unit which is often less than half the size prevailing in Amata City, Thailand, MM2100 or Amata City Bien Hoa, Viet Nam. They also include the unit power cost for Sherpur which are about a half the size for Amata City or MM2100. Finally, Sherpur, being in its planning stage, the numbers used for it are, at times, forecasts, whereas the corresponding numbers for the other entities in the comparison are actual.

- 3) Master plan of an EZ is about fostering international competitiveness through (1) physical infrastructure/facilities, (2) OSS, (3) legal framework, (4) support systems. If BEZA can deliver all that the master plan envisages, Sherpur EZ can be competitive globally. The EZ program will improve the DB ranking from current 110th in 2012 to 40-50th level by the building high quality EZ.
- 4) Virtually all successful industrial parks of the ASEAN countries in the 1980's didn't look the part at all. For example, when the EZ program was started in 1989, Indonesia's investment climate was bleak. Development of Bekasi Industrial City (the owner of MM2100) changed things from the early 1990's and now Indonesia is one of most popular FDI destinations. Vietnam (first EZ introduced in 1993) and Cambodia (first EZ introduced in 2008) had the same result - introduction of the EZ program changed the investment climate immediately at the EZ sites as they were able to attract investors immediately after introduction of EZs.
- 5) How BEZA seizes the opportunity to develop competitive EZs in short order is key for attracting both FDI and domestic investment. If BEZA with PPP partners is able to develop an internationally competitive EZ at Sherpur (the proposed Master Plan is an internationally competitive one), investors will be attracted to the proposed Sherpur EZ. Especially, given the cessation of activities by BEPZA since 2009, there is, currently a severe shortage of well prepared industrial sites. Sherpur EZ is expected to become very competitive domestically and internationally.
- 6) Chittagong EPZ has been ranked 4th in 2009, 3rd in 2010, and 9th in 2011 by FDI Magazine. Bangladesh is able to develop and operate an internationally competitive industrial zone (EPZ) already. If BEZA is able to learn from the experience of the EPZ program and improve upon it, the proposed Sherpur EZ and others like it are likely to attract investors of both FDI and DDI.

2.2 Industry Assessment

2.2.1 Overview

2.2.1.1 Current Status

Led by the strong growth of exports of readymade garments (RMG) and large remittances from overseas workers and migrated Bangladeshis, Bangladesh has experienced rapid economic growth over the last two decades. The RMG sector, almost non-existent in the beginning of 1980s, has burgeoned, accounting for around 80% of total exports by 2010. This sector contributed to growth in various related sectors and a wide range of economic activities. With this growth in the RMG sector, the export to GDP ratio increased from 6.8% in 1991 to 17.2% in 2010. The manufacturing sector now accounts for around 18% of the Bangladesh national economy.

Table 2.2.1.1-1: Manufacturing Sector of Bangladesh

| Item/Year | 1981 | 1991 | 2001 | 2010 |
|-------------------------------|--------|--------|--------|--------|
| Export (% of GDP) | 4.10% | 6.80% | 10.60% | 17.20% |
| Manufacturing of Total Export | 65.50% | 78.90% | 92.10% | 90.90% |
| RMG of total export | 0.10% | 38.90% | 56.10% | 77.10% |
| Manufacturing Sector of GDP | 13.70% | 13.40% | 15.60% | 17.90% |

Source: Sixth Five Year Plan (SFYP)

The table below looks at major manufacturing sectors from the perspective of value addition. The garment and its related sectors constitute the largest manufacturing sector in added value, followed by machinery products, food processing, and chemical fertilizer production. The garment sector accounts for 6.8% of GDP in 2011.

Table 2.2.1.1-2: Industrial Sectors of Bangladesh in 2011

| Sectors | Share* |
|----------------------|--------|
| Manufacturing | 18.20% |
| Textile and Clothing | 6.80% |
| Machinery Products | 5.20% |
| Food Processing | 2.50% |
| Chemical Fertilizer | 2.00% |
| Leather Products | 0.90% |
| Petroleum Products | 0.80% |
| Other Manufacturing | 1.20% |
| Construction | 8.20% |
| Other Industries | 2.30% |
| Total Industries | 28.70% |

Source: Sixth Five Year Plan (SFYP)

*Estimated figures from SFYP. Addition of subsections does not match total manufacturing 18.2%. Reasons are unknown.

Over the period from 2006 to 2011, RMG exports increased at 20% per annum for knitwear and at around 16% for woven garments. Home textiles, which account for only 3.4% of total exports, grew even more than RMG at an average annual rate of around 37%. While dwarfed by the growth of those sectors, exports of pharmaceuticals and frozen food also increased at rates of over 9% and 6%, respectively. Other sectors, reporting growth of nearly 14%, include ceramic table ware and agricultural products such as vegetables and tobacco. Many sectors have emerged, and are growing, in export markets, following the big success of RMG.

Table 2.2.1.1-3: Merchandise Exports on Bangladesh

| Sectors | 2006 | | 2011 | | Average Growth |
|-----------------|----------------|----------------|----------------|----------------|----------------|
| | (US\$ Million) | Share | (US\$ Million) | Share | |
| Leather | 257 | 2.40% | 298 | 1.30% | 3.00% |
| Frozen Food | 459 | 4.40% | 625 | 2.70% | 6.40% |
| Woven Garments | 4,084 | 38.80% | 8,432 | 36.80% | 15.60% |
| Knitwear | 3,817 | 36.30% | 9,482 | 41.40% | 20.00% |
| Home Textiles | 165 | 1.60% | 789 | 3.40% | 36.70% |
| Pharmaceuticals | 28 | 0.30% | 44 | 0.20% | 9.50% |
| Others | 1,716 | 16.30% | 3,254 | 14.20% | 13.70% |
| Total | 10,526 | 100.00% | 22,924 | 100.00% | 16.80% |

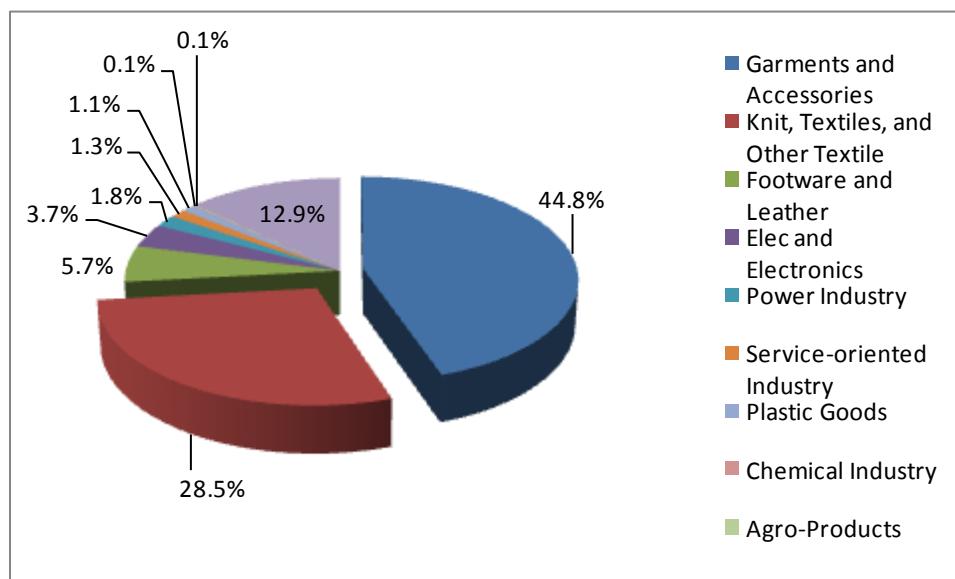
Source: Export Promotion Bureau

This export led growth has had a significant positive impact on domestic economic activities. Recently it was reported that per capita income surpassed US\$1,000 according to the revised national statistics. During this course of growth, domestic market oriented sectors have grown significantly. They include, among others, the construction sector, suppliers of construction materials, food processing, the light engineering sector (bicycles, rickshaws, and motorcycles), electric and electronic appliances and so on. These sectors will play further important roles as the country approaches the middle income status envisaged in its Vision 2021.

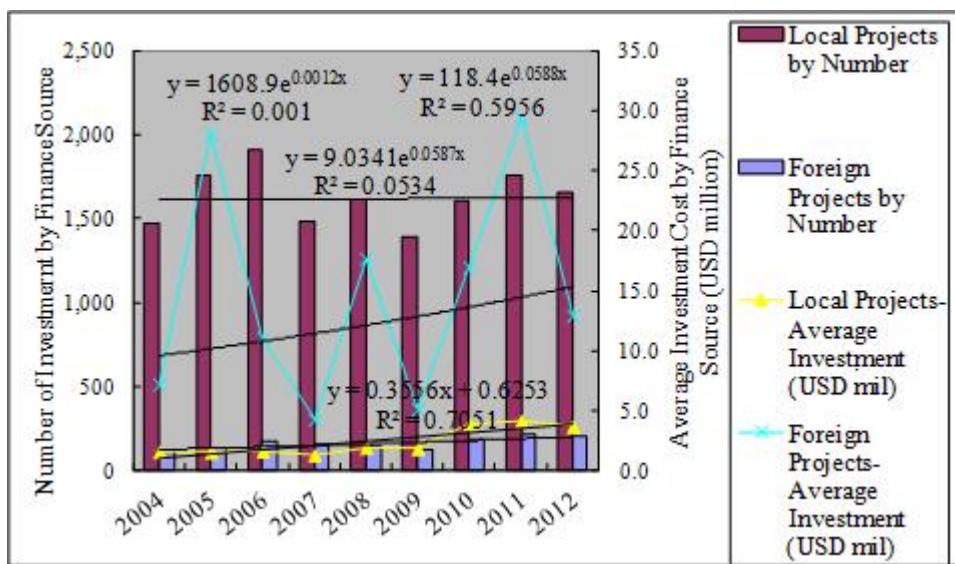
Dhaka and Chittagong are the venues for the growing manufacturing sectors. Dhaka has attracted all kinds of business investment during the course of growth and formed clusters of many manufacturing sectors including garment and textiles, pharmaceuticals, ceramics, food processing and so on. Chittagong is the location of the country's heavy industries like steel making, ship building, urea fertilizer, oil refining, and others. Of course, Chittagong, as the second largest city, has a wide range of export sectors, but the magnitude of each sector producing export products is small as compared to each corresponding sector in Dhaka. The corridor connecting the two cities is also economically flourishing to host various growing sectors like steel, cement, garment, and so on. The other regions, which cover the vast territory of Bangladesh, are still predominantly rural areas with economic activities limited to agriculture and fishery.

In the light of aggregate investment by manufacturing industry up to 2012, a large amount of investment emanates from garment and textile industry, followed by footwear and leather, electric appliances and electronics, etc. The garment and textile industry accounts for 73.3% of total investments into the export processing zones (EPZ). The share of the EPZ investments for footwear and leather and electric appliances and electronics is 5.7% and 3.7%, respectively²⁰³ (Figure 2.2.1.1-1).

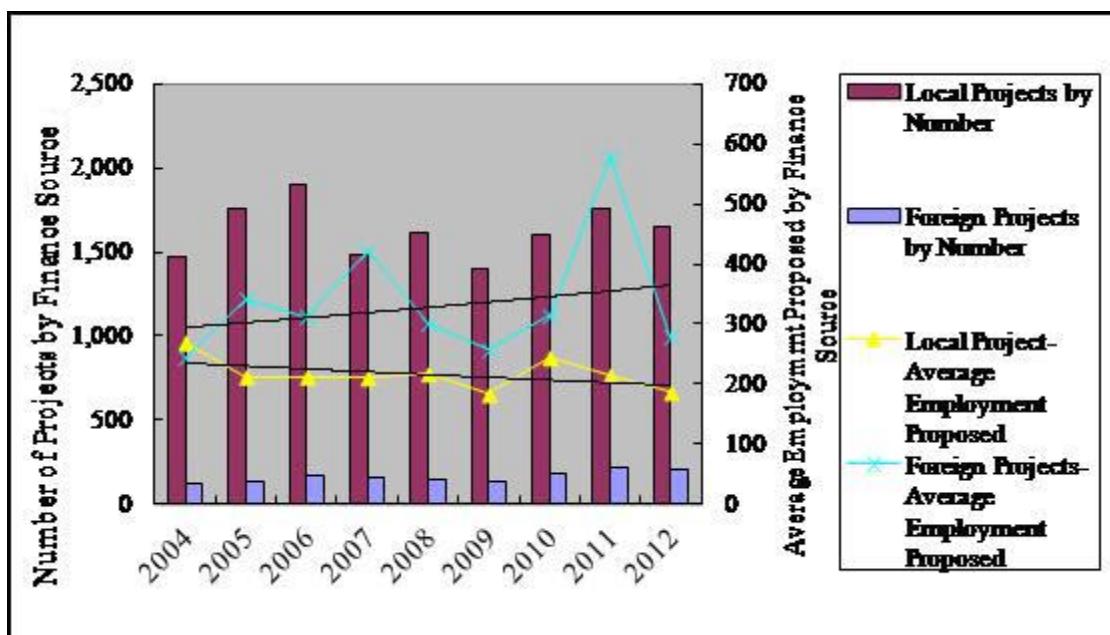
²⁰³ Source: The Ministry of Finance, Finance Division, *Economic Review*, 2013, p. 133

Figure 2.2.1.1-1: EPZ Investment by Industry up to July 2012

Both local and foreign firms and their joint ventures registered at the Investment Board of Bangladesh revealed a profound and steady evolution of growth by number and investment value as well as by employment in the last decade. During this period, local and foreign firms posted the average annual growth of 11.1% and 7.6%, respectively in terms of investment value, subject to somewhat periodic fluctuations. The number registered at the Board increased to 6.7% for foreign firms and to 1.5% for local firms annually. These chronological transitions are shown in Figure 2.2.1.1-2, where the exponential approximate equations are derived as, $y = 1608.9e^{0.0012x}$ ($R^2 = 0.001$) for foreign firms and $y = 118.4e^{0.0588x}$ ($R^2 = 0.5956$) for local firms.

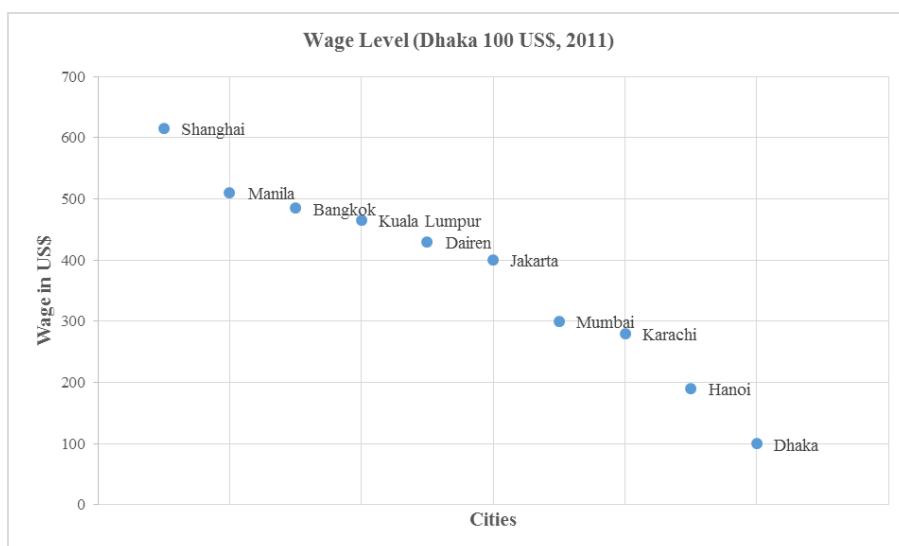
Figure 2.2.1.1-2: Number and Average Investment Costs by Registered Local and Foreign Firms

Likewise, the growth trends of employment proposed to be created by both foreign and local firms were steady, as depicted below as Figure 2.2.1.1 - 3, where the exponential approximate equations are derived as $y = 239.63e^{-0.022x}$ ($R^2 = 0.2416$) for foreign firms and $y = 286.03e^{0.0269x}$ ($R^2 = 0.076$) for local firms.

Figure 2.2.1.1-3: Number and Average Employees by Registered Local and Foreign Firms

2.2.1.2 The Next 20 Years

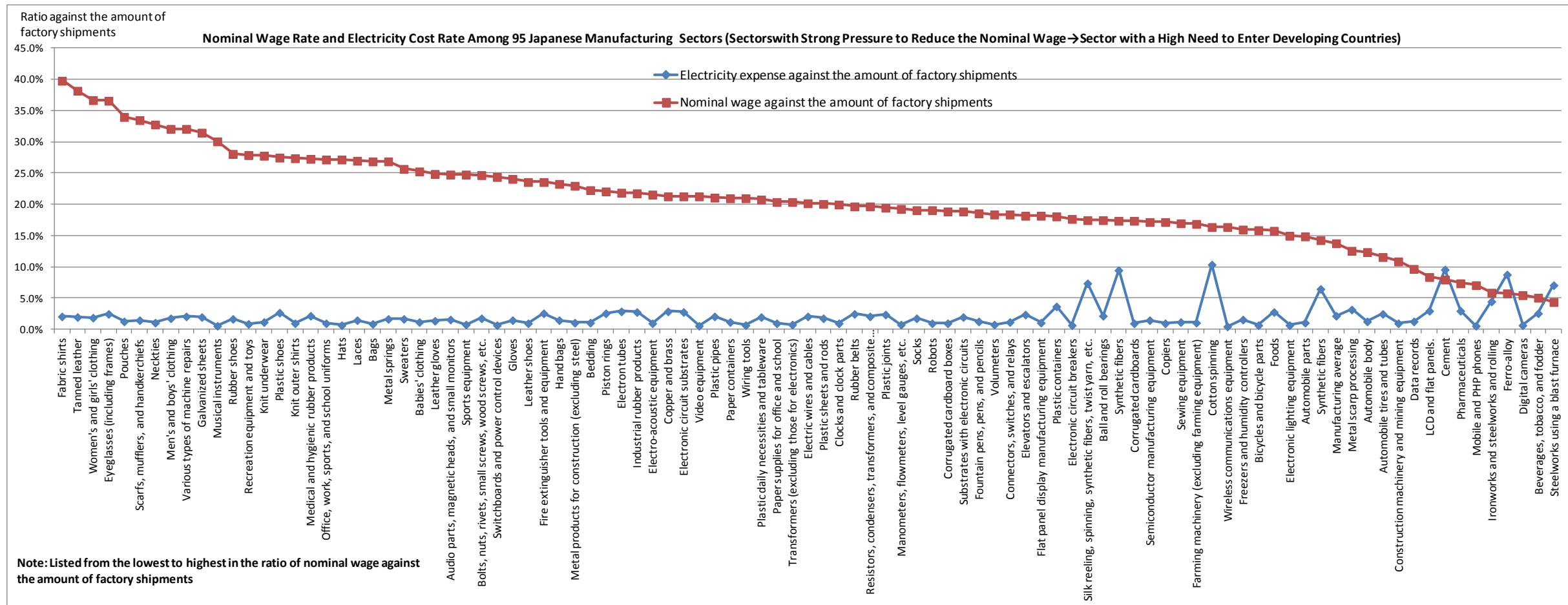
Bangladesh's wage level is one fifth that of China and is the lowest among ASEAN countries other than Myanmar. The relative wage competitiveness of Bangladesh to China, India, and the other ASEAN countries will remain unchanged over the next two decades. Consequently, Bangladesh is expected to continue to attract export oriented labour intensive industries which will increase both in volume and lines of business (Figure 2.2.1.2-1).

Figure 2.2.1.2-1: Wage Levels among Major Asian Cities (2011)²⁰⁴

This export growth will be fed back to the country's economic activities through the following three channels: import substitution of materials, parts and machinery, production expansion of domestic market oriented sectors, and introduction of new lines of business requiring higher skills and

²⁰⁴ Source: JETRO, Comparison of annual actual wages in major cities in Asia in 2011

technologies. This chain reaction of industries is already visible in many areas of business. The scope and scale of this interaction will be intensified in the next two decades, involving energy, capital and knowledge intensive sectors. The figure below shows a wide variety of Japanese industries in terms of usage of electricity and labour.

Figure 2.2.1.2-2: Wage and Electricity to Total Factory Shipment Cost of Representative Japanese Manufacturing Sectors

Based upon the current situation of Bangladesh industries and experiences learned from the cases of industrialization in ASEAN countries, the types of industries envisaged for the Bangladesh economy are summarized in Figure 2.2.1.2-3 in a five year interval over the next two decades. Garment production will continue to dominate Bangladesh economic scenes. But other sectors such as pharmaceuticals, ceramics, and IT related sectors will become important emerging sectors in Bangladeshi exports. Construction materials and food processing will continue to expand under a rapidly growing economy.

Per capita income was reported recently to have surpassed US\$1,000 in Bangladesh and it could reach over US\$2,500 (passing the current income level of the Philippines) in the next twenty years if it grows at the current rate²⁰⁵. In the second five year interval starting from 2020, manufacturing of motorcycles, electric appliances, and other consumer durable goods will be intensified to meet rapidly increasing demand. Similar things will happen for the sectors of automobile parts and components, precision machinery, other parts and machinery. These sectors will not be confined to local markets for their operation, but are expected to invest and expand production in their strategies for regional and global markets. International automobile assemblers will invest in Bangladesh from the same perspectives in the middle of the second five year interval. During the same timeframe, ship builders will come to construct medium-size vessels for export market.

The automobile industry will be an important driving force in changing the industrial structure of Bangladesh, which will have become a middle income country in the third interval starting in 2025. Various metal fabrications and steel making will start to supply products to the automobile industry and others, using imported steel and metal products. And then those imports will be replaced by domestic production. Basic materials such as non-ferrous metals and chemicals will be produced on a large scale to meet increasing domestic demand. Many other industries, which did not exist in Bangladesh and therefore relied on materiel imports, will have emerged by then. In the final stage of the next two decades, Bangladesh will produce steel from imported iron ore through a blast furnace process. By that time, steel consumption of Bangladesh will exceed Thailand's current consumption.

²⁰⁵ The per capita income is extrapolated based upon the current US\$1,000, assuming the real economic growth of 6.0% and the population growth of 1.2%.

Figure 2.2.1.2-3: Major Manufacturing Sectors of Bangladesh (2015-2034)

| Sectors/Year | 2015 – 2019 | 2020 – 2024 | 2025 – 2029 | 2030 – 2034 |
|------------------------------------|-------------|-------------|-------------|-------------|
| Garment & Textile | ← | | | → |
| Leather Products | ← | | | → |
| Pharmaceuticals | ← | | | → |
| ICT | ← | | | → |
| Tableware/ceramics | ← | | | → |
| Construction Materials | ← | | | → |
| Food Processing | ← | | | → |
| Light Engineering | ← | | | → |
| Ship Breaking | ← | | | → |
| Shipbuilding - Small Vessels | ← | | | → |
| Shipbuilding - Medium Size Vessels | | ← | → | |
| Shipbuilding - Large Vessels | | | ← | → |
| Steel Making - Induction Furnace | ← | | | → |
| Steel Making - Blast Furnace | | | ← | → |
| Bicycle & Motorbike | ← | | | → |
| Automobile Parts | ← | | | → |
| Precision Machinery | ← | | | → |
| Automobile Assembly | | ← | | → |
| Non-ferrous Metals | | | ← | → |
| Chemicals | | | ← | → |

Many constraints and obstacles need to be eliminated to realise this scenario of industrial development. Basic physical infrastructure such as roads, ports, power generation and transmission facilities, amongst others, need to be developed to sustain increasing economic activities. Various soft infrastructure for the smooth operation of business, will need to be in place. Strategies and policies need to be formulated and implemented to promote foreign direct investment and allocate limited resources to priority sectors. Through this series of actions, Bangladesh will further climb the ladder of industrialisation.

It has been demonstrated in many cases of other Asian countries that a special economic zone (SEZ) is a strong policy tool to break through the complicated situation of various constraints and obstacles. This study is the first attempt at providing a design of an SEZ and analysing the types and magnitude of potential investors in the selected sites. Learning from other countries' experiences, Bangladesh could have 100 economic zones for its economic development over the new two decades mainly by privatizing the EZ programme in a PPP scheme just as in the ASEAN Countries. The area required for the zones will be 50,000 ha, which requires only 0.03% of the total agricultural land of the country. If achieved, these economic zones could create 10 million new jobs.

Table 2.2.1.2-1: Planned Economic Zones and Job Creation

| Items/Year | 2015 | 2020 | 2025 | 2030 | 2035 |
|---------------------------|-------|-----------|-----------|-----------|------------|
| Number of Economic Zones | 1 | 10 | 40 | 70 | 100 |
| Land Area to be Developed | 200 | 5,000 | 20,000 | 35,000 | 50,000 |
| Job Creation | 4,000 | 1,000,000 | 4,000,000 | 7,000,000 | 10,000,000 |

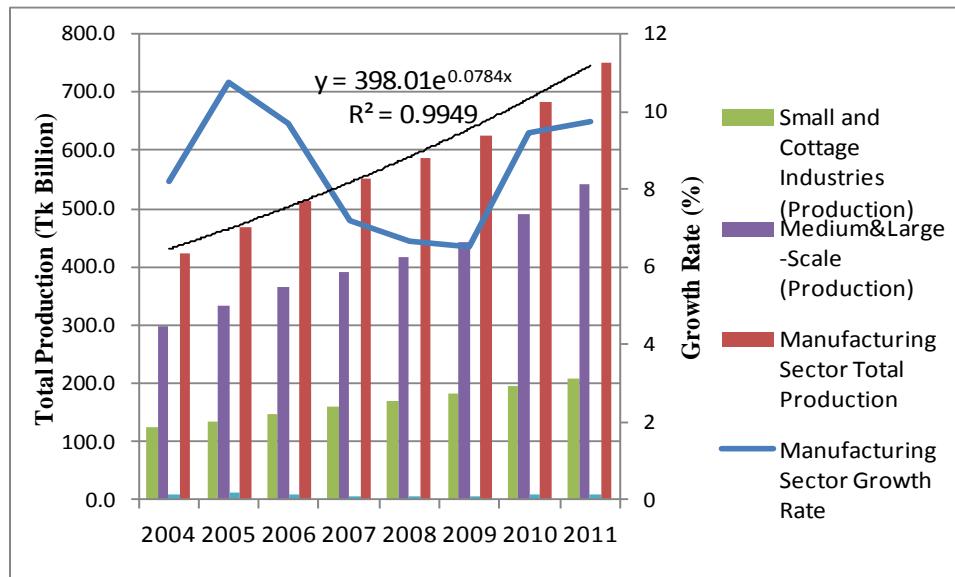
*all figures are cumulative

**figures are calculated under the assumption that an average size of EZ is 500 hectares and an average job creation is 100,000 persons per zone

2.2.1.3 Envisaged Growth of the Manufacturing Sector and Export Processing Zones (EPZ)

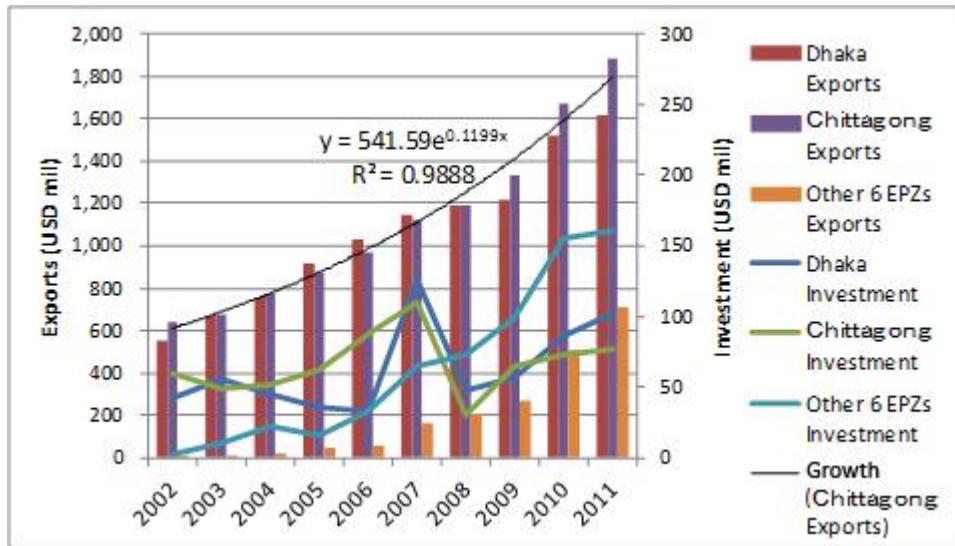
Evolution of the manufacturing sector (small and cottage industries, medium and large scale industries and the aggregate) over the past 7 years (FY 2004-11) are depicted in Figure 2.2.1.3-1, where the approximate exponential equation is derived as $y = 398.01e^{0.0784x}$ ($R^2 = 0.9949$) for the total sector production²⁰⁶. With this, the growth rate of the manufacturing sector would remain at around 7.8% in the future, on a *Ceteris Paribus* basis)

Figure 2.2.1.3 - 1: Manufacturing Sector Nominal Production and Growth (2004-2011)



Likewise, Dhaka and Chittagong EPZs posted the annual average growth of manufacturing goods exports at 11.9 % ($y = 541.59e^{0.1199x}$, $R^2 = 0.9888$) and 11.3 % ($y = 541.84e^{0.1129x}$, $R^2 = 0.9666$), respectively²⁰⁷ (Figure 2.2.1.3-2).

Figure 2.2.1.3-2: Manufacturing Sector Exports from and Investment Growth in EPZs (2002-2011)

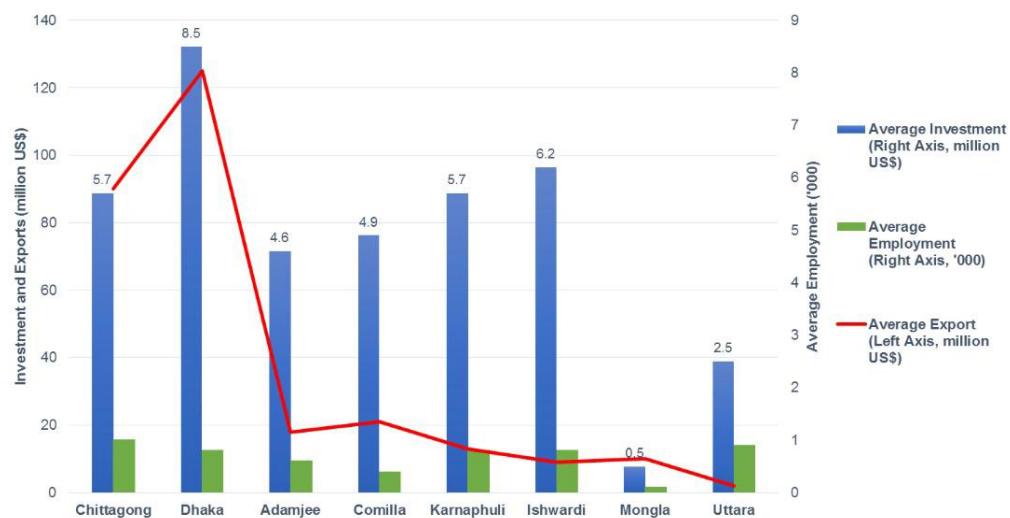


²⁰⁶ Source: The Ministry of Finance, *Op., Cit*, 2013, p. 117

²⁰⁷Source: The Ministry of Finance, *Op., Cit*, 2013, p. 134

Note that up to June 2012, the average investments, exports, and employment per operating unit (406 units in 6 EPZs) are US\$6.1 million, US\$73.0 million and US\$0.8 thousand, in that order²⁰⁸. (Figure 2.2.1.3-3)

Figure 2.2.1.3 - 3: Average EPZ Investment, Export and Employment in Aggregate (2002-2011)



2.2.1.4 Brief Description of Major Sectors

The current situation of major manufacturing sectors and their future prospects are briefly described below in the context of relevance to the three special economic zones.

Garment and Textile Sectors

Bangladesh is the second largest exporter of garments in the world with its market share of 4.8%. China, the market leader, with over 37% of world trade, is now facing rapidly rising labour costs, which already reached the level for garment companies to consider shifting manufacturing bases. If garment manufacturing, equivalent to 5% of world garment trade is shifted from China to Bangladesh, garment production in Bangladesh will double by simple arithmetic. This is not a remote possibility, but rather, it is the situation now under way.

Fabrics for knitwear are almost made domestically, but woven fabrics are mostly imported now. Domestic production will supply around 40% of woven fabric consumed in the garment sector. There are around 100 large textile mills whose land lot exceeds 20 ha. Although they have huge potential demand in front, they are not able to expand production, constrained by the availability of land with good access to power and natural gas. Large companies are ready to expand if sufficient land were available. “We are ready to grab the entire land in Sherpur,” was the message conveyed to the Project Team at the meeting with the textile association.

Garments and textiles produced in Bangladesh have been mainly concentrated in low end products. Garment and textile companies are eager to produce more value added products, facing increasing labour cost²⁰⁹. In the midst of garment manufacturing being shifted from China, they plan to not only

²⁰⁸Source: The Ministry of Finance, *Op., Cit*, 2013, p. 133

²⁰⁹ Labour cost in the case of EOS Textile Mill in the Dhaka Export Processing Zone increased by around 10% annually over the last five years: Daily wage increased from BDT 70 in 1998 to BDT 300 in 2013. The current monthly pay check for

increase sales volume, but also to penetrate into upmarket products so that they can improve the profitability of their investment.

Ceramics

The Bangladeshi ceramic sector produces export quality porcelain. Monno, the industry leader of table ware with 50% domestic market share, is exporting its products to over 150 countries. There are fifteen ceramic table ware manufacturers in Bangladesh, geographically concentrating mainly in the Dhaka region with a few factories in Chittagong. FARR Ceramics is another major manufacturer in this sector with a domestic market share of around 25%. Shinepukur Ceramics produces mainly for export markets.

The competitive edge of ceramic table ware is the low price for quality products derived from low cost skilled labour and natural gas. Major companies are carrying a backlog of orders and therefore they are ready to expand production capacity. However, the inavailability of a large plot of land and large amounts of natural gas becomes a serious constraint for expansion.

Another major subsector of ceramics covers tiles and sanitary ware. Bangladesh has 14 manufacturers in this sector, geographically concentrating mainly in the Dhaka region with a few factories in Chittagong. Leading companies are RAK Ceramics, Star Ceramics, and AKIJ. Their products are predominantly tailored to domestic markets. Facing rapidly increasing domestic demand, many companies of this sector have a strong appetite for new plots of land with good access to natural gas. Star Ceramics was established in 2012. After construction of Star's ceramic factory, no new construction of a ceramic factory has been reported in Bangladesh due to the new government order restricting new gas connections for industrial use in Bangladesh.

Food processing

Frozen food, primarily shrimp, has been a large export item after garments and textiles. Bangladesh is also exporting various food processing products worldwide including juice, jam, jelly, bakery, mustard oil, etc. The food processing sector is finding more market opportunities in domestic markets as the country's income has been increasing. In this business environment, many food processing companies emerged and have grown to become large scale companies. Major food processing companies are Pran Foods, ACI Food, and Square Consumer Products, etc.

The next decade is the period during which Bangladesh will be transformed into a middle income country. Capturing this opportunity, food processing companies plan to further increase sales in domestic markets as well as overseas markets. Many companies are now looking for land and raw materials to enable their expansion.

Shipbuilding

Bangladesh has a long history of ship building because of the extensive water networks running through the country. This generated a large body of skilled workers in ship building, who find opportunities to work in overseas dockyards in Singapore, the Middle East, and India. This sector used to serve domestic markets alone. However, after Ananda Shipyard & Slipways (Ananda) successfully delivered two 2,900 DWT multipurpose vessels to Danish Stella Shipping in 2008, Western Marine Shipyard (WMS) followed soon afterwards. They have been shifting resources to

workers including basic salary, allowance, and fringe benefits is BDT 5,000 (US\$ 64) for unskilled workers, BDT 11,000 (US\$142) for supporting staff and BDT 30,000 (US\$386) for professional staff. Wage increases are being accelerated recently due to the rising demand for workers in the sectors.

overseas markets. So far twenty vessels were exported from Bangladesh with a value of over US\$100 million.

Ananda and WMS are the only ship builders which exported vessels so far. But there are other ship builders along the Karnaphuli River who are capable of producing export quality vessels. They formed the export oriented ship builders association which has ten members at present. If the eight other members follow Ananda and WMS in exporting vessels, it is not unrealistic to achieve the current objective of the association to capture 1% of the \$200 billion global small vessel markets.

Export-oriented ship builders are now constrained by the availability of land to achieve this objective. The banks of the Karnaphuli River, where ship builders are concentrated, are fully occupied and no land is available for their expansion. It is a challenging task for ship building companies to find new sites to expand operation. Many large ship builders envisage building middle size vessels in the medium term. But to do so, they need to find locations along the Bengal Bay since the middle size vessels cannot pass the Shah Amanat Bridge, which is the first bridge from the mouth of the Karnaphuli River.

Although several ship builders started ventures to manufacture ship building components, all steel sheets and almost all ship building components are imported from various countries such as Japan, Korea, China, Singapore, and others at present. Stock management and transportation cost in connection with import of these ship building components cause significant costs to ship building companies to offset certain advantages created by the low cost skilled labour available in Chittagong. The export-oriented ship building industry is facing challenges to reduce reliance on imported components. This is the important issue to overcome along with another challenges to procure working capital at a reasonable cost so that the ship building industry can grow to form an export-oriented ship building cluster in the future.

Steel Products

The steel demand in Bangladesh is estimated at around 3 million tons per year, which are mostly MS bars. A leading steel company is BSRM with the production capacity of 0.7 million tons, followed by KSRM (0.4 million tons) and AKS (0.4 million tons). BSRM will increase its capacity to 1 million tons in 2014. The main source of scrap steel comes from ship breaking which is conducted on the north shore of Chittagong. All major steel makers are located near Chittagong.

Pharmaceuticals

Bangladeshi pharmaceutical companies now supply nearly 100% of generic drugs consumed domestically. Accumulating technologies and expertise through the development, some of the companies started exporting generic drugs in 2006. Those companies see further business opportunities in overseas markets and expand their operation in the coming period when many patents for highly used drugs will expire.

Foreseeing hard competition with India which is currently providing active pharmaceutical ingredients (API), key materials for generic drug makers, to Bangladeshi pharmaceutical companies, the pharmaceutical association recently entered into an agreement with the government to develop a 200 acre API park in Munshiganj, 50km south of Dhaka. The pharmaceutical sector is expected to grow at an annual rate of 15% to 20% for the coming decade. Pharmaceutical companies need to find locations for their capacity expansion. This will be likely to occur in the Dhaka region since highly educated and skilled manpower, which is the key to the sector, will be available only there in the timeframe envisaged for the project. Business outsourcing process in IT industry, another knowledge intensive sector expecting high growth, will also find venues for their expansion in the Dhaka region from the same reasons.

Motorcycles

The number of registered motorcycles is reported to be 1 million as of September 2013 according to the Bangladesh Road Transport Authority (BRTA). It doubled over the last four years. The ownership of motorcycles is still very low at just over 6 vehicles per 1,000 persons, as compared to the cases of ASEAN countries with a range of 200 to 300 vehicles per 1,000 persons. As the number of middle income people increases and their disposable income rises, annual sales is expected to increase remarkably from the current level of 0.2 million to 1.4 million in the near future.

The motorcycle market used to be dominated by imports of Indian made products such as Bajaj and Hero-Honda. Responding to rapidly growing demand and huge potential markets, Walton, a manufacturer and retailer of electric appliances, started motorcycle production in 2008 and already captured 7% of the domestic market. Runner is another local motorcycle manufacturer in Bangladesh. Many foreign motorcycle manufacturers are interested in development of the Bangladesh motorcycle market. Honda planned to start motorcycle production in Bangladesh in 2013. Suzuki and Mahindra recently announced their intention to step into the local market. Many more foreign direct investments are expected to come into this sector.

Automobiles

The number of registered automobiles in Bangladesh is 249,900 for passenger cars and 55,500 for pick-ups as of September 2013. Registered automobiles are mostly of Japanese origin, in which Toyota has a dominant share. Over 80% of registered vehicles are reconditioned (used) ones. The overall tariff structure is currently favourable for importation of used cars rather than new ones.

Table 2.2.1.4-1: Number of Registered motor Vehicles in Bangladesh

('000)

| Vehicle Type | Total as of end 2009 | Annual Registration | | | Total as of September 2013 |
|-----------------------|-----------------------------|----------------------------|-------------|-------------|-----------------------------------|
| | | 2010 | 2011 | 2012 | |
| Private Passenger Car | 196.9 | 23 | 13 | 9.2 | 249.9 |
| Pick-up | 23.3 | 9 | 10.5 | 7.6 | 55.5 |
| Bus | 26 | 1.8 | 1.8 | 1.4 | 31.9 |
| Truck | 73.3 | 9.5 | 7.3 | 4.3 | 98.4 |

Source: Bangladesh Road Transport Authority (BRTA)

The current car ownership in Bangladesh is less than 2 vehicles per 1,000 persons, 186th in the world. This is very low as compared to 18 vehicles for India, 30 vehicles for the Philippines and 165 vehicles for Thailand. Applying comparable indicators in the projection for future demand, the total number of automobiles is calculated at 3.4 million at the end of 2024 in Bangladesh. Bangladesh's annual sales of automobiles are expected to be over 0.3 million units in 2014. This calculation is based upon the assumption that Bangladesh will be able to prepare urban road infrastructure at the same level of India and other comparable countries. If this is achieved, annual automobile sales will increase over ten times over the next decade. However, this size of the market is still small for foreign automobile companies to seriously consider investments for Bangladesh domestic markets alone.

Bangladesh has one small state-owned knockdown plant of PRAGOTI near Chittagong. It assembles less than 1,000 units of Mitsubishi Pajero, minibuses of Tata and Eicher. There are no automobile parts manufacturers in Bangladesh and thus all parts and components required for repair and maintenance of automobiles have to be imported. Mitsubishi announced a plan of manufacturing Mirage type small cars for local markets. Walton also announced a plan to manufacture pick-ups and small-size vehicles in 2015. The level and types of their investments would be unlikely to lead to automobile manufacturer clusters as those found in Thailand. International automobile companies have to come to Bangladesh in a large scale.

Given the size of Bangladesh's domestic market, international companies would come only if those investors see manufacturing in Bangladesh from the perspective of the manufacturing base for the regional or global markets. In order to make this happen, a development policy of the automobile industry will play a critical role. There are already good precedents in the countries like Thailand, South Africa, etc. By implementing the development policy successfully, Bangladesh would be able to establish automobile manufacturing clusters, which will bring fundamental changes to the industrial structure of Bangladesh.

Electric Appliances

Bangladesh has witnessed rapid growth of consumer electric appliances as the number of middle income households increases. But the ownership level is still very low and there is huge potential demand to be realized in the coming decade. The ownership per 1,000 persons is 1.4 for refrigerators and 0.5 for air-conditioners at present. Based upon the figures of comparable countries, the number of both refrigerators and air-conditioners is calculated to become fourfold over the next decade: 0.8 million refrigerators and 0.3 million air-conditioners at the end of 2024.

To capture the increasing markets, Walton started manufacturing refrigerators in 2008 and air conditioners in 2010. Utilizing its extensive dealer network, Walton successfully increased sales in domestic markets. Its market share of refrigerators was reported to have reached 70% of the domestic market in 2012. Currently key parts and components of electric appliances are all imported. As its production increases, Walton is expected to increase the ratio of local manufacturing in electric appliances to reduce manufacturing cost and to increase value addition.

2.2.1.5 Next 20 year Industrial Land and Economic Zone Land Demand

Current Investment Trend in Bangladesh

Table 2.2.1.5-1: Investment & FDI for the Past 10 years

| Financial Year | Local | Amount | FDI & JV No | Amount | Registered | Amount |
|-----------------------|--------------|-----------------------|------------------------|-----------------------|-------------------|-----------------------|
| | No | US\$ (million) | | US\$ (million) | No | US\$ (million) |
| 2001-02 | 2875 | 1,531 | 89 | 302 | 2964 | 1833 |
| 2002-03 | 2101 | 2,027 | 104 | 359 | 2205 | 2,386 |
| 2003-04 | 1624 | 2,356 | 130 | 460 | 1754 | 2,816 |
| 2004-05 | 1469 | 2,319 | 120 | 864 | 1589 | 3,183 |
| 2005-06 | 1754 | 2,730 | 135 | 3,794 | 1889 | 6,524 |
| 2006-07 | 1930 | 2,825 | 191 | 1,711 | 2121 | 4,536 |
| 2007-08 | 1615 | 2,798 | 143 | 785 | 1758 | 3,584 |
| 2008-09 | 1336 | 2,467 | 132 | 2,123 | 1468 | 4,509 |
| 2009-10 | 1470 | 3,931 | 160 | 890 | 1630 | 4,821 |
| 2010-11 | 1746 | 7,748 | 196 | 5,104 | 1942 | 12,852 |
| 2011-12 | 1735 | 6,679 | 220 | 4,470 | 1955 | 11,148 |

Source: BOI Annual Report of 2012

The investment used to run from \$3 to \$5 billion per year from 2003 to 2009 but, in 2010, the investment jumped to over \$10.0 billion and remains around that high level until now. The average of the two years (2010 and 2011) was taken to determine a base: local is \$7.2 billion and FDI is \$4.8 billion.

Of the total investment in the manufacturing sector, 76% is local investment and 11% is FDI. It was estimated that the total manufacturing investment in 2012 was \$6.0 billion.

Industrial sector growth is 9.5% for the 2011-2012 and assuming the trend will continue until 2015. The manufacturing investment will reach at \$7.8 billion by 2015.

Assuming the Economic Zone (EZ) program will start from 2014-2015; the manufacturing investment will increase from the current 9.5% to 12% for 2015-2020, 15% for 2021-2025 and 15% for 2026-2030 and return to 12% for 2031-2035.

Investment in manufacturing is expected to increase to \$13.74 billion by 2020, \$27.64 billion by 2025, \$68.40 billion by 2030 and \$137.6 billion by 2035.

Average investment of the EPZ is \$6.1 million, land requirement is 1.5 hectare with 800 workers and export of \$73 million/year. Land demand from the manufacturing sector will be estimated.

Development Scenario for Bangladesh Manufacturing (2015 to 2035)

Base Case: Assuming the stability of the Bangladesh economy, and, that the Economic Zone Program constructs several coal power plants assuring stable power supply from 2015 (Recently, in June 2014, JICA agreed to construct a 1200MW Coal Power plant) and rapidly expands reaching 50 EZs by 2030, the growth of the manufacturing sector will continue the past trend of 9.5% for 2013-2015, but start to accelerate to 12% for 2016-2020 and reach 15% for the 10 years of 2021-2030. After the peak period of 10 years, the growth will slow down to 12% for 2031-2035 and to 10% for 2035-2040.

Pessimistic Case: Assuming the stability of the Bangladesh economy and that the Economic Zone Program fails to develop additional power plants, a stable power supply will start from 2015 (as stated above, in June 2014, JICA agreed to construct a 1200MW Coal Power plant) but expand slowly reaching only 10 EZs by 2030, the growth of the manufacturing sector will continue the past trend of 9.5% for 2013-2015, but start to increase to 10% for 2016-2020 and reach 12% for the 10 years of 2021-2030. After the peak period of 10 years, the growth will slow down to 10% for 2031-2035 and remain at 10% for the period 2035-2040.

Optimistic Case: Assuming the stability of the Bangladesh economy and that the Economic Zone Program constructs over 10 coal power plants assuring stable power from 2015 onward (JICA agreed to construct a 1200MW Coal Power plant) and successfully expands, reaching 100 EZs by 2030, the growth of the manufacturing sector will continue the past trend of 9.5% for 2013-2015, but will jump to 13% for 2016-2020 and reach 16% for 2021-2025, reaching a peak of 18% for the 2026-2030 period. After the peak period of 5 years, the growth will slow down to 16% for 2031-2035 and to 13% for 2035-2040.

Table 2.2.1.5-2: Basic Assumptions for Three Manufacturing Development Scenarios

| Period | 2012 | 2015 | 2020 | 2025 | 2030 | 2035 |
|-------------|------|------|------|------|------|------|
| Base Case | 9.5% | 12% | 15% | 15% | 12% | 10% |
| Pessimistic | 9.5% | 10% | 12% | 12% | 10% | 10% |
| Optimistic | 9.5% | 13% | 16% | 18% | 16% | 13% |

Base Case

Table 2.2.1.5-3: Manufacturing investment and EZ Land Demand in Hectares for the Base Case

| Period | 2012 (Base) | 2015 | 2020 | 2025 | 2030 | 2035 |
|----------------------------------|------------------|--|-------------------|-------------------|-------------------|--------|
| Manuf. Invest. (Bil.US\$) | 6.0 | 7.8 | 13.74 | 27.64 | 68.4 | 137.6 |
| Base Case (%) | 9.5% | 12% | 15% | 15% | 12% | 10% |
| Factory No | 984 | 1,278 | 2,252 | 4,529 | 9,110 | 16,052 |
| Land Demand | 1,476 | 1,917 | 3,378 | 6,794 | 13,665 | 24,078 |
| Share of EZ | | 50% | 60% | 80% | 80% | 80% |
| EZ Demand (Ha) | 738 | 959 | 2,027 | 5,435 | 10,932 | 19,262 |
| EZ Land D for 5 year period (Ha) | 2012-15 1,697 | 2016-20 7,465+(849) 8314 (-) is back log of 5 y | 2021-25 18,655 | 2026-30 40,917 | 2031-35 75,485 | |

- (1) Number of factory: 984 in 2012, 1,278 in 2015, 2,252 in 2020, 4,529 in 2025, 9,110 in 2030 and 16,052 in 2035.
- (2) Industrial land demand (Assuming an average factory is 1.5 ha) is 1,476ha in 2012 and increases to 1,917 ha by 2015, 3,378 by 2020, 6,794 by 2025, 13,665ha by 2030, and 24,078 ha by 2035.
- (3) Assuming the share of EZ is starting 50%, and gradually increases to 80% by 2025, and remains at 80% as other ASEAN countries.
- (4) Then, EZ land demand is estimated to be 738 ha in 2012, 959 ha by 2015, 2,027 ha by 2020, 5,435 ha by 2025, 10,932 ha by 2030 and 19,262 ha by 2035.
- (5) For a 5 year period land demand is estimated taking average of 5 years multiplied by 5. For the 2015, it was considered that a backlog of EZ land demand (849 ha) is 50% of the 2012-2015 period, EZ land demand to be added due to the backlog which was not implemented due to a shortage of suitable EZ or other industrial land.
- (6) Based on the above assumptions, the EZ land demand for 2015-2020 is estimated to become 8,314 ha, for 2021-25 will be 18,655 ha, 2026-30 will be 40,917 ha and for 2031-35 will be 75,485 ha respectively. Even now in the 2012-2015 period, 1,697 ha is the potential demand for EZ land. It is urgent for Bangladesh to seriously take necessary actions to implement the EZ Program as soon as possible.

Pessimistic Case

Using the same methodology, the pessimistic case is estimated below:

Table 2.2.1.5-4: Pessimistic Case Manufacturing investment and EZ Land Demand in hectares

| Period | 2012 (Base) | 2015 | 2020 | 2025 | 2030 | 2035 |
|---------------------------------------|-----------------|---|-------------------|-------------------|-------------------|--------|
| Manuf. Invest. (Bil.US\$) | 6.0 | 7.8 | 13.74 | 27.64 | 68.4 | 137.6 |
| Growth (%) | 9.5% | 10% | 12% | 12% | 10% | 10% |
| Factory No | 984 | 1,278 | 2,059 | 3,628 | 6,392 | 10,298 |
| Land Demand | 1,476 | 1,917 | 3,089 | 5,442 | 9,588 | 15,447 |
| Share of EZ | 50% | 50% | 60% | 80% | 80% | 80% |
| EZ Demand PS (Ha) | 738 | 959 | 1,853 | 4,354 | 7,670 | 12,358 |
| EZ Land D for each 5 year period (Ha) | 2012-15 1697 | 2016-20 7,030+(849) 7,879 (-) is back log of 5 years | 2021-25 15,518 | 2026-30 30,060 | 2031-35 50,070 | |

Optimistic Case

Using the same methodology, the pessimistic case is estimated below:

Table 2.2.1.5-5: Manufacturing investment and EZ Land Demand in hectares

| Period | 2012 (Base) | 2015 | 2020 | 2025 | 2030 | 2035 |
|--|-----------------|--|-------------------|-------------------|--------------------|------------------|
| Manuf. Invest. (US\$ billion) Growth | 6.0 9.5 | 7.8 13% | 13.74 16% | 27.64 18% | 68.4 16% | 137.6 13% |
| Factory No Land Demand | 984 1,476 | 1,278 1,917 | 2,354 3,531 | 4,943 7,415 | 11,310 16,965 | 23,752 35,628 |
| Share of EZ | 50% | 50% | 60% | 80% | 80% | 80% |
| EZ Demand OP (Ha) | 738 | 959 | 2,119 | 5,932 | 13,572 | 28,502 |
| EZ Land D for 5 year period (Ha) | 2012-15 1697 | 2016-20 7695+(849) 8,544 () is back log of 5 y | 2021-25 20,128 | 2026-30 48,760 | 2031-35 105,185 | |

Summary of the projected three cases of EZ land demand in Bangladesh for 2015-2035 is shown in the Table 2.2.1.5-6 below. For our EZ land demand for 2015-2035, we shall use the base case as the most likely scenario.

Table 2.2.1.5-6: Economic Zone (EZ) Land Demand in hectares

| Year | 2012-2015 | 2016-2020 | 2021-2025 | 2026-2030 | 2031-2035 |
|-------------|-----------|-----------|-----------|-----------|-----------|
| Pessimistic | 1697 | 7,879 | 15,518 | 30,060 | 50,070 |
| Base Case | 1697 | 8,314 | 18,655 | 40,917 | 75,485 |
| Optimistic | 1697 | 8,544 | 20,128 | 48,760 | 105,185 |

Source: WB Study Team

2.3 Site Specific Industry Assessment

2.3.1 Current Situation

The Sylhet economy has been benefiting largely from remittances and investments from the overseas Bangladeshi community, particularly from the UK. The funds have been predominantly invested in real estate such as detached houses, apartments, and shopping malls. Construction and service sectors have been booming, and, Sylhet is considered to be one of the wealthiest cities in Bangladesh.

Sylhet does not have a broad industrial base. The existing industries were limited to a small number of companies utilizing natural resources available locally. Such industries include tea plantations, cement works, and stone crushing activity. Maulvibazar district in the Sylhet division has around 150 tea plantations, accounting for 80% of the country's tea production. This industry has a long history of exporting tea to the UK and other countries. In Sreemangal, there are around 20 mechanical workshops serving around 30 tea plantations, fixing and maintaining tea gardening equipment and processing facilities. Sylhet has two cement companies, Lafarge Surma Cement and Chhatak Cement. Lafarge is producing around 7% of the country's consumption by obtaining limestone across the border from its sister company in India. The stone crushing sector is not only serving local demand in construction but also serving neighbouring states in India (so-called Indian Seven Sisters).

Sylhet is rich in mineral resources. However, most minerals are currently sold outside the region without processing. Silica sand is shipped to glass manufacturing factories in Chittagong and Dhaka. White sand is used as raw materials for ceramic tiles and sanitary ware and shipped to ceramic companies located in the Dhaka region. Sylhet sand is available only in the region and is used mainly for upmarket construction materials. Sylhet Division is predominantly an agriculture based area, producing various fruits and vegetables such as tomatoes, oranges, pineapples, jackfruits and so on. There is no food processing factory in the region at present. Almost all produce is consumed locally or wasted. Rubber is another product produced locally and it is all shipped to Chittagong and Dhaka at present. The volume of rubber production, however, is still too small to attract large manufacturers. Agar, an extract from Agar trees used for scent, is exported directly to Dubai for processing. Agar scent is marketed widely in the Middle East and exported to Europe.

In Sylhet, a region with few industries, Saiham is a notable exception. Saiham has had spinning and weaving operations in Shayestaganj, 50 km south of the Sherpur site, since 1982. It produces cotton and polyester yarns for domestic and export markets. Near Saiham's factory, a few factories have recently been constructed or are under construction. Examples of such factories are RAK Paints and Star Ceramics. RAK Paints is a joint venture between the UAE and RAK Group Bangladesh. RAK Ceramics, a sister company in the Group, is the leading company for tiles and sanitary ware. Star Ceramics was established in 2012 by Star Industrial Holding which has ceramic production in India, Saudi Arabia, and Nigeria.

2.3.2 Target Sectors

The Sherpur zone is one of the few areas that have access to a stable supply of natural gas, electricity and water. Target sectors are selected to take advantage of this. Spinning, weaving, and dyeing sectors in the textile industry and the ceramics sector are selected because they are energy intensive sectors which are facing serious constraints regarding natural gas for production expansion. This does not exclude other energy intensive sectors such as paint and glass making. The food processing sector is selected to tap local agricultural products. Pharmaceuticals industry is also considered as it has a strong demand in Bangladesh. All of the five sectors showed strong interest in investment in the Sherpur zone as described below.

Table 2.3.2-1 shows the determinant factors for hosting the target sectors as well as often cited major industrial sectors in Bangladesh. Labour intensive sectors like the garment industry are not suited to the Sherpur zone as labour is relatively less abundant and people enjoy a more luxurious commercial life backed by remittances from the UK. Therefore fewer people are interested in the monotonous and low-paid work typically offered in the garment sector (This view was provided by a number of local business representatives). Similar less appealing labour intensive sectors include leather and footwear. Knowledge intensive sectors like pharmaceuticals and business processing outsourcing should be the sectors in the vicinity of Dhaka since highly educated and skilled manpower are the keys to their business and is only available there. Electric and electronic appliances tend to be located close to a large urban consumption centre. Sylhet is not considered to be such a centre in the current Bangladesh. Walton, the largest domestic manufacturer of electric and electronic appliances, occupies a large plot of land in Gazipur, 30 km north of Dhaka city. Automobile industry and machinery and parts supply sectors require a certain industrial linkage of parts manufacturers, etc., which is not available in Sylhet and is unlikely to be created in a small zone like Sherpur. The target sectors for the Sherpur zone are briefly described below.

Table 2.3.2-1: Determinant Factors for Selected Industrial Sectors

| Sectors | Access to Natural Gas | Access to Low Cost Labour | Access to Raw Materials | Knowledge Intensive Labour | Industrial Linkage | Anti-pollution measures |
|------------------|-----------------------|---------------------------|-------------------------|----------------------------|--------------------|-------------------------|
| Textiles | (◎) ¹⁾ | | | | | |
| Ceramics | ◎ | ○ | | | | ○ |
| Food Processing | | ○ | ◎ | | | |
| Garment | | ◎ | | | | ○ |
| Machinery | | ◎ | | | ◎ | |
| Pharmaceuticals | | | | ◎ | | |
| ICT BPO | | | | ◎ | | |
| Leather Products | | ◎ | | | | ◎ |

◎ Indispensable; ○ relevant; blank spaces indicate irrelevance.

1) Facing the situation of an unstable power supply in Bangladesh, textile companies rely on their own natural gas-fired power generation facility as their primary source of electricity.

Strained by the availability of natural gas, the textile industry is not able to capture the rapidly increasing demand at home. Major textile companies have sufficient financial resources through a number of profitable years in the past. They are ready for immediate investment for expansion. Sherpur will provide textile companies with an ideal location for expanded operations not only because of good access to natural gas, electricity and water, but also the timeframe required for its development: sales of land can start in 2015. Major textile companies plan to establish an integrated textile operation covering from spinning to weaving to dyeing and finishing in a large plot of land (10 ha), which is the typical size of development of integrated mills seen in China, India, and Indonesia.

The ceramic sector is another sector whose expanded activities are constrained by the availability of natural gas. Ceramic companies also have financial resources to invest following a series of good years of operation. Monno Ceramics, the leading company of tableware in this sector, expressed strong interest in investment in the Sherpur zone in the meeting. Other ceramic table ware companies are believed to share the same interest since they are facing the same situation with a backlog of orders. Sherpur will provide an ideal location for such ceramic companies. Another sector of the ceramic industry producing tiles and sanitary ware is facing the same constraint and business

opportunities. Large companies like RAK Ceramics and AKIJ are believed to have a strong interest in the Sherpur zone. The recent investment of Star Ceramics in Shayestaganj indicates that Sherpur is an attractive location for investment by ceramic companies.

In order to meet the increasing demand for food and drinks at home as well as abroad, food processing companies are looking for factory sites to expand production. The sites need to be close to raw materials such as fruits and vegetables and to gain easy access to utilities and road infrastructure. The Sherpur zone meets these requirements. Pran and Well Group, major food processing companies, showed strong interest in the Sherpur EZ at the meetings.

The food processing sector has the potential to mobilize many local people to establish a sustainable supply chain, as opposed to the capital intensive investments in the textile and ceramic sectors, which are unlikely to lead to the same scale of job creations. Greater job creation will help engage local communities in the development of the economic zone. When the Team visited the Maulvibazar Chamber of Commerce and Industry, its directors started discussions the processing of agar extract and use of tea flavour for various drinks in the zone. Agar extract, collected locally and currently exported directly to Dubai, can be refined and processed to make agar scent in the zone. If achieved, agar scent can be distributed to the markets of Middle East and Europe under the Sylhet (or Maulvibazar) brand. This will help increase recognition of other consumer goods produced in the zone.

The key to success in marketing food products and scents is packaging. A packaging plant will be invited into the zone. This will be able to provide services not only to food processing companies, but also to the commercially booming city of Sylhet. The investments in the Sherpur zone may provide business opportunities to the groups like mechanical works in Sreemangal who, because of little industrial impetus in the region, have worked over a long period time to provide similar services to only fixed customers in tea plantations. The Sherpur zone will provide stimulus for them to upgrade their levels of service which will lead to increasing business opportunities.

2.4 Marketing Assessment

2.4.1 Sherpur Economic Zone (EZ) Land Demand by Macro Level Approach

Industrial land demand for Sherpur EZ was projected using the investment trend and three scenarios.

Table 2.4.1-1: EZ Land Demand (Hectares) of Sylhet Region and Sherpur EZ

| Period | 2016-2020 | 2021-2025 | 2026-2030 | 2031-2035 |
|---------------------|------------------|------------------|------------------|------------------|
| Pessimistic | 7,879 | 15,518 | 30,060 | 50,070 |
| Base Case | 8,314 | 18,655 | 40,917 | 75,485 |
| Optimistic | 8,544 | 20,128 | 48,760 | 105,185 |
| Sylhet Share % | 6.9% | 6.9% | 6.9% | 6.9% |
| Share of EZ % | 100% | 50% | 30% | 20% |
| (Sherpur EZ Share) | 6.9% | 3.45% | 2.07% | 1.38% |
| Pessimistic Case | 544 | 535 | 622 | 691 |
| Base Case | 574 | 645 | 847 | 1,041 |
| Optimistic Case | 590 | 694 | 1,009 | 1,452 |

Source: WB Study Team

Potential Sherpur EZ land demand for the base case is estimated to be 574 hectares for 2015-2020, and, 645 hectares for the period of 2021-2025. Assuming several EZ projects will be initiated in Sylhet Division in the future; the Sherpur EZ is expected to have a few competitors reducing the share of Sherpur EZ land demand for 100% in the 2015-2020 and 50% in the 2021 to 2025 period. Yet, the sufficient demand for Sherpur EZ is likely to be available and if BEZA/Developer is able to construct fully serviced EZ with all necessary infrastructure such as power, water supply, natural gas, access road, and telecommunications, based on the Macro Demand Approach, the Sherpur EZ will be able to attract investors to fill up the Sherpur EZ within the first 5 years period of 2015-2020. The 230MW electricity generation plant nearby, and, the availability of natural gas in particular are likely to attract investors. Actual development & marketing of the Sherpur EZ land will determine the actual filling up of the Sherpur EZ. The Macro Approach demand analysis indicates that sufficient potential land demand for Sherpur EZ (574 hectares for 2015-2020 for the Base Case and 544 hectares even for the Pessimistic Case) exist well above (6 times) the projected EZ land marketing schedule of 89 hectares between the years 2016 and 2020.

2.4.2 Demand Survey: the Results

A demand survey was conducted. The narrative in the following is structured as follows. We discuss next the sampling methodology. We then briefly discuss how size of enterprise is defined in Bangladesh. That discussion is in context as the statistical universe that ought to underlie the demand survey on hand is presumed to comprise large and perhaps medium-sized manufacturing enterprises in Bangladesh. Finally, we present one table of results about the demand for developed land at the Sherpur EZ.

Sampling methodology

The following table presents an idea of the size of the universe of all manufacturing enterprises in Bangladesh. The second column shows the seventeen industrial sectors that were represented in the demand survey. The third column presents the Bangladesh-wide number of manufacturing enterprises in each of those industry categories as of the year that the last Business Registry of industrial enterprises was published in Bangladesh in the year 2006.

Table 2.4.2-1: The overall size of the Bangladeshi manufacturing sector

| Sl No | Name of the industry sector | Total number of manufacturing firms (cottage, small, medium, or large scale) in Bangladesh, 2007 |
|--------------|--|---|
| 1 | Auto-assembly and – parts making firms | 341 |
| 2 | Cement-making firms | 63 |
| 3 | Ceramics and non-metallic minerals | 19,861 |
| 4 | Electronic and electrical products | 20,262 |
| 5 | Number of firms in the extractive industries | 20 |
| 6 | Food & beverage | 123,169 |
| 7 | Furniture | 71,034 |
| 8 | Integrated textile mills./ ready-made garments | 110,536 |
| 9 | Leather goods manufacturers | 5,358 |
| 10 | Motor cycle makers | 6 |
| 11 | Other parts manufacturers | 67,128 |
| 12 | Paint and Chemical producing firms | 80 |
| 13 | Paper and Packaging firms | 6,304 |
| 14 | Pharmaceutical firms | 250 |
| 15 | Plastics products making firms | 2,365 |
| 16 | Ship-building firms that are registered | 124 |
| 17 | Steel mills, and other firms making different steel products | 990 |
| | Total | 427,891 |

Quoted from the publication "Efficient, Proactive and Inclusive SME Development in Bangladesh: Issues, Methods and Results", published by SMESDP project, SME Cell, The Ministry of Industries, Government of Bangladesh. The original source had been the BBS, The Business Registry, 2007. The total number of manufacturing enterprises according to a later version of the Economic Census, reporting for 2013, has been put at 450,348.

Definition of Small & Medium Enterprises

A variety of definitions concerning small and medium enterprises exists in Bangladesh.

BBS definition:

BBS uses a definition of size based on 'employment size'. Establishments employing between 1 and 9 workers are called 'micro' establishments; those employing between 10 and 49 workers are called 'small'; those employing between 50 and 99 workers are called 'medium'; and, finally, those employing between 100 or more workers are called 'large.' It is this definition that was used both in the BBS' Economic Census of 2001/2003, whence came the Business Registry – 2005/6. It is also used in the updated BR of 2007, which, authorized by the RFP from ADB that our team is using.

Ministry of Industries definition:

The erstwhile Small and Medium Enterprise Task Force (SMETF) enunciated a second definition of size. This was subsequently adopted in the issuance of the Cabinet-approved SME Policy Strategies 2005---the muse for all SME policies of the Government of Bangladesh.

The definition formulated by the Bangladesh Better Business Forum (BBBF).

That said, the BBBF has recently issued another definition of small and medium enterprises in various realms of production. This is presented below:

Table 2.4.2-2: Definition mooted by the BBBF, in 2008

| Enterprise | Sector | Asset size | No. of employees |
|-------------------|---------------|---|-------------------------|
| Small | Service | Total fixed asset excluding land & building between Tk. 50000-Tk. 5 Million | Up to 25 |
| | Trade | Total fixed asset excluding land & building between Tk. 50000-Tk. 5 Million | Up to 25 |
| | Manufacturing | Total fixed asset excluding land & building between Tk. 50000-Tk. 15 Million | Up to 50 |
| Medium | Service | Total fixed asset excluding land & building between Tk. 5 Million -Tk. 100 Million | Up to 50 |
| | Trade | Total fixed asset excluding land & building between Tk. 5 Million -Tk. 100 Million | Up to 50 |
| | Manufacturing | Total fixed asset excluding land & building between Tk. 15 Million -Tk. 200 Million | Up to 150 |

Most analysts follow the definition that is based on employment size per firm. The existing definition of BB uses either of the 'employment size' or 'fixed investment brackets.' "In the BBBF definition as adopted by the government and BB, *both* fixed asset excluding land & building and number of employees has been taken into consideration while defining SMEs. In the new Industrial policy (IP) 2010 *both* of these criteria have been retained (emphasis added)". A definition based on employment size is, chronologically, more stable (and therefore more 'robust'), than one using fixed investment. Any measure of size of enterprise based on the replacement cost of plant and machinery will vary based on geography, for instance. We have used the definition using employment size, The replacement of the same collection of (imported) plant and machinery will be the lowest in Bangladesh's port city of Chittagong, somewhat (at least 7-8%) higher in Dhaka due to the spatial arbitrage cost, and at least 15-17% in Thakurgaon compared with Chittagong. The same 'package' of plant and machinery could conceivably pass for a billing of 'medium firm' while failing the 'test for medium' in Dhaka and Thakurgaon, merely due to geography. Put differently, geography could get conflated with the true measure of *industrial* size, as long as one is measuring things using *monetized units*. There is therefore *a lack of purity* in the size measures based on fixed investment. As well as chronological instability, already demonstrated, this definition also betrays spatial instability. A definition based on headcount does not suffer, at least as egregiously, from those two counts, as one based on fixed investment. Thus we have preferred using headcount compared with fixed investment as our empirical measure of 'size.'

The statistical universe of the demand survey must be comprised of the firms that populate the top of the firm size-structure found in Bangladesh. That points to the firms in the class of large and medium-sized firms. Bangladesh Bureau of Statistics (BBS) typically processes the data from the economic censuses for compiling the portions of the national accounts data related to manufacturing as a sector. Towards that end, however, the BBS clubs medium-sized enterprises along with large enterprises, small enterprises being clubbed with cottage-scale enterprises. The number of large enterprises is not typically reported as a standalone item. There is some suggestion in the numbers presented along with the preliminary results of the 2013 Economic Census that the number of large and medium manufacturing enterprises in Bangladesh is about 7,000 as of 2013.

The JDI team sampled a total of 107 enterprises including 28 (twenty-eight) foreign ones and 4 joint-ventures. Of the total number of enterprises, foreign firms account for some 26%. Thus, one in four enterprises sampled happens to be a firm with foreign ownership. It is certain that the matched percentage of foreign firms in the manufacturing economy of Bangladesh at large would be much smaller. We have therefore oversampled foreign-owned firms on our sample. Three of these firms were actually interviewed in Japan. One Indo-Nepalese firm with substantial operations in both of those countries was interviewed in India. Executives representing the remaining foreign-owned firms

were interviewed in Bangladesh. Annual turnover of the firms on the sample in the year was estimated to be in excess of US\$40 million.

Twenty-three (out of the 107) firms have demonstrated strong demand for buying into Sherpur EZ. The total demand for land/factory-rentals at Sherpur EZ happens to be 262 hectares.

Many foreign investors outside are still sceptical about the ability of the Bangladesh Economic Zones Authority (BEZA) to implement fully-featured economic zones. It is quite understandable that foreign investors will display a ‘show-me’ attitude until such time that BEZA can successfully roll-out an economic zone with all the promised infrastructure and smoothly-functioning one stop service (OSS). Despite the still difficult situation in Bangladesh, three of the four foreign companies interviewed in Japan and India are very seriously considering investing in Bangladesh’s prospective economic zones only if BEZA is able to deliver the fully serviced EZ. An Indian company (hailing from food processing) is interested in Sherpur EZ to market in both Bangladesh and India. Another Japanese company--- the KPF Corp. --- is also seriously considering investing in Anwara or Mirershori.

2.4.3 Demand Forecast

2.4.3.1 Major Assumptions

The following are assumed in marketing demand projections for the Sherpur zone:

1. All proposed land (public and private land) will be acquired for the project by the end of 2015;
2. All permits including, among others, those for access rights to natural gas, electricity, and water supply will be granted by the end of 2015;
3. A private entity (Sherpur Economic Zone Company, SEZC) will be selected for investment of the zone and the investment agreement between SEZC and the government will be entered into by the end of 2015;
4. All off-site connections of natural gas, electricity, and water supply will be constructed by SEZC with use of its own funds²⁰⁸ by the end of 2016;
5. The starting unit price of land will be at \$50 per square meter; and increased as the demand will pick up as most of SEZ developers practice.
6. The land for resettlement should be made before the construction start in 2016.
7. However, any reasons, the above tasks are delayed; the implementation should be delayed as much the initial delay as any other projects.

2.4.3.2 Micro Approach for Demand Projections

Based on the Market Demand Survey of 107 interviews, 18 companies with 162 hectares are interested to lease the Sherpur EZ plots within 2-5 years. The Macro Demand estimation for the Sherpur EZ for the period from 2016-2020 is 544 hectares in the Pessimistic case. Both Macro and Micro Demand Survey indicate that the demand for Sherpur EZ is much higher than the available leasable land of 89 ha. Based on the Market Demand Survey, the base case demand forecast is projected and summarized in the table below. According to this, all the plots of land (only 89 hectare) will be leased out within the first four years after the commencement of land sales: land sales for textile and ceramic sectors will be completed for the first two years to 2017 while plots for pharmaceuticals and food processing will be leased over three years to 2019. The timing of investment in the table indicates the signing of an investment agreement, not the completion of factory construction which normally takes 1.0 to 2.0 years.

Through the interview survey meetings, the Team received strong responses from certain companies and associations of the target sectors as described in the industry assessment. There is huge potential demand for land in Bangladesh, particularly land with the various advantages that the Sherpur zone possesses. Therefore, the demand side will not affect the projections, but potentially the supply side will. If all the processes in granting permissions and selection of the private entity are delayed, the timeframe for completing land sales will be delayed accordingly.

The land sale for the food processing sector will start one year after the textile and ceramics sectors since it will take time to prepare a supply chain for procuring fruits and vegetables. If this is expedited, the land sale will be completed within the same time frame as the textile and ceramic sectors, within two years (the ideal case).

Table 2.4.3.2 - 1: Projected Demand and Timeframe of Investment in Sherpur

| Sector | Area per investment (ha) | 2015-2020 | |
|----------------------|---------------------------------|----------------------------|---------------------------------------|
| | | Number of investors | Total Area for investment (ha) |
| Integrated textile | 3.5 | 5 | 17.3 |
| Ceramics | 5.0 | 3 | 14.85 |
| Pharmaceuticals | 7.7 | 4 | 30.98 |
| Paints | 4.8 | 1 | 4.76 |
| Food processing | 2.0 | 9 | 17.77 |
| Rental Factory | | | 2.19 |
| Commercial Zone | | | 0.83 |
| Total (in ha) | | | 88.68 |

2.5 Evidence for the Strong Potential Demand for the Fully Serviced & Efficiently Operated Economic Zone (EZ) Land in Bangladesh

The first three sections (Competitive Analysis, Industry Assessment and Marketing Assessment) showed much strong evidence for the potential demand for a fully serviced Economic Zone in Bangladesh. We consider it as the most important assessment of the possible market demand of EZ since the viability of three EZs depends on the possible market demand from all possible angles and factors and not just one or two sources. The major evidence of strong demand for EZ land is summarized below.

(1) Interview survey result is overwhelmingly positive for EZ development.

The study team conducted market surveys in Dhaka, Chittagong, Thailand, and Japan for possible EZ land demand by conducting (1) 107 personal interviews, (2) 7 interviews with industrial associations, (3) 3 with EPZs and BEPZA headquarters, (4) with Investment Promotion Agencies (as BOI, JETRO and JICA) and 5 with Local Chamber of Commerce. Nearly all interviews and meetings indicated that fully serviced industrial land has been very scarce in Bangladesh for several years, without exception, those organizations had requested BEZA to develop fully serviced industrial land as soon as possible. The most important request/message is delivery of “fully serviced EZs” as soon as possible!

(2) Every month, more than 100 potential investors have been visiting BEPZA asking for additional EPZ industrial land plots. Requests have been increasing every year. BEPZA is now allowing factory expansion vertically upwards into multi-story building as no additional EPZ land is available.

(3) JETRO has been receiving more than 200 enquiries per month in their Dhaka and Tokyo offices for possible investment into Bangladesh. These enquiries were received in 2013 especially for relocation of factories from China and Thailand to Bangladesh.

(4) A JICA survey of Japanese companies operating factories in China indicates 12% of those companies are interested in relocating their factories to Bangladesh in 2013 (179 companies out of 1,462 companies). This evidence is significant since Bangladesh never appeared on the destination list previously. JICA is now proposing to support the EZ Project by carrying out a Feasibility Study/Master Plan as soon as possible.

(5) Macro Demand Approach indicates 3 to 7 times the requirement of the planned under the three sets of EZ industrial land available:

- (a) Sherpur EZ: 574 ha during 2016-2020 and 645 ha during 2021-2025,
- (b) Anwara EZ: 499 ha during 2016-2020 and 1,119 ha during 2021-2025 and
- (c) Mirershori EZ: 831 ha during 2016-2020 and 1,866 ha during 2016-2025.

In order to expand the industry sector, additional industrial land is essential and the result of the demand analysis show how badly additional fully serviced industrial land is needed in Bangladesh.

(6) All EPZ Land Plots have been nearly occupied recently (by 2013):

Some years back, three remote EPZs (in Uttara, Ishwardi and Mongla), had difficulty in attracting investors. However, since 2010, nearly all the plots in those three remote EPZs have been leased out (93%) at the end of 2013 - indicating a strong demand for industrial land even in distant remote locations. It is also important to note that recently approximately 132 plots have been created out of which 79 plots have been allotted to different industrial entrepreneurs.

(7) New phenomena of multi-story factory buildings in the EPZs and major cities of Dhaka and Chittagong have been taking place in the past several years - indicating a severe shortage of industrial land. The factory buildings have been raised to 5 stories and in some cases to even 10 stories which created a problem of some poorly built factory buildings collapsing as the tragedy of the Rana Plaza case occurred in 2013. Speedy development of the three EZs is likely to reduce this type of tragedy by guiding factories to safer EZ locations.

(8) Increase in the demand of fully serviced EZ land in Bangladesh due to the global economic changes:

Besides the ample internal evidence, due to the global economic changes made, Bangladesh, as a possible investment destination of international companies - especially labour intensive industries from Japan, Korea, Taiwan, Thailand and even from China in recent years - mainly due to (1) rapid increase of wages in Asian countries and China and (2) policy change of Japan & other Western/Asian countries for investment policy shifting from China to other countries due to the political risk factors. Many companies are looking at countries which have lower production cost than China or Thailand. Naturally, Bangladesh is one of lowest wage countries and the potential demand has increased dramatically in the past few years.

(9) Several SEZ/EZ international developers and operators are showing keen interest in the EZ business. So far potential developer/operators from the UAE, Japan, China, Korea, Malaysia, and Singapore have shown keen interest in investing in an EZ project under the proper conditions. The main reason is that these potential developers smell a business opportunity in the EZ business due to the new EZ Act and the global economic changes favouring Bangladesh - especially highly competitive wage levels due to a large labour force and limited employment opportunities in Bangladesh.

(10) Benchmark Analysis of various factors indicate that if BEZA/developers are able to develop fully serviced EZs at the proposed cost, (1) Mirershori EZ is ranked No 1, (2) Sherpur EZ is ranked

No 2, (3) Anwara EZ is ranked No 4 out of 10 including 7 well known SEZs in Asia and India. The reason is the wage costs of Bangladesh are far lower than any competitor in addition to the planned fully serviced EZ infrastructure carrying a relatively lower cost than in other countries. The lower ranking of Anwara EZ is due to the high cost of construction of Super Dike and reclamation/channel development cost pushing up the overall development cost.

(11) Japan emerged as a strong destination for garment exports from Bangladesh:

The export of garments to Japan increased from \$173 million in 2010 to \$478 million in 2013 – a 276% increase within 4 years.

Table 2.5-1: Garment Export to Japan (in \$ million)

| Year | 2010 | 2011 | 2012 | 2013 |
|--------|-------|-------|-------|-------|
| Export | 173.3 | 247.5 | 403.6 | 478.5 |

Source: EPB

This rapid increase in garment exports to Japan is due to two major factors: First of all, the cost of production in China, which had been a major garment supplier, increased dramatically in the past several years. The average wage in China is now 5-6 times higher than in Bangladesh (in 2013). It is quite sensible to shift production of garments from China to Bangladesh. The second reason is the worsening of the Japan/China political relationship. The Japanese Government and the private sector initiated a China + 1 policy encouraging Japanese companies to shift supply of manufactured products from China to other Asian countries because of the political risk affecting economic affairs. For Example, Uniqlo Co., which is the biggest garment retailer in Japan, started ordering garment products from Bangladeshi suppliers in 2010. This action by Uniqlo paved the way for many other companies to view Bangladesh as a garment supplier country. This trend is likely to promote investments from Japan. That is the reason that Sumitomo Trading Co. started searching for possible EZ land in 2013 in Bangladesh since many Japanese companies are inquiring for possible investment sites (in EPZ or EZ). Due to the same reason, JICA also started to investigate a possible EZ Project in Bangladesh in 2013. It is clear that if BEZA/Developers are able to develop fully serviced EZs; many Japanese companies are likely to come to Bangladesh to cope with a China +1 and Thailand +1 policy.

All of the above 11 pieces of evidence indicate that there is a strong demand for fully serviced EZ land by both domestic and foreign investors. The key point for strong demand is based on the fact that BEZA/private developers are able to deliver the promised fully serviced infrastructure with efficient OSS service. If BEZA/private developers are able to develop fully serviced EZs with an efficient OSS at a competitive sales/leasing price from \$50 (Year 2017) to \$70 (Year 2019)²¹⁰ per square metre, the investors (both FDI and DDI) are likely to be attracted to the proposed three EZs, and occupy the plots in a relatively short time. Based on overwhelming evidence of demand for fully serviced EZ land, BEZA should promote at least 10-15 more EZs in the coming years. BEZA should create an EZ land market where EZ land can be transferred freely as any real estate land.

Considering the above strong evidence of latent demand for fully serviced EZ land, BEZA should finalize the “EZ Guidelines” for developer/operators and implement the proposed three EZs as soon as possible as the Pilot EZ projects of Bangladesh. Several more EZs should be considered ASAP even during the initial pilot project implementation because of large demand for fully serviced EZ land. These three EZ projects should be a test case for BEZA/developers to deliver fully serviced EZs quickly and operate effectively adopting an OSS system which is equal or better than Asian OSS standards.

Recognizing the strong demand for three EZs, a Master Plan will be prepared.

²¹⁰Detail on land price can be found in section 6.1.6 (Chapter 6)

2.6 Marketing Strategy

This chapter offers an overview of the marketing strategy and a discussion of how Economic Zones in Bangladesh could be packaged and promoted and the type of materials needed for their start-up. The four elementary questions on marketing strategy relate to:

- Overall strategy, timing and implementation framework and responsibilities;
- Target markets, countries, and investor profiles;
- Types of promotional tools and materials required;
- Opportunities to coordinate with other promotional agencies in Bangladesh.

2.6.1 Overall Strategy

The term marketing is composed of several related concepts such as product, price, distribution, promotion, etc., but it has a crucial connotation, which is sometime un-focused, that of whether there is a market for the products. In practice, therefore, the most important element in “marketing” is to satisfy customer demand. In the Economic Zone project, even though full-fledged infrastructure and services are supplied in the Economic Zone, if there is no identified and/or prospective market for products to sell in Bangladesh, no investor will be interested in investing. Consequently, a demand-side approach, rather than a supply-side approach becomes crucial. Thus more than physical set-ups or legal systems in the Economic Zone, creation and provision of a business environment where market needs for investors can be nurtured, are the most fundamental elements to be considered in a marketing strategy.

Deciding on the contents of the marketing strategy and a timetable for implementation, it is clear that the length of time taken to implement the marketing strategy will vary according to the following three elements:

- The type of marketing strategy
- The number of activities involved
- The resources available

Strategy is regarded as “a method or plan to attain and maintain a position of advantage over rivals through the successive exploitation of available or evolving resources rather than committing to any specific fixed plan designed at the outset.” As the global economy and industrial development have been dramatically changing in structure, the type of strategy to be employed for the marketing of Economic Zones in Bangladesh should be elastic and reflectional in choosing the ideal context for pursuing marketing targets. In order to capture the ever-changing business and industrial environment, phased elements with multiple ‘rounds’ of feedback should be embedded in the flexible marketing strategy to provide room for updates and additions. The strategy should incorporate reflection on the current changes in the surrounding industrial and business environment.

Figure 2.6.1-1: Diagram of Market Strategy

Therefore, the following chapters include the implementation framework outlining the marketing activities to be employed and the extent of involvement of resources in the context of Bangladesh, together with the investment promotion agencies' responsibilities. In this study, the proposition is in line with the reference from OECD investment promotion and facilitation guidance, which contains international best practices of investment promotion. Success in promotion of the Economic Zone requires a careful calculation of how to employ resources most effectively. It also requires consideration of how to organize investment promotion and marketing activities within the government so that the overriding goal of economic development through improvements in the investment climate remains at the forefront of policymaking.

2.6.2 Requirements of BEZA for Formulation of the Marketing Strategy for Economic Zones

In formulating a successful marketing strategy to promote investment in each economic zone, the following factors need to be elaborated within BEZA.

- Information gathering (methods, effectiveness, improvement measures)
- Stakeholder consultations (policy formulation process to have feedback from relevant stakeholders and government agencies; efficiency and transparency of the process; improvement measures; implementation; gathering of public comments; electronic dissemination tools; timely feedback; availability of an appeals process from business communities)
- Inter-government communication
- Clear, up-to-date information provision on laws and regulations
- Up-to-date database of the target marketing industries

Information Gathering

Marketing strategy formulation requires a responsible agency having various sources of information in relation to investment. This task can be accomplished even if new routes of information sources were not established, but many other government agencies like BOI and BEPZA should have the conventional route of information gathering. So an information sharing channel must be established for effective use of information sources. Then improvement measures for gathering and using information and a feedback system must be employed within BEZA.

Stakeholder Consultations

A system of regular contact with business communities would enable BEZA to spot business and industrial needs and trends early and begin taking necessary action. Through this system, the need for

a change in marketing strategy would become clear and the process of renewing the strategy could be carried out efficiently. The strategy should be sufficiently flexible to allow the responsible stakeholder, which includes other government agencies and private developers, to respond to new developments in the Economic Zones.

Inter-government Communication

BEZA's ability to resolve problems effectively, in communication with other government agencies, is related to its legal status, mandate, and location within government. Political support is critical in overcoming vested challenges, in the provision of leverage for BEZA to impose Economic Zone policy on line ministries and other government agencies. BEZA should be given clear responsibility on behalf of the Prime Minister's Office, as well as other ministries, to develop and perform a sound strategy for investment and to create streamlined procedures for dealing with various business and administrative affairs.

Clear Up-to-Date Information Provision on Laws and Regulations

Laws and regulations may frequently have unintended consequences and confuse business operation. If this is the case in the development of Economic Zones, the situation may become dynamic and sometime obstructive for prospective investors. Framing good regulatory responses to business activities in the Economic Zones requires clear, up-to-date information provision, including through direct communication with existing and potential investors.

Up-to-Date Database of the Target Marketing Industries

BEZA should maintain an up-to-date database of the various representative bodies and major players in each industrial and business market. Sufficient time is needed for interested parties to study the situation and trends properly and for BEZA to consider all inputs and comments of concerned business parties.

2.6.3 Activities and Implementation Framework

International experience suggests that the following four main elements should be considered as the marketing activities of the implementation agency.

- **Policy advocacy** among government bodies to seek necessary approvals or urge the removal of obstacles to investment
- **Image building** through attending trade fairs, organizing seminars, information dissemination via website and publications (advertising and promotional materials) to the business community in the country as well as abroad, promoting the country as an investment destination
- **Investor servicing or facilitation** to help solve problems faced by existing or prospective investors
- **Targeting investment generation** by actively seeking out investors based on national development plans or other criteria

Policy Advocacy

Since the implementation agency, and, the leading investment promotion and marketing strategy, will be the focal point of contacts from investors, coordination among many ministries concerned with business affairs and regulation surely remains in the hands of the implementation agency. Different agencies have different points of view and responsibilities and therefore might not all see investment proposals in the same way. However, when obstacles arise in the path of investment projects, the implementation agency must act as a diplomat within government, conveying to government the

concerns of business and balancing these against the different regulatory imperatives in different agencies. Clear responsibility and power should be assigned to the implementation agency to streamline regulatory procedures for dealing with regular business and management issues.

Image Building

Marketing strategy should be reflected in the mission of the implementation agency, with image building, which includes advertising, producing promotional materials and attending trade fairs etc. The implementation agency often does not have as much funding and outreach staff as they might desire, so establishing priorities for image building is important. As the investment climate becomes sound, attracting investors will require less effort in image building and the need for promotion, servicing and targeting can be reduced at a later stage.

Investor Servicing or Facilitation

The implementation agency is in the front-line in hearing about adverse perceptions or practical business problems from investors and thus should have a role as advocate/solution provider for investors within government. Therefore, the implementation agency should seek approval of permits and request fundamental changes to laws and regulations for the good of the investment climate.

Targeting Investment Generation

The implementation agency's prime role, is to attract and promote investment to the country. Arrangement of meetings with each individual potential investor is an important activity, but it may make sense to prioritize such meetings toward strategic sectors already focused on, or that can immediately target existing and prospective markets. The set of priority sectors ought to be agreed widely within the government but allow flexibility for investors to explore market accessibility. Also, the gathering investors in one meeting through investment seminars or tours would be cost effective.

The responsibilities of each marketing activity are described below.

2.6.4 Responsibilities of Marketing Activities

The responsibility for each marketing activity should lie with respective agencies who conduct implementation, required fund and budget allocation, performance evaluation, and improvement with supporting measures. Each of the described activities is examined, but in the case of each different Economic Zone, different levels of responsibilities even among provincial implementation agencies need to be addressed.

Policy Advocacy

BEZA has responsibility for the dissemination of new EZ developments in registration and legality among different but concerned government ministries and agencies. Different authorities concerned with business administration may, at an early stage of implementation, hesitate to cooperate with the implementation agency in streamlining the business administration, since they feel their privilege is taken by BEZA. To respond to this, political intervention must be employed to impose the new registration and regulatory framework, which can only bring advantage to Economic Zones. Sustaining this political interest has proved to be a challenge, especially under changing political circumstances. In practical terms, international experience suggests that to be most effective as an advocate within government and to be able to remove obstacles to particular investments, an implementation agency should report directly to the prime minister. In this way, performance evaluation and improvement measures for investment projects are directed and supported by the top political leader of the country. Exchange of experience with other countries to learn about effective

advocate reform and maintaining good relations with government departments, can be accessible through peer networking of investment promotion agencies. This is presented in a later chapter.

Image Building

While policy advocacy is an internal affair within the government, image building is an external affair addressing business and industrial communities both at home and abroad. BEZA should employ qualified staff with sufficient training in presentation and investor relations to conduct seminars, trade fairs, international conferences and media broadcasting. This activity is rather time-consuming but should be a continuous process. A large cost will be involved. A definition of cost and benefit analysis and evaluation should be carefully developed so that selective image building approaches can be planned with funds and other resource allocation. The best practices in other countries involve great use of electronic and media instruments to achieve cost effectiveness. Collaboration with other investment promotion agencies should have a positive effect on image building.

Investor Servicing or Facilitation

BEZA is pledged to be established to act as a one-stop-shop for approvals and licensing, but investment projects often require approval from many government agencies and sub-national governments in such areas as land use, labour practices, safety, taxes and customs and environmental impact. In relation to this, BEZA is expected to help to expedite decisions in these cases and to offer investment counselling services in (i) securing raw materials; (ii) market access (national or regional); (iii) seeking efficiency; and (iv) gaining strategic elements for investors may need to be integrated. These are important marketing activities for Economic Zones. A One-stop-shop should aim to cater to the needs of both prospective (prior to implementation of project) and already-settled investors (after implementation) on access to information on investment permits and licenses, clearance formalities, application forms and other business administration affairs such as tax, labour, and environment clearance. At this stage in the functioning of the one-stop-shop at BEZA, service provision is not necessarily meant to be one-stop-clearance-shop. Due to the pending legal jurisdictional set-up among other departments and authorities, the delegation of power to a one-stop-shop at BEZA seems to be still in the processing stage. The competency level of staff at BEZA would need to be further upgraded to perform such clearance functionality. However, the unique institutional structure and mandate given to BEPZA can be referred to as the relevant model for the functioning of a one-stop-shop in Bangladesh (more information can be found in Chapter 5). In relation to this, BEZA should, at first, focus on the provision of investor services at headquarters. This would provide a single window of information provision and facilitation and monitoring of business administrative applications on EZ related affairs. To withdraw the delegation of power upon BEZA, remarkable jurisdictional backups on BEZA is required. Then it would only make it possible to appoint representatives situated in either BEZA headquarter or each EZ local office for provision of one-stop-clearance-service. However, this function would depend on the volume of applications and requests from investors. Investors see BEZA as their mediator for proceeding with required business administration. BEZA should comply with its promise to complete all investment approvals within a certain time of license provisions and a system to meet the promise should be installed.

Institutional Setup and Coordination

There are several government institutes, which have been performing marketing activities for investment into Bangladesh since before the establishment of BEZA. Those institutes are, namely, Board of Investment (BOI) and Bangladesh Export Processing Zone Authority (BEPZA). In fact, their experience in marketing activities and networking among peer investment promotion agencies is better than the status of BEZA. As a member of the World Association of Investment Promotion Agencies (WAIPA), BEPZA has good exposure to the investor market through interaction with the community of investment promotion agencies. Furthermore the staff members of BOI and BEPZA have been trained in the field of marketing service provision through participating in overseas

business missions, training provided by the peer network association and going through actual and practical interactions with prospective and already-settled investors.

Cooperative institutional coordination among BEZA, BOI and BEPZA is required to maximise opportunities for promotion and marketing of EZs and to minimise the duplicate mandate for investment promotion through redundant marketing activities, considering the limited resources available. First of all, a training programme for BEZA staff should be considered. Having a good exposure to the networking of peer investment promotion agencies and being a nodal point of contact for investors, BEPZA would be a good organisation for BEZA staff to transfer to temporarily, for training. Acquisition of the sense of an investor-centred work ethic through this kind of orientation is invaluable for the staff of EZ management and operation. The role of the BOI should continue as it is, but should incorporate effective marketing activities for the EZ. BEZA should focus on dissemination of information about EZs among BEPZA and BOI and then perform as the nodal point of contact for prospective investors.

Targeting Investment Generation

This activity is directly linked with how effectively BEZA uses image building channels, plays an intermediary role between the government and targeted investors and how successfully it helps to streamline administrative procedures involved in both establishment and operation phases of investment. But effective target marketing is technically based on a continuous effort of gathering business and industrial needs, trends and information through exchanging views with prospective and existing investors. Investors come to the country not because of the good investment environment as perceived by the government but because of the actual business chances and market needs, which can be enhanced by the investment environment. Government's efforts to improve the investment environment should be accompanied with provision of information where such needs for the market lie and how government can assist investors with target policies to satisfy them. BEZA also needs to understand that the efforts are always exposed to international competition and can be improved by feedback of the views from investors.

Funding

Operation of an effective implementation agency is expensive. Hiring well-qualified staff, ideally with private sector experience and actively engaging in image building such as through communications programmes, advertising and trade fairs attendance are all costly. How BEZA is funded and the budget allocation decided is the crucial element in carrying out effective marketing activities. BEZA needs well qualified staff who can only be hired with the salary range equivalent to that in the private sector. It is the responsibility of the government to ensure the conditions which provide enough motivation for the staff of the investment agency.

Regular Evaluation

Regular evaluation is needed of investment agency performance in terms of attracting investment. The performance of BEZA in marketing activities can be evaluated with the following factors; 1) overall investment flow, 2) the form of investment, i.e. portfolio investment, exposition of existing projects, investment in sales and marketing facilities and greenfield projects, 3) investment by sector, 4) job creation, 5) linkages and additional purchase of inputs and services, 6) technology transfer and 7) net tax benefits from corporate taxes, customs duties and employment taxes paid. This evaluation process should be linked with incentive and salary for staff members of BEZA, so that continuous improvement efforts can be expected.

2.6.5 Timing of Marketing

It is important that staff within BEZA have a clear understanding of how to divide their time between advocacy work (and its associated research), image building and promotion, servicing and targeting activities. At different Economic Zones, the proportion of time spent on each activity may change and the particular tactics and coordination within government should be taken into account.

2.6.6 Target Markets, Countries, and Investor Profiles

In the marketing strategy, selection of target markets should be based on a factual study and analysis of the current investment environment and its opportunities and challenges. Clear, reasonable and realistic target sectors should be identified for marketing and investment in each Economic Zone. Clear goals and sectoral targets need to be defined so that BEZA staff knows their priorities. Sufficient and appropriate numbers of staff and resources need to be identified to achieve these goals.

In order to screen the marketing target of industries, countries and companies, the study team conducted a study on the investment environment with SWOT analysis, conducting a series of interviews with prospective investor enterprises in Bangladesh and selective overseas countries. These comparative analyses directly support the next steps in decision making on positioning and strategic policy alternatives of each Economic Zone. Accordingly, surveys of prospective investors are at the core of identification of target markets.

The short listing of the companies for interview was conducted taking into consideration industry and market assessment of each three Economic Zone sites. Moreover the methodology of short listing was expected to expedite the process of identifying target markets in relatively large numbers of the study population. The short listing took into consideration both national and international companies operating in Bangladesh as well as abroad. This exercise was carried out for the identification of companies and their motivation for wishing to invest in EZs. In this sense, the extent of their interests and expectations can be enhanced with provision of relevant information and with efforts to meet their requirements. The shortlisted companies were visited by the marketing expert together with a local consultant and interviews conducted to find out the intent of the companies and to evaluate their prospects as investors in Economic Zones.

Criteria for Selection of Target Market

After visiting the shortlisted companies, the project team proposed the following criteria for evaluation and selection.

- i. Willingness: whether the industrial group/companies are willing to consider investment in Economic Zones and to expand/shift their factories onto Economic Zones.
- ii. Readiness: whether the industrial group/countries are going to be ready to invest in Economic Zones within time frame of Economic Zones development scheduling.
- iii. Capacity: whether the industrial group/companies have enough capacity to expand/shift their factories.
- iv. Potential: whether the industrial group/companies have potential to grow their business after expanding/shifting their factories in Economic Zones.
- v. Demonstrative: whether the industrial group/companies can be a demonstrative case to other companies in and outside Bangladesh after investing in Economic Zones.

The selection of the target market was conducted in discussion within the consultant group together with BEZA officials. The shortlisted companies were evaluated after field surveys and personal interviews with those responsible for business development and marketing of the companies. The above criteria was agreed to be important in formulation of an appropriate marketing strategy and for

the success of the Economic Zone project. Since BEZA policy is to include some involvement of private enterprises in EZ development and operation, interviews with potential Economic Zone developers were also carried out. The target group of industries is discussed in the market strategy for each Economic Zone.

2.6.7 Type of Promotional Tools and Materials Required

Required promotional tools and materials for marketing of Economic Zones should match the needs of investors. Furthermore, due to the lack of knowledge about investors, investment promotion agencies sometime tend to present too much unnecessary information while providing little on what potential investors really want to know. For example, a typical presentation structure of an investment promotion mission contains the main economic indicators and statistics on FDI, ODA, trade and tourism. Bilateral information featuring the country they are visiting is also given, including the types of investment (wholly foreign owned, joint venture or business cooperation contract), the number of invested projects, registered capital, number of jobs created by the investment from that country and so on. Such information can be useful to potential investors, but they need more specific information on how they can start a business operation in the countries, what incentives they are given, how the government assists them in solving difficulties in doing business etc. This kind of information is not usually provided in presentation materials. Moreover, very useful international comparisons in labour costs, business start-up costs, and utilities costs between rival countries are rarely provided. If the implementation agency just presents the country profile, policy, and potential of its own, it might not meet the requirements of potential investors. The implementation agency must understand the needs of investors and promotion tools and marketing materials must be produced with clear concepts of the following; 1) what products they are going to market (Product), 2) the strength and weakness of the products in comparison with competitors' products (Positioning), 3) the target group of customers (Target Audience), 4) the services provision to be involved together with marketing the products (Scope of services) and 5) how the strength of the products can be conveyed to the target group (Scope of Communications). The explanation of the five strategic marketing attributes is presented as follows.

Product

The product of BEZA is not the land of the Economic Zone itself but the investment environment of the Economic Zone.

Positioning

For effective positioning, BEZA must objectively know the present strengths and weaknesses of the Economic Zone vis-à-vis those in rival countries and define a realistic direction toward which Bangladesh can proceed in order to dramatically improve its investment environment in the minds of investors. "Appropriate positioning" is more important than "high positioning." Setting goals that are too ambitious will reduce feasibility in implementation and credibility to the prospective investors.

Target Audience

Since national and foreign investors are not uniform, they must be categorized into different segments. They can be divided into groups by country of origin, by industry, by company type (MNCs or non-MNCs), or by the strategy they follow (domestic market-oriented versus globally-oriented). The government cannot satisfy all investors at the same time. The benefits of the investment environment should be addressed to the targeted national and foreign investors.

Scope of Services

The scope of services should be understood as the investment services where facilitation of investors' business start-ups and implement of their investment projects in Economic Zones should be addressed.

Scope of Communications

The scope of communications is how and where positioning is delivered to the target audience. As noted above, foreign investors consist of different groups. After deciding on the target audience, the government should work out a communication programme that delivers its message regarding the investment environment to the target audience. Communications programmes must be consistent with and supportive to the positioning statement. Referring to the best practices of Asian countries, the attitude of pro-activeness, rather than just waiting for investors to come to the authority office, must be employed.

Furthermore, investors are very demanding in terms of detailed information of not only the physical infrastructure of the EZ but also many other socio-economic related information including availability of labour forces, international schools, hospitals, shopping area, amenities, legal and regulatory framework etc. Pricing of Economic Zone land (sale, lease and rent) is an important negotiation item. In order to promote Economic Zones and appeal to the potential investors, the overall advantages of the Economic Zones in Bangladesh compared with other countries especially with potential competitors such as Cambodia, Myanmar, India and Vietnam, must be shown clearly in the promotional tools with facts and objective figures. Therefore, the study team intends to prepare a list of contents to be required in promotional tools and materials to comply with the best practices of other countries for each of the three Economic Zones.

2.6.8 Opportunities to Coordinate with Other Promotional Agencies in Bangladesh

Many international organizations work with investment agencies to facilitate the exchange of the best practices on investment promotion strategies and assist in building capacity. These advisory services can be extremely useful in improving the effectiveness of investment promotion but should not divert attention from the broader policy environment in which the implementation agency operates.

In order to perform effective and timely investment promotion, we consider the establishment of an international investment promotion network to be crucial and we propose that BEZA join the OECD (Organisation for Economic Co-operation and Development) Investment Promotion Association - World Association of Investment Promotion Agencies (WAIPA). They should also make contacts with the other investment promotion offices, United Nations Industrial Development Organization (UNIDO), United Nations Conference on Trade and Development (UNCTAD), IFC, Multilateral Investment Guarantee Agency (MIGA), ADB and other international agencies dealing with investment promotion directly and indirectly. BEZA should also be able to establish good peer networks with bilateral investment promotion agencies such as JETRO, Trade and Development Agency (TDA), Malaysian Investment Development Authority (MIDA), Indonesia Investment Coordinating Board (BKPM), BOI of Thailand and Philippines etc. We consider this network would become a valuable resource for BEZA. JETRO has already shown a preliminary yet positive response to establishing a peer relationship with BEZA for investment promotion and marketing of EZs in Bangladesh and Japan.

A bilateral chamber of commerce would also provide an important and unique network for promotion of investment into Economic Zones. The Bangladesh German Chamber of Commerce & Industry is one of the active bilateral business and investment promotion agencies in Bangladesh and it has an investment promotional office in Berlin to promote investment from Europe to Bangladesh. The Nordic Chamber of Commerce and Industry (NCCI) is another chamber of commerce in Bangladesh,

which is also promoting investment from Nordic countries. Both chambers have shown interest in cooperating with BEZA on the promotion of European investors to Economic Zones.

Various organizations can assist BEZA, however, simply by joining a network does not guarantee that Bangladesh derives the full potential benefit. BEZA also needs to ensure that they have adequate funding and staff to make membership meaningful. Networks provide a variety of conferences, referral services, and best practice guides. Using these effectively requires that the agency dedicates staff to studying best practices and to reaching out to peers and policy advisors.

2.6.9 Investment Promotion is Different From the Textbook

Business marketing is, in reality, different from the general information found in textbooks. The competence required for business marketing is rather specific and unique depending on the nature of the individual enterprises and must also be comprehensive. The issues currently facing the investor for optimal operation in Economic Zones are mingled and interlinked with other issues. These range from resources management, logistics, manpower, materials, utilities, equipment or machines, manufacturing processes, customers, sales, claims, transports, cash, accounting to marketing, etc. There is a need to localise the real issues in the context of Economic Zones through exchange of information and interaction with executives of the prospective investment enterprises and sometimes employees. In this way, the real issues can be identified, confronted, and appropriately addressed with trouble-shooting measures in the content of marketing tools, with a demand-driven approach.

2.6.10 Implications

One of the objectives of formulating a marketing strategy for Economic Zones is to enable BEZA officials to understand the true nature of the business administration and operation of the zones and to demonstrate the findings and trouble-shooting mechanisms involved. Yet another aspect of the objective is to enable BEZA officials to provide tailor-made professional services to investor enterprises, utilizing the BEZA officials' own business administration knowledge, experience and network.

With the presence of an international and national investment promotion network which has rich experience in coaching and marketing services for private companies in other counties, it is important for BEZA officials to absorb the marketing skill and knowhow and become performers of on-site lively marketing and to gain confidence as a business marketing agency. Consequently it should be the ultimate aim after providing a marketing strategy, that BEZA officials have enough competence to perform marketing services for investor enterprises, in turn investor enterprises would recognize the value of their marketing service. In other words, recipient enterprises can be prospective clients for BEZA. Then the potential is there to create an investor-friendly environment in Economic Zones. Together with the mission approach of BEZA to extend their business administrative and operational capacity, the project can be regarded as a new venture for BEZA.

2.7 Marketing Strategy for Sherpur

The marketing strategy for the Sherpur Economic Zone, Sylhet, first provides a situation analysis. It then describes positioning to clarify the target market. Action programmes together with strategic policy alternatives are also presented.

2.7.1 Situation Analysis

This step provides an overall picture of Sylhet. Illustration of the region gives an understanding of the key characteristics of Sherpur Economic Zone to prospective investors. Sylhet has comparative advantages, as described earlier, in the availability of gas and other mineral resources, which include stone and sand materials and also its geographical location, situated next to the Northeast Indian states. This potential market has not yet been fully explored for Bangladesh products. Tea farming, which requires moderately cool temperatures, is also a unique characteristic of the region. Remittances from abroad and rather substantial deposits in commercial banks in the region are another feature. In the past, the key success factors in attracting investment into the region are shown to be gas exploration, power generation, ceramics and tea farming. However, there are relatively limited numbers of industrial development clusters and the level of agricultural production is not high compared with other districts. There seems to be a low level of interest in agriculture in the region. However, purchasing power in the region is higher than in the rest of the country. This phenomenon can be observed in the city, in the many shopping malls and cosmetics stores which attract middle-class customers.

The land price in the region is lower than in Dhaka or Chittagong. However, the long distance from the major hubs of industry and logistics is one of the constraints for investors to consider.

2.7.2 Positioning

Interviews and literature surveys suggest that the two most crucial factors for investors; now seeking expansion and relocation projects in Bangladesh, are large, economically priced and readily available areas of industrial land, together with a reliable source of power. The Sherpur EZ is able to offer both those two factors. It can also offer accessibility to market products in Northeast India, which is regarded as another attraction of the Economic Zone, enabling investors to have an additional production site for their diversification or expansion projects. The market demand for intermediate products (knitting fabric, woven fabric, thread, garment accessories, etc.) used for ready-made garments is consistently high. But for the manufacture of these intermediate products, a relatively large area of land and a stable power supply is critical. The provision of proper treatment of the industrial waste-water generated by the dyeing process is another focus of the dyeing industries in Bangladesh. This is particularly so, from the perspective of international buyers, as they expect a code of conduct. The food processing industry, consumer goods and construction materials such as tile and cement manufacturing industries, which need manufacturing bases located in close proximity to the market, find this location attractive. Furthermore, the relatively cool climate in Sherpur may attract horticulture industries such as tea farming, already established in the area.

Consequently, as a positioning statement for the Sherpur Economic Zone, we suggest the following.

- Sherpur Economic Zone aims to be the preferred diversification destination of a number of industries in relation to Dhaka and the rest of Bangladesh. The woven fabric and spinning industries both domestic and from overseas (Taiwan, China and Thailand) may consider this location for the manufacture of intermediate products for the ready-made garment industry. The dyeing industry may chose Sherpur Economic Zone to be its risk diversification destination in that environmentally sound industrial operations will be possible. This would appeal to the international buyers' code of conduct.
- Sherpur Economic Zone aims to attract food processing, consumer goods, and construction materials manufacturing industries, with provision of smooth and cost effective logistics for accessing markets.
- Sherpur Economic Zone will provide the most reliable power supply in the region.
- Sherpur Economic Zone will become the ideal bridge providing easy access between Bangladesh and the markets of North East India.

2.7.3 Strategic Policy Alternatives

A strategic policy alternative is regarded as a programme to describe and integrate the five strategic marketing attributes (product, positioning, target audience, scope of distribution, and scope of communications). Several such alternatives must be constructed for consideration by BEZA. BEZA needs to conclude the one mutually agreed strategic policy alternative on which a concrete action programme could be formed. The forthcoming policy advocacy and image building activities must comply with the positioning statement targeting certain potential investors.

Table 2.7.3-1: Evaluation Criteria to be used for Making Marketing Strategic Policy Alternatives

| Criteria | Positive norm | Negative norm | Marketing strategic policy alternatives |
|---------------------------------------|---|---|---|
| Land/Location | | | |
| ✓ Land | Relatively large area and economical valued industrial land is available | There is little presence of near-by industrial cluster/supporting industries | For investors, large amounts of land should be of attraction, also assembling industries are not a priority due to their having fewer linkages to local supporting industries |
| ✓ Location | Locating near to the north-east Indian market; and the large pool of capital in the region. | Rather long distance from ports as well as exiting major industrial hub | Market accessibility to North east India can be highlighted |
| Utility Service | | | |
| ✓ Power | Natural gas is available nearby, so gas-based power is an attraction. | There are no alternative energy sources; merely depending on natural gas reserves | Reliable power supply should be highlighted for investment promotion for the time-being. |
| ✓ Water | Industrial water can be taken from the river passing nearby the zone | Flood control measures must be properly installed | Accessibility to large volume of water is one of the strong points, together with adequate flood control and risk management measures. Both must be well presented. |
| ✓ Telecommunications | High speed data transaction capability is to be provided | No major negative parameter | Backup system of telecommunications should be highlighted. |
| ✓ Access | The zone is adjacent to the national highway | Access to river and railway transport are limited | Road connectivity and logistics channel must be well presented |
| ✓ Industrial waste water treatment | Internationally standard industrial waste water treatment plant is to be made available | No major negative parameter | The target market could potentially be Investors concerned about industrial waste water treatment. |
| Accessibility to raw materials | | | |
| Accessibility to Raw materials | Mineral resources like gas and sand materials are locally available | Petro-chemical intermediate products and agricultural raw materials are not locally available | Gas-based and sand material-based industries can be of target |
| Workers facilities | | | |
| ✓ Management | Shopping centres and high-rise | Rather remote area of living for management class and | Recreation facilities need to be offered for management |

| Criteria | Positive norm | Negative norm | Marketing strategic policy alternatives |
|--------------------------------|---|---|--|
| | apartments are coming up in the region | expatriates | class / expatriates |
| ✓ Factory workers | There are nearly 500,000 people in the region | Few labourers from Sylhet are working at labour-intensive factories in Bangladesh | Industries requiring little labour for factory operation can be a focus. |
| Business environment | | | |
| ✓ Licensing and administration | OSS shall in operation | Physical distance between central government in Dhaka is far | OSS should be properly functional and attractive to investors |
| ✓ Customs clearance | Customs office shall be open in the zone | Physical distance between central government in Dhaka and port in Chittagong is far | Satellite customs operation must be functional |
| ✓ Availability of finance | Fiscal incentive shall be granted for investors in the zone | Average interest rate for business is rather high in Bangladesh | Banking system in the zone may need to be relaxed |

Investment promotion agencies like BOI, BEPZA and BEZA should agree on a positioning statement and run integrated national marketing campaigns for targeted potential investors. Each agency should have coherent and clear information for investors to plan their investment decisions. All this must be done consistently within the national framework set by the Prime Minister's Office and other ministries.

As an example of the strategic policy alternative at Sherpur Economic Zone, the policy can be illustrated as follows.

The investment environment of Sherpur Economic Zone is positioned as the most ideal destination in Bangladesh for diversification and/or expansion, targeted to woven fabric, spinning, and dyeing factories investors as well as investors who are looking into market opportunities in North East India. Opportunities should be communicated in Bangladesh and ASEAN countries by workshops and seminars in Dhaka, Singapore, Bangkok, Taipei and Shanghai; advertisements in business newspapers, TV commercials and reportage on international broadcasting channels such as CNN; investment promotion website linked to websites of counterpart countries; and brochures distributed through current factory operators in Bangladesh. Investors can register their investments online or at the Bangladesh embassies in the respective countries, or at the investment representative office of Bangladesh in these cities. The Bangladesh government ensures that investors can commence investment projects in Sherpur Economic Zone within 45 days of the date of receiving applications. The Bangladesh government guarantees to effectively provide necessary utilities services and continues to improve the legal and business administration system and its offsite infrastructure.

2.7.4 Action Programs

Action programs should be designed with activities along with policies needed for attracting investors and tasks and responsibilities of implementation agencies should be specified. Policies must be clear, tangible, proactive and mutually-agreed among investment promotion agencies. The following table presents the necessary content of investment promotion action programmes for Sherpur Economic Zone.

Table 2.7.4-1: Investment Promotion Action Programs

| Part 1. Policy advocacy | |
|--|---|
| 1. Policy Advocacy | <ul style="list-style-type: none"> - Creating image on investment environment - Attaining political leaders supports - Organizing workshop for EZ development - Learning best practices from other countries from peer network |
| 2. Coordination and cooperation | <ul style="list-style-type: none"> - Establishing cordial relation with licensing authorities in both central and provincial government. - Streamlining the number of licenses required for newly invested projects - Reducing amount of time for processing business licenses - Having dialogue with Indian government for international trade and market potentials |
| Part 2. Image building | |
| 3. Image building measures | <ul style="list-style-type: none"> - Preparing investment brochure, video and website for Sherpur EZ in line with five strategic marketing attributes (product, positioning, target audience, scope of distribution and scope of communications) - Planning and proceeding media exposure of EZ development (newspaper, international business/industrial magazines, exhibition screen at airport and etc.) - Building constructive relationship among enterprises, organizations, and governments - Organizing and attending overseas investment seminars and forums - Developing proactive investment promotion peer network |
| Part 3. Investor servicing or facilitation | |
| 4. Investment service measures | <ul style="list-style-type: none"> - Coordinating policy dialogue between policy makers and businesses - Making business directories of private companies like names, business field, address of office, person directly involved in, products list and future business plan for business match-making - Conduct coordinating with local and international financial entities - Providing and improving business support facilities - Assisting investors for acquiring licenses |
| Part 4. Targeting investment generation | |
| 5. Investment generating measures | <ul style="list-style-type: none"> - Focusing on investors who are already in Bangladesh, - Meeting with target audience set forth in strategic policy alternative |
| 6. Representative offices of other countries and international organizations in Bangladesh | <ul style="list-style-type: none"> - Disseminating EZ development through representative offices in other countries and through international organizations in Bangladesh, with bilateral chambers of commerce |
| 7. Overseas offices of Bangladesh organizations and bodies | <ul style="list-style-type: none"> - Identifying business and industrial trends through dialogue with international investors who can be accessible through overseas offices of Bangladesh organizations and bodies (Information to be collected would be names, functions, head of office, person directly involved in FDI, current cooperation, direction for future coordination) |
| Part 5. Funding | |
| 8. Fund generation and allocation measures | <ul style="list-style-type: none"> - Conduct coordination with Prime Minister's office together with Ministry of Finance for budget allocation for activity implementation and for collaborative organizations networking |
| Part 6. Regular evaluation | |
| 9. Measurement and adjustment by implementing organization | <ul style="list-style-type: none"> - Consulting with BOI, BEPZA, Prime Minister's Office and other related ministries for criteria, results, causes of successm and failure - Conducting survey of newly emerging factors and conditions and supportive tools to be continued |

Timeline of marketing activities is proposed below to comply with the project schedule of Sherpur EZ project.

Table 2.7.4-2: Timeline of Marketing Activities

| Project Schedule | 1. Policy Advocacy | 2. Coordination and cooperation | 3. Image building measures | 4. Investment service measures | 5. Investment generating measures | 6. Representative offices of other countries and international organizations in Bangladesh | 7. Overseas offices of Bangladesh organizations and bodies | 8. Fund generation and allocation measures | 9. Measurement and adjustment by implementing organization |
|------------------|----------------------|--|---|--|--|---|--|---|--|
| 1Q 2014 | Detail Design | Organise dissemination workshops at Dhaka on EZ development and operation among related lined ministries and department | Establishing cordial relation with licensing authorities in both central and provincial government. | Having dialogue with representatives of bilateral chamber of commerce in Bangladesh to understand business trend and prospects on EZ development and operation | Coordination of policy dialogue between policy makers and businesses | | | | Consulting with BOI, BEPZA, Prime Minister's Office, and other related ministries for marketing activities |
| 2Q 2014 | | | | | | | | Funding and allocation for marketing activities for a fiscal year | |
| 3Q 2014 | | | | | | | | | |
| 4Q 2014 | | Organize international training trips to other ASEAN or European countries to learn the best practices of marketing activities | Streamlining number of licenses required for newly invested projects | Planning and proceeding media exposure of EZ development | Development and opening of web site on EZ development and operation | | Dialogue with international investors to identify business and industrial trend | | Conducting survey of newly emerging factors, and conditions and supportive tools to be |
| 1Q 2015 | Construction Phase 1 | | | | | Organise meetings with individual target audience set forth in strategic policy alternative | Dissemination of EZ development and operation among overseas representative offices of Bangladesh like embassies | | |
| 2Q 2015 | | | | | | | | | |
| 3Q 2015 | | | | | | | | | |
| 4Q 2015 | | Organize international training trips to other ASEAN or European countries to learn the best practices of marketing activities | Opening of one stop window desk at BEZA, Dhaka | Material preparation of marketing (power point presentation, image video, brochure, booklet of investment market information) | Assisting investors for acquiring licenses | | | | |
| 1Q 2016 | | | | | | | | | |
| 2Q 2016 | | | | | | | | | |
| 3Q 2016 | | | | | | | | | |
| 4Q 2016 | | Organize international training trips to other ASEAN or European countries to learn the best practices of marketing activities | | Developing proactive investment promotion peer network | | | | | |
| 1Q 2017 | Construction Phase 2 | | | | | | | | |
| 2Q 2017 | | | | | | | | | |
| 3Q 2017 | | | | | | | | | |
| 4Q 2017 | | Organize international training trips to other ASEAN or European countries to learn the best practices of marketing activities | Development and operation of electronic single window application submission system | | Providing and improving business support facilities | | | | |
| 1Q 2018 | | | | | | | | | |
| 2Q 2018 | | | | | | | | | |
| 3Q 2018 | | | | | | | | | |
| 4Q 2018 | | | | | | | | | |

2.7.5 Promotional Tools and Materials

In the promotional tools and materials for Sherpur Economic Zone, the following data and information set are expected to be integrated.

Table 2.7.5-1: Proposed Contents of Promotion Material for Sherpur EZ

| Products (Investment environment) | |
|---|---|
| ✓ Message from <i>Hon'ble</i> Prime Minister | ✓ Message from <i>Hon'ble</i> Minister of Finance |
| ✓ Message from <i>Hon'ble</i> Minister of Industry | ✓ Message from <i>Hon'ble</i> Minister of Commerce |
| ✓ Message from Executive chairman of BEZA | |
| Positioning, | |
| ✓ Characteristics of Sherpur EZ | ✓ Land use / plan |
| ✓ Price of land in comparison with other rival SEZs in Asia | ✓ Comparison chart with other rival countries SEZs - the total cost and time required for approvals of business licenses and permits |
| ✓ Distance and location between access to major logistics centres (major cities, port and airport) | ✓ Incentives to be considered - system of investment incentives; tax concessions and customs duty waivers; work permits for foreign senior staff and technicians |
| Target Audience | |
| ✓ Industrial growth outlook of textile/garment sector in Bangladesh | ✓ Economic and market outlook of North east India |
| ✓ Electric power and water development prospect | ✓ Specification description of wastewater treatment plant |
| Scope of services | |
| ✓ Application procedure - The number and details of procedures for establishing a new investment project | ✓ Time framework of the procedure - Average length of time required to complete a process |
| ✓ General payment terms | ✓ Permits from national and sub-national governments |
| ✓ Utilities specification - electric power; water; telecommunications; wastewater treatment; access road | ✓ Function of OSS - Provision of enquiry point for information regarding the administrative procedures required to establish a new investment |
| ✓ Utilities unit price indicators | ✓ Business support facilities - including availability of social and recreation facilities; Provision of assistance/support for new investors if they are faced with difficulties during this process |
| ✓ Process of EIA - environmental impact assessments and agreements on mitigating and monitoring environmental impacts | ✓ Labour availability - Various facets of labour law and pension provisions |
| ✓ Land titling process - Approvals to purchase or lease land or change the zoning restrictions on use of particular pieces of land | ✓ Foreign exchange regulation or restrictions on capital and dividend repatriations |
| ✓ Insurance regulations for transported goods | ✓ Dispute resolution systems |
| ✓ Investor's voice feedback system - Mechanism of integrating investor's complaints into the proposal or advocacy for reform | |
| Scope of Communications | |
| ✓ Contact address of BEZA | ✓ Contact address of Steering Committee - Hotline in the investment agency for registering complaints by established investors |
| ✓ Contact address of other business related ministries and agencies - Cooperation mechanism with other relevant state agencies to address investor's complaints | ✓ Website platform information - Website and interactive platform between investment agency and investors |

2.8 Employment Assessment

The number of employment in Sherpur has been estimated using the average employment per hectare of the existing industries in Bangladesh. Based on the planned land use of Sherpur, the estimated employment created will be 25,446 workers when the proposed Sherpur EZ is fully occupied. Once the 25,446 jobs are created in the Sherpur area, an additional 12,723 indirect jobs (about 50% more) are likely to be created in the Sherpur area mainly various services such as transport, retail, health, food, and housing services. The total number of jobs, counting both direct and indirect employment, may reach 38,169 workers. Average employment per hectare is expected to reach 287/h, which is less than half that of Dhaka EPZ and 3/5 of Chittagong EPZ.

Table 2.8-1: Employment Estimate for Sherpur Economic Zone

| Industry & Commercial Zone | Land Area (Ha) | Employment - jobs/ha* | Employment Created |
|---------------------------------------|-----------------------|------------------------------|---------------------------|
| Integrated Textile | 17.3 | 400 | 6,920 |
| Ceramics | 14.85 | 350 | 5,198 |
| Pharmaceuticals | 30.98 | 200 | 6,196 |
| Paint | 4.76 | 300 | 1,428 |
| Food Processing | 17.77 | 250 | 4,443 |
| Rental Factory | 2.19 | 500 | 1,095 |
| Commercial Zone | 0.83 | 200 | 166 |
| Total | 88.68 | 287 (Average) | 25,446 |

Source: WB Study Team

* estimated from the Bangladesh Industry Examples from demand survey

We have checked the Bangladesh employment condition of existing EPZ and fund out that due to the limited number of EPZ/Industrial Parks in Bangladesh, occupying factories are economizing on space. As a result, employment figures are much higher than other countries in South East and South Asia. Taking into account the special condition of Bangladesh, we estimated employment based on the final Master Plan and type of industries.

Table 2.8-2: Average employment of existing EPZ and Proposed Three EZs

| EPZ | Total Are (ha) | Employment (2013) | Jobs/ha |
|----------------|-----------------------|--------------------------|----------------|
| Dhaka EPZ | 142.48 | 88,536 | 621 |
| Chittagong EPZ | 183.37 | 186,064 | 1,014 |
| Comilla EPZ | 108.28 | 14,966 | 138 |
| Karnaphuli EPZ | 83.6 | 41,659 | 498 |
| Sherpur EZ* | 88.68 | 25,446 | 287 |
| Anwara EZ* | 431.42 | 47,539 | 110 |
| Mirershore EZ* | 1705.33 | 476,678 | 280 |

Source: WB Study Team * proposed estimation.

Sherpur and Mirershore EZ would have 287 employed people per hectare and 280 employed people per hectare respectively - still well below the Dhaka and Chittagong EPZ. Anwara EZ would be more specialized in shipbuilding & related industries. Therefore, the employment per hectare is a bit lower at 110 employed people per hectare upon reaching its full occupation and mature stage of development (10 to 15 years into the future).

2.9 Transport Assessment

Sandwiched from three sides by India on the North, West, and partly on the East, and, sharing a 193 Km border with Myanmar, Bangladesh has 4,246 Km of land border. To the south is the Bay of Bengal with 580 Km of coastline. There are 2 ports handling international traffic, namely the Ports of Chittagong and Mongla, with Chittagong handling the majority of Ex-Im trade. In the year 2011-2012, Chittagong port handled over 41 million tons of cargo including 1.34 million Twenty Feet Equivalent Units (TEUs) - approximately 92% of the total maritime trade of Bangladesh.

To facilitate economic growth, an efficient transportation system is essential. This chapter discusses the various modes of transport for carrying goods from/to the Sherpur EZ. Each mode of transport is described below separately and in the last section. Transportation of goods using a multimodal transport platform is detailed not only in terms of the operation of the current system, but consideration has been given to include the future projected developments in the nation's transport sector.

Constraints of the present transportation system are addressed, specific to the sectors - road, waterways, air, and gateway port, and recommendations regarding infrastructure needs are made. Bangladesh's position in trade connectivity and its position as per Doing Business 2013 is analysed.

Since the study team is proposing a rail based Inland Clearance Depot (ICD) at Sreemangal Railway Station, the layout along with the associated costs is also described in detail. International Multimodal Transport concepts, advantages, systems, platforms and its relevance to Bangladesh are also described in the following pages. It is relevant to note here that the concept of ICD has been localized in Bangladesh, whereby ICD generally refers to Inland Container Depot as the Dhaka (Kamlapur) ICD that handles containerized rail traffic and the term ICT (Inland Container Terminal) is referred to a river port handling containers (as the Pangaon ICT).

2.9.1 Current Status of Different Modes of Transport in Bangladesh

Roads

Road transport is the dominant mode of transport for carriage of freight and passenger traffic. Bangladesh has about 1.5 million motorised and over 3 million non-motorised vehicles²¹¹. Out of the motorised vehicles about 65% are 2 & 3 wheeler vehicles and the rest are vehicles of different categories as cars, jeeps, buses, trucks, pick-ups, etc. The number of vehicles is steadily increasing along with the increase of road mileage. Traffic on Bangladesh roads is characterised by the presence of both motorised and non-motorised vehicles plying on all roads creating serious traffic congestion. The road network in the country is bisected by water courses. Bridges and ferry systems are provided to maintain the traffic flow on the road network. Bangladesh has about 40,344 Km of paved roads and all the ports and important centres are connected by road.

There are 98,928 trucks; 3,422 tankers; 250,984 private passenger cars and 31,991 buses registered in Bangladesh.²¹² (Up-to October 2013). About 30% of trucks run on CNG (mostly for shorter distances deliveries) and 70% on diesel. Petrol vehicles have the option of switching from CNG to petrol, as and when required, but the trucks can only use either CNG or diesel. The price of diesel is BDT 68.6 per litre; petrol BDT 95 per litre and CNG Tk30 per cubic metre (as of November 2013).

²¹¹ <http://www.unescap.org/ttdw/common/Meetings/TIS/EGM-Roadsafety-2011>Status/Countries/Bangladesh-Add-Info-1.pdf>

²¹² http://www.brsa.gov.bd/images/files/bangladesh_1.13-10.13.pdf

Railways

Bangladesh Railways is the state-owned rail transport agency of Bangladesh. It operates and maintains the entire railway network of the country. BR is controlled by the Directorate General of Bangladesh Railways under the Ministry of Railways along with Bangladesh Railway Authority (BRA) which works for the policy guidance of BR.

Key features of BR include the coexistence of several gauges, broad gauge, metre gauge, and dual gauge and the separation of the system by the Jamuna River (Brahmaputra) into a Western and Eastern Zone of operations with only one bridge - the 2003 Jamuna Bridge - connecting the two zones. Bangladesh Railways employs 34,168 people. BR operates international, inter-city, and suburban rail systems on its multi-gauge network. It also owns coach production facilities.

Bangladesh Railways had a total of 2,877 route Km as of the end of 2011-2012. The East Zone has 1,273 route Km of MG and 35 route Km of DG track; and the West Zone has 535 route Km of MG, 659 route Km of BG and 375 route Km of DG track. The total length of running track including track on double line, in yards and sidings is 3,976 Km²¹³. The country is divided into East and West Zones by the Jamuna/ Meghna River for railway demarcation.

In the Eastern Zone, 8 goods trains are placed in the circuit, out of which 4 dedicated trains, used for carrying containers, are placed in the Dhaka – Chittagong Container circuit (called Container Express trains); and 4 Tank Special Trains between Chittagong Port Yard and Sylhet, Sreemangal, Parbatipur and Dhaka Cantonment. In the Western Zone, 7 Express Goods trains are serving various inland destinations between Khulna – Parbatipur; Darshana – Ishwardi; Khulna – Ishwardi; Noapara – Darsana; Ishwardi – Santahar; Santahar – Parbatipur; and Ishwardi Rohanpur. All these trains follow a fixed schedule²¹⁴ as detailed in the annex.

In the Container Express trains running between Chittagong and Dhaka, 32 wagons are attached to the locomotive, and the route takes about 12 hours. There is always a backlog load of import containers from Chittagong to Dhaka.

Railways Expansion and Modernisation Projects

Under the Line of Credit (LoC)²¹⁵ from the Government of India, the following railways equipment is being procured for expansion, upgrade and modernisation of the Bangladesh Railways. The current status and price is given below for reference.

- i. 180 BG tank wagons and 6 brake vans (US\$ 17.38 million) - procured
- ii. 50 MG flat wagons and 5 brake vans for carrying containers (US\$ 2.9 million) -procured
- iii. 10 BG diesel locomotives (US\$ 21.29 million) - procured
- iv. 81 MG tank wagons and 5 brake vans (US\$ 7.43 million) - procured
- v. 170 MG flat wagons and 11 brake vans for carrying containers (US\$ 9.49 million) – transaction to be completed by April 2014
- vi. 30 BG diesel locomotives (US\$ 60.95 million) – to be completed by April 2014

Besides the above, contractors have been appointed for construction of a Dhaka – Tongi Rail Line, a Khulna – Mongla Port Rail Line, and a 2nd Bhairab and 2nd Titas Bridges with approach rail lines.

²¹³ Bangladesh Railway – Information Book 2012

²¹⁴http://www.railway.gov.bd/good_tsraint_schedule.asp.

²¹⁵ Excerpts from “Contract for all 13 projects under LoC awarded “- Financial Express, 22nd November 2013

Air

Bangladesh has three International airports (Hazrat Shahjalal International Airport in Dhaka, Shah Amanat International Airport in Chittagong and Osmani International Airport in Sylhet). Hazrat Shahjalal International Airport is the principal airport of the country. In addition, there are 12 domestic airports out of which 5 are operational at Cox's Bazar, Rajshahi (Shah Makdum), Jessore, Saidpur and Barisal. Regular international flights from South, East and South East Asia, the Middle East and Europe are directly connected to Bangladesh by 17 International Airlines.

There are regular flights from these airports to international destinations world-wide. Domestic air travel is served by Biman Bangladesh Airlines, Novo Air, GMG, United Airways connecting with Jessore, Cox's Bazar, Rajshahi, Saidpur and Barisal, Ishwardi and Tejgaon.

All of the top ten international routes are served by at least two carriers with the Kolkata market particularly competitive as all three Bangladeshi carriers are joined by Air India Express, Jet Airways. Low-cost airlines have a presence at the airport - such as Air Asia, one of five airlines serving Kuala Lumpur, and, Air Arabia that operates a daily flight to Sharjah. Other carriers operating at the airport include Afriqiyah (to Tripoli), China Eastern (to Kunming), China Southern (to Guangzhou), Druk Air (to Bhutan), Etihad (to Abu Dhabi), Gulf Air (to Bahrain), Malaysia Airlines (to Kuala Lumpur), PIA (to Karachi), Qatar Airways (to Doha), Saudi Arabian (to Dammam, Jeddah and Riyadh), Singapore Airlines (to Singapore) and Thai Airways (to Bangkok). Analysis of the schedule data for Dhaka airport reveals that Dubai is the busiest route with Emirates offering 17 weekly departures. Biman Bangladesh, GMG Airlines and United Airways Bangladesh also serve this route. United Airways' flights continue on to London Gatwick.²¹⁶

Hazrat Shahjalal International Airport in Dhaka is designed to handle 8 million passengers per year. The airport handles about 99.5% of all import and export load and about 6 million passengers every year. This airport has a dedicated cargo terminal (known as cargo village) with a floor area of 200,000 sq. ft. managed by Biman Bangladesh Airlines. Almost all of the air freight shipments destined for/from Bangladesh arrive/depart at/from this terminal. (Refer to the box below for excerpts on the Cargo Village).

Excerpts from The Bangladesh Monitor on Cargo Village, HSJIA

The freight side of the aviation industry has over the years, assumed great importance, because of its significant contribution to the profitability of the airlines. The future of market potential of airfreight is also considered to be really great. In Bangladesh the rate of growth is comparatively very healthy. Hazrat Shah Jalal International Airport (HSJIA, Dhaka) is virtually the only airport, handling entire volume of air freight through international passenger flights and some scheduled and chartered freighter flights. This only gateway of the country this far-- is achieving nearly double digit growth every year on an average - 7.77 per cent between 1991 and 2005. In 2006-2007 HSJIA handled 69,302 tons of export cargo.

In 2007-2008 the volume increased by 68.33 per cent to 1, 16,660 tons. Due to global recession, the volume of cargo increased to 1, 21,127 tons in 2008-2009-- a growth of modest 3.82 per cent. With import air cargo of 48,738 tons, HSJIA handled 1.69,865 tons of cargo in fiscal 2008-2009.

Market share

Of the total export air cargo in 2008-2009, Biman enjoyed a market share of only 16.74 per cent. It was followed by Saudi Arabian Airlines with 13.88 per cent; Emirates with 12.40 per cent; Qatar Airways 9.07 per cent; Etihad with 8.91 per cent and all other carriers 39 per cent. Of the imported cargo Biman carried only 7.75 per cent and the rest 92.25 per cent was carried by foreign airlines.

²¹⁶<http://www.anna.aero/2010/04/07/bangladesh-airport-and-airline-begin-2010-with-new-name-and-look/>

Poor Ground handling

It may be recalled that Biman Bangladesh Airlines Ltd. is providing Ground Handling facilities in the entire airport in Bangladesh and to all the airlines since 1972. It is enjoying monopoly to handle both passenger and cargo-- operating on commercial basis.

Until 2003 Dhaka airport was serviced by passenger aircrafts. Cargo was sharing belly capacities with passenger baggage. There was no scheduled freighter operation to and from Dhaka. During peaks some shippers and freight forwarders used to bring chartered freighters to help exporters save from cancellation damage.

In recent year's capacity situation from Bangladesh has witnessed significant improvement due to increase in frequency of foreign airlines and resulted in significant boost of belly hold capacity as well as operation of scheduled freighters by a number of airlines. Saudi Arabian Airlines is operating twice weekly Boeing 747 freighter with 110 ton capacity each. Emirates operates thrice weekly freighter with 40 ton each. Etihad and Qatar also operates freighter similar to Emirates-both in frequency and capacity. British Airways, Singapore Airlines and Malaysia Airlines operate once a week freighter with 40 ton capacity each. Cathay Pacific operates twice weekly freighter with 110 ton capacity each. The freighter operation of Air France is now suspended. In addition there are non-scheduled chartered freighters serving air cargo sector in Bangladesh

Apart from lack of modern cargo handling facility, the cargo complex is also suffering from shortage of critical equipment. The pallet build-up area is insufficient. There is no stack yard for container. There is no dedicated space for build-up cargo.

With no infra-structure, logistics and adequate proper equipment, Biman as a ground handling agent is facing tremendous problems. The working condition is bad-very bad indeed. There is acute shortage of space. The entire cargo complex is in a mess. Due to inadequate waiting space at Cargo Complex, before handing over to airlines, shipments are kept under open sky exposed to sun and rain.

Sometimes, even that open space becomes insufficient. Theft and pilferages are rampant at cargo complex. Shippers and forwarders are the ones paying claims for such pilferages or losing business.

As the ground handler, the national flag carrier is earning solid revenue from cargo operation. Biman earned BDT 207 crore in 2005-2005; BDT 243.06 crore in 2005-2006; BDT 230.03 in 2006-2007; BDT 258.12 crore in 2007-2008 and BDT 298.02 crore in 2008-2009. The actual revenue earnings in all these years are much higher than the target.

Despite ever growing substantial income, the condition in cargo complex has remained bad-real bad in terms of working conditions and proper handling of cargo.

Source: The Bangladesh Monitor, Nov 16 -30 (Volume: XXIII, Issue No. 07)

Inland Waterways

Bangladesh has one of the largest inland waterway networks in the world. Situated in the lower end of 3 great rivers namely the Brahmaputra, the Ganges, and the Meghna, Bangladesh is situated in a flood plain criss-crossed by a network of several rivers and their tributaries. About 800 rivers including tributaries flow through Bangladesh making it a riverine country. A network of important rivers of which the Padma, the Jamuna, the Teesta, the Brahmaputra, the Surma, the Meghna and the Karnaphuli and their 230 tributaries constitutes around 24,140 Km. Total inland navigational area is about 24,000 Km varying during the monsoon (5,986 Km) to dry season (3,865 Km)²¹⁷. Navigability of rivers in Bangladesh has been deteriorating over a long time. The withdrawal of water beyond the border and within Bangladesh for irrigation and other purposes has resulted in decreased navigability of rivers during the dry season resulting in gradual channel decline.

²¹⁷<http://cmsdata.iucn.org/downloads/navigation.pdf>

The river network connects almost all the country's major cities, towns and commercial centres. Moreover, being cheap, safe and environmentally friendly, inland water transportation is often the only mode that serves the poor, proving especially useful during periods of widespread flooding.²¹⁸ The third port, Paira Seaport, was inaugurated by the Prime Minister on 19th November 2013. It is on Rabnabad channel, which is 31 Km from the sea boundary, 316 Km from Chittagong, 130 Km from Mongla port and 340 Km from the capital. This port will have a draft of 8 -10 m when in operation.

Currently, container feeder service is available from Chittagong Port to Port Klang (daily); Port of Singapore (daily); and Colombo Port (every 2-3 days) for connecting the mother vessels serving international destinations. More than 5 feeder vessel operators with vessels capacity of 1,000 -1,500 boxes (containers) have deputed their feeder vessels in this circuit. The transit time is about 3-4 days from /to Chittagong Port to the hub ports. All international Shipping Lines have their presence in Bangladesh and some even operate their own feeder vessels.

Chittagong Port mainly handles food grain, cement clinker, sugar, salt, fertilizer, general cargo, iron materials, chemicals, coal, and edible oil etc., as import commodities and readymade garments, knitwear, fertilizer, jute & jute products, hides and skins, tea, naphtha, molasses, and frozen foods etc. make up the general export.

Due to the steady growth in traffic volume, Chittagong Port performs well on the financial front. It is financing its 3rd Port development project at Paira Bandar with its own resources. Statistics of Cargo handled at the Chittagong Port is given in the annex.

In addition to the Pangaon ICT, the Government of Bangladesh granted approval to establish a container port on the bank of the Meghna River in Narayanganj District to the Ananda Group in November 2013. It will be the fifth inland container terminal (ICT) in the private sector. Approvals for establishing ICTs have already been granted to the Rupayan Group, Kumudini Welfare Trust, AK Khan and Company and Cemcor. Meanwhile, the Ministry of Shipping, GoB, is finalising a draft of guidelines for establishing ICTs under private sector investment²¹⁹.

2.9.2 Existing Conditions of Sherpur

Roads

Sherpur EZ is connected with all the major locations of Bangladesh by road. The EZ site lies on the Dhaka – Sylhet national highway. It is spread on both sides of the 7 metre bitumen road and is below the road level. Currently this highway is catering to passenger buses and trucks destined for Northern Bangladesh. A small bridge on the highway bifurcates the two sides of the site. It is about 20 Km to the nearest town of Maulvibazar (district headquarter) and about 25 Km from the Upazila headquarters and about 35 Km from Sylhet. Dhaka lies at a distance of about 208 Km from this point. Chittagong Port is about 435 Km from this site.

²¹⁸<http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/SOUTHASIAEXT/EXTSARREGTOPTRANSPORT/0,,contentMDK:20674801~menuPK:868784~pagePK:34004173~piPK:34003707~theSitePK:579598,00.htm>

²¹⁹ Ref to article in the Financial Express of 21st November, 2013: Ananda Group gets approval for building container port.



Bridge on the highway separating the 2 sides of the Sherpur EZ

Rail

There are two railway stations near the EZ site – Sylhet Station (35 Km from the site) and Sreemangal Station (43 Km from site). Sylhet Station is crowded and does not have adequate land for developing any new facility. Sreemangal Railway Station, on the other hand, is catering to the passenger traffic arriving mostly from Dhaka (south) and Sylhet (north). A field visit to Sreemangal Railway Station was undertaken and it was observed that there is scope for developing a small Rail Terminal (ICD - Inland Clearance Depot) at the Railway Station as land is available on both sides of the Railway Station (Discussed in detail at the end of this chapter).

The current train schedule for trains in Sreemangal is given in the annex. Every week, 5 Express and 12 Intercity Trains are originating from Sreemangal RS (on different days) destined for Sylhet, Dhaka and Chittagong. Travel time from Sreemangal to Sylhet is about 2.5 hrs; to Dhaka is about 5 hours and to Chittagong is about 8 hours for passenger trains. There are 2 “Tank Special” trains arriving from the Chittagong Port Yard. One is destined for Sylhet in transit through the Sreemangal RS and the other one destined for the Oil depot located inside the Sreemangal RS. These “Tank Special” trains carry fuel for the Northern Eastern area of Bangladesh.

Air

Osmani International Airport in Sylhet is about 55 Km from the site. There are direct passenger flights from Dhaka to Sylhet operated by domestic airline companies Novo Air, Regent Airways, United Airlines and Biman Bangladesh Airlines. International flights operated by Biman Bangladesh Airlines operate between Sylhet and Abu Dhabi, Doha, Dubai, London and seasonally to Jeddah. At present, no freight services are available.

Inland Waterways

The closest navigable river to Sherpur EZ is the Kushiyara River located at about 1.5km from the proposed EZ. But due to reasons mentioned below, this is not proposed as a potential site for river transportation. Alternatively, the Ashuganj River Terminal (discussed below) is proposed and it is about 108 Km from the proposed EZ by road. This terminal could be used like the Pangaon Container Terminal (ref to meeting minutes with BIWTA of 29th August provided in the annex).

Reasons for not proposing the Kushiyara River Jetty Port

1. The river is not navigable throughout the year. It can ideally be used in the wet season only (i.e. from June/ July – August/ September). Hence for the rest of the year, cargo/container transport has to depend on other means for evacuation and delivery from/to the Chittagong Port for catching the main line vessels. This temporary seasonal arrangement for river transportation is not viable to the industry.

2. Even if dredging is viable and undertaken, the cost of maintenance of channels comes to about US\$7-8.5 million per year based on preliminary assessment. This huge investment for catering to limited cargo movement operation may not be economically feasible.
3. The limitation of navigation times, i.e. not being able to navigate at night and only day time navigation possible, makes the cargo delivery susceptible to delays as the vessel carrying containers/ cargo have to be detained for the night and sufficient berth space for berthing as well as security at the berthing jetty needs to be organised.
4. Pilots have to be used for escorting and guiding the vessels in the river channel that is time consuming with direct impact on the cost of river transportation.
5. Alternatives are available for cargo evacuation – by road directly to Dhaka ICD or to Chittagong.
6. Under Bilateral Agreement, the Government of India, Ministry of External Affairs, is conducting a Feasibility Study for developing the Ashuganj River terminal (discussed below). WAPCOS, a consulting company of India is assigned to undertake this study. The detailed feasibility study is to be completed by the end of 2013. This river terminal is about 108 Km from the Sherpur site by road. This could be another alternative in the long run when the cargo volume increases and the transit jetty becomes operational.
7. The physically ready Pangaon Container Terminal could also be used for cargo evacuation from the Sherpur EZ. Containers could be loaded on trucks/trailers and transported to the Pangaon River Port and thereafter on board to Chittagong.

It should be of relevance to point out here that the government of India has provided 27 acres of land next to the BIWTA terminal for developing it into a multipurpose transit terminal for handling all types of cargo including containers. On the day the team visited the site, the study team was informed that one transit ship load of fly ash was delivered via Zakiganj (Bangladesh side) to Karimganj (Indian side) on a 240 ton vessel that took 4 days for delivery from Ashuganj to Karimganj (refer to minutes of meeting at Ashuganj on 9th September in the Annex-3 (Section 3: Transport Assessment).

2.9.3 Potential Opportunities for Using Riverine Routes for Cargo to/from the Sherpur EZ

Ashuganj River Terminal

Ashuganj River Terminal (ART) is located at about 108 Km from Dhaka and about the same distance (100 Km) from the Sherpur EZ on the Meghna River. Meghna River is about 1 Km wide at Ashuganj. This terminal is classified as Class – I River terminal by the BIWTA²²⁰ (i.e. Operational -round the year with minimum draft of 12 ft. to 13 ft.). BIWTC²²¹ is the other government authority entrusted with providing a transport fleet (barges, ferries, cargo and passenger vessels etc.) to serve the passenger and cargo traffic within the waterways of Bangladesh.

This terminal could be used like the Pangaon Container Terminal (River Port located about 25 Km from Dhaka) that the Chittagong Port Authority (CPA) has developed in joint venture with Bangladesh Inland Waterways Transport Authority (BIWTA).

²²⁰ Bangladesh Inland Waterways Transport Authority (BIWTA): The apex body for operation and management of inland river ports, jetties and the government body handling domestic and transit traffic on behalf of the Government of Bangladesh.

²²¹ Bangladesh Inland Water Transport Corporation:



Stakeholders meeting @ BIWTA before visit to ART



Meghna River Bridge at Bhairab



Access Road to ART



Truck loading of bagged Fertilizer @ ART



Imported Fertilized covered with tarpaulin



Bridge over Meghna River



Earmarked Area for Transit Terminal (27 Acres) to be developed by Government of India



Bricks being unloaded @ART



Jetty construction work @ART



Loaded barge crossing the Meghna River



Proposed area for Transit traffic

Currently, BIWTC has a fleet of 205 vessels and new orders for 6 additional vessels have been made (refer to the meeting memo with BIWTC of 10th September, 2013). Among the 6 vessels ordered, 4 are container carriers of 158 TEU (each) capacities and scheduled to be placed in the Pangaon – Dhaka/Mongla container transportation circuit.

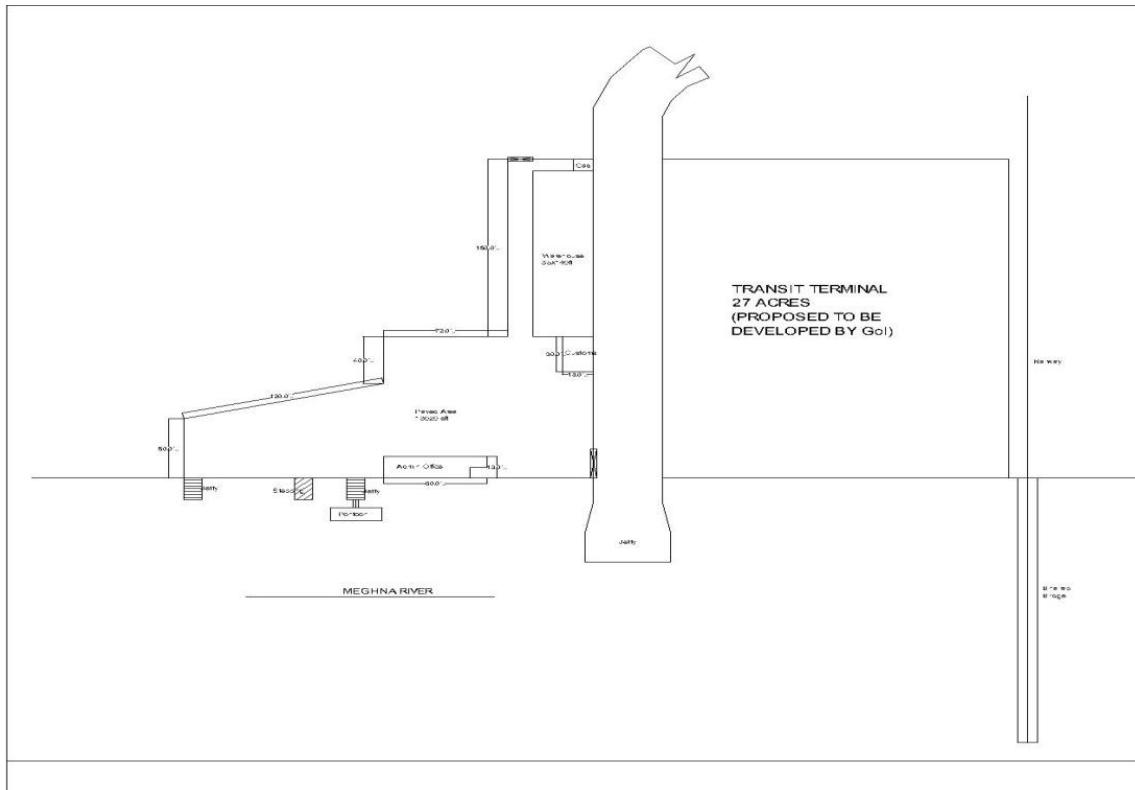
Chittagong Dry Dock and Khulna Shipyard (both Government owned Ship Building entities) have been entrusted with this order of 2 ships each. In addition, during discussion with the Chittagong Port Authority, the consulting team was informed that CPA has placed order of 2 x 108 carrying capacity vessels in China which was scheduled to be delivered in September 2013 and thereafter CPA/Mongla to Pangaon container transportation by river shall commence. It is relevant to mention here that Pangaon river terminal is ready for operation since July 2013, awaiting container vessels to be placed in this circuit. Hence this circuit shall have 6 vessels with a total carrying capacity of 532 TEU.

Bangladesh has 683 Km of Class – I waterways (11%) ; 1000 Km of Class – II waterways (7ft to 8ft:17%); 1885 Km of Class – III waterways (5ft- 6ft : 32%) and Class – IV (less than 5ft :40%).

The draft in the wet season at the Ashuganj River Terminal is about 35ft – 40ft and decreases to about 18' in the dry season. Currently the terminal is catering to about 2 ships of 2000 – 2500 MT loads per day consisting of bagged fertilizer, bagged wheat, bagged cement, stone chips, coal etc. The terminal is handling about 200 trucks each day loading and despatching cargo to various inland destinations.

BIWTA has started construction of the terminal consisting of a Jetty (80ft x 45ft: 95% construction work complete), a road inside the terminal 22ft x 2,200ft, a surface layer of cemented blocks (started), and has earmarked an area for office rooms (60ft x 18ft), warehouse (35ft x 140ft) and a paved area of 13,020 sq. ft. This development is scheduled to be completed within next 6 months (Refer to layout map given below).

Figure 2.9.3-1: Layout of Transit Terminal with Jetty



Layout of Ashuganj River Terminal

This transit terminal is proposed to be developed with the assistance of the Government of India. This terminal is proposed to carry transit cargo to the North Eastern States of India through Zakiganj (Bangladesh) – Karimganj (India) river route. Currently it takes about 4 days to reach Karimganj from ART as there is no night navigation facility (day navigation: 06:00 AM – 06:00 PM).

Ashuganj River Terminal is the last of the Class – I classified river terminals north of Dhaka on the river Meghna (upstream) that is closest to accessing the Indian side. It is proposed that large vessels shall carry bigger loads up to this terminal, unload and then return. From here onwards, smaller vessels will carry cargo to Karimganj and then onwards inside the Indian Territory. There are a few choke points (with less draft) between ART and Zakiganj as under:

- Elenjuri – draft 3ft
- Dhaki – draft 2.5ft

- Katakhal – draft 3ft
- Sherpur – draft 3ft
- Beani Bazar – draft 3ft
- Loharmul – almost dry

On enquiry, it was found that the current rate of river freight of that cargo originating from Kolkata Port, India is:

- ✓ Kolkata to Dhaka: US\$ 13 per ton.
- ✓ Kolkata to Ashuganj: US\$ 19 per ton.

Road Transportation Cost from Ashuganj River Terminal

The consulting team came across truck traffic jam at the vibrant Ashuganj River Terminal with loading operations going on – manually. The team discussed the ongoing truck freight rate, time, distance to various locations within Bangladesh which is given below. This information is relevant to the study as currently there is no organised trucking facility available at Sherpur EZ and this freight indication may be considered for calculating the trucking freight from the EZ to the various destinations²²².

Table 2.9.3-1: Freight Transport Cost based on a Truckload of 15 Tons*

| No. | City | Freight (15 ton) in BDT | Approx. Distance (Km) | Time (hours) |
|-----|--------------|-------------------------|-----------------------|--------------------------|
| 1. | Dhaka | 8000 | 100 | 4-6 |
| 2. | Chittagong | 20,000 | 250 | 15 |
| 3. | Comilla | 10,000 | 100 | 5 |
| 4. | Sylhet | 12,000 | 160 | 5 |
| 5. | Cox's Bazaar | 30,000 | 350 | 24 |
| 6. | Khulna | 35,000 | 400 | 48 (with Ferry Crossing) |
| 7. | Rajshahi | 45,000 | 350 | 48 (with Ferry Crossing) |
| 8. | Mymensingh | 12,000 | ? | 5 |
| 9. | Rangpur | 40,000 | 450 | 48 |
| 10. | Thakurgaon | 45,000 | 500 | 60 |
| 11. | Dinajpur | 45,000 | 500 | 60 |
| 12. | Jessore | 30,000 | 350 | 48 |
| 13. | Tangail | 18,000 | 200 | 10 |
| 14. | Bogra | 35,000 | 275 | 15 |
| 15. | Narsingdhi | 5000 | 40 | 2 |
| 16. | Kushtia | 22,000 | ? | 48 |
| 17. | Benapol | 40,000 | 400 | 48 |
| 18. | Tamabil | 20,000 | 220 | 8 |
| 18. | Banglabandh | 50,000 | 550 | 60 |
| 20. | Teknaf | 40,000 | 450 | 24 |
| 21. | Sherpur | 7,000 | 100 | 3 |

Note: The above freight is for trucks originating from ART. Those trucks arriving from the respective destinations and carrying backload are sometimes available and carry return load for about 40-60% of the freight mentioned above.

2.9.4 Constraints

Roads

- As roads play the most vital role in transportation in Bangladesh, its relevance need not be elaborated. Constant traffic jams and restrictions on movement due to limited roads and an increasing number of vehicles plying makes it almost impossible to guarantee travel time of passengers and goods. In addition, the slow progress in development of the construction of the Dhaka – Chittagong Highway (the main artery) makes travelling to Dhaka or Chittagong extremely time consuming. Even the roads inside the 2 major cities are mostly congested with a long queue of vehicles.

²²² Products manufactured at the Sherpur EZ are targeted not only for the international market, but also the domestic market. Hence the relevance of this transport table providing distance and freight.

- The limitation in the number of pumps providing CNG causes vehicles to line up for hours to fill up. Though the vehicles have the provision of using other fuel such as petrol and diesel, they do not use it due to the current price which is about 2 - 3 times the cost of CNG²²³.
- The trucking industry needs a further injection of modern trucks and trailers as the current fleet is limited to old trucks and trailers mostly unsuitable for carrying containers.

Waterways

- The limitation on using the riverine route for larger cargo vessels is further constrained due to the limitation of draft and lack of dredging of channels. Currently, only one riverine port is constructed and operational at Pangaon which started operation in October. The opening of this ICT may soften the current pressure on the Chittagong Port where import cargo is stranded for 10 -15 days awaiting its turn to catch the train to Dhaka.
- Though blessed with such large rivers, transportation by river is not a common means of transport. Among many reasons, the frequency of service, availability of ferry services, the status of the river jetties, and the limited riverine ports (Chittagong and Mongla) and the adjoining road connectivity to reach the main destinations makes it less attractive for users.
- Though 5 ICTs are being developed by the private sector, they are yet to be opened for traffic handling. Though the government has given approval and is currently working on the guidelines, there may be delay as the guidelines should have been drafted first and then approval given.
- Another problem may be the deputation of the number of container feeder vessels between CPA and these 5 private ICTs. Vessels required for inland waterways movement is yet to be seen except for the 3 (*Pangaon Express, Pangaon Success, Pangaon Vision*) deputed by CPA and in operation between the Pangaon ICT and CPA. In the case of Pangaon, though the ICT was developed in early 2013, it had to wait for about six months before the opening of the terminal for business. The CPA had the resources for purchasing the 3 feeders, but in the case of the private ICTs, it is yet to be seen how they will operate and manage their terminals.
- Though Pangaon ICT opened in early November, it remains idle due to many reasons. Many likely users and institutes have their own versions of why it could not be used, but primarily it seems that lack of awareness, security in the waterways, no-mention of “Pangaon” as final delivery destination in the shipping document, insurance coverage issues, seaworthiness and the number of vessels deputed in the Chittagong – Pangaon circuit along with a lack of guarantee of time and cost could be the major factors.

Port

- The GoB is yet to sign an inter-governmental agreement on “dry ports” to promote international recognition, facilitating investments in their infrastructure, improving operational efficiency and enhancing the environmental sustainability of transports. In the first round of signing in Bangkok (at UN- ESCAP on November 7 – 8, 2013) 14 countries signed including Armenia, Cambodia, China, Indonesia, Iran, Lao PDR, Mongolia, Myanmar, Nepal, Republic of Korea, Russia, Tajikistan, Thailand and Vietnam. Failing to sign this agreement has left the identified and potential Dry Ports of Bangladesh (Akaura, Brahmanbaria, Benapole, Jessore, Bibirbazar, Comilla, Burimari, Lalmonirhat, Hili, Dinajpur, Kamlapur ICD, Dhaka, Sonamasjid, Chapainawabganj, Teknaf, Cox’s Bazar, Banglabandh, Panchagarh) short of international recognition. Hence these destinations cannot be mentioned in the shipping documents as the “final place of delivery” and in turn are losing out on the advantages of through movement of the consignment.

²²³ Price of CNG: BDT 30; Diesel: BDT 68.6 and Petrol: BDT 95 -99 (for Octane)

- As Chittagong Port is the key gateway for accessing overseas markets, its relevance is crucial and discussed. Traffic jams on most of the highways, including within cities, are ubiquitous and frequent and all those transporters interviewed complained about the slow speed of road expansion projects that are underway. Shipping lines and freight forwarders revealed the following facts associated with the operations at the Chittagong Port.
- Shipping lines (commercial operations) were facing the problem of sharing the channel with the Bangladesh Navy. This caused unnecessary delay in the delivery and pick-up of containers from the Chittagong Port. This was crucial, especially in the turning points of the channel as it was narrow, with lots of meanders and had to be shared with the naval vessels, which are given priority. One solution would be for the naval vessels and the commercial vessels to have their own dedicated channels.
- The following are the drafts and the deficiencies of each of the container berths:
 - GCB (General Cargo Berth) – draft 8.53 Metres: As this berth lacks Gantry Cranes, only those vessels with their own gears can berth for unloading and loading. Hence vessels without gears have to wait their turn for berthing at CCT.
 - CCT (Chittagong Container terminal) – draft 9.15 Metres: Though there are 4 Gantry Cranes here, there is insufficient back-up area/facility.
 - NCT (New Mooring Container terminal) – 9.15 Metres: Here too, this berth lacks Gantry Cranes and so only those vessels with their own gears can berth for unloading and loading. Hence vessels without gears have to wait their turn for berthing at CCT.
- During the period of the announcement of the national budget (June-July), the Port is under pressure, as there are large shipments of Imports causing Port congestion and delays. The current delay for import containers for Dhaka ICD is about 10 - 15 days (for transportation of containers by train from CPA to Dhaka ICD).
- Though there are 19 Off-Dock (CFS, ICDs operated by Private Sector) facilities surrounding the port, these dedicated places are only allowed to handle 29 import items (ref to annex for the list of items). In the month of August 2013, all the depots combined handled about 35,000 TEUs of export load and about 15,000 TEUs import load only. Some of the ICDs are closed (Iqbal enterprise and Saved Timber Container Yard) due to a supply - demand imbalance in the trade.
- Out of total Import Cargo, 60% is de-stuffed inside the Port, only about 30% sent to the Off-docks for de-stuffing and the balance 10% is sent to the Merchant's/Importer's Premises and to Dhaka ICD (which is under the purview of the CPA – Chittagong Port Authority). Due to availability of limited cargo for Off-dock facilities, some of them are closed. Active Shipping Lines in Bangladesh include Maersk, APL, Hapag Lloyd, MSC, Hanjin Shipping, Hyundai, K-Lines, MOL and OSK Lines etc.
- No time line specified for de-stuffing of delayed boxes: Though the Customs rules states that if a box/container is not de-stuffed after 30 days of arrival, the Customs has the authority to de-stuff the box/container and release the boxes/containers to the liners. Though in real practice, this is not happening. The problem is more rampant in the case of reefer boxes as the Port charge on supplying electricity (@ US\$9 per day) is levied up to the time when the boxes are released. This charge is on a/c of the Shipping Lines owning the boxes.
- Chittagong Port has a shortage of equipment to continuously serve the clients for taking delivery of the containers/cargo. Hence cargo is stranded awaiting loading and despatch.
- Though the depots located in Chittagong are charging the same tariff for 40ft and 40HC, the CPA is charging 1.5 times higher. The same is the case with the railways carrying containers to Dhaka: it charges higher rail freight for HC.

- Chittagong Port is served by feeder vessels operated from Singapore, Colombo, and Port Kelang. This increases the ocean freight as it is not a hub port. The pilot time is about 1 hr. to the Port covering about 9 nautical miles from the outer anchorage.
- There is official restriction by the Chittagong Port on weights of the 20ft and 40ft containers. As per CPA, the Gross Weight of 20ft containers shall be less than 24,000 kilogram and of 40 ft. shall not exceed 30,480 kg. This official restrictions imposed by CPA should be withdrawn and international practices imposed (i.e. load should be as per the allowable weights in the boxes.)
- The currently used road within Chittagong Port area is common; this causes traffic jams and undue delay in delivery. If the CPA can develop separate 'Buffer Parking Area' inside the Port gate where trucks can come inside and park instead of waiting and jamming the gates and the roads, it would not only decongest the gates but also give relief to the traffic jams on the VIP road. 'This Buffer Parking Area' is a common user facility inside the open gates where trucks can line up and get inspected as per the gate entry requirement and then finally enter the controlled port premises.
- There is no EDI connectivity between different relevant agencies as the Port, Customs and Depots etc. making it paper based for processing.
- The Port, Customs and the Depots use their own software hence there is no compatibility in their operation.
- Due to an inadequate number of scanners, delivery is delayed as the trucks have to wait their turn to get scanned prior to exit from the gates.
- The Same gate is used for both entry and exit causing congestion. If separate gate were earmarked, it would solve the gate jams to a certain extent.
- The Port does not provide adequate export slots. So the vessels ready for loading containers have to call the Depots to send the containers directly to the Vessel, which takes 2-4 hours, and sometimes due to traffic, the container is stranded and when it arrives, and the vessel is gone. The containers then have to be returned to the depot.
- So basically, the CPA has space constraints, equipment shortage and requires better management for optimal use of its facilities adhering to the needs of the market (market driven approach).

Railways

- Since the railway system consists of three gauges – broad, metre, and dual lines which involves transhipment at the break of gauge points - transhipment causes delay and increases the chance of pilferage.
- The number of available wagons running between Dhaka and Chittagong carrying containers is limited. This is the reason behind 10 - 15 day back log at the Chittagong Port. Though the rail freight may be cheaper, this backlog is forcing the importers to shift their cargo from rail to road and now river transportation to Pangaon ICT.
- The limited number of wagons (32) per train/per rake (64 TEUs) is not sufficient to cater to the growing rail transport business between Dhaka and Chittagong Port. In neighbouring India and even in Nepal, all the container special trains (rakes) carry 45 wagons/ 90 TEUs and even double deck container service has started in some sectors.
- Transit time: Though ideally it should take about 8 hours from Chittagong to Dhaka, it takes about 15 hours due to the constant breaking down and sharing of tracks with the passenger trains.
- Though railways transportation is cheaper, there is not much development in expanding the network. Laying of new tracks is almost stagnant with focus on maintenance of the existing tracks.

2.9.5 Customs Clearance System

The Customs use the “ASYCUDA ++” software now but have plans of upgrading to the “ASYCUDA World.” The project is already underway. The Customs use the “red” and “yellow” button system for cargo clearance now, but with the introduction of “ASYCUDA World,” they shall also use the “Green” button system for Customs examination of cargo.

Under “red” button, 100% cargo is to be examined, under “yellow” button, 20% cargo is to be examined and under the “green” button, no examination is required. Under the present system, Customs does not have access to any other Customs Office declaration verification system elsewhere in Bangladesh, but with “ASYCUDA World”, they will have this access – clearing the way for simplification of cargo clearance and also on-line filing of documents. In addition, with the implementation of “ASYCUDA World”, electronic filing of documents will take place, whereas now, both manual and electronic filing of documents is required.

2.9.6 Multimodal Transport

Article 1.1 of the United Nations Multimodal Convention (which has not yet been ratified) defines multimodal transport as: "International multimodal transport' means the carriage of goods by at least two different modes of transport on the basis of a multimodal transport contract from a place in one country at which the goods are taken in charge by the multimodal transport operator to a place designated for delivery situated in a different country".

2.9.6.1 Advantage of Multimodal Transport Operation

Multimodal transport is the carriage of goods by at least 2 modes of transport under a single contract operated by one carrier. It involves the usage of more than one means of transport as combination of ship, truck, railways, or aircraft in succession. When a multimodal transport operator (MTO) signs a contract, he assumes the responsibility for the execution of the assigned transportation using several individual operators, but these subcontractors would not affect his obligation to the consignor for the performance and liability arising under the contract.

Any consignment, coming from overseas and destined an inland location, will be travelling on multiple modes of transport utilizing sea, rail, air, or road. The only difference with appointing an MTO is that he assumes the responsibility and is liable for the complete chain of transportation.

Minimises time loss at trans-shipment points

Multimodal transport, which is planned and coordinated as a single operation, minimises the loss of time and the risk of loss, pilferage and damage to cargo at trans-shipment points. The multimodal transport operator maintains his own communication links and coordinates interchange and onward carriage smoothly at trans-shipment points.

Provides faster transit of goods

The faster transit of goods made possible under multimodal transport reduces the disadvantages of distance from markets and the tying-up of capital. In an era of Globalization the distance between origin or source materials and consumer is increasing thanks to the development of multimodal transport.

Reduces burden of documentation and formalities

The burden of issuing multiple documentation and other formalities connected with each segmented of the transport chain is reduced to a minimum.

Saves cost

The savings in costs resulting from these advantages are usually reflected in the through freight rates charged by the multimodal transport operator and also in the cost of cargo insurance. As

savings are passed onto the consumer, demand increases.

Establishes only one agency to deal with

The consignor has to deal with only the multimodal transport operator in all matters relating to the transportation of his goods, including the settlement of claims for loss of goods, or damage to them, or delays in delivery at destination.

Reduces cost of exports

The inherent advantages of multimodal transport system will help to reduce the cost of exports and improve their competitive position in the international market.

Source:<http://www.unescap.org/ttdw/CapBuild/Module%20-Multimodal%20Transport%20Operations.pdf>

Multimodal transportation is the result of containerization where one single unit (container) was to be carried from the place of origin to the place of delivery without breaking bulk. This resulted in the development of containerization throughout the world and the development of modern container terminals and the equipment associated with carrying, loading, and offloading the container. However it is to be noted that other cargo can also be carried and delivered on the concept of multimodal transport – i.e. without changing its original form, but with the only change in mode of transport.

2.9.6.2 The Case of Bangladesh

The MTD (Multimodal Transport Document) is not used as there is no legislation in place for authorizing MTOs (Multimodal Transport Operators). Neighbouring countries like Nepal and India have the Multimodal Transport Act in place. There are about 840 Freight Forwarding Companies in Bangladesh, out of which about 40 are Multi Nationals.

In the context of Bangladesh, multimodal transport is very relevant as the government of Bangladesh is trying to increase its Ex-IM, regional, bilateral, and domestic trade. Bangladesh has a vast river network, but its potential is yet to be harnessed. River transportation is the most economical means of transport compared to road, rail, and air. It can play a significant role in the transportation of goods including the positive impact it has on the environment and cost of transportation.

As smooth connectivity through the gateway ports and to the rest of the world is the key for setting up economic zones in inland locations, any such large investments should first consider the cargo evacuation system and methods using multimodal transport operations.

Multimodal Systems and Options of Cargo evacuation to/from the Sherpur EZ

1. Land – Sea (using road and ocean going ship)

- ✓ As Sherpur EZ Site is located on the Sylhet – Dhaka highway, cargo/ container can move by road from the EZ site to Chittagong Port covering a distance of 435 Km. At Chittagong Port, it shall be loaded “on board” and shipped out of the country. Same, in reverse order, prevails for import cargo.

➔ This system of cargo evacuation can be currently used.

2. Land – River – Sea (using road, feeder vessels, and ocean going ship)

- ✓ Road haulage from Sherpur EZ to Pangaon River Terminal (ICT); River transportation to CPA and then on board Ocean going Ship (through transit @ hub Port).

➔ This system of cargo evacuation can be currently used.

- ✓ It is envisaged that the opening of Ashuganj transit terminal will open doors for transportation of container and other traffic (whether international or domestic) by river.

Cargo including containers shall be trucked to this terminal and then put on board the vessel to Chittagong Port and from there onwards to their respective destinations. As River transportation is more economical than road or rail transportation, it may provide an ideal alternative to transportation by road or rail up to other destinations including to the Chittagong Port.

➔ This system of cargo evacuation may be used in future.

3. Land – Sea (using road, rail, and ocean going ship)

- ✓ By road from the proposed EZ to Dhaka Kamlapur ICD and then by train to Chittagong Port and on board an ocean going vessel.

➔ This system of cargo evacuation can be currently used.

- ✓ Preliminary study revealed that this station has ample extra space for converting it into an Inland Clearance Depot (ICD)/rail cargo terminal for catering to goods and containers. With the advent of Sreemangal ICD/Cargo terminal, the business prospects shall grow not only for the EZ traffic but for all other traffic destined for the North East of Bangladesh. This may be the second ICD after the Dhaka ICD. (Detail layout of proposed Sreemangal ICD along with the costs associated with development of this terminal is provided under *recommended transport infrastructure*).

➔ This system of cargo evacuation maybe used in future.

4. Land – Air (using road and airport)

- ✓ With this gateway, any parcels destined from/to the EZ may be air lifted from within the country as well as from overseas and delivered. Road transportation shall be used for accessing the airport from/to the EZ.
- ✓ Alternatively, air freight could arrive/ sent to the Chittagong International Airport and air lifted to the final destination.

➔ Both these system of cargo evacuation can be currently used.

Multimodal Transport Platforms

Multimodal Transport systems of cargo evacuation are discussed above. In this section, current and future available platforms are discussed. All modes of transport are considered and each mode is individually described providing how and where the cargo is to be trans-loaded and from one means of transport to another. This section has also considered the future development of the transport sector in Bangladesh and accordingly suggested the method of cargo evacuation.

Table 2.9.6.2-1: Summary of Multimodal Transport Platforms

| Available Options | Road – Sea Connectivity | Road – Rail – Sea Connectivity | Road – River – Sea Connectivity | Road – Air Connectivity |
|-------------------|---|---|---|--|
| Current | Road haulage from Sherpur EZ to Chittagong Port and then on board Ocean going Ship to the final destination | Road Haulage from Sherpur EZ to Dhaka ICD; Rail haulage from Dhaka ICD to CPA and then on board Ocean going Ship (through transit | Road haulage from Sherpur EZ to Pangaon River Terminal (ICT); River transportation to CPA and then on board Ocean going | Road haulage from Sherpur EZ to Sylhet International Airport and then on board to hub airport for transfer to the airplane flying to the |

| Available Options | Road – Sea Connectivity | Road – Rail – Sea Connectivity | Road – River – Sea Connectivity | Road – Air Connectivity |
|-------------------|---|---|---|---|
| | (through transit @ hub Port) | @ hub Port) | Ship (through transit @ hub Port) | final destination or alternatively road haulage to Chittagong International Airport and then on board the flight to destination |
| Future | a. Road Haulage to Sonadia Deep Sea Port and then on board on Ocean going ship to the final destination. b. Road Haulage to Paira Bandar (3 rd Port) or other ICTs and then on board Ocean going vessel to the final destination. | Road haulage from Sherpur EZ to Sreemangal ICD; rail haulage to CPA and then on board Ocean going Ship (through transit @ hub Port) or Rail haulage directly to the Sonadia DSP for catching the main line vessel | Road haulage from Sherpur EZ to Ashuganj River Terminal (ICT); River transportation to CPA and then on board Ocean going Ship (through transit @ hub Port) or River haulage directly to the Sonadia DSP for catching the main line vessel | When (air) freighter service starts, to board the cargo on these freighters serving the major airport for quicker delivery. |

2.9.7 Analysis of Freight Benchmarks, Trading Across Borders, and Trade Connectivity

Analysis of road freight, ocean freight, air freight, trade connectivity and Bangladesh's position on the Doing Business index was undertaken and is given below. It could be seen that Bangladesh's position is more or less the same without much significance improvement. The cost and time to import is much higher than the regional average. Hence the GoB needs to take some drastic measures to improve its positioning in the global index. There is room for intra-regional trade that Bangladesh should explore. It's FDI in stock GDP was below the regional average as of 2012.

A. Road Freight

It is expected that all goods heading for domestic deliveries from the EZ shall be using covered vans²²⁴ and trucks; whereas the movement of export traffic shall include containers loaded on trucks and trailers when exiting from the proposed EZ and thereafter shall use other modes to finally arrive at the gateway port.

On the basis of taking a 20ft container (with a 20 ton load) and a 40ft container (with a 30 ton load) from Sherpur to Chittagong and comparing it with similar loads from Chittagong to Dhaka, the per ton per Km freight cost as per the figures mentioned below is considered. Though the cost is slightly higher on that basis (per ton per Km), it is reasonable at this stage as there is no big volume of traffic movement and there are no competitive forces acting for fulfilling the demand/supply. Calculations of similar destinations are also provided as a reference.

²²⁴ In the context of Bangladesh, small pick-up delivery vans up to 3 tons are normally referred to as "covered vans" followed by mini trucks (up to 8 tons), trucks (up to 20 tons include) and trailers (above 20 tons).

Table 2.9.7-1: Benchmarks –Road Freight

| Sector | Distance | 20ft (20ton) Freight | 40ft (30 ton) Freight | Per ton cost (20ft) | Per ton/Km cost (20ft) | Per ton cost (40ft) | Per ton/ Km cost (40ft) |
|----------------------------|-------------------------|----------------------------|-----------------------------|------------------------|------------------------------|------------------------|-------------------------------|
| Chittagong - Sherpur | 435 Km | BDT 50,000 | BDT 60,000 | US\$31.25 | US\$0.071 | US\$27 | US\$0.062 |
| Chittagong - Mirershori | 39 Km | BDT 15,000 | BDT 18,000 | US\$9.37 | US\$0.240 | US\$7.5 | US\$0.19 |
| Chittagong - Anwara | 28 Km | BDT 12,000 | BDT 15,000 | US\$7.5 | US\$0.267 | US\$9.375 | US\$0.33 |
| Chittagong - Dhaka | 319 Km | BDT 30,000 | BDT 35,000 | US\$18.75 | US\$0.058 | US\$14.58 | US\$0.045 |
| Kathmandu - Kolkata | 1,200 (by road) | US\$2,300 | US\$3,300 | US\$115 | US\$0.095 | US\$132 | US\$0.11 |
| Kathmandu - Kolkata | 900 (by road - rail) | US\$1,800 | IS\$2,800 | US\$90 | US\$0.1 | US\$112 | US\$0.124 |

*Above information is based on an interview with 'Homebound Logistics' and a local transporter from Chittagong and info from Nepal from Inter State Multimodal Transport Pvt. Ltd- Kathmandu, Nepal

B. Ocean Freight to/from Chittagong Port

Ocean Freight rates for the major ports from/to the Chittagong Port are given below. From the freights provided, it is seen that import and export to Hong Kong & Dubai are most economical. For import & export cargo in general, Australia, followed by New Zealand, Rotterdam, New York, & Los Angeles are in economical order with Canada having the costliest ocean freight. It is to be noted here that most of the sectors have a large difference in the import and export freight. Ocean freight rate is volatile and is governed by the demand and supply theory as well as the availability of containers. The freight rates can go up substantially during the peak season.

Table 2.9.7-2: Benchmark- Ocean Freight

| Export / Import | 20ft (in US\$) | 40ft (in US\$) | 20ft (in US\$) | 40ft (in US\$) |
|---|-------------------|-------------------|-------------------|-------------------|
| Ocean Freight to International Destinations (from Chittagong Port) | EXPORT | | IMPORT | |
| Major European Ports (Rotterdam) | 1,300 | 2,600 | 1,500 | 3,000 |
| USA - East Coast (New York) | 3,000 | 4,000 | 3,000 | 4,000 |
| USA - West Coast (Los Angeles) | 3,000 | 4,000 | 3,000 | 4,000 |
| Canada (Toronto/ Montreal) | 3,500 | 4,500 | 3,500 | 4,500 |
| Australia (Melbourne) | 1,200 | 2,400 | 1,100 | 2,200 |
| New Zealand | 1,200 | 2,400 | 1,500 | 3,000 |
| Hong Kong | 1,000 | 2,000 | 1,200 | 2,400 |
| UAE (Dubai) | 1,100 | 2,200 | 1,200 | 2,400 |

Source: National Agencies, Dhaka, Bangladesh

C. Air Freight to/from the Shah Jalal (R.) International Airport, Dhaka:

Air freight rates to/from Dhaka to several destinations are given below. Similarly to ocean freight, air freight shipments to/from Dubai, Hong Kong, and Shanghai are comparatively cheaper in comparison to Melbourne, London, Rotterdam, and Montreal. The cheaper freight to Dubai, Hong Kong, and Shanghai is due to the fact that there are many scheduled flights to those nearer destinations (with belly-hold capacity in the passenger aircrafts) as well as the availability of freighter services to those destinations. Shipments to other destinations as London, Montreal, New York, and Los Angeles etc.

have to use transit routes with lesser frequency resulting in costlier freights. The greater the distance and transit, the costlier the freight becomes.

Table 2.9.7-3: Benchmarks – Air Freight

| Air Freight (Export /Import from Dhaka Airport) | Up to 1 kg(US\$) | Up to 10 Kg(US\$) | Up to 50 Kg(US\$) |
|---|------------------|-------------------|-------------------|
| Dubai | 50/100 | 4.50/3.5 | 3.70/3.2 |
| London | 50/100 | 7.50/3.5 | 3.70/3.2 |
| Rotterdam | 50/100 | 7.87/3.5 | 3.70/3.2 |
| Montreal | 75/100 | 9.50/5.5 | 7.10/5.1 |
| Melbourne | 50/100 | 6.50/3.5 | 3.70/3.2 |
| Hong Kong | 50/100 | 4.50/3.5 | 3.70/3.2 |
| Shanghai | 50/100 | 4.50/3.5 | 3.70/3.2 |
| New York | 75/100 | 9.50/5.5 | 7.20/5.1 |
| Los Angeles | 75/100 | 9.50/5.5 | 7.20/5.1 |

Source: National Agencies, Dhaka, Bangladesh

D. Ocean Freight – Comparative Analysis

The table below provides the benchmark on how 2 major cities from OECD countries (Yokohama and Los Angeles) fare from a developed country's perspective. The table provides the status of Bangladesh's ocean freight standing in terms of import and export to/from Japan (Yokohama Port) and to US – West Coast (Los Angeles). It can be noted from the above table that other ports/cities like Seoul, Kuala Lumpur, Beijing, and other Chinese cities are paying less than or about US\$700 per 40ft box for their export shipment, and Batam is paying about US\$800, whereas Bangladesh is paying US\$900 followed by Bangkok, Phnom Penh and Yangon. The most expensive ocean freight seems to be from Danang and Hanoi which is above US\$2,000.

Except for Dalian, other Chinese cities are enjoying cheap ocean freight within/about US\$ 900 for their import shipment from Yokohama. It is followed by Malaysia, Singapore, Cambodia, and Bangladesh. Indian and Vietnamese import freights are near/above US\$2,000.

In the case of export to Los Angeles, again, Bangladesh's position is in the lower section with Seoul, Beijing's fare within US\$ 2000 followed by other Chinese cities, Jakarta and Singapore. Bangladesh is almost at par with Bangkok but costlier than Mumbai, Chennai, Ho Chi Minh City, and Guangzhou.

Table 2.9.7-4: Benchmarks - Ocean Freight of 40ft Container to/from Yokohama (Japan) & to Los Angeles (USA)

| Country | City | Export to Yokohama (US\$) | Import from Yokohama (US\$) | Export to Los Angeles (US\$) |
|--------------|---------------------|---------------------------|-----------------------------|------------------------------|
| 1.Bangladesh | Dhaka | 900 | 2,000 | 3,675 |
| 2. Cambodia | Phnom Penh | 1,500 | 1,400 | 4,000 |
| 3. India | a. Mumbai | 500 | 2,450 | 3,000 |
| | b. Chennai | 979 | 2,803 | 2,817 |
| | c. New Delhi | 1,566 | 2,878 | 3,968 |
| 4. Indonesia | a. Jakarta | 800 | 1,200 | 2,600 |
| | b. Batam | 1,850 | 1,800 | 4,000 |
| 5. Myanmar | a. Yangon | 1,600 | 2,400 | 6,500 |
| 6. Vietnam | a. Danang | 2,500 | 3,000 | 5,000 |
| | b. Ho Chi Minh City | 500 | 650 | 2,600 |

| Country | City | Export to Yokohama (US\$) | Import from Yokohama (US\$) | Export to Los Angeles (US\$) |
|-----------------|--------------|---------------------------|-----------------------------|------------------------------|
| | c. Hanoi | 2,000 | 2,500 | 4,500 |
| 7. Thailand | a. Bangkok | 1,162 | 1,322 | 3,863 |
| 8. Malaysia | Kuala Lumpur | 643 | 1,008 | 2,878 |
| 9. Singapore | Singapore | 900 | 1,100 | 3,000 |
| 10. China | a. Hong Kong | 700 | 100 | 2,900 |
| | b. Dalian | 50 | 2,400 | 227 |
| | c. Shenzhen | 400 | 995 | 2,700 |
| | d. Guangzhou | 650 | 895 | 3,000 |
| | e. Shanghai | 564 | 775 | 2,938 |
| | f. Beijing | 1,005 | 671 | 1,945 |
| 11. South Korea | Seoul | 480 | 200 | 1,823 |

Source: (http://www.jetro.go.jp/en/reports/survey/pdf/2013_05_01_biz.pdf): The 23rd Survey of Investment Survey Related Costs in Asia and Oceania (FY 2012 Survey) May, 2013 –Overseas Research Department, Japan External Trade Organisation (JETRO)

2.9.8 Bangladesh's position in Doing Business 2013

In the country table provided in *Doing Business 2013*, Bangladesh ranks 119 out of 185 countries under the trading across border heading. The table below provides a glimpse of Bangladesh's standing compared to its neighbours and also to the developed countries in the world. Documents required for export are fewer in Bangladesh than in India, but the time it takes to export and import is more than any other country in the list presented below. Ideally, Bangladesh's import and export container costs should be below the US\$1,000 benchmark, but they are not. This may be because of it not being a hub port and relying on feeder services serving the hub port which adds costs. With the development of the proposed Sonadia Deep Sea Port, as a hub port, the scenario may change.

Table 2.9.8-1: Benchmarks - Doing Business (Trading Across Border)

| Country | Trading Across Border (rank) | Documents to export (number) | Time to export (days) | Cost to export (US\$ per container) | Documents to import (number) | Time to import (days) | Cost to import (US\$ per container) |
|------------|------------------------------|------------------------------|-----------------------|-------------------------------------|------------------------------|-----------------------|-------------------------------------|
| Bangladesh | 119 | 6 | 25 | 1,025 | 8 | 34 | 1,430 |
| India | 127 | 9 | 16 | 1,120 | 11 | 20 | 1,200 |
| Sri Lanka | 56 | 6 | 20 | 720 | 6 | 19 | 775 |
| Cambodia | 118 | 9 | 22 | 755 | 10 | 26 | 900 |
| Thailand | 20 | 5 | 14 | 585 | 5 | 13 | 750 |
| Indonesia | 37 | 4 | 17 | 644 | 7 | 23 | 660 |
| China | 68 | 8 | 21 | 580 | 5 | 24 | 615 |
| Japan | 19 | 3 | 10 | 880 | 5 | 11 | 970 |
| USA | 56 | 6 | 20 | 720 | 6 | 19 | 775 |

Source: *Doing Business 2013*

2.9.9 Bangladesh's Position in Trade Connectivity: UN Report 225

In a UN-ESCAP report published some time ago, Bangladesh took 137th position out of 179 in the ESCAP International Supply Chain Connectivity (ISCC) Index. Bangladesh's progress in enhancing

²²⁵ *Financial Express*, 24th Nov 2013

supply chain connectivity from 2006 to 2012 has been similar to other countries in the South and South West Asian region. The latest data from the ESCAP database suggests that Bangladesh has made limited progress in reducing trade costs with its South and South-West Asian neighbours, with relatively more progress with East and North East Asia.

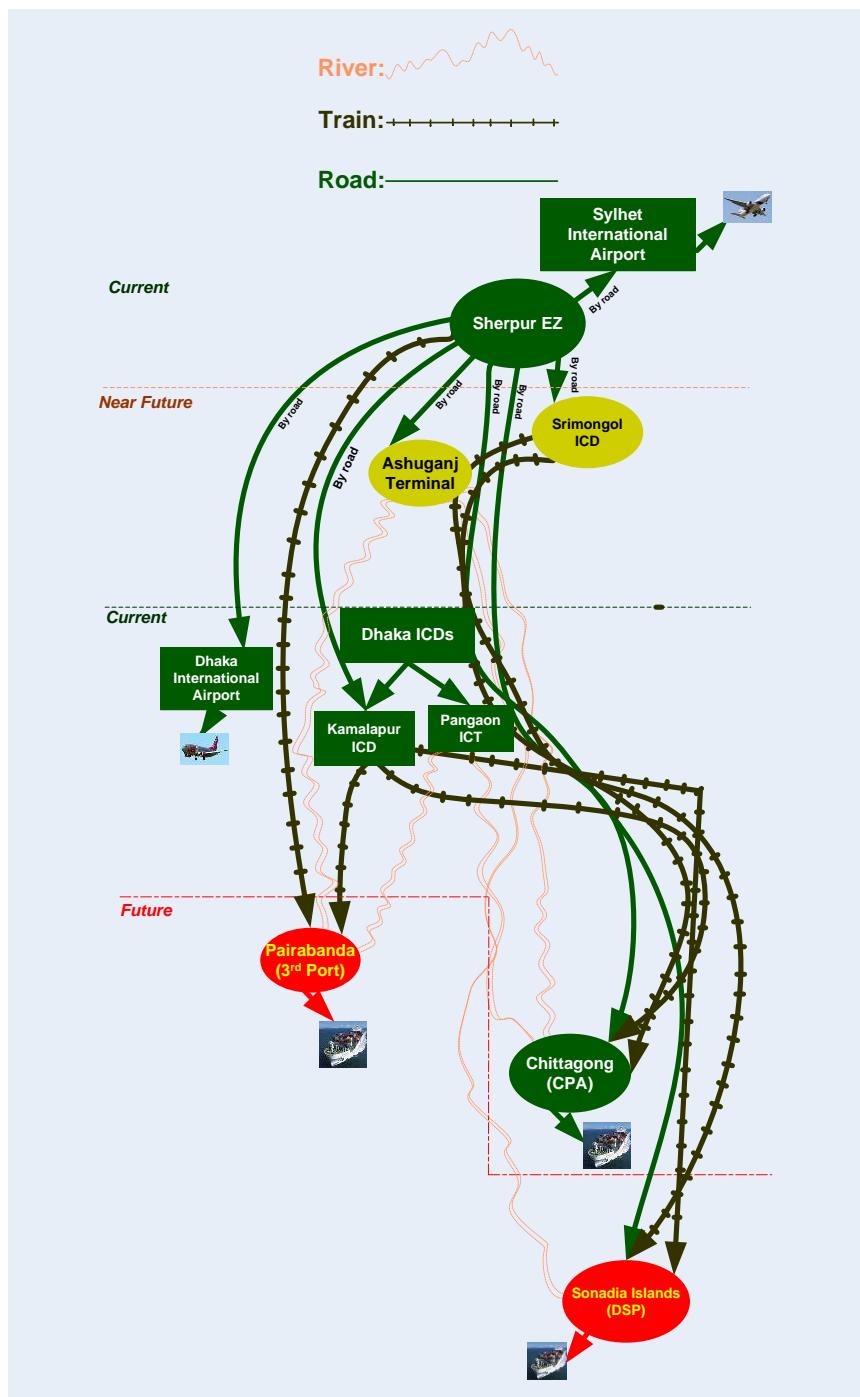
With exclusion of tariff cost, trade between Bangladesh and the USA is only slightly higher than those between Bangladesh and some other South Asian countries, suggesting room for intra-regional trade facilitation.

As per ESCAP, the country's export growth was slightly above average for the Asia-Pacific region, while imports fell by over 5 % compared to 2011. This improved the trade balance deficit of 11 % of GDP in 2011 to 8 % in 2012.

Though foreign investment increased from US\$700 million in 2009 to under US\$1 billion in 2012, the country could do a lot more to attract investment as the share of inward FDI stock in GDP was far below the regional average in 2012.

2.9.10 Cargo Evacuation: Schematic Diagram of Multimodal Transport Platform

The schematic drawing below provides a single point view of the options available for cargo evacuation to/from the Sherpur EZ. All modes of transport are covered including road, rail, river and air along with the current status and future options.

Figure 2.9.10-1: Schematic Diagram of Multimodal Transport Platform

2.9.11 Recommendations of Infrastructure for a Multimodal Transport Platform

2.9.11.1 General Recommendations

Road Transport will play a major role in transportation of goods to and from the proposed EZ. The current bitumen road width of 7 metres is not sufficient to cater to the growing traffic when the EZ becomes operational. Hence, road widening (at least up to 15 metres) is recommended to cater to the movement of heavy traffic of trucks and trailers, especially in the vicinity of the EZ.

Movement of goods by rail is covered in detail in the following pages with proposal of construction of an ICD at the Sreemangal RS that shall connect with the Chittagong Port and the rest of the rail network of Bangladesh. The total investment in the development of the ICD is about BDT 18,48,26,000 (say about US\$2.3 million). As the cost of developing such a facility may not be attractive to any operator, it is recommended that the facility be developed by the Government of Bangladesh and leased out to a private operator. The operator signs a long term operation and management contract of the ICD with the responsible agency of the Government of Bangladesh and is required to invest in the equipment.

For air shipments, either Sylhet Airport or Dhaka Airport may be used. As there are limited flights to/from Sylhet Airport, Dhaka airport may be extensively used. Connectivity to the airport from the site will be by road.

For import/export traffic by sea, it is recommended to use the Ashuganj River Terminal when it is developed in future. Containers can be transported by road to the Ashuganj River Port and then ferried to the Chittagong Port from where the containers can be put on board for export and the reverse system shall prevail for import traffic.

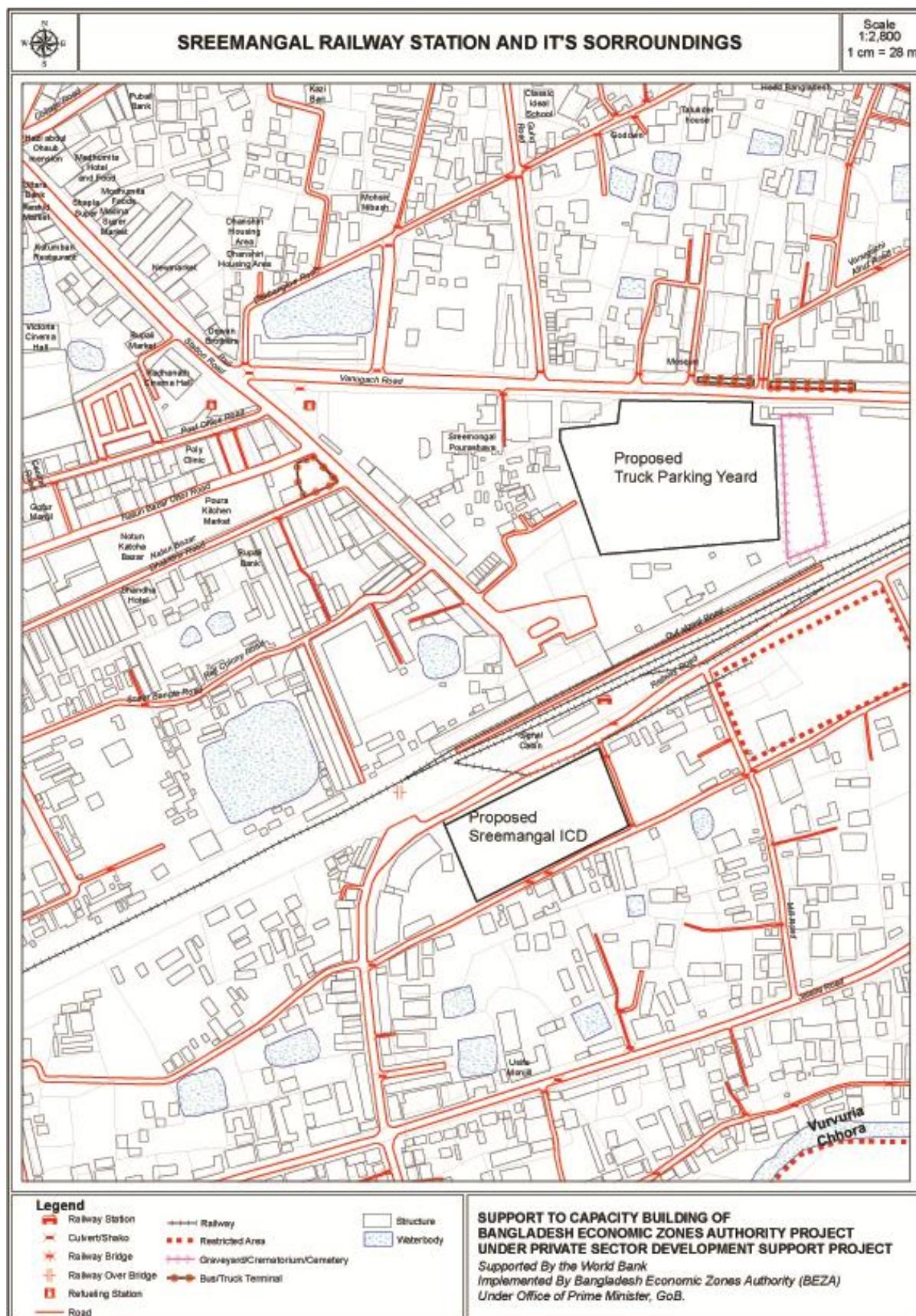
2.9.11.2 Specific Recommendation for Transport Infrastructure

Development of Inland Clearance Depot at Sreemangal Railway Station (Sreemangal ICD)

A railway based Inland Clearance Depot has been proposed at Sreemangal Railway Station. It will be located at the southern part of the railway station. The truck parking yard is separated from the ICD and is located near the main building with a separate entrance. The ICD will have a total area of 0.6 hectare and the parking yard will be of 1 hectare. The location is shown below. The land is owned by Bangladesh Railways (BR). Initial discussion with Bangladesh Railways indicated their willingness to cooperate. This ICD will be a good attraction for the investors in Sherpur EZ. They can transport their produced goods through this ICD to the Chittagong Port or to any other rail linked destinations at economical freight.

This ICD shall be catering not only to the traffic of the EZ, but also to the other traffic in and around Northern Bangladesh. Since “Container Special trains” may not have the volumes in the initial stages, mixed trains (i.e.) rakes with mixed cargo of containers and other goods could be combined to complete a full train.

Locational maps, basic design, layout plan including cross sections drawings of both the ICD and the parking yard is described in detail along with the cost estimate and scheduled in the in the following pages. Some photos of the existing 2 locations are also provided.

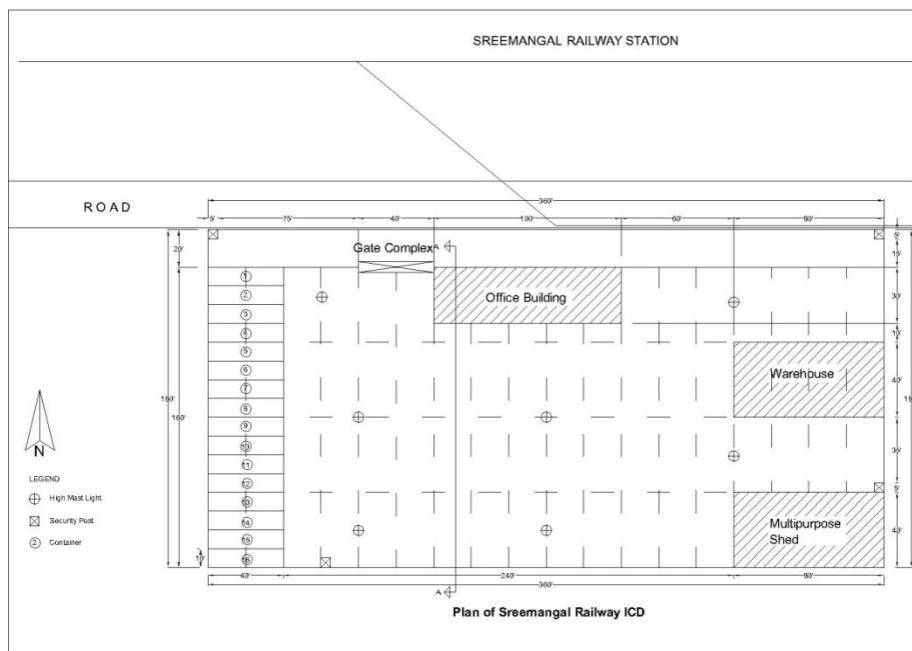
Figure 2.9.11.2-1: Location of Proposed Sreemangal ICD

- **Basic Design**

Design of the ICD is proposed considering the existing design of Pangaon Container Terminal and Ashuganj River Terminal. The facilities are provided accordingly. The following is the design of the ICD area. The dimension of the site is 360 ft. x 180 ft. along the access road. An area of 20 ft. is left for movement of the train on the track. The gate complex is 40 ft. wide. At the eastern side of the gate complex, a two storied office building of 100 ft. x 30 ft. is proposed for construction. This structure will be used for administrative operations of the ICD.

A warehouse and a multipurpose shed of 80 ft. x 40 ft. will be constructed at the eastern side of the ICD. The multipurpose shed will be used for parking, maintenance, and spare parts storage (Reach Stacker, cranes, forklifts, trucks, etc.) and other ancillary facilities as restrooms for the operators. On the western side, a container stack yard is proposed. As many as 16 containers can be stacked on one level. Then, 7 high mast lights and 4 security posts will be established to ensure security of the site. The ground shall be strengthened to accommodate a load of 100 tons psi and cement blocks are proposed to be used. There shall be a water drainage system along with a captive power back-up. (Refer to the cost estimate sheet).

Figure 2.9.11.2-2: Layout Plan of Sreemangal ICD



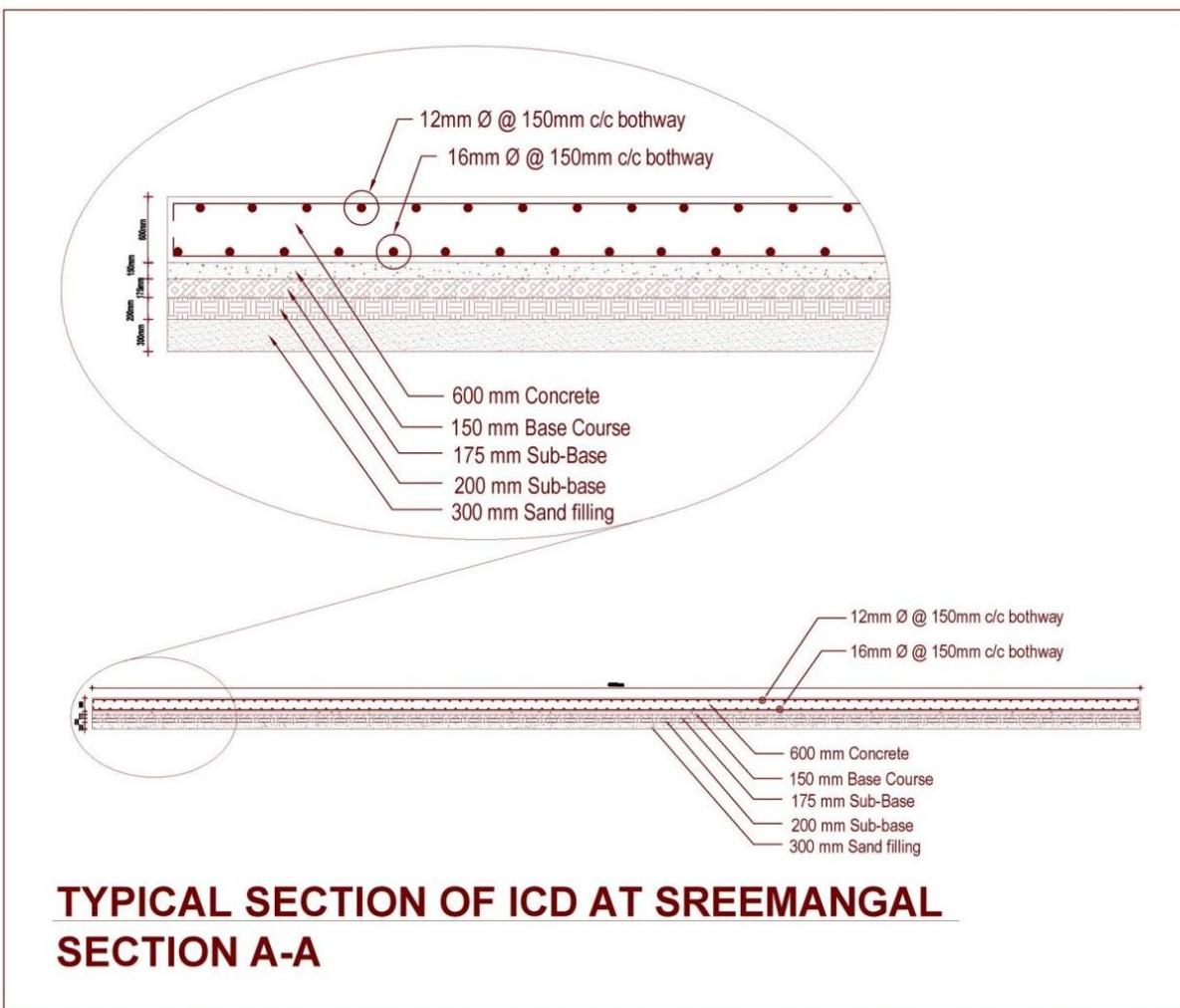
Photos of Proposed Site for ICD Development



Existing condition of the proposed ICD at Sreemangal



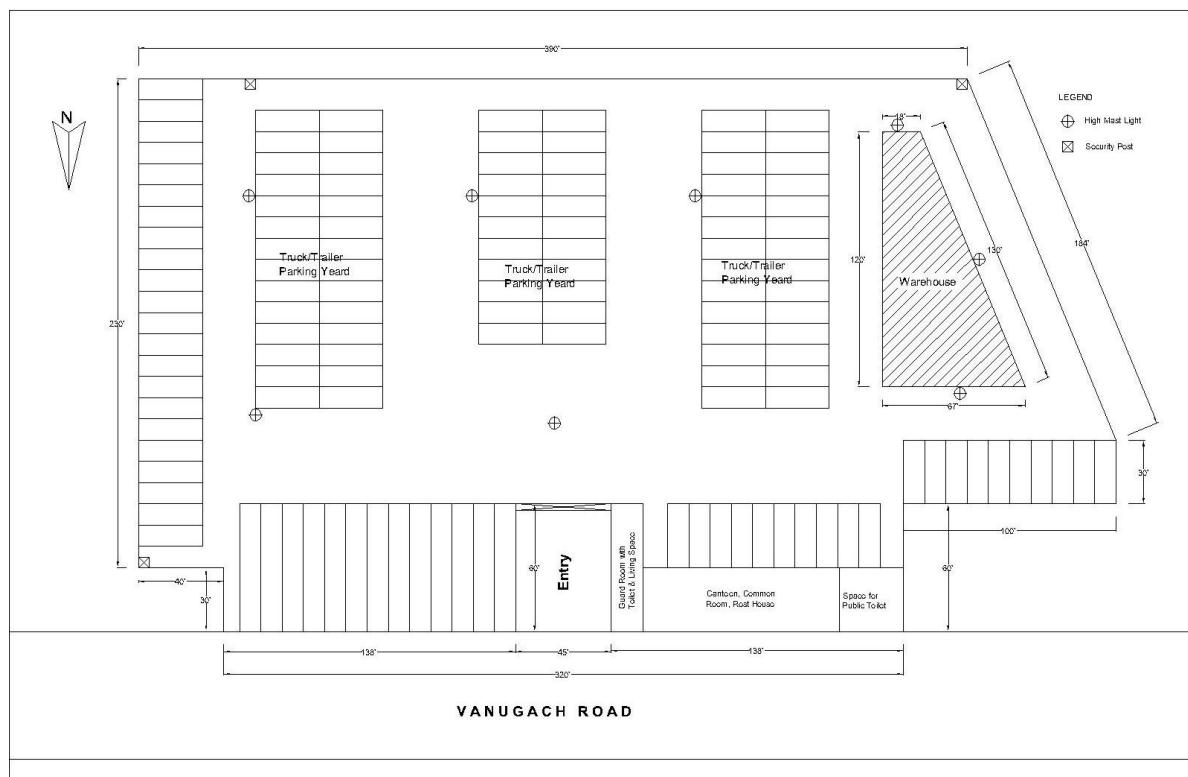
Proposed land for ICD @Sreemangal RS

Figure 2.9.11.2-3: Cross section of the proposed ICD

- Truck Parking Yard @ Sreemangal ICD

The truck parking yard is located 600 ft. away from the site. Total area is 1 hectare. The land is not evenly shaped. Length is 390 ft. and width is 260 ft. The entrance to the yard is from Vanugach Road, which is a 60 ft. wide road in Sreemangal. At present this site is used as local vehicular parking yard including parking of trucks and tankers.

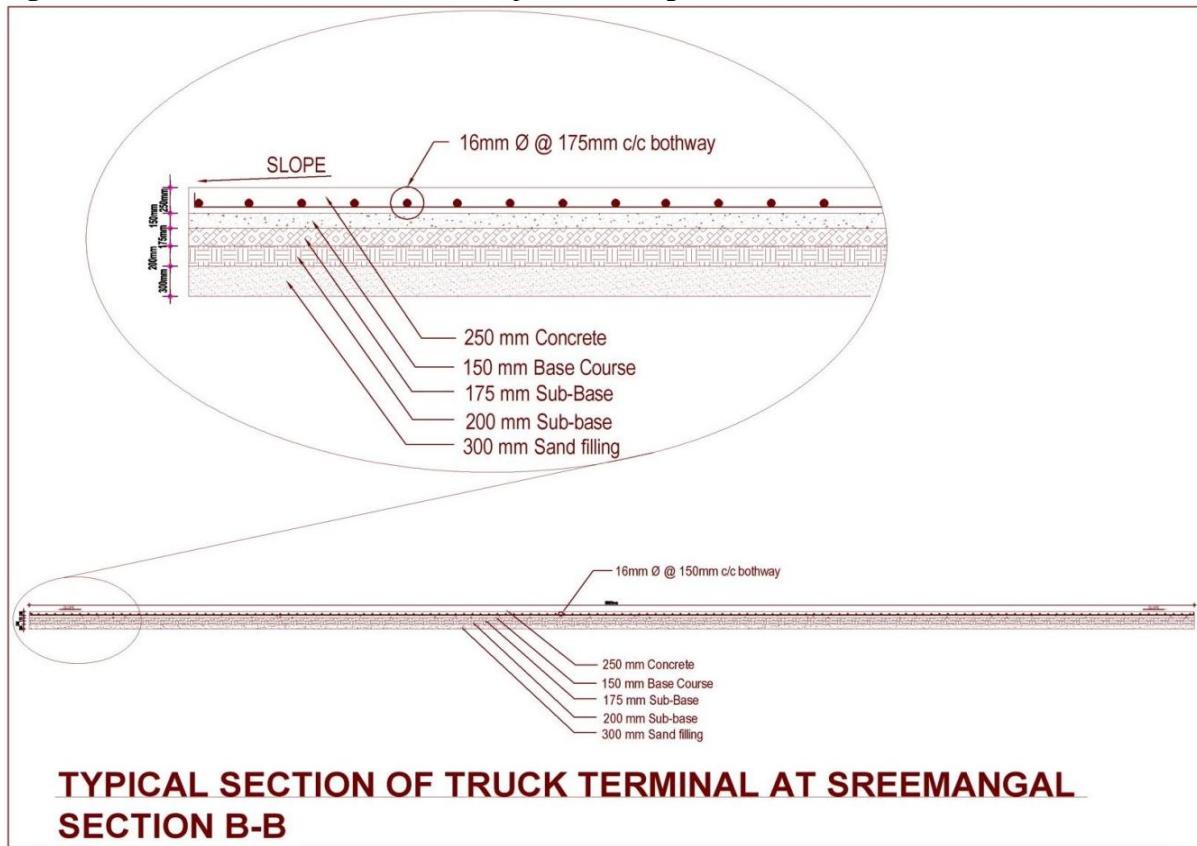
The entry gate will be 60 ft. inside the yard from the existing road. At the side of the gate there will be a one storied structure containing the guard room with basic facilities as toilets and living spaces. Adjacent to this structure another structure will combine the facilities like the common room, restroom, canteen, etc. Space is also kept for a public toilet there. A total of 108 trucks and 13 trailers can be parked in this yard at a time. Three security posts are proposed to ensure security inside the parking yard. The surface of the parking yard will be covered with cement blocks (refer to the cost sheet for details).

Figure 2.9.11.2-4: Layout Plan of Parking Yard**Photos of Proposed Site of Parking Yard**

Proposed land for Truck Parking (existing condition – July 2013)



Existing condition of the parking yard – August 2013

Figure 2.9.11.2-5: Cross Section of the Proposed Parking Yard

CHAPTER 3

MASTER PLANNING AND INFRASTRUCTURE

(COMPONENT 2)

3.1 Site Assessment

3.1.1 Site Visit Report

As a startup activity for the Feasibility Study, Sherpur EZ site was visited by a team of consultants (expatriates and local personnel) from July 9 until July 10, 2013. The purpose of the visit was to observe and explore existing site conditions, investigate off/on site infrastructure and available facilities, land acquisition, and resettlement issues, environmental and social aspects, etc. Details of that visit are provided in Chapter-3, Inception Report. The power point presentation given to the World Bank on the Field Visit is shown in Annex 3 of that report.

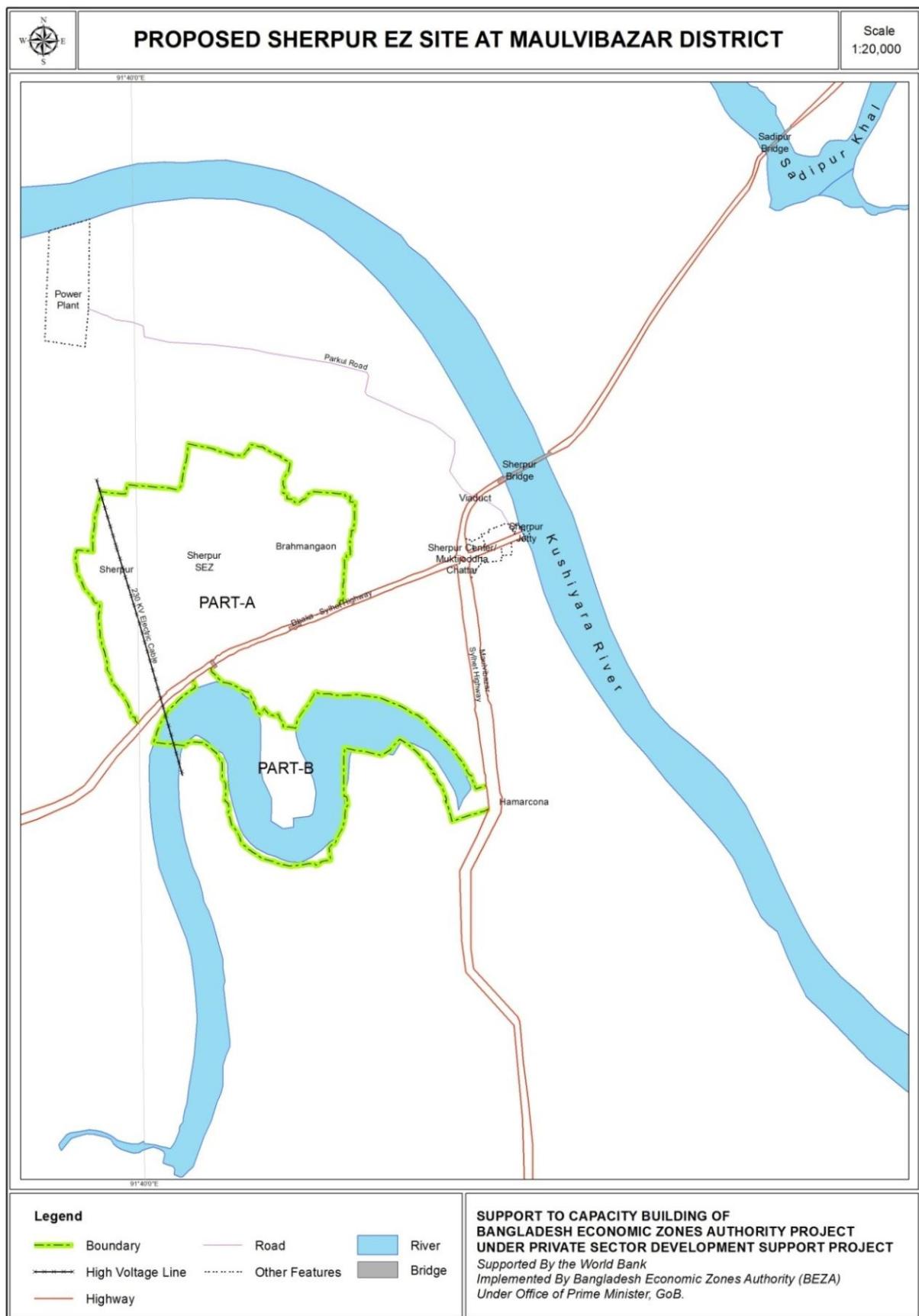
Subsequently on preparing the Master Plan, the site was also visited by the Consultant Team (Local Personnel) from August 1, 2013 to August 2, 2013. During this period the Team also visited various offices. These include the DC office, Upazila Parishad office, RHD Office, BWDB Office, BPDB Office, Gas office, etc. in Maulvibazar District. Relevant documents were collected, for example location maps of the sites, information regarding assessment of cost of compensation and relocation of affected persons and properties, their list, etc. and other information related to the project. The team discussed the previous activities related to the project (EZ sites) with engineers and others conversant with the features of the sites.

3.1.1.1 Location and Physical Aspects of Sherpur EZ

The site is located in Sherpur (within 1 Km of Sherpur Bazaar which is a business center) under Maulvibazar Sadar Upazila (Mouza-Brahmangaon and Sherpur, District-Maulvibazar, Sylhet Division) about 23 Km north-west from Maulvibazar District Headquarter. The site is close to Sylhet town, about 35 Km to the north.

The Project site is about 352.89 acres (142.87 ha) of which private land is 217.37 acres (88 ha) and public land is 135.52 acres (54.87 ha). The total area slightly differs with our surveyed total area of 353.53 acre (143.07 ha). A more detailed survey is required to be undertaken to fix the exact boundary and area of the zone. The Dhaka-Sylhet Highway and Sylhet-Maulvibazar Highway pass by the project site while the Kushiyara River flows parallel to the Maulvibazar-Sylhet Highway near the site and downstream across the Dhaka-Sylhet/Maulvibazar-Sylhet Highway. A composite Steel Bridge (Sherpur Bridge) of about 290 m length exists at this intersection of the River and Highway and is about 1 Km north-east from the proposed EZ site. Further, the project site is divided into two parts (private land-**part A** and public land-**part B**) by the Dhaka-Sylhet Highway. The Maulvibazar-Sylhet Highway runs north near the project site keeping the public land part of the site (part B) to the left (west) at Hamarcona and meets with the Dhaka-Sylhet Highway at Sherpur Centre about 1.2 Km from the Hamarcona point (Refer to Figure 3.1.1-1 for Sherpur EZ site map with surroundings). The private land part of the EZ area (Part A) is mostly agricultural, with a little scattered rural settlement. Public land of the project area (Part B) is entirely water body. This is a small river locally known as 'Gong.' According to the local people, the depth of the Gong varies in places from 15 to 35 feet. This Gong and adjacent beel (Marshy Land) area is connected with Kushiyara River by a khal at about 5 Km upstream from the Sherpur Bridge.

Figure 3.1.1.1-1: Sherpur EZ Site Map with Surroundings



Small Bridge on the Highway

A single span double lane (7.3m) RCC Bridge of length about 54ft (16.5m) exists on the Dhaka-Sylhet Highway over a small khal/water body. During the visit, the water level (WL) in the khal was found to be about 2ft from the lowest bed of the khal, the soffit of the girder of the bridge is about 13' above the water level, a nominal vertical clearance (free board) considered for the bridge is about 2' above the 2004 flood. The road top (near the bridge) from the water level was found to be about 18'. Topography of Part A is almost plain and agricultural and is about 15ft to 9ft below the two lane carriageway (7.3m) road near the upper bridge location and at the lower point where the road is almost consistently high. The bridge on the Highway works as a drainage structure for discharging flood water from upstream to downstream in the monsoon and normally the water level at both sides of the Highway is controlled by the bridge. It is to be noted here that the hydrology of this area is characterized by the flow of a small river (Gong), existing khal, tributaries and by the flow of the nearby Kushiyara with increased discharge near the project site from Monu River, falling to the Kushiyara about 6 Km upstream. So it will be very important that with the implementation of the EZ Project, what may be the changes in flow pattern of the Kushiyara River are taken into account. So the hydro-morphological Study of the Kushiyara River and the project area with existing small rivers, other khals and tributaries might be carried out. Forecasts are needed on potential morphological changes in Kushiyara and in the vicinity of the project area before and after its implementation.

Access Roads to the Site

Both the Dhaka-Sylhet and Maulvibazar-Sylhet Highway are the access roads to the Sherpur EZ site. On the Dhaka-Sylhet Highway, the distance from Dhaka to the site is about 208 Km and that of from Sylhet is about 35 Km.

Through Maulvibazar and Sreemangal the highway from Dhaka takes a turn to the right at Mirpur about 156 Km and after Shayestaganj, the distance to the project site near Hamarcona on the Maulvibazar-Sylhet Highway is about 70 Km. the distance from Sreemangal through Maulvibazar up to the site at Hamarcona point on the Maulvibazar-Sylhet Highway is about 43 Km.

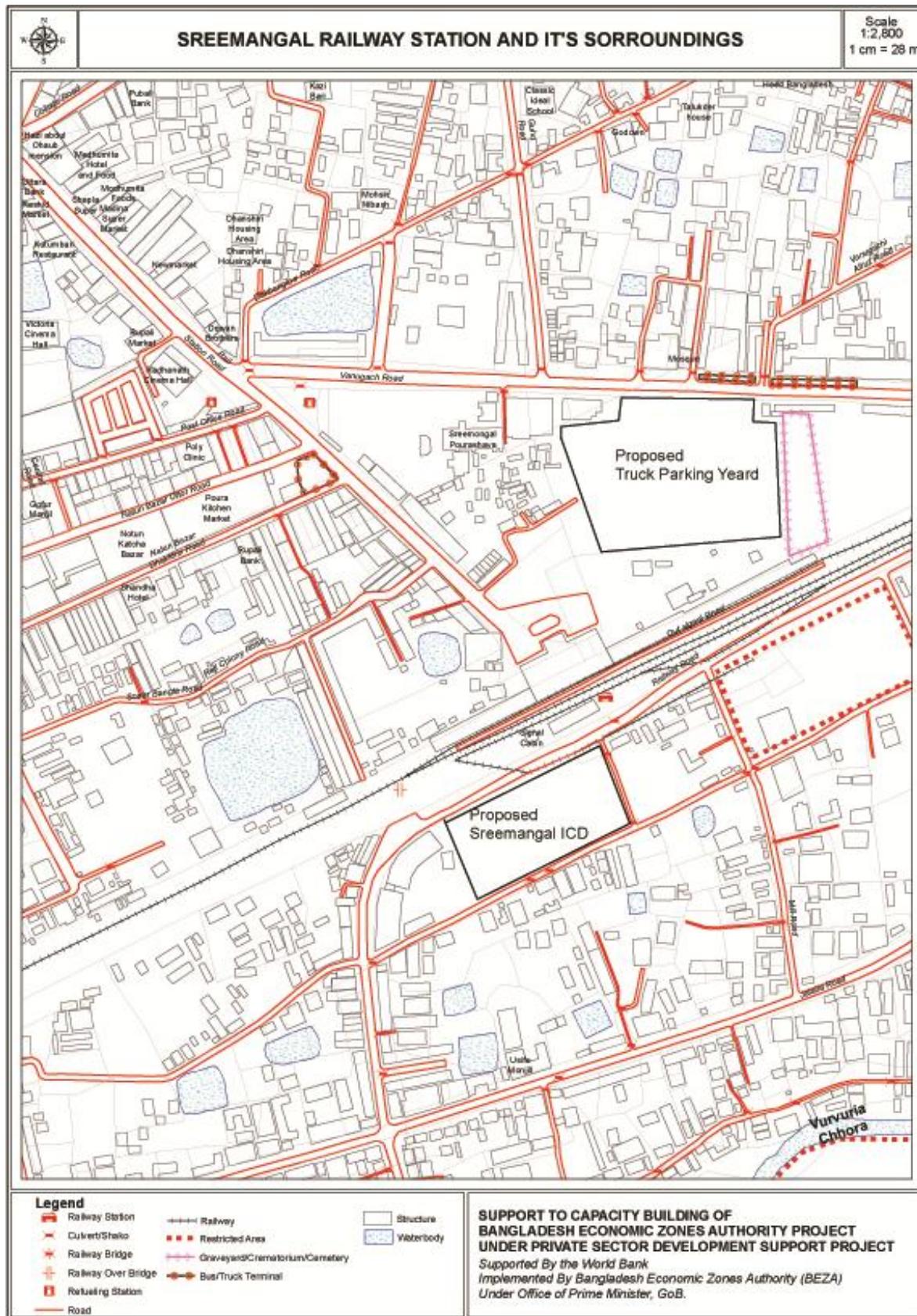
3.1.1.2 Visit to Sreemangal Railway Station

During this mission, a field visit was made to Sreemangal Railway Station with a view to assessing the same for developing a small Rail Terminal (ICD- Inland Clearance Depot) at the Railway Station. The available land on both sides of the Railway Station was observed and the following information was collected:

- For selection of a container ICD Sreemangal is assessed as the better location compared to Sylhet Railway Station considering the land availability at the station, location, and road access and road condition to the proposed EZ site.
- Observed 2 spots, one is for parking of trucks to the northern side of the Railway Station just by the side of Sreemangal-Vanugach/Shamshernagar Road (about 60 ft. wide). Another spot (site) for an ICD is to the southern side of the Railway Station having both road and railway connectivity. Each of the sites is about 3.5 acres in area (refer to Fig. 3.1.1-2 for Location of proposed ICD and Parking yard near Sreemangal Railway Station).
- ***Access to the Southern ICD site:***
 - 60 feet wide road (Sreemangal-Vanugach/Shamshernagar road) passes by the Truck Parking site towards Vanugach/Shamshernagar to the east then turns towards the south from the level crossing at about 250 metres east from Truck Terminal site. Further, one 25 feet wide road leading to the ICD site (to the west) starts from above the Sreemangal-Vanugach road just near the level crossing.

- The tankers of two existing oil depots here use this route to go out of the town.
- Cost of freight transport (5 ton truck) is approximately BDT 4,000/Trip as informed from the tankers.

Figure 3.1.1.2-1: Sreemangal Railway Station and Its Surroundings with Location of Proposed ICD



3.1.1.3 Kushiyara River

The Kushiyara River flows almost parallel to the Maulvibazar-Sylhet Highway near the EZ site and downstream across the Dhaka-Sylhet/ Maulvibazar-Sylhet Highway. A composite Steel Bridge (Sherpur Bridge) of about 290 m length (3 main spans of 90 m each +2 end spans of 10 m each),

constructed in 1988, exists at this intersection of the River and Highway and is about 1 Km north-east from the proposed EZ site.

The Kushiyara River originates from India and flows through the Sherpur Bridge near the proposed EZ site, converges with the Surma River at Elenjuri, Kishoreganj and then flows till it falls to the Meghna near Bhairab. It is a perennial river with significant flow during the monsoon season.

During visit the water level in the river was found to be about 80 ft. as per local information. The soffit of the guarder of the bridge is about 39 ft. from the existing water level. Vertical clearance for the bridge is considered to be about 35 ft. above the 2004 flood level. According to local information, the lowest water level in the river remains about 10-12 ft. above the lowest bed level.

3.1.1.4 Possible Social Implications

As a small amount of land to be acquired at the site for establishing the first economic zone in Sylhet Region; some social issues may create problems for the project. The social expert looked into those issues and suggested possible resettlement plan which is described in detail in Section 4.2 of Chapter 4.

During the field visit various consultation meetings were held with Upazila level government officials, union parishad officials. Consultations were also conducted with local people - including homestead owners, agricultural land owners, fishermen, fish traders, women, elementary school children and local traders. During these consultations people mentioned their problems of life at present and lack of employment opportunities. They are aware of the proposed EZ project and are looking to work on it or have some benefit from the spillover effect. They're looking to hand over the land to EZ authority in exchange for appropriate and early compensation. They also explained that it'll be better for them if land is provided against their households. For agricultural and fishery lands; compensation will be sufficient.

The fish traders and fishermen living nearby have stated that they will have a positive impact on their lives. At present fish is available for only 4 months of the year and is not enough to support their lives. They think the EZ will create opportunities for them to work in the other period of the year.

The consultants didn't find any problem with acquiring land for the proposed EZ. There are only 5 households with a total of 39 people living in them. All the household owners are ready to give up their land for the proposed EZ. A girevence redress mechanism has been proposed in Chapter 4 to solve the possible land acquisition issues. Still if the land acquistion takes more time then estimated in this feasibility study; the whole construction process can be shifted. Some increase in construction costs will be a result of the delay; so it'll be advisable to complete the land acquistion process swiftly for a better outcome.

Some relevant photographs of field visit on Sherpur EZ site are presented below.



View of Sherpur EZ Site (Private land-Part A) showing landscape and settlement characteristic of the site.



Another view of part A site showing High Voltage Line within the site.



View of public land part of Sherpur EZ site (B site) as seen from the end of the site at Hamarcona on Sylhet-Maulvibazar Highway.



View of Dhaka-Sylhet Highway (access road to the site) with small bridge ahead on the Highway that bifurcates the two parts of the site (site A to the left and site B to the right).



View of small bridge on Dhaka-Sylhet Highway at the site showing existing small khal underneath the bridge and its structure.



View of khal that passes through the small bridge up to the Gong.



View of Sylhet-Maulvibazar Highway (access road to the site) near public land part (B site) at Hamarcona.



View of Sreemangal Railway Station track layout.



View of empty land to the left for developing proposed container ICD.



View of access road to the ICD site from Vanugach/Shamshernagar Road.



View of ICD access road towards Vanugach/Shamshernagar Road as seen from the other side of the road near the proposed ICD site to the right



View of ICD access road, tank wagons at Sreemangal RS with Oil depot to the right. Photograph taken from the ICD access road near the ICD site to the RHS.



View of Sreemangal-Vanugach/Shamshernagar Road leading to Sreemangal-Maulvibazar Highway (to the left). Level crossing and starting of ICD access road behind and Track Terminal ahead (by the side of Sreemangal-Vanugach road).



View of Sherpur bridge over Kushiyara River on Dhaka-Sylhet/Maulvibazar-Sylhet Highway at about 1 Km north-east from the proposed EZ site. Photograph taken from Sylhet end.



View of proposed parking yard for Trucks (Truck Terminal) as seen from Sreemangal-Vanugach/Shamshernagar Road.



View of Sreemangal-Vanugach/Shamshernagar Road leading to Sreemangal-Maulvibazar Highway (to the left). Level crossing and starting of ICD access road behind and Truck Terminal ahead (by the side of Sreemangal-Vanugach road).



View of Sherpur bridge over Kushiyara River on Dhaka-Sylhet/Maulvibazar-Sylhet Highway at about 1 Km north-east from the proposed SEZ site. Photograph taken from Sylhet end.



View of Kushiyara River near Sherpur bridge site. Photograph taken from Sylhet end.



Upstream view of Kushiyara river as seen from the bridge top at starting of August.



View of downstream of Kushiyara river from the bridge top.



Upstream view of Kushiyara River showing river traffic (launch) at launch Terminal that plays throughout the year.



View of Sherpur bridge over Kushiyara River as seen from the Jetty point. Stable river banks in the vicinity of the bridge are seen in the view.



View of road (under construction) starting from Launch ghat/Jetty point (BC access road) runs about 3 Km up to Pakrul Power Plant.

3.1.2 Description of the Sub-soil Condition of the Site

The topsoil at the EZ site is mainly silty clay. According to the sub-soil investigation record of this area (Maulvibazar District, Sylhet Division) the soil profile at shallow/beyond shallow depth is mainly dominated by non-cohesive soil. However, for better understanding a field soil bore log data of a bridge site (bore hole location on the land) in Maulvibazar district is presented here.

The soil bore log is collected from secondary spruce and it is of a site about 20 km from the site. It's been collected to get general idear about the region and considered in design process of foundation type and dimension of super structures.

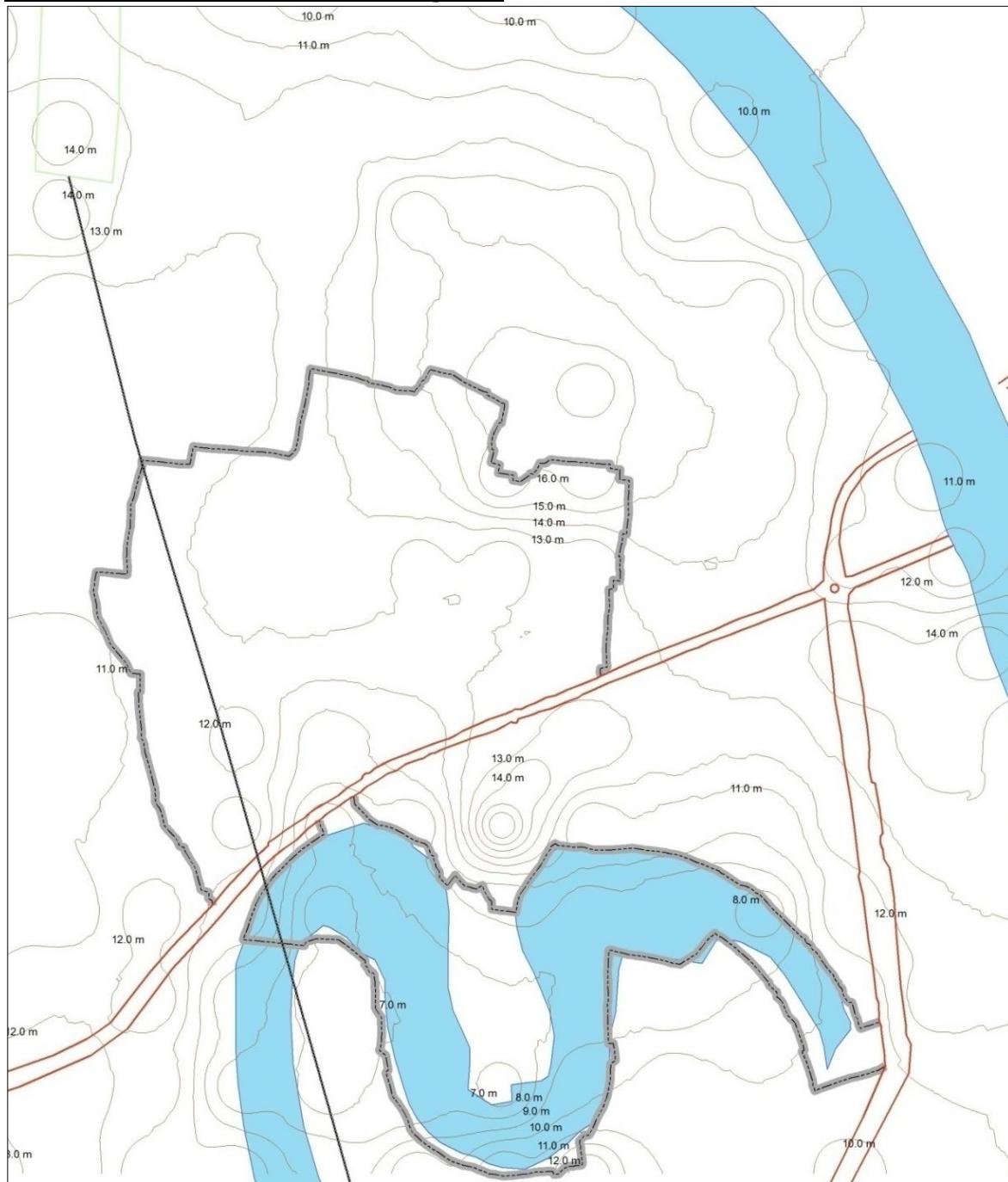
Figure 3.1.2-1: Soil Bore Log Data Sheet

3.1.3 Topographical Condition

Topographical conditions are critical in determining the finishing level of the land development. The contour lines are overlapped on the geographical map. The elevation of the river side will be investigated carefully to figure out the suitable finishing level.

According to the topological contour analysis, the northern part has an elevation of +10m ~ +13m. The southern part has an elevation of +7m ~ +8m. The river side has the elevation of approx. +10m. Considering these conditions, the finishing ground elevation is designed to be +12m. Details are shown in the section of engineering design.

Figure 3.1.3-1: Contour condition of Sherpur EZ



3.1.4 Rain Data

The following data is used for analysis:

Three hourly Rainfalls in millimetre.txt, Bangladesh Meteorological Department
Climate Division, Agargaon, Dhaka-1207

Figure 3.1.4-1: Yearly Total Rainfall in mm

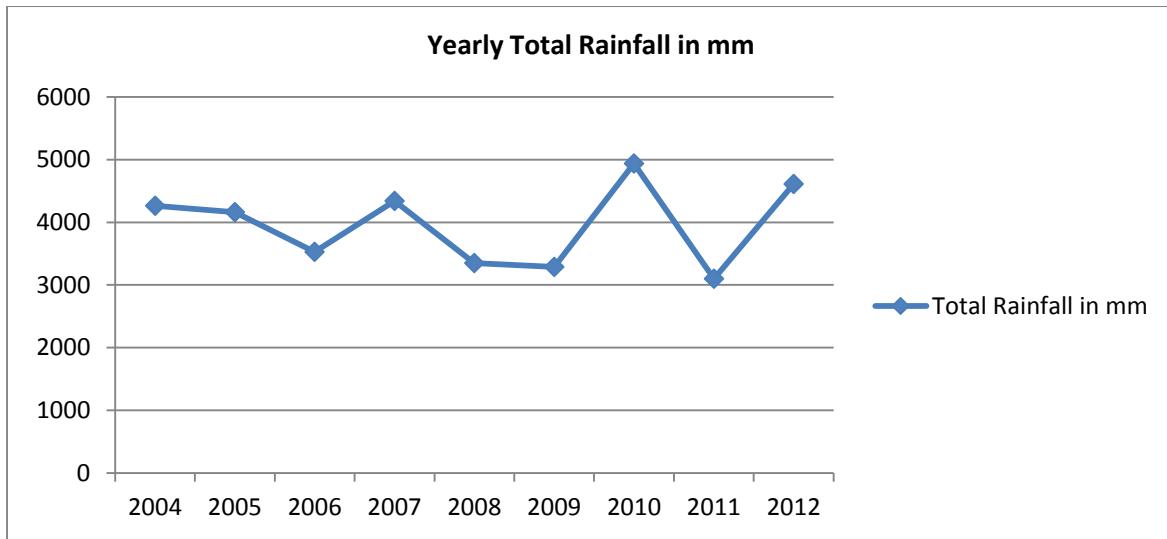


Figure 3.1.4-2: Monthly Maximum Rainfall in mm

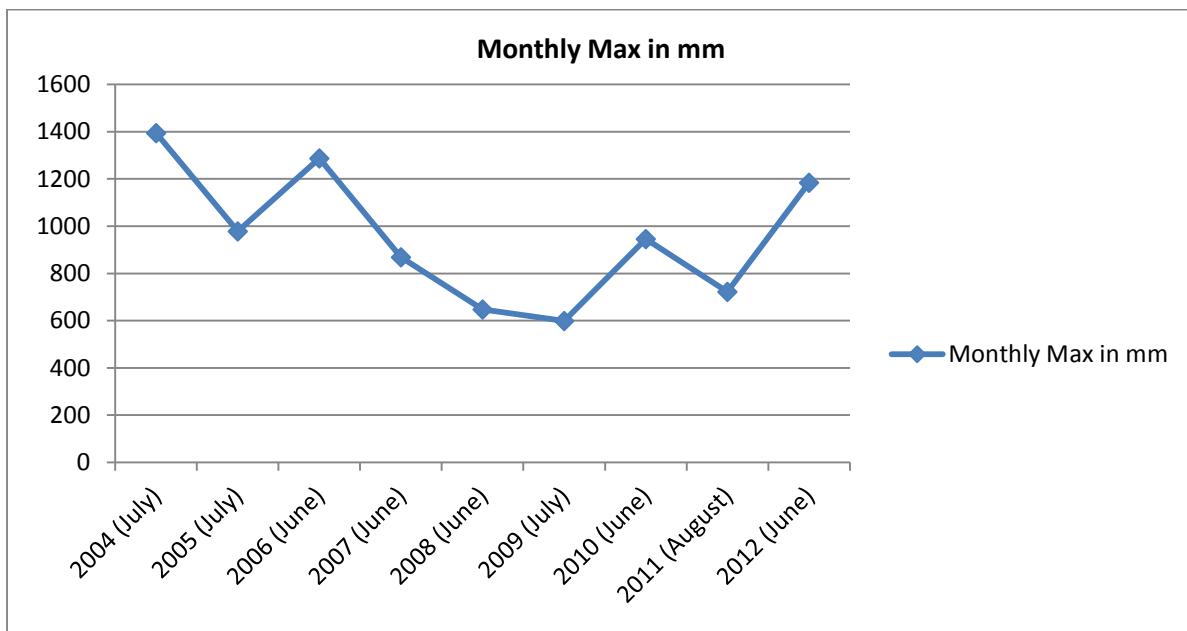


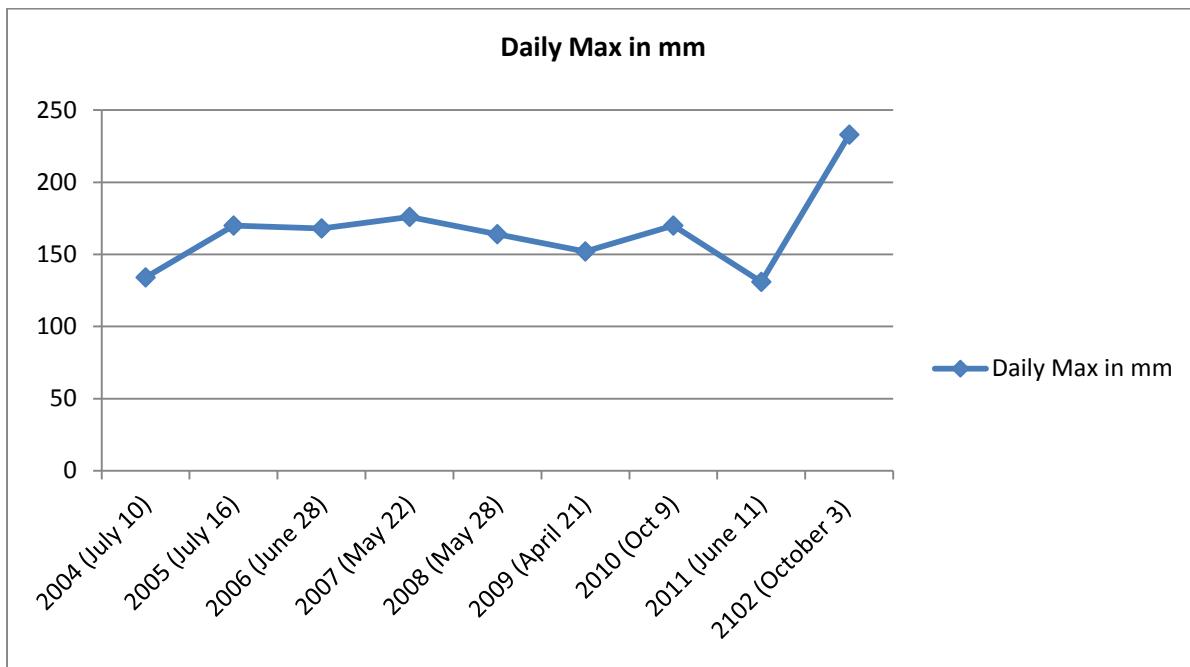
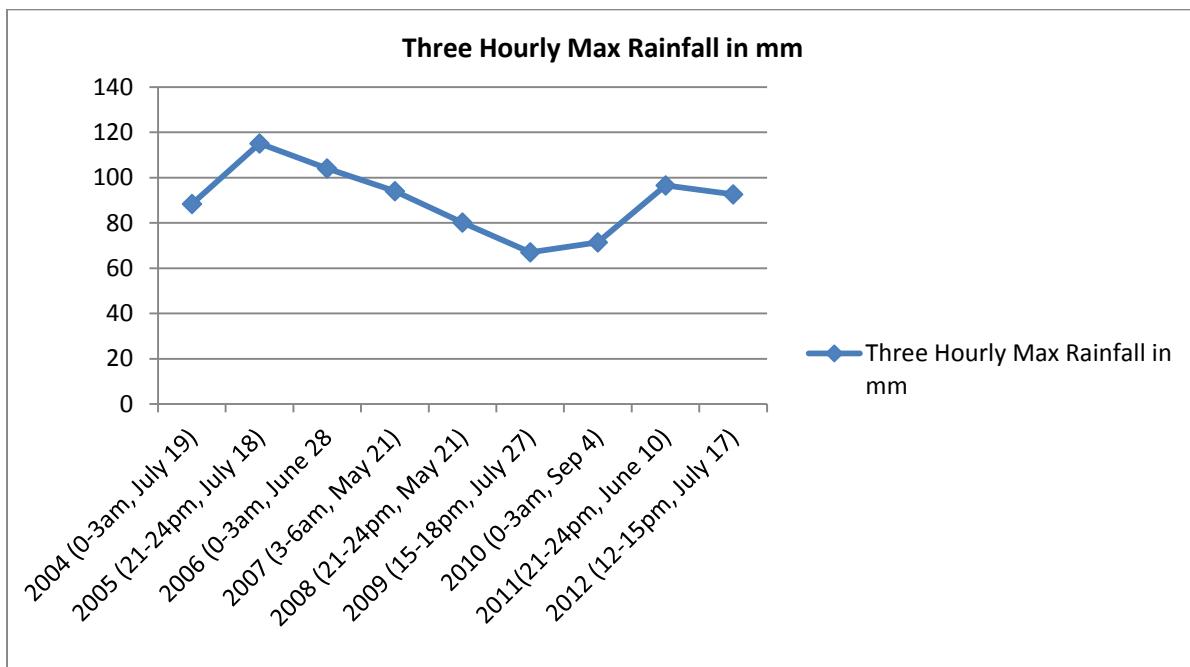
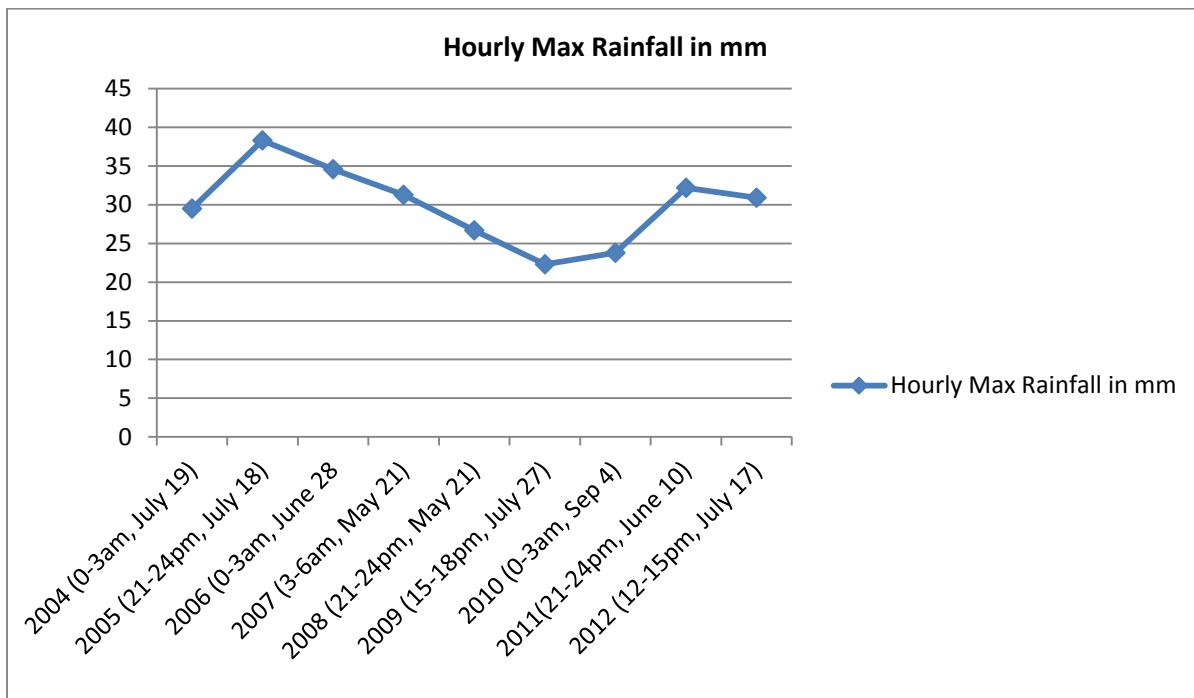
Figure 3.1.4-3: Daily Maximum Rainfall in mm**Figure 3.1.4-4: Three Hourly Maximum Rainfalls in mm**

Figure 3.1.4-5: Hourly Maximum Rainfall in mm

The daily rainfall is a critical parameter in deciding the dimensions of the retention pond on the site of the proposed EZ. The retention pond is necessary to retain the extra rain volume and will reserve excess volume when an unexpected heavy rain and flooding is caused.

The hourly maximum rain data is important for designing the dimension of the u-drain which will be built along the road. Detail of the design process is explained in the section on the drainage system in the engineering design.

3.1.5 River Condition

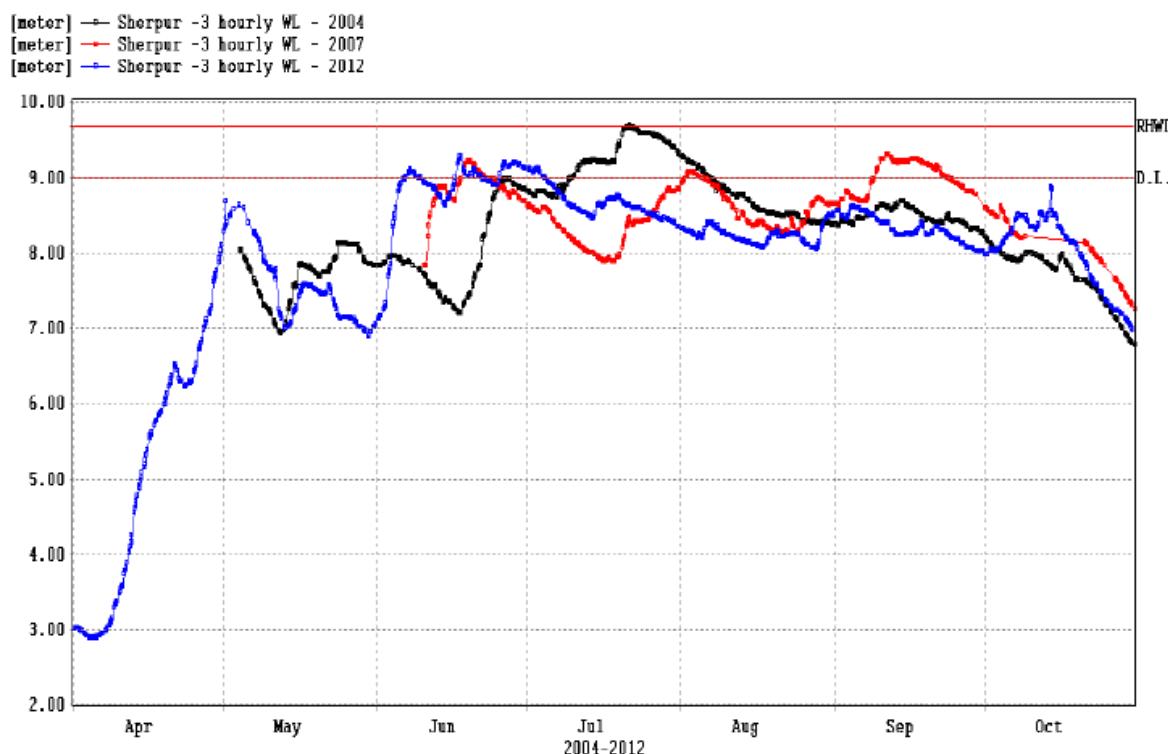
The Kushiyara River flows within 1 Km of the site. It is one of the many international rivers in Bangladesh. It is a branch of the Barak River, which originates in the state of Manipur in India and runs along the border of the Indian states of Manipur & Mizoram before being split into the Surma and Kushiyara prior to entering Bangladesh. It is a river of the Surma-Meghna River system, one of the largest river systems in the world. The Kushiyara receives left bank tributaries from the Tripura Hills, the principal ones being the Manu. The Kushiyara River is approximately 150 m wide when full and the average depth is about 12 m. The slope of the river bed is higher in Kushiyara which is 100mm/Km. Limited data on suspended sediment concentrations at Sherpur suggests that loads are relatively modest for the Kushiyara. The highest concentration reported is 2,300 ppm at Sherpur from a discharge of 2,300 m³/s. A previous study on the water quality near Sherpur (converging point of the Manu and Kushiyara Rivers) shows the following result.

Table 3.1.5-1: Water Quality of Kushiyara River near Sherpur

| Parameters | Value |
|------------------------------------|-------|
| pH | 8.2 |
| Total Dissolved Solids (mg/l) | 139 |
| Calcium (Ca^{++}) | 0.4 |
| Magnesium (Mg^{++}) | 6.2 |
| Sodium (Na^+) | 14.5 |
| Soluble Iron (Fe^{+++}) | 0.13 |
| Bicarbonate (HCO_3^-) | 98.0 |
| Carbonate (CO_3^{2-}) | 2.04 |
| Chloride (Cl^-) | 3.00 |
| Sulphate (SO_4^{2-}) | 16.00 |
| Nitrate (NO_2^-) | 0.11 |
| Fluoride (F^-) | 0.00 |

Source: Study project of USAID

The water level of the Kushiyara at Sherpur shows a steep rise and fall throughout the year. In 2012 it flowed above the Danger Level (DL) in June for 9 days and in July for 4 days (total 13 days). It attained its yearly highest peak of 9.28 m on 17th June, which was 28cm above its DL (9.00 m). In 2011, it flowed above the DL on 19th August for one day, from 23rd August to 27th August for 5 days (total 6 days). It attained its yearly highest peak of 9.12m on 24th August, which was 122cm above its DL (9.00m). No data is available for the Sherpur gauge station of the Kushiyara River before the year 2004. The following figure shows the three hourly water levels of different years with the recorded highest water level (9.68m).

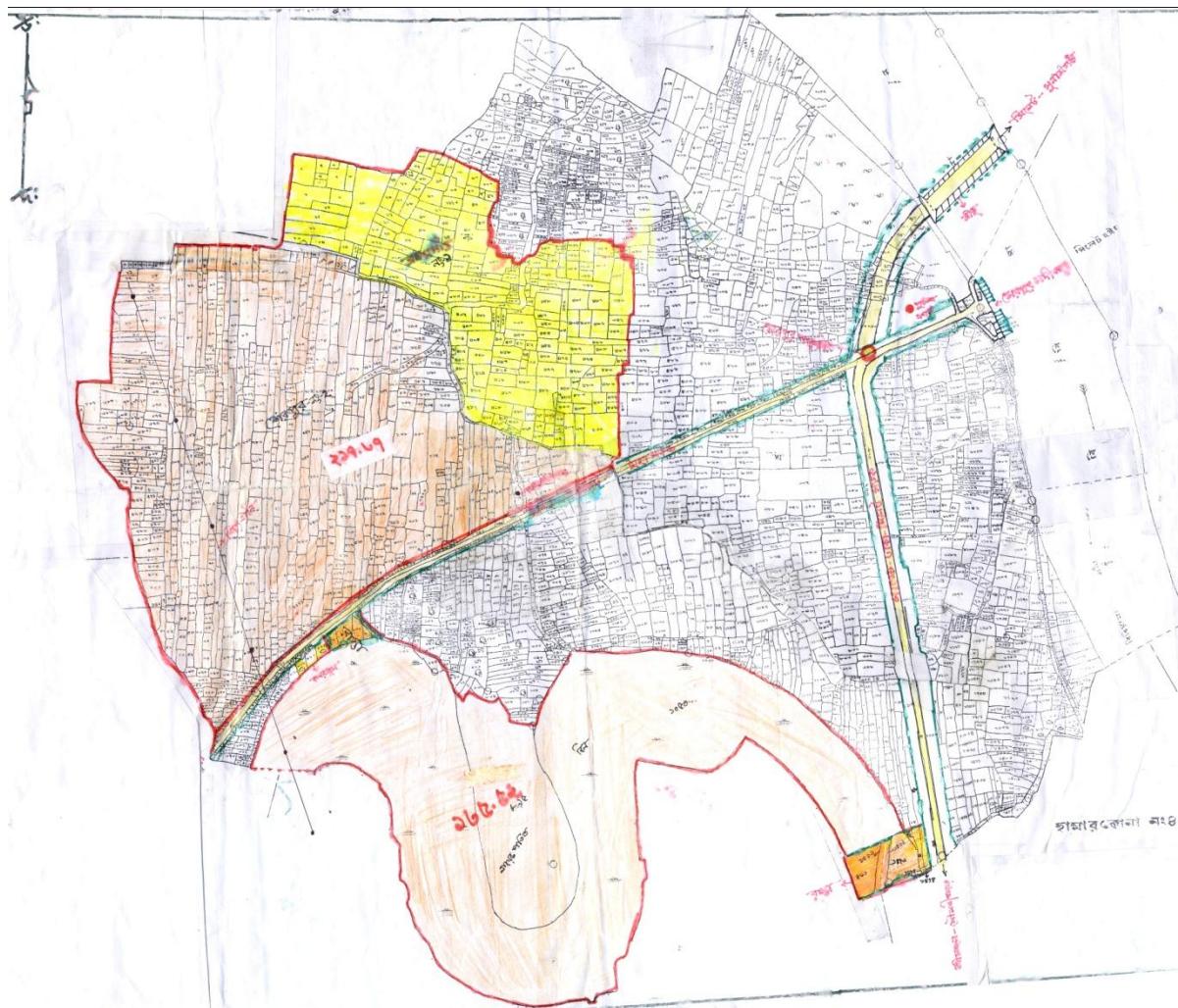
Figure 3.1.5-1: Comparison of Hydrograph on the Kushiyara River at Sherpur

Source: Annual Flood Report of 2012, Flood Forecasting and Warning Center (FFWC) of BWDB

3.1.6 Cadastral Map

The cadastral map provided by the DC office, Maulvibazar is added below. In the map the southern red coloured part is the public land. Most of this area is an existing water body.

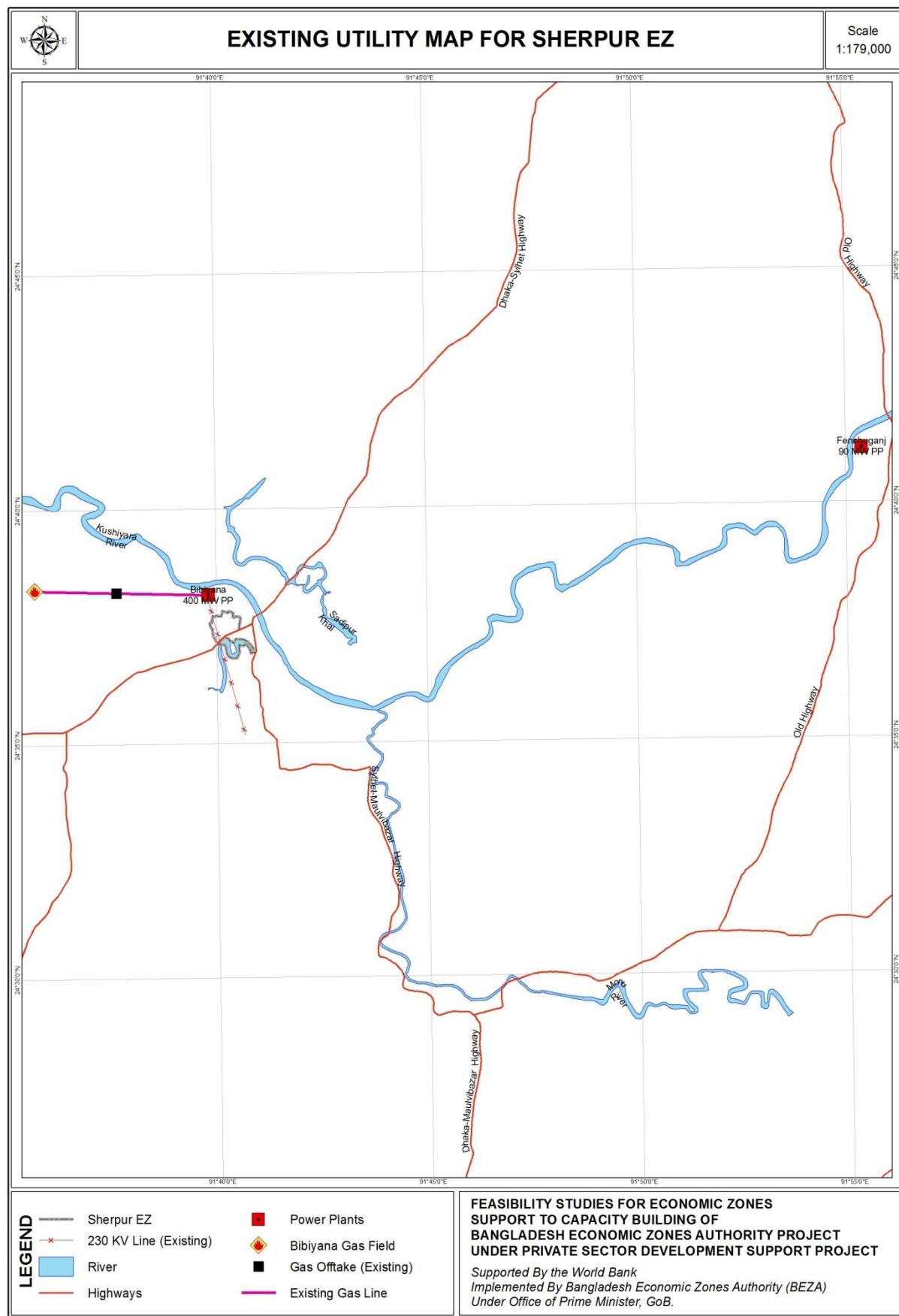
Figure 3.1.6-1: Cadastral (Mouza) Map of Sherpur EZ and Surroundings



3.1.7 Utility Map

Bibiyana gas field is located very close to the site (10 Km). There is a gas connection line from Bibiyana gas field to the 430MW power plant under construction which is within 1 Km of the site. Gas for Sherpur EZ could be taken from this line. There is a gas off-take on this line which can be used to connect the site with an existing gas network. For electricity connection both the existing 230KV line passing through the site or the 132/33KV SS available in Fenchuganj can be accessed. This depends upon the power demand of the site.

For water, there is no problem of water for Sherpur EZ. Kushiyara River is just within 1 Km from the site which can be used as a reliable water supply. The detail of utility connections is given in Sections 3.5 to 3.9 of Annex-4.

Figure 3.1.7-1: Existing Utility Map of Sherpur

3.1.8 SWOT Analysis

The proposed Sherpur EZ as an EZ site possesses both strengths and weaknesses, as well as opportunities and threats. But, compared to weaknesses and threats, its strengths and opportunities are great and as such, this EZ has been proposed for implementation. Following are the lists of strengths, weaknesses, opportunities and threats:

Table 3.1.8-1: SWOT Analysis Table for Sherpur EZ

| Strengths | Weaknesses | Opportunities | Threats |
|--|---|---|--|
| <ul style="list-style-type: none"> • Site is located by the side of the 60 ft. wide Dhaka-Sylhet Highway. • The site has a good road network. • The land is plain and high and only 3m earth filling is required. • A 230KV power line is passing through the site. • Optical fibre line telecom system is present at the site. • Only 5 households are located at the site and as such, the resettlement issue will not be significant. • Loss of agricultural crop land and associated income is very small. • Site is especially suitable for heavy and large industries. • Less number and temporary type of structures will reduce the time for site clearing. | <ul style="list-style-type: none"> • No existing water supply facility at site. • The land parcel under the 230KV HT line can not be used for development. • Large waterbody within the site will cause environmental concerns. • Low land filled by river sand will raise the issue of compaction and thus increase construction cost. • Site is divided into two parts by the highway which decreases the safety and increases development costs. • Dike needs to be constructed around the site to make it flood free. • Higher amount of private land will increase the time and cost of land acquisition. | <ul style="list-style-type: none"> • 3x400 MW power plant is under construction within 1 Km from the site. • Gas off-take is also available within 6 Km. • Surface water is available from Kushiyara River, which is within 1 Km from the site. • Railway transportation up to Sylhet is possible. • ICD at Sreemangal Railway Station is planned to be constructed. • This will be the first planned industrial base in Sylhet region. • Ashuganj river port is about 100 Km from the site which can be used for river transportation | <ul style="list-style-type: none"> • The site is 208km from Dhaka. • The site is also 435Km from Chittagong Port. • Lack of proper infrastructure in the Region. • The region is not very industrially developed. • Insufficient Cargo handling facilities by Rail transport. • Water transportation of heavy containers is not possible through nearby Kushiyara River. • Air shipment of Cargo facilities is virtually absent. • Absence of urban living and recreational facilities in nearby areas |

It may be concluded that, to ensure at least optimum (if not maximum) utilization of the strengths and opportunities of the proposed EZ, the weaknesses identified need to be overcome and the threats need to be eliminated or at least controlled (brought in to effective control of the EZ management); and, it is possible only when the concerned management takes in to active consideration the above characteristic features and addresses them properly and adequately in a way they deserve.

3.2 Best Practice Master Plan

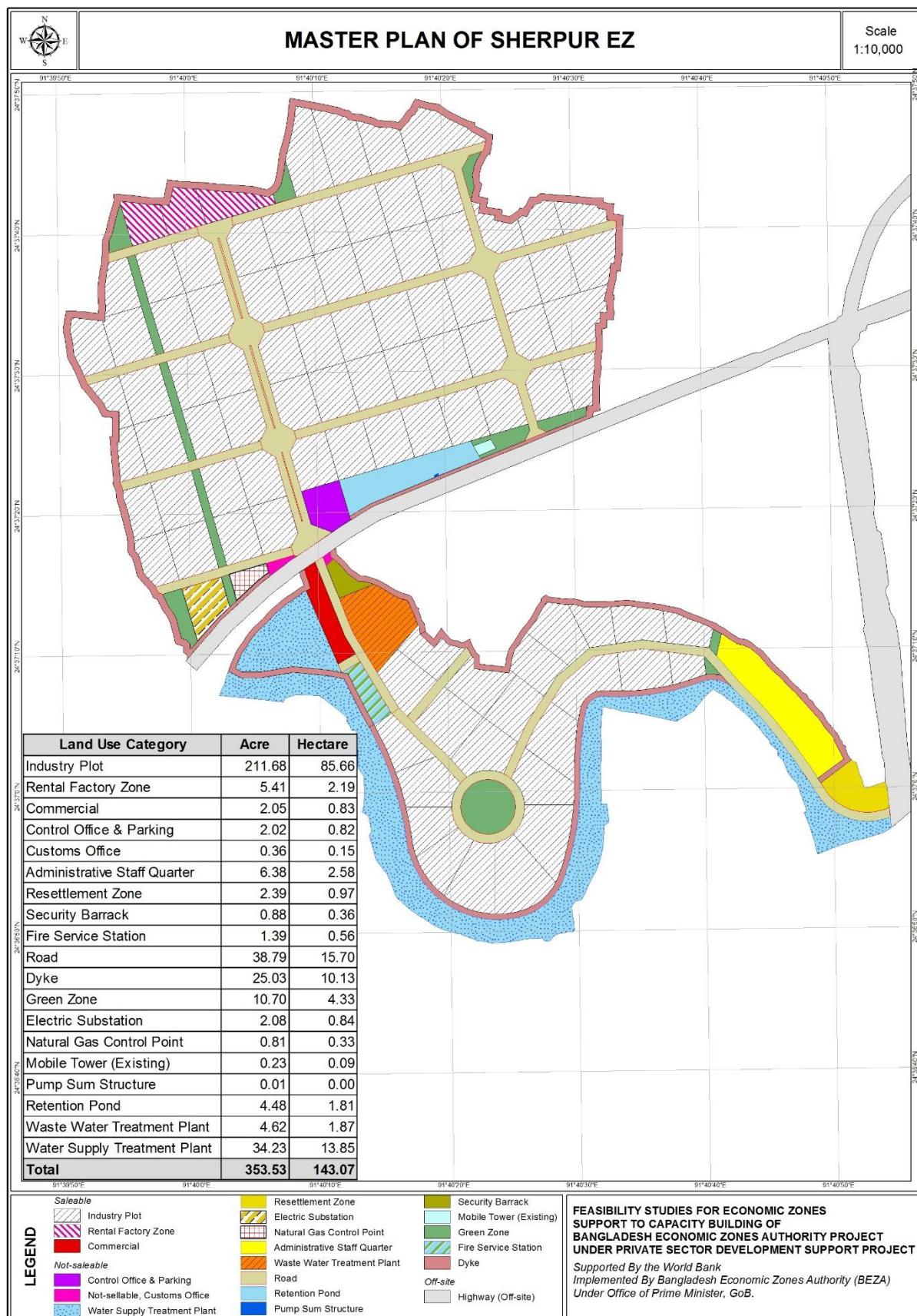
This chapter describes primary planning and engineering considerations required to achieve the best practice master plan for the Sherpur EZ.

3.2.1 General Land Use and Concept of Master Plan

The main objective of the Sherpur Economic Zone is to create the first modern and environmental friendly industrial zone in Sherpur. The project site is approximately 353 acres (143 ha). Due to the compact nature of the designated site, the planning team has determined its most suitable land use is to be mainly for industrial use. The land is bifurcated by the existing Dhaka-Sylhet Highway. The northern part is approximately 219 acres (89 ha) while the southern part is approximately 134 acres (54 ha). The full packaged combination of readily available capacity for future electric power supplies, sufficient gas supplies, and an abundant volume of water in the Kushiyara River increase the potential development of heavy power-consuming industry such as dyeing, textile manufacture and ceramics to locate their production in this industrial zone. These industries are labour-demand intensive and huge job creators. There will be 89 industrial lots (approximately 210 acres (85 ha), with an area set aside for rental factories (approximately 6 acres (2 ha) in this development Master Plan - an attractive force for investors.

Sherpur Economic Zone will have a modern infrastructure such as a power supply, gas system, water supply treatment system, waste water treatment system, communication system and a flood protection/control system equipped to international standard. This industrial zone aims at achieving a modern and environmental friendly industrial zone. A unique eco design is prepared for energy conserving systems of water reserving and recycling. A “Full Packaged Utilities and Environmental Friendly Industrial Zone” is the development concept recommended for recognition as the future urban development model for Bangladesh.

The Master Plan drawing of Sherpur EZ is shown next.

Figure 3.2.1-1: Master Plan (Environment Friendly Industrial Zone)

3.2.2 Basic Land Use

Relatively large sized factories are expected to be built that will consume significant electricity and gas resources together with sizable quantities of water from the existing river. In this case, a relatively wide area will be needed for the water treatment plant. Therefore, the water supply treatment plant and waste water treatment plant are proposed along the existing highway near the planned water intake, rain water capture, and waste water discharge route. The standard factory lot is designed to have an average area of 2.47 acres (1 ha). The plot layout is designed to be adjustable for increasing or decreasing, as desired. Tenants will be able to purchase any large lot by adding a standard lot or, any small sized piece by dividing the standard lot into smaller pieces of 2,000 m². Through skilful land use planning, approximately 62% of land is to be held for the factory area so as to receive sufficient numbers of tenants.

The following table shows the Area of Requirement in the Development Master Plan.

Table 3.2.2-1: Master Plan Area of Requirement (Industrial Zone)

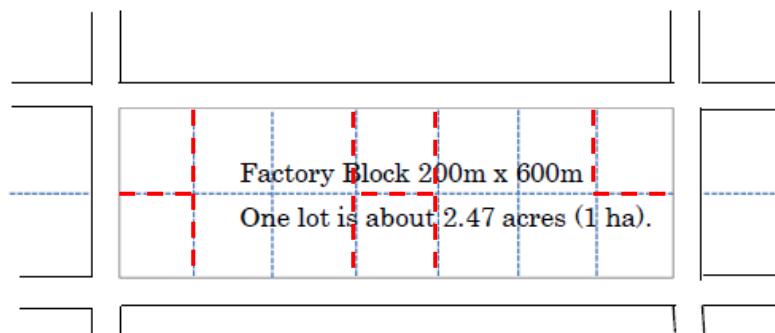
| Sale Status | Land Use Category | Acre | Hectare |
|--------------|------------------------------|---------------|---------------|
| Saleable | Industry Plot | 211.68 | 85.66 |
| | Rental Factory Zone | 5.41 | 2.19 |
| | Commercial | 2.05 | 0.83 |
| Not-saleable | Control Office & Parking | 2.02 | 0.82 |
| | Customs Office | 0.36 | 0.15 |
| | Administrative Staff Quarter | 6.38 | 2.58 |
| | Resettlement Zone | 2.39 | 0.97 |
| | Security Barrack | 0.88 | 0.36 |
| | Fire Service Station | 1.39 | 0.56 |
| | Road | 38.79 | 15.70 |
| | Dike | 25.03 | 10.13 |
| | Green Zone | 10.70 | 4.33 |
| | Electric Substation | 2.08 | 0.84 |
| | Natural Gas Control Point | 0.81 | 0.33 |
| | Mobile Tower (Existing) | 0.23 | 0.09 |
| | Pump Sum Structure | 0.01 | 0.00 |
| | Retention Pond | 4.48 | 1.81 |
| | Waste Water Treatment Plant | 4.62 | 1.87 |
| | Water Supply Treatment Plant | 34.23 | 13.85 |
| Total | | 353.53 | 143.07 |

3.2.3 Standard Plot Size

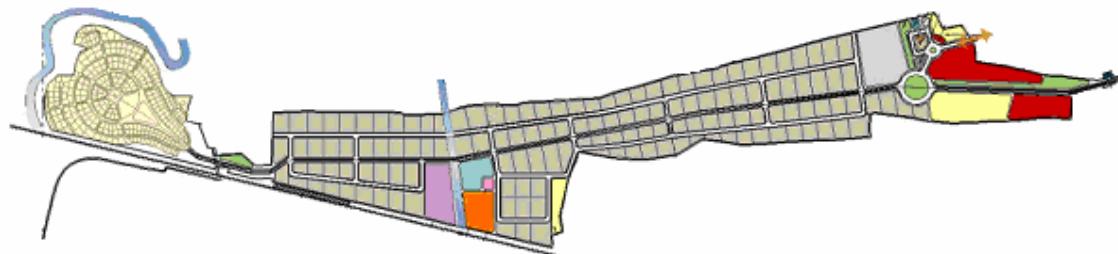
The road network is planned in order to divide the factory lot block by approximately 200m x 600m, on average, for optimizing the traffic flow inside the economic zone.

The standard factory lot is designed to have an average area of 2.47 acres (1 ha). The standard dimension of the standard lot is 90m x 111m. The factory lot dimension excluding the front setback (main road: 20m, minor road: 15m) becomes approximately square which forms the desired factory wall lines.

In addition, the plot layout is designed to be adjustable for increasing or decreasing, as desired. Tenants will be able to purchase any large lot by adding a standard lot or, any small sized piece by dividing the standard lot into smaller pieces of 2,000 m².

Figure 3.2.3-1: Standard Factory Block and Road Network

This approach has been applied to the Phnom Penh Special Economic Zone in Cambodia which was built recently and enjoys a good reputation among foreign direct investors. This allows flexible plot layout and has been accepting frequently changing real demand of tenants when the land leasing contract was signed. The following figure shows the master plan layout of the Phnom Penh Special Economic Zone in Cambodia. The total development area is about 360ha. The average standard plot size is 1 ha as explained before.

Figure 3.2.3-2: Example of Plot Layout

This layout has accepted a variety of tenant's need such as 1ha, 3ha, 5ha, 10ha, or even 2000m². Therefore, the same layout can be applied to the EZs in Bangladesh.

3.2.4 Main Functions inside Sherpur Economic Zone

A brief explanation is given to the major functions inside the Sherpur Economic Zone.

1) Main Function

The major land use of the Sherpur Economic Zone is industrial.

Focal Point (Main Gate)

An attractive monumental main gate should be built. It should be an eye catching structure, with a unique design, and be visible from the highway.

One-Stop Service Centre

The facility will provide advocacy information to economic zone tenants for their continuous operation as well as providing the clear and transparent supportable guidance. This facility could be located inside the administration building. It has become traditional for investors to be required to submit documents and proposals to several ministries when they need to build their factory or to export/import goods. And often, those investors have complained of rampant corruption, or the requirement to pay 'under-the-table-money' to ministry officials or government clerks so as to avoid

long delays in processing necessary paperwork. The One-Stop Service Centre will simplify paperwork and cut out traditional redundancy. Ministerial offices are located in one building and highly motivated officials will support application procedures for potential investors in the zone.

Administration Building

A sales office and administration building will be located adjacent to the focal point. The facilities should house administrative functions as well as promotion and sales functions. The audio visual briefing room should be available for interested investors to gain more knowledge about the attractiveness of the economic zone. There will also be a small clinic located in this building.

Customs Office

Two customs offices are proposed adjacent to the entrance of the Northern and Southern parts for controlling the flows of goods into and out of the economic zone. A customs office will cover 0.15 ha (0.36 acre) land. The custom officers normally check for appropriate documentation and verify that a good or a resource is entitled to enter the economic zone. Any goods or resources not yet cleared through the custom would be held near the custom office until processed.

Green Area and Landscape

All along the main road inside the industrial zone will be landscaped with beautiful small trees. The small open space would also be provided, as a buffer zone. This would create a pleasant environment for the industrial community.

Factory Lots

A rather conventional rectangular shape of plot is designed with approximately 2.47 acres (1 ha) area inclusive of the buildings setback from the front road. Forming a factory block surrounded by the internal road will give tenants a variety of land purchasing options. Tenants will be able to purchase any continuous plots or to reduce the lot size downward to 0.494 acres (2,000 m²) accordingly.

Rental Factory

A total of 5.41 acres (2.19 ha) of space is set aside as a rental factory zone. This will provide industrial space to the investors who do not have long-term production plan or sufficient initial investment sources.

Housing for Administrative Staff of the the Economic Zone:

A total of 6.38 acres (2.58 ha) of space is kept for housing the zone's administrative staff. It will provide residence to the BEZA administrative officials working there. Details of buildings are explained in Section 3.10 of Annex-4.

Commercial Zone

The commercial zone will be established in the EZ by private investors. This zone will be located along the road closer to the southern entrance of the industrial zone. It will include a food market and other small mini-shops. It will have a total area of 2.05 acres (0.83 ha).

Resettlement Zone

A total of 5 households have been found exist on the Sherpur Economic Zone site. These people need to be relocated to develop the industrial zone. A total of 2.39 acres (0.97ha) of land is set aside for their resettlement.

2) On-Site Infrastructure

Footbridges

Over the intersection between the south and north part of the EZ, footbridges are planned to enable safe crossings over the highway.

Roads

There will be two types of road in the industrial zone. One is a main road with a 33 metre right-of-way and the minor one is a road with a 19.5 metre right-of-way. The road network is designed in order to provide smooth traffic flow inside the zone. All utility lines such as electrical distribution, communication lines, water supply pipes, waste water pipes, drains are to be built along the roads.

Dike

The most important emphasis is placed on the design of a protection system from the natural hazard of flooding. The dike is to be built along the economic zone to block the unexpected high water overflowing from the Kushiyara River during a monsoon.

Retention Pond

The retention pond will be at the centre of the economic zone to catch water suitable for recycling, especially for water supply during the rainy season.

Water Supply Plant

Water from the Kushiyara River will be used as the water supply source for the Project. The place of water intake is selected at some point up-stream of the river. The existing water body will be utilized as the reservoir tank. The existing water body is maintained and utilized for the water reservoir of the water supply treatment plant. Sufficient water can be retained for the treatment system and simultaneously, the natural environment will be protected. The water body will act as a rain water retention pond during the heavy rainy season, as well. The water supply system will be by a gravity feed from a water tower at each water supply tank. Details are explained in Annex-4.

Waste Water Treatment Plant

Central wastewater treatment plants will be provided. A wastewater system will consist of a gravity sewer pipe, a sewer manhole, a lift station and a pressurised sewer pipe to collect wastewater generated within the Project to be treated by a central wastewater treatment plant. Pre-treatment for toxic waste will have to be provided in each factory prior to discharge to the sewer system outside the factory area. The final treated water will be used for recycling purposes and for irrigating the green zone. The details of the treatment plant are explained in Annex-4.

3) Off-Site Infrastructure

Details are described in section 3.3.

Dimensions and cost estimates of all infrastructures are explained in Annex (Engineering Design).

3.2.5 Investment Structure

The type of investors is shown in the table below.

Table 3.2.5-1: Type of investors for Sherpur EZ

| Lease Status | Main Land Use | Investor |
|---------------------|--------------------------|-----------------|
| Leasable | Industry Plot | PI |
| | Rental Factory Zone | EZD |
| | Commercial | PI |
| Not-Leasable | Control Office & Parking | EZD |
| | Police Station | EZD |
| | Electric Substation | EZD |
| | Fire Service Station | EZD |

| Lease Status | Main Land Use | Investor |
|---------------------|------------------------------|----------------------|
| | Gas Station | EZD |
| | Telephone Exchange | EZD |
| | Mobile Tower (Existing) | EZD |
| | Administrative Staff Quarter | EZD |
| | Resettlement Zone | GOB |
| | Internal Road | EZD |
| | Dike | EZD |
| | Green Zone | EZD |
| | Pump Sum Structure | EZD |
| | Water Supply Treatment Plant | EZD |
| | Retention Pond | EZD |
| | Waste Water Treatment Plant | EZD |
| | Off-Site Infrastructure | ICD |
| | Electrical Connection | PDB/EZD |
| | Communication Connection | BTCL/ISP/EZD |
| | Gas | Jalalabad Gas Co Ltd |
| | Highway Widening | RHD/EZD |

Note *EZD* : Economic Zone Developer
PI : Private Investor
GOB : Government of Bangladesh
BR : Bangladesh Railway
PDB : Power Development Board
BTCL : Bangladesh Telecom Communication Ltd
RHD : Road Highway Department
PHED : Public Health Engineering Department
ICD : Inland Clearance Depot at Sreemangal Railway Station

3.3 Off-site Infrastructure Connections

The off-site infrastructure connections for the electrical system, gas, and water supply are described below.

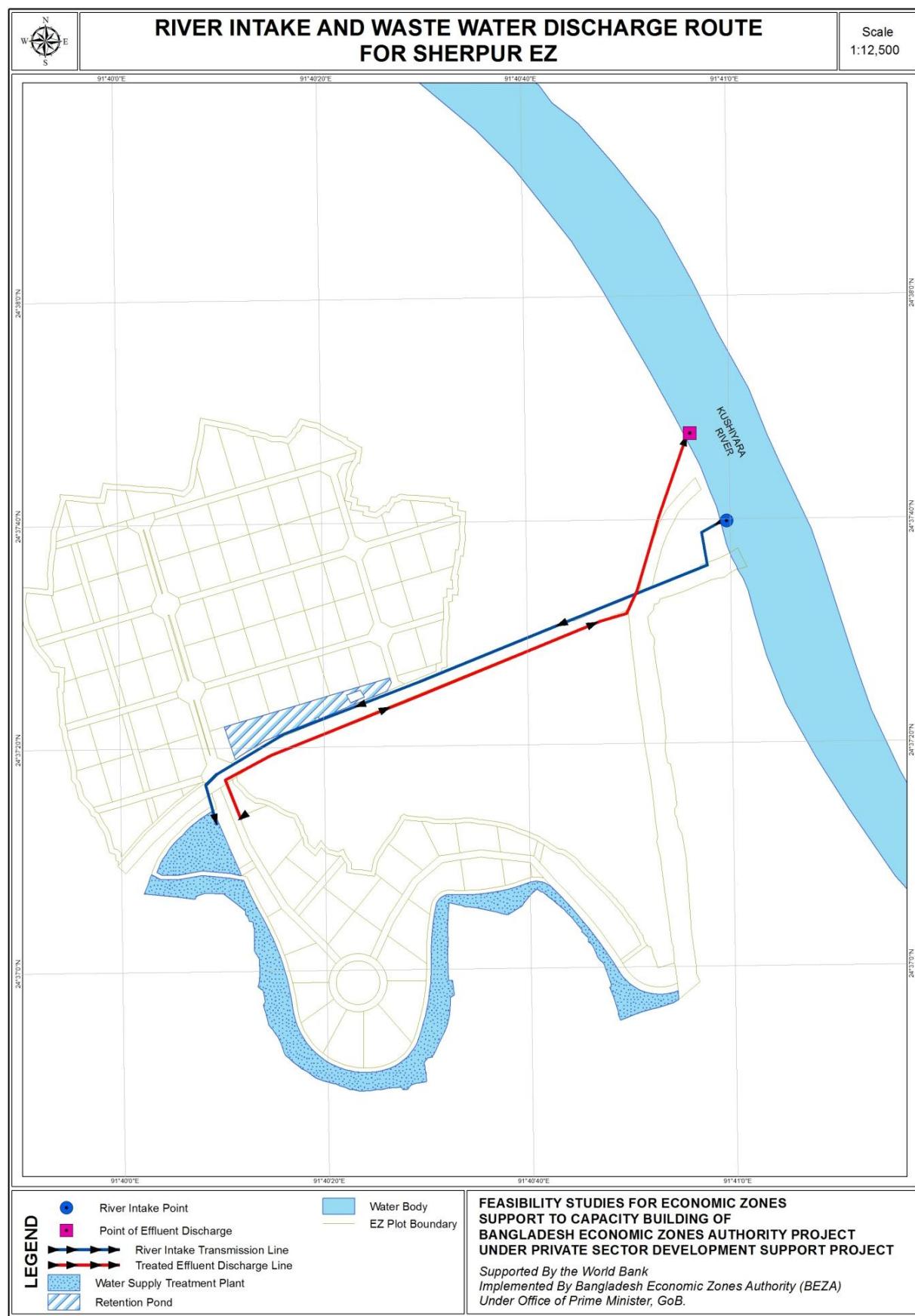
3.3.1 River Intake for Water Supply

The proposed river intake for Sherpur EZ will be located on Kushiyara River, flowing at 1 Km distance from the site. It will be connected to the retention area located inside the water supply treatment plant. Figure 3.3.1-1 shows the river intake location and connection to the site. The existing condition of the river intake point is shown in Photo 3.3.1-1.



Photo 3.3.1-1: River intake point for Sherpur EZ

The following figure shows the river intake and waste water discharge line for the EZ.

Figure 3.3.1-1: River Intake and Waste Water Discharge Route for Sherpur EZ

3.3.2 Electrical Connection

From nearby Bibiyana power station a 230KV PGCB substation at double circuit 230KV line leads to Comilla North 230KV substation. This 230KV transmission line passes through the Sherpur EZ area from where sufficient power can be drawn by constructing a 230/132/33KV substation of required capacity and a required transmission and distribution line. But this connection will be dependent on demand for power of the EZ. If the demand is more than 50MW, then this is a possible option. But the demand of Sherpur EZ (estimated) is 33MW. This option will also require a large space to be earmarked in the EZ area for establishment of a 230/132/33KV substation, which is quite impossible for a small EZ like Sherpur. That is why another option is needed for connection.

In the Sylhet area (near Sherpur EZ) a 132KV 3-circuit is available.

- (a) Shajibazar power station to Ashuganj power station direct single circuit.
- (b) Shajibazar to Ashuganj substation via Brahmanbaria grid substation double circuit. Single circuit can carry 100 MW load.

Fenchuganj to Bibiyana power station (Under construction) – Comilla North 230KV double circuit, can carry 250MW load. At present, a 200MW load is flowing in the peak hour. In the present construction scheme there is provision for a 230/132KV step down. The distance from Bibiyana power plant (under construction) to Sherpur EZ area is about 1Km. Sherpur EZ area can get power from Bibiyana PP by drawing this 1Km 132KV line and making a 132/33KV substation of required capacity in the Sherpur EZ area. But for this, the demand will be higher. As the EZ has very low electricity demand (only 33MW) this connection is not a viable option for it at present.

The estimated power consumption in Sherpur area is expected to be 33MW in the final stage. At the beginning of the project, it will require only the construction of 7-8MW of power, and gradually, with the development being finished and the industries being installed, the power demand will also increase to the expected level of 33MW. Keeping in view the above development of the power demand, the following recommendation for power connection to Sherpur EZ has been made:

- The construction of 33KV line from Fenchuganj 132/33KV substation to the Sherpur area and another line from Sylhet 132/33KV substation along with installation of suitable capacity transformers, switchgears, control room, etc.,
- The 230KV line which is passing along Sherpur area via Bibiyana Power station to Comilla is an express high voltage line. As such, for a load demand of 33MW, the power supply in/out of this 230KV line will not be allowed from the systems stability point of view. It should be possible to connect the EZ to the Fenchuganj 132/33KV grid. This line will be 27Km long. There can be a future option of connecting the EZ site with the Kumargaon 132/33KV SS located in Sylhet, so that the EZ can have an alternative source of power if one line fails. Figure 3.3.2-1 shows the power connection diagram for Sherpur EZ.

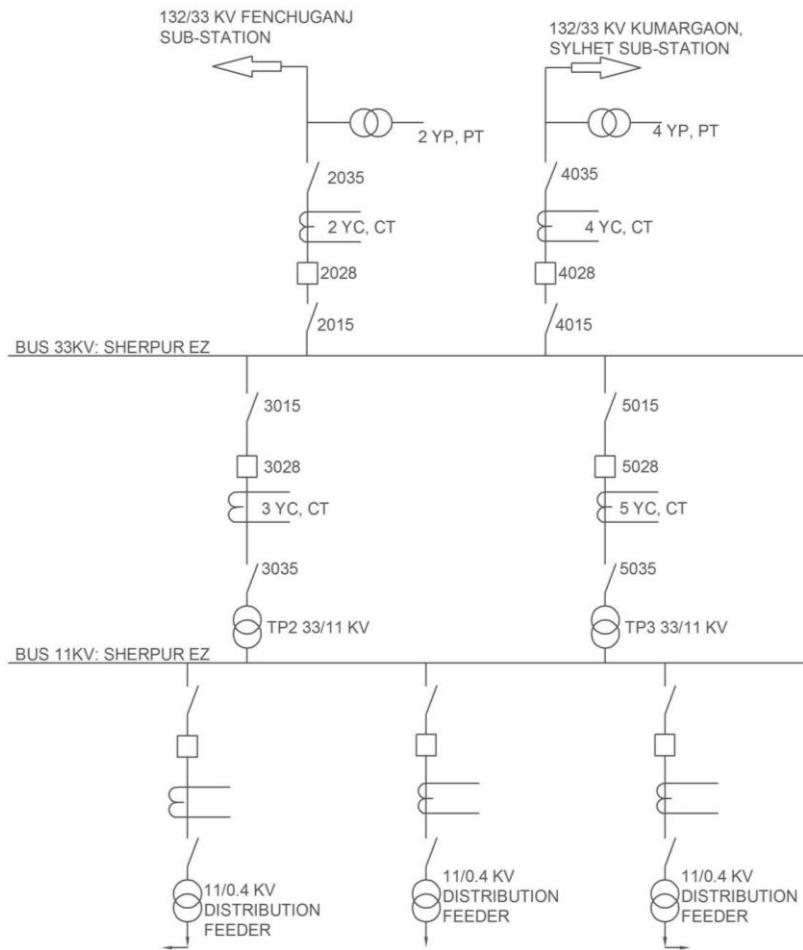
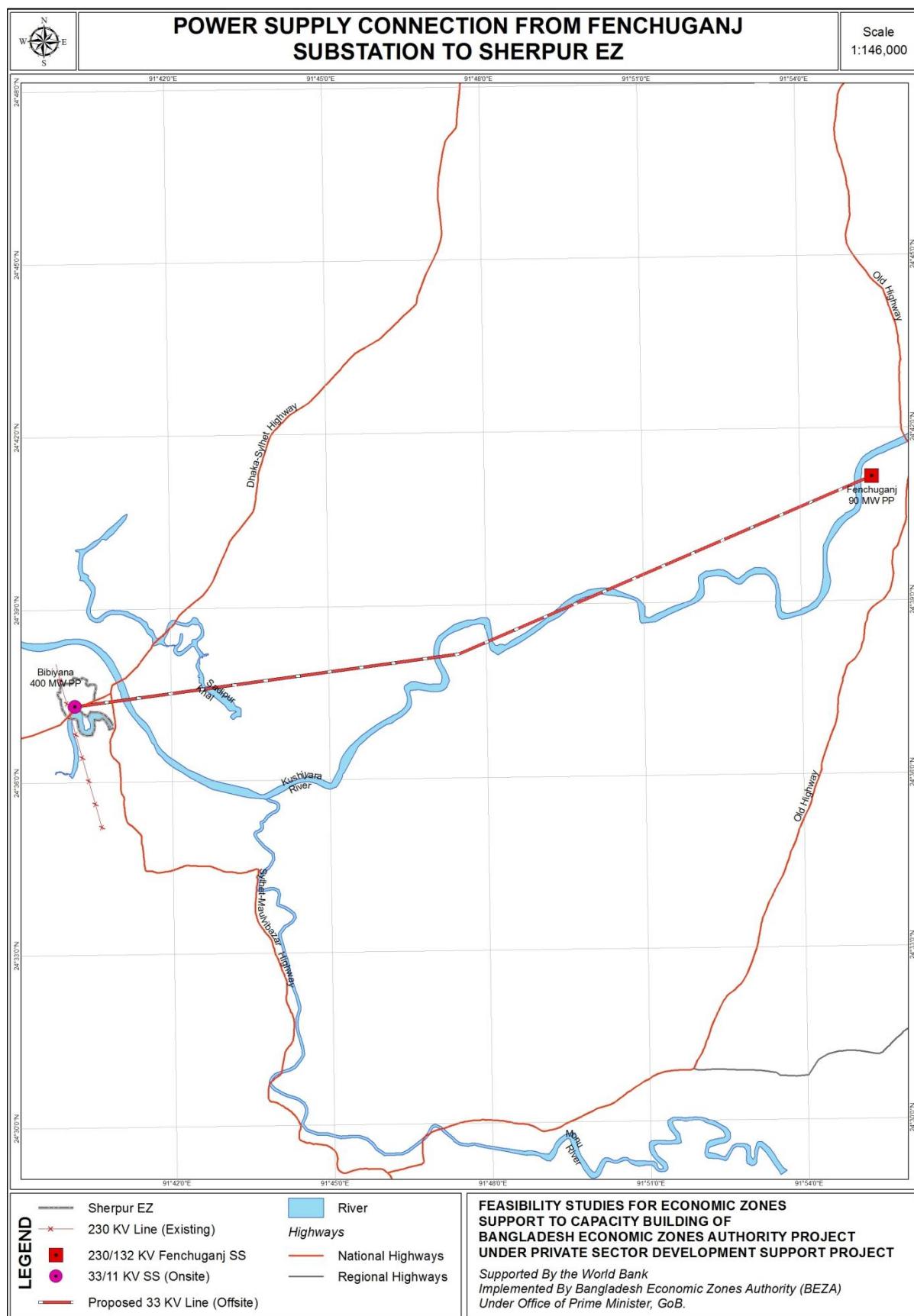
Figure 3.3.2-1: Power connection diagram for Sherpur EZ

Figure 3.3.2-2 shows the offsite connection from the Fenchuganj PP 132/33KV SS to the EZ.

Figure 3.3.2-2: Power Connection (Offsite) for Sherpur EZ

3.3.3 Gas Connection

It is already stated that the Bibiyana Gas field having a capacity of 400mmcfd gas is only 5 Km away from Sherpur EZ. It was learned from Jalalabad Gas Company Limited that three 450MW power plants are under construction and will be supplied with gas from Bibiyana Gas field by a transmission gas pipe line under 1,000 psi of pressure. From this transmission line, an 8 inch diameter off take provision has been kept for the proposed Sherpur economic zone area, which is at a distance of about 6 Km. The gas requirement in the area is about 15mmcfd. So, the gas supply of required demand to Sherpur is possible from the line with the construction of the following installations as per these requirements:

- i) For the supply, City gate station (CGS) pressure 1,000 Psig -300 Psig-150 Psig/Town boarding station (TBS) pressure 1,000 Psig -300 Psig-150 Psig- 50 Psig is required to be constructed.
- ii) District regulation system (DRS) pressure 150 Psig-50 Psig.
- iii) Regulating metre station (RMS) for bulk customer. Pressure 1000 Psig-650Psig-400Psig-380Psig-85Psig-50 Psig.
- iv) About 6Km of 8 inch dia gas pipeline to be constructed from the off take to Sherpur economic zone area.

Figure 3.3.3-1: A Typical Diagram of Connecting the EZ with the Existing Gas Supply Network

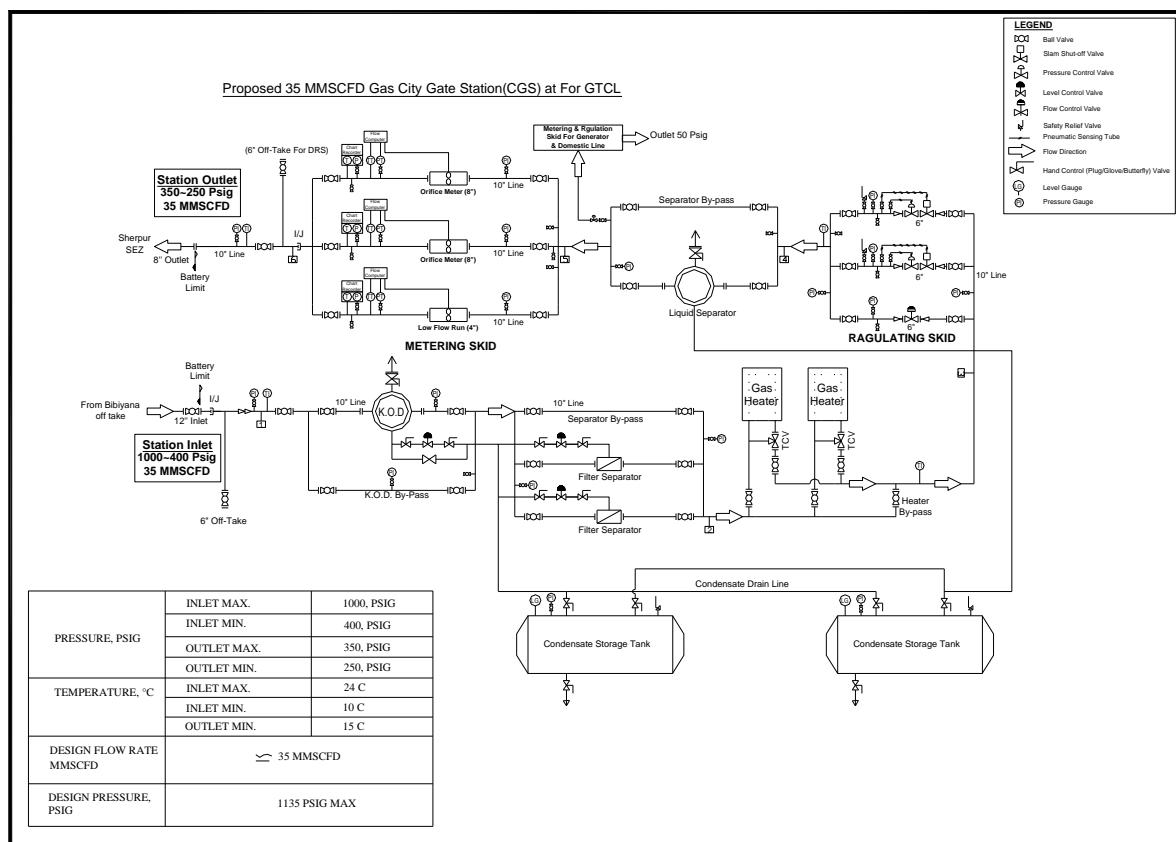
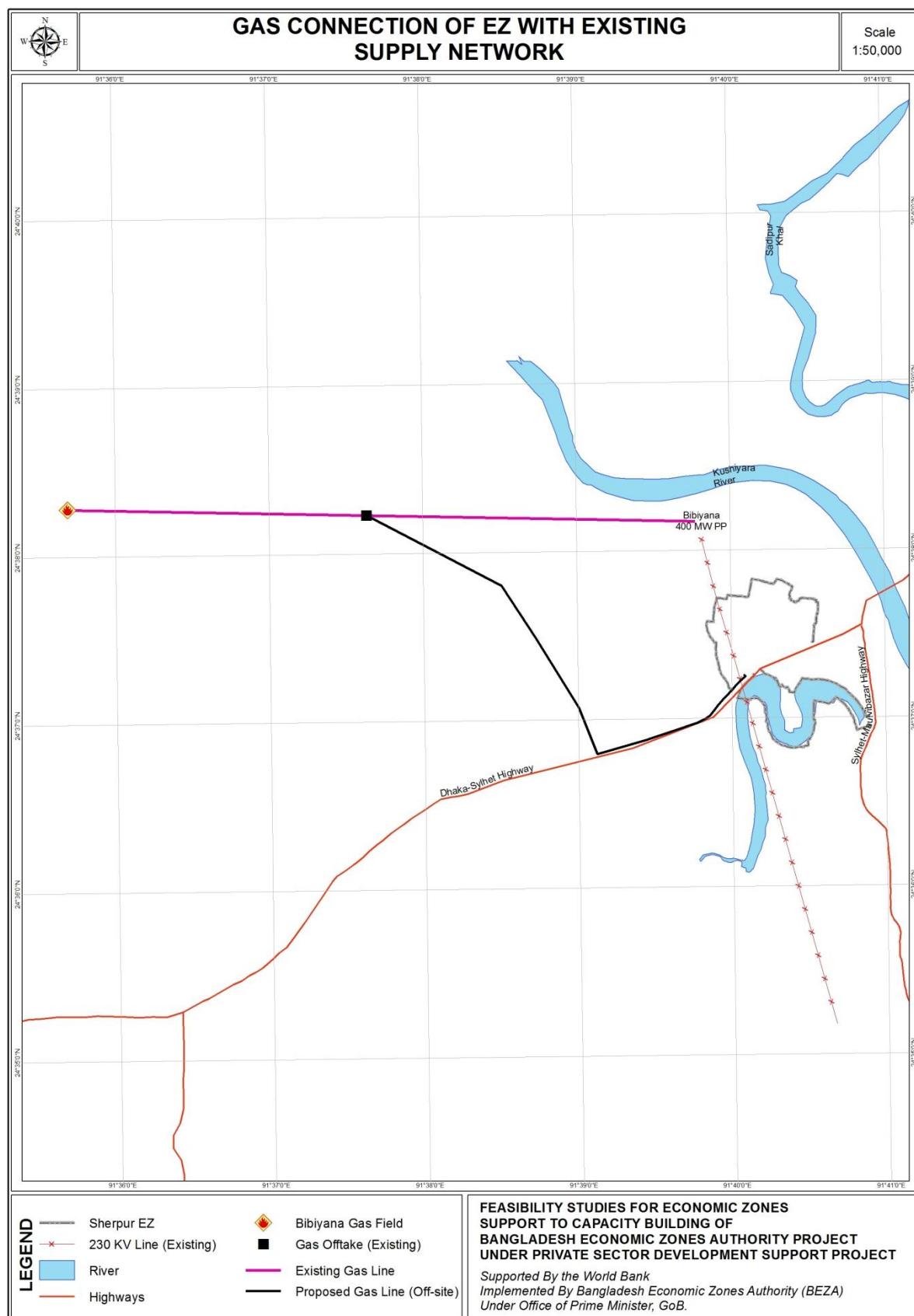
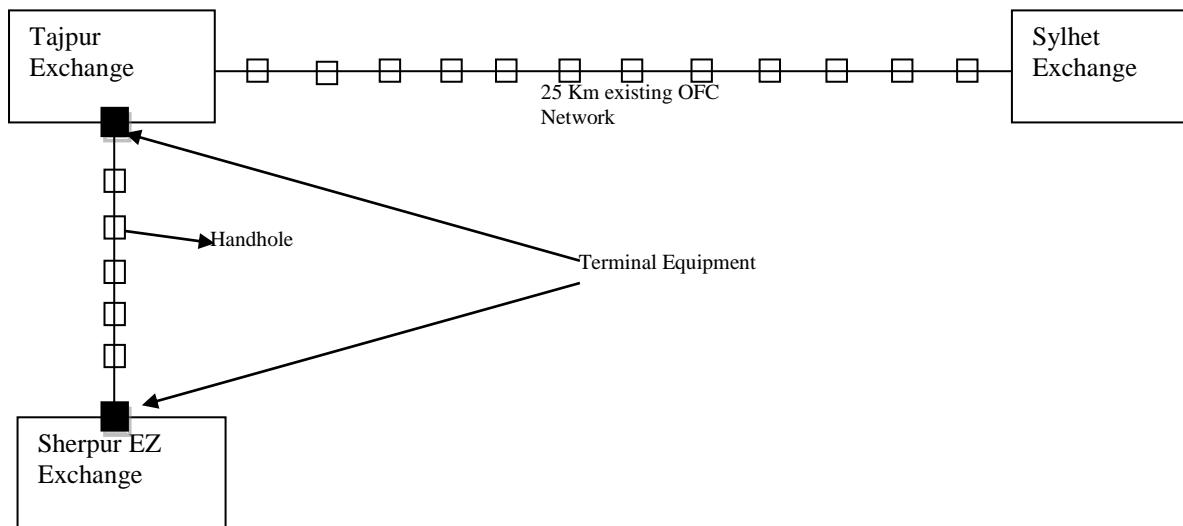


Figure 3.3.3-2: Connection of EZ with Existing Gas Network

3.3.4 Telecommunications

If a BTCL Fixed Phone network is to be installed in Sherpur, a Fibre Optic Cable (FOC) connection will be established by laying the FOC between Sherpur EZ site and Tajpur Exchange on the Sherpur-Sylhet route. A BTCL exchange will be installed at the EZ site and also local networks are to be expanded according to need. The cost is calculated to include the most modern soft switching (SS) technology. Since the power transmission line will be constructed in the EZ, the FOC line can be hung overhead if found to be cheaper.

Figure 3.3.4-1: Connection diagram (off-site)



3.4 Existing Condition of Utility Services

3.4.1 National Conditions

The following sections describe the present condition of utility services like electricity, gas, and telecom in Bangladesh.

3.4.1.1 Electrical Power

At present only 60% of the people have access to electricity (including renewable). Per capita generation is 321KWh (including captive), which is one of the lowest in the region. Every year the demand is increasing at a rate of 10%. Present generation capacity is 10,213MW. Out of this total capacity, 800-1,000MW could not be generated due to the shortage of gas. As a result, about 800-1,000MW load shedding was experienced during the peak hours of last summer.

Table 3.4.1.1-1: Present Power Condition in Bangladesh at a Glance

| Type | Capacity |
|-------------------------------------|----------------|
| Installed capacity (Derated) | 10,213 MW |
| Demand (Summer) | 7,600 MW |
| Generation Capacity (Summer) | 6,000-6,800 MW |
| Maximum Generation (August 4, 2012) | 6,350 MW |

About 13,000MW new generation addition has been planned from 2013 to 2017. A number of HFO (Heavy Furnace Oil) based peaking plants in the public and private sector has been planned. Large coal and gas based combined cycle power plants have been considered for base load plants in the future.

Table 3.4.1.1-2: Planned Power Generation Project up to 2017

| Sector | Year-wise Generation (MW) | | | | | |
|--------------|---------------------------|--------------|--------------|--------------|--------------|---------------|
| | 2013 | 2014 | 2015 | 2016 | 2017 | Total |
| Public | 662 | 960 | 1,813 | 1,260 | 1,950 | 6,645 |
| Private | 895 | 1,028 | 888 | 1,654 | 1,300 | 5,765 |
| Import | 500 | | | | | 500 |
| Total | 2,057 | 1,988 | 2,701 | 2,914 | 3,250 | 12,910 |

Generation Plan from 2017 to 2021 is 11,655MW. So the total power generation in the year 2021 will be 24,565MW.

Long Term Generation Plan (2010-2030):

The Government has prepared a Power Sector Master Plan, 2010 (PSMP 2010). According to the PSMP 2010, the maximum demand in 2015, 2021 and 2030 will be 10,000, 19,000 and 34,000MW respectively. To meet the demand with reliability, installed capacity needs to be increased to 24,000MW and 39,000MW by the year 2021 and 2030 respectively. Generation capacity from different primary fuels in the year 2030 would be:

Table 3.4.1.1-3: Planned Generation Capacity from Different Primary Fuels in 2030

| Fuel | Generation Capacity |
|---|---------------------|
| Domestic and imported coal based ST (Station Turbine) | 19,650 MW |
| Nuclear Power | 4,000 MW |
| Gas and LNG | 8,850 MW |
| Regional Grid | 3,500 MW |
| Liquid Fuel, Hydro, and Renewable | 2,700 MW |
| Total | 38,700 MW |

3.4.1.2 Gas

Natural gas is now being produced from 18 out of 24 gas fields. These fields consist of 79 production wells capable of producing 1,985 mmcfd. On January 2009 they produced 1,811 MMCF gas plus 6,842 bbl condensate. As of June 2007, the net recoverable reserve was 13.51 TCF against gas in place 28.62 TCF. Today the net recoverable reserve is estimated to be around 12 TCF. At the current rate of production, with 5% growth in demand, the remaining reserve will last for another 15 years. Today the gap between demand and production of gas is about 300 mmcfd.

Bangladesh has 18 producing gas fields; 12 operated by Petro Bangla and 6 by International Oil Companies (IOC). Presently, Petro Bangla produces 930 mmcfd and IOCs produce 1,020 mmcfd; thus contributing nearly 50:50 to the total national production of about 1,950 mmcfd against a national demand of about 2,200 mmcfd.

Bibiyana Gas Field (Initial Reserve about 2.5 TCF) is operated by Chevron Oil Company. This gas field came on stream in 2007 and in the last two years, the number of producing wells drilled has been 12 and this is the top producer in Bangladesh at present.

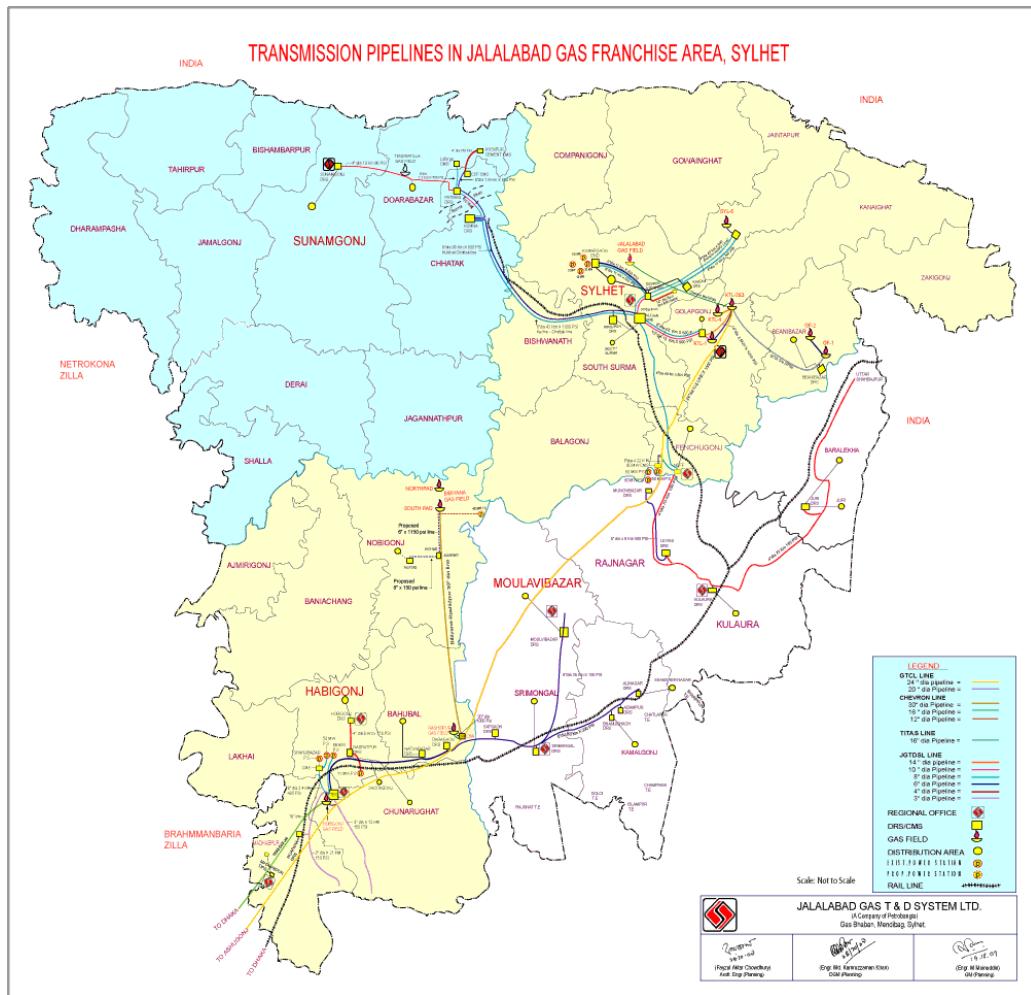
In the country so far, 24 gas fields have been discovered of which 18 gas field are producing from 79 wells about 2,000 mmcfd gas against the demand of 2,500 mmcfd.

Table 3.4.1.2-1: Gas Sector at a Glance

| Sl. No. | Description | Number |
|---------|--|---|
| a. | Total gas field | 24 Nos. |
| b. | Producing gas field | 18 Nos. |
| c. | Gas producing wells | 81 Nos. |
| d. | Daily production capacity | 2,249 mmcfd Petro Bangla = 1073 mmcfd IOC = 1,176 mmcfd |
| e. | Max. production in a particular day (April 17, 2012) | 2,155.6 mmcfd |
| f. | Total reserve primary (confirm and probable) | 20.61 TCF |
| g. | Total gas produced till December 2011 | 10.74 TCF |
| h. | Present estimated gas reserve (confirm and probable) | 9.87 TCF |
| i. | Daily gas requirement | >2,500 mmcfd |
| j. | Expected requirement in 2019-2020 | 4,567 mmcfd |
| k. | Daily gas shortage | >436 mmcfd |
| l. | No. of consumer | 23.2 Lac Approx. |
| m. | In the tenure of the present government increase in gas production | 505 mmcfd |

- At present there is a gas crisis as an additional 500 million cubic feet of gas is needed per day. Currently, Bangladesh produces about 2,000 mmcfd gas against demand of more than 2,500 mmcfd.
- The Sylhet region can produce additional gas, which cannot be brought to Dhaka and other parts of the country due to the lack of pipelines.

Figure 3.4.1.2-1: Transmission Pipelines in Jalalabad Gas Franchise Area



3.4.1.3 Communications Network

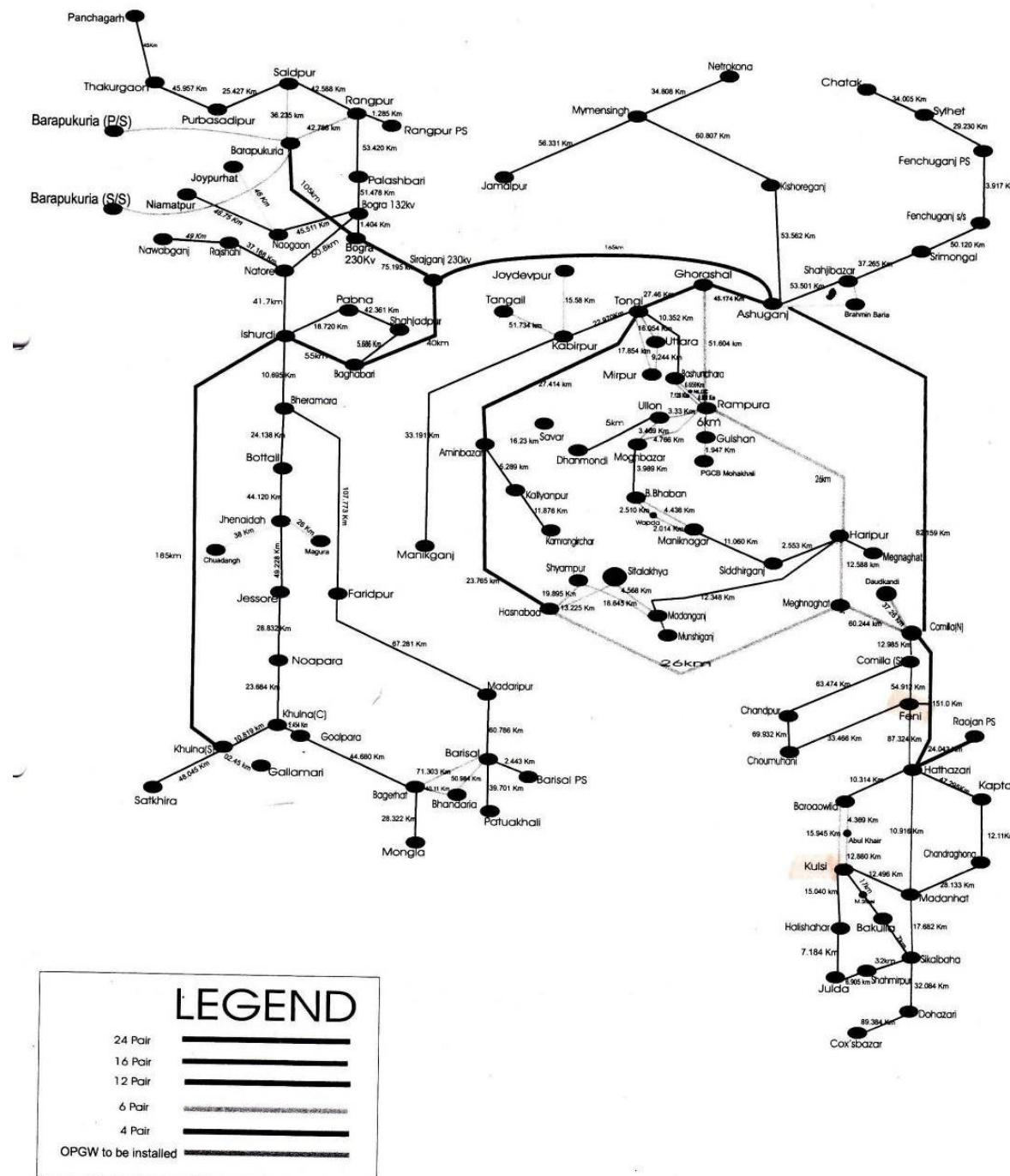
In Bangladesh there are two types of national network - the Radio Link Network and the OFC Link Network. BTCL has both types. The network diagrams are shown in figure 3.4.1.3-1 and 3.4.1.3-2.

Figure 3.4.1.3-1: BTCL Microwave Links



Figure 3.4.1.3-2: BTCL Optical Fibre Links (OFC)

The Power Grid Company Bangladesh also has an OFC overhead network through Bangladesh along the HT power transmission towers, shown below in figure 3.3.4.1-3.

Figure 3.4.1.3-3: Optical Fibre Backbone of PGCB

From various discussions with some service providers in the telecommunications sector in Bangladesh the communication network has been evaluated. The following is a brief of these visits.

Visit to Bangladesh Telecommunication Regulatory Commission (BTRC), Dhaka

It is reported that BTRC has given license/permission for telecom operations of PSTN to a good number of Operators. Most of them could not become successful in fixed/land phone network service. Among the private operators, Ranks Tel started with a land/fixed phone service. But a few days ago their service also became non-standard. Most of the Mobile Operators are quite successful in promoting their business.

Visit to Bangla Phone (BP)

Another operator, Bangla Phone (BP) is giving service, with a completely different concept. They are working only in the Sylhet Region and also in some rural areas. BP claims that their leased Optical Fibre network, leased from PGCB, is spread throughout Bangladesh. They have only one switching centre in Dhaka. Wherever service is requested, they drop an FOC line, from the nearest junction to create a Termination Point (TP) and connect the required service from the TP. They can provide telephone service, internet service, and point to point data communication service throughout Bangladesh and internationally. They have worldwide international connections through POPs of BTCL.

Visit to Power Grid Company Bangladesh (PGCB)

It is found that the Power Grid Company of Bangladesh (PGCB) is a primary owner of FOC throughout Bangladesh. PGCB has High Tension power lines with HT power transmission towers throughout Bangladesh. Also, they have constructed FOC an overhead network for their own communication and are also leasing their FOC to other Telecom Operators.

Information of other FOC networks

The primary owners of FOC networks in Bangladesh are BTCL, PGCB, Grameen Phone (GP) and some others. The FOC network of GP was initially purchased from Bangladesh Railways. At a later stage they laid and expanded their network.

Visit to Dhaka EPZ

This EPZ has a total of 356 acres of land in two phases with a total number of 451 plots (each plot 2,000 sq. m). Some of the bigger factories occupy more than one plot. The total number of factories is 102. The EPZ Zone has a BTCL Telephone Exchange of 3,000 lines. Primarily, the Exchange was installed by BTCL by contributory work, i.e. Dhaka EPZ has established a BTCL fixed Phone network through contributory work. At a later stage, the exchange was expanded by BTCL to connect with outside subscribers. The EPZ factories are connected with only about 600 telephones. Other telephone connections are with the other BTCL subscribers.

Though there is internet facility with the BTCL exchange, the EPZ factory owners prefer to use private internet services. It is found in Dhaka EPZ, that, internet facilities are provided by several private Internet Service Providers (ISPs). About 4 to 5 ISPs have set up their network in Dhaka EPZ. The EPZ authority mentioned only one name 'AMRA'. The EPZ Authority did not have to pay for the internet service. The ISPs connected their facilities to the factories and offices of the Zone by overhead FOC network along the electric poles, for which they are paying a yearly rent to the EPZ Authority. They have no underground FOC network. Factory owners have their internet connection from more than one ISP, so that, in case one ISP is interrupted, service can be continued.

3.4.2 Local Conditions (Sherpur)

3.4.2.1 Electrical Power

Power supply in this area is provided by REB. Power in the Sherpur area is being supplied from the Maulvibazar 33/11KV substation. The present load in Sherpur area is 1MW. This place is 45Km away from the Sylhet 132/33KV substation and also 35Km away from the Fenchuganj 132/33KV substation. From the Fenchuganj 230KV PGCB substation, a double circuit 230KV line passing along the Sherpur area & touching Bibiyana Power Station site leads to the Comilla (north) 230KV substation.

Information on Power Projects Concerning Sherpur EZ:

Table 3.4.2.1-1: Information on Bibiyana 450MW#3 Combined Cycle Power Plant (BPDB Power Project)

| Sl. No. | Type | Detail |
|----------------|--------------------------------------|--|
| 1. | Project Owner | : Bangladesh Power Development Board (BPDB) |
| 2. | Location of the Power Plant | : Parkul Union, Habiganj District. |
| 3. | Type of Fuel | : Natural Gas |
| 4. | Type of Technology | : Combined Cycle Gas Turbine |
| 5. | Capacity of the plant | : 300-450 MW |
| 6. | Expected plant availability | : 90% |
| 7. | Approximate total project cost | : Million US\$350-500 |
| 8. | Site Arrangement | : BPDB |
| 9. | Gas supply | : Jalalabad Gas Distribution Company |
| 10. | Transportation of fuel and equipment | : - Road communication available - River communication available |
| 11. | Expected commissioning date (CoD) | : June, 2014 |

Summit Bibiyana II Power Company Limited (IPP):

This power plant is under construction. It is located within 0.5Km of the proposed EZ. A 230KV line passes through the EZ and is connected with the power plant. Some information on the power plant is given below.

- 341MW Gas Fired Combined Cycle Power Station at Bibiyana, Sylhet, Bangladesh.
- EPC Contractor:
 - The First Northeast Electric Power Engineering Corporation (NEPC)
 - China Energy Engineering Group Co. Ltd. (CEEC)
- Consultant: Lahmeyer International (Li)

Present Generation Scenario of Sylhet Zone (Data of June 15, 2013; BPDB's Daily Generation Schedule) covering Sherpur EZ Area

Installed capacity = 735MW

Derated capacity = 724MW

Fuel used = Gas only

Day peak generation = 590MW

Evening peak generation = 620MW

Due to gas/water limitation no generation = 0MW

Machine shut down = 5MW

Evening demand = 301MW

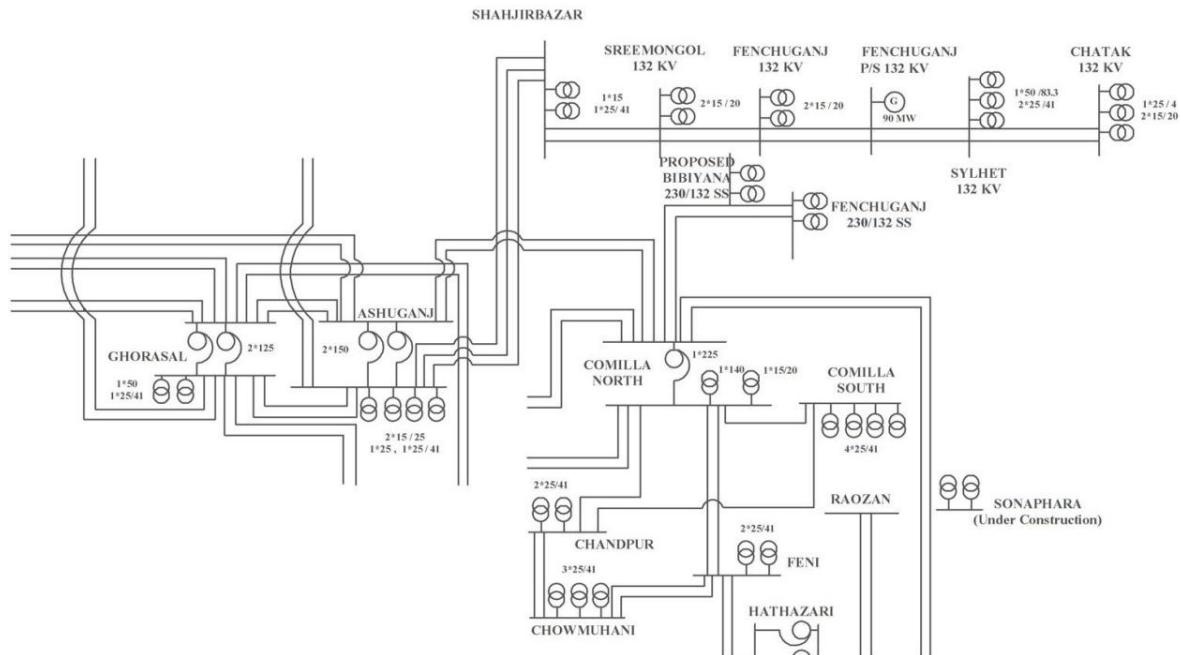
Evening load shedding = 0MW

Available National Grid near EZ

- 132 KV Shajibazar power station to Ashuganj power station direct single circuit.
- 132 KV Shajibazar to Ashuganj substation via Brahmanbaria grid substation double circuit.
- 230 KV line from Fenchuganj Power Plant via Bibiyana PP (Under Construction) to Comilla North Grid Substation.

The following figure (Figure 3.4.2.1-1) shows the existing grid network of Sylhet and Comilla Zone.

Figure 3.4.2.1-1: National Grid near Sherpur EZ



3.4.2.2 Gas

The nearest gas field is the Bibiyana gas field located at Habiganj. UNOCAL discovered the Bibiyana field in 1999 with a potential daily production of 400 mmcf/d.

Now the Bibiyana Gas Field is operated by Chevron. Each well produces on an average of about 52 mmcf/d, with a few of them producing 50 to 100 mmcf/d. On the other hand, the average production in each well in the Habiganj Gas Field, under Petro Bangla, is 25 mmcf/d; with that of Titas at 29 mmcf/d, and Rashidpur at 10 mmcf/d.

According to a Petro Bangla source, increase in the production rate by 10 to 20 mmcf/d in each of the 13 producing wells located in the middle parts of the Titas and Habiganj gas fields will increase the national gas output to 150 to 250 mmcf/d.

3.4.2.3 Communication Network

The Sherpur site is 24 Km from the Maulvibazar District HQ. The distance from the EZ to the Maulvibazar Exchange is 28 Km and to Sylhet Exchange is 38 Km. For the Sherpur site, the manholes of BTCL FOC junction are available on both of the Dhaka-Sylhet Highway and on the Maulvibazar-Sylhet road adjacent to the site. Another telephone exchange is located at Tajpur (on the Dhaka-Sylhet Highway) which is 13 Km away from the site. The OFC connection from that exchange can be constructed to connect the site with the EZ.

Photograph of the manholes are shown in the Photo 3.4.2.3-1 and 2.



Photo 3.4.2.3-1 BTCL OFC jointing manhole on Dhaka-Sylhet Highway at site



Photo 3.4.2.3-2 BTCL OFC jointing manhole on Maulvibazar-Sylhet Highway at site

3.5 Development Schedule and Cost

3.5.1 Development Process

Since all works are related to each other, the construction of the Sherpur economic zone needs to be done in a single phase. Since the existing ground elevation of the northern side requires less dredging work, it is possible for the northern side to be equipped with all utilities and for tenants to occupy the this area while the southern side is under construction. The thickness of dredging could be less than 1m for the northern part while about 4m to 6m thickness is required for the southern part. A well planned CM (Construction Mangement) approach is necessary. The specific consideration is as follows:

- The dredging is applied to both northern side and southern sides.
- The dike/ditch work will be done for both sides.
- Utility works and road works are supposed to start in the northern part first while waiting about one year before stating the utility work in the southern sides.
- The road work will be done for the northern part first and the road work will be continued for the southern part.

Following the above process and carrying out compactions by construction equipment, serious damage might not be encountered. The development of the Sherpur Economic Zone is supposed to be carried out in a single phase. The major scope of works, of both the northern and southern sides, is as described below.

Northern Part and Plant Area:

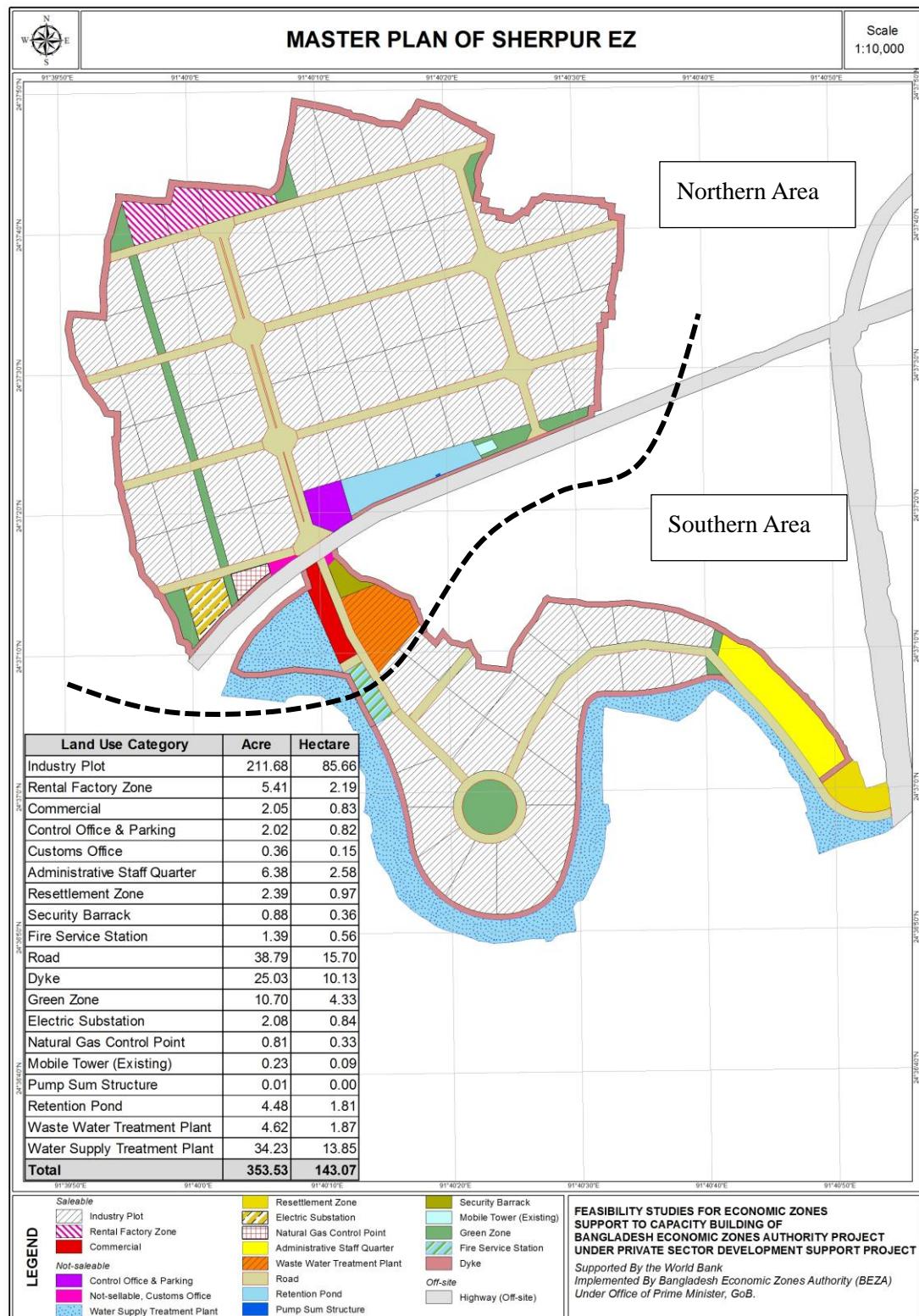
This development area covers approximately 239 acres (97 ha) inclusive of the northern part of the industrial zone 162.80 acres (65.91 ha), and the water supply treatment plant 5.72 acres (2.31 ha), a reservoir 28.51 acres (11.54 ha) and the waste water treatment plant 4.62 acres (1.87 ha). The development basically starts from land clearing and site preparation inside the industrial zone. However, the construction scope of clearing, dredging, dike building, and ditch digging should begin both in the southern area as well as the northern area because of the lower ground elevation of the southern area. At least 30cm thickness of unsuitable soils shall be taken away and dredging will commence. Dikes and ditches will be constructed and the utility line works will start under the ground. The utility line works should be done from the deepest position to the shallower position. The

order of waste water pipe, water supply pipe, gas pipe, drainage u-channel is the recommended standard. At the ending of the utility line works, the road work will start. Following this, the construction of the superstructures will start. The water supply treatment plant (WSTP) and Waste Water Treatment Plant (WWTP) will be built inside the southern area as part of the works inside the northern area. Suitable foundation piles are mandatory on the dredged land. The main gate, and control office building will follow in parallel, and a One-Stop Service Center will be built inside the area of the control building and general parking area.

Southern Area:

This development area covers approximately 115 acres (46 ha) inside the southern area. Geographically, most of the southern land is in the lower ground area - therefore, landfill by dredging is required as the first step. This zone will also be surrounded by a dike to protect the entire area from flooding. The dike and dredging are recommended to be completed during the early stage of the construction. Pipe-laying for all utility work shall be done first, with the road work following soon thereafter.

Efficient construction management through these development processes will provide a unique space for the Sherpur Economic Zone and will form an environmental friendly industrial area. This will be a suitable urban development model for Bangladesh for the future.

Figure 3.5.1-1: Development Area for Sherpur Economic Zone (Single Phase)

The following Gantt chart is strategically planned to minimize the construction cost within a shorter time frame. The dike and dredging are supposed to be carried out and the utility work in the northern area is scheduled as the first step while the southern area needs natural settlement time. The utility work in the southern area is supposed to be done by the workable resources continuing from the

northern area. Thus the construction resources are levelled and the total construction schedule and cost are minimized by this CM (Construction Management) approach.

The feasibility study is carried out until the end of 2014. The land acquisition, detail design and tender will be done in the following year 2015. The tendering process is guided by The Public Procurement Rules (enacted in 2008). The approval process of tendering shall follow this rule. Due to the fewer numbers of people requiring resettlement and strong political will, the land acquisition should be relatively smooth. Therefore the construction will start in 2016 and will be finished by the end of 2019.

3.5.2 Construction Schedule

The total construction schedule and cost are shown.

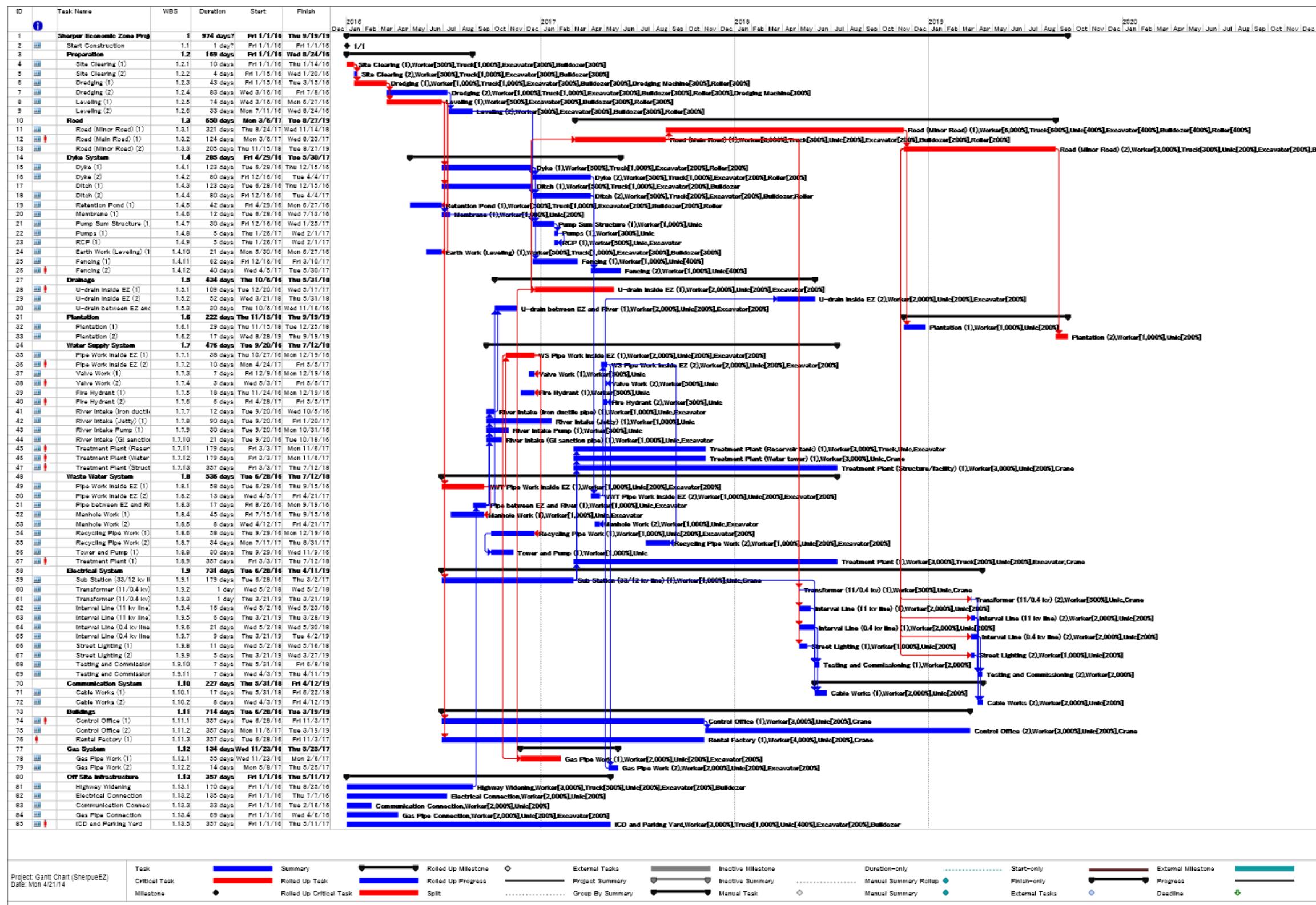


Figure 3.5.2-1: Construction Schedule for Sherpur Economic Zone

Footnotes

- (1) Scope of Works in Northern Area
- (2) Scope of Works in Southern Area

3.5.3 Construction Cost

The construction cost is shown.

Table 3.5.3-1: Construction Cost for Sherpur EZ

| Scope/Year | 2016 | 2017 | 2018 | 2019 | Total (BDT) | Total (USD) |
|--|-------------|-------------|-------------|-------------|-------------|-------------|
| Preparation | | | | | | |
| Site Clearing (1) | 9,902,470 | | | | 9,902,470 | 123,781 |
| Site Clearing (2) | 4,448,510 | | | | 4,448,510 | 55,606 |
| Dredging (1) | 145,046,224 | | | | 145,046,224 | 1,813,078 |
| Dredging (2) | 278,254,346 | | | | 278,254,346 | 3,478,179 |
| Leveling (1) | 180,234,918 | | | | 180,234,918 | 2,252,936 |
| Leveling (2) | 360,470,715 | | | | 360,470,715 | 4,505,884 |
| Road | | | | | | |
| Road (Minor Road) (1) | | 86,371,332 | 211,749,072 | | 298,120,404 | 3,726,505 |
| Road (Main Road) (1) | | 57,623,048 | | | 57,623,048 | 720,288 |
| Road (Minor Road) (2) | | | 20,689,680 | 107,837,120 | 128,526,800 | 1,606,585 |
| Dike System | | | | | | |
| Dike (1) | 17,681,742 | | | | 17,681,742 | 221,022 |
| Dike (2) | 3,052,577 | 19,147,983 | | | 22,200,560 | 277,507 |
| Ditch (1) | 17,681,742 | | | | 17,681,742 | 221,022 |
| Ditch (2) | 1,715,802 | 10,762,758 | | | 12,478,560 | 155,982 |
| Retention Pond (1) | 11,525,850 | | | | 11,525,850 | 144,073 |
| Membrane (1) | 7,227,504 | | | | 7,227,504 | 90,344 |
| Pump Sum Structure (1) | 837,056 | 1,445,824 | | | 2,282,880 | 28,536 |
| Pumps (1) | | 2,500,000 | | | 2,500,000 | 31,250 |
| RCP (1) | | 240,000 | | | 240,000 | 3,000 |
| Earth Work (Leveling) (1) | 34,577,592 | | | | 34,577,592 | 432,220 |
| Fencing (1) | 4,804,085 | 22,273,485 | | | 27,077,570 | 338,470 |
| Fencing (2) | | 17,578,000 | | | 17,578,000 | 219,725 |
| Drainage | | | | | | |
| U-drain inside EZ (1) | 12,732,390 | 141,471,000 | | | 154,203,390 | 1,927,542 |
| U-drain inside EZ (2) | | | 95,441,112 | | 95,441,112 | 1,193,014 |
| U-drain between EZ and River (1) | 49,500,000 | | | | 49,500,000 | 618,750 |
| Plantation | | | | | | |
| Plantation (1) | | | 2,979,199 | | 2,979,199 | 37,240 |
| Plantation (2) | | | | 479,995 | 479,995 | 6,000 |
| Water Supply System | | | | | | |
| Pipe Work inside EZ (1) | 12,276,698 | | | | 12,276,698 | 153,459 |
| Pipe Work inside EZ (2) | | 4,034,560 | | | 4,034,560 | 50,432 |
| Valve Work (1) | 1,368,997 | | | | 1,368,997 | 17,112 |
| Valve Work (2) | | 615,999 | | | 615,999 | 7,700 |
| Fire Hydrant (1) | 31,289,994 | | | | 31,289,994 | 391,125 |
| Fire Hydrant (2) | | 10,270,002 | | | 10,270,002 | 128,375 |
| River Intake (Iron ductile pipe) (1) | 41,940,000 | | | | 41,940,000 | 524,250 |
| River Intake (Jetty) (1) | 2,466,642 | 533,328 | | | 2,999,970 | 37,500 |
| River Intake Pump (1) | 2,087,070 | | | | 2,087,070 | 26,088 |
| River Intake (GI sanction pipe) (1) | 500,010 | | | | 500,010 | 6,250 |
| Treatment Plant (Reservoir tank) (1) | | 400,000,023 | | | 400,000,023 | 5,000,000 |
| Treatment Plant (Water tower) (1) | | 55,999,971 | | | 55,999,971 | 700,000 |
| Treatment Plant (Structure/facility) (1) | | 427,450,912 | 272,548,976 | | 699,999,888 | 8,749,999 |

| Scope/Year | 2016 | 2017 | 2018 | 2019 | Total (BDT) | Total (USD) |
|---------------------------------|----------------------|----------------------|----------------------|--------------------|----------------------|-------------------|
| Waste Water System | | | | | | |
| Pipe Work inside EZ (1) | 56,644,018 | | | | 56,644,018 | 708,050 |
| Pipe Work inside EZ (2) | | 19,577,922 | | | 19,577,922 | 244,724 |
| Pipe between EZ and River (1) | 9,432,008 | | | | 9,432,008 | 117,900 |
| Manhole Work (1) | 75,424,995 | | | | 75,424,995 | 942,812 |
| Manhole Work (2) | | 16,408,392 | | | 16,408,392 | 205,105 |
| Recycling Pipe Work (1) | 14,138,950 | | | | 14,138,950 | 176,737 |
| Recycling Pipe Work (2) | | 8,330,000 | | | 8,330,000 | 104,125 |
| Tower and Pump (1) | 3,999,990 | | | | 3,999,990 | 50,000 |
| Treatment Plant (1) | | 427,450,912 | 272,548,976 | | 699,999,888 | 8,749,999 |
| Electrical System | | | | | | |
| Sub Station (33/12 kv line) (1) | 11,229,066 | 3,770,955 | | | 15,000,021 | 187,500 |
| Transformer (11/0.4 kv) (1) | | | 24,000,000 | | 24,000,000 | 300,000 |
| Transformer (11/0.4 kv) (2) | | | | 8,000,000 | 8,000,000 | 100,000 |
| Interval Line (11 kv line) (1) | | | 4,902,000 | | 4,902,000 | 61,275 |
| Interval Line (11 kv line) (2) | | | | 1,945,500 | 1,945,500 | 24,319 |
| Interval Line (0.4 kv line) (1) | | | 3,316,005 | | 3,316,005 | 41,450 |
| Interval Line (0.4 kv line) (2) | | | | 1,421,604 | 1,421,604 | 17,770 |
| Street Lighting (1) | | | 530,002 | | 530,002 | 6,625 |
| Street Lighting (2) | | | | 250,000 | 250,000 | 3,125 |
| Testing and Commissioning (1) | | | 249,998 | | 249,998 | 3,125 |
| Testing and Commissioning (2) | | | | 249,998 | 249,998 | 3,125 |
| Communication System | | | | | | |
| Cable Works (1) | | | 16,088,341 | | 16,088,341 | 201,104 |
| Cable Works (2) | | | | 4,614,256 | 4,614,256 | 57,678 |
| Buildings | | | | | | |
| Control Office (1) | 28,151,256 | 46,848,732 | | | 74,999,988 | 937,500 |
| Control Office (2) | | 40,997,600 | 267,509,340 | 57,396,640 | 365,903,580 | 4,573,795 |
| Rental Factory (1) | | 458,395,755 | 454,909,856 | 55,774,389 | 969,080,000 | 12,113,500 |
| Gas System | | | | | | |
| Gas Pipe Work (1) | 6,136,032 | 5,916,888 | | | 12,052,920 | 150,662 |
| Gas Pipe Work (2) | | 3,419,626 | | | 3,419,626 | 42,745 |
| Off Site Infrastructure | | | | | | |
| Highway Widening | 110,628,010 | | | | 110,628,010 | 1,382,850 |
| Electrical Connection | 81,000,000 | | | | 81,000,000 | 1,012,500 |
| Communication Connection | 13,505,844 | | | | 13,505,844 | 168,823 |
| Gas Pipe Connection | 227,572,005 | | | | 227,572,005 | 2,844,650 |
| ICD and Parking Yard | 135,124,920 | 49,701,120 | | | 184,826,040 | 2,310,326 |
| Total (BDT) | 2,004,610,028 | 2,339,136,127 | 1,647,462,557 | 237,969,502 | 6,229,178,214 | |
| Total (USD) | 25,057,625 | 29,239,202 | 20,593,282 | 2,974,619 | | 77,864,728 |

Table 3.5.3-2: Summary of Costs

| Scope/Year | 2016 | 2017 | 2018 | 2019 | Total (BDT) | Total (USD) |
|--------------------|----------------------|----------------------|----------------------|--------------------|----------------------|-------------------|
| On-site Cost | 1,436,779,249 | 2,289,435,007 | 1,647,462,557 | 237,969,502 | 5,611,646,315 | 70,145,578.94 |
| Off-site Cost | 567,830,779 | 49,701,120 | 0 | 0 | 617,531,899 | 7,719,148.74 |
| Total (BDT) | 2,004,610,028 | 2,339,136,127 | 1,647,462,557 | 237,969,502 | 6,229,178,214 | |
| Total (USD) | 25,057,625 | 29,239,202 | 20,593,282 | 2,974,619 | | 77,864,728 |

3.5.4 Comparative Scenario of Construction Schedule, Land Sale, Industry Operation, and Utility Demand

The following tables and figures explain the relationships between the construction schedule, the land acquisition, the industry operation, and the utility demand.

3.5.4.1 Notes from the Gantt Chart

- 2016 Dike and Dredging are finished in both northern area and southern area.
- 2017 Northern Area:
All underground utility works and drainage systems are completed. About half of the roads are completed.
The northern area becomes leaseable in late 2017.
- Southern Area:
All underground utility works are completed.
- 2018 Water supply treatment plant and waste water treatment plant are completed. Road and all utilities are finished in the northern area. Road work begins in the southern area. The southern area becomes leaseable in late 2018.
- 2019 All utilities and infrastructure are completely installed and operational in the southern area.

Considering these notes, the development schedule of the leasable land is shown here.

Table 3.5.4.1-1: Developed Area for Land Lease

| Land | Land | Area Year | Developed Area for Land Lease (Hectare) | | | | | Total Area | |
|----------------------|---------------------|-----------|---|--------|-------|------|------|------------|--------|
| | | | 2016 | 2017 | 2018 | 2019 | 2020 | Hector | Acres |
| Developed Land | Industry Plot | | 0 | 62.89 | 22.77 | 0 | 0 | 85.66 | 211.58 |
| | Rental Factory Zone | | 0 | 2.19 | 0 | 0 | 0 | 2.19 | 5.41 |
| | Commercial Zone | | 0 | 0.83 | 0 | 0 | 0 | 0.83 | 2.05 |
| Total Area (Hectare) | | | 0.00 | 65.91 | 22.77 | 0.00 | 0.00 | 88.68 | |
| Total Area (Acres) | | | 0.00 | 162.80 | 56.24 | 0.00 | 0.00 | | 219.04 |

3.5.4.2 Notes from the Marketing Research

According to the market research (Table 2.4.2.2-1 Projected Demand and Timeframe of Investment in Sherpur), the demand of industrial land is very high and the following assumptions are set up.

Asumptions

- 2017 Industries (Integrated Textile, Ceramic, Pharmaceuticals, Food Processing) acquire the industry plots in the northern area.
- 2018 Industries (Ceramic, Pharmaceuticals, Paint, Food Processing) acquire the industry plots in the southern area.

3.5.4.3 Projection of Land Sales

Following previous assumptions, the land sales are projected.

Table 3.5.4.3 -1: Demanded Area by Marketing (Projection of Land Sales)

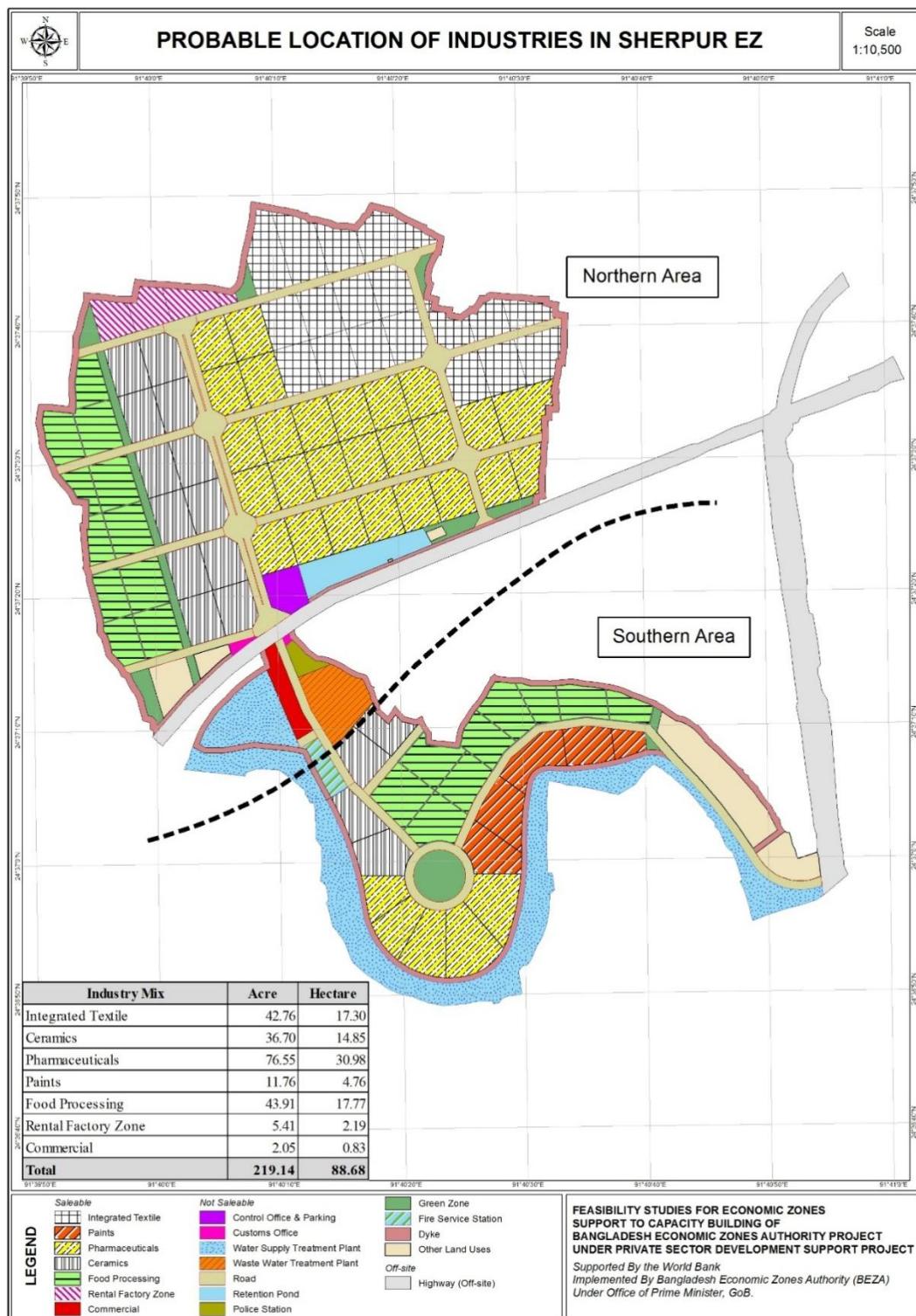
| Land | Land | Area Year | Demanded Land Area (Hectare) | | | | | Total Area | |
|----------------------|----------------|--------------------|------------------------------|----------|---------|------|------|------------|--------|
| | | | 2016 | 2017 | 2018 | 2019 | 2020 | Hector | Acres |
| Demanded Land | Industry Plot | Integrated Textile | 0 | 17.30 | 0 | 0 | 0 | 0 | 42.73 |
| | | Ceramics | 0 | 11.17 | 3.68 | 0 | 0 | 0 | 36.68 |
| | | Pharmaceuticals | 0 | 25.06 | 5.92 | 0 | 0 | 0 | 30.98 |
| | | Paints | 0 | 0 | 4.76 | 0 | 0 | 0 | 11.76 |
| | | Food Processing | 0 | 9.36 | 8.41 | 0 | 0 | 0 | 43.89 |
| | Rental Factory | | 0 | 2.19 | 0 | 0 | 0 | 0 | 5.41 |
| | | Commercial Zone | 0 | 0.83 | 0 | 0 | 0 | 0 | 2.05 |
| Total Area (Hectare) | | | 0.00 | 65.91 | 22.77 | 0.00 | 0.00 | 88.68 | |
| Total Area (Acres) | | | 0 | 162.7977 | 56.2419 | 0 | 0 | | 219.04 |

These demand is reflected in the following probable industry layout.

3.5.4.4 Probable Industry Layout

The demand for land is reflected in the following probable industry layout. The layout is designed with the consideration of the marketing demand and developed land available on the timeframe. Special attention is paid for the location choice of clean industries.

Figure 3.5.4.4-1:Probable Industry Layout



3.5.4.5 Land under Operation

The following assumptions are set up to project the land area under operation.

Assumptions

Northern Area:

- 2018 All utilities and roads are completed. The occupancy permit is issued. Tenants start factory construction.
- 2019 Tenants start operation covering 50% of their leased land.
- 2020 Tenants expand their operation covering the remaining 25% of their leased land.
- 2021 Tenants expand their operation covering the remaining 25% of their leased land.

Southern Area:

- 2019 All utilities and roads are completed. The occupancy permit is issued. Tenants start factory construction.
- 2020 Tenants start operation covering 50% of their leased land.
- 2021 Tenants expand their operation covering the remaining 25% of their leased land.
- 2022 Tenants expand their operation covering the remaining 25% of their leased land.

The projection of land area under operation is shown.

Table 3.5.4.5-1:Land under Operation

| Land | Land | Area | Operating Land Area (Hectare) | | | | | | Total Area | |
|--|-----------------|--------------------|-------------------------------|------|------|------|-------|--------|------------|--------|
| | | | Year | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
| Demanded Land | Industry Plot | Integrated Textile | | 0 | 0 | 0 | 8.65 | 4.325 | 4.325 | 0 |
| | | Ceramics | | 0 | 0 | 0 | 5.585 | 4.6325 | 3.7125 | 0.92 |
| | | Pharmaceuticals | | 0 | 0 | 0 | 12.53 | 9.225 | 7.745 | 1.48 |
| | | Paints | | 0 | 0 | 0 | 0 | 2.38 | 1.19 | 1.19 |
| | | Food Processing | | 0 | 0 | 0 | 4.68 | 6.545 | 4.4425 | 2.1025 |
| | | Rental Factory | | 0 | 0 | 0 | 1.095 | 0.5475 | 0.5475 | 0 |
| | Commercial Zone | | | 0 | 0 | 0 | 0.415 | 0.2075 | 0.2075 | 0 |
| Total Area (Hectare) | | | | 0.00 | 0.00 | 0.00 | 32.96 | 27.86 | 22.17 | 5.69 |
| Cumulative Land Area under Operation (Hectare) | | | | 0.00 | 0.00 | 0.00 | 32.96 | 60.82 | 82.99 | 88.68 |
| Total Area (Acres) | | | | 0.00 | 0.00 | 0.00 | 81.40 | 68.82 | 54.76 | 14.06 |
| | | | | | | | | | | 219.04 |

3.5.4.6 Utility Demand

The marketing demand survey provides information about the utility use of the industries. The following table is prepared based on the utility demand estimated by the respondents in industry demand surveys.

Table 3.5.4.6-1:Unit Rate of Utility Demand (Per Hectare) for Sherpur EZ

| Industry Type | Power (MW/day) | Water (m3/day) | Gas (m3/day) |
|---|----------------|----------------|--------------|
| Integrated Textile | 1.38 | 1,921 | 14,173 |
| Ceramics | 0.04 | 80 | 6,832 |
| Pharmaceuticals | 0.21 | 650 | 8,333 |
| Paints | 0.08 | 700 | 7,087 |
| Food Processing | 0.04 | 33 | 45 |
| Commercial, Residential, and Supporting | 0.25 | 20 | 0 |

The Table 3.5.3.5-1 and Table 3.5.3.6-1 give following utility demands by industries.

Table 3.5.4.6-2: Utility Demand by Industries (Power)

| Land | Land | | Unit Rate | Demanded Power (MW) | | | | | | | Total MW |
|-----------------------|---------------|--------------------|-----------|---------------------|------|------|-------|-------|-------|-------|----------|
| | | | MW/ha | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | |
| Demanded Land | Industry Plot | Integrated Textile | 1.38 | 0 | 0 | 0 | 11.94 | 5.97 | 5.97 | 0.00 | 23.87 |
| | | Ceramics | 0.04 | 0 | 0 | 0 | 0.22 | 0.19 | 0.15 | 0.04 | 0.59 |
| | | Pharmaceuticals | 0.21 | 0 | 0 | 0 | 2.63 | 1.94 | 1.63 | 0.31 | 6.51 |
| | | Paints | 0.08 | 0 | 0 | 0 | 0.00 | 0.19 | 0.10 | 0.10 | 0.38 |
| | | Food Processing | 0.04 | 0 | 0 | 0 | 0.19 | 0.26 | 0.18 | 0.08 | 0.71 |
| | | Rental Factory | 0.35 | 0 | 0 | 0 | 0.38 | 0.19 | 0.19 | 0.00 | 0.77 |
| | | Commercial Zone | 0.25 | 0 | 0 | 0 | 0.10 | 0.05 | 0.05 | 0.00 | 0.21 |
| | | Total (MW) | | 0 | 0 | 0 | 15.47 | 8.79 | 8.26 | 0.53 | 33.04 |
| Cumulative Total (MW) | | | | 0 | 0 | 0 | 15.47 | 24.25 | 32.51 | 33.04 | |

Assumptions

Utility demand is proportional to the land area under industrial operation.

Unit rate of a rental factory is the average of all industries.

Table 3.5.4.6-3: Utility Demand by Industries (Water)

| Land | Land | | Unit Rate | Demanded Water (m³/day) | | | | | | | Total m³/day |
|---------------------------|---------------|--------------------|-----------|-------------------------|------|------|--------|--------|--------|--------|--------------|
| | | | m³/day/ha | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | |
| Demanded Land | Industry Plot | Integrated Textile | 1,921 | 0 | 0 | 0 | 16,617 | 8,308 | 8,308 | 0 | 33,233 |
| | | Ceramics | 80 | 0 | 0 | 0 | 447 | 371 | 297 | 74 | 1,188 |
| | | Pharmaceuticals | 650 | 0 | 0 | 0 | 8,145 | 5,996 | 5,034 | 962 | 20,137 |
| | | Paints | 700 | 0 | 0 | 0 | 0 | 1,666 | 833 | 833 | 3,332 |
| | | Food Processing | 33 | 0 | 0 | 0 | 154 | 216 | 147 | 69 | 586 |
| | | Rental Factory | 676 | 0 | 0 | 0 | 259 | 130 | 130 | 0 | 518 |
| | | Commercial Zone | 20 | 0 | 0 | 0 | 8 | 4 | 4 | 0 | 17 |
| | | Total (m³/day) | | 0 | 0 | 0 | 25,630 | 16,691 | 14,753 | 1,938 | 59,011 |
| Cumulative Total (m³/day) | | | | 0 | 0 | 0 | 25,630 | 42,321 | 57,073 | 59,011 | |

Assumptions

Utility demand is proportional to the land area under industrial operation.

Unit rate of a rental factory is the average of all industries.

Table 3.5.4.6-4: Utility Demand by Industries (Gas)

| Land | Land | | Unit Rate | Demanded Gas (m³/day) | | | | | | | Total m³/day |
|---------------------------|---------------|--------------------|-----------|-----------------------|------|------|---------|---------|---------|---------|--------------|
| | | | m³/day/ha | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | |
| Demanded Land | Industry Plot | Integrated Textile | 14,173 | 0 | 0 | 0 | 122,596 | 61,298 | 61,298 | 0 | 245,193 |
| | | Ceramics | 6,832 | 0 | 0 | 0 | 38,157 | 31,649 | 25,364 | 6,285 | 101,455 |
| | | Pharmaceuticals | 8,333 | 0 | 0 | 0 | 104,412 | 76,872 | 64,539 | 12,333 | 258,156 |
| | | Paints | 7,087 | 0 | 0 | 0 | 0 | 16,867 | 8,434 | 8,434 | 33,734 |
| | | Food Processing | 45 | 0 | 0 | 0 | 211 | 295 | 200 | 95 | 800 |
| | | Rental Factory | 7,294 | 0 | 0 | 0 | 7,987 | 3,993 | 3,993 | 0 | 15,974 |
| | | Commercial Zone | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Total (m³/day) | | 0 | 0 | 0 | 273,363 | 190,974 | 163,828 | 27,146 | 655,312 |
| Cumulative Total (m³/day) | | | | 0 | 0 | 0 | 273,363 | 464,338 | 628,166 | 655,312 | |

Assumptions

Utility demand is proportional to the land area under industrial operation.

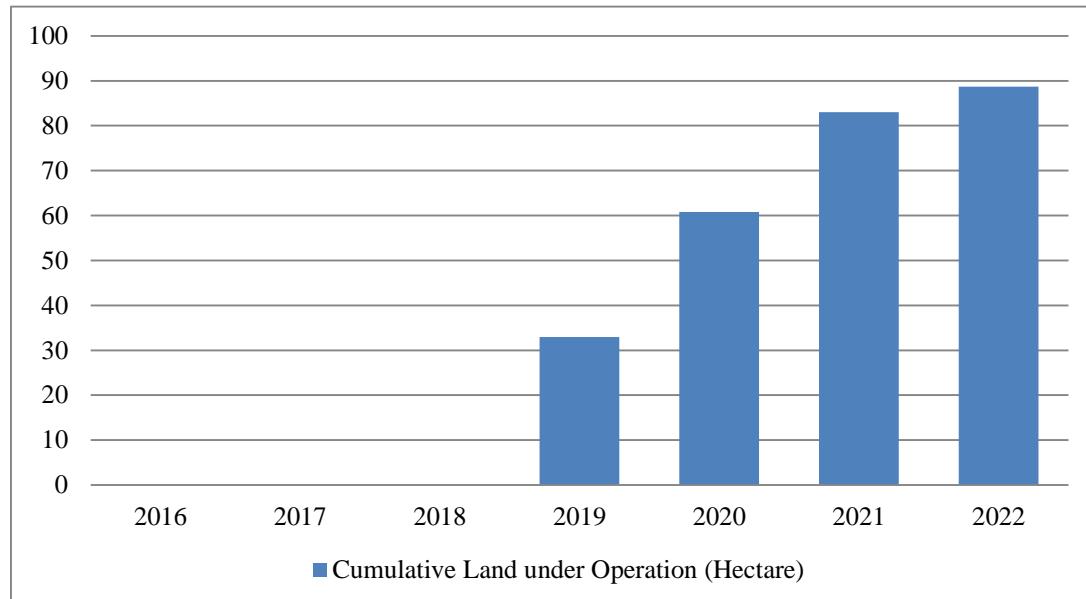
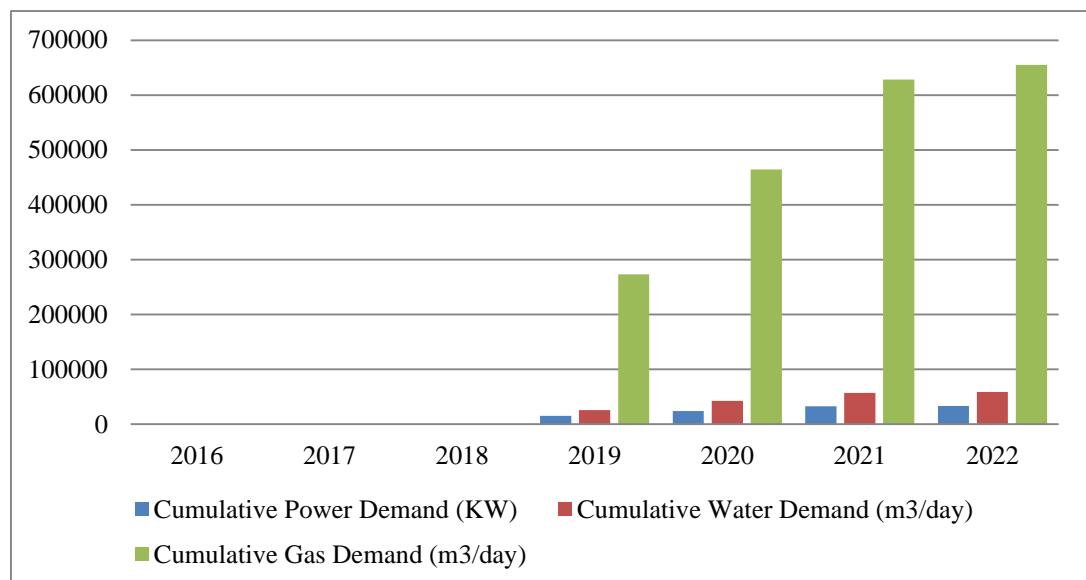
Unit rate of a rental factory is the average of all industries.

The area of operation land and the utility demands are summarized in the following table and figures. Tenants are able to start their operation upon completion of the whole construction of the economic zone by the application of CM (Construction Management). This kind of efficient approach is necessary for private sector's development projects.

Table 3.5.4.6-5:Operating Land and Utility Demand

| Operating Land and Utility Demand | Year | 2015 | | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | |
|---|------|---------------|----|---------------------|---------------------|------------------------------|---|------|---|-----------|---------|---------|---------|------|--|------|--|
| | | Project Stage | | LA & DD | | Construction in Single Phase | | | | Operation | | | | | | | |
| Items | Unit | Hector | KW | m ³ /day | m ³ /day | | | | | | | | | | | | |
| Cumulative Land under Operation (Hectare) | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 33 | 61 | 83 | 89 | | | | |
| Cumulative Power Demand (KW) | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15,466 | 24,253 | 32,513 | 33,039 | | | | |
| Cumulative Water Demand (m ³ /day) | | | | 0 | 0 | 0 | 0 | 0 | 0 | 25,630 | 42,321 | 57,073 | 59,011 | | | | |
| Cumulative Gas Demand (m ³ /day) | | | | | 0 | 0 | 0 | 0 | 0 | 273,363 | 464,338 | 628,166 | 655,312 | | | | |

Notes: LA & DD: Land acquisition and detail design

Figure 3.5.4.6-1:Cumulative Land under Operation**Figure 3.5.4.6-2: Cumulative Utility Demand**

3.5.4.7 Comparison of Utility Demand with Other EZs

The utility data is compared with the utility data of two proposed EZs (Anwara and Mirershori) and Dhaka and Chittagong EPZ.

Table 3.5.4.7-1: Comparison of Daily Utility Demand (Per Hectare) Among Industrial Zones in Bangladesh

| Utility | Dhaka EPZ | Chittagong EPZ | Sherpur EZ | Anwara EZ | Mirershori EZ |
|-----------------------------------|------------------|-----------------------|-------------------|------------------|----------------------|
| Water (m ³ /day/ha) | 516.72 | 1,677.00 | 663.04 | 85.98 | 161.20 |
| Power (MW/ha) | 0.51 | 0.48 | 0.37 | 0.24 | 0.34 |
| Gas (m ³ /day/ha) | 3,720.00 | 5,349.00 | 7,363.06 | NA | NA |

Note: NA - Not Applicable

The utility data of Dhaka and Chittagong EPZ is for the month May and June, 2013. From this table it can be seen that the utility estimated for Sherpur EZ is quite similar to Dhaka EPZ. The difference occurs due to the different mix of industries in different EZs and EPZs. For example gas demand in Sherpur is higher because of the inclusion of ceramic industries into the mix.

3.6 Building Guidelines

Key items of building guidelines to make the economic zone a high quality environment, are described below.

3.6.1 Architectural Plans

1. The tenants of plot/plots desiring to construct a building in the economic zone shall submit the architectural plans/area layouts for the proposed building and other ancillary structures.
2. Enlarged plans of the plot/plots shall be submitted giving the dimensions of the plot and indicating the location of the building/buildings, parking areas, lawn, walkways, loading/unloading area, vehicular and pedestrian approaches from the road, septic tank, guard house, pump-house, electric sub-station, boiler house, generator house, surface drains, etc.
3. Special attention will be paid to site plans & section drawings with ground levels. Directions and connection of drainage system shall be clarified to connect the economic zone utilities.

3.6.2 Compulsory Open Space Requirement

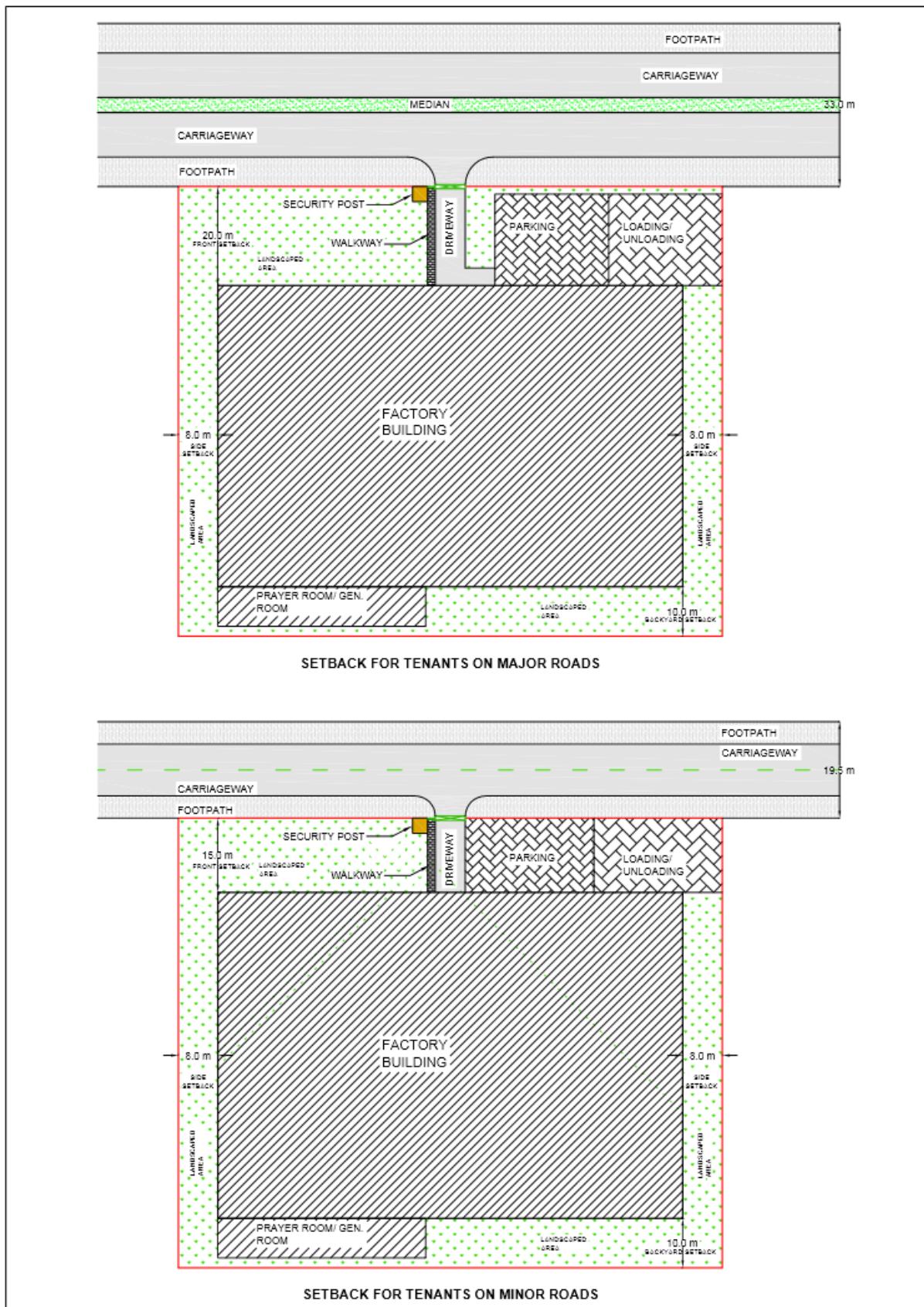
3.6.2.1 Ground Coverage and Setback

The setback areas are determined as in the following patterns shown in Figure 3.6.2.1-1.

- Minimum Setback from Plot boundary are as follows:
 - Frontage: 65.57 feet (20m) for the main road (width = 33m), 49.2 feet (15m) for the minor roads (width = 19.5m)
 - Side Yard: 26.2 feet (8 m) (on both sides)
 - Back Yard: 32.8 feet (10 m)

The following are regulations on the ground coverage.

- Nothing can be constructed on the setback area on the side of the building for the firefighting. It should be properly landscaped with small sized trees.
- 30% of the setback area on the back yard can be used for services (generator room, prayer room, etc.)
- 65% of the frontage can be used for parking, loading unloading, security booth, walkway, and driveway, etc.
- 35% of the setback at the frontage should be landscaped with trees and properly landscaped.

Figure 3.6.2.1-1: Setbacks for Tenant's Building on Major and Minor Roads

3.6.2.2 Parking

- Parking for industries and other facilities is to be developed within the plot. No on-street parking is allowed within the EZ.
- 30% of the setback area on the front can be used as open parking.
- 20% of the setback area on the front can be used for loading and unloading.
- All plots will have a minimum parking space of 1 standard sized automobile (2.5mx4.6m) per 200 m² of floor space.
- An extra 5% of ground coverage is permissible for construction of automated multi-level/parking with ramp parking structures for additional needs.
- In the case of basement parking, it cannot exceed the set back line and maximum 20% of the ground coverage. It should be kept as a service area (prayer room, generator room, etc.).
- Space Standard for parking:

Table 3.6.2.2-1: Equivalent Car Space (ECS) in Different Types of Parking

| Parking Type | Area in m ² Per ECS |
|-----------------------|--------------------------------|
| Open shed | 23 |
| Basement | 32 |
| Multi-level with ramp | 30 |
| Automated multi-level | 16 |

- For bicycle parking, 1 space per 500 m² floor space is to be provided.
- The dimension of parking area and turning radius will be fixed following the table below:

Table 3.6.2.2-2: Recommended Dimensions for Parking Area Design

| Type of vehicle | Parking width (m) | Parking length (m) | Internal turning radius (m) | External turning radius (m) |
|-----------------|-------------------|--------------------|-----------------------------|-----------------------------|
| Car | 2.5 | 4.6 | - | - |
| Truck | 3.6 | 10.0 | 8.7 | 12.8 |
| Trailer | 3.6 | 18.0 | 6.9 | 13.8 |

3.6.2.3 Landscape

- All plant materials shall be watered with an automatic irrigation system.
- Sprinkler layout should be designed in a way that minimizes the amount of spray that falls on sidewalks, neighboring properties, and buildings (no overspray onto hardscape or on landscaped areas).
- All grass areas should be mulched to a depth of 2 inches.
- The plant design shall address sight distance (no landscape improvements shall be placed so as to obstruct the vision of drivers and/or pedestrians).

3.6.3 Compulsory Exterior Requirements

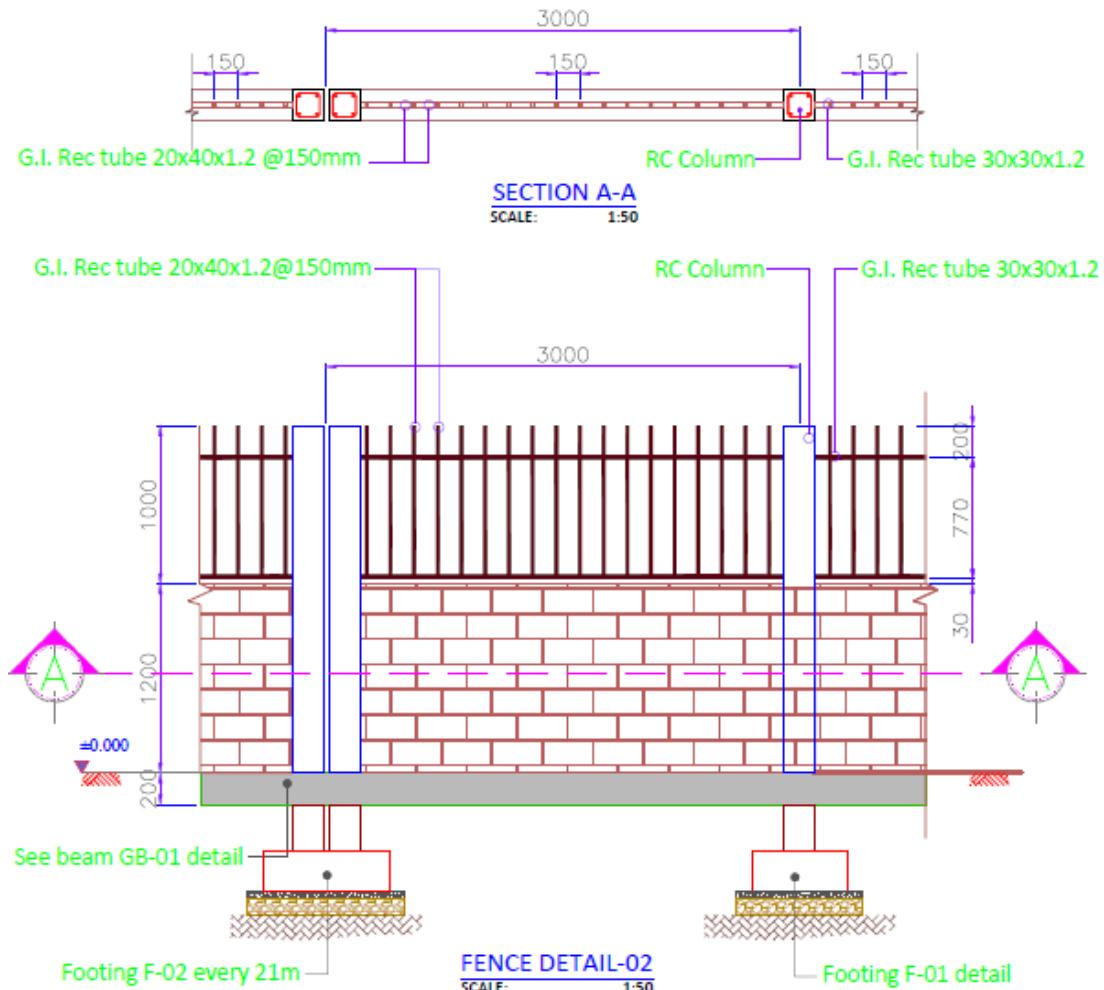
3.6.3.1 Entrance/Exit of the Plot

1. The entrance/exit shall be located along the minor (secondary) road. The entrance/exit shall not be placed along the main road in order to maintain smooth internal traffic flows.
2. One main entrance gate has to be built for each plot. The main entrance gate has to face the minor road.
3. For safe and smooth and efficient traffic flows, the main entrance gate must be located at least 20 metres from major intersections.

3.6.3.2 Fence

1. The maximum height of fences, if any, shall be 7.2 feet (2.2 m) from the ground level. For the front side, the upper half portion should be open type and the lower half portion should be closed type. The standard sample is shown.

Figure 3.6.3.2-1: Standard Front Fence



2. The Fences facing the front road shall be open-type fences made of iron bars or galvanized chain-link fencing material framed with galvanized pipes and other similar types of fences. Details of colour and material should be discussed with the economic zone administrators.

3. No concealing fences shall be erected facing the roads for transparent purpose. On the other hand, the structure of the side and back fence should be closed type for security purposes.
4. The fence between two adjoining plots could be built right on the plot division line with agreement of both tenants of the adjacent plots and the cost of the fencing could be shared by the two tenants.
5. The setback of 3.281 feet (1m) is required between the u-channel and the fence. This is for the necessary maintenance of the fence foundation in the future. The setback should be grassed for the landscape purpose.

3.6.3.3 Signage

The purpose of the special signage regulations is to allow the Economic Zone Area to have sufficient signage for business purposes, while avoiding clutter and maintaining the character of the surrounding region.

1) Entrance of Office and Industrial Zone

One (1) entrance monument sign that is up to ten (10) feet in height (measured from the grade of the street centreline) and one hundred (100) square feet at each entrance to the zone from a public street are permitted. Such monument signs shall only announce the name of the economic zone.

2) Industrial Lots within the Economic Zone

One (1) monument sign shall be permitted at maximum of eight (8) feet tall and forty-eight (40) square feet in area. The amount of permitted building mounted signage shall be determined by the area of the building covering area or tenant space. For example:

Over 40,000 square feet: Individual building users or tenant spaces shall be permitted one building mounted sign on each facade that faces a public street or main development driveway. However, no more than two such signs shall be permitted. The permitted size of the building mounted signs shall be two square feet for each lineal foot of building or tenant space width on which the sign is mounted but shall not exceed two hundred and fifty (250) square feet.

40,000 square feet in area or smaller: Individual building users or tenants spaces shall be permitted one building mounted sign for each facade that faces a public street or main development driveway. However, no more than two such signs shall be permitted. The permitted size of the building mounted sign shall be two square feet per each lineal foot of building or tenant space width on which the sign is mounted but shall not exceed one hundred fifty (150) square feet in area.

Monument Signs

The base and sides of the sign shall be constructed with a masonry product (excluding smooth or textured concrete blocks). The top of the sign shall have an architectural feature representing the concept of the economic zone. Single panel plexi-faced cabinets shall not be permitted.

Building Mounted Signs

Board signs, graphics painted directly on the building, manually changeable copy, electronically changeable copy, plexi-faced panels, internally illuminated awnings, firmly structured awnings with an “inflated” or plastic appearance and similar signs shall not be permitted unless specifically approved through a Design Review Meeting with the economic zone administrators.

3) Commercial Zone

3-1) COMMERCIAL/RETAIL/SHOPPING CENTERS

A group of retail and/or service establishments planned, developed and managed as a single site with common off-street parking provided on the property.

One (1) architectural freestanding sign is permitted at the main development entrance where it meets a public street. The architectural freestanding sign shall include only the name of the center and the major anchor tenant unless the conditions below are met. The maximum size of such a sign shall be two hundred (200) square feet in area. The maximum height of such a sign shall be proportional to the road frontage along which the sign is to be located: up to two hundred (200) feet of frontage allows a fifteen (15) foot tall sign and more than two hundred (200) feet of frontage allows a twenty (20) foot tall sign. Multi-tenant signs may be permitted with one tenant panel per 100,000 square feet of gross floor area in the retail center with a maximum of four such panels per retail center. These multi-tenant panels shall be accessory to the main development identification portion of the sign.

3-2) INDIVIDUAL TENANT SPACES WITHIN COMMERCIAL/RETAIL/SHOPPING CENTERS

Anchor tenants of properties over 40,000 square feet in area shall be permitted one building mounted sign on each facade that faces a public street or main development driveway. However, no more than two such signs shall be permitted. The permitted size of the building mounted signs shall be two square feet for each lineal foot of tenant space width on which the sign is mounted but shall not exceed two hundred and fifty (250) square feet.

Individual tenant spaces that are 40,000 square feet in area or smaller are permitted one building mounted sign. The permitted size of the building mounted sign shall be two square feet per each lineal foot of tenant space width on which the sign is mounted but shall not exceed one hundred (100) square feet in area. Corner tenant spaces can break their permitted square footage up and display it on the front and side facades if the side facade is visible from a public street or main development driveway. In such a case, the permitted signage can be broken into one sign area on the front facade and one sign area on the side facade.

3-3) FREESTANDING COMMERCIAL LOTS AND OUTLETS WITHIN COMMERCIAL/RETAIL/ SHOPPING CENTERS

One building mounted sign shall be permitted on each facade that faces a public street or main development driveway. However, no more than two such signs shall be permitted. The permitted size of the building mounted signs shall be two square feet per each lineal foot of building or tenant space width on which the sign is mounted but shall not exceed two hundred (200) square feet in area. One monument sign shall also be permitted at a maximum of eight (8) feet tall and twenty-four (24) square feet in area.

4) Administration of the Signage

As stated previously, all proposals that meet the Special Sign Regulations can proceed directly to the Sign Permit Review Process of the Economic Zoning Regulations. Proposals that do not meet the Special Sign Regulations shall be reviewed and suitable modifications will be advised by the Economic Zone Administrators.

3.6.4 Utility Connections

3.6.4.1 Electricity

The tenant shall apply to the economic zone administrators in prescribed form at least 30 days before the actually designated service connection. The following documents shall be submitted in triplicate with the application.

- Site map drawn to a suitable scale, showing the location of the tenant's sub-station within his premises and the location of the economic zone's 11KV line and incoming cable to be the consumers' sub-station.
- Copies of the manufacturer's test certificate and manual of the transformer as per BSS or IEC standard.
- Copy of the oil test report of the transformer (the oil test report is to be prepared after the transformer is brought to the site. Such tests may be conducted by Bangladesh Power Development Board or any expert recognized by the Chief Electrical Inspector of the economic zone.

3.6.4.2 Waste Water

1. Waste water drainage and rain water drainage system shall be designed separately.
2. The pre-treatment for toxic and chemical constituent elimination from each factory is required prior to discharging to the wastewater system.
3. The connection of water, electricity shall be carried out with the consultation of the economic zone administrators.

3.6.4.3 Water Supply

1. The application in the prescribed form shall have to be submitted at least 30 days before the date of the actual requirement of water.
2. Tenants have to construct their own over-head reservoir, pump and float valve, etc. at their own cost before applying for construction.
3. The water metre has to be approved by the economic zone administrators and has to be arranged by the tenants at their own cost. The water metre shall be kept sealed and it shall always be available to the representative of the economic zone for checking and billing purposes. Without any metre, a water connection can be given with the condition that the tenants agree to pay by flat rate for their consumption.
4. In case any unauthorised water connection is detected, the economic administrators may cut off the said connection without any notice. Reconnection of the defaulting consumer shall be allowed after payment of any outstanding bill, reconnection fee and other charges as determined by the economic zone administrators.

3.6.4.4 Gas

1. The application with letter head of the tenant shall be submitted at least 3 months before the date of actual requirement of gas.
2. The applicant has to appoint an enlisted contractor of the gas company who will prepare a plan as per gas requirement of the consumer and will submit the plan along with other necessary documents to the economic zone office. Then the economic zone office forwards the application

form, plan and other necessary documents to the gas company. One inspector from the gas company will then visit the premises where the gas is required by the applicant. Finding everything in order, the contractor engaged by the consumer will then be allowed to do the installation work. After completion of the installation work, the gas contractor will submit a completion report and information to the gas company for the necessary inspection and the gas connection. The gas company will then inspect and check all the works done by the contractor. The company will test the line. If the test result is satisfactory, the gas company will take actions.

3. The cost of laying the gas line from the gas main to the tenant's premises shall be borne by the consumer.

3.6.5 Approval of the Contractor

Foreign investors interested to construct a factory building in the zone usually do not know the rates of construction materials in Bangladesh. As a result investors may be misguided or cheated by the local contractors or a person who is not concerned with the construction work and therefore adverse reactions may be created among the investors.

To help investors in constructing their own factory building with reasonable rates, investors are advised to take approval for appointment of a contractor in a specified form prepared by the economic zone administrators before starting the work. It may be mentioned here that no work shall start before the approval of the plan of the factory building and also approval of the contractor.

CHAPTER 4

ENVIRONMENT & SOCIAL REVIEW

(COMPONENT 2)

4.1 Environmental Review

4.1.1 Background

In Bangladesh, the proposed Economic Zone Projects will provide a new approach in association with the existing BEPZ functional establishments, both in management and in investment. The proposed Economic Zone (EZ) should function as a test field for reforms and an open economy providing experience that can be replicated and promoted nationwide. The Economic Zone Act was passed in the Parliament in August 2010, providing an overall framework for establishing EZs throughout Bangladesh. Subsequently the Government of Bangladesh has selected three locations for the setting up of economic zones. These are at Sherpur in Sylhet division, at Mirershorai, and at Anwara in Chittagong Division. The Government of Bangladesh has also decided to carry out individual feasibility studies for each of the proposed three sites.

The objective of the study is to provide clear-cut data, information, and an analysis of the feasibility status of the proposed three Economic Zones. The study will include a Transport Assessment, Industry/Market Assessment, Demand Forecast, Master Plan, Infrastructure Requirements, Environmental and Social Review, and Institutional Framework.

This Initial Environmental Examination (IEE) has been prepared as part of the GoB assistance in undertaking the project appraisal of the Sherpur EZ Development Projects for the Bangladesh Economic Zone Authority (BEZA). The project proponent is the BEZA under the Prime Minister's Secretariat. The objective of the TA is to help the Government prepare a detailed EZ Project suitable for World Bank financing.

As such, this IEE was prepared based on field reconnaissance, coordination with BEZA, BEPZA, Department of Environment (DOE), the Water Resources Planning Organization, and stakeholder consultations. This report covers the description of existing environmental conditions, an assessment of qualitative environmental impacts of the land filling activities and associated economic zone project components, recommended mitigation measures and environmental monitoring. The environmental impact was considered for activities during pre-construction, construction, and operation phases of the Project. Further, this IEE is an updated self-standing companion document of Component 2 (Master Planning, Infrastructure Requirements, and Environmental and Social Review) of the Feasibility Study of the Project.

4.1.2 Environmental Clearance Requirements

In accordance with the Environmental Management Framework (EMF) of PSDSP project, safeguard policies of The World Bank and Environmental Assessment Requirements of Infrastructure Projects, an Initial Environmental Examination (IEE) and Summary Initial Environmental Examination (SIEE) will be presented to BEZA. Further, BEZA will submit this IEE to the Department of Environment (DoE) of the Government of Bangladesh for site clearance and World Bank review. An Environmental Assessment (EA) of the project, will, however, be carried out by the Developer in line with the EMF of PSDSP and Environmental Regulations of GoB.

4.1.2.1 GoB Environmental Laws, Regulations and Guidelines

The Economic Zone area, with associated industrial development, is subject to the environmental requirements of the GoB. Section 7 of the Environmental Conservation Rules of 1997 mandates that an Environmental Clearance Certificate (ECC) shall be obtained for specific types of projects. The documents to be submitted to the concerned Divisional Officer of the DoE for Orange B Category and Red Category are the following:

- (i) Accomplished Form-3: Application for Environmental Clearance Certificate
- (ii) Report on the feasibility of the project;
- (iii) For Orange B Category: a). an IEE Report of the project b). layout Plan and design of the EZ Project;
For Red Category: a). an IEE relating to the project and also the terms of reference for the Environmental Impact Assessment (EIA) of the unit or the project b). It's Process Flow Diagram; c). EIA report prepared on the basis of terms of reference previously approved by the Department of Environment, along with the Layout Plan (showing location of Effluent Treatment Plant), Process Flow Diagram, design and time schedule of the Effluent Treatment Plant of the unit or project, (these are applicable only for a proposed project)
- (iv) Report on the Environmental Management Plan (EMP) for the project and also the Process Flow Diagram, Layout Plan (showing location of Effluent Treatment Plant), design of the Effluent Treatment Plant and information about the effectiveness of the ETP of the unit or project, (these are applicable only for an existing project);
- (v) No objection certificate from the local authority;
- (vi) Emergency plan relating adverse environmental impact and plan for mitigation of the effect of pollution; and
- (vii) Outline of the relocation, rehabilitation plan (where applicable).

The national laws, regulations, ordinances and policies were reviewed during the development of this IEE. The list and description of a current legal and regulatory framework related to the EZ Project development are presented in Table 4.1.2.1-1 below.

Table 4.1.2.1-1: Relevant Laws and Regulation on Economic Zone Projects

| Reference | Description |
|--|---|
| Environment Policy of 1992 | |
| Section 3.3: Health and Sanitation | Requires prevention of harmful impacts in all areas and development activities in the country |
| Section 3.5: Water Development, Flood Control and Irrigation | Requires environmentally sound utilization of all water resources Requires prevention of adverse environmental impact of water resource development projects and irrigation networks Requires sustainable, long term, environmentally sound and scientific exploitation and management of the underground and surface water resources Requires conduct of Environmental Impact Assessment before undertaking projects for water resources development and management |
| National Environmental Management Action Plan of 1995 | |
| Unsustainable land use | Development of sustainable land use management |
| Pollution and degradation of open waters | Inclusion of water treatment plants should be made obligatory by all new projects; Dumping of sewage and other human wastes as |

| Reference | Description |
|--|--|
| | well as other raw organic wastes into the open waters should be discontinued |
| Environment Conservation Act of 1995 (Amendment 2000 & 2002) | |
| Section 12: Environmental Clearance Certificate (ECC) | Requires all industrial units or projects to obtain an ECC from the DoE prior to implementation |
| Environment Conservation Rules of 1997 | |
| Section 7: Procedures for issuing ECC | Describes procedures and documentation requirements for obtaining ECC for different project category |
| Schedule 1 | Classification of industrial units or projects based on location and impact on the environment |
| Schedule 3 | Standards for ambient water quality and drinking water quality |
| Schedule 10 | Standards for effluent from industrial units and projects |
| National Policy for Safe Water Supply and Sanitation of 1998 | |
| | Provide safe water in urban, slum, squatter settlements. Setting tariffs, reducing non-revenue water. |
| East Bengal Embankment and Drainage Act, 1952 | |
| | Concerning construction, maintenance, management, removal and control of embankment and water courses for the better drainage of lands and for their protection from floods, erosion or other impacts by water |
| The Protection and Conservation of Fish Act, 1950 | |
| | Concerning the protection and conservation of fish in Bangladesh |
| Water Supply and Sewerage Authority Ordinance, 1963 | |
| | Concerning construction, improvement, expansion, operation and maintenance of water and sewerage work and other facilities relating to environmental sanitation and for construction authority |
| Groundwater Management Ordinance, 1977 | |
| | Regarding management of groundwater resources for drinking and agricultural purposes |

Source: Modified, Environmental Policies, Rules & Regulations, DoE, 1992-1997

4.1.2.2 Other Acts and Regulations of Bangladesh

Titles of the relevant literature, Acts and regulations were also reviewed where applicable during the course of this process. These are listed below:

- Bangladesh Wildlife (Preservation) Order 1973 (Amended in 1994);
- The Environmental Court Act 2000 (Amendment 2002);
- The Forest Act, 1927 and the Forest (Amendment) Act 2000;
- Bangladesh Electricity Act 1910 and Regulations;
- Fifth Five Years Plan;
- National Energy Policy, 1995;
- River Dredging Conditions of BIWTA; and

4.1.2.3 International Conventions, Treaties, and Protocols

- The Convention on Biological Diversity, 1992;
- The Convention on the Conservation of Migratory Species of Wild Animals, 1979

4.1.3 World Bank Environmental Requirements

The EMF for PSDSP will facilitate compliance with the World Bank's environmental safeguard policies and also with the policies, acts, and rules of the Government of Bangladesh. Ensuring the long-term sustainability of benefits from "EZ Sub-projects" by adjusting interventions with the natural resource on which they are dependent. The main objectives of the EMF is "to outline a framework for environmental screening procedures and methodologies for the "EZ Subprojects," and guidelines for preparation of environmental management (mitigation, monitoring, and compensation), and reporting on the concept, design, construction, and operational stages of the project.

The World Bank requires environmental assessment (EA) of projects proposed for World Bank financing to help ensure that they are environmentally sound and sustainable. The World Bank's environmental assessment policy and recommended processing are described in Operational Policy (OP)/Bank Procedure (BP) 4.01: Environmental Assessment. This policy is considered to be the umbrella policy for the Bank's environmental "safeguard policies" which among others includes: Natural Habitats (OP 4.04), Pest Management (OP 4.09), Physical Cultural Resources (OP 4.11), Forests (OP 4.36) and Safety of Dams (OP 4.37). The Operational Policies (OPs) are the statement of policy objectives and operational principles including the roles and obligations of the Borrower and the Bank, whereas Bank Procedures (BP) are the mandatory procedures to be followed by the Borrower and the Bank.

4.1.3.1 OP/BP 4.01: Environmental Assessment

The World Bank requires environmental assessment (EA) of projects proposed for Bank support to ensure that they are environmentally sound and sustainable and thus to improve decision making. EA is a process whose breadth, depth, and type of analysis depend on the nature, scale, and potential environmental impact of the proposed project. EA evaluates a project's potential environmental risks and impacts in its area of influence; examines project alternatives; identifies ways of improving project selection, siting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts; and includes the process of mitigating and managing adverse environmental impacts throughout project implementation. The borrower is responsible for carrying out the EA and the Bank advises the borrower on the Bank's EA requirements.

The World Bank classifies the proposed project into three major categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts. Projects with multiple components or with multiple subprojects (other than projects using FIs) are categorized according to the component with the most serious potential adverse effects. Dual categories may not be used. However, the depth and breadth of EA and choice of EA instrument(s) for each component or each sub-project is decided on the basis of its respective potential impacts and risks.

Category A: The proposed project is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works.

Category B: The proposed project's potential adverse environmental impacts on human population or environmentally important areas-including wetlands, forests, grasslands, or other natural habitats- are less adverse than those of Category A projects. These impacts are site specific; few if any of them are irreversible; and in most cases mitigatory measures can be designed more readily than Category A projects.

Category C: The proposed project is likely to have minimal or no adverse environmental impacts.

4.1.3.2 OP/BP 4.04: Natural Habitats

The conservation of natural habitats, like other measures that protect and enhance the environment, is essential for long-term sustainable development. The Bank therefore supports the protection, maintenance and rehabilitation of natural habitats and their functions in its economic and sector work, project financing and policy dialogue. The Bank supports and expects borrowers to apply a precautionary approach to natural resource management to ensure opportunities for environmentally sustainable development. The Bank promotes and supports natural habitat conservation and improved land use by financing projects designed to integrate into national and regional development, the conservation of natural habitats and the maintenance of ecological functions. Furthermore, the Bank promotes the rehabilitation of degraded natural habitats. The Bank does not support projects that involve the significant conversion or degradation of critical natural habitats.

4.1.3.3 OP/BP 4.36 Forests

Forest is defined as an area of land of not less than 1.0 hectare with tree crown cover (or equivalent stocking level) of more than 10 percent, that has trees with the potential to reach a minimum height of 2 metres at maturity *in situ*. A forest may consist of either closed forest formations, where trees of various height and undergrowth cover a high proportion of the ground, or open forest. However, the Bank's forests policy aims to reduce deforestation, enhance the environmental contribution of forested areas, promote afforestation, reduce poverty and encourage economic development. Where forest restoration and plantation development are necessary to meet these objectives, the Bank assists borrowers with forest restoration activities that maintain or enhance biodiversity and ecosystem functionality. The Bank also assists borrowers with the establishment and sustainable management of environmentally appropriate, socially beneficial, and economically viable forest plantations to help meet growing demands for forest goods and services.

4.1.3.4 OP/BP 4.11: Physical Cultural Resources

Physical cultural resources are defined as movable or immovable objects, sites, structures, groups of structures and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Their cultural interest may be at the local, provincial, or national level, or within the international community. Physical cultural resources are important as sources of valuable scientific and historical information, as assets for economic and social development and as integral parts of a people's cultural identity and practices. The Bank assists countries to avoid or mitigate adverse impacts on physical cultural resources from development projects that it finances. The impacts on physical cultural resources resulting from project activities, including mitigating measures, may not contravene either the borrower's national legislation, or its obligations under relevant international environmental treaties and agreements. The borrower addresses impacts on physical cultural resources in projects proposed for Bank financing, as an integral part of the environmental assessment (EA) process. The following projects are classified during the environmental screening process as Category A or B and are subject to the provisions of this policy: (a) any project involving significant excavations, demolition, movement of earth, flooding, or other environmental changes; and (b) any project located in, or in the vicinity of, a physical cultural resources site recognized by the borrower. Projects specifically designed to support the management or conservation of physical cultural resources are individually reviewed and are normally classified as Category A or B. When the project is likely to have adverse impacts on physical cultural resources, the borrower identifies appropriate measures for avoiding or mitigating these impacts as part of the EA process. These measures may range from full site protection to selective mitigation, including salvage and documentation, in cases where a portion or all of the physical cultural resources may be lost.

The above World Bank safeguard documents were reviewed in preparing this IEE for the proposed Sherpur Economic Zone Project.

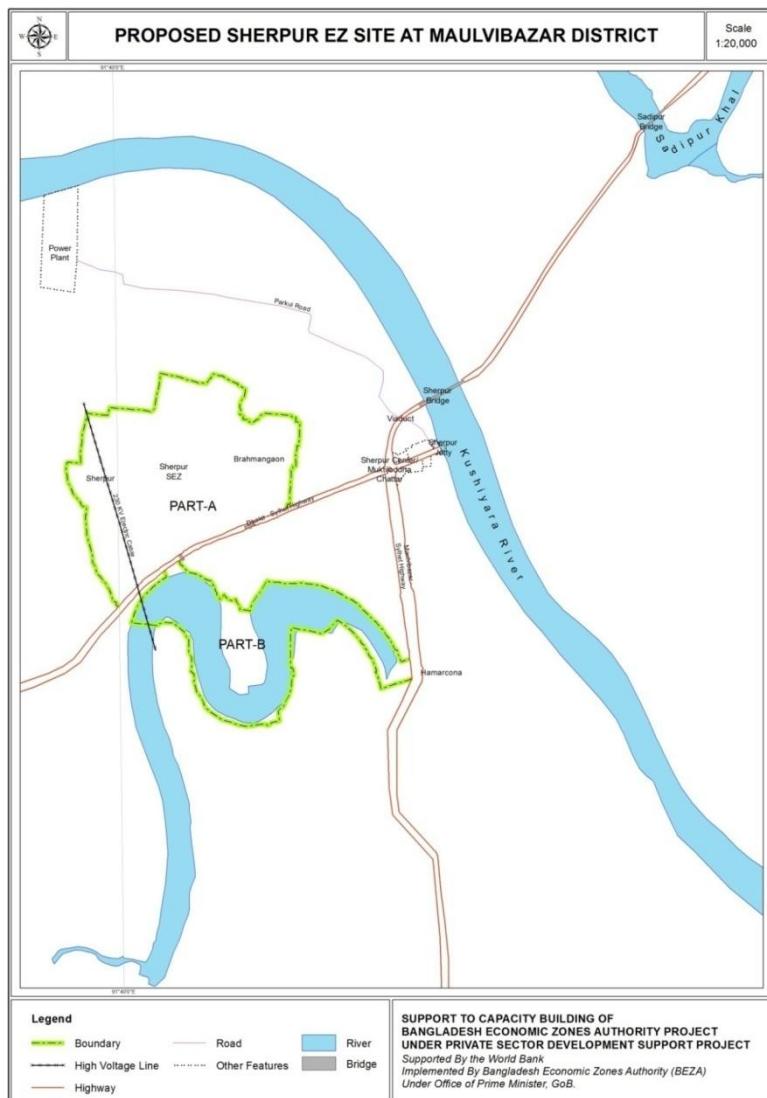
4.1.4 Description of the Project

4.1.4.1 Overview

The initiative of the Government of Bangladesh aims to establish economic zones in all potential areas including backward and underdeveloped regions and development, operation, management, and control thereof, including ancillary matters, with a view to encouraging rapid economic development through increase and diversification of industry, employment, production, and export. Likewise, the Bangladesh Export Processing Zones Authority (BEPZA) is expected to stimulate rapid economic growth of the country, particularly through industrialisation. The government has adopted an 'Open Door Policy' to attract local and foreign investment to Bangladesh. The BEPZA is the official organ of the government to promote, attract and facilitate foreign investment in the Export Processing Zones. Similarly, the primary objectives of an EZ are to provide special areas where potential investors would find a congenial investment climate, free from cumbersome procedures.

4.1.4.2 Project Location

The proposed Sherpur EZ Project site is located within 1 km of Sherpur Bazar in Maulvibazar Sadar Upazila. The site is within the Mouza Brahmangaon and Sherpur, under Maulvibazar District in Sylhet Division. The following Figure 4.1.4.2-1 shows the location.

Figure-4.1.4.2-1: Location of Sherpur Economic Zone

4.1.5 Objectives of the Project

The project's objectives are as follows: (a) to establish central treatment plant and treated wastewater reuse facilities in the Economic Zone, and (b) to strengthen regulation, enforcement, and environmental monitoring of the EZs to promote pollution control, to improve public wellbeing in the neighbouring areas, and to promote investments and capability in the planning of BEZA.

4.1.6 Description of the Proposed Project Components

The total project area is 143 hectares (353 acres). The summary of the project components are given below. Detail can be found in Chapter 3 and Annex-4.

1) Main Functions

- Focal Point (Main Gate)
- One-Stop Service Centre
- Administration Building

- Customs area
- Green Area and Landscape: Landscaping along the road and dike. Total green zone 10.70 acres (4.33 hectares)
- Factory Lots: Standard plot size in 1 hectare. Total industrial plot area 211.68 acres (85.66 hectares).
- Housing for Administrative Staff of the Economic Zone: Total area 6.38 acres (2.58 ha).
- Commercial Zone: Total area 2.05 acres (0.83 hectares)
- Resettlement Zone; Total 2.39 acres (0.97 hectare) land for resettlement of 5 households.

2) On-Site Infrastructure

- Footbridge: Over the highway at the entrance of the EZ.
- Road: Main Road: width 33 m, length 746 m; Minor Road: width 19.5 m, length 6,315 m.
- Dike: Traditional dike of +14 m from MSL.
- Retention Pond: For rainwater harvesting and drainage retention.
- Water Supply Plant: Capacity 60,000 m³/day. Source: Kushiyara River.
- Waste Water Treatment Plant: Capacity 48,000 m³/day.
- Others: Telecommunications, Gas and Electrical connection.

3) Off-Site Infrastructure

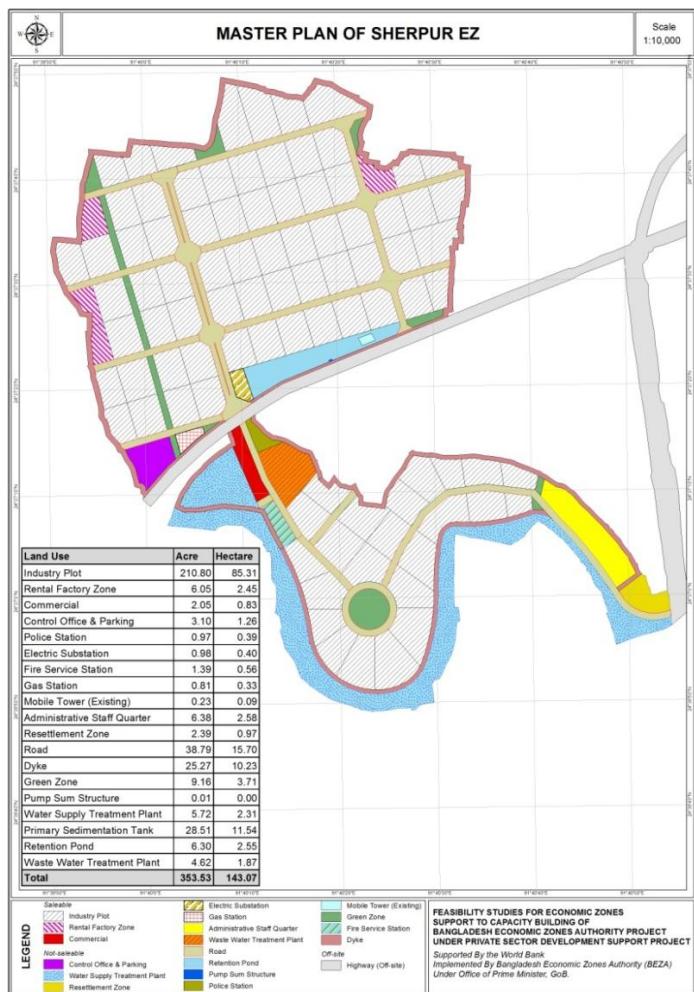
- River intake for water supply system: Water collected from Kushiyara River that is within 1 Km from the site.
- Electrical Connection: 33KV electrical connection from Fenchuganj substation at 27 Km from the site.
- Gas Connection: Gas connection by 8 inch dia MS-pipe from the existing off-take at 5 km from the site.
- Telecommunications: 13 Km new offsite FOC connection along the Dhaka-Sylhet Highway.

4) Utility Requirement:

Total utility required by the industries in 2022 is:

- Power: 33.04 MW/day
- Water : 59,011 m³/day
- Gas: 655,312 m³/day

The following figure shows the proposed Master Plan for the zone.

Figure 4.1.6-1: Master Plan of Sherpur EZ

4.1.7 Methodology

This IEE report prepared during the study period has reviewed data from the following disciplines:

- Engineering design
- Surface and groundwater
- Aquatic and terrestrial ecology
- Public participation

Additionally, the following activities were undertaken during the preparation of this report:

1. Review of initial and secondary data for the environmental component of the project;
2. Meeting with concerned agencies;
3. Reconnaissance field visit;
4. Public consultation within the project area;
5. Analysis and presentation;
6. Preparation of the review Report; and
7. Feedback and Quality check.

4.1.7.1 Stakeholders' Engagement

Participation of local people and other stakeholders has now been recognized as a key element to ensure sustainable results of both environment and development projects. Participation enables different socioeconomic interest groups in an area to develop their capabilities and to play a dynamic role in developing initiatives. It also strengthens the commitment of a wide cross-section of stakeholders, elected representatives, government employees, professional groups, and voluntary groups including NGOs and community-based organizations, by giving them an opportunity to share responsibility in key decisions. Finally, it enables project planners to make use of local knowledge of the environment, of specific land and water regimes, and land and water use by different socio-economic groups.

The World Bank and Department of Environments' Environmental Considerations for Category A and Category B projects require the conduct of public consultation during the project preparation stage. Initial public Consultations were conducted involving stakeholders according to World Bank Environmental Guidelines. The consultation involved participants representing local people, farmers and rickshaw-van pullers.

However, consultation outcomes are expressed in the following table with signature in Annex-5.

Table 4.1.7.1-1: Public Opinion

| Issues | Participants' Opinion, Comments and Suggestions | Response to Questions and Concerns | Action Points during Detail Design of EZ |
|--|--|--|--|
| General perception about the project and the awareness about the proposed project. | Most of the participants are in favor of the project and are not aware about the proposed project. | N/A | The project site is not required to be relocated at this stage |
| Support of local people for the proposed project? | Almost everybody said that they will support the project and advised the Consultant to take precautions in the environmental mitigation to avoid wetlands, flora, and religiously sensitive locations, | Explained possible mitigation measures | N/A |



Field Level Consultation Photo

4.1.7.2 Secondary Baseline Data Collection

During this stage, further review was conducted of the physical, ecological and legal issues relevant to the Project. The review of secondary sources and field reconnaissance was used to prepare a qualitative assessment of the physical environment, biodiversity, and conservation significance of the Project site. This preliminary literature review assists in identifying the baseline situation, which ultimately forms the basis for the impact assessment component of this Rapid Environmental Assessment (REA). The following activities have been undertaken:

- Data was collected from secondary sources comprising ecological information, including habitats, ecosystems, flora, fauna, vertebrates, fish, and invertebrates for the prospective site' terrestrial and fresh water environments (Ref: Interim Environmental Report);
- An appraisal was made of all legislation having direct and indirect relevance to the environmental conditions and biodiversity within the study areas;
- Information was collected on current local conservation management practices; and
- An information gap analysis and identification of the areas where further field work is required to be undertaken was completed.

4.1.8 Description of the Environment

4.1.8.1 Overview

The ecology of the Sherpur ecosystem is principally driven by seasonal hydraulics. During the monsoon, the entire region becomes a single body of open water linked to the Kushiyara River system. When the floodwater recedes, the paddy fields become isolated and remain as standing water bodies until the next rainy season. These natural habitats are linked together by a complex web of direct and indirect interactions; disruption of any one of these has an effect on the others. These habitats are dynamic and are susceptible to change due to anthropogenic processes. They lack resilience and have a low threshold to irreversible damage. The physical and ecological characteristics of these habitats make them especially vulnerable to degradation. Once degradation exceeds the limit set by the low threshold, rehabilitation becomes prohibitively expensive or impossible. The Sherpur plains of Maulvibazar District can be identified as an Endemic Bird Area (EBA) with the status of “urgent conservation priority.” Because of the geographical position of Bangladesh at the receiving end of the three major rivers and given the dispersal behaviour of aquatic biodiversity, the wetlands of Bangladesh become crucial for conserving the globally important biodiversity of the entire basin. Detailed physical and ecological baseline information is provided in the Environment Section of the Interim Report of this EZ project.

4.1.8.2 Topography

Following the review of a generalised topographic map for the whole region, this Sherpur site is seen to be part of a prominent low-lying basin in comparison to other parts of the country. Approximately 25% of the area in the region lies below 5m elevation and 50% lies below 8m²²⁶. The northern and eastern boundaries of the region are hilly areas belonging to Meghalaya and Tripura hills respectively.

The region consists of floodplain land occupied by a complex relief of broad and narrow ridges, inter-ridges, depressions, partially in-filled cut-off channels and basins. The highest floodplain ridge soils lie above the normal floodplain. The middle and lower parts of ridges are subject to shallow flooding.

²²⁶ Review of NWMP Project documents and maps, NWMPP, 2001

Basins are mainly shallowly flooded, but basin centres and old channels are generally moderately deeply flooded. Basin centres are subject to early and rapid flooding by run-off from adjoining higher land when there is heavy pre-monsoon or early rainfall. They generally stay wet for part or all of the dry season.

Within the immediate vicinity, the proposed Sherpur EZ site is surrounded by the Kushiyara River in the East and North, an oxbow lake in the south (subject to EZ encroachment) and two power stations in the north-west (having 450MW each established by Summit and BPDB).

4.1.8.3 Faunal Diversity

The area is important for a wide variety of waterfowl and shorebirds. The *toptilosjavanicus* (Lesser Adjutant) and *Leptoptilosdubius* (Greater Adjutant Stork) have also been recorded in the proposed economic zone. Common migrants and winter visitors include *Anasacuta* (Pintail), *Pluvialisdominica* (Eastern Golden Plover), *Charadriubius* (Little Ringed Plover), *Charadriusalexandrinus* (Kentish Plover), *Charadriushiaticula* (Ringed Plover), *Charadriusmongolus* (Mongolian Plover), *Numeniusphaeopus* (Whimbrel), *Numeniusarquata* (Curlew), *Tringatotanus* (Common Red Shank), *Tringanebularia* (Green shank), *Gallinagostenura* (Pintail Snipe), *Gallinagogallinago* (Fantail Snipe), *Calidris alba* (Sanderling), *Chlidoniashybrida* (Whiskered Tern), *Larusridibundus* (Blackheaded Gull), *Philomachuspugnax* (Ruff and Reeve) and *Sterna hirundo* (Stern Hirundo). Large numbers of Open-bill Storks *Anastomososcitans* occur on migration and flocks of up to several hundred birds have been observed. Other migrants and winter visitors observed in small numbers include *Threskiornismelanocephalus* (White Ibis), *Pseudibispapillosa*, *Anserindicus* (Barheaded Goose), *Anser. Anser* (Grey Leg Goose), *Haematopusstralegus* (Oyster Catcher), *Tringastagnatilis* (Marsh Sandpiper), *Calidristenuirostris* (Eastern Knot) *Larusichthaetus* (Great Blackheaded Gull), *Larusbrunnicephalus* (Brownheaded Gull) *Rynchopsalbicollis* (Indian Skimmer). Birds of Prey include *Haliaeetusleucogaster* (White-bellied Sea-Eagles), *Eurynorhynchuspygmeus* (Spoonbill Sandpiper) *Limnodromussemipalmatus* (Asian Dowitcher) and *Tringaguttifer* (Nordmann's Greenshank).

4.1.9 Screening Environmental Impacts and Mitigation Measures

4.1.9.1 Soils and Geology

During the construction period, the main impacts on the land will be from the excavation of soil from different locations to raise the EZ Project site and associated land and access road development. Possible impacts include the loss of top soil, damage to local existing roads during transportation of construction material and equipment, erosion of stockpiles during rain, and re-suspension of dust during the dry weather. The construction process will potentially remove vegetation and disturb the upper soil layer making it more susceptible to erosion and increased runoff. However, the areas that will be subject to disturbance will be very small and so the potential impacts associated with the development of EZ land are not considered significant, provided basic environmental management measures are implemented.

During the operational period, it is possible that contamination of the soil could occur from spillage of hazardous materials and wastes from the different industrial operations in the EZ premises. However, the impact of such an event would be much localized. In order to mitigate against such an event the following measures will be implemented: all hazardous wastes and hazardous materials, like lubricating oil, solvents and fuels, shall be stored within concrete or brick buildings properly designed for such storage facilities and oil spill clean-up materials (sorbent pads, loose sorbent material, etc.) will be made available. It will be ensured that the industrial operators are trained in repair and

maintenance of machines and equipment and also on how to clean up the spill and dispose of the contaminated materials using treatment technologies.

Likewise, the potential impacts associated with geology may include the loss of and damage to geological, paleontological, and physiographic features of the geological environment. Seismicity related potential impacts would include any change to the frequency or severity of earthquakes or impacts to earthquake preparedness and response capabilities.

Considering the Project features, there are no specific potential impacts related to geology and seismicity that have been identified as having the potential to result from the site establishment stage of the Project and subsequent EZ Industrial set up.

4.1.9.2 Air Quality

During construction, air quality is likely to be degraded by initial earth work for excavation of soil and subsequent dumping to raise the EZ site, exhaust emissions from the operation of construction machinery; fugitive emissions from aggregate and dust generated from earth works, approach roads, exposed soil, and material stock piles. Air quality is expected to be less impacted by any activity during operations by the industrial operators subject to compliance of EMP and DoE Environmental Regulations.

In order to mitigate these effects, the following shall be implemented: (i) Construction equipment will be maintained to a good standard and the idling of engines discouraged. (ii) Machinery causing excessive pollution (e.g., visible smoke) will be banned from construction sites. (iii) Spraying of water on the soil excavation and dumping site and on access roads if dust is being generated and the covering of loads with tarpaulins.

4.1.9.3 Noise and Vibration

A high level of noise and vibration at the EZ Site (during construction phase only) will result from the operation of heavy machinery (Bulldozers, Excavators, Dump trucks, Loaders, Rollers, Asphalt pavers, Water tankers, Concrete Mixers, Car/ Passenger vehicle movement, etc.) To prevent noise and vibration, working hours will be restricted. Work will only be allowed between 6 am and 9pm. Additional management and mitigation measures should be considered, for example: (a) Noise generated during the construction should aim to comply with the noise standards of the Government of Bangladesh; (b) A code of conduct should be established for field personnel to reduce the potential for impacts on nearby communities, such as avoidable noise generation; (c) Noise monitoring should be undertaken at the location of the nearest sensitive receivers if complaints about noise are received, etc.

4.1.9.4 Surface Water and Hydrology

Water is an essential resource which sustains all life on earth. Surface water is made up of standing water such as ponds, lakes and dams, and watercourses such as streams, rivers, and wetlands. Hydrology is the study of precipitation, evapotranspiration, and the interaction between surface water, soil water, and groundwater.

Potential impacts to surface water and hydrologic systems due to EZ developments are usually centred on changes to the water quality and water quantity of the Kushiyara River and associated networks in the project area of influence. Potential water quality impacts may result from changes to the physical and chemical composition, while potential water quantity impacts may result from changes to the storage and flow of water. This section identifies the potential impacts from the Project on surface water and hydrology.

There is potential that the following impacts related to surface water could result from the site establishment stage of the Project:

- The dewatering of waterlogged dredged materials may contribute to increased turbidity in the Kushiyara River (if dredged material is used for EZ land development);
- Dredging operations may disturb sediments and contribute to the volume of turbidity in the Kushiyara River;
- There is the potential that vehicle movement and land development could lead to erosion and sedimentation;
- Accidental spillage, mismanagement, or leaks of hazardous materials (such as fuels, oils and solvents) may pollute surface waters;
- Waste generated by the accommodation of personnel living and working on the EZ site could pollute surface waters if improperly managed ;
- Dredged areas may alter bathymetry, promoting changes to the flow velocities and erosion/accretion cycles (If dredged material is used for EZ land development) ;
- Preferred flow paths for drainage may be modified by the construction of the raised EZ site;
- Construction of the raised EZ pad may impact flooding and ponding conditions in the local area.

Management and mitigation measures include the following:

- Major earthworks should be planned within the dry season to reduce the potential for runoff and sedimentation of adjacent waterways.
- A progressive sediment and erosion control plan should be developed prior to construction (or prior to the disturbance of soils) and subsequently implemented and maintained throughout construction.
- Storage stockpiles and dewatering stockpiles should only be placed in designated areas.
- Erosion and sediment controls should be regularly checked and maintained during the Project construction phase.

4.1.9.5 Flora

Flora relates to all aquatic and terrestrial based plants. Plants are vital for ecosystem function and are used as resources for human food, shelter, clothing and other products. Developments often have the potential to impact flora. These potential impacts may be felt at several different levels including individuals, communities, populations, species, ecosystems, or habitats.

Potential impacts to flora could include a reduction in diversity, change in species composition and the destruction of individuals, species or communities or, changes to species population distributions or health. This section identifies the potential impacts to flora that may occur as a result of the Project.

The majority of impacts on local flora species and communities will occur within the site establishment phase of the project. In summary, potential impacts could include:

- Dredging could impact aquatic plants due to increased turbidity and sediments in the Kushiyara River water (if dredged material is used for EZ land development);
- Agricultural plants are likely to be removed as a result of the formation of the EZ raised pad, stockpile areas, roads and tracks;
- Existing roadside vegetation may be lost if new or existing roads need to be constructed, widened or improved.

Agricultural land

As agricultural lands cover a large percentage of the EZ study area, the majority of potential impacts on flora are likely to occur in this ecosystem. The most important impact will be the land use change of agricultural land to a raised pad area. Agricultural areas provide little habitat for local flora species and therefore this change will not constitute a significant loss to potential habitat for plant species.

Village Forest and Residential Plantation

Removal of native and abundant vegetation within and around the EZ raised pad site, connecting roads and other possible service points, has the potential to be the most significant impact on terrestrial flora. The significance of the potential impact will depend largely on the species composition to be removed.

Management and mitigation measures include:

- Stabilization, e.g. re-vegetation/compaction of disturbed areas, should be undertaken as soon as possible following completion of the development works.

4.1.9.6 Fauna

At the time of construction, potential impacts are destruction of habitat from the trimming or cutting of the trees in the vicinity, disturbance of individual animals, localized decline in the quality of habitat (removal of original plants), and poaching of edible animals and birds by construction workers using equipment and machines. During the operational years, the most common impact is the reduction of faunal habitats by infrastructure development and associated industrial activities.

Management measures include, development of alternative wildlife habitat sites by plantation of native flora leading to the support of a wide range of species including birds.

4.1.9.7 Other Impacts and Mitigation Measures

Other Impacts and Mitigation measures are presented in Annex-5 as anticipated environmental impacts, corresponding mitigation measures related to the pre-construction (pertaining to project location and design), construction and operation of the Sherpur EZ project as well as the responsible entity for implementation.

Potential environmental impacts have been assessed according to magnitude (I-insignificant, M-moderate or S-significant) and impact duration (T-temporary or P-permanent) and are presented in a manner that shows magnitude and duration of a particular impact, e.g., I/T means the impact is insignificant and is temporary in nature.

4.1.10 Institutional Requirement for Environmental Management

The Environmental Management Plan (EMP) was prepared to provide an outline of measures likely to be needed to mitigate the potential adverse environmental and social impacts due to the proposed EZ development project. A detailed EMP covering all significant environmental and socio-economic issues would be developed as part of a full scale Environmental Impact Assessment (EIA). This EMP will form the primary mechanism for management, accountability, and reporting on the project's social and environmental performance.

This report has been based upon the project description as provided by BEZA at the time of initial project commencement. In the event that any details of the project's implementation are changed it will be necessary to appropriately update this plan.

Project Management Office (PMO): The Project's management will comprise an executive committee, an inter-agency working group, a Project Management Organization in the BEZA (BEZA-Project Director) and PIU in Sherpur.

Executing Agency (EA) - The PMO in association with the Prime Minister's Office will be responsible for the overall technical supervision and execution of the project. The staffing of the PMO will include expertise in project management, civil engineering, institution and finance, environment, socioeconomics, land acquisition, and resettlement aspects. The mitigation measures that are incorporated into the design will be verified by the PMO before providing technical approvals. The mitigation measures that form part of the Contract Documents will also be verified by Project Consultant (JDI-Maxwell, Sheltech) before the signing of the contract between the PMO and the contractor.

The mitigation measures identified in the IEE will be incorporated into the project cycle. Environmental controls pertaining to design and location will be incorporated into the detailed design by the project construction supervision consultant (CSC). Mitigation measures during the construction stage shall form part of the Contract Documents and will be implemented by the contractor.

Project Implementation Unit (BEZA-PIU): In Sherpur, the PIU will be established as soon as the Executing Agency (EA) enters into a project agreement with the funding agency (GoB, WB). The PIU will be headed by a Chief Engineer and will comprise the following sections: (i) Construction Section, (ii) Environment and Social Development Section, (iii) Operations and Maintenance Section and (iv) the Project Accounts Section. The PIU will be located within the Sylhet District office and with the assistance of the CSC, will be responsible for construction supervision, local level procurement activities, contracting with local contractors, and implementing the engineering and environmental control.

The responsibilities of the PIU with support from project supervision consultants, shall include (i) construction supervision and management; (ii) assessment of works carried out by the contractor; and (iii) preparation of quarterly reports on the implementation of environmental mitigation measures and a monitoring plan at the construction stage.

The contractor will provide the BEZA (PIU) with monthly reports on the implementation of mitigation measures. The reports prepared by the contractor along with quarterly monitoring reports to be prepared by the Project Consultant will be consolidated and submitted to the PIU for review.

During the operation stage of the Project, the responsibility for monitoring the environmental performance of the Project components should be delegated to either the external monitoring consultant, or BEZA representatives, who, in association with the O&M Contractor and Consultants, will undertake routine and random monitoring of specific environmental plans addressed in this IEE.

For the detailed EIA study, the tentative ToR for the international environmental specialist and the ToR for the local environment specialist to be employed by the Project Consultant are as follows:

Environmental Training Specialist – International

The proposed ToR for the training consultant is as follows:

- (i) review prevailing DoE and WB regulations and guidelines governing the assessment and management and mitigation of environmental impacts of the EZ project;
- (ii) identify the procedures and tasks required to be performed by BEZA to meet the requirements of these regulations and guidelines;
- (iii) review the skills of relevant BEZA officials and personnel and assess the need for training to establish the capability to meet requirements for preparing environmental assessments,

- environmental monitoring, and implementation of mitigation measures of EZ development impacts and associated infrastructure development projects;
- (iv) prepare a short-term staff training plan and associated materials to meet immediate needs;
 - (v) undertake training workshops that will include the following topics:
 - Environmental assessment requirements of GoB EZ Projects
 - WB requirements and procedures on project cycle, project categorization, IEE/EIA process, and preparation of summary IEEs/EIAs, including formats and reporting requirements
 - Assessment of environmental impacts
 - Identification of mitigation measures
 - EMP formulation, implementation and monitoring
 - Review of IEE/EIA/ reports to comply with WB requirements
 - Incorporation of mitigating measures in the project design and contracts
 - (vi) Evaluate the effectiveness of the training, measuring improvements in attitudes and skills achieved.

Environment Specialist – Local

Below is the proposed ToR for the environmental specialist to be employed by the BEZA during the construction stage:

- (i) develop an environmental auditing protocol for the construction period;
- (ii) conduct quarterly monitoring (through site inspection, review of the contractor's monthly reports, review of related documents and interviews/consultations with village people and the community, PIU staff, on-site workers/employees, etc.) of the contractor's performance regarding implementation of mitigation measures;
- (iii) based on the monitoring findings, recommend additional mitigation measures, as necessary;
- (iv) in close coordination with the PIU, prepare and submit monthly and quarterly monitoring reports;
- (v) assist the international environment specialist and in the needs assessment, preparation of training materials, as well as the coordination and conduct of training.

4.1.11 Environmental Management and Monitoring Plan

4.1.11.1 Environmental Management

The Executing Agency of the Project is BEZA-PMO and the Prime Minister's Office and thus has overall responsibility for ensuring that all standards and procedures are followed during construction activities. BEZA also has responsibility for ensuring that all monitoring requirements, including progress reporting are fulfilled. The Construction Contractor under Special Conditions of Contract with the GoB will be responsible for construction of the EZ site and associated civil works. Upon completion of construction, the O&M Contractor will be responsible jointly with the BEZA for maintenance of the EZ establishment and all project management aspects, including oversight of environmental pollution, mitigation and monitoring (subject to the approval of an additional O&M Contract).

4.1.11.2 Environmental Monitoring Programme

Environmental monitoring is a very important aspect of environmental management during construction and operation stages of the project to safeguard the protection of the environment. An

environmental monitoring programme for the construction and operation stage of the Project will be undertaken to monitor environmental impacts of the Project, to determine conditions requiring remedial measures and to assess compliance with national and World Bank environmental safeguard policies. The contractor will be responsible for implementing the monitoring programme and preparation of monthly progress reports regarding implementation. The Project Consultant will undertake an environmental monitoring programme during the construction stage and will also monitor compliance of the contractor with the implementation of required mitigation measures and contract provisions pertaining to environmental aspects.

The following activities will also be carried out and cross-checked in association with the implementation of the monitoring programme:

- Pre-construction: updating of EMP during the detailed design phase and inclusion of environmental clauses in bid and contract documents.
- Construction: environmental performance of contractors with regard to control measures pertaining to erosion, material storage, setting up of work site, noise, waste disposal, traffic management, workers' safety, etc.
- Operation: O & M practices and environmental effects including soil erosion, soil contamination, surface water and groundwater quality.

Further detail of the environmental monitoring programme appears in the following Table 4.1.9.2-1 and in Annex – 5.

Table 4.1.11.2-1: Environmental Monitoring Programme

| Impact | Location | Means of Monitoring | Frequency of Monitoring |
|--|---|--|---|
| Construction Phase | | | |
| Pollution of water courses and flow obstruction due to improper stockpiling of excavation spoils and construction materials | Throughout project raised area (and its influence area) | Site inspection | Regular Monitoring |
| Flooding or accumulation of construction run-off due to inadequate drainage and improper stockpiling of excavation spoils and construction materials | Throughout project area | Site inspection | Quarterly |
| Excessive dust emission | Throughout project area | Site inspection, interviews/consultation with adjacent households/occupants of nearby schools and other structures | Regular site specific instrumental monitoring |
| Excessive noise emission | Throughout project area | Site inspection, Interviews/consultation with adjacent households/occupants of nearby schools and other structures | Quarterly |
| Health and safety hazards (workers and community) associated with construction activities | Throughout project area | Site inspection, interviews with workers and communities | Quarterly |
| Pollution due to improper disposal of wastes and excavation spoils | Treated water | Measurement of pH, iron, manganese etc. | Quarterly |
| Operational Phase | | | |
| Health hazards due to distribution of unsafe water | Treated water | Measurement of pH, iron, manganese etc. | Quarterly |

| Impact | Location | Means of Monitoring | Frequency of Monitoring |
|---|---|--|--------------------------------|
| Pollution due to improper disposal of sludge from industrial establishments | Disposal site, Receiving body of water for supernatant water drained from the sludge tank | Site inspection, Interviews with pump operator, staff and communities; Measurement of total suspended solids | Quarterly |
| Odour emission and fly/vermin proliferation | Compost/sludge pit | Site inspection | Weekly |
| Pollution due to sewage overflows from filled-up septic tanks/pit latrines and bypassing of soak pits | Sanitation facilities (e.g., public and community latrines) throughout the EZ area | Site inspection | Monthly |

Source: Environmental Analysis, October, 2013

The Construction Supervision Consultant (CSC) in cooperation with the PIU will, during project implementation, be required to develop an environmental auditing protocol for the construction period, formulate a detailed monitoring and management plan, supervise the environmental monitoring on an agreed-to regular basis, and submit quarterly reports based on the monitoring data and laboratory analysis. The PIU shall submit the following environmental reporting documentation to the GoBand funding agency (World Bank):

- a. Baseline Monitoring Report
- b. Bi-annual Environmental Monitoring Reports
- c. Project Completion Environmental Monitoring Report: Three years after completion

4.1.12 Conclusions

Findings of the IEE reveal that no major negative environmental impacts are likely to occur due to construction and operation of the Economic Zone Project. The potential negative environmental impacts associated with the construction activities are relatively minor in comparison to the significant environmental and economic benefits resulting from project operation. The implementation of the EMP which deals with mitigation measures, implementation responsibilities, and the monitoring plan as defined in the IEE, will result in minimal adverse impacts.

During construction, the contractor will implement the mitigation measures identified in the IEE while project consultants will conduct regular monitoring to ensure contractor's compliance with applicable provisions of the EMP. The project consultant will also assist the PIU in preparing contractual documents so that bidding documents, bills of quantity and other contractual obligations of the contractor clearly identify environmental responsibilities and describe penalties for non-compliance.

In conclusion, the Project will have overall beneficial impacts and will have minor negative impacts, which will be carefully monitored and adequately mitigated. As such, the completion of this IEE fully meets the Government of Bangladesh and Word Bank standards at this stage.

However, it is recommended that a detailed EIA study should be undertaken, considering alternative EZ site options and that seasonal data collection should be carried out through a multidisciplinary team (wildlife expert, limnologist, fisheries biologist, terrestrial and aquatic ecologist, etc.) to ensure an accurate baseline and refined designs. This should reflect precisely the EIA variables defined in *Identification of Impacts (IECs), Quantification of Impacts and Valuation of Impacts to ensure Project sustainability*. Likewise, detailed monitoring including management training procedures and

costs will be presented in the EIA.

4.2 Social, Gender, and Resettlement Review

4.2.1 Introduction

Social and gender aspects and resettlement issues are crucial in the planning and implementation of any development project. On the one hand, Economic Zones (EZ) require land acquisition which will cause loss of property, homes, and livelihood sources, and on the other hand will provide significant opportunities for economic activities, commerce and trade. These are all likely to have an impact on land ownership, poverty issues, food security, economic status, social status, and gender relations. The social and gender aspects and the resettlement issues presented here, cover the impact of the proposed EZ on the EZ itself and adjacent areas. This is based on the current socio-economic scenario of the locality, and discusses whether the proposed project will affect lives, livelihoods, structures, institutes, historic sites, ethnic and religious minority people, and the resettlement of the population displaced by the proposed EZ.

4.2.2 Methodology:

- Review of relevant documents and data including WB policies related to social, gender, and resettlement aspects and the Bangladesh Government Acts.
- Meeting with concerned agencies.
- Reconnaissance field visit.
- Public consultation within the project area and adjacent areas.
- Preparation of the review report including secondary and primary data and incorporation of feedback.

4.2.2.1 Secondary Data Collection and Literature Review

The literature review is carried out to identify the current socio-economic scenario of the EZ and adjacent areas and the project affected people (PAP). This will provide the basis in formulation of the RAP (Resettlement Action Plan). However, during the feasibility stage, further review will be conducted on social, economic, and legal issues relevant to the project.

The following activities have been undertaken:

- Data has been collected from secondary sources comprising demographic composition, occupational status and sources of livelihood, educational status, household structures, and access to basic physical facilities.
- An assessment of all legislation including World Bank Policies and those of the Bangladesh Government was undertaken.
- A list of social, cultural, religious and academic institutions and sites was prepared.
- An information gap analysis and identification of the areas where further field work is required was completed.

4.2.2.2 World Bank Policies and Acts and Regulations of the Bangladesh Government

The World Bank's environmental and social safeguard policies: The World Bank's environmental and social safeguard policies were analysed. These are a cornerstone of its support to sustainable poverty reduction. The objective of these policies is to prevent and mitigate undue harm to people and

their environment in the development process. These policies provide guidelines for World Bank and borrower staff in the identification, preparation and implementation of programmes and projects. Safeguard policies have often provided a platform for the participation of stakeholders in project design and have been an important instrument for building ownership among local populations. The following policies and legislation were consulted:

- World Bank's OP 4.12 Requirements for Involuntary resettlement
- World Bank Gender Policy: OP 4.20 - Gender and Development (Revised March 2012)
- Specific Funding Requirement of the World Bank's Policy OP 4.10.
- World Bank's policy on Physical and Cultural resources: OP4.11
- Bangladesh Government's Acquisition and Requisition of Immovable Property Ordinance, 1982 was done.

4.2.2.3 Meeting with relevant Agencies and consultation with various stakeholders

A participatory approach to projects is essential in order to ensure sustainable development. Participation of local people and other stakeholders enables different socioeconomic interest groups to enhance their capabilities in playing an effective role in development initiatives. It also ensures commitment and a sense of ownership of various stakeholders, beyond the local and direct project beneficiaries. Government agencies, people's representatives, professional groups, and voluntary groups including NGOs and community-based organizations, could be actively engaged in sharing responsibility in key decisions. It also enriches project planners with local/indigenous knowledge.

As part of the public consultation of social, gender, and resettlement issues, a series of consultations with people from a range of categories were carried out within the proposed EZ and the nearby areas.

Consultations were conducted with local people - including homestead owners, agricultural land owners, fishermen, fish traders, women, elementary school children, and local traders.

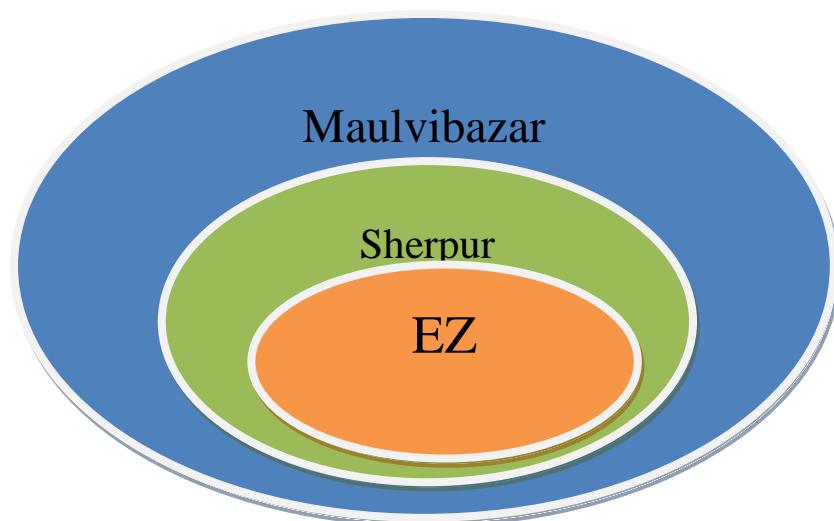
Table 4.2.2.3-1: Field visit to the Sherpur, EZ

| Date | Stakeholders | Location | No of persons |
|-------------------------------|--|-------------------------------|--|
| 27 July 2013 | Interviews with the DC and ADC and other government officials | Maulvibazar District | DC and ADC |
| 27 July 2013 | youth, day labour, small traders, shopkeepers, transport workers | Srimongol Rail station | 5+8+7 persons in 3 places around the Srimongol rail station |
| 27 July 2013 and 28 July 2013 | Fishermen, fish businessmen, rickshaw puller, van pullers | Sherpur Sadar | 11+6+9 persons around the fish storage market near riverside. |
| 28 July 2013 | Affected households. | Sherpur, EZ and adjacent area | 7 persons at homestead owners' place, 6 children in the adjacent area, 5 fishermen, 6 farmers, 2 women |

4.2.3 Information on Sherpur EZ

Sherpur EZ is under Khalilpur Union of Maulvibazar Sadar Upazila in Maulvibazar district. Maulvibazar district is situated in the North-East corner of Bangladesh in Sylhet division. It has an area of 2,707 km, and a population of 1.38 million.

The following section provides the current socio-demographic and economic conditions of the people of the proposed EZ area of Sherpur. It is to be noted that Sherpur EZ will create 40,706 job opportunities in various industries including garments, textiles, toy-making, and food processing. It will require more manpower from beyond Sherpur and adjacent areas.

Figure 4.2.3-1: Sherpur EZ in Maulvibazar**Table 4.2.3-1:** Population in Sherpur EZ Area

| Male and female population: | Occupations of HH | Institutions affected |
|--|---|-----------------------|
| 5 households 39 people: 13 women 8 children 18 men | All home owners are, returned from Middle East, retired persons and small businessmen | None |

As a whole, this is an agriculture and fisheries based area (Poverty information: Detailed information provided in the section on Sherpur Mouza).

Table 4.2.3-2: Total Number of Structures

| Item | Number |
|------------------------------------|--------|
| Homes | 5 |
| Mosques | None |
| Temples | None |
| Primary Schools | None |
| High schools | None |
| Colleges | None |
| Community centres | None |
| Health centre: | None |
| Business centres | None |
| Historical sites | None |
| Graveyards | None |
| Other religious sites | None |
| NGOs: None working in project area | None |

Table 4.2.3-3: Types of land ownership in EZ

| Sl. No. | Land ownership pattern | Area |
|---------|-------------------------|-------------------------|
| 1 | Total project area | 353.53 Acre (143.07 ha) |
| 2 | Private land | 217.37 Acre (88.00 ha) |
| 3 | Public land | 135.52 Acre (54.87 ha) |
| 4 | Resettlement Zone in EZ | 2.39 Acre (0.97 ha) |

Private land ownership includes single and doubled cropped lands: (List provided in 4.2.13, collected from the DC office of Maulvibazar)

Table 4.2.3-4: Resettlement Costs

| Sl no | Class | Proposed Area for Acquisition | Compensation for land | Resettlement cost reallocation cost |
|---------------------------|------------|-------------------------------|--|---|
| 1 | Homes | 5 HH | Resettling in EZ area | 1. US\$ 0.125 Million (including 5 pucca homes) |
| | | | Sherpur Resettlement Zone - 2.39 Acre (0.97 ha) | 2. Land acquisition cost: US\$22.56 Million |
| 2 | Crop lands | 61.64 acres | Cash compensation for land + one year crop price | |
| 3 | Others | | Cash compensation for land | |
| TOTAL Private land | | 217.37 Acre (88.00 ha) | Cash compensation | |
| Resettlement zone | | | | 2.39 Acre (0.97 ha) |

Table 4.2.3-5: Land by Crop Category

| Sl. No. | Types of crops | Land size in acres |
|----------|----------------|--------------------|
| 1 | Aman | 29.91 |
| 2 | Aush | 21 |
| 3 | Chara | 0.95 |
| 4 | Boro | 9.78 |
| 5 | Total | 61.64 |

Table 4.2.3-6: Sherpur EZ's Distance from Other Strategic Important Points

| Distance (in km) | Location (from Sherpur) |
|------------------|------------------------------------|
| 20 | District Headquarter (Maulvibazar) |
| 25 | Upzila Headquarter |
| 35 | Sylhet Railway Station |
| 43 | Sreemangal Railway Station |
| 55 | Osmani Airport in Sylhet |
| 208 | Dhaka City |
| 435 | Chittagong Port |

4.2.4 Information on Sherpur & Brahmangaon Mouza

Sherpur is situated in Maulvibazar. Maulvibazar district is surrounded by Sylhet in the north, Habiganj District in the west and the Indian States of Assam and Tripura in the east and south respectively. The main exports of Maulvibazar are bamboo, tea, pineapple, cane, jackfruit, oranges, agar, rubber, mangoes, and lemons. There are 92 tea gardens in this district. Three ethnic minority (indigenous groups/tribes) Manipuri, Khasia, and Tripura live in the three Upazilas of Maulvibazar. Large tea estates (home to the three largest tea gardens in the world), the shrines of Muslim Saints, sites of historical and archaeological interest , the Madhav Kunda waterfall, Hakaluki Haor, an eco-

park and migratory birds in winter have made Maulvibazar one of the tourist attractions of Bangladesh. The Greater Sylhet region has the largest number of expatriate Bangladeshis abroad, almost half a million in number. This Diaspora is mostly in the United Kingdom, but also is found in North America. The Greater Sylhet region receives, on average, the equivalent of some US\$4 billion in foreign remittances from this Diaspora, making this a better off socio-economic strata of the Bangladeshi population. Sylhet is the most important gateway for Bangladesh's aspiring manufacturers when it comes to penetrating the seven Indian states - the so-called "seven sisters."

Sherpur Mouza

Sherpur is under Khalilpur Union of Maulvibazar Sadar Upazila.

Population:

The total number of households (HH) in Sherpur is 425, and the population density is 5.1. The largest percentage of households (18.1%) consist of 4 persons, followed by 17.6% of households consisting of 5 members.

Table 4.2.4-1: Household Type and Gender Based Population Distribution

| Households | | | | Population | | | Sex ratio |
|------------|---------|---------------|--------|------------|-------|--------|-----------|
| Total | General | Institutional | Others | Both | Male | Female | |
| 428 | 425 | 0 | 3 | 2,184 | 1,169 | 1,015 | 115 |

Source: BBS, Population and Housing Census 2011, Community Report, Maulvibazar Zila

Most of the households fall under the general category. The number of males is higher than the number of females.

Table 4.2.4-2: Age-wise Population Distribution

| Total pop | Percent of population in the age group | | | | | | | | | |
|-----------|--|------|-------|-------|-------|-------|-------|-------|-------|-----|
| All ages | 0-4 | 4-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30-49 | 50-59 | 60-64 | 65+ |
| 2,184 | 11.2 | 13.0 | 11.7 | 10.6 | 11.1 | 9.9 | 21.8 | 4.8 | 2.7 | 3.2 |

Source: BBS, Population and Housing Census 2011, Community Report, Maulvibazar Zila

Age Distribution:

The majority of the population are in the age group of 30-49, also the percentage of young population is much higher than the dependent population, but the employment rate is low in the locality. Thus, the EZ will have a very positive role for employment generation for the youth and all other ages including women in various industrial sectors established in the EZ.

Poverty Information:

There is no data directly indicating poverty in the latest Census. But the data on occupation, education, and household types are presented to give the idea of the socio-economic condition of the locality. From these variables, the area seems impoverished and very few well-off families live in the proposed area. But in the Upazila there are several structures and buildings and institutions which are presented in the report.

Table 4.2.4-3: Employment Status of Population

| Employment status | | | | | | | |
|-------------------|--------|------------------|--------|----------------|--------|-------------|--------|
| Employed | | Looking for work | | Household work | | Do not work | |
| Male | Female | Male | Female | Male | Female | Male | Female |
| 185 | 14 | 0 | 0 | 3 | 183 | 20 | 44 |

Source: BBS, Population and Housing Census 2011, Community Report, Maulvibazar Zila

There is a huge gap in male-female employment. While 185 males are employed, only 14 females are gainfully employed. Most women are involved in household work, 183 females out of a total of 241 are involved in household work.

Women's Empowerment:

Women are mostly relegated to the household work category. Thus, employment opportunities for women created by the proposed EZ directly or indirectly are expected to provide them with a better socio-economic status and some degree of empowerment.

Table 4.2.4-4: Employment by Field Of Activity

| Field of activity | | | | | |
|--------------------------|--------|-----------------|--------|----------------|--------|
| Agriculture | | Industry | | Service | |
| Male | Female | Male | Female | Male | Female |
| 45 | 1 | 10 | 0 | 130 | 13 |

Source: BBS, Population and Housing Census 2011, Community Report, Maulvibazar Zila

Among the employed population, in agriculture there is only one female; in industry no females are employed; 130 male and 13 females are in the service sector. The Industrial Zone, therefore, is likely to have a positive impact on both males and females, in terms of opportunities for employment.

Table 4.2.4-5: Household Structure and Sanitation Facilities

| No of Households | Types of structures (%) | | | | Toilet facilities (%) | | | |
|-------------------------|--------------------------------|-------------------|---------------|---------------|------------------------------|----------------------------------|---------------------|-------------|
| | pucca | Semi-pucca | kutcha | Jhupri | Sanitary water sealed | Sanitary non water sealed | Non-sanitary | none |
| 425 | 28.7 | 27.5 | 43.5 | 0.2 | 11.5 | 59.5 | 25.9 | 3.1 |

Source: BBS, Population and Housing Census 2011, Community Report, Maulvibazar Zila

Structure and Sanitation facilities:

The household pattern, sanitation facilities and lack of appropriate behaviour shows a grim picture of poverty in the proposed EZ area. Most of the households have 'kuccha' houses (temporary houses).

Brahmangaon Mouza:

Only a small portion of the EZ is in Brahmangaon mouza, 1,745 people are living there but the area falling under the EZ has no one living inside or nearby.

4.2.5 Overall Social Impact

Regarding the social indicators, the following are likely to have a positive impact on the social lives of the local population due to the EZ:

Table 4.2.5-1: Overall Social Impacts of EZ

| Sl. No. | Issues | Impact | Strategies for Risk mitigation |
|----------------|----------------------------|---|---|
| 1. | Poverty Alleviation | <p>Employment will reduce poverty through increased income.</p> <p>Diversification in livelihood through industrialization and related trades will occur.</p> <p>18,780 direct employed and about half (9,390) will be indirectly employed in</p> | <p>Skill training programs by relevant government agencies and NGOs will be needed for efficient utilization of this huge manpower.</p> |

| Sl. No. | Issues | Impact | Strategies for Risk mitigation |
|----------------|--|--|---|
| | | the Zone area. Industries include textile, ceramics, food processing etc. industries which are suitable for women and do not require high skill. So, this will enormously benefit a cross section of the population and both genders. On the other hand pharmaceuticals require high skill labor, so some skilled people will migrate to Sherpur and generate more economic activities. | |
| 2. | Food Security | With increased income, families will be able to ensure food security for their families. The average yield of the two cropped land, i.e., Aman land is 16/17 <i>Monds</i> (one mond is around 40.4Kgs) of paddy in 1 Bigha (33 Decimal = 0.33 Acre /0.13 Hectare). Average yield on the cropped land, i.e., Aush land produces 8/10 <i>Monds</i> of rice yearly. These are not enough for the farmers to ensure food security for themselves or a standard livelihood. | As agricultural lands will be acquired, special care is needed for the small and marginal farmers who are solely or mainly dependent on these lands. Better livelihood options and food security should be ensured for them. |
| 3. | Awareness and Accessibility Regarding Health | Due to better earning directly and indirectly due to the EZ establishment, the families will have better access to health services and the community as a whole will be aware and will benefit. | Issues of health hazards caused by the EZ industries need to be identified. If there are any, steps need to be taken to prevent and minimize such hazards. |
| 4. | Education for Children Including Girls' Education | Due to better earning directly and indirectly due to the EZ establishment, the child education- rate is likely to increase leading to a reduction in children's informal or agriculture based labour. | During construction and while the EZ gets operational children's safety needs to be ensured. Local community needs to be sensitized and NGOs can be engaged with them. |
| 5. | Access to Civic Amenities and Communication | 5 households that will be resettled in the EZ area will access better civic amenities. However, due to the EZ construction overall traffic may be congested over the years. But industrialization will ensure better livelihood and increase ability to access better civic facilities. | |
| 6. | Social Mobility | With improved employment opportunities and increased and secured income, impoverished people will be able to move up the social ladder. | |
| 7. | Women's Empowerment | Women are mostly engaged in household work. Thus, employment opportunities for women created by the proposed EZ directly or indirectly are expected to provide them better socio-economic status. Through employment, women will be empowered economically by being self-reliant and may become more socially aware. This could lead to their having more decision making power in their respective families and communities. | Measures should be taken to ensure women of the households who are losing agricultural land are not in a vulnerable situation of losing livelihood options of their head of household or themselves. While dealing with land transfer and compensation, the gender issue should be taken care of sensibly as women in Bangladesh do not usually possess land in their own names but in the male household members' |

| Sl. No. | Issues | Impact | Strategies for Risk mitigation |
|---------|--------|---|--|
| | | <p>This will also encourage the parents to send their children to school and withdraw them from wage earning activities. At the same time girl's education due to parents' better economic condition and awareness will prevent early and child marriage as girls' education will automatically retain them in school and will create social awareness and relieve the pressure of marrying them off at an early age.</p> | <p>names. If cash compensation is given, it could be also in joint account transfer, so women are not deprived of any benefit and also do not share the burden of loss alone. With female heads of households, a special package can be provided.</p> <p>Preferences in job opportunities created by the EZ.</p> |

At the macro-level, employment opportunities, social, and economic commitments to development efforts and public-private partnership will be the outcomes of the project.

4.2.6 Resettlement Issues and Plans

The policy objective conforms to the government's plan to reduce poverty and meet the Millennium Development Goals (MDGs).

- The basic policy is to avoid land acquisition as much as possible. The guiding principles are:
 - to minimize and mitigate adverse impacts;
 - to ensure compensation payment according to the World Bank OP 4.12 and GoB rules and regulations; and,
 - to establish a grievance redress mechanism with representatives from stakeholders to suggest institutional and monitoring arrangements for compensation payments.

4.2.6.1 People likely to be Affected

The people who will be removed from their homes (5 households) will be re-located in the project's residential areas. There they will have the benefit of living in a residential area with modern facilities including, gas, electricity, pure drinking water, and sanitation. In addition to this, there will be a school and health centre within the EZ area which will improve their lives significantly.

The private owners of agricultural land will be compensated according to standard provisions. As the EZ will provide job opportunities (25,446) and better wages, the poor population will benefit from that. The project can make provision for the agricultural landowners and agricultural labour to be given priority in employment and recruitment in the EZ.

During the consultation with the local people including women, students, and fishermen, all were of the opinion that the EZ will bring more economic benefits to the population of the EZ and adjacent areas.

There are fish traders and fishermen in the nearby Upazila who also consider that the EZ will have a positive impact on their lives. At the moment, the fishermen can only catch fish from the water bodies nearby for 4 months of the year, and the fish are not very plentiful. Thus, economic activities in the locality will bring more opportunities and diverse livelihood options for them.

However, while the construction activities go on to establish the EZ, outside workers are likely to be present in the locality for a long period. Thus, necessary measures need to be taken to prevent any harassment or violence against women and public health related problems including HIV-AIDS.

4.2.6.2 Employment of Sherpur

Based on the planned land use of Sherpur, an estimated 25,446 new jobs will be created when the Sherpur EZ is fully occupied. Once the 25,446 jobs are created in Sherpur area, an additional 12,723 indirect jobs (about 50%) are likely to be created in the Sherpur area - mainly in various service areas such as transport, retail, health, food, and housing services. The total job creation from both direct and indirect employment as a result of the advent of the EZ project may, consequently, reach 38,169 workers.

Table 4.2.6.2-1: Employment Estimate for Sherpur Economic Zone

| Industry & Commercial Zone | Land Area (Ha) | Employment per /ha* | Employment Created |
|---------------------------------------|-----------------------|----------------------------|---------------------------|
| Integrated Textile | 17.3 | 400 | 6,920 |
| Ceramics | 14.85 | 350 | 5,198 |
| Pharmaceuticals | 30.98 | 200 | 6,196 |
| Paint | 4.76 | 300 | 1,428 |
| Food Processing | 17.77 | 250 | 4,443 |
| Rental Factory | 2.19 | 500 | 1,095 |
| Commercial Zone | 0.83 | 200 | 166 |
| Total | 88.68 | 287 (Average) | 25,446 |

Source: WB Study Team

* is estimated from the Bangladesh Industry Examples from demand survey

4.2.6.3 Compensation and Entitlements

Land acquisition for Sherpur EZ will be during July 2014 to December 2015. The resettlement arrangements and associated compensation also will be undertaken during this time.

The affected persons will be compensated for their affected structures, trees, crops, ponds, and businesses. Compensation is based on entitlements including: (i) replacement value for structures, tree, etc. and (ii) other resettlement assistance, as required, such as transfer grants, re-installation grants, and compensation for loss of business/wages due to dislocation. The entitlements as per loss category are presented in the table below.

Table 4.2.6.3-1: Resettlement Matrix-Compensation Package

| Sl. No. | Type of loss | Type of compensation suggested |
|----------------|--|--|
| 1. | Homes (5) | Resettle them in the EZ area |
| | | Preference in the jobs created by the EZ |
| 2. | Private land ownership [217.37 Acre (88.00 ha)] | Cash compensation 1.5 times of current market price considering that the market price will go higher after the EZ establishment |
| | | Compensation of actual cost of loss of crops where applicable |
| | | Preference in the jobs created by the EZ |
| 3. | Training need assessment | Government's youth department, women affairs department, NGOs can do need assessment on training and provide technical training suitable related to employment at EZ industries. |
| 4. | Temporary/short term problem for construction period | Compensation to the affected people during the period |
| | | Employ their household members in construction works or other relevant works |
| 5. | Closing accessibility to natural resources | The proposed EZ zone will be situated beside the highway and will not hinder accessibility to any natural resources. Though there is a low land fisheries area, the EZ will not obstruct that. |

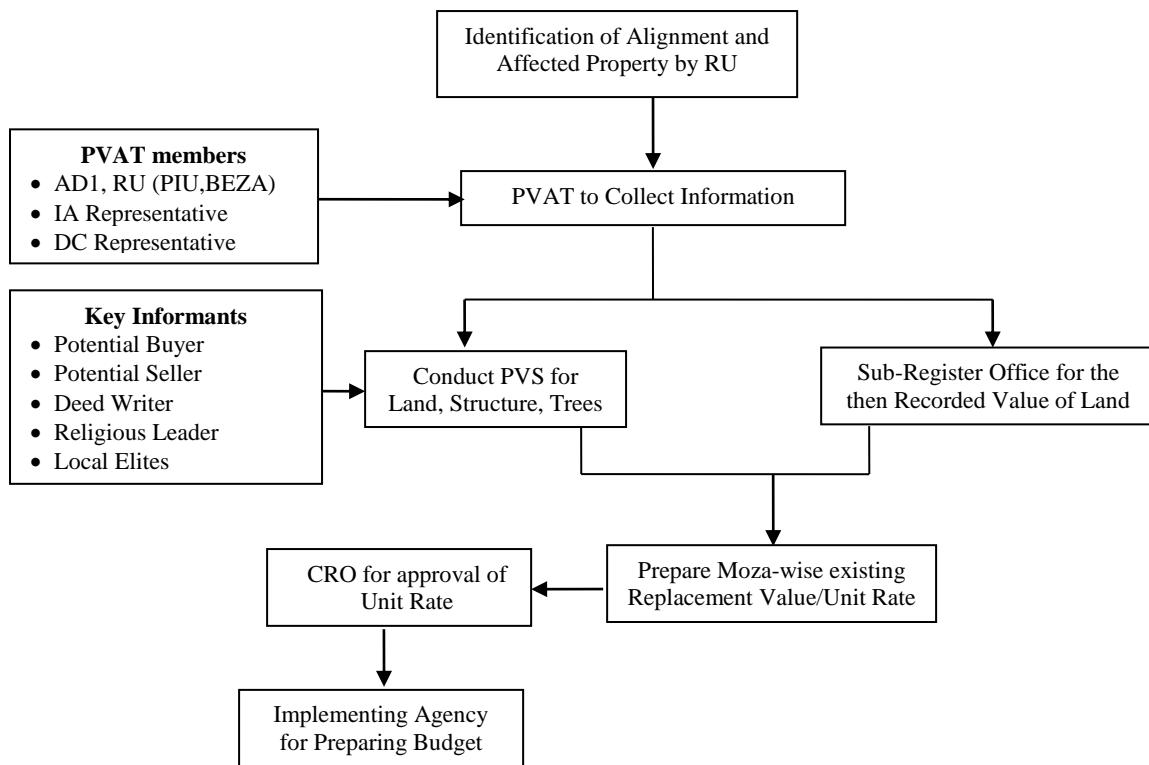
Organisational arrangements for resettlement and compensation: BEZA is responsible for overall execution and coordination, ensuring GoB's support and timely financial disbursements of the EZ. However, land acquisition and resettlement has to be done by the Ministry of Land through the respective DC office. Thus, complexity of bureaucratic procedure and coordination may happen.

Land replacement costs, dislocation allowance, transfer grants, reconstruction grants, one-time special assistance and income and livelihood restoration grants will be included in the compensation package so that the economic condition of PAPs will be improved.

The Project construction activities will require many unskilled labourers and skilled staff for earthwork in construction of the EZ, approach road, offices, and management work. Provision could be made in the contract with the contractors for employment of qualified project affected people (PAPs) and their dependents in the recruitment of local labour, including affected women. Employment in the project construction will act as an added source of income, in the livelihood restoration processes of PAPs.

Table 4.2.6.3-2: Institutional Responsibilities in the Resettlement Process

| Related Activities and Responsibilities | Responsibility |
|--|-----------------|
| A. Preparation of Updated RAP | |
| Preparation of land acquisition plans | RU/Eng Firm |
| Land acquisition process and land acquisition | DC/RU |
| Recruitment of ERS and NRS | RU/WB |
| Recruitment of Implementing Agency | PIU |
| Design and reproduction of RAP Information Brochures | RU/NRS |
| Disclosure and public consultations | RU/IA |
| Selection of members for resettlement advisory bodies | RU/IA |
| Design and carry out census for joint inventory of losses | RU/IA |
| Market survey on prices of lands, structure, crops and trees. | IA/PVAT |
| Establishment of unit prices | PVAT/RU |
| Processing the Census and socioeconomic data of APs | IA/NRS |
| Assessing AHs to be relocated and any vulnerable APs | IA/RU |
| Determination of entitlements and consultations with individual APs | RU/IA |
| Consultation of Draft RAP to EA, APs and stakeholders | ERS/RU |
| Incorporate suggestions and finalizing the RAP | ERS |
| Review and concurrence of RAP | SS(National)/WB |
| B. RAP Implementation | |
| Mobilization of GRC | RU/IA |
| Establishment of internal monitoring and hiring of EMA | MOHW/DCs/PIU |
| Budget approval for compensation and resettlement | PIU |
| Release of funds for compensation | BEZA/RU |
| Filing and resolution of complaints APs, | RU/GRCs/IA |
| Assess needs, identify sites and develop relocation sites | RU/IA/APs |
| Consultation with APs on schedule of clearing the lands | RU/IA |
| Clearing of lands | APs |
| Confirmation of "No Objection" for the award of civil works contract | WB |
| Relocation and livelihood restoration assistance | IA/RU/LIRP |
| C. Monitoring and Evaluation | |
| Internal monitoring | RU/ERS/NRS/IA |
| Independent external monitoring and evaluation | EMA/WB |

Figure 4.2.6.3-1: Procedure of Determining Valuation of Property

4.2.6.4 Disclosure of Information

According to WB OP 4.12, people's participation in the project planning and implementation phases is essential. People have the right to information about what is going to happen in their surroundings. They must be informed about the positive and negative impacts of the proposed project and their opinion, suggestions, and feedback must be incorporated into the project design.

During the site visit, consultation was done with various stakeholders including the home owners. People in the EZ area, must be informed about the construction of the EZ, so that they can take protective measures or can get compensation for the loss of their structures and can also take measures for human and social safety.

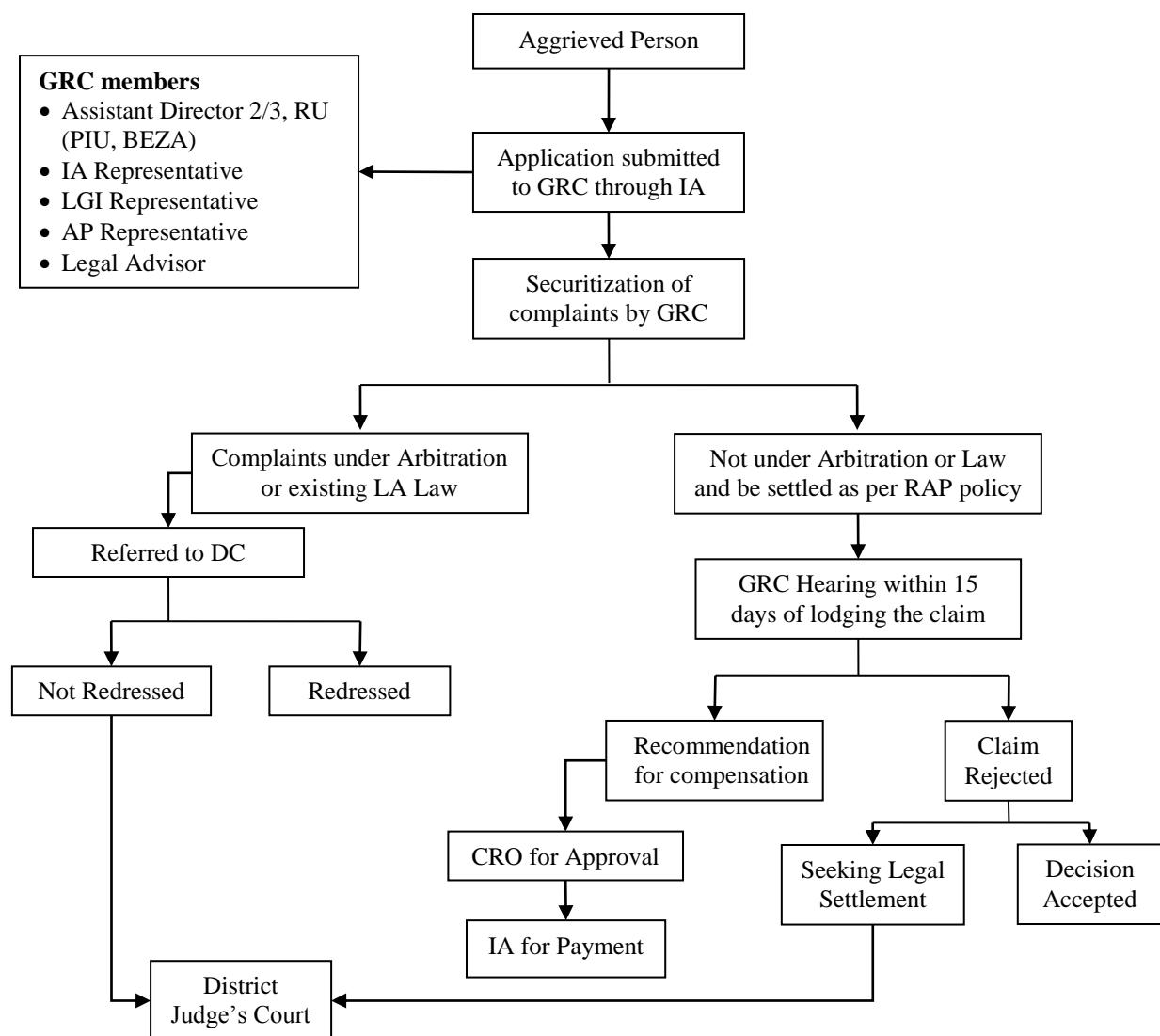
4.2.6.5 Grievance Redress

A grievance redress mechanism should be developed prior to the compensation provided and during the resettlement period.

The land acquisition and resettlement will be carried out between mid-2014 to early 2016. A local body incorporating the Local Governance (LG) representatives and the government administration at the local level, with a cell at central level, could be established to take care of this.

The aggrieved person will apply to the GRC (Grievance Redress Committee). The grievance redressing mechanism is shown in the following figure. GRC will review the application, and, if the application is under arbitration, then it will be referred to the DC. If the application is not under arbitration, then the grievance will be settled by RAP policy. If the application is rejected then the person can apply to the district judge for legal settlement.

It should be remembered that grievance redress is a very time consuming matter and should be given priority so that the minimum possible time is required for it.

Figure 4.2.6.5-1: Grievance Redress Mechanism

4.2.6.6 Resource Compensation Needed for the Project

A budget is in place for compensation for asset loss (homes, land, livelihood sources, shops, trees, and ponds) costs.

Table 4.2.6.6-1: Costs for resettlement and land acquisition

| Categories of cost | Categories of assets | Costs |
|--|--|--------------------|
| Resettlement cost & reallocation cost | 5 pucca homes | US\$0.125 Million |
| Land acquisition and resettlement cost | Agricultural and other lands with loss of livelihood | US\$22.562 Million |

4.2.7 Institutional Arrangements and Challenges

There may be problems regarding institutional arrangements among several government departments involved in the EZ implementation. Lack of manpower, lack of training, lack of coordination, administrative problems for transfers, trust building, and adequate communication with the local people may become the major problems project developers face during implementation.

During consultation with the relevant stakeholder government agencies, it appeared that while the PPP agency had a considerable amount of money to undertake new ventures, due to a lack of experience, in practice, that money could not be spent. Also the regulatory mechanisms and coordination are mentioned as major obstacles to project progress. Government Ministries and agencies likely to be the stakeholders are (among others): the Prime Minister's Office, the Ministry of Finance (Finance Division and Economic Relations Division), the Ministry of Land, the Customs Authority, the Board of Investments (BOI), the Bangladesh Economic Zone Authority (BEZA), the Bangladesh Export Processing Zone Authority (BEPZA), the Ministry of Industries, the Ministry of Commerce, the Ministry of Power, Energy and Mineral Resources, the Ministry of Communications, the Ministry of Water Resources, the Ministry of Railways, the Ministry of Law, and the Ministry of Environment and Forests. A cell could be established under the PM's office but working independently headed by a "Steering committee" or "Project Advisory Committee" to identify the problems prior to implementation, and to be proactive in determining a strategic direction for the zone while encouraging government agencies to support the project and to act accordingly.

Land will be acquired by the Ministry of Land where other activities will be carried out by other ministries and agencies. Therefore, good coordination is needed and will be a major challenge.

In the PPP section of this report, details of the institutions, agencies' roles and responsibilities are presented.

Figure 4.2.7-1: Institutional Arrangements in Central Level

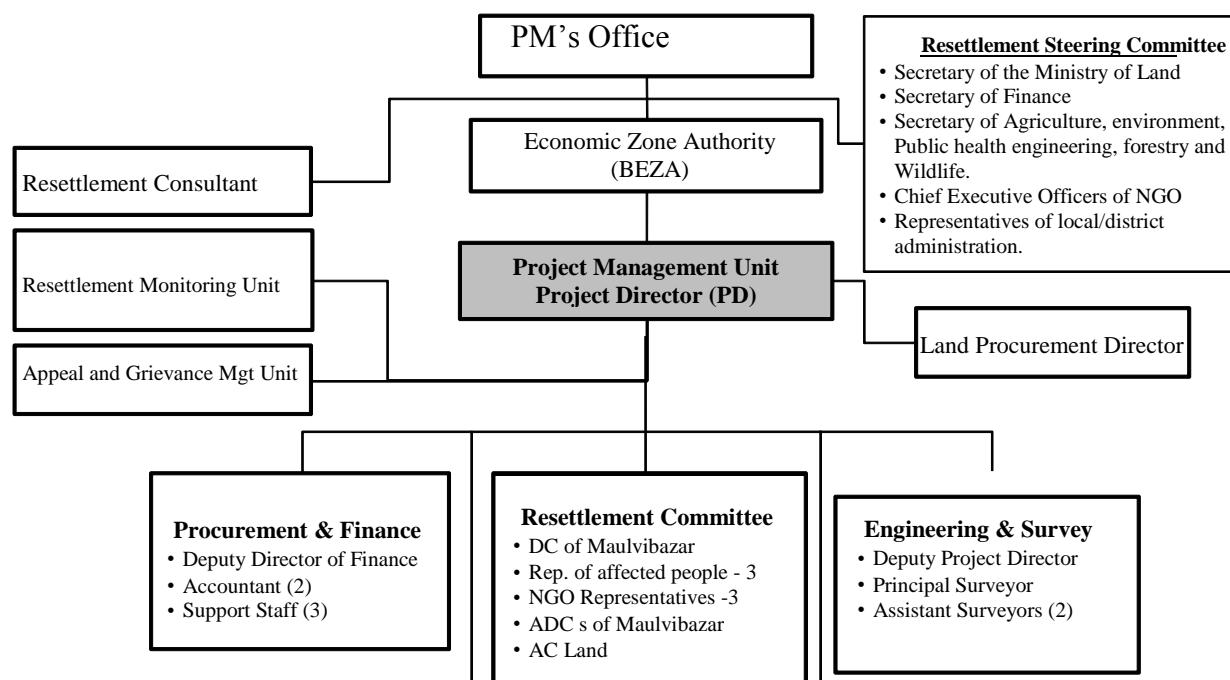
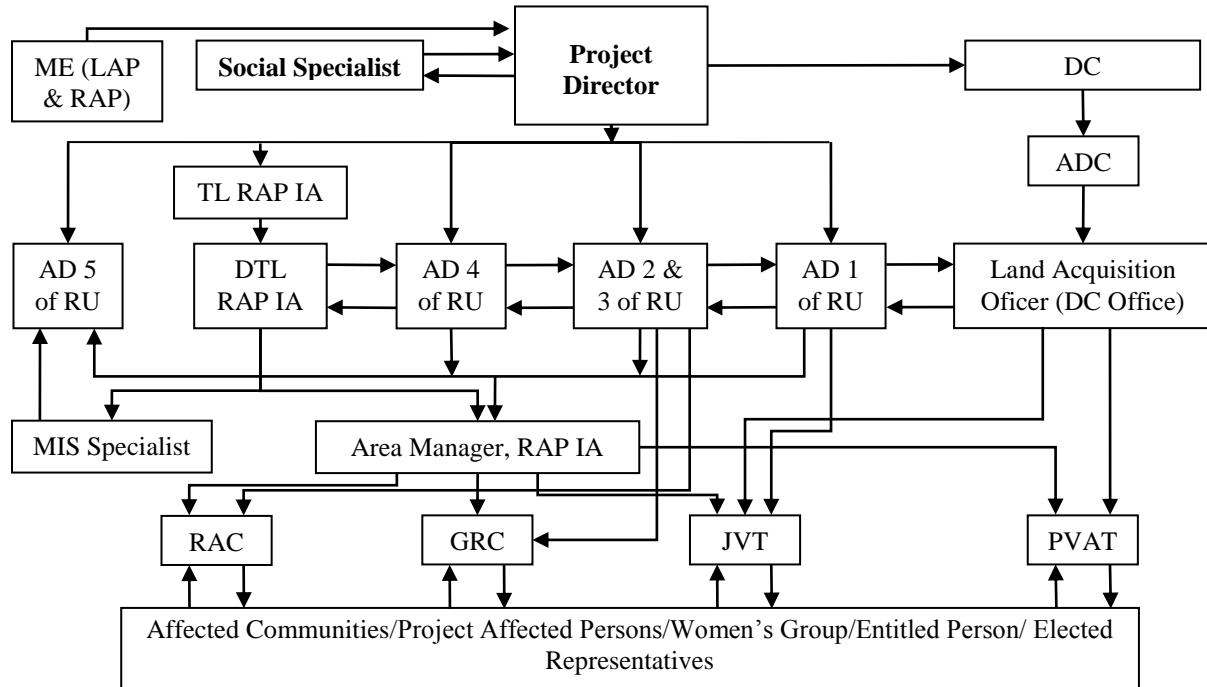
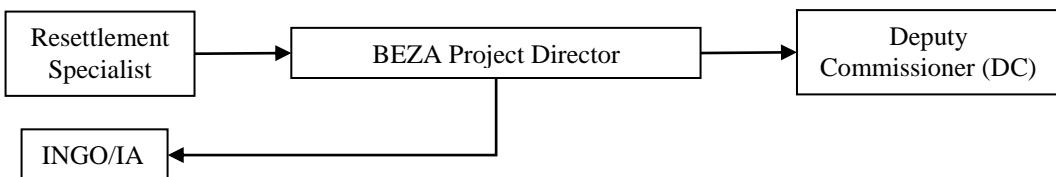


Figure 4.2.7-2: Details of the Resettlement Unit for BEZA up to EZ level**Figure 4.2.7-3: Resettlement Unit (RU) for BEZA**

An INGO needs to be involved in the process of resettlement for transparency and effective land acquisition and resettlement and grievance redress process for timely completion of this phase to move on to construction of the EZ and allocation of industrial plots.

In the Section 5 on Institution and PPP, details of the institutions, agencies' roles, and responsibilities are presented.

4.2.8 Consultation with Locals

Consultations were done with the District Administration and the local people including local businessmen, farmers, fishermen, fish traders, students, women, and children. In the consultation, all stakeholders mentioned the positive impact of the EZ on the lives and livelihoods of the people of that area or adjacent areas. They consider in the current scenario of unemployment and low return from agriculture and fishing, low food security is recognized and industrialization will enhance job opportunities and income and have positive impacts.

Issues covered in Consultation:

During consultations, issues covered are current socio-economic conditions of the population living inside the EZ area and the locality, women's employment, children's education, and health facilities. How EZ will affect the lives and livelihoods of the people living inside and adjacent areas? What are the expected prospects for socio-economic development in the area due to the EZ? And, if there will

be any probable negative problems related to the establishment of the EZ, what should be the resettlement compensation and grievance redress?

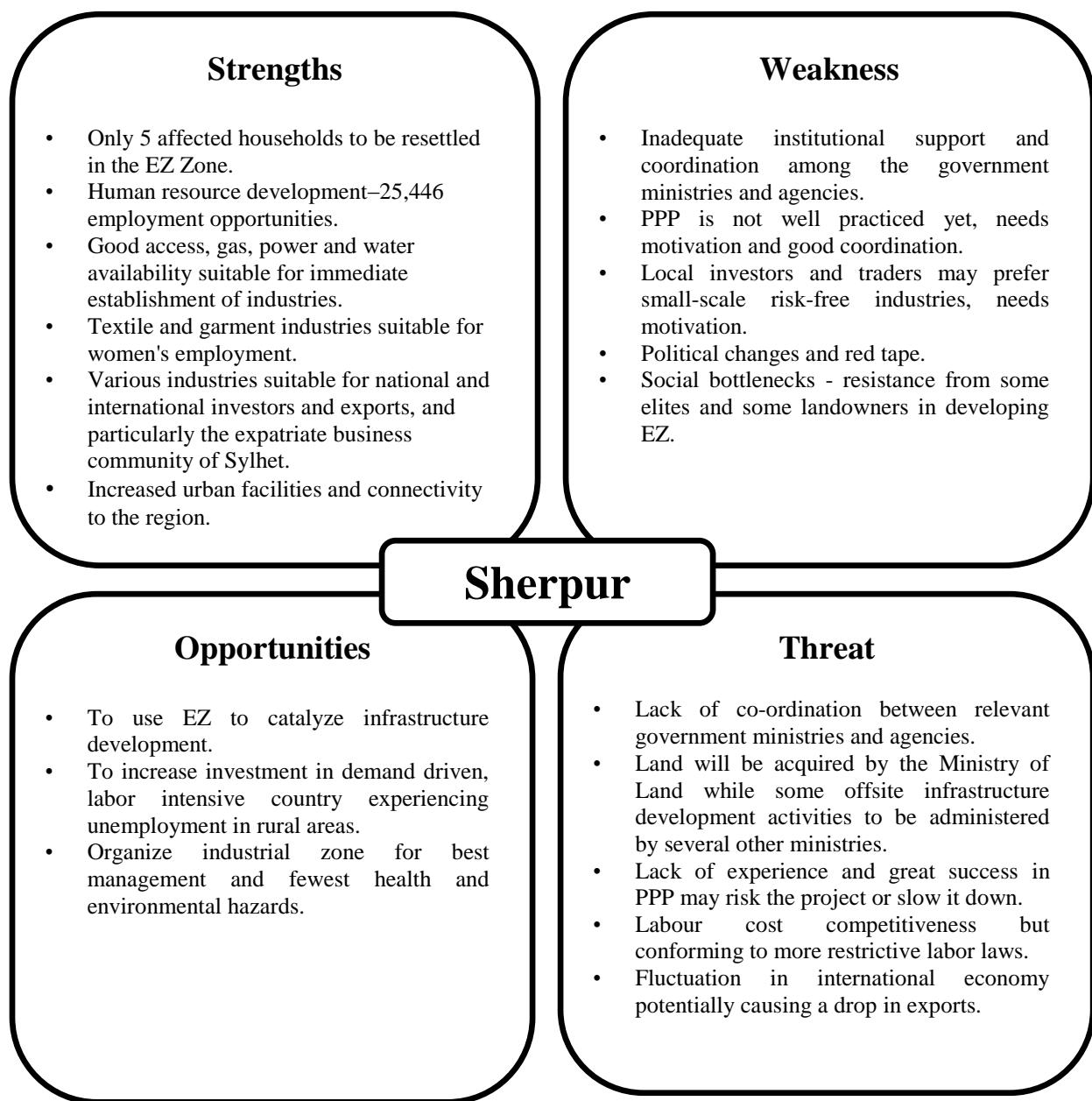
CASE: Home owner:

Mr Abdul Khalique was in the Middle East for several years and returned home during the Gulf War. Two of his sons were also in the Middle East. Recently, all are staying at home and not employed. They built this building after coming back from the Middle East. They were worried about losing their home without compensation. The EZ in Sherpur has made provision for compensating for the agricultural land and considering the small number of the homes, the project is planning to rehabilitate them in the project's residential area with all modern facilities.



Consultation with Businessmen and local traders: A consultation with the local businessmen and traders was undertaken to get a perspective of the current business and trading situation and prospects of new business in the Special Economic Zone. Natural resources and raw materials in the Sherpur area include rubber, tea, and limestone. Most traders, however, are involved in business such as restaurants and hotels which they consider risk free as continuous reasonable return is ensured from these. If there are new industries on the basis of availability of raw materials, or countrywide or international demand, the business community needs to be motivated to invest in these industries.

4.2.9 SWOT Analysis for Sherpur:



4.2.10 World Bank Policy on Involuntary Resettlement, Gender, and Indigenous/Tribal Population and Government's Acquisition and Requisition of Immovable Property Ordinance

4.2.10.1World Bank OP 4.12: Requirements for Involuntary Resettlement

The primary objective of the World Bank policy on 'Involuntary Resettlement' is to explore all alternatives to avoid or at least minimize involuntary resettlement. Where resettlement is unavoidable, the resettlement activities should be conceived and executed as sustainable development programmes, providing sufficient resources to enable affected persons to share in project benefits and assisted in their efforts to improve their livelihood and standard of living, or at least to restore them to a pre-

project level. The policy also requires that affected people are meaningfully consulted and should have opportunities to participate in planning and implementing resettlement programmes. The policy applies to the taking of land and other assets when involuntary resettlement results in the loss of shelter, the loss of all or part of productive assets, or access to them and the loss of income sources or means of livelihood, with or without physical displacement.

Measures required to ensure that resettlement has a positive outcome include:

- Providing Project Affected Persons with options;
- Permitting their participation in planning and selecting these options;
- Facilitating prompt compensation at full replacement cost for losses;
- Choosing relocation sites that provide, at a minimum, the same benefits as the sites they replace;
- Providing allowances and other assistance to make a smooth transition after displacement;
- Identifying vulnerable groups and providing and special assistance to these groups; and,
- Implementing an institutional structure that supports the process to a successful end.

World Bank policy on Involuntary Resettlement requires payment of compensation and other assistance to project affected people before they are displaced from their existing locations. Further, the policy requires income rehabilitation assistance to those affected severely due to the loss of their productive assets or loss of incomes and livelihood.

Absence of legal title does not exclude individuals from the eligibility to receive compensation and/or other assistance. The displaced or affected population eligible for compensation for losses include: those who have formal legal rights to land or other assets and those who initially do not have formal legal rights to land or other assets but have a claim to legal rights based upon the laws of the country. The Policy also requires that those without legal title should be given assistance to meet the objectives of the policy. The genesis of these rights may come from continued possession of public land where the government has not sought their eviction. The Bank's policy also recognizes that stakeholders who illegally occupy project-affected areas after the established cut-off-date for any components are not eligible for compensation and other assistance provided that adequate measures are taken for information dissemination to people.

The gaps in the existing legal framework of Bangladesh and the objectives and requirements of the World Bank and other multilateral agencies are well recognized. Therefore, institutional or project specific policies are prepared to address these gaps and to meet the requirements of multilateral agencies in projects funded by them.

The following basic categories of issues/impacts are foreseen under this entitlement framework:

- a) Loss of land;
- b) Loss of structure;
- c) Loss of source of livelihood;
- d) Loss of access to common resources and facilities;
- e) Loss of standing crops, trees and perennial trees; and
- f) Loss of public infrastructure.

The project will provide compensation for the displaced households inside the proposed Sherpur EZ area. Local people who will lose their agricultural lands will be compensated at the standard rate of government provisions. As there is no public infrastructure, the only loss of structures will be small houses, whose owners are to be provided with other houses in the EZ area. This project area is not restricting access to common resources on site. Though there are fishermen and small fish traders in some areas in the Upazila, they do not possess any land on this site or this site is not causing any loss of livelihood to them. The agricultural landowners will be compensated by cash to enable them to buy similar types of lands in nearby areas. There will be no hindrance to common resources either on-site

or off-site. The Proposed ICD in the Sreemangol rail station area will be on the government land and no houses will be evicted and no people will be adversely affected.

4.2.10.2 World Bank Gender Policy OP 4.20: Gender and Development (Revised March 2012)

The objective of the Bank's gender and development policy is to assist member countries to reduce poverty and enhance economic growth, human well-being, and development effectiveness by addressing the gender disparities and inequalities that are barriers to development and by assisting member countries in formulating and implementing their gender and development goals.

As Sherpur EZ has all the facilities and resources available for the industrialisation and viability of the EZ, the study proposes these industries: spinning, weaving, dyeing/drying, ceramics, and pharmaceuticals among others. These industries are likely to have huge manpower employed including women and youth. Thus the livelihood, food security, health, and nutrition of the workers are expected to improve.

There will be no gender disparity as a result of the implementation of the proposed EZ. Rather, it will contribute to the gender parity and women's empowerment by their involvement in the income generation activities and employment in the industries proposed in the Sherpur EZ. The proposed industries in these areas are suitable for female employment. As this EZ is expected to provide employment for many local people of various ages, and, social status including the poorest segments of the population, it will contribute to poverty alleviation of the respective families which in turn is expected to bring positive changes in gender relations both in the family and society and will contribute to the empowerment of women of all ages. Due to higher income and food security, better health seeking behaviour and nutritional status will be ensured. Due to new industries, economic, and social development in the locality will bring diversity in livelihood options for the lower income groups.

It is expected to contribute to reducing child labour in the poorest households and there is also a possibility of a higher rate of school attendance for both boys and girls, precipitating a reduction in child marriage. Overall improvement in economic wellbeing and social mobility is expected directly and indirectly due to the establishment of the EZ.

4.2.10.3 Specific Funding Requirement of the World Bank's Policy OP 4.10

Policy document OP4.10 of the World Bank contributes to the Bank's mission of poverty reduction and sustainable development by ensuring that any development activity and accompanying processes fully respects the dignity, human rights, economies, and cultures of indigenous peoples. It is a requirement that all projects which are proposed for financing by the World Bank are assessed to see whether the policy needs to be triggered, keeping in mind the geographic location, nature, and scope of activities.

The policy requires client governments to seek broad community support of indigenous peoples through a process of free, prior, and informed consultation before deciding on development projects affecting indigenous peoples. The policy requires that indigenous peoples benefit from the commercial development of natural resources. Projects must include measures to (a) avoid potentially adverse effects on the indigenous peoples' communities; or (b) when avoidance is not feasible, minimize, mitigate, or compensate for such effects. Bank-financed projects are also to be designed and structured in a manner to ensure that the indigenous peoples receive social and economic benefits which are culturally appropriate, and, gender and inter-generationally inclusive.

The project does not have any indigenous/tribal land acquisition and there is no tribal population inhabiting the project area, thus it is not going to have any adverse impact on such a population.

4.2.10.4OP/BP 4.11: Physical and Cultural Resources

The objective of OP/BP 4.11 on Physical Cultural Resources is to avoid, or mitigate, adverse impacts on cultural resources from development projects that the World Bank finances. Cultural resources are important as sources of valuable historical and scientific information, as assets for economic and social development and as integral parts of a people's cultural identity and practices. The loss of such resources is irreversible, but fortunately, it is often preventable.

Taking OP 4.11 into consideration, the project plans try to prevent any such loss of resources caused by the project and propose alternative routes to avoid destruction of any cultural resources and minimise the displacement of physical resources.

4.2.10.5Legal Context of Land Acquisition in Bangladesh

Currently the only legal framework that governs land acquisition in Bangladesh is the **Acquisition and Requisition of Immovable Property Ordinance, 1982**. However, its provisions are not adequate to address adverse impacts associated with land acquisition and involuntary displacement and do not fully satisfy the requirements of the Bank's Operational Policy (OP 4.12) on Involuntary Resettlement or that of the international practices.

The project proposal follows the World Bank policy OP 4.12 - Requirements for Involuntary Resettlement - even where there is a difference between the government's and World Bank's policy regarding the resettlement issues.

4.2.11 Detailed Information of Land for Sherpur EZ Area

Data on this section was collected from the AC Land from the from the AC Land and Maulvibazar DC office records. There may be a little gap in these details and the land use pattern in the EZ. This is provided to help in identifying the land details during the land acquisition and compensation for resettlement.

Table 4.2.11-1: Detailed Information of Land for Sherpur EZ Area

| Sl. No. | Khatian No. | Plot No. | Class | Total Area | Proposed Area for Acquisition |
|----------------|--------------------------|-----------------|--------------|-------------------|--------------------------------------|
| 1 | 214 | 808 | LayekPatit | 0.04 acre | 0.04 acre |
| 2 | 234,236,264,291 | 815 | Layek Jungle | 0.23 acre | 0.23 acre |
| 3 | 872,876 | 816 | That | 0.42 acre | 0.42 acre |
| 4 | 214 | 817 | That | 0.27 acre | 0.27 acre |
| 5 | 151,157,154 | 818 | That | 0.11 acre | 0.11 acre |
| 6 | 336 | 854 | That | 0.28 acre | 0.28 acre |
| 7 | 4,6,10,12,14,17,18,21,23 | 895 | LayekPatit | 20.35 acre | 20.35 acre |
| 8 | 1 | 1050 | Bil | 109.49 acre | 109.49 acre |
| 9 | 941 | 1455 | Aush | 0.44 acre | 0.44 acre |
| 10 | 567 | 1472 | That | 0.25 acre | 0.25 acre |
| 11 | 566 | 1473 | Chara | 0.19 acre | 0.19 acre |
| 12 | 1 | 1474 | Gopat | 0.10 acre | 0.10 acre |
| 13 | 1 | 1475 | Gopat | 0.06 acre | 0.06 acre |
| 14 | 836 | 1476 | LayekPatit | 1.54 acre | 1.54 acre |
| 15 | 194 | 1453 | Aush | 0.77 acre | 0.77 acre |
| 16 | 1 | 1476/ 1482 | Khal | 0.52 acre | 0.52 acre |
| | | | | Total= | 133.82 acres |

Amount of Dag= 16

Private Ownership= 23.91 acre

No. 1 KhasKhatianbhukto= 109.91 acre

**133.82 acre

| Sl. No. | Khatian No. | Dag No. | Hallsreni | Total Area | Proposed Area for Acquisition | Comment |
|---------|-------------|----------|------------|------------|-------------------------------|------------------------------------|
| 1. | 1 | 461/1599 | Khal | | 0.26 | Khas, in half of Habigonj District |
| 2. | **9 | 461 | LayekPatit | | 1.44 | |
| | | | | Total= | 1.70 acres | |

**In Total= 135.52 acres

| Sl. No. | Khatian No. | Dag No. | Class | Total Area | Proposed Area for Acquisition |
|---------|-------------|---------|----------|------------|-------------------------------|
| 1. | 418 | 1 | Aman | 0.74 | 0.74 |
| 2. | 420 | 2 | Aman | 0.87 | 0.87 |
| 3. | 422 | 3 | Aman | 0.11 | 0.11 |
| 4. | 418 | 4 | Aman | 0.09 | 0.09 |
| 5. | 422 | 5 | Aman | 0.24 | 0.24 |
| 6. | 422 | 6 | Chara | 0.09 | 0.09 |
| 7. | 422 | 7 | Aman | 0.47 | 0.47 |
| 8. | 422 | 8 | Aman | 0.29 | 0.29 |
| 9. | 419 | 9 | Aman | 0.39 | 0.39 |
| 10. | 421 | 10 | Aman | 0.36 | 0.36 |
| 11. | 420 | 11 | Aman | 0.90 | 0.90 |
| 12. | 423 | 12 | Aman | 0.91 | 0.91 |
| 13. | 118 | 13 | Aman | 0.28 | 0.28 |
| 14. | 178 | 14 | Aman | 0.38 | 0.38 |
| 15. | 190 | 15 | Aman | 0.19 | 0.19 |
| 16. | 162 | 16 | Aman | 0.08 | 0.08 |
| 17. | 147 | 17 | Aman | 0.09 | 0.09 |
| 18. | 427 | 18 | Aman | 2.37 | 2.37 |
| 19. | 461 | 19 | Aman | 0.19 | 0.19 |
| 20. | 464 | 20 | Aman | 0.18 | 0.18 |
| 21. | 457 | 21 | Aman | 0.28 | 0.28 |
| 22. | 457 | 22 | Aman | 0.28 | 0.28 |
| 23. | 458 | 23 | Aman | 0.28 | 0.28 |
| 24. | 459 | 24 | Aman | 0.15 | 0.15 |
| 25. | 1 | 25 | Aman | 0.01 | 0.01 |
| 26. | 459 | 26 | Devsthan | 0.30 | 0.30 |
| 27. | 459 | 27 | Aman | 0.27 | 0.27 |
| 28. | 459 | 28 | Aman | 0.27 | 0.27 |
| 29. | 459 | 29 | Aman | 0.18 | 0.18 |
| 30. | 459 | 30 | Aman | 0.14 | 0.14 |
| 31. | 459 | 31 | Aman | 0.12 | 0.12 |
| 32. | 459 | 32 | Aman | 0.14 | 0.14 |
| 33. | 459 | 33 | Aman | 0.19 | 0.19 |
| 34. | 459 | 34 | Aman | 0.24 | 0.24 |
| 35. | 459 | 35 | Aman | 0.08 | 0.08 |
| 36. | 460 | 36 | Aman | 0.18 | 0.18 |
| 37. | 460 | 37 | Aman | 0.16 | 0.16 |
| 38. | 460 | 38 | Aman | 0.36 | 0.36 |
| 39. | 465 | 39 | Aman | 0.34 | 0.34 |
| 40. | 460 | 40 | Aman | 0.33 | 0.33 |
| 41. | 460 | 41 | Aman | 0.35 | 0.35 |
| 42. | 463 | 42 | Aman | 0.39 | 0.39 |
| 43. | 461 | 43 | Aman | 0.36 | 0.36 |

| Sl. No. | Khatian No. | Dag No. | Class | Total Area | Proposed Area for Acquisition |
|----------------|--------------------|----------------|--------------|-------------------|--------------------------------------|
| 44. | 461 | 44 | Aman | 0.25 | 0.25 |
| 45. | 461 | 45 | Aman | 0.22 | 0.22 |
| 46. | 460 | 46 | Aman | 0.69 | 0.69 |
| 47. | 464 | 47 | Aman | 0.39 | 0.39 |
| 48. | 462 | 48 | Aman | 0.55 | 0.55 |
| 49. | 366 | 49 | Aman | 0.40 | 0.40 |
| 50. | 346 | 50 | Aman | 1.21 | 1.21 |
| 51. | 360 | 53 | Aman | 0.20 | 0.20 |
| 52. | 350 | 56 | Aman | 0.54 | 0.54 |
| 53. | 354 | 57 | Chara | 0.14 | 0.14 |
| 54. | 350 | 58 | Chara | 0.07 | 0.07 |
| 55. | 368 | 59 | Aush | 0.16 | 0.16 |
| 56. | 424,426 | 60 | Aman | 0.21 | 0.21 |
| 57. | 424,426 | 163 | Chara | 0.14 | 0.14 |
| 58. | 352 | 252 | Chara | 0.05 | 0.05 |
| 59. | 362 | 253 | Aush | 0.60 | 0.60 |
| 60. | 365 | 254 | Chara | 0.11 | 0.11 |
| 61. | 1 | 255 | Gopat | 0.34 | 0.34 |
| 62. | 363 | 256 | Aush | 0.22 | 0.22 |
| 63. | 355 | 257 | Aush | 0.08 | 0.08 |
| 64. | 355 | 258 | Aman | 0.18 | 0.18 |
| 65. | 369 | 259 | Aush | 0.21 | 0.21 |
| 66. | 613 | 260 | Aman | 0.05 | 0.05 |
| 67. | 369 | 261 | LayekPatit | 0.08 | 0.08 |
| 68. | 397 | 341 | Aush | 0.35 | 0.35 |
| 69. | 403 | 342 | Aush | 0.08 | 0.08 |
| 70. | 374 | 343 | Aush | 0.05 | 0.05 |
| 71. | 327 | 347 | Aush | 0.08 | 0.08 |
| 72. | 322 | 348 | Aush | 0.14 | 0.14 |
| 73. | 374 | 349 | Aush | 0.50 | 0.50 |
| 74. | 344 | 350 | Aush | 0.59 | 0.59 |
| 75. | 344 | 351 | Aush | 0.33 | 0.33 |
| 76. | 342 | 352 | Aush | 0.33 | 0.33 |
| 77. | 341 | 353 | Aman | 0.16 | 0.16 |
| 78. | 341 | 354 | Aman | 0.17 | 0.17 |
| 79. | 342 | 355 | Aman | 0.26 | 0.26 |
| 80. | 341 | 356 | Aman | 0.14 | 0.14 |
| 81. | 341 | 357 | Aman | 0.14 | 0.14 |
| 82. | 343 | 358 | Aman | 0.07 | 0.07 |
| 83. | 355 | 359 | Aman | 0.24 | 0.24 |
| 84. | 343 | 360 | Aman | 0.34 | 0.34 |
| 85. | 409 | 361 | Aman | 0.41 | 0.41 |
| 86. | 411 | 362 | Aman | 0.25 | 0.25 |
| 87. | 411 | 363 | Chara | 0.06 | 0.06 |
| 88. | 343 | 364 | Chara | 0.10 | 0.10 |
| 89. | 355 | 365 | Aush | 0.09 | 0.09 |
| 90. | 365 | 366 | Aush | 0.17 | 0.17 |
| 91. | 350 | 367 | Aush | 0.21 | 0.21 |
| 92. | 364 | 368 | Aush | 0.27 | 0.27 |
| 93. | 277 | 369 | Aush | 0.48 | 0.48 |
| 94. | 382 | 370 | Aush | 0.66 | 0.66 |
| 95. | 118 | 371 | Aush | 0.32 | 0.32 |
| 96. | 34 | 372 | Aman | 0.75 | 0.75 |
| 97. | 4 | 373 | Aman | 0.18 | 0.18 |
| 98. | 27 | 374 | Aush | 0.30 | 0.30 |
| 99. | 36 | 375 | Aush | 0.26 | 0.26 |
| 100. | 162 | 376 | Aush | 0.34 | 0.34 |

| Sl. No. | Khatian No. | Dag No. | Class | Total Area | Proposed Area for Acquisition |
|----------------|--------------------|----------------|--------------|-------------------|--------------------------------------|
| 101. | 147 | 377 | Aush | 0.30 | 0.30 |
| 102. | 36 | 378 | Aush | 0.27 | 0.27 |
| 103. | 132 | 379 | Aush | 0.40 | 0.40 |
| 104. | 70 | 380 | Aush | 0.22 | 0.22 |
| 105. | 191 | 381 | Aush | 0.38 | 0.38 |
| 106. | 1 | 382 | Gopat | 0.18 | 0.18 |
| 107. | 28 | 384 | Aush | 0.35 | 0.35 |
| 108. | 169 | 385 | Aush | 0.18 | 0.18 |
| 109. | 175 | 386 | Aush | 0.20 | 0.20 |
| 110. | 193 | 387 | Aush | 0.20 | 0.20 |
| 111. | 72 | 388 | Aush | 0.08 | 0.08 |
| 112. | 72 | 389 | Aush | 0.09 | 0.09 |
| 113. | 25 | 390 | Aush | 0.09 | 0.09 |
| 114. | 9 | 391 | Aush | 0.05 | 0.05 |
| 115. | 1 | 392 | Aush | 0.58 | 0.58 |
| 116. | 14 | 393 | Aush | 0.09 | 0.09 |
| 117. | 14 | 394 | Aush | 0.31 | 0.31 |
| 118. | 71 | 395 | Aush | 0.09 | 0.09 |
| 119. | 388 | 396 | Aush | 0.19 | 0.19 |
| 120. | 389 | 397 | Aush | 0.53 | 0.53 |
| 121. | 193 | 398 | Aush | 0.14 | 0.14 |
| 122. | 195 | 399 | Aush | 0.14 | 0.14 |
| 123. | 192 | 400 | Aush | 0.11 | 0.11 |
| 124. | 120 | 401 | Aush | 0.11 | 0.11 |
| 125. | 177 | 402 | Aush | 0.35 | 0.35 |
| 126. | 144 | 403 | Aush | 0.39 | 0.39 |
| 127. | 214 | 404 | Aush | 0.29 | 0.29 |
| 128. | 196 | 405 | Aush | 0.58 | 0.58 |
| 129. | 220 | 406 | Aush | 0.43 | 0.43 |
| 130. | 191 | 407 | Aush | 0.30 | 0.30 |
| 131. | 201 | 408 | Aush | 0.05 | 0.05 |
| 132. | 1 | 409 | Aush | 0.29 | 0.29 |
| 133. | 213 | 410 | Aush | 0.22 | 0.22 |
| 134. | 201 | 411 | Aush | 0.09 | 0.09 |
| 135. | 191 | 412 | Aush | 0.54 | 0.54 |
| 136. | 123 | 413 | Aush | 0.39 | 0.39 |
| 137. | 123 | 414 | Aush | 0.40 | 0.40 |
| 138. | 7 | 415 | Aush | 0.18 | 0.18 |
| 139. | 12 | 417 | Aush | 0.89 | 0.89 |
| 140. | 12 | 417 | Boro | 0.89 | 0.89 |
| 141. | 15 | 418 | Boro | 0.41 | 0.41 |
| 142. | 53 | 419 | Aush | 0.15 | 0.15 |
| 143. | 22 | 420 | Aush | 0.17 | 0.17 |
| 144. | 1 | 421 | Aush | 0.02 | 0.02 |
| 145. | 215 | 422 | Aush | 0.09 | 0.09 |
| 146. | 22 | 423 | Aush | 0.05 | 0.05 |
| 147. | 215 | 424 | Boro | 0.16 | 0.16 |
| 148. | 221 | 425 | Boro | 0.28 | 0.28 |
| 149. | 153 | 426 | Boro | 0.23 | 0.23 |
| 150. | 239 | 427 | Boro | 0.14 | 0.14 |
| 151. | 207 | 428 | Boro | 0.12 | 0.12 |
| 152. | 215 | 429 | Boro | 0.13 | 0.13 |
| 153. | 227 | 430 | Boro | 0.12 | 0.12 |
| 154. | 213 | 431 | Boro | 0.28 | 0.28 |
| 155. | 205 | 432 | Boro | 0.16 | 0.16 |
| 156. | 106 | 433 | Aman | 0.14 | 0.14 |
| 157. | 106 | 434 | Boro | 0.08 | 0.08 |

| Sl. No. | Khatian No. | Dag No. | Class | Total Area | Proposed Area for Acquisition |
|----------------|--------------------|----------------|--------------|-------------------|--------------------------------------|
| 158. | 102 | 435 | Boro | 0.18 | 0.18 |
| 159. | 95 | 436 | Boro | 0.45 | 0.45 |
| 160. | 21 | 437 | Aman | 0.36 | 0.36 |
| 161. | 184 | 438 | Aman | 0.24 | 0.24 |
| 162. | 185 | 439 | Aman | 0.20 | 0.20 |
| 163. | 218 | 440 | Aman | 0.40 | 0.40 |
| 164. | 116 | 441 | Boro | 0.07 | 0.07 |
| 165. | 116 | 442 | Boro | 0.79 | 0.79 |
| 166. | 12 | 443 | Boro | 0.36 | 0.36 |
| 167. | 44 | 444 | Aman | 0.30 | 0.30 |
| 168. | 51 | 445 | Aman | 0.07 | 0.07 |
| 169. | 51 | 446 | Boro | 0.13 | 0.13 |
| 170. | 117 | 447 | Boro | 0.30 | 0.30 |
| 171. | 148 | 448 | Boro | 0.41 | 0.41 |
| 172. | 148 | 449 | Aman | 0.15 | 0.15 |
| 173. | 387 | 450 | Aman | 0.10 | 0.10 |
| 174. | 387 | 451 | Aman | 0.10 | 0.10 |
| 175. | 387 | 452 | Aman | 0.13 | 0.13 |
| 176. | 388 | 453 | Aman | 0.35 | 0.35 |
| 177. | 107 | 454 | Aush | 0.34 | 0.34 |
| 178. | 32 | 455 | Aush | 0.35 | 0.35 |
| 179. | 14 | 456 | Aush | 0.23 | 0.23 |
| 180. | 14 | 457 | Aush | 0.26 | 0.26 |
| 181. | 35 | 458 | Aush | 0.57 | 0.57 |
| 182. | 116 | 459 | Aush | 0.25 | 0.25 |
| 183. | 234 | 460 | Aman | 0.44 | 0.44 |
| 184. | 161 | 461 | Aman | 0.45 | 0.45 |
| 185. | 223 | 462 | Aman | 0.56 | 0.56 |
| 186. | 117 | 463 | Aman | 0.38 | 0.38 |
| 187. | 117 | 464 | Aman | 0.39 | 0.39 |
| 188. | 315,172 | 465 | Aman | 0.19 | 0.19 |
| 189. | 237 | 466 | Aman | 0.42 | 0.42 |
| 190. | 92 | 467 | Aman | 0.40 | 0.40 |
| 191. | 109 | 468 | Aman | 0.18 | 0.18 |
| 192. | 97 | 469 | Aman | 0.19 | 0.19 |
| 193. | 14 | 473 | Boro | 0.54 | 0.54 |
| 194. | 14 | 474 | Aman | 0.14 | 0.14 |
| 195. | 14 | 475 | Aman | 0.19 | 0.19 |
| 196. | 7 | 476 | Aman | 0.19 | 0.19 |
| 197. | 5 | 477 | Aman | 0.47 | 0.47 |
| 198. | 35 | 478 | Aman | 0.33 | 0.33 |
| 199. | 35 | 479 | Boro | 0.09 | 0.09 |
| 200. | 50 | 480 | Boro | 0.33 | 0.33 |
| 201. | 215 | 486 | Boro | 0.34 | 0.34 |
| 202. | 215 | 487 | Boro | 0.37 | 0.37 |
| 203. | 215 | 488 | Aman | 0.11 | 0.11 |
| 204. | 227 | 489 | Aman | 0.29 | 0.29 |
| 205. | 145 | 490 | Boro | 0.35 | 0.35 |
| 206. | 198 | 491 | Boro | 0.14 | 0.14 |
| 207. | 206 | 492 | Boro | 0.15 | 0.15 |
| 208. | 430 | 493 | Boro | 0.48 | 0.48 |
| | | | | Total= | 59.34 acres |

Total No. of Dag= 208

Private Ownership= 57.92 acres

No. KhasKhatian included Land= 1.42

** 59.34 acres

Meetings and Consultations at Sherpur and Maulvibazar



Meeting with the DC Mr Kamrul Hasan and AC Mr Nurul Huda of Maulvibazar and other officials



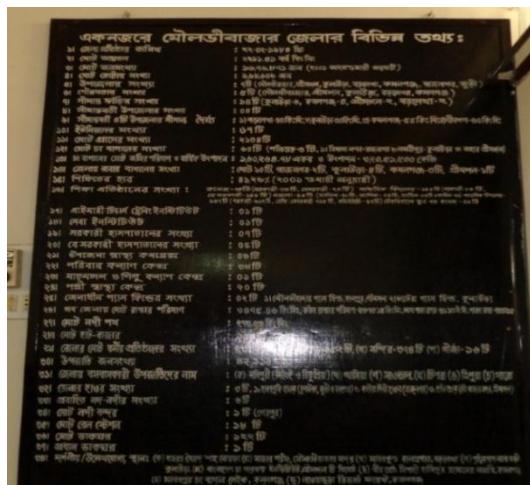
Meeting with the DC Mr Kamrul Hasan and AC Mr Nurul Huda of Maulvibazar and other officials



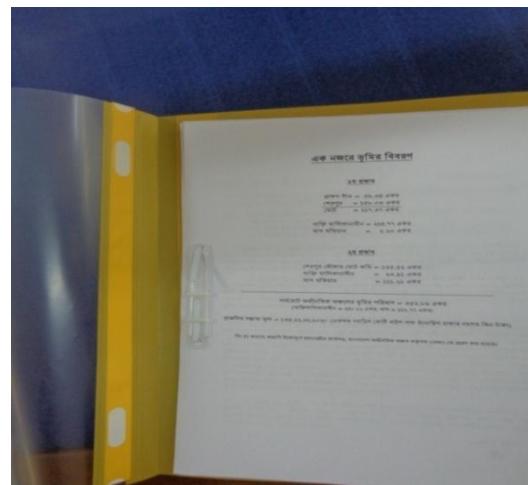
Meeting with the DC Mr Kamrul Hasan and AC Mr Nurul Huda of Maulvibazar and other officials



Consultation with officilas at Maulvibazar DC office



Information on Maulvibazar District in DC office



Collection of information on land of EZ area at DC office



Consultation with Mr Abdul Khalique, a resident in Sherpur proposed EZ



Consultation with small traders and labours at Sreemangal Railway Station



Sreemangal Railway Station to ICD site



Consultation with locals near ICD site at Sreemangal Railway Station



Consultation with local youth in ICD site at Sreemangal Railway Station



Sherpur bridge



Sreemangal Railway Station



Car parking area near ICD site



Truck drivers and transport workers at ICD site



Consultation with station labours at Sreemangal Railway Station



A mosque adjacent to the EZ area



Consultation with women and children



Farmers in agricultural fields in Sherpur



Homes in the proposed EZ area



Children at leisure around the EZ area



Farmers in agricultural fields near the EZ area



A bridge near the EZ area



Paddy field on the way to a home in the EZ area



Consultation with fish traders in a fish market in the Sherpur Market area near the riverside



Consultation with fish traders in a fish market in the Sherpur Market area near the riverside



Consultation at the EZ site



The Sherpur Market area near the riverside



Highway near the EZ area



Sherpur mosque and bazar area near the river

CHAPTER 5

INSTITUTIONAL FRAMEWORK & PPP

(COMPONENT 3)

5.1 Background

The Government of Bangladesh passed the Bangladesh Economic Zones Act in 2010 and established the Bangladesh Economic Zone Authority (BEZA). The Economic Zones (EZ) Act allows various institutional frameworks with a special focus on Public Private Partnership (PPP) arrangement involving the private sector, to implement EZs. For a successful PPP EZ, technical assistance, Viability Gap Financing (VGF) and infrastructure investment funds are allotted. A number of PPP EZ projects are in the pipeline including the Sherpur site, in Sylhet division.

5.2 Findings of Field Visits

PPP Experts of the Team met with representatives of the following organisations:

1. Infrastructure Development Company Limited (IDCOL).
2. Bangladesh Infrastructure Finance Fund Limited (BIFFL).
3. Summit Assets Limited.
4. Korean EPZ
5. Shamsul Alamin Real Estate Limited.
6. Building for Future Ltd.
7. Summit Power Limited
8. Ananda Group

During discussions with IDCOL, it was found that this financial institute has a track record in financing some components of running EPZs including the Chittagong Export Processing Zone (CEPZ) in Chittagong and a power plant in Dhaka EPZ. It has no plans to fund green field EZs, i.e. land & onsite development of future EZs, for example the Korean EZP and Savar Leather Industrial Park, as they feel that these projects are uncertain. On the other hand, the Bangladesh Infrastructure Finance Fund Limited (BIFFL) has the scope to finance some components of running EPZs and future EZs. At the same time, it has plans to finance green field EZs provided the projects are good and balance sheets of their sponsors are sufficiently sound.

The country's only private EZ development company, Summit Assets Limited stressed the importance of quick approval of EZ projects by the government and access to low cost long term loans to carry the PPP economic zone forward. Summit informed the team that became the Design-Build-Finance-Own-Operate-Transfer (DBFOOT) model for the World Bank suggested concession PPP model for Kaliakoir Hi-Tech Park. The private Korean EPZ, now under construction, has recognised the importance of a multimodal transport system including port facilities on its adjoining river front.

Real estate companies indicated that they are interested in building and operating PPP EZs if they are provided with conditions similar to those enjoyed by Indian real estate companies, i.e. particularly quick approval of projects and availability of low cost long term funding. If real estate companies will not take up the full project, single components (housing & commercial zone in economic zones) will be taken up on the basis of PPP models. They suggest that the one stop service (OSS) centre at BEZA will coordinate with relevant government agencies in simplifying paperwork for fast track approval of economic zones under PPP models. That will create an enabling environment for effective private sector participation in the country's EZ programme.

Private investors in power sector, Summit Power Limited, placed emphasis on the importance of low cost foreign currency loans for the country's EZ programme. Summit Power has collected loans from the International Finance Corporation (IFC), the Asian Development Bank and foreign commercial banks at a lower rate of interest compared to local financial markets. Its financial controller feels that the private sector of the EZ programme will try to arrange funds from those financial institutions. EZ

private investors need the World Bank's PRG facility in order to collect loans easily from international financial markets. The Chairman of the Ananda Group emphasised that the right type infrastructure facilities must be available for the Anwara EZ to attract private ship building and related industries investors.

5.3 Institutional Frameworks and PPP Schemes

Economic zones have been implemented across the world using a variety of institutional structures, ranging from fully public (government operator, government developer, government regulator) to 'fully' private (private operator, private developer, public regulator). In many cases, the public sector, in partnership with private investors, formed pseudo-corporate institutional structures to develop and operate economic zones. Under this arrangement, the public sector provides some level of support including initial land acquisition and provision of off-site infrastructure, while the private sector arranges funding, develops onsite infrastructure, sells industrial plots and takes up Operation and Management (O&M). PPP economic institutional structures and PPP schemes must be tailored to accommodate the existing conditions and achieve project development objectives. The following institutional frameworks and PPP options for implementation of the selected economic zones are evaluated to facilitate a comparative analysis.

5.3.1 Option A: Government-Led Model

Under Option A, BEZA would be responsible for land acquisition, arranging funds, development of onsite infrastructure, regulation, and operation & management of EZs. BEZA would promote EZs and lease ready plots to industrial units.

5.3.2 Option B: Operating and Managing Outsourcing Model

BEZA would request the concerned government organization to acquire land on its behalf and fill the land. BEZA would develop the on-site infrastructure such as roads, electricity connections, sewerage networks, etc. In parallel, they would invite tenders from potential private investors to operate and maintain the selected 3 EZs. The private operator would then obtain a lease over the land for the concession period through a concession agreement. It would pay a royalty to the government and sub-lease plots to industrial units.

5.3.3 Option C: Concession PPP Model

BEZA would award control and development rights over the land (acquired by a government organisation) to a private economic zone developer under a long term lease through competitive public bidding. After completion of the land bidding, the private developer would form a Special Purpose Vehicle (SPV), responsible for preparing detailed concepts, layouts, and detailed designs; arranging financing, land filling & onsite development, and preparing plots for sub-lease to industrial units for 99 years. The SPV would provide operation and management services throughout the lease term.

5.3.4 Option D: Private Ownership PPP Model

Under Option D, BEZA would be responsible for regulation of the zone and land acquisition. The SPV would pay the land price upfront. In parallel, the SPV would be responsible for preparing detailed concepts and layouts; arrange financing; prepare detailed designs; carry out land filling,

develop onsite infrastructure, prepare plots for outright sale to different categories of entrepreneurs; and manage O&M of the zone area. As per the Bangladesh Economic Zones Act of 2010, the SPV will impose minimum standards for the zones, criteria for plot design and development control guidelines for on-site infrastructure and common facilities, etc.

5.3.5 Various PPP Options in Summary

Table 5.3.5-1: Summary of PPP Options

| Options | Land Acquisition | Off-site | Financing | Land filling and On-site | O & M | Regulation |
|---|------------------|----------|--|--------------------------|------------------|------------|
| Option A: Government-Led Model | BEZA | BEZA | BEZA | BEZA | BEZA | BEZA |
| Option B: Operating and Managing Outsourcing Model | BEZA | BEZA | BEZA | BEZA | Private operator | BEZA |
| Option C: Concession PPP Model | BEZA | BEZA | BEZA – Initial land acquisition and SPV procures land and funding up front development | Private operator | Private operator | BEZA |
| Option D: Private Ownership PPP Model | BEZA | BEZA | Private operator | Private operator | Private operator | BEZA |

5.4 Components of the EZ as PPP Entities

After field trips to the three sites and the drawing up of best practice master plans of the sites, it has been identified that implementation of the sites requires large investment. It is envisaged that there will be two categories of projects such as core infrastructure of the zone (land and onsite infrastructure) and individual components (commercial zone, inland cargo depot, IPPs, water treatment plant, CETP, etc.).

Some of the major services could be split off as separate component PPPs in the case of the Sherpur EZ. PPPs would be governed by their respective concession agreements. The private zone developer will be free to outsource the above components to other private organizations as PPP entities. The basic revenue and cost model envisaged for implementation through component PPPs is presented in the following table.

Table 5.4-1: Investment Structure of Sherpur EZ

| Status | Main Land Use | Land Use Sub-Category | Investor | PPP Scheme |
|--------------------|--------------------------|-----------------------|----------|------------|
| Saleable Lease | Industry Plot | | PI | BOT |
| | Rental Factory Zone | | EZD | |
| | Commercial | | PI | BOT |
| Non-saleable lease | Control Office & Parking | | EZD | |
| | Police Station | | EZD | |
| | Electric Substation | | EZD | |
| | Fire Service Station | | EZD | |

| Status | Main Land Use | Land Use Sub-Category | Investor | PPP Scheme |
|------------------------|------------------------------|----------------------------|----------------------|-------------------|
| | Gas Station | | EZD | |
| | Telephone Exchange | | EZD | |
| | Mobile Tower (Existing) | | EZD | |
| | Administrative Staff Quarter | | EZD | |
| | Resettlement Zone | | GOB | |
| | Internal Road | Main Road | EZD | |
| | | Median | EZD | |
| | | Minor Road | EZD | |
| | Dike | | EZD | |
| | Green Zone | | EZD | |
| | Pump Sump Structure | | EZD | |
| | Water Supply Treatment Plant | Treatment Plant | EZD | DBFOM |
| | | Primary Sedimentation Tank | EZD | |
| | Retention Pond | | EZD | |
| | Waste Water Treatment Plant | | EZD | DBFOM |
| Offsite Infrastructure | ICD | | GOB/BR | O & M Outsourcing |
| | Electrical Connection | | PDB/EZD | |
| | Communication Connection | | BTCL/ISP /EZD | |
| | Gas | | Jalalabad Gas Co Ltd | |
| | Highway Widening | | RHD/EZD | |

Non-core infrastructure such as the Commercial Zone, ICD, Water Treatment Plant, and CETP can be undertaken on the PPP model, based on the following criteria:

1. Projects with a minimum economic size as an independent investment.
2. Establish revenue model that is typically viable.
3. ICD at Sreemangal Railway Station will be built by a concerned government agency and transferred to a private investor under the Operating and Managing Outsourcing Model - Non - investment PPP.

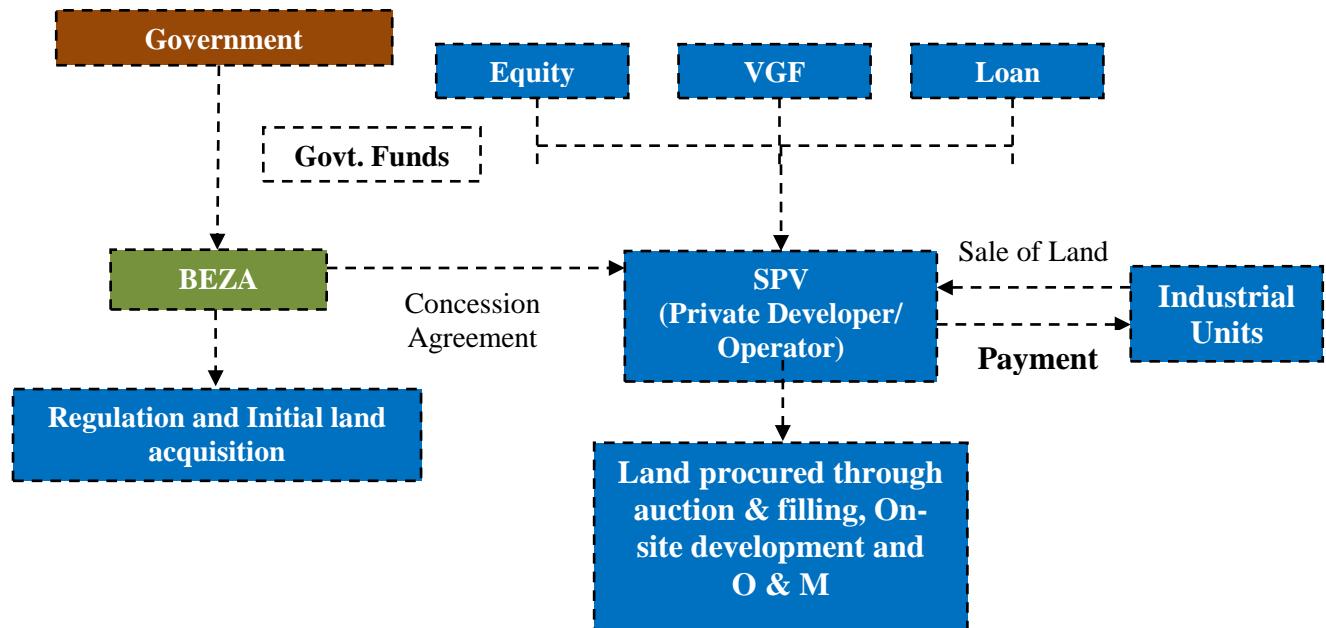
The Private zone developer cum operator will take up core infrastructure development of the zone (land & onsite development, preparing plots and O&M) along with individual components of the project or separate can be proposed for individual components, under PPP entities.

5.5 Business Model of Sherpur Economic Zone

The Concession PPP Model (BOT) - **Option C** is proposed as the preferred modus operandi of the private developer in implementing Sherpur Economic Zone. The business of the SPV of Sherpur Economic Zone is to procure land on a 99-year lease through competitive public bidding at auction, develop plots and sell these plots to industry entrepreneurs and provide good quality infrastructure and facilities such as quality power supply, commercial facilities, vocational training centre, water supply and CETP under a PPP structure. The cost of off-site infrastructure, which includes connectivity infrastructure such as a gas pipeline and power transmission line outside the economic zone's premises, will be borne by BEZA. The social infrastructure is also very important and ensures proper living conditions for the people inside the zone and could include administrative buildings, low cost housing for workers, a clinic, a mosque and public toilets. These will be the part of BEZA's initiatives. The social infrastructure like the mosque, clinic etc. are not expected to generate revenue.

It is noted that only a BOT PPP project is qualified to receive Viability Gap Financing according to the Guideline for Viability Gap Financing (VGF) for Public-Private Partnership Projects, 2012. In general, PPP structured EZs will be enabled to receive VGF in the form of a capital grant during construction or annuity for O&M over the concession period. After completion of the concession period on a 99-year lease, the private operator will hand over the operation and management of the zone to BEZA. The overall structure is presented in the figure below.

Figure 5.5-1: Structure of Business Model for Sherpur EZ



The advantages of this model are as follows:

1. Private sector efficiency in operating and maintaining the EZ is achieved.
2. If Option C-Concession PPP Model (BOT) is chosen, the Government needs substantially less investment in the EZs compared to other options - Government-Led Model and Operating and Managing Outsourcing Model. In table 3.5.3-1 of Chapter 3 the cost summary of different investors is given. From that table it is can be seen that 88.26% of the cost will be borne by the EZD and 11.74% by the Government.
3. The Government has strong control, through the concession agreement, of regulation of the selected EZ.
4. Viability gap funding may be provided to the SPV to increase viability of the project and attract investors.

The disadvantages of this model are as follows:

1. No clear source of government funding for the initial land acquisition cost of Sherpur Economic Zone.
2. Private operators' interest in operating and managing the EZs is uncertain at this point and has to be tested in the market following the completion of the feasibility study.

5.6 Delineation of Responsibilities under Option C-Concession PPP Model

The responsibilities of BEZA and the private developer/operator under the concession PPP model are presented in the table below.

Table 5.6-1: Delineation of Responsibilities for BEZA and Developer/Operator

| BEZA | Private Developer/ Operator |
|---|--|
| <ol style="list-style-type: none"> 1. Initial Land acquisition. 2. Conduct competitive land auction bidding for private investors. 3. Guideline for developing the zone. 4. Defining terms and conditions defining the interrelationships within the PPP, between the private and the public sector. 5. BEZA and BOI will jointly formulate and implement marketing of EZ through information gathering, stakeholder consultation, intra-govt. communication and clear up-to-date information provision on law and regulations. 6. Development of off-site infrastructure, which includes gas pipeline and power transmission line. | <ol style="list-style-type: none"> 1. Prepare master plan of the zone. 2. Receive land on lease basis through competitive bidding. 3. Develop onsite infrastructure and sub-leasing to industrial plots. 4. Environmental and social impact mitigation. 5. Side by side, zone developer with BEZA and BOI will market the zone to the potential entrepreneurs for setting units in the zones. 6. Reporting to BEZA. 7. Payment of license fees to BEZA. |

5.7 Need for Change in Present Land Lease Regulations

The current BEZA Land regulation stipulates a 30 year lease (extendable twice up to 90 years). However, the Study Team strongly recommends a lease term of 99 years, and, rendering the lease both renewable and transferable as enabled in most Asian countries. If the land lease is only 30 years and not transferable, just as the BEPZA land regulation, then the PPP scheme is not likely to attract many developers/investors and the BEZA EZ Programme may have to use Option Case 1 requiring BEZA to develop and operate the site just as the current BEPZA programme.

Table 5.7-1: Land Regulations for Asian Countries and Bangladesh

| Country | Bangladesh | Thailand | Philippines | Malaysia | Cambodia |
|-----------------------------------|--|----------------------------|----------------------------|--------------------------|---------------------------|
| Land Ownership | NO | Yes For Industrial Park | Yes For Industrial Park | Yes | No |
| Land Lease Extension Transferable | 30 years Yes No | Any period Yes Yes | Any period Yes Yes | Any Period Yes Yes | 50-99 years Yes Yes |
| Recommended | 50-99 years Plus Transferable & Extendable | | | | |

Source: WB Study Team

Without changing the present land regulation to enable term extension and lease transference, the BEZA EZ project is not likely to be promoted as a PPP scheme as originally considered. It is strongly

recommended the land lease regulation be changed immediately before starting the BEZA EZ programme.

5.8 Institutional Framework: Implementing Sherpur Economic Zone

Fundamental to the institutional framework is the question of the implementation route. It has been proposed in the study that Sherpur Economic Zone will be developed and operated under the PPP arrangement. A four-tier system, as the institutional framework for the implementation of Sherpur Economic Zone, is given below:

- An Apex body, headed by the Principal Secretary to the Prime Minister's Office with concerned head of lined agencies (BEZA, PPP office, Department of labour, customs, power, roads & highways, national highway, Department of Environment) as Members for overall guidance, planning and approvals.
- In this project, BEZA, headed by a full time project director, is to be responsible for initial land acquisition and transfer of land to private investors through competitive bidding for site development. The Project Director will ensure infrastructure development of the zone within a specified period through monitoring BEZA activities and those of the Economic Zone developer.
- Various government agencies will be involved in the process of implementation of Sherpur EZ. Each and every agency will want to regulate Sherpur EZ. Due to involvement of various government agencies, problems can occur during pre-operational and operational periods of the Sherpur EZ. In order to identify and solve the problems immediately, a Steering Committee (SC) will be formed for this zone to coordinate and conclude the technical or legal aspects or issues. It has a further duty of receiving any complaints and to find solutions to such complaints filed by the Zone Developer as well as by any Zone Investor. The Sherpur EZ Steering Committee (SC) will meet once a month. The composition of the Sherpur EZ SC will be as follows:
 - I. A member nominated by the Prime Minister.
 - II. Chairman of BEZA.
 - III. Heads of Relevant Government Agencies.
 - IV. Project Director of Sherpur Economic Zone.
 - V. Deputy Commissioner of the District Relevant to the Sherpur Economic Zone.
 - VI. Chairman of the SPV Company, Sherpur Economic Zone.
- The SPV Company of Sherpur EZ is the “One-Stop Service” (OSS) organization in charge of the development and management of operations of the zone. The SPV Company will arrange equity and debt funding from local & foreign markets. Various formations of SPV have been explored for development and O&M activities of the Sherpur Economic Zone. These are :
 - A Private Shareholding Company governed by a board of directors and owned through a joint venture partnership between the Government and the private investor.
 - 100% single privately owned SPV.
 - 100% single foreign investor owned SPV.
 - Private consortium owned SPV.
 - Local and foreign investor's consortium owned SPV.
 - Multiple SPVs will be formed to develop and manage Zone development & operation and individual components (Commercial Zone, Rail ICD, Vocational Training Centre, Water Treatment Plant and CETP etc.).

5.9 One Stop Service (OSS) for Sherpur Economic Zone

The OSS of the Sherpur EZ will have an impact in reducing the cost of doing business and increasing the flow of investments through improved service delivery. BEZA may, upon Government instruction, set up, maintain, and manage centres of the Customs Department and Office of the Chief Controller of Imports and Exports (CCI&E) in the EZ area to facilitate export, import, and supply to the local market. Apart from customs facilities, investors will receive all types of services required for investment. In the meantime, the Export Processing Zones of Bangladesh are already operating this type of OSS where the investors can receive all types of services required for investment safeguards. A tentative OSS System for BEZA is shown below:

Table 5.9-1: Tentative OSS System for Sherpur EZ

| Item | BEPA | Other Agency |
|---------------------------------|-------------|-------------------------|
| Investment License | Yes | |
| Construction & Operation Permit | Yes | |
| Import & Export License | Yes | Custom Office |
| Tax Registration | Yes | Tax Office |
| Working Permit | Yes | Ministry of Labor |
| Multi Visa Issues | Yes | Immigration |
| Incentive Arrangement | Yes | |
| Environmental Issues & Permit | Yes | Ministry of Environment |

The above OSS operation is based on the BEPZA practice now which is considered as a fairly good system and BEZA should be able to improve upon the existing OSS system of BEPZA.

Further improvements are suggested below:

- 1) One customs official should be posted full time under BEZA to facilitate activities of Bond permissions and renewal of Bond licenses every year.
- 2) One representative should be posted to each EZ from different (respective) gas companies to take proper care relative to connections and other matters related to Gas.
- 3) One representative from the ministry of homes may be posted to BEZA H/Q for security clearance of BEZA investors.

Comprehensive and high-standard infrastructure:

- Reliable power and gas supply
- Independent water supply system
- Common Effluent Treatment Plant
- Reliable and modern telecommunications system
- Multi-modal transport system

"On-site, one-stop" services in partnership with relevant government agencies:

- Bangladesh Economic Zone Authority.
- The Customs Department
- Office of Chief Controller of Imports and Exports (CCI&E)
- The Ministry of Commerce
- The Ministry of Labour and Vocational Training

Other on-site services provided by Sherpur Economic Zone:

- Investment registration
- Import / Export permits
- Customs clearance

- Business: Bank, Courier, Post office, C&F Agent, Shipping Agent and commercial complex etc.
- Workers' recruitment support
- Labour management assistance in cooperation with the Ministry of Labour
- 24 hour security and fire station.
- Garbage collection and disposal
- Canteen and medical centre for workers.
- Legal, administrative and accounting consultation

5.10 Financing Plan of Sherpur Economic Zone

Using the Concession PPP Model (BOT) in the private development and implementation of the Sherpur EZ, the SPV Company of Sherpur E Z will mobilise internal & external equity and debt funds to procure land on long term lease at competitive auction, develop onsite infrastructure, and prepare industrial plots.

Using Option C (Concession PPP Model), sources of finance for developing Sherpur EZ from the perspective of two parties should be considered, i.e. government/BEZA and private developer/operator.

5.10.1 Government/BEZA Financing

Potential sources of finance for government/BEZA for initial land procurement and developing off-site of the zone are assumed to be as follows:

- **Government's Own Funding**

To gain the confidence of private investors regarding the government's eagerness and strong position in the PPP initiative, US\$3.5 million would be kept aside for the Public-Private Partnership (PPP) programme for the fiscal year 2013-14 in the national budget. Part of the PPP fund would be used to finance off-site development and initial land procurement costs. Later, the cost would be realised from private investors through competitive bidding. BEZA would use the expertise of the Public Private Partnership Office Bangladesh under the PMO to enter into a PPP agreement with a private zone developer.

- **Funding Provided by Different Donor Agencies (IDA, ADB, JBIC, JICA etc.)**

The terms and conditions of financing provided by different donor agencies are discussed below:

- **International Development Association (IDA)**

IDA credits are given only to governments with a maturity of 40 years including a 10-year grace period. IDA credits have no interest, but carry an annual service charge of 0.75 percent on the disbursed and outstanding credit. The commitment charge on IDA credit and grants is set annually within a range of 0–0.5% and is determined by the Executive Board before the start of a financial year. IDA is financed by a partnership of donors who come together every three years to agree on the resources required to fund IDA's lending programme and to determine the policy objectives that guide IDA's activities. As a result, IDA's resources, unlike the resources of a regular lending institution, must be regularly replenished through contributions if the agency is to continue in business.

- *Asian Development Bank (ADB)*

The ADB provides two types of loans - Asian Development Fund (ADF) and Ordinary Capital Resources (OCR). ADF is a concessional loan while OCR attracts near market rates for the borrowers. Bangladesh joined the ADB in 1973 and became one of the largest borrowers of concessionary Asian Development Fund (ADF) resources. For project loans from the ADF window (i.e., other than quick-disbursing programme loans) the terms are: 32-year maturity including an 8-year grace period, 1-percent interest charge during the grace period and 1.5 % during the amortization period and equal amortization. For quick-disbursing programme loans, the terms are: 24-year maturity including an 8-year grace period, 1-percent interest charge during the grace period and 1.5 % during the amortization period and equal amortization. There is no commitment fee associated with ADF-financed loans. Most lending from OCR has been as per London interbank offered rate (LIBOR)-based loans (LBL). LBL may be denominated in US dollars, Euros, yen, or other foreign currencies in which ADB can efficiently intermediate. Initially, LBLs carry a floating lending rate consisting of the 6-month LIBOR or another relevant floating rate benchmark and an effective contractual spread and, where applicable, a maturity premium fixed over the life of the loan. For OCR loans the terms are: a 20-year maturity including a 5-year grace period. There is a commitment fee associated with OCR-financed loans.

- *Japan Bank for International Cooperation (JBIC)*

JBIC is a government financial institution that provides long-term, low-interest project loans for development projects and programmes. Since independence, JBIC extends soft loans to Bangladesh which carries an interest rate of 0.01% and repayment period of 40 years with a 10 year grace period.

- *JICA ODA Loan (Long term, Low Interest)*

Since establishing diplomatic relations, JICA has been giving ODA loans in development of much-needed physical infrastructure in Bangladesh. For example, JICA recently finalised modalities of the \$2.1 billion credit under its 33rd Official Development Assistance (ODA) package for a metro-rail project with a term of 13 years. BEZA and private investors are looking for a similar soft loan facility for the country's EZ programme with particular focus on offsite development.

Table 5.10.1-1: Major Conditions of a JICA ODA Loan

| Project Type | Government Project |
|----------------------|--|
| Financing Tool | Loan |
| <u>Terms of Loan</u> | |
| - Interest Rate | Normal ODA loan: 1.4% Special Condition: 0.2% |
| - Repayment Period | Normal ODA loan: 30 years Special Condition: 40 years (Revised periodically) |
| - Grace Period | 10 years |
| - Maximum Share | 85% |
| Procedure | -Initiated by official request of the government of recipient countries |
| Security | -Sovereign guarantee or Government borrowing |

5.10.2 Private Developer/Operator Financing

Financing options for a private operator may be one or a combination of equity source and debt sources. External equity and debt financing for the Sherpur economic zone developer/operator, is expected to be obtained from the following sources:

5.10.2.1 External Equity Financing

a. IFC's Equity Financing

As the demand for infrastructure grows, governments are increasingly looking to public private partnerships as an innovative way of financing infrastructure projects. IFC investments typically range from \$5 million to \$100 million, with a limited number of investments in the \$100,000 to \$5 million range. To ensure the participation of investors and lenders from the private sector, IFC typically finances no more than 25 % of the total estimated project costs.

- For new projects, the maximum limit is 25% of the total estimated project costs, or on exceptional basis, up to 35% in smaller projects.
- For expansion projects, IFC may provide up to 50% of the project cost, provided its investments do not exceed 25% of the total capitalization of the project of the company.

b. Equity Fund from the Asian Development Bank

The ADB may invest directly in an enterprise. It offers financing through equity investments, including direct equity investments in the form of common shares, preferred stock, or convertibles. Equity investments in enterprises, especially financial institutions, occur before an initial public offering. ADB does not seek a controlling interest in an investee company and will not assume any management responsibilities. It will, however, typically wish to reserve the right to appoint a nominee or an observer in the board of directors of each of its investee companies and to selected board committees and will exercise voting rights as a shareholder. It will maintain regular contact with company management and require periodic reports on the progress of capital projects, operating performance, financial conditions of the enterprise, and economic value added. The ADB also requires reports on specific indicators for development outputs and outcomes and monitors continued compliance of its environmental and social safeguards.

Potential ADB participation in the Sherpur EZ Project will help the private sector of Bangladesh to mobilize additional investment from top tier international partners in future years.

c. Private Sector Investment Finance (Equity Funding), JICA

In April 2008, the government announced its “New Strategies for the Enhancement of Collaboration between ODA programmes and Japanese Companies: Public Private Partnership for Growth Acceleration”.

Major Conditions: Equity Finance (Investment)

- | |
|--|
| <ul style="list-style-type: none"> • <u>Investees</u> JICA invests in commercially viable projects (or funds) e.g. PPP infrastructure project company (SPC), individual project sponsors. • <u>Share of Equity</u> JICA cannot take majority share, maximum 25 % of the total capital • <u>Exit Policy</u> Pre-arrangement of exit plan required for successful transition to sustainable private business. |
|--|

5.10.2.2 Debt Financing

a. Investment Promotion and Financing Facility (IPFF)

The Government, through the Bangladesh Bank (BB), has come forward with an Investment Promotion and Financing Facility (IPFF) project with the assistance of the World Bank to make partial debt financing available for private infrastructure projects. The Sherpur EZ operator can take advantage of such loans through participatory financial institutions (BB approved financial intermediaries).

The Bangladesh Bank provides loans to a participating financial institution (PFI) upon the request of private investors to the PFI for such loans. The PFI upon receiving a request from the private investor makes an application to the facility, for funding. The BB considers the application based on the operational directives of the facility and disburses the fund to the PFI. The PFI then extends a loan to the private investor. The loan is received by PFI from the BB under this facility. Syndication among PFIs and with non-participating institutions is permitted but the PFIs are responsible for credit administration and recovery.

The private sector promoter needs at least 30% equity contribution to access an IPFF loan, whereas PFIs need to finance at least 14% of the project cost and of the rest 56% may be financed by IPFF. The maximum term of the loan repayment is 20 years with 3-10 years grace period. The interest rate for a PFI is a weighted average yield of 1 year Treasury bill plus 50 basis points (if a floating loan). A Facility loan can also be taken in dollars or other currencies with a rate of 50 basis points above the relevant interbank rate.

b. Debt Fund from the Asian Development Bank

ADB supported PPP modalities projects range from build-operate-transfer, build-own-operate-transfer, concession, independent power producers (IPP), joint ventures, service contracts, build-own-operate, design-build-finance-operate, financing facility and purely private sector investments such as direct loans to SPVs of PPP projects.

Interest rates and other terms vary, depending on companies' or projects' needs and risks.

- **Rates** - In pricing its loans, the ADB considers prevailing market rates in the relevant country and sector, factoring in country and transaction risks. The ADB provides floating rate loans at a spread above the London interbank offered rate (LIBOR) or Euro interbank rate, depending on the currency. It also offers fixed rate loans at the fixed-rate swap equivalent of floating-rate loans.
- **Fees** - Market-based fees are charged. Typically, on floating-rate loans, the ADB charges a once-only front-end fee as well as an on-going commitment fee on the undisbursed balance. A fee to cover upfront costs associated with due diligence may also be charged. Project sponsors or clients will reimburse out-of-pocket expenses, such as travel and external advisory services (i.e., legal counsel, technical consultants and environmental and insurance advisors, if any).

c. JICA Debt (Concessional Loan for Private Sector)

Private Companies are gaining access to the JICA debt fund to build infrastructure that previously had been reserved for the public sector.

Major Conditions

- Fixed rate (Base rate : GOJ bond plus), JPY – denominated
- Long term up to 20 years with a grace period (up to 10 years)
(Exceptionally up to 25 years dependant on necessity)
- JICA provides loans up to 70% of the total project cost
(Exceptionally up to 80% depending on necessity)
- Future possibilities of providing PSIF in US\$

d. IDA Guaranteed Loan

Partial Risk Guarantees (PRG) supports private sector investment projects, including Public-Private Partnership (PPP) projects, green-field, and rehabilitation/expansion projects and concession and privatization transactions. PRG can be structured to protect lenders of limited-recourse project finance debt, or to protect the project company (“Letter of Credit” or “Deemed Loan” PRGs). Country eligibility: PRGs are available to all IBRD and IDA countries, PCGs and PBGs only to IBRD-eligible countries. IBRD may provide PRGs for enclave projects in IDA-only countries. IDA would make payments under its Guarantee in accordance with the amortization schedule pre-agreed with commercial lenders or prepay the loan, at its option. Partial Risk Guarantees (PRG) will help the private developer/ operator SPV Company of Sherpur EZ to receive long term international financing. The successful financial closure of Sherpur EZ through the deployment of the IDA Guarantee will serve as an important milestone in establishing a track record for facilitating financial capital flows to the country’s EZ programme.

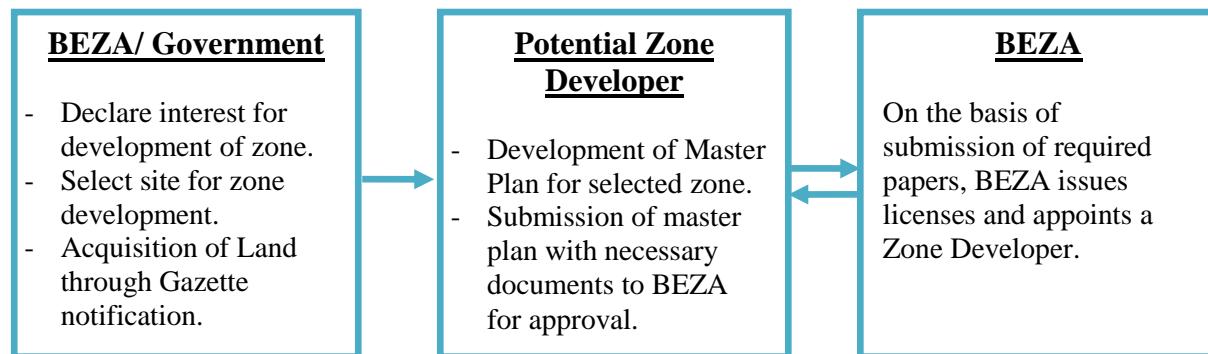
e. Off-shore Financing

With the rising foreign exchange reserves of Bangladesh Bank and remittances encouraged, off-shore banking units of foreign and local private banks can arrange a long term lower interest rate fund for private sector economic zone investors. For this purpose, banks will collect resources from remittances, borrowing from foreign banks, deposits of foreign banks, EPZs, and foreign exchange reserves.

5.11 Approval Process for Economic Zones

The Bangladesh Economic Zones Act 2010 has opened up a new window and will allow the private sector to own, develop, and manage economic zones and establish infrastructure and services for the companies there. In the backdrop of the Bangladesh Economic Zones Act, the process of approval of zone developers is presented in the following exhibit.

Figure 5.11-1: Process of Approval of EZs



According to Bangladesh Economic Zones Act 2010, BEZA or any government agency will develop economic zone or specialised zone for industrial or particular sector development. In this regard, BEZA will seek expression of interest for prospective zone developers under a suitable PPP model. After receiving proposals with all the required documents from interested zone developers, BEZA will approve proposals.

CHAPTER 6

FINANCIAL AND ECONOMIC MODELLING

(COMPONENT 4)

6.1 Financial Analysis

The private sector will be allowed by the Government of Bangladesh to participate and bear the burdens and rewards of developing infrastructure—power generation, bridges, economic zones - in a partnership approach to a greater extent. It is therefore assumed in the study that the economic zones will have a large degree of private sector participation especially when the local private sector, foreign investors, and the Non-Resident Bangladeshis (NRBs) have shown interest in developing economic zones. Accordingly, this section analyzes the financial viability of the Sherpur EZ in Moulvibazar, based on net financial benefits, under the different degree of involvement/participation of the private sector and cash flows accruing to investors who provide equity in developing economic zones.

The analysis is based on the demand for serviced industrial land set out in the section on demand projections and, construction and development costs are detailed in Annex-5. Assumptions on the operation and maintenance (O&M) costs, and capital structure are also presented. The model developed proceeds to analyze revenues generated by the zone, and the IRR (both for the zone and equity investors), and the NPV of the project.

The project's sensitivity to various factors is examined in the financial model. In addition, the key issues—the cost of the land, land development, utilities, water supply, and waste water supply to be borne and provided by whom — Government, or Private Sector or combination of both - are analyzed in terms of different PPP models. All these issues are run through the financial model to see what the impact would be on the final IRR and equity IRR if the government develops them, then the private sector or some combination of both. Key assumptions are presented in Table 6.1-1.

Table 6.1-1: Overview of Key Assumptions

| Category | Key Assumptions |
|-------------------------|--|
| Land | 353.53 acres or 1,430,701 gross square meters of land, 856,629 square meters of industrial plots |
| Sales Revenue | Service Land (\$50/m ²) ²²⁷ or (Tk. 4000 /m ²) initially & then price increase to 70 \$/m ² in 2019) |
| Service Revenue | Full charge fee for water & waste water and other service revenue equivalent to 15% of applicable utility rent/bill |
| EZ Service Fee | \$1.92 /m ² /year |
| Depreciation | 25 years (Infrastructure & Buildings) 5 years (Equipment) |
| Govt. Partial Guarantee | For availing soft long term loan by SPV company but No Grant (VGF) |
| Debt/Equity Ratio | 70% (70% LTD, 30% Equity or Reinvested Cash) |
| Long-Term Loan | Loan arrangement fee equal to 2% of the maximum credit line |

6.1.1 Methodology

The financial assessment enables us not only to assess the financial viability of the project, but also to guide any pricing and timing issues that may be able to influence the profitability of the project, and identify any requirements for public support. A model was developed in a spreadsheet to calculate projected revenue streams, and capital and O&M costs, to enable the testing of a number of parameters for their effects on the finances of the Sherpur EZ. The primary outputs of the model are estimates of the Internal Rate of Return (IRR) and Net Present Value (NPV) of the cash flow generated by the Sherpur EZ for the project and its equity investors. The analysis is based on the Base Case, which considers demand projections presented in this report and assumes land costs, relocation and compensation costs, all on-site infrastructure development costs, being provided by the private sector.

²²⁷Initial land price. For detail plz see section 6.1.6.

The financial viability of the Sherpur Economic Zone is assessed through the following estimations:

1. Costs of public lands
2. Capital Costs of acquiring the EZ inclusive of Relocation and Compensation Costs
3. Capital Costs of developing/constructing the zone
4. O&M costs of operating and maintaining the zone
5. Revenues accruing to the zone owner/operator
6. Government support necessary to make the project viable for private sector ownership, development, and/or operation

It is proposed that Sherpur EZ funds almost all capital expenditures through debt financing. This soft long-term debt is secured through government partial guarantee and all the assets of the project. The equity share of initial capital expenditures is funded by investors. Subsequent requirements are funded from investors through the use of retained cash whenever possible, and additional injections of external equity from investors when necessary.

6.1.2 Assumptions

In light of the master plan and development of cost estimate and demand projections, certain non-financial assumptions are made in this feasibility study and are listed in Table 6.1.2-1.

The Financial Analysis of Sherpur EZ covers only the capital costs of acquiring the EZ inclusive of relocation and compensation costs, cost of public land, only on-site infrastructure development, and O&M costs and revenues of the economic zone. It is assumed that the government of Bangladesh will develop all off-site infrastructure. This includes all roads to be widened and utility connections to the borders of the economic zone. It is also assumed that the government will be responsible for acquisition of land and development of the proposed inland container depot (ICD) and truck terminal as part of the Sherpur zone site.

Table 6.1.2-1: Sherpur Economic Zone Financial Model Assumptions

| Variables | Assumed Value | Notes |
|---|-------------------------|--|
| Size of gross land | 1,430,701 square meters | Parcel of land along the Dhaka-Sylhet Highway in Sherpur, of which 880,040 m ² is to be acquired and purchased by the Govt/owner at beginning of project. |
| Gross/net land ratio | 61.98% | 58.87% of gross land will be serviced industrial land to be saleable lease ²²⁸ , and 0.58% of gross land will be commercial plot to be saleable lease. 1.53% & 0.68% of gross land will be rental factory space & resettlement zone and 37.34% will be devoted to road, utilities, green space, and common zone facilities. |
| Inland container and truck terminal | 16,023 square meters | Purchased, developed, owned and operated by the government as a part of off-site costs. |
| Earth filling requirement | 1.5 meters | Average depth shown. |
| Average market price (\$/m ²) | \$ 15.38/m ² | The average price is for land other than water body, may be fully/partially provided by government under some PPP arrangements. |

²²⁸ Saleable lease implies the lease on sale rather than lease on rent having lease period of 30 years and transferability conditions as well for the purpose of SPV.

| Variables | Assumed Value | Notes |
|-----------------------------------|---|---|
| Relocation and compensation costs | \$ 22.651 million (using \$1 = Tk 80) | Information provided by BEZA office, cost may be borne by the government under some PPP arrangements. This includes a 50% premium over current market prices as required by law. |
| Corporate tax/VAT | 0% | Assumed government will waive corporate tax and VAT for the developer as an incentive |
| Phasing of Development | No Phasing of Development 143.1 gross hectares | Infrastructure development in the zone is not phased. The project starts in 2016 and is scheduled for completion in 2019; In the base case, this occurs in Year 2 and ends in year 5. |

6.1.3 Capital Costs

Capital costs are based on the market value of the land including the cost of the public portion of land, estimated relocation and compensation costs to be paid to landowners and residents, and the costs of on-site infrastructure for the zone, including earthworks, roads, institutional buildings, utilities, water supply system, and waste water treatment plant in line with the master plan. According to the master plan, these items are disaggregated from the estimated cost of developing the northern and southern areas of the zone. So, the phased development costs include those related to the construction of all necessary infrastructure other than roads for common buildings, site preparation costs (filling, leveling, and compaction), and initial landscaping for these items.

Land is assumed to become available for lease in the later part of the same year as it is developed. However, 70% of the available lease land is assumed to be sold in the year and the rest in the next year for a conservative estimate. The full annual break down of site development and building costs is provided in Annex -5 (e).

In the base case, the project is developed by year 5 (2019). The total fixed costs for the development of the Sherpur EZ over the 20 year period in the Base Case is projected to be approximately US\$94.68 million except for Off-site costs in terms of 2014 prices. The cost is divided as follows:

- Public Land, Land Acquisition and Compensation, and Relocation US\$24.54 million
- Site development, infrastructure, and common building US\$58.03 million
- Standard Factory Buildings US\$12.11 million
- Off-site costs amounting to US\$7.72 million

6.1.4 No Phasing of Development

In line with best practice in economic zone development, Sherpur EZ is planned to be developed in a single phase. While the entirety of the land is acquired at the beginning of the project, the infrastructure is constructed to accommodate the outcome of the Demand Forecast. Thus, no phasing of development of the Sherpur EZ project is required because land acquisition and other basic infrastructure have to be made initially to satisfy expected demand.

The analysis is carried out over a 21-year period of the Sherpur EZ project, with a 20 year actual operation. The project starts in year 2 (2016) and should be completed by the year 5 (2019) - within a 4 year period. The estimated timing of the development is matched to the demand projections given in Chapter III. It is assumed that the developed sites in a zone area will become available in the later part of the year that the construction takes place.

6.1.5 Operation and Maintenance Costs

Operation and Maintenance costs (O&M) regarding Sherpur EZ are assumed for four areas — administration/staffing costs, promotion costs, provision of costs for operating and maintaining utility services, and provision of security services.

Administration costs are based, initially, on 3 upper level managers, 2 mid-level officers, 16 technical and skilled workers, and 30 unskilled workers including security personnel. Based on the level of human resources, the initial wage bill for the Sherpur EZ administration and security personnel would be US\$0.118 million (just above Tk. 12.4 million). Annual marketing and promotion costs are set to Taka 5 million (US\$0.0625 million), which will continue and be sustained for the first five-years and taka 2 million for remaining periods. It is assumed that annual provision of O&M costs are equivalent to 2 percent of capital costs amounting to US\$1.158 million.

6.1.6 Prices for Leasing

The price level for a saleable lease of serviced land was considered by analyzing the current rates in the region, in the context of competing free zones, industrial estates, and commercial space, while the Sherpur EZ is being planned and constructed. The Sherpur EZ is also assumed to provide better infrastructure and service to its tenants than competitive locations. The price of land for a saleable lease was generated by analyzing the costs of improvements made to the land. In order to attract investors, the developer/operator should start leasing at an attractive leasing price of \$50 per sqm for the initial year in 2017, and increase the price by \$10 to \$60 in 2018 and \$70 by 2019. The initial saleable lease price of \$50 per sqm is a strategic one to lure investors to the EZ. A lease fee of \$2.75 per m²/month for Standard Factory Building Space of the rental factory zone would be charged.

Under the financial model, a full charge for the provision of water and waste water is levied and other service charge is assessed on all the occupants of the EZ. This service charge depends on the consumption of utility services by the occupants of the EZ and is equivalent to 15 percent of the applicable utility bill. In addition, an EZ service fee of \$1.92 per sqm/year is assessed to be charged to all occupants depending on the usage of the land. This covers the provision of common services to the occupants of the Sherpur EZ. This EZ service fee ensures that the owners/operators of the Sherpur EZ have a continuing solid basis for management of the zone when all the developed land has been passed on to investors.

6.1.7 Capital Structure

The development of Sherpur EZ is assumed to require at least a 30 percent share of equity to obtain any needed loans. All capital expenditures are assumed to be leveraged at a 70 percent debt-equity ratio to maximize returns to investors. Equity requirements are funded, if possible, through retained cash from operations of the Sherpur EZ. When retained cash is not available (such as for the initial investment), the model assumes that equity is provided from an external source (the investor). The sole investor in the development of the Sherpur EZ is assumed to be the developer/operator—herein referred to as Sherpur Special Purpose Vehicle (SPV) Company.

The model assumes that all new borrowing must be fully repaid within 7 years of the issuance of debt. The interest rate on soft long term commercial loans (with partial guarantees of government) is assumed to be 6 percent. For the first two years after new borrowing, there is a moratorium on principal and interest repayments. For years 3-7 after borrowing, it is assumed that the Sherpur SPV Company pays its annual interest obligations and annually repays 20 percent of the principal borrowed. It is also assumed that Sherpur SPV Company must pay upfront a one-time loan arrangement fee equivalent to 2 percent of the size of credit facility.

Sherpur SPV Company may not be able to meet its debt service obligations during the early years of operation. If Sherpur SPV Company is unable to meet its debt obligations, it is assumed that additional equity would be provided to clear the deficit. Debt considerations may require Sherpur EZ to lower its debt-equity ratio from 70 percent to provide for better debt service coverage ratios. These issues are explored for each PPP scenario in the Results section.

6.1.8 Public Private Partnership Structure

As part of the financial analysis, several PPP structures are assessed to determine impact on the viability of the Sherpur EZ.

1. The first scenario is the base case scenario, where it is assumed that land costs, relocation and compensation costs, all on-site infrastructure development costs would be borne by the private sector owner/developer/operator. The private entity would:

- acquire all land through the government's right of domain, following all necessary stipulations required under Bangladeshi law and pay for the acquisition of land and bear costs of public land as well;
- bear relocation costs associated with acquiring the land;
- pay for all on-site infrastructure;
- pay all O&M costs throughout the life of the project;
- retain all profits;
- bear responsibility and risk for any and all losses.

The government, for its part in base case scenario, provides the following:

- Off-site infrastructure such as road widened, and utility connectivity – gas to the borders of the zone;
- Construction and Operation of the ICD and Truck Terminal located near the zone site;
- Waiver of corporate and VAT taxes for the zone developer/operator.

The other scenarios are also considered where government involvement/support is increased in developing the zone, in areas such as –

- acquisition of land, provision of government land at no cost,
- provision of partial guarantees enabling private investors to have access to soft long term debt, bearing the costs of premium for compensation associated with land acquisition etc., for the purpose of the viability of the project.

2. Scenario 2 is defined by increased government involvement in the acquisition of land and differs in that the government bears the costs of the premium required for the compensation of private land owners – 50% premium over current market prices as required by law, and provides government land or water bodies at no cost to the private developer. The private entity would:

- bear compensation costs only without premium for the acquisition of private land;
- bear relocation costs associated with acquiring the land;
- pay for all on-site infrastructure;
- pay all O&M costs throughout the life of the project;
- retain all profits;

- bear responsibility and risk for any and all losses.

The government, for its part in scenario 2, provides the following:

- Land acquisition and premium costs associated with the acquisition of land;
- Govt. land at no cost to the private developer;
- Off-site infrastructure such as road widened, and utility connectivity—gas to the border of the zone;
- Construction and Operation of the ICD and Truck Terminal located near the zone site;
- Waiver of corporate and VAT taxes for the zone developer/operator.

6.1.9 Net Present Value

The results of the financial analysis of the Sherpur EZ using the base case scenario are presented below. For the purpose of this model, discount rates of 12, 15, and 20 percent were used. NPV is calculated according to the formula:

$$NPV = \sum_{t=0}^{n_t} Net\ Cash\ Flow_t / (1 + rate)^t$$

where the time period, nt, is 20 years. Detailed capital costs, O&M costs and revenue calculations to support the project cash flow analysis are provided in Annex-5 (c).

6.1.10 Results of Base Case and Scenario 2

Key financial indicators for the Sherpur EZ are presented in Table 6.1.10-1 below in terms of US dollars including the NPV of the project under each discount rate, the project's IRR, equity IRR, average debt load, the maximum debt load in a single year, and the equity required to fund development.

Table 6.1.10-1: NPV, IRR, Debt and Equity for the Sherpur EZ (US\$ Million)

| | Base Case Scenario (Scenario-1) | Scenario-2 |
|---------------------------|--|-------------------|
| Project IRR | 17.27% | 20.67% |
| Project NPV @ 12% | 23.57 | 32.96 |
| Project NPV @ 15% | 8.47 | 17.86 |
| Project NPV @ 20% | (7.79) | 1.60 |
| Equity IRR ²²⁹ | 27.78% | 40.18% |
| Equity NPV @ 12% | 32.72 | 40.97 |
| Equity NPV @ 15% | 21.06 | 28.84 |
| Equity NPV @ 20% | 9.12 | 16.23 |
| External Equity Required | 21.33 | 18.52 |
| Average Debt Balance | 26.51 | 23.88 |
| Maximum Debt Balance | 54.81 | 50.86 |

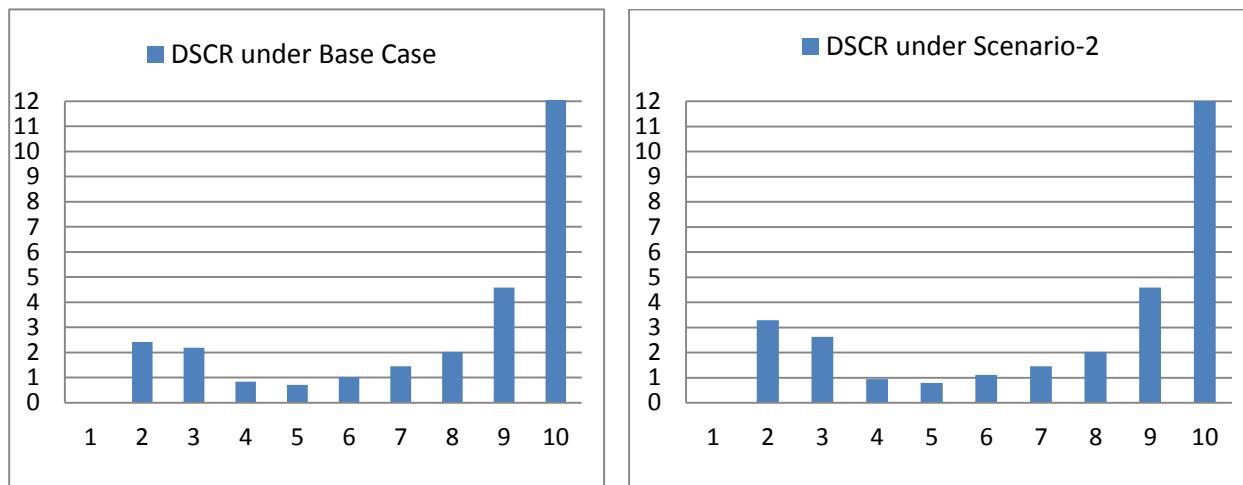
The project IRR implies that the IRR of 17.27% and 20.67% in the base case and scenario-2 respectively could be achieved by funding all capital expenditures through cash rather than debt. It

²²⁹ At a 70:30 percent debt-equity ratio.

can be said here that with the debt/equity ratio utilized by the Special Purpose Vehicle (SPV) Company, equity investors can obtain a rate of return (Equity IRR) higher than the project IRR in both scenarios, as the project IRR is above the interest rate on long-term commercial debt. Equity IRR comes to 27.78% and 40.18% respectively in the base case and scenario-2. Sherpur SPV Company's ability to repay its debt servicing obligations under each scenario is best shown by debt service coverage ratio (DSCR) defined in below that is calculated on annual basis (See figure 6.1.10-1).

$$\text{Debt Service Coverage Ratio (DSCR)} = \frac{\text{EBITDA}}{\text{Annual Debt Service Requirement}}$$

Figure 6.1.10-1: Debt Service Coverage Ratio



As shown in figure above, the Sherpur SPV Company does have an ability to repay its debt in either of the 2 scenarios. Typically, a bank would feel comfortable lending to a developer whose debt service coverage ratio (DSCR) remains above 1 throughout the debt repayment period.

6.1.11 Results of Simulation of Different Scenarios and Sensitivity to Capital Costs and Prices

The purpose of doing a simulation of different scenarios and sensitivity to the saleable lease price of serviced land and/or capital costs is to identify the critical factors responsible for failure of the viability of the EZ.

- Impact of Lease price reduced by 10% and EZ service fee reduced by 10% upon the IRR and equity IRR***

If the lease price of serviced land is reduced by 10%, the project IRR and equity IRR declines from 17.27% and 27.78% to 16.33% and 24.71% respectively in the base case scenario and from 20.67% and 40.18% to 19.43% and 34.13% respectively in scenario-2. The impact of reduction of the lease price by 10% coupled with reduction of the EZ service fee by 10% would reduce the project's IRR and equity IRR to 16.18% and 24.42% respectively in the base case, and to 19.27% and 33.77% respectively in scenario-2.

- ***Impact of Water Supply System being developed by the Government***

If the cost of the water supply system is borne by the government, the project IRR and equity IRR would increase to 21.57% and 39.29% respectively in the base case and 26.58% and 60.72% respectively in scenario-2. If the cost of the water supply system is borne by the government and private sector equally, the project IRR and equity IRR would increase to 19.29% and 33.05% respectively in the base case, and to 23.39% and 49.77% respectively in scenario-2. The impact of the water supply system being developed by the government, coupled with the reduction of the lease price by 10% and the EZ service fee by 10% would lead to a project IRR and equity IRR of 20.22% and 34.15% respectively in the base case, and of 24.72% and 50.96% respectively in scenario-2. Alternatively, the impact of the water supply system being developed equally by the government and the private sector, coupled with the reduction of the lease price by 10% and the EZ service fee by 10% would lead to a project IRR and equity IRR of 18.08% and 28.85% respectively in the base case, and of 21.79% and 41.53% respectively in scenario-2.

- ***Impact of Waste Water System being developed by the Government***

If the cost of the waste water system is developed by the government, the project IRR and equity IRR would increase to 20.21% and 35.61% respectively in the base case, and to 24.68% and 54.54% respectively in scenario-2. If the cost of the waste water system is developed by the government and private sector equally, the project IRR and equity IRR would increase to 18.70% and 32.49% respectively in the base case, and to 22.59% and 47.01% respectively in scenario-2. The impact of the waste water system being developed by the government coupled with the reduction of the lease price by 10% and the EZ service fee by 10% would lead to a project IRR and equity IRR of 18.94% and 31.00% respectively in the base case, and of 22.97% and 45.47% respectively in scenario-2. The impact of the waste water system being developed equally by the government and private sector coupled with the reduction of lease price by 10% and the EZ service fee by 10% would result in a project IRR and equity IRR to 17.52% and 27.53% respectively in the base case, and to 21.05% and 39.23% respectively in scenario-2.

6.1.12 Conclusions from Financial Analysis

The results of the financial analysis show that the Sherpur EZ is a financially feasible project for a developer &/or operator. Both in base case and scenario-2, the project generates an IRR much higher than the cost of capital (assumed to be 10-12% for such an infrastructural industrial development) — making it a good investment choice.

The Sherpur EZ project is suitable for a PPP in which the private sector is expected to contribute equity with soft commercial debt arrangements carrying partial guarantees of government, as it could provide a rate of return (equity IRR) of 27.78% in the base case and of 40.18% in scenario-2 to equity investors higher than targeted/benchmark equity IRR of 18-20 percent for investment. The conclusion made for the Sherpur EZ project is robust as the equity IRR in the base case remains above 24 percent even after considering either an increase of all costs by 10% or a reduction of lease price and EZ service fee by 10%. BEZA may provide support in terms of acquisition of land and arrangement of concessional commercial loans partially guaranteed by the GoB and financing the off-site infrastructure through public funding.

6.2 Economic Analysis

The objective of this subsection is to present the methods used and results obtained from carrying out the economic analysis of the Sherpur economic zone (EZ).

It answers the following questions: what is the economic internal rate of return (EIRR), based on a base-case involving a number of core assumptions on both the cost and the benefits side compliant with the requirements of the World Bank's comments on an earlier draft, and measured by using 'economic' prices. How robust are its IRRs in the face of negative economic shocks, whether related to benefits-contraction or cost-push, in compliance with the requirements of the terms of reference (TORs)?

6.2.1 The highlights of the methods used

At the very outset of this section, the highlights relating to the methods used in calculating the economic internal rates of return are presented.

All values in market prices were obtained from the JDI engineering team/calculations in financial modelling in Section 6.1 in the foregoing. Apportionment of all onsite project costs into net of relevant taxes and 'para-tariffs' (such as supplementary duties and the like), and government's tax yield has been done, with the latter being added to the government revenue from the implementation of the economic zone in question. Allowance has been made for subsidies provided by the government for a very tiny percentage of all capital outlays involving energy-sensitive inputs, assumed to be especially important for equipment or vehicle rentals.

All offsite costs are incorporated net of tax and para-tariff(s), with the difference that such taxes are *not* deemed to be government revenue. The details regarding the conversion of values as determined by using market prices are presented subsequently in this narrative.

The zone's benefits are assumed to equal the sum of

- (i) the direct economic benefits represented by all manners of sale of land;
- (ii) second-order benefits to the economy and/or society arising from sources of induced income growth outside the zone itself;
- (iii) a measure of dynamic, agglomeration, economies, arising from the fact of the inception of the zone, assumed to equal 2% of direct benefits;
- (iv) second-order benefits arising from major forms of transfers from the private-sector to the government by way of tax-yields at the borders or value-added tax (VAT), etc.²³⁰
- (v) the government revenue loss arising from companies relocating totally to the zone after its establishment and becoming eligible to enjoy a tax holiday (whereas they would not be tax-exempt were they to remain outside the zone) is also taken into account.

The Government's exchequer is assumed to gain revenue arising from (i) the issuance of registration rights by new start-up companies; (ii) the payment of fees for renewing trade licenses by new start-up companies; (iii) incomes taxes paid by employees of new start-up companies; (iv) company income taxes paid by new start-up companies. Estimates to be made wherever necessary in this context were made in consultation with Bangladesh Export Processing Zones Authority (BEPZA).

²³⁰ To reiterate, all off-site capital costs enter into our calculations net of relevant taxes and 'para-tariffs'. The keyword is 'relevant'- the average combined tax and para-tariff rates on "tradables" are assumed to be 22%.

The policy and institutional framework conditioning the formation of prices

The pricing of investment goods has an abiding influence on what building the EZ will cost. The prevailing policy and institutional framework, within which such pricing takes place naturally, influences the price determination process. It is therefore necessary to introduce the policy interventions that shape the pricing of investment goods in the domestic markets, especially relative to their international or border prices. Three strands of policies will be seen to inform this discussion, namely, the nominal protection policy pursued by the government; the exchange rate policy pursued by the Bangladesh Bank; and the policy of (modest) subsidization of various kinds of fuel.

The following policy interventions drive a wedge between domestic prices of goods and their opportunity costs to the society.

- The border taxation regime.
- Second, the on-going management of the float of the Taka using Bangladesh Bank's interventions in the US Dollar exchange-rate markets. The Taka remains slightly over-valued. According to recent research published by BIDS analysts Drs. Hossain and Ahmed (2009), Taka is overvalued by about 3%. That means that the standard conversion factor (SCF) which is usually used to convert financial prices of largely non-tradable production goods and services would have the value of $1/(1 + .03)$ or 0.97.
- Both policies raise the unit costs to domestic users of imported goods, raw materials, parts, and components, and harbor a well-known bias against exports. Both policies raise domestic prices higher compared with their 'social opportunity costs.' For the most part, the users of tradable inputs and resources are implicitly taxed: they pay prices which overstate the overall economy's opportunity costs at the margin. There is then a need to apply a downgrade to the financial costs of implementing investment projects to obtain parity with the 'economic prices.' It is necessary to find out conversion factors to complement the SCF found in the earlier paragraph.
- On the other hand, Bangladesh subsidizes the use of diesel, petrol, and natural gas and electricity in certain uses. Fuel or interest-rate subsidies pull in the opposite direction, warranting a scaling-up of the financial costs in economic analysis. We make an appropriate allowance for this fact in the economic analysis to follow.

Besides policy interventions, institutional rigidities matter to the pricing of primary factors of production, such as unskilled-worker labour input. Wage-setting typically allows certain degree of influence of *institutional factors*. Market wages in construction or manufacturing do not clear the market. The adjustment between the demand for and supply of labour don't really push the market wages rates to the 'equilibrium' wage rate. The equilibrium wage rate is, by definition, the wage rate that will drive the unemployment rate to zero, signalling the achievement of full employment. Under those circumstances, market wages overstate the opportunity cost of hiring people to the society. A correction on this score would be necessary in an economic analysis.

The border-taxation regime

Customs duties (CDs) levied in Bangladesh range from between 0 and 5 per cent on primary commodities and raw materials, to intermediate rates of between 10 and 15% on parts and components, finally to rates that equal or exceed 25%. The diversity of customs duties betrays the cascading characteristic of the structure of protection found in many a developing country that is evolving through cycles of import-substituting industrialization. Within the given broad grouping of Harmonic-systems (HS) codes, higher CDs are levied on import substitutes that are the subject of strong producer interest, whether actual or perceived, of domestic manufacturers than elsewhere within the HS grouping.

When imports arrive at the Chittagong port, they carry with them a *cost & freight* (C & F) tag, which typically have been foisted as a result of *pre-shipment inspection*---a service that can sometimes be bought into by the importers. If the customs authorities accept the PSI-induced C & F valuation as legitimate, a 1% charge over and above the C & F unit valuation is triggered preparatory to the assessment of customs duties payable. However, the import trade is stigmatized by an allegedly long-standing and previously wide-spread practice of *under-invoicing* of C & F costs as an instrument of shielding oneself from CD liabilities. The customs authorities very often brush aside the PSI results, and resort to their own assessment. When this happens, then the 1% charge of the customs duty on account of the PSI is waived, and the unit assessed value becomes the one and the same thing as the unit C & F value as assessed by the customs. Regulatory Duty (RD), Supplementary Duty (SD) and value-added taxes (VAT) are three additional levies upon imports. Even though VAT belongs strictly speaking to the category of indirect taxes and not border taxes, it is so ubiquitous that it is convenient to cluster it along with the RD and SD. Then there are para-tariffs, to be covered below. The total tax incidence, which is closely related to the nominal rate of protection (NRP), is in fact typically much higher compared with customs duties, because the supplementary duties and the para-tariffs raise the actual tax incidence considerably more.

The RD rate for FY2012/13 was 5.0% applied almost uniformly on all products subject to the top rate of 25%, thus making the effective top customs duty (CD) rate to be at least 30%, when supplementary duty (SD) is applied. The base for computation of RD is the same as CD, i.e. assessable value (AV) of imports. For all practical purposes, RD is an additional CD applied on all goods subject to the highest CD rate of 25%. Historically, RD has been applied intermittently, having been eliminated in some years in response to the requirement for simplification of the tariff structure under the World Bank's budget support facility, Development Support Credit, but remerging once the obligation was no longer binding.

Supplementary Duty (SD) was introduced in 1991 under the VAT Act, and was meant to be a trade-neutral tax. However, increasingly it has come to be applied in a non-neutral fashion, i.e. it is not applied equally on imports as well as domestic sales. Indeed it has become an expedient instrument of protection through its differential application (higher rates on imports; lower or zero rates applied to import substitutes). The VAT authority also issues exemptions on SD through SROs, betraying the discriminatory nature of the intervention. SD was applied as a percentage of "assessable value" (AV) but, from 1997-98, SD is levied on the basis of duty paid value (assessable value plus customs duty plus regulatory duty).

We estimate that the average total tax incidence (TTI) for tradeable capital costs applicable for Sherpur calculations is 128%. This is a result of central importance.

Any reasonable analysis of an investment project warrants calculating internal rates of return (IRR) using economic prices. To be systematic, it is necessary to know beforehand the *structure of investment costs in gross fixed capital formation*. This is because the relative share of labour versus non-labour varies a great deal across different kind of investment activities. Site clearing and dredging, will have very different composition compared with works involving reinforced concrete casting (RCC), and RCC will have very different composition of tradable versus non-tradable investment goods. The spending data needs to be disaggregated in terms of its components because the motivating interventions that evaluate the various conversion factors differ from one kind of tradable investment good compared with another. In this study, all financial-price capital cost estimates have been broken into a five-way disaggregation--- 'labour', 'non-tradable construction', 'tradables', 'rentals' and finally 'financial overheads'. The weight for each such category was obtained in coordination with consultants, in the know, to the World Bank on this project. Conversion factor for labour at Sherpur site was calculated at 0.95. The tradable component of investment outlays was downgraded by good-specific conversion factors whose values (relative to 1) were pivoted by the value(s) of the total tax incidence (TTI). The TTIs themselves are the sum-total of both levels of tariff (customs duties, regulatory duty, supplementary duty and the para-tariffs). Para-tariffs are represented by advance income taxes, VAT and two other specimens. Some of the statutory border-taxes are

applied on *ad valuation* basis that incorporates compounding. Some of the para-tariffs also involve a valuation-base that involves compounding.

Our estimates of nominal rates of protection (NRP) build on the estimated TTI, but in addition, measuring them to equivalent values for the Sherpur EZ by taking into account what it will take to transport tradable goods from Chittagong port to the Sherpur project site. Our NRP estimates are therefore specific to the EZ site. Finally, for non-tradable capital and maintenance costs and other non-tradable but non-labour costs, we use the assumption that the shadow exchange rate factor is 1.03. To reiterate, the associated SCF is estimated to be 0.97.

Likewise, when it comes to costs other than capital ones, such as the organization & management (O & M costs), we took the same componential approach of disaggregation. This is because the non-capital cost is a hodge-podge, too, and comprises (i) wages and salaries paid to blue-collar and white-collar workers, (ii) marketing and promotional costs; and (iii) other odds and ends.

The conversion factors in Table-6.2.2-1 are obtained by dividing unity by an expression equal to 1 plus the total tax incidence expressed as a fraction. Roughly speaking, the TTI can be expressed as equivalent to the nominal rate of protection (NRP). In adjusting downwards the market-price spending on all tradable capital costs, whether on or off-site, arising from outlays on various investment goods, we multiply the former by 0.78. We calculate the applicable average value of the TTI to 128%. We obtain the value of 0.78 by dividing unity by 1.28. The only case where the conversion factor is greater than 1 is subsidized sources of energy - there is still a modest subsidy on most kinds of fuel used in running machinery and transport equipment, which are mostly rented.

For all capital costs of a non-tradable nature (such as on account of locally-procured construction items, various kinds of rental payments, etc.) the incidence of VAT is about 4%, with proceeds from VAT being appropriated as indirect benefits of the zone. The rest is assumed to equate the economic cost.

O & M costs were divided up into two broad categories: personnel costs, and others. For the first, the conversion factor used to convert market values into their economic counterparts is 0.95. The resultant values were multiplied further by 0.97 before retention in our calculations. The conversion factor for the second ('others') is 0.97, this being the standard conversion factor.

Table 6.2.1-1: The conversion factors used for tradable components of capital outlays

| | Tradable goods | | Tradable goods | |
|---|--------------------------------|-------------------|--------------------------------|-------------------|
| | Names of the production inputs | Conversion factor | Names of the production inputs | Conversion factor |
| 1 | Cement | 0.511 | Electrical sub-stations | 0.765 |
| 2 | PVC pipes | 0.712 | Power-distribution lines | 0.712 |
| 3 | Mild-steel (MS) rods | 0.712 | Water-treatment plant | 0.765 |
| | | | Waste-water treatment plant | 0.765 |
| 4 | Galvanized iron wires | 0.712 | Shadow wage rate factor | 0.95 |
| 5 | Transformers | 0.511 | Shadow Exchange rate factor | 0.97 |
| 6 | Pipes carrying natural gas | 0.712 | Fuel conversion factor | 1.098 |

Sources: World Bank Study Team, 2014.

Benefits evaluation

Our calculations make allowance for the following static benefits:

- Revenue from selling developed industrial and commercial land.
- Second-order benefits to the economy and/or society arising from sources of induced income growth outside the zone itself;
- a measure of dynamic, agglomeration economies arising from the fact of the inception of the zone;
- second-order benefits arising from major forms of transfers from the private-sector to the government by way of tax-yields at the borders, value-added tax (VAT), etc.²³¹
- The government revenue loss arising from companies relocating totally to the zone after its establishment and becoming eligible to tax holiday (whereas they would not be tax-exempt were they to remain outside the zone) is also accounted for.²³²

As well, the calculations will make allowance for the following dynamic benefits attendant upon the formation of the EZ:

- The gains in technical and economic efficiency within the EZ and its attendant diffusion to the rest of the economy through technology spill-over.
- Encouragement of entrepreneurship.

Technical efficiency is about producing goods at leaner unit costs measured physically (such as in man-hours, or tonnes of iron ore mined). Economic efficiency additionally brings prices into the fray. If the EZ is able to attract one or more *practice-leaders* into tenancy, and if tenant-enterprises are well-integrated in the domestic economy, the EZ is likely to create waves of technology spill-over benefit to the rest of the country. The occurrence and the fall-out from such a spill-over effect is usually an empirical question.

When it comes to evaluating the benefits stream, we mostly take the same benefit stream that the financial model takes, that is, without probing further into whether the tenant represents an act of FDI or an investment by a national investor. We recognize two broad kinds of benefits; (i) the direct benefits; and (ii) the second-order benefits. The category (i) comprises benefits that will stem from selling/enforcing, as appropriate:

- the zoned land that the EZ will render saleable;
- the residential and commercial land whose supply will grow;
- a tenant user-charge;
- a charge for piped water;
- a charge for the services of the waste-water treatment plant;

Second-order benefits are assumed to arise from two broad sources that have already been mentioned.

²³¹ To reiterate, all off-site capital costs enter into our calculations net of relevant taxes and ‘para-tariffs’. The keyword is ‘relevant’ - average combined tax and the para-tariff rates on tradables is assumed to be 22%.

²³² We have accounted for direct employment effect due to the zone as one element of our calculation of second-order benefits. We have not included our team’s estimate of indirect increases in employment levels in the economy. As well, we have not made any effort to claim the alleged benefit on account of an incremental ‘export-penetration’ benefit. This actually adds credence to our estimates of EIRR being conservative underestimates.

Taking into account other static benefits of an EZ

Some enterprises that move to the EZ will be those that have already been in existence, who plainly re-locate to the EZ site in search of agglomeration benefits, technology spill-over benefits, and the benefits of skills-pooling. Unless better recruitment terms and social protections were to be wrung from the employers on the EZ, the act of establishment through re-location means that *incremental employment due solely to the creation of the EZ is zero*. The remainder of the enterprises on the EZ will be start-ups going in. For this second category, the moot issue is whether the marginal product of this bunch of workers in their alternative employment is zero or not. However, one thing that is sure is that the direct value-added that tenant-enterprises generate on the EZ cannot be attributed in its entirety as a benefit of the EZ. This is because of the following:

- The assumption that the entire work-force of start-up enterprises that find employment on the Sherpur economic zone (EZ) has a marginal product of zero in the alternative, ‘without-Sherpur EZ’, situation. Many of the textile mills on the Sherpur EZ will be dealing with complex, high-value, manufacturing processes with more intricate requirements that would require more customized machine-handling. The test of skills that this implies for not only production workers ‘in the trenches,’ but also for the line-supervision and quality-control staff, is very demanding. The significantly greater skill requirements of high-end, high-value, apparel production are an open secret. Clearly, the recruitment of both the white-collar and the blue-collar workers by the firms that become tenants on the EZ will heavily factor in skills of the applicants. Clearly, skills, prior job-references, and strong performances in the job interviews will drive recruitment. These workers would have been working at some other firms in the ‘without-project’ situation. Their marginal product in that alternative employment would decidedly be positive, not zero. The issue is - what were the ‘net’ benefits from employing workers on the EZ. Only the *additionality* should be ascribed as a benefit of the EZ.
- Some of the re-locators into the EZ will have left behind their own manufacturing premises on rented space elsewhere in the economy in favour of their industrial leases on the EZ. Most of the value-added per worker they would typically generate on their new premises would be carried over from their incarnation in the ‘without-Sherpur’ EZ situation. Of course, compared with the rest of the economy, there would be capital-deepening, represented by more modern machinery being brought into use. There would be more attention paid to total quality-control, reducing wastages. All of that is likely to raise labour and capital productivity of the workers in the zone. As a result, the value-added per worker in the new situation in the Sherpur EZ would be expected to out-perform what existed in the ‘without Sherpur’ situation. This additionality will be included in the benefits of the EZ.
- New evidence suggests the appearance of relative scarcity of labour in rural areas of Bangladesh compared with urban areas. The evidence involves quite sharply divergent real-wage trends across both a rural-urban divide and a gender-divide (IFPRI, 2012). Rural real wages have outperformed urban real wages since about 2005. Women’s real earnings have out-grown the corresponding male earnings, on a Bangladesh-wide basis---erasing a considerable part of the gender-gap in earnings. Madani’s observation (1999), “for workers, the alternative to EZ employment is often unemployment, underemployment, or a return to village subsistence life.” This is a caricature for Bangladesh. For a female worker employed by one of the textiles factory, according to a report published in the mass-circulation daily *The Prothom-Alo* in August 2013, the alternative is most probably an unregistered partnership among several such female returnees to a peri-urban location in Syedpur in Nilphamari district that sews apparel for sale across the border. That alternative is almost certainly not returning to village subsistence life. We would do well to disabuse ourselves of some pointed misperceptions of alternatives open to female workers in Bangladesh’s textiles industry;
- What percentage of the tenant enterprises are mere re-locators? The minimum size of plots prospectively coming to the market in Sherpur happens to be one hectare, or about 2.471 acres. Most of today’s medium or large-scale manufacturing enterprises in Bangladesh started off on

more modest land-areas than that. A majority of the tenant-enterprises would be of the ‘re-locator’ variety. This would redound to the validity of the argument, previously made, that the additionality of second-order benefits to be attributed to the EZ *per se* should be less than 1. Perhaps, this ought to be deemed to be well less than one.

Agglomeration Efficiencies

The TORs speak of gains in allocative efficiencies. Typically, allocative inefficiencies are caused by mis-pricing of capital or labour. Because the various incentives accorded by the BEZA will very largely leave the factor pricing regime intact, the EZ will not have any perceptible effect upon any prevailing allocative inefficiencies on the ground. However, EZs will trigger agglomeration efficiencies that will likely be notable initially and fairly powerful in the long-run.

These efficiencies will stem from:

- labor market pooling--- skilled laborers entering the area and are able to lower the cost of doing business through stimulating the informal exchange of capabilities and practical knowledge. The more firms there are in this area, the greater the competition is to obtain workers and therefore results in higher wages for the workers.
- facilitating access to specialized goods and services provided for the clustering firms, and,
- most importantly, from technological spill-over effects.

The agglomeration benefits of an EZ are undeniable, even if it requires a great deal of reliable data to accurately gauge their extent. Despite an extensive search on the Web, we have not been able to locate a single study containing an actual estimate of the percentage positive effect that owed to a living special economic zone or an industrial park. Anecdotal evidence about the quite palpable favorable effect that the coming of Suzuki to India had on the techno-managerial efficiency of the automotive operations in India exists, but that happens to be true of India. In Bangladesh, no similar evidence, anecdotal or otherwise, seems to exist to our knowledge. We assume that agglomeration economies translate into a fixed step-up of roughly 2% over and above the direct economic benefits (not counting the incremental benefits from the stream of wages and salaries paid on the EZ).

Benefits from enhanced company and personal-taxation

The tax holiday accorded to the investors in the Sherpur economic zone has been taken to be 10 years. The effect of the tax holiday has been thus calculated. In Sherpur, the first batch of sales of industrial land takes place in 2017. We allow two years for a gestation lag between land sale and the investor’s company becoming a ‘resident’ for purposes of profit taxation. Therefore, calculation of the effect on tax-holiday on government’s tax-yield for new start-up firms who set up operations on the economic zone begins as of 2019 for Sherpur. The Government’s tax yield registers a positive entry on account of new start-up firms in 2029. That said, companies that relocate entirely from outside the zone into the zone have been treated differently, as required by the World Bank. In this particular case, these companies were assumed to be paying taxes on profits. After moving to the zone, they become profit-tax exempt for the first 10 years. Profit taxes that they were paying before moving to the zone have been deducted from the government’s tax yield.

A certain percentage of the white and blue-collar workers in the new start-up enterprises will of course contribute to the public revenue from taxes to be imposed on personal incomes above the threshold of taxability of such incomes. These additional benefits are also accounted for, on informed basis, in the calculation of EIRR.

The economic internal rates of return (EIRR) are presented in four definitive scenarios, presently narrated.

The effect of the gains in the agglomeration efficiencies is inserted in the base-run iteration, to the describing of which we now turn.

The base-run: In the base-run, we cluster all categories of costs---including land, whether privately or publicly owned. To reiterate, all outlays and benefits have, ultimately, been corrected for the shadow-exchange rate being greater than 1, by using Standard Conversion Factor (SCF) of 0.97. We assume that the entire regime of the border-taxation is binding on the level and structure of domestic prices, and that there is no ‘water-in-the-tariff’. We also assume that the Standard Conversion Factor (SCF) to be used is 0.97. (This is also the assumption underpinning the other subsequent run).

Iteration-1: In this set of iterations, there will in fact be **three** sub-iterations. In the first of these sub-iterations we assume, as offered in the JDI proposal, a 10% ratcheting of all capital and other costs. In the second of these sub-iterations, we assume a 10% roll-back of all benefits while costs stay the same. In the final of these sub-iterations, we assume both a 10% roll-back of all benefits while costs gain by 10%.

The Internal Rates of Returns

Table 6.2.1-2 presents the IRRs in economic prices.

Table 6.2.1-2: Presenting the Economic Internal Rates of Return, and Economic Net Present Values of the Sherpur Economic Zone

| Iteration | Assumptions underpinning the iterations | EIRR (%) | ENPV (r=0.12) (US \$ million) | ENPV (r=0.15) (US \$ million) | ENPV (r=0.20) (US \$ million) |
|-------------|---|----------|-------------------------------|-------------------------------|-------------------------------|
| Base-run | All costs clustered, first- and second-order benefits all included | 27.7 | 82.2 | 54.9 | 25.1 |
| Iteration-1 | Baserun, modified by 10% gains in costs | 24.95 | 73.7 | 46.8 | 17.6 |
| Iteration-2 | Baserun, modified by 10% roll-back in benefits | 25.4 | 70.6 | 45.3 | 17.8 |
| Iteration-3 | Baserun, modified by 10% gains in costs <i>plus</i> 10% roll-back in benefits | 22.9 | 62.1 | 37.2 | 10.3 |

Note: The Standard Conversion Factor (SCF) underlying the computations in the table is everywhere equal to 0.97; the Shadow Wage Rate Factor is everywhere 0.95.

Source: World Bank Study Team

Major conclusions:

- The Sherpur Economic Zone is economically justified as it has a base-run EIRR of 27.7%.
- If all costs were to gain, and if those gains were allowed to work their way through to make a difference to the EIRRs based on base-run, the EIRR was seen to come down to 24.95%. Whereas if costs held but benefits were squeezed downward by 10%, the EIRR was found to be 25.41%.
- Finally, when both cost-push and benefits-contraction both come to pass simultaneously, the EIRR is found to fall to 22.87%. That said, the EZ at Sherpur remains economically viable even in the midst of the combination of benefit-contraction and cost-push.

Annex

ANNEX 1

PRESENTATION SLIDES FOR THE THIRD STAKEHOLDER WORKSHOP AND SUPPORTING DOCUMENTS

Presented by – Dr. Shoichi Kobayashi
Date – 23 February 2013
Location – The Westin, Dhaka

Workshop on Draft Final Report of the Feasibility Study of Three Proposed Economic Zones (Sherpur of Maulvibazar District and Mirershorei and Anwara of Chittagong District).

PROGRAMME

- 09:30 : Registration
- 10:20 : Guests take their Seats
- 10:25 : Arrival of the Chief Guest and Special Guests
- 10:30 : Recitation from the Holy Quran
- 10:35 : Welcome Address by Mr Fakhrul Islam (Secretary in Charge), Executive Chairman, BEZA.
- 10:45 : PowerPoint Presentation on Draft Final Reports by Dr. Shoichi Kobayashi, Team Leader, Feasibility Study Team.
- 11:30 : Address by the Special Guests.
- 11:45 : Address by the Chief Guest Engr. Mosharraf Hossain, MP, Honourable Minister, Ministry of Housing and Public Works.
- 12:00 : **Tea/Coffee Break**
- 12:10 : Statement by the Representative from the World Bank
- 12:20 : Open Discussion on Draft Final Reports
- 13:25 : Address by Dr. Mashiur Rahman, Adviser to the Honourable Prime Minister, Economic Affairs.
- 13:30 : Vote of Thanks by Dr. Md. Nurannabi Mridha, Project Director, BEZA Project.
- 13:45 : Closing Session & Lunch

Technical Advisory Services for Feasibility Studies for Economic Zones (3rd Stakeholders Workshop)

23 February 2014

Dr. Shoichi Kobayashi, Team Leader
PSDSP (World Bank) – BEZA Project



Background & Objective of EZ

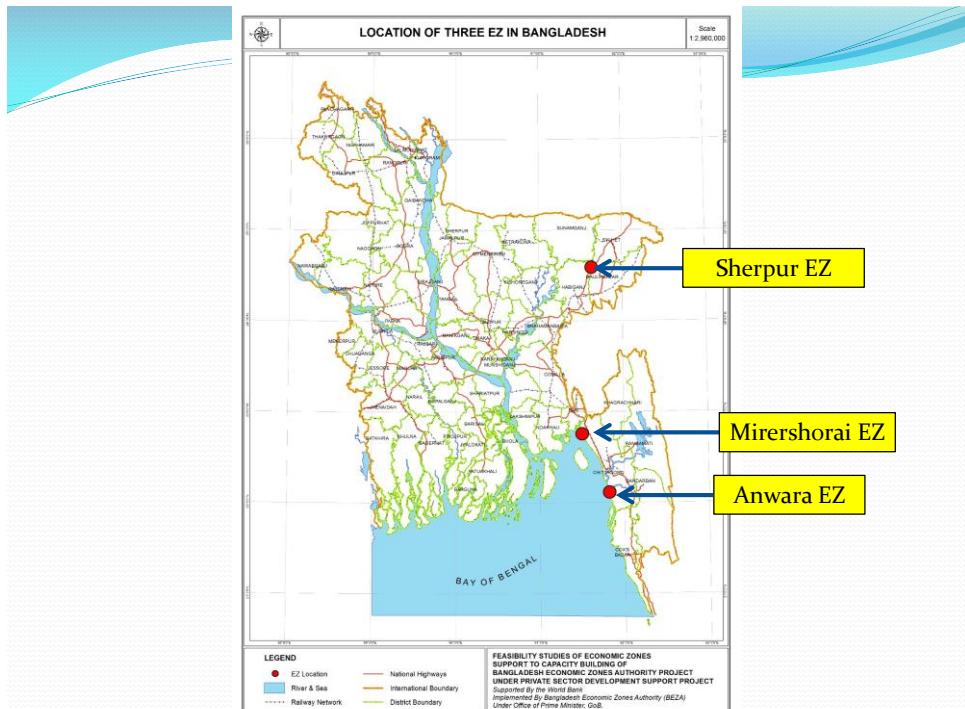
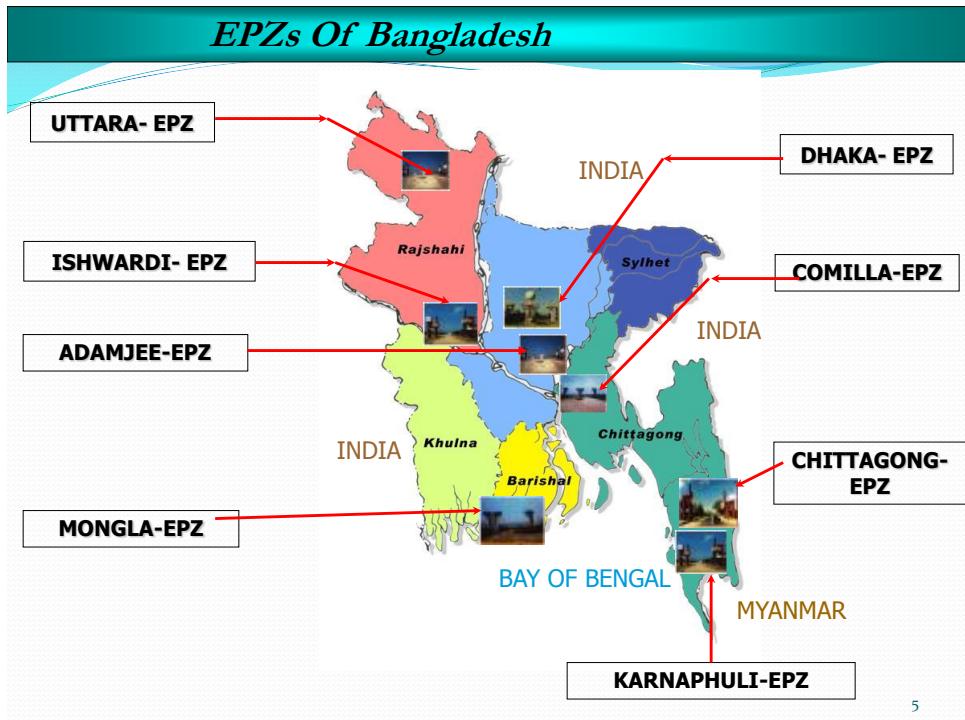
1. Bangladesh Economy is growing well at 6.3% in the Past 5y.
2. However, need to accelerate GDP growth to 8% -10% to reduce the poverty level from 40% now to 15% and targeting to be a Middle Income Country by 2021 .
3. In order to achieve the above goals, private investment must increase to 32% of GDP from just 19% now.
4. Economic Zone (EZ) program is aiming to achieve the above goals by attracting private investment (FDI & DI), accelerating GDP growth & creating 10 millions of new employments .
5. EZ Act was approved in August 2010 and now WB & DFID is supporting this EZ Master Plan Study as pilot EZ Projects.
6. Three EZs: Sherpur, Mirershori and Anwara are selected by BEZA as pilot EZ projects under PPP Scheme.

Type of Economic Zones in Bangladesh (Only 8 EPZs are in operation now- Needs More!)

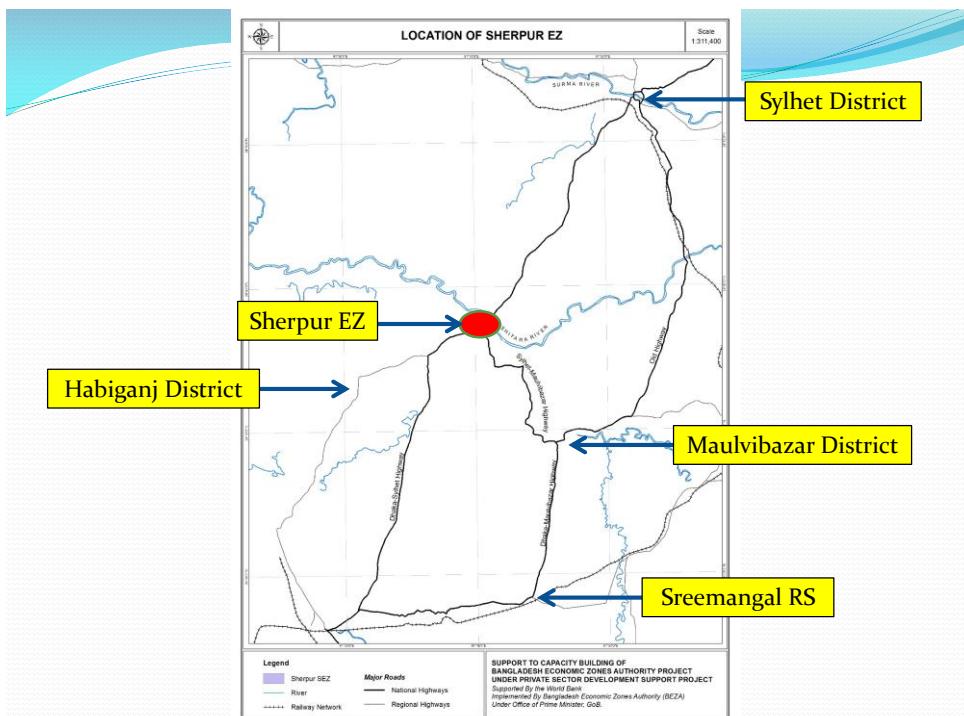
| Type of Industrial Park | Characteristics |
|---|---|
| 1. <u>Export Processing Zone (EPZ)</u> (8 EPZ: 2,572 Acre: 1042 hectare 354,722 Employees (2013): Nearly Sold out! Only 7% (20 hectare) at three remote area EPZs are still vacant. | 1. Export Oriented Industry (100%) 2. BEPZA Administration Office 3. One Stop Service (OSS) 4. 5 EPZs are already full & only 3 remains : but 93% are already filled! Net 900 hectare |
| 2. <u>Private Export Processing Zone (PEPZ)</u> (Korean EPZ) | 1. Export Oriented Industry (100%) 2. BEPZA Administration Office 3. One Stop Service (OSS) 4. One KEPZ is partially operating |
| 3. <u>Economic Zone(EZ) Program (BEZA)</u> (Just starting with a big hope: May start from this year 2014 using PPP scheme) | 1. Both Export Oriented Industry & Domestic Oriented Industry 2. BEZA Administration Office setup 3. One Stop Service (OSS) 4. Ready to start soon. |
| 4. <u>Industrial Estate (IE)</u> (Domestic Industries for SME in nearly each major district) | 1. Domestic SME 2. BSCIC Office 3. Small IP in nearly all provinces accommodating SME. |

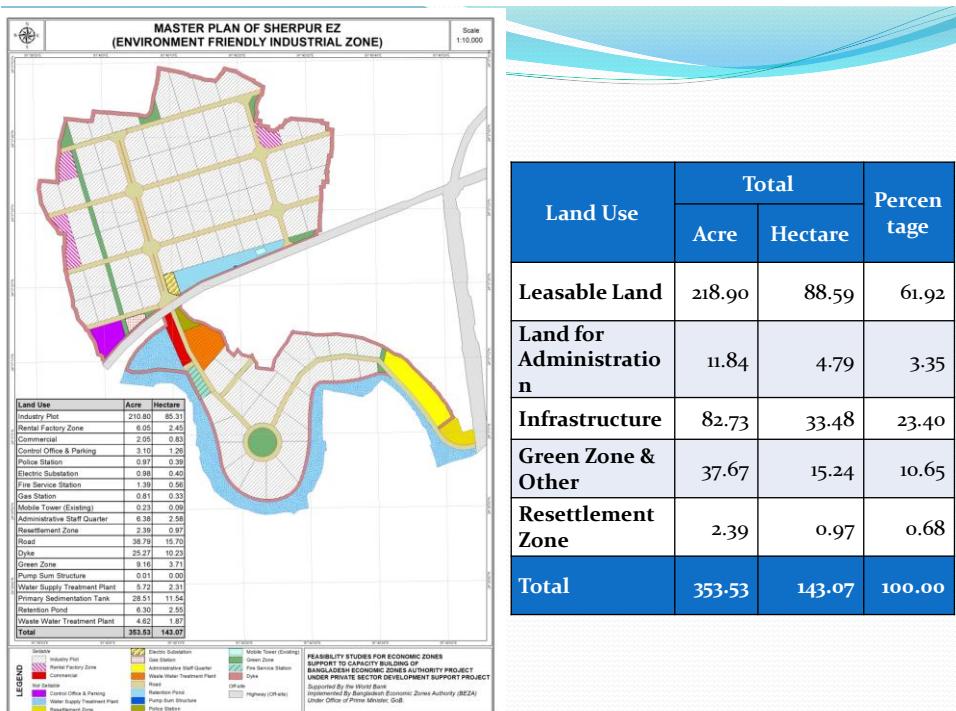
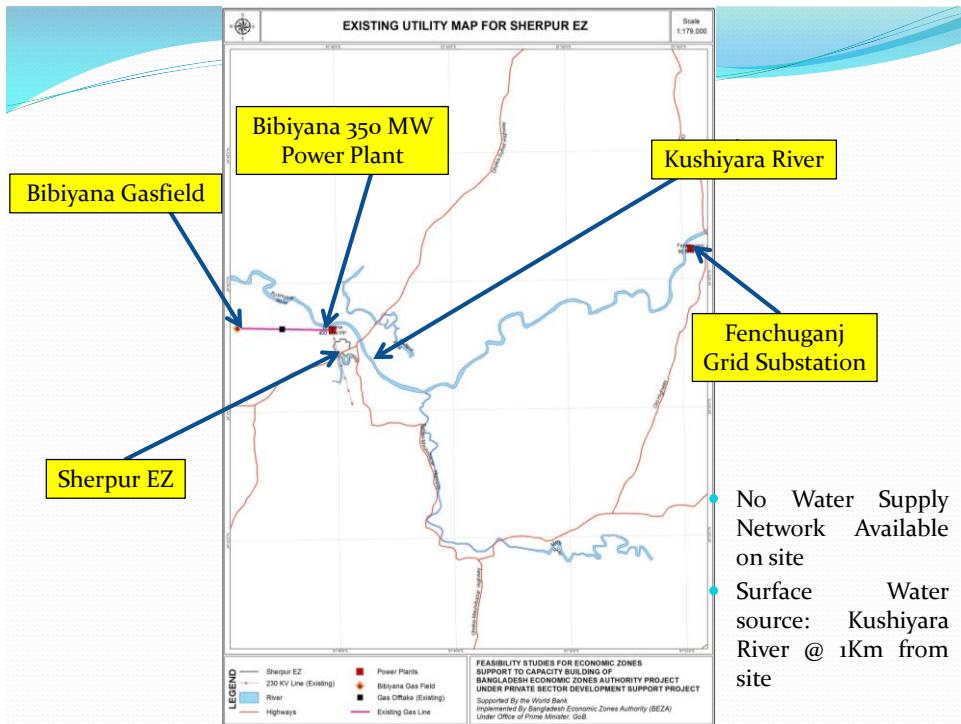
BEPZA History & Current Condition (93% is Occupied & Only 74 Acres Remain !)

| EPZ | Year Area (Ac) | Plots | Occupied Period | Remaining Plots |
|----------------|-------------------------|-------|----------------------------|--------------------------------------|
| 1. Dhaka | 1993 361 | 442 | 1993-2008 | 0 |
| 2. Chittagong | 1983 453 | 502 | 1983-2005 | 0 |
| 3. Comilla | 2000 267 | 213 | 2001-2011 | 0 |
| 4. Adamjee | 2006 293 | 234 | 2006-2013 | 0 |
| 5. Karanaphuli | 2006 222 | 254 | 2006-2011 | 0 |
| 6. Uttara | 2001 212 | 202 | 2001- | 13 (6%) |
| 7. Ishwadi | 2001 309 | 158 | 2004- Original Occupied | 116 (2 nd Phase) (73%) |
| 8. Mongala | 1999 255 | 124 | 2008- | 18 (15%) |
| Total | 2372 (Gr) 1779 (Net) | 2103 | 1956 (93%) 147 (7%) | 147 (74 Ac) |



SHERPUR ECONOMIC ZONE





Sherpur: Consultation with Stakeholders



Sherpur: Site



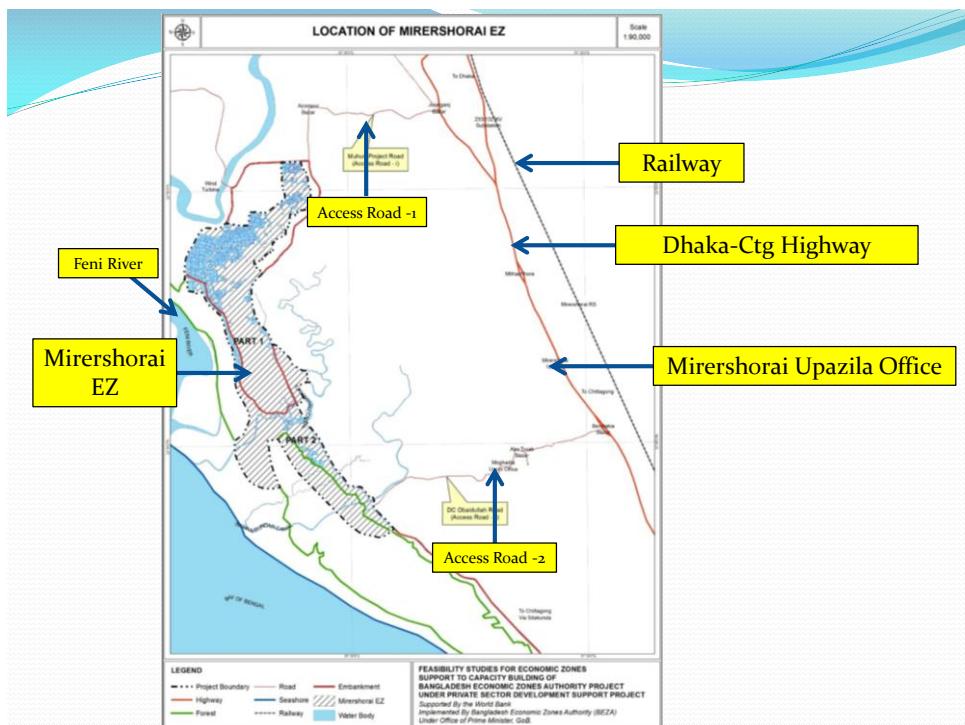
Sherpur: Sreemangal Railway Station

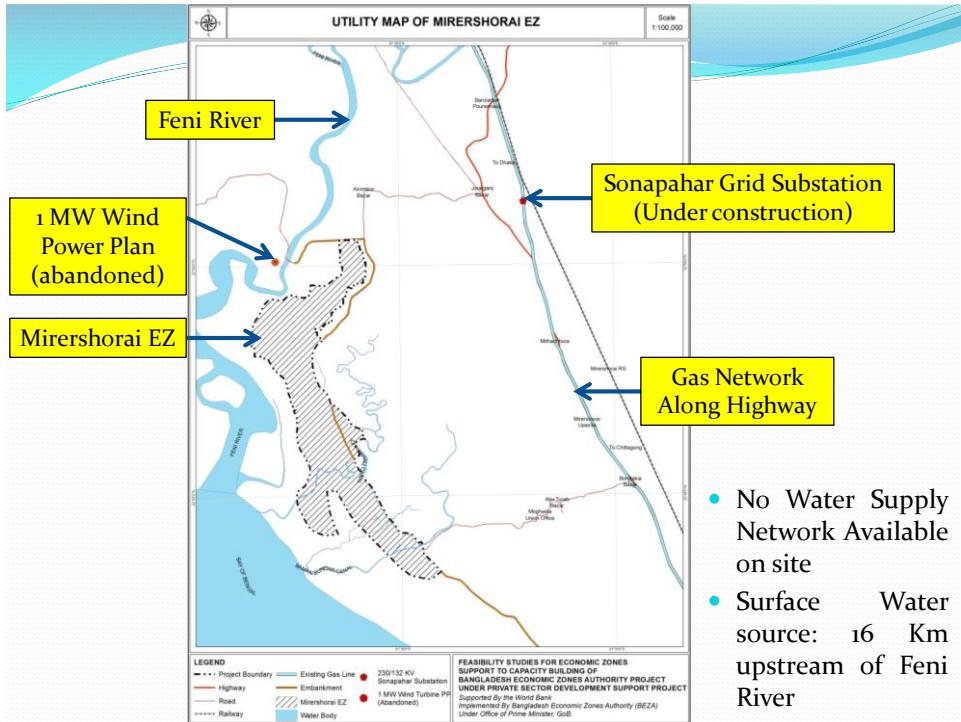


Profile of Sherpur EZ

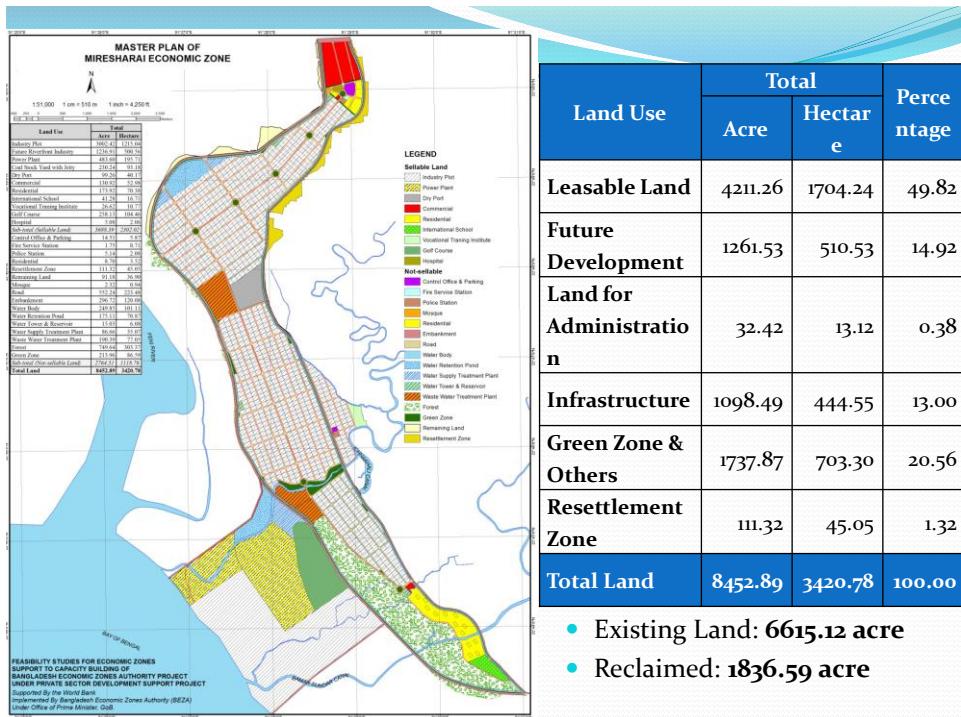
| Item | Detail Comments |
|----------------------------|---|
| Access & Utility | 55 Km Airport, 435 Km to Chittagong Port and 208 Km to Dhaka |
| Land Gross & Net | Gross Area: 143.09 ha and Net Area for Sale: 88.59 ha |
| Type of Industry | Textile, Ceramics, Pharmaceuticals, Food processing |
| Price of Land Lease | \$50 per Sqm |
| Cost for On & Off Site | \$ 82.87 million for On-Site and \$7.7 million for Off-Site |
| Financial & Economical IRR | Financial IRR Base Case: 21.13% & 26.44% for Case 2 Economical EIRR 47% |
| Competitiveness | Considering the current shortage of well equipped EZ, Sherpur EZ Power and Gas supply will be competitive. Benchmark Analysis indicates No 1 out of 7 Asian EZ. |
| Employment Creation | Employment creation is expected to be 40,706 workers |
| Expected Schedule | Construction start from 2016 and complete by 2019 |
| Market Demand | 169 ha (18 Firms) out of 103 Surveyed : Exceed Supply. |

MIRERSHORAI ECONOMIC ZONE





- No Water Supply Network Available on site
- Surface Water source: 16 Km upstream of Feni River



- Existing Land: 6615.12 acre
- Reclaimed: 1836.59 acre

Mirershori: Consultation with Stakeholders



Mirershori: Site



Mirershori: Access Roads



Access Road (i): Muhuri Project Road

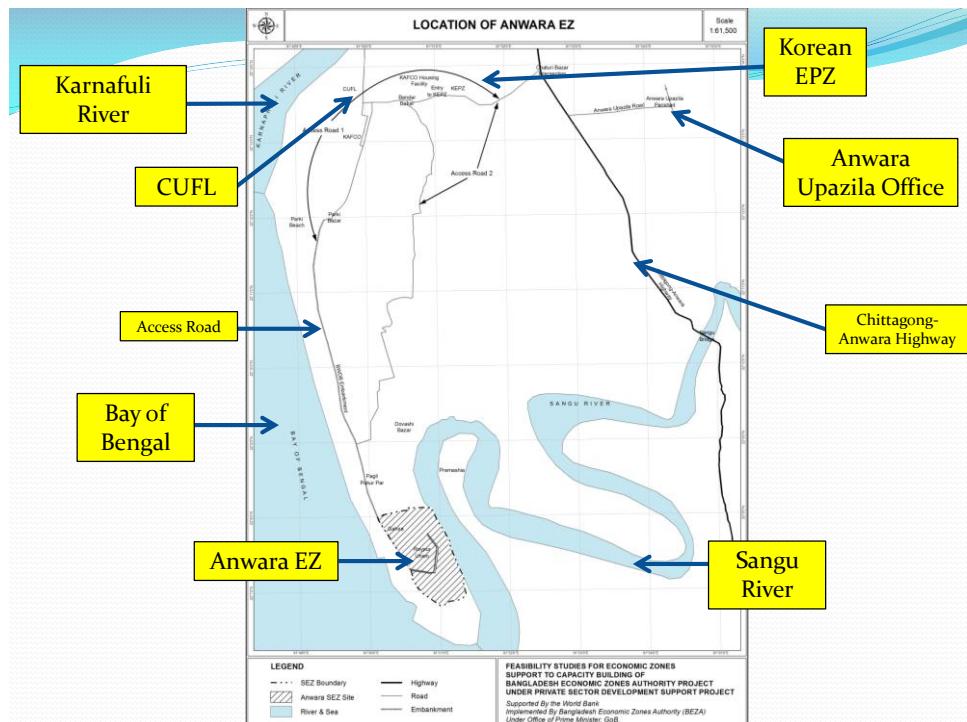


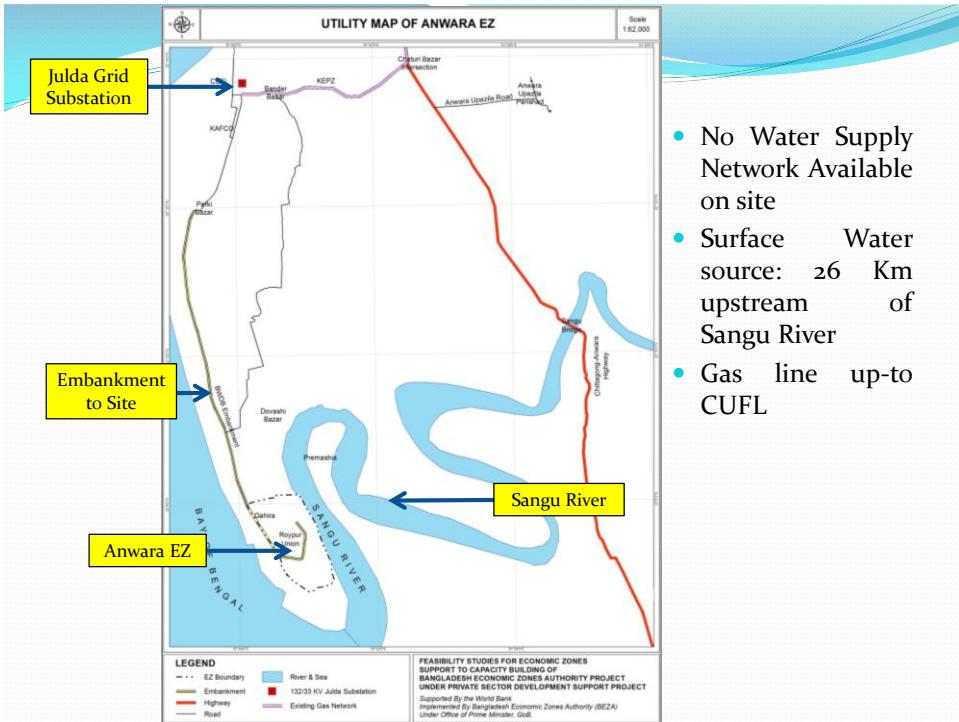
Access Road (ii): Abu Torab Bazar Road

Profile of Mirershori EZ

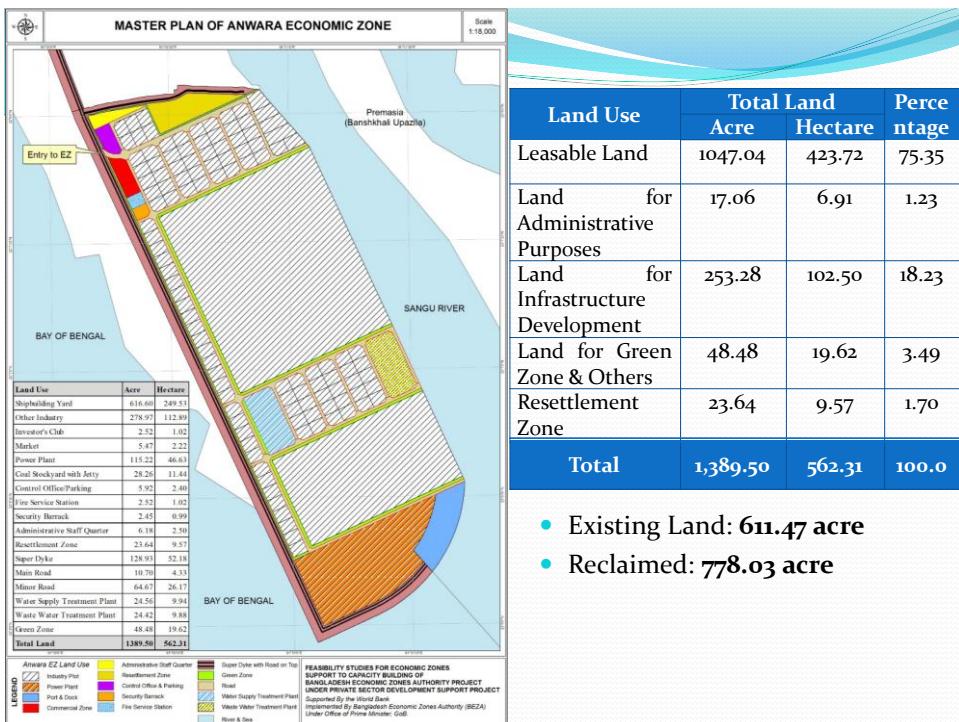
| Item | Detail Comments |
|----------------------|---|
| Access & Utility | 182 Km fm Dhaka, 66Km to Chittagong, 79Km Airport, 67 Km to Sea Port: Own Port & Coal Power (600MW) |
| Land Gross & Net | Gross: 3420 ha and Net Saleable Land: 1704 ha |
| Type of Industry | Garment, G. Accessory, Textile, Machinery Parts , Bike & Automobile Assembly later. |
| Price of Land Lease | \$50/sqm (2016-2020) \$70/sqm (2023-2024) \$80/sqm after 2024 |
| Cost : On & Off-Site | \$818 million for On-Site & \$29 Million for Off-Site |
| Financial IRR | Financial IRR 28.0% and Economic EIRR is 49.85% |
| Competitiveness | Along the Dhaka-Chittagong Corridor with own power & other infrastructure, Mirershori EZ will be competitive. |
| Employments | 578,751 Workers |
| Expected Schedule | Construction start from 2017 and Phase 3 will end 2025 |
| Market Demand | 275 ha (28 Firms) of 103; If include FDI and Universe : 10 times More ? 2750 ha which is likely to exceed the demand for 17-25. |

ANWARA ECONOMIC ZONE





- No Water Supply Network Available on site
- Surface Water source: 26 Km upstream of Sangu River
- Gas line up-to CUFL



Anwara: Consultations with Stakeholders



Anwara: Site



Anwara: Embankment & Access Road



Profile of Anwara EZ

| Item | Detail Comments |
|------------------------------|--|
| Access & Utility | 45Km to Chi.Port, 28Km to City and 46 Km to Airport W, Ws, Tel, Own Port and Power (300MW) |
| Land Gross & Net | Gross: 562 ha and Net: 423 ha |
| Type of Industry | Shipbuilding, Steel, Power plant, Leather Products, Auto Parts |
| Price of Land | \$60 - \$70/sqm |
| Cost | On-Site cost of \$172.87 Mill. & Off-Site cost of \$67 Mill. |
| Financial IRR & Economic ERR | Financial IRR 35.2% with 15% VGF Economic EIRR is 32.16% with 15% VGF |
| Competitiveness | Anwara EZ has advantage of Sea access directly able to attract the waterfront industries such as shipbuilding, steel and cement and supporting industries. |
| Employment Creation | 53,420 workers |
| Expected Schedule | Start construction from 2017 and complete by 202 |
| Market Demand | 170 ha (24 Firms) out of 103: actual demand may be 5-7 times. |

Summary of 3 EZ: Sherpur, Anwara and Mirershrai

| EZ and Item | Sherpur | Anwara | Mirershrai |
|-------------------------------|---|---|--|
| 1. Gross &Net Area | 143.0 ha & 88.6 ha | 562 ha & 423 ha | 3420 ha & 1704 ha |
| 2. Utilities | P, W, Ws, Gas, Tel | P, W, Ws, Tel, Jetty | P, W, Ws, Tel, Jetty |
| 3. Type of Industry | Textile, Ceramics, Pharmaceuticals, Food processing | Shipbuilding, Steel, Power plant, Leather, Auto Parts | Garments, Textiles, Machinery Parts, and Auto-industry |
| 4. Cost : On& Off | \$82& \$7.7 million | \$172 & \$67 Million | \$818 & \$29 Million |
| 5. Land Price/sqm | \$50 | \$50-80 | \$60-70 |
| 6. Financial & Economical Re. | FIRR 21.13% EIRR 47.0% | FIRR 28% wVGF EIRR 49.85% w VGF | FIRR 35.2% EIRR 32.16% |
| 7. Schedule Plan | 2016-2019 | 2017-2020 | 2017-2025 |
| 8. Employment | 40,706 workers | 53,420 workers | 578,751 Workers |
| 9. Competitive | Power & Gas No1 out 7 EZs | Direct Access to Sea Port | Own Power & Sea Port & Good Acc. |
| 10. Key Points | Plenty W, P & G First Pilot Project! | Own Port & Power Access to Sea . VGF may be used: | Large size (3420h) Own P & Port First Sea Board EZ |
| 11. Market Demand | 169 ha (18)by Survey | 170 ha (24)by survey | 275 ha (28) by survey |

Social & Environment Aspects

| EZ | Sherpur EZ | Mineshtorai EZ | Anwara EZ |
|--|---|---------------------------|--------------------------|
| Social Aspect: Family Relocation Employments | 5 households 40,706 | 650 households 578,750 | 980 households 46,600 |
| Environment Aspect Natural Physical | Loss of paddy Minor risk of de-Gradation | Erosion Loss of paddy | Erosion Loss of paddy |

- Detailed EIA (Environmental Impact Assessment) is proposed for the three sites

Other Consultations: 1st Workshop



Other Consultations: 2nd Workshop



Other Consultations: Meeting with Chambers



Prospect of BEZA & EZ Program

- Successful EZ Program quickly is needed for Bangladesh because creating millions of new employments will be needed for coming years.
- Need a strong top level **political support & political will** for successful implementation.
- Three related institutions: BEZA, BEPZA and Private EZP needs to be simplified, strengthened and perhaps unified in the future.
- BEZA Capacity must be improved with experienced professional staffs.
- Clear Future Vision, Targets and Road Map will be needed to convince Government and the developers/investors.
- Market Driven & “A to Z” Approach in all process will be needed.
- First EZ project should be implemented successfully with all support by everyone by PPP scheme. Then, Expand!
- Land acquisition process/implementation scheme need to improved allowing (1) PPP Scheme and/or (2) Private- Private Scheme.
- Trouble Shooting Mechanism must be established from the beginning.

Guidelines for BEZA (EZ): More Specific Environment Control Guideline is needed!

1. Guidelines and Regulations for EZ is also one of the key factors.
2. BEZA guidelines is drafted and pending for an approval .
3. Proposed BEZA guidelines are fairly good except lacking specific guidelines for pollution control at the pre-treatment and final treatment stages.
4. Infrastructure connection & Green Zone Guideline may be improved .
5. For BEZA, EZ Guidelines should be the improved the best practice of Asian country leaning from other EZs.

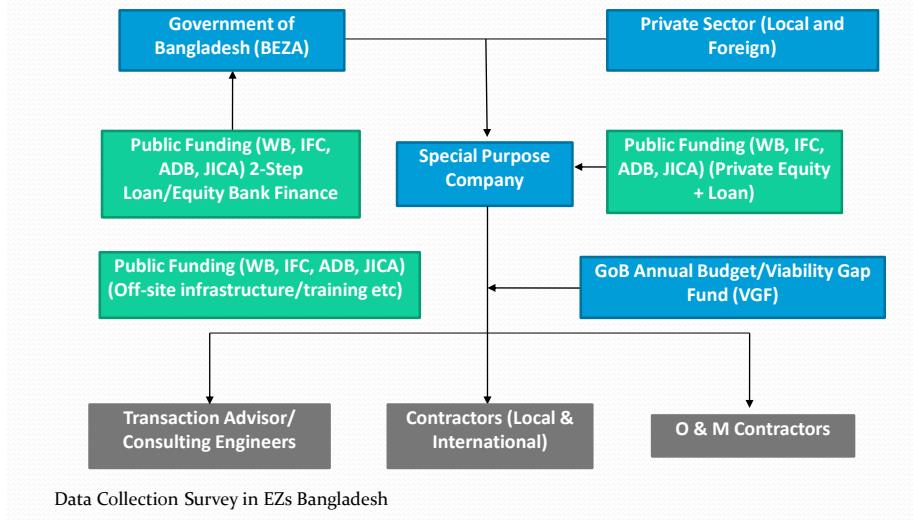
| Guideline s & Regulation s of EZ |
|---|
| 1. Architectural Plans guidelines |
| 2. Open Space Requirement |
| 3. Architectural Requirements : Setback & height etc. |
| 4. Ventilation & Sanitation Guidelines |
| 5. Strucutre Guidelines |
| 6. Facilities for Workers : Canteens & clinics etc. |
| 7. Anti -pollution Measure |
| 8. Power, water, waste-water, gas connection |
| 9. Approval of Contractors |

One Stop Service (OSS) System (One of Keys for Successful EZ)

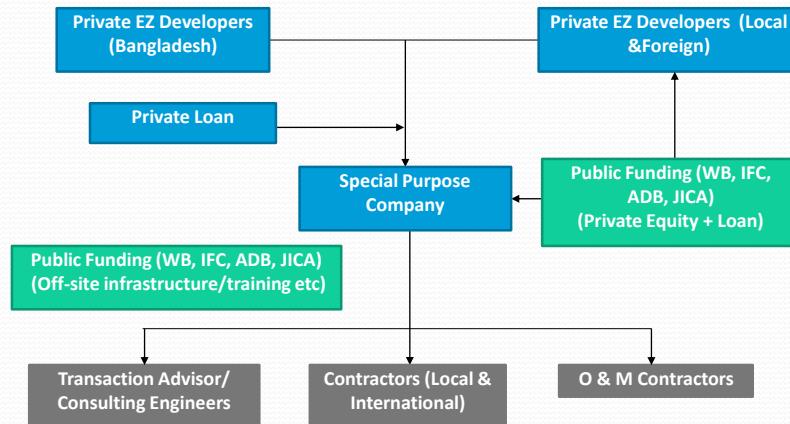
1. Nearly all permits and approvals will be given at EZ OSS Office.
2. BEZA inherit the best practice of BEPZA and other EZ /SEZ in Asia.
3. BEZA to adopt the best practice & improve OSS further in the areas of (1) Renewal of Bond license,(2) Gas Operation and (3) Security clearance for investors.

| Item | BEPA | Other Agency |
|------------------------------|------|------------------|
| Investment License | Yes | |
| Construction & Op/Permit | Yes | |
| Import & Export License | Yes | Custom Office |
| Tax Registration | Yes | Tax Office |
| Working Permit | Yes | M of Labor |
| Multi Visa Issues | Yes | Immigration |
| Incentive Arrangement | Yes | |
| Environmental Issues &Permit | Yes | M of Environment |

Public, Private Partnership (PPP) Funding Scheme



Private, Private Partnership Funding Schema



Possible EZ Implementation Scheme: PPP supported by Public F

1. BEZA implement & operate EZ themselves (Just as BEPZA)
Old style system up to 1980's and not recommended now.
2. Private -Public Partnership (PPP: P & G JV)
Land can be acquired by BEZA, Local Government or other Government agencies and form a JV and develop /operate EZ. (e.g. some SEZ/IP in Vietnam, China and Thailand)
3. Private and Private (Local Alone or JV with Foreign)
This scheme has been the case of most of Asian countries since 1980's successfully. Land acquisition & off site infrastructure : coordination are the key for success.
4. Start from the Case 2 and swiftly shift to the Case 3 just as other Asian countries.
5. Set up a Package Loan Scheme for the BEZA Program mainly Off Site infrastructure/Acquiring of Land purpose.

Some Evidences for Demand for Fully Serviced EZ land for Bangladesh

- Bangladesh is 10th destination in Japanese investors' poll in 2013 by JETRO.
- 200 Investors/m² are visiting JETRO & 100 investors/m² are visiting BEZA for suitable land indicating many potential investors are waiting.
- Due to higher wages in China and Asean, many labor intensive investors are looking for cheaper production countries (Myanmar and Bangladesh are competing in)
- Nearly all Bangladesh Industry associations have future expansion plan but difficult to find suitable industrial land where all requirements (Power, Energy, water and access)are met.
- Bangladesh Textile Mills Association (BTMA) alone requires over 100 hectare industrial land immediately and Pharmaceuticals Association is trying to develop own SEZ of 200 acre.
- 8 EPZs by BEPZA is nearly filled with factories(93%): only 117 Plots (7%) remain indicating huge demand for EPZ/EZ but no plots available.
- Over 100 visitors to BEPZA per month asking possible plots in the recent years.
- ED land demand is estimated fro 2025-2035 is 66,560 ha for Base Case & 52,034 ha for pessimistic Case. Market Survey indicates sufficient demand for three EZs: 64% of Surveyed Yes.
- Sherpur EZ: 169 ha (18 Firms) ; Anwara EZ: 170 ha (24 Firms); and Mirershrai : 275 ha (28 firms)
- Strong potential demand for fully serviced EZ exist and If BEZA prepares fully serviced EZs with competitive Guidelines & OSS, large number of investors (Domestic and Foreign)are likely to be attracted to these EZs.
- Several potential developers from Japan, China, Singapore and Korea and Thailand have shown interest to invest in EZ projects if the conditions are met.
- These evidences are only potential not real demand: BEZA/PPP developers must shown ability to implement the fully serviced and competitive EZs quickly.

EZ Program will solve 5 problems?

Considering all of Macro-Micro Problems faced by Bangladesh,

- Major problems:

- 1) Shortage of Meaningful Employments,
- 2) Weak Infrastructure (Especially Power & Energy),
- 3) Weak Business Competitiveness (114 out of 144),
- 4) Serious major urban area congestions and
- 5) Limited Government budget.

Proper EZ Program may solve all of the above problems as other ASEAN countries achieved.

Is it possible to attract Investors to Bangladesh in large number? Yes and No!

Yes! You can!

If BEZA with Government & Private sector work together with strong **Peoples & Political will** : Orchestrated way.

EZ should provide full serviced EZs to Investors are looking for and solve any problems arises Development & Operation period : Need a **Trouble Shooting Mechanism**.

No!

If every one goes own way selfishly as “Business as usual” and creating only a big smoke but no fire.

It is not easy to successfully attract investors at new EZs without knowing what investors are looking for and everyone work hard enough for developing attractive EZs .

The Key is how BEZA/Government together able to develop fully serviced EZs which is equal or better compared with ASEAN countries.

Suggestions for Bangladesh EZ

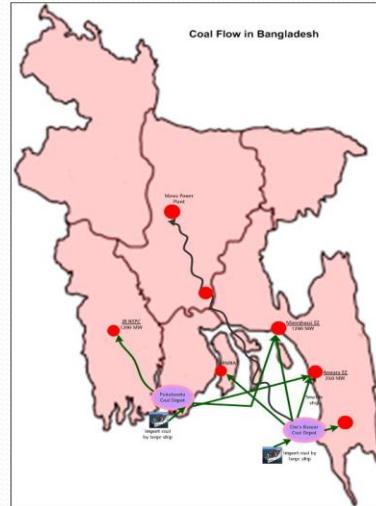
- Initiating one Pilot EZ project (one EZ out of 3 at least) ASAP & implement successfully.
- Formulate a clear EZ Vision & Target: 10 Million Job Creation! By 2030 by developing at least 100 EZs.
- EZ Guidelines & Regulations including OSS system should be approved and make operational ASAP.
- Packaged EZ with Key infrastructure such as Power, Port and access road at several key regions stabilizing power. Mirershorai EZ can be one of such case.
- EZ Authority should delegated power to each EZ to operate efficiently by OSS reducing Red Tapes.
- Once EZ is operational, Manpower skill program based on Market Driven should be initiated and implemented quickly.

Specific Recommendations for BEZA Program

1. **Start Sherpur EZ first** fully supported by the Prime Minister Office with **Strong Political-Will** and demonstrate BEZA is able to implement EZ quickly and successfully. Then follow Mirershorai and Anwara.
2. Remember: **No Fully Serviced Industrial Land! No Investment!** Without Investments, No Jobs /Income in Bangladesh.
3. Backlog of well prepared EZ industrial land is building up to nearly 2,000 hectare now and 7465 hectare for coming 2015-2020 period projected based on both Macro projection and Market Survey support the Macro Demand Projection.
4. Achievement of National Goal of 2021 is heavily depend on successful implementation of EZ Program by BEZA.
5. **Get on Asian Express Bus!** Now and Move on AFASP.
6. BEZA has a full mandate to develop EZ. So, develop as many EZs and as fast as possible with **"Can Do Spirit!"**

Critical Pass for EZ Program

1. Power & Energy
Stabilization is needed.
2. Ports & Highway should
be developed as well.
3. Use of more River
Waterway is
recommended.
4. Package Approach of
Power/Port/EZ is
needed.
5. Use of Clean Coal & LNG
gas Power is a solution.



Thank you!

Meeting Minutes: 23rd February, 2014

Workshop on Draft Reports of the Feasibility Study of the Three Proposed Economic Zones

(Sherpur of Maulvibazar District and Mirershori and Anwara of Chittagong District)).

Date & Time: Sunday, 23 February, 2014 at 10:30 AM

Venue: Ball Room, The Westin
Gulshan, Dhaka.

The third and final workshop was held on February 23, 2014 at the ball room of The Westin Hotel with Honourable Minister, Ministry of housing and public works Engr. Mosharraf Hossain as the chief guest. Honourable State Minister, Ministry of land Mr Saifuzzaman Chowdhury (Javed), Honourable Economic Adviser to the Honourable Prime Minister Dr. Mashiur Rahman and Secretary, Prime Minister's office Mr Abul Kalam Azad and FBCCI President Mr Kazi Akram Uddin Ahmed were present in the meeting as special guests. The meeting was presided over by the Executive Chairman, BEZA Mr Fakhrul Islam.

The program started with the recitation from the Holy Quran with large number of distinguished participants both from the private and public sector.

With a short introduction of the distinguished guests, BEZA chairman has delivered the welcome address to the attending guests. In his speech Mr Islam expressed that it is high time for developing economic zones in the country and attract potential investors. In order to create facilities for potential investors, full support and co-operation from the government is needed. He sought guidance and blessings from the chief guest and special guests' for successful implementation of the Economic Zones.

Dr. Kobayashi presented his speech followed by power point presentation. While presenting the draft final report on Technical Advisory Services for Feasibility Studies for the proposed Economic Zones he mentioned that to obtain national goal of becoming a middle-income country's status by 2021, depend mainly on successful operation of EZs in the country. Dr. Kobayashi has also observed that Bangladesh presently requires more EZs for providing job opportunities to its unemployed and under-employed people who are still living in poverty. Many Asian countries have come out of poverty by developing EZs. Bangladesh can solve many of its problems such as poverty and unemployment to a great extent, by following the same path.

President FBCCI Mr Kazi Akram Uddin Ahmed supported to create more economic zones in Bangladesh. He made strong commitment to provide full support and co-operation needed from FBCCI to implement economic zones.

Mr Abul Kalam Azad, Secretary Prime Minister's Office appreciated the work carried out by Dr. Kobayashi and his team and drew attention of the guests to the "Critical Pass" shown in the power point presentation of the EZ project. He stated that all those issues are being addressed by the Government of Bangladesh and moreover government has identified six projects as fast track projects and Economic Zone project is among those projects.

Saifuzzaman Chowdhury Javed, State Minister for land, said attracting foreign direct investment would not be a problem if the country can set up economic zones. He stated that all the indicators are very positive in the present context and to accelerate economic growth, the economic zones are needed to be established.

The following points were raised and discussed in the open discussion session. The session was conducted by Mr Abul Kalam Azad, Secretary, PMO.

Mr Arastoo Khan, additional secretary of the Economic Relations Division has lauded the presentation of the feasibility study of Dr. Kobayashi and presumed that the points which were raised by the World Bank on draft final reports have been already incorporated in the report. He also mentioned that BEZA's capacity building shall have to be increased to shoulder higher responsibility of implementing projects as the feasibility study is going to be completed very soon. He also mentioned the possible amalgamation of the two authorities (BEZA and BEPZA) to increase the capabilities to undertake the huge task of construction and management of the zone. In answering to this question, Dr. Kobayashi said that most of the points have been taken into consideration in the final version of the report. Regarding amalgamation Dr. Kobayashi also recommended the same as he also thinks these two organizations should merge together.

Mr A F M Afzal Hossain, Joint Secretary, Privatization Commission, mentioned that Sherpur is located far away from Dhaka and two port city of Mongla and Chittagong. Thus the cost of carrying goods discourages investors in setting up industries there. He referred that a state owned textile mills was offered for sale and a tender was invited to the public but the response was not positive. The study made Sherpur EZ project viable which is located far from the Sylhet city centre. He also questioned whether the price of land to be US\$50 per square meter is not in the very high side? In reply Dr. Kobayashi pointed out that the demand survey was conducted, the responses from the potential investors were very positive. It is mentionable Ceramic industries, Textiles sector, Paint and Chemicals, Food processing, and leather goods manufacturing industries have shown keen interest to invest in Sherpur EZ. Dr. Kobayashi also said the proposed EZ in Sherpur has the potential to become one of the top seven economic zones in Asia and advised the government to roll out the Sherpur Economic Zone first with required infrastructure such as power, water and gas etc. So, it has the potential to attract investors. Regarding the cost of the land, Dr. Kobayashi pointed out that the cost of land in Sherpur EZ is still less than other neighbouring countries; hence the price of US\$50 per square meter is justified at the initial stage.

Mr Kaikobad Hossain, Member BEZA asked a question to Dr. Kobayashi regarding IRR. He wanted to know how the FIRR 28% and EIRR 49% for the Anwara project can be viable? In reply, Dr. Kobayashi stated that since the rate is above the present opportunity cost of capital and also higher than the present bank interest rates, the project is therefore has been considered viable.

Mr Md. Abdul Mannan DC Chittagong appreciating Kobayashi's effort and his team for the study mentioned that public land which remains as 'khas land' will not be any problem but for acquisition of the land those are under private ownership, there might be disputes and the process may become complex. He ensures to do everything possible and expects full support from the government and the related authority.

Mr Md. Kamrul Islam DC Maulvibazar raised a question to whether the study conducted considered the fact that Sherpur area is under high risk of earthquake area in Bangladesh. The point mentioned shall be taken into consideration at the time of developing the economic zones and in the construction stage Dr. Kobayashi replied.

Another speaker wanted to know whether the Kushiyara River can be used for transportation of the goods of the proposed economic zones? In regard to this, Dr. Kobayashi explained that there is no possibility of transporting goods through Kushiyara River. In another question he pointed out that in Sherpur EZ how food processing, ceramic and pharmaceuticals industries can be set up side by side. In regard to this Dr. Kobayashi mentioned that in designing the master plan of the EZs this issue has been addressed and will be accommodated accordingly.

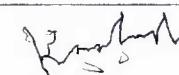
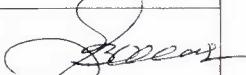
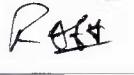
Bangladesh Inland Water Transport Authority (BIWTA) representative raised the point of analysing the prospects of Ashuganj river port. Dr. Kobayashi stated that this issue has been addressed in the report. The Ashuganj river port will be used by the EZ companies.

Special guest Honourable Advisor Economic Affairs to the Honourable Prime Minister Dr. Mashiur Rahman expressed the need for setting up economic zones in the proposed locations and indicated that he personally visited the Mirershori location along with the local MP who is eventually the chief guest of the function. He personally convinced that the location is ideally suited for establishment of Economic Zone at Mirershori. He however, stressed the need for making required infrastructure development on the offsite as explained by the team leader. Dr. Mashiur Rahman emphasized for setting up a complete township in the proposed economic zones to give workers a better life and their families' better access to education and health.

Dr. Md. Nurannabi Mridha Project Director BEZA in his thanks giving speech mentioned all investments for EZ will come from both local and foreign investors. Since there were no other questions from the participating guests he expressed his thanks to all the attending guests including the chief guest and special guests in the chair.

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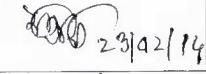
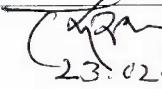
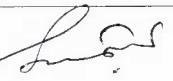
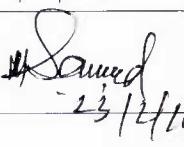
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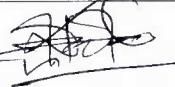
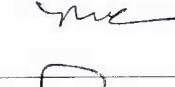
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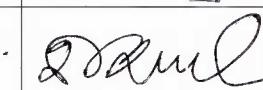
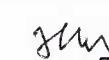
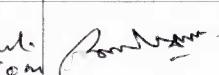
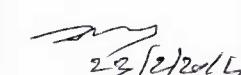
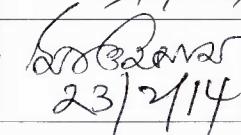
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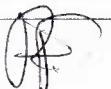
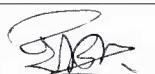
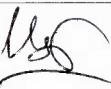
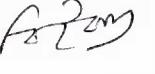
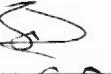
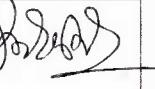
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ANNEX 2

CHAPTER 2: COMPETITIVE ADVANTAGE AND INDUSTRY ASSESSMENT (COMPONENT 1)

Annex for Section 2.1 (a)

Several clarifications to the sources underpinning Table-2.1.1-4 need to be noted.

First, the employment number for Sherpur shown is arrived at while multiplying the industrial saleable land in hectares by 400. For the other SEZs and IPs, they are, as far as practicable, estimates about the direct employment generated by the enterprises there.

Secondly, that said, the quotation from Ms. Kim, of the Amata City Bien Hoa Industrial Park, cited in the body of the report must be accounted for and qualified. Kim makes the point that authorities promoting the SEZ or IP have no business interest in keeping up-to-date with the combined employment level of their tenants on the SEZ. The estimates often cited in the literature, either popular or specialists are several steps removed from the managers actually doing the hiring and firing in the underlying enterprises. It is virtually impossible to get at the total employment generated by all the firms on the MWC, Chennai, for instance. The very large volume of promotional material on various web-sites representing either Mahindra Lifespaces Limited is completely reticent about the total employment by those who carry on their businesses on the World City. We ran into an episodic mentioning in one of the web-sites that InfoSys, which runs the world's largest information-technology (IT) campus the size of 3.5 million sq.-ft. at the MWC, alone hires more than 30,000 employees (<http://www.mahindracity.com/content.aspx?act=cust&id=36>). But next to nothing is known in the public square about the employment level for the other companies, including many of them on the Fortune-500 list of name-brand corporations, located at the MWC. We must surmise that the total employment of all those companies including InfoSys must run into hundreds of thousands. We wrote directly to the authorities at MWC requesting access to certain essentially promotional information, including total employment generated on the MWC. MWC, like several other authorities have not responded to our questionnaire. The number on account of employment of at least 150,000 for MWC is based on informed guess of the JDI team working on this project. Additionally, as one article related to Myanmar and cited among the sources listed below made clear, that the SEZ/IPs on this sample suffer from considerable but varying levels of worker turnover, which only makes any estimate of employment very dynamic in nature. The upshot is that what we have presented for employment levels in the zones/IPs may not strictly be comparable.

Thirdly, there have been reports that some employers on Cambodian SEZs such as the Manhattan SEZ report a significant difference between the employment level maintained with the SEZ's developer, and the actual employment situation. As the authors of the report at <http://www.sciencespo.fr/cohesionet/sites/default/files/GMS%20Capstone%20Report%20May%2017.pdf> show, the Taiwanese bi-cycle producer, Best Bi-cycle Factory, reported an employment level of about 582 workers (352 men, 230 women; 549 local, 33 foreign) to the SEZ's One-stop-service (OSS), whereas the actual employment of the enterprise was actually 1,500, according to this 'firm's high-level manager who showed' the authors around. The article written by the French team quoted earlier on report that as of February, 2011, enterprises located on the PPSEZ has generated direct employment of 4,972 and indirect employment on the SEZ of another 142 in services. And yet a reporter reporting in New York Times in 2012 stated that PPSEZ had generated as much as 20,000 jobs (source quoted below). We quote the higher figure in the table in the foregoing so as to give the PPSEZ the benefit of doubt. All-in-all, there is a need to take with a grain of salt employment figures that originate from the OSS or the authorities of the SEZs themselves. The employment numbers are therefore unlikely to be comparable across the EZs/IPs.

Fourthly, the following exchange rates are used in this chapter (all to United States dollar): 4,104 Cambodian Riel; 58 Indian rupees; 21,000 Viet Nam Dong; 30 Baht; 9,765 Indonesian Rupiah and 857 Myanmar kyat.

Fifthly, the estimates for the availability of electricity supplied to the EZ/IPs that we have presented will once again not really be comparable. The literature at times only presents the maximum capacity of the transmission lines used to carry power to the industrial park(s), but not the total availability of

electricity in question. Several other IPs, we have had access to the desired latter kind of information, and have included them in the material. However, for several other IPs, we have been limited, despite our best efforts, in the range of information available in the public square, and been forced to only merely re-cycle them. As a result, the information presented on the important aspect of the availability of power is not strictly comparable across the comparator EZs/IPs.

Sixthly, placeholders relating to several dimensions of tax incentives have been included. As far as practicable, they have been defined so that they can be enumerated in chronological units such as years. They are: (1) length of tax-holidays; (2) tenure of lower tax rates, if any, after tax-holidays have expired.

Two international cargo rates are included. Cargo rate-1 denotes shipping costs between the port nearest to the EZ/IP in question and the Japanese port of Yokohama. Cargo rate-2 denotes shipping costs between the port nearest to the EZ/IP in question and the Japanese port of Los Angeles. Telecom rates are measured using (i) a one-time charge to be paid to the national incumbent telecom service provider for the basic connectivity; (ii) basic monthly charge for using a fixed-line telephone from the national incumbent telecom service provider.

All prices, whether they are unit values or total values, are provided in US dollars. The rates of exchanges have already been provided in the foregoing.

Two indicators, both from IFC's Doing Business-2011, are selected to denote the rigidity of working hours. They are (i) premium for night-work as a % of hourly wage; (ii) premium for work on the weekly rest-day, as a % of hourly wage. Four indicators, from the same source, are selected to denote the difficulty in hiring workers. They are (i) fixed-term contracts prohibited for permanent tasks; (ii) maximum length of fixed-term contracts in months; (iii) minimum-wage of a 19-year-old worker or an apprentice to be hired; and, (iv) the ratio of minimum wage to value-added per worker.

Annex for Section 2.1 (b)

Minutes of meeting in Thailand between Mr. Sumiyuki Otsuki, and several Japanese executives based in Thailand

1. Date: 11th September, 2013

Japanese Chamber of Commerce, Bangkok

Attendance: Mr. Nobuyuki Ishii, Secretary General

Points of discussion

- There are 4,000 member companies in the chamber.
- The chamber visited Bangladesh recently and found that it would be too early for Thai-based Japanese companies to shift their base to Bangladesh.
- The reason lies in logistics situation, in particular, port facility and operation, and poor business/investment environment due to lack of transparency in policy and legal system.
- However, it is foreseeable in Thailand that local Thai companies are the ones who really suffer from the labour wage hike in these days, so there must be a good prospect from local Thai companies to look into the investment in Bangladesh from Thailand.
- Japanese companies in Thailand are mostly manufacturing high-value products, in particular, for automotive industries.
- Japanese companies are looking into business prospects into South Asia like India and Bangladesh and even Africa as upcoming market for their products.

2. Date: 12th September, 2013

Board of Trade of Thailand, the Thai Chamber of Commerce

Attendance: Mr. Mingpant Chaya, President, Committee on South Asian Affairs

Points of discussion

- There are 10,000 companies in the chamber of Thai business community sees the advantage

of Bangladesh in cheap labour force (1/6 of Thai labour wage). In comparison with Myanmar, Bangladesh is regarded to be more favorable in infrastructure set-ups and business can start immediately.

- Board of Trade has submitted a request letter to Thai government to take an initiative on developing industrial land in Bangladesh, which should be at least 5,000 acre, for Thai companies production ground.
- Board of Trade, Board of Investment and Chamber have sent several business delegation to Bangladesh to see the investment environment in 2011.
- At this political transition moment, Thai business community see it as the momentum for next political body, then once new political body was established, they would like to resume the dialogue for investment projects.
- The main interest in Thai business community, who looks into Bangladesh as prospective production center, came from garment, textile, food processing and consumable goods manufacturers. There are about 20 to 40 companies who have already shown keen interest in investing in Bangladesh. Fishery / fish processing industries show interest in Bangladesh, yet power is the key infrastructure for them.
- Those industries look into both export and domestic market attractiveness by having production base in Bangladesh.
- Relationship between Thailand and Bangladesh is rather good in that some cultural background is common, so relatively easy to run the business operation, and it is already seen that Thai business in Bangladesh is prosperously running its operation.
- There are many Bangladeshi who visit Thailand for medical check-ups and shopping. Thai business community sees the large number of middle-class population in Bangladesh as a big market for Thai products.
- Thai supplies polymer to Bangladesh, then plastics products manufacturing can be of interest for Thai industries in investing in Bangladesh.

3. Date: 12th September, 2013

304 Industrial Park Co., Ltd.

Attendance: Mr Poolsak Sutanthavibul, Executive Vice President

Points of discussion

- 304 industrial part is developed and operated by Double A group, which has a prime business operation in paper manufacturing in Thailand and other ASEAN countries.
- The park has 1,200ha of land, which is fully occupied by about 110 foreign and national companies. 60% of the company operating in the part is Japanese company.
- The park is equipped with a captive 406MW coal-fired power plant, 3.6million cubic meter capacity water supply system, as well as one stop service.
- Recreation facilities for expatriates are of importance, and resort hotel, golf course, banks, shopping center and fitness club is available in the complex.
- The group had once tried to enter into Bangladesh for development project of industrial estate in 2011. Yet the project faced in difficulty in acquisition of land. For acquiring just 40 acre of land, there were more than 100 land owners came up for compensation.
- There are certainly a large number of voices of interest came from Thai business industries to invest in Bangladesh. And the group has seriously been considering to setup industrial estate in Bangladesh.
- Out of 3 project site under BEZA/WB project, Mierershori is the most preferential area for the group, due to close proximity to the port and marketing center of products in Dhaka.
- Captive power plant as well as flood control in Mierershori are the most crucial infrastructure development as far as the opinion of the group. The land side in Mierershori is adequate, but the development plan in phase-wise approach is required.
- The group intend to develop environmentally sound industrial estate in Bangladesh to attract international investors. The port development and operation are also of interest for the group. The group has its own captive port, Future Port in Thailand for unloading woodchip and Tapioka (Cassava).
- For the way forward, the group would like to know how the foreign zone developer can come

into the picture of Economic Zone development.

Annex for Section 2.1 (c)

Soft copy of the questionnaire filled in by Ms. Kim of Amata City Bien Hoa Industrial Park, Viet Nam as a response to JDI/MSL/Sheltech team's request.

Multivariate competitive benchmarking rating for Viet Nam Amata Industrial Park (IP) (with some entries entered in the table below based on Web-search (please update those values if they are not entirely accurate)

| Benchmarks | Description of the information being requested | Viet Nam |
|------------------------------|--|--|
| | | Amata |
| Size (ha) | Size of the industrial park | 700 |
| No. of plots | Number of plots either sold, or leased, waiting to be sold or leased | 112 (NA) |
| Employment | Employment generated by tenant companies on those plots | 33,576 |
| If land is leased or sold | Whether land is only sold on a permanent basis, or is it only leased on long-term basis (1=sold; 2=lease; 3=both) | 2 |
| Power-plant (MW) | Is there an on-site power-plant, if yes, what is its generating capacity in MW. If there is a committed sub-station but no plant, then its capacity. | 13 (brochure) |
| Power-supply | Is power supply to each tenant limited or unlimited | (discussed by both parties) |
| Water treatment unit (m^3) | If there is a water-treatment plant, what is its capacity in cubic-meter | 30,000 |
| Wastewater TP (m^3) | If there is a waste-water-treatment plant, what is its capacity in cubic-meter | 5,0007,000 |
| Solid-waste removal | what is the capacity of the solid-waste removal system, if any | No |
| Natural gas | Is the Industrial Park connected with the public natural gas network? | No |
| Other gas | Is the Industrial Park supplied with other gases on a reliable basis? | No |
| No. of tel. lines | Number of telephone lines | 960 |
| Pre-built facilities, or not | Average cost of pre-built facilities per unit, if they are supplied on the IP | Ready built factory (VND98,000/m2/month) |
| Sewage-treatment (KLD) | If sewage-treatment is separate from waste-water treatment, what is its capacity in kilo-liters per day | Separated, NA |
| Land price (\$) | | VND1,900,000/m2/lease term |
| Infrastructure | | |
| Distance(1) | from nearest sea-port or deep-sea port | 25 |
| Distance(2) | from the largest commercial metropolis | 30 |
| Distance(3) | from the largest airport in the country | 35 |
| Electricity (\$/kWh) | Rate per kilo-watt per hour (kwh) in US \$ (VND) | 0.073 (VND1,632) |

| Benchmarks | Description of the information being requested | Viet Nam |
|---|--|---|
| | | Amata |
| Water (\$/cu.-m) | Rate per kilo-watt per hour (kwh) in US \$ | 0.218 (VND8,100/m3) |
| Waste-water (\$/cu.-m/mth) | Rate per kilo-watt per hour (kwh) in US \$ | 0.280 (VND7,700/m3) |
| Government policy | | |
| Corporate tax rate (%) | | 25 (turn to 22 from 2014) |
| VAT (%) | | (5)-10 |
| OSS | Whether One Stop Service (OSS) exists in the IP. | 1 |
| Incentives | | |
| Tax h'day (yrs) | Tax-holiday to Corporate income taxes (CIT) in years | No |
| Lower tax rate (yrs) | Tenure of concessionary CIT rate, if any, after tax-holiday expires | No |
| A. Depn. | Does tax-code allow any accelerated depreciation of capital assets | NA |
| Tx rlf: Expr (%) | Any tax relief given for exporters on the Industrial Park | No |
| Loss carry forward (yr) | For how many years is carrying-forward of losses allowed | NA |
| Exemption from import taxes (Years) | For how many years, is exemption given on duties on raw materials, parts and components imported into the industrial park by enterprises? | NA |
| Relief in imports tax(yrs) | For how many years, are concessions allowed on duties on raw materials, parts and components imported into the industrial park by enterprises? | NA |
| Double deduction from taxable income of water costs: | Is double deduction from taxable income on account of water, electricity and other infrastructural costs allowed? | NA |
| PIT lowering | | NA |
| Types of industry to be located or in location (percentages calculated based on promotional material on the Web) | | |
| Most dominant | | Chemicals/plastics/paint (22) |
| Next | | Auto/machinery parts, steel, metal (18) |
| Next | | Textile, garment (16) |
| Next | | Electric & electronic devices (11) |
| | | Beverage, food processing (7) |
| | | Miscellaneous (14) |
| Individual operating costs (\$) | | |
| Mgmt wage rates/month | Monthly salary for, say, a company accountant with five years of experience | Brochure |

| Benchmarks | Description of the information being requested | Viet Nam |
|--------------------------------------|---|-------------------------------|
| | | Amata |
| Skilled wage rates/month | Monthly salary for, say, a company engineer with five years of experience | Brochure |
| Unskilled wage rates/month | Monthly wages earned including overtime if any by production worker with one year of experience | Brochure |
| | | |
| Cargo rates | What does it cost to ship cargo the size of five tonnes to the nearest major sea-port | NA |
| Telecom rates | What is the monthly cost of leased-lines | NA |
| | | |
| Quality-of-life (QOL) ratings | | |
| Security | Is security on 24-by-7 basis provided | NA |
| Open-space (acre) | How much open-space exists in the Industrial Park | Approximately 100 ha |
| Entertainment | What entertainment facilities are available | Super market, restaurant, ... |
| Golf-course | Is a golf-course provided | No |
| Quality Housing | Is quality-housing for expatriates, or workers available | Yes |
| Healthcare | Is a hospital or at least a clinic available on the IP | Yes |
| High school | Is a high-school of international quality available | Yes |
| Distance | How far is the international high-school from the residential blocks on the IP | Under schedule |
| University | Is an university available near the IP | Under schedule |
| Distance from University | How far is the university from the residential blocks on the IP | 7km |

Note:

Land-price is for industrial land and measured per sq.-meter.

Annex for Section 2.1 (d)

| Multivariate competitive benchmarking across ten EZs/IPs | | | | | | | | | | |
|--|------------|--------|------------|------------|---------------|-----------|-----------|---------|-------|----------|
| Benchmarks | Bangladesh | | | Cambodia | India | Indonesia | Myanmar | Vietnam | | Thailand |
| | Sherpur | Anwara | Mirershore | Phnom Penh | Mahindra City | MM2100 | Mingalado | Amata | VSIP | Amata |
| Zone Size (ha) | 143 | 562 | 2911 | 360 | 607 | 805 | 90 | 700 | 500 | 1353 |
| Lease Duration (Year) | 30 | 30 | 30 | 99 | 99 | 70 | 49 | 50 | 50 | 50 |
| Power-charges (kWh) | 0.066 | 0.066 | 0.066 | 0.28 | 0.105 | 0.1354 | 0.12 | 0.077 | 0.078 | 0.15 |
| Water-charges (cu.-m) | 0.3 | 0.3 | 0.3 | 0.3 | 0.6 | 0.4 | 0.05 | 0.383 | 0.31 | 0.65 |
| Waste-water charges (cu.-m/mth) | 0.35 | 0.35 | 0.35 | 0.26 | 0.06 | 0.55 | 0.05 | 0.364 | 0.19 | 0.233 |
| Land-lease Charges | 56 | 60 | 56 | 60 | 65 | 175 | 58 | 90 | 117 | 125 |
| Cargo rates (40 Container): | | | | | | | | | | |
| Export to Yokohama | 900 | 900 | 900 | 1500 | 979 | 800 | 1600 | 500 | 500 | 1162 |
| Export to Los Angeles | 3675 | 3675 | 3675 | 4000 | 2817 | 2600 | 6500 | 2600 | 2600 | 3863 |
| Telecoms rates (min) | 1.12 | 1.12 | 1.12 | 5 | 21 | 6.28 | 0.67 | 1.05 | 1.05 | 3.16 |
| Wage rates: | | | | | | | | | | |
| Mgmt wage rates | 578 | 578 | 578 | 700 | 1510 | 995 | 600 | 1146 | 1146 | 1565 |
| Skilled wage rates | 251 | 251 | 251 | 180 | 607 | 414 | 145 | 521 | 521 | 641 |
| Semi-skilled wage rates | 78 | 78 | 78 | 120 | 264 | 209 | 92 | 128 | 128 | 286 |
| Water-treatment plant capacity (per hectare) | 419.58 | 12.00 | 96.19 | 14.72 | 37.78 | 52.17 | 55.56 | 60.00 | 60.00 | 13.30 |
| Waste-water treatment plant capacity (per hectare) | 335.66 | 9.60 | 76.95 | 11.11 | 29.06 | 46.96 | 55.56 | 10.00 | 36.00 | 10.35 |
| Is school provided | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 |
| Tax holiday length (yr) | 7.00 | 5.00 | 5.00 | 9 | 5 | 7.5 | 5 | 0 | 4 | 8 |
| GCI Index ranking of country | 110.00 | 110.00 | 110.00 | 88.00 | 60.00 | 38.00 | 139.00 | 70.00 | 70.00 | 37.00 |
| Benchmarked rank_version2 | 0.698 | 0.557 | 0.648 | 0.548 | 0.500 | 0.473 | 0.545 | 0.561 | 0.608 | 0.425 |
| Benchmarked rank_version1 | 0.658 | 0.534 | 0.668 | 0.521 | 0.481 | 0.460 | 0.513 | 0.541 | 0.581 | 0.426 |

Note: version 1 is based on all indicators. Version 2 excludes land area of the zones/ips

1. Transport Assessment

1. Goods Train Schedule

A. EAST ZONE (East of Jamuna/Meghna River)

| Train No | Name | From | Departure | To | Arrival |
|----------|-------------------|------------------|-----------|------------------|---------|
| 801 | Container Express | Ctg Port Yard | 02:00 | Dhaka ICD | 12:05 |
| 802 | Container Express | Dhaka ICD | 10:50 | Ctg Port Yard | 01:10 |
| 803 | Container Express | Ctg Port Yard | 11:00 | Dhaka ICD | 23:10 |
| 804 | Container Express | Dhaka ICD | 13:00 | Ctg Port Yard | 05:55 |
| 805 | Container Express | Ctg Port Yard | 17:00 | Dhaka ICD | 03:00 |
| 806 | Container Express | Dhaka ICD | 20:30 | Ctg Port Yard | 05:55 |
| 807 | Container Express | Ctg Port Yard | 19:00 | Dhaka ICD | 04:05 |
| 808 | Container Express | Dhaka ICD | 23:45 | Ctg Port Yard | 09:30 |
| 951 | Tank Special | Ctg Port Yard | 23:30 | Sylhet | 16:20 |
| 952 | Tank Special | Sylhet | 01:00 | Ctg Port Yard | 18:20 |
| 961 | Tank Special | Ctg Port Yard | 23:30 | Sreemangal | 00:20 |
| 962 | Tank Special | Sreemangal | 04:40 | Ctg Port Yard | 03:50 |
| 971 | Tank Special | Ctg Port Yard | 22:30 | Dhaka Cantonment | 11:45 |
| 972 | Tank Special | Dhaka Cantonment | 01:00 | Ctg Port Yard | 14:40 |
| 981 | Tank Special | Ctg Port Yard | 22:30 | Parbatipur | 03:10 |
| 982 | Tank Special | Parbatipur | 20:30 | Ctg Port Yard | 04:40 |
| JT | Express Goods | Ctg Port Yard | 22:30 | Tejgaon | 11:45 |
| TJ | Express Goods | Tejgoan | 01:30 | Ctg Port Yard | 01:55 |
| JB | Express Goods | Ctg Port Yard | 12:00 | Dewangonj Bazar | 06:00 |
| DJ | Express Goods | Dewangonj Bazar | 12:10 | Ctg Port Yard | 20:30 |

B. Goods Train Schedule WEST ZONE (West of Jamuna/ Meghna River)

| Train No | Name | From | Departure | To | Arrival |
|----------|---------------|------------|-----------|------------|---------|
| KP-1 | Express Goods | Khulna | 22:45 | Parbatipur | 12:35 |
| Pk-2 | Express Goods | Parbatipur | 17:45 | Khulna | 07:35 |
| DI-1 | Express Goods | Darsana | 07:00 | Ishardhi | 10:20 |
| ID-2 | Express Goods | Ishardhi | 02:00 | Darsana | 05:20 |
| KI-1 | Express Goods | Khulna | 10:00 | Ishardhi | 14:10 |
| IK-2 | Express Goods | Ishardhi | 03:30 | Khulna | 15:25 |
| ND-1 | Express Goods | Noapara | 02:30 | Darsana | 08:00 |
| DN-2 | Express Goods | Darsana | 19:30 | Noapara | 00:15 |
| IS-1 | Express Goods | Ishardhi | 02:30 | Santahar | 06:10 |
| SI-2 | Express Goods | Santahar | 17:30 | Ishardhi | 22:05 |
| SP-1 | Express Goods | Santahar | 22:15 | Parbatipur | 02:50 |
| PS-2 | Express Goods | Parbatipur | 23:00 | Santahar | 04:10 |
| IR-1 | Express Goods | Ishardhi | 22:00 | Rohanpur | 06:35 |
| RI-2 | Express Goods | Rohanpur | 09:45 | Ishardhi | 18:50 |

Source: http://www.railway.gov.bd/good_tsrain_schedule.asp

2. Statistics of Chittagong Port Authority

A. Cargo Handled

| Calendar Year | Import (Tones) | Export (Tones) | Total (Tones) |
|---------------|----------------|----------------|---------------|
| 2006 | 2,39,36,103 | 30,89,550 | 2,70,25,653 |
| 2007 | 2,42,36,261 | 33,92,974 | 2,7629,235 |
| 2008 | 2,44,92,707 | 37,04,862 | 2,81,97,569 |
| 2009 | 3,05,86,680 | 39,57,894 | 3,48,44,574 |
| 2010 | 3,66,70,356 | 45,12,439 | 4,11,82,795 |
| 2011 | 3,82,66,480 | 48,73,562 | 4,31,40,042 |

B. Containers Handled

| Calendar Year | Chittagong Port(TEUs) | Cargo (Tones) | Dhaka ICD (TEUs) | Cargo (Tones) |
|---------------|-----------------------|---------------|------------------|---------------|
| 2006 | 8,76,186 | 85,17,130 | 77,567 | 3,25,305 |
| 2007 | 9,58,020 | 96,06,032 | 80,714 | 3,31,216 |
| 2008 | 10,69,999 | 102,16,055 | 82,458 | 4,34,628 |
| 2009 | 11,61,470 | 12,27,321 | 63,780 | 4,94,525 |
| 2010 | 13,43,448 | 1,43,70,217 | 64,369 | 4,83,039 |
| 2011 | 13,92,104 | 1,47,62,762 | 69,723 | 5,56,781 |

C. Vessels Handled

| Calendar Year | No. of Vessels |
|---------------|----------------|
| 2006 | 1957 |
| 2007 | 1945 |
| 2008 | 2099 |
| 2009 | 2167 |
| 2010 | 2249 |
| 2011 | 2248 |

D. Cargo Handling Including Inland & ICD

| Calendar Year | Import (Tons) | Export (Tons) | Inland(Tons) | ICD (Tons) | Grand Total (Tons) | Growth |
|---------------|---------------|---------------|--------------|------------|--------------------|--------|
| 2006 | 2,39,36,103 | 30,89,550 | 26,33,565 | 4,80,439 | 3,01,39,657 | 1.93% |
| 2007 | 2,42,36,261 | 33,92,974 | 26,77,509 | 4,92,644 | 3,07,99,388 | 2.19% |
| 2008 | 2,44,92,707 | 37,04,862 | 25,18,564 | 4,34,628 | 3,11,50,761 | 1.14% |
| 2009 | 3,08,86,680 | 39,57,894 | 28,30,025 | 4,94,525 | 3,81,69,124 | 2.53% |
| 2010 | 3,66,70,356 | 45,12,439 | 37,30,829 | 4,83,039 | 4,53,96,663 | 18.93% |
| 2011 | 3,82,66,480 | 48,73,562 | 55,77,114 | 5,56,781 | 4,92,73,937 | 8.54% |

Source:

http://cpa.gov.bd/portal/home.php?option=article&page=82&link=statistical_info&item=cargo_handl e_1#

3. List of items to allowed to be handled at the Off -docks:

(As per Customs Circular - REF: CPA Circular # 01/06 DD 04-11-06/ Circular #3/07 DD 22-01-07
REF: NBR File #3 (1) Customs Export & Bond/96/545 (6) DD02-09-10 called Items to be unstuffed outside CPA Premises).

- 1) Raw Cotton
- 2) Metal Scrap
- 3) Wheat
- 4) Rice
- 5) Lentils
- 6) Mustard Seeds
- 7) Waste Paper
- 8) Chick Peas
- 9) Animal Feed (Meat & Bone Meal)
- 10) Hard Coke
- 11) Carbon Block
- 12) Marble Chips
- 13) Ball Clay (Bulk)
- 14) Onion (Dry Container)
- 15) Ginger (Dry Container)
- 16) Garlic (Dry Container)
- 17) Fertilizer
- 18) Soda Ash
- 19) PVC Resin
- 20) Staple Fiber
- 21) Round Log
- 22) Dates
- 23) Sugar
- 24) Bitumen
- 25) Cane
- 26) Marble
- 27) Sodium Sulphate
- 28) Wood Pulp
- 29) Salt

Freight, Charges, Container Cycles and Off Dock Facilities

| Location | Distance from Chittagong | 20ft Container | 40ft Container | 10T/30 CBM truck |
|----------|--------------------------|----------------|----------------|------------------|
| Anwara | 40 Km | 10,000/- | 12,000/- | 7 – 8,000/- |

Source: based on interview with a transporter from Chittagong who owns 15 trucks and trailers

✓ CHA/ Clearing Agent Fees

Customs Clearance Charge levied by Clearing Agents: The Clearing Agents charge their fees on the basis of percentage of the value of the cargo and not on box basis.

| Value (in BDT) | Charge basis |
|---------------------------|------------------|
| Up to 500,000 BDT | 1% |
| 5 -15,00,000 take | 0.75% |
| 1.5 million to 20 million | 0.50 % |
| Above 20 million | To be negotiated |

Source: Interview with a forwarding agency

✓ **IMPORT Cycle**

- Port to Off-docks (ICDs):

Load Port--> CY (Port Container Yard) --> ICD -->Delivery (either de-stuffed or FCL out): in this case, all payments from hook to delivery a/c. Importer
- Cargo Clearance and Delivery
- Sea Cargo
 1. Preparation of Data Sheet
 2. Noting by Customs
 3. Examination of Papers by Customs & Physical Inspection
 4. Assessment
 5. Payment of Duty
 6. Indent Placement (Placement of Vehicles)
 7. Delivery
 - Under normal circumstance, with complete documentation, import clearance and delivery takes about 3 -4 days for import
 - For export, 1 – 2 days is required.
- Air Cargo
 1. Documentation as above
 - Import clearance takes about 2-3 days (for urgent and perishable cargo – 1 day)
 - Export clearance takes about 1-2 days.

✓ **EMPTY Container Cycle at Off-dock ICD**

2. Empty container arriving from Import de-stuffing
3. Empty container coming from Port (export CY) as per MLO instruction
4. Repositioning from hook or CY
5. Factory de-stuffed containers
6. As per instruction of MLOs – by internal repositioning.

Off-Dock: The team visited K & T Logistics Ltd. Located inside the Chittagong Export Processing Zone (CEPZ) and discussed about the services provided by this Off-dock facility.

✓ **Facilities at the K&T ICD: (Off-dock)**

1. There are 14 reefer points at the facility, but K&T not interested in handling reefers
2. EDI connectivity with Maersk Line
3. MLOs want data of their container on 24-hr cycle
4. K&T ICD covers an area of 8 Acres (44,000 sq. ft. = 1 Acre)
5. Capacity: Ground slot of 400 (can handle about 2000 TEUS @ 5 high)
6. In operation since 1st May, 2001.
7. ICD on lease for 30 years, now running 13th year
8. Throughput: (annual about 1,20,000 TEUs)

On an average, container stays about 10 days at the

Container Tariff at the K & T Logistics ICD –CEPZ Facility

| Container size | IMPORT | EXPORT |
|----------------------------------|--|---|
| 20ft | 5,000/- (remove container from port and cargo delivery to consignee) | 3000/- (stuffing and despatching to port) |
| 40ft | 6,000/- | 4000/- |
| Other charges as per Port Tariff | | |

7. Ocean Freight

| EXPORT | 20ft (in US\$) | 40ft (in US\$) |
|---|-----------------------|-----------------------|
| Ocean Freight to International Destinations (from Chittagong Port) | | |
| Major European Ports (Rotterdam) | 1,300 | 2,600 |
| USA - East Coast (New York) | 3,000 | 4,000 |
| USA - West Coast (Los Angeles) | 3,000 | 4,000 |
| Canada (Toronto/ Montreal) | 3,500 | 4,500 |
| Australia (Melbourne) | 1,200 | 2,400 |
| New Zealand | 1,200 | 2,400 |
| Hong Kong | 1,000 | 2,000 |
| UAE (Dubai) | 1,100 | 2,200 |

Source: National Agencies, Dhaka, Bangladesh

| IMPORT | 20ft (in US\$) | 40ft (in US\$) |
|---|-----------------------|-----------------------|
| Ocean Freight from International Destinations (to Chittagong Port) | | |
| Major European Ports (Rotterdam) | 1,500 | 3,000 |
| USA - East Coast (New York) | 3,000 | 4,000 |
| USA - West Coast (Los Angeles) | 3,000 | 4,000 |
| Canada (Toronto/ Montreal) | 3,500 | 4,500 |
| Australia (Melbourne) | 1,100 | 2,200 |
| New Zealand | 1,500 | 3,000 |
| Hong Kong | 1,200 | 2,400 |
| UAE (Dubai) | 1,200 | 2,400 |

Source: National Agencies, Dhaka, Bangladesh

8. Air Freight:

| Air Freight (Export from Dhaka Airport) | Up to 1 kg(US\$) | Up to 10 Kg(US\$) | Up to 50 Kg(US\$) |
|--|-------------------------|--------------------------|--------------------------|
| Dubai | 50 | 4.50/kg | 3.70/kg |
| London | 50 | 7.50/kg | 3.70/kg |
| Rotterdam | 50 | 7.87/kg | 3.70/kg |
| Montreal | 75 | 9.50/kg | 7.10/kg |
| Melbourne | 50 | 6.50/kg | 3.70/kg |
| Hong Kong | 50 | 4.50/kg | 3.70/kg |
| Shanghai | 50 | 4.50/kg | 3.70/kg |
| New York | 75 | 9.50/kg | 7.20/kg |
| Los Angeles | 75 | 9.50/kg | 7.20/kg |

Source: National Agencies, Dhaka, Bangladesh

| Air Freight (Import to Dhaka Airport) | Up to 1 kg(US\$) | Up to 10 kg(US\$) | Up to 50 kg(US\$) |
|--|-------------------------|--------------------------|--------------------------|
| Dubai | 100 | 3.50/kg | 3.20/kg |
| London | 100 | 3.50/kg | 3.20/kg |
| Rotterdam | 100 | 3.50/kg | 3.20/kg |
| Montreal | 100 | 5.50/kg | 5.10/kg |

| Air Freight (Import to Dhaka Airport) | Up to 1 kg(US\$) | Up to 10 kg(US\$) | Up to 50 kg(US\$) |
|--|-------------------------|--------------------------|--------------------------|
| Melbourne | 100 | 3.50/kg | 3.20/kg |
| Hong Kong | 100 | 3.50/kg | 3.20/kg |
| Shanghai | 100 | 3.50/kg | 3.20/kg |
| New York | 100 | 5.50/kg | 5.10/kg |
| Los Angeles | 100 | 5.50/kg | 5.10/kg |

Source: National Agencies, Dhaka, Bangladesh

Similarly, air freight shipments to/from Dubai, Hong Kong, Shanghai followed by Melbourne, London, Rotterdam and Montreal are in order of the freight charges.

ANNEX 3

CHAPTER 3: MASTER PLANNING AND INFRASTRUCTURE (COMPONENT 2)

A. Engineering Design

1. Analysis of Flood Protection System

1) Rain Data

According to the rain data of Sherpur (Section 2.1.4), the following figures are used for the drainage design.

Table 1-1: Rain Data for Drainage Design

| Rain Data of Sherpur (Maximum Figures) | | | Reference (PPSEZ in Cambodia) |
|---|---------------------------------|-------------------|--------------------------------------|
| Yearly data | 4,934 mm/year | Year of 2010 | 2010 |
| Monthly data | 1,394 mm/year | July of 2004 | |
| Daily data | 233 mm/day | October 3 in 2012 | 147.2 mm/day |
| 3 hourly data | 115 mm/3 hours (38.3mm/hour) | July 18 in 2005 | 32 mm/hour |

The rain intensity pattern (147.2mm / day), October 2000 was the maximum recorded in the 10 year design period of PPSEZ) this was applied to the PPSEZ design and is shown in the right hand column for reference.

From the above data, 38.3 mm/hour and 233 mm/day are chosen for the design criteria.

2) Discharging System

Once the Economic Zone has been developed and the whole area is covered by the factory roofs, rain water will accumulate inside the Economic Zone within a very short period since the rain fall pattern occurs within 2~5 hours in nature. The Economic Zone needs a retention pond in order to block any unexpected floods from the river. The retention pond system includes a retention pond itself, a pump sump structure and reinforced concrete pipe. (RCP).

From the previous investigation the rain water volume reaches $165,896 \text{ m}^3/\text{day}$ ($233 \text{ mm/day} \times 89 \text{ ha} \times 100 \times 100 \times 0.8$, where 0.8 is absorption factor) in the industrial zone. The volume of $165,896 \text{ m}^3$ needs to be discharged by the following process;

5 pumps (capacity of each pump is $30 \text{ m}^3/\text{min}$) in case of flooding:

Discharging volume is given by the next calculation.

$$30 \text{ m}^3/\text{min} \times 60 \times 20 \text{ hrs} \times 5 \text{ pumps} = 180,000 \text{ m}^3/\text{day} > 165,896 \text{ m}^3/\text{day}$$

4 lines of RCP (reinforced concrete pipe, diameter 1m, length 10m) in normal condition:

From the Table 2.2.5.3-3, the discharging volume of one RCP is $2,182.355 \text{ m}^3/\text{h}$. using four lines of RCP, the following volume can be discharged.

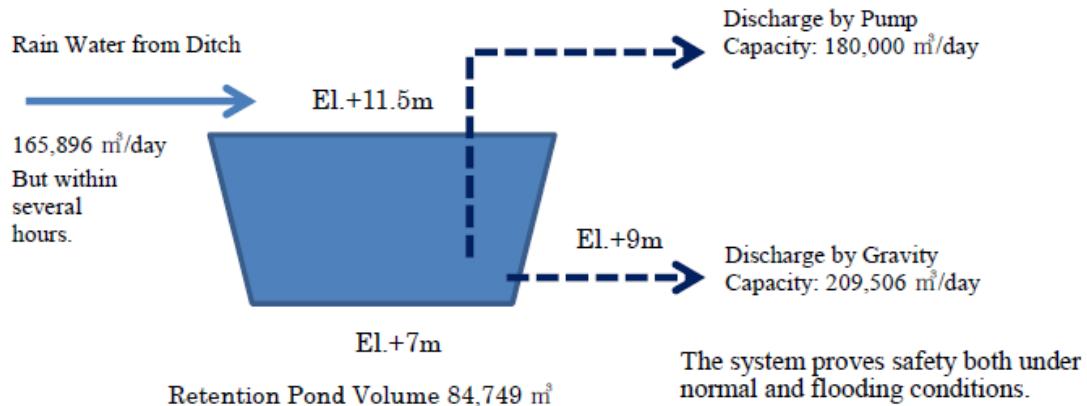
$$2,182.355 \text{ m}^3/\text{h} \times 24 \text{ hrs.} \times 4 \text{ lines} = 209,506 \text{ m}^3/\text{day} > 165,896 \text{ m}^3/\text{day}$$

Therefore, having 5 pumps (capacity of one pump is $30 \text{ m}^3/\text{min}$) improves safety in case of flooding. Having 4 RCP (reinforced concrete pipe, diameter 1m, length is 10m) lines improves efficient discharge in normal conditions.

Retention Pond:

The basic logic of the discharging system is shown in the following figure.

Figure 1-1: Discharging System



The dimensions of the retention pond are calculated as follows:

Suppose the rain water from the ditch (factory zone) arrives in the retention pond in 5 hours. Within 5 hours, the possible discharging volume becomes,
 $(\text{Pump: } 180,000 \text{ m}^3 + \text{RCP } 209,506 \text{ m}^3) \times (5/24) = 81,147.083 \text{ m}^3$

Therefore, the necessary volume of the retention pond becomes,
 $165,896 - 81,147 = 84,749 \text{ m}^3$

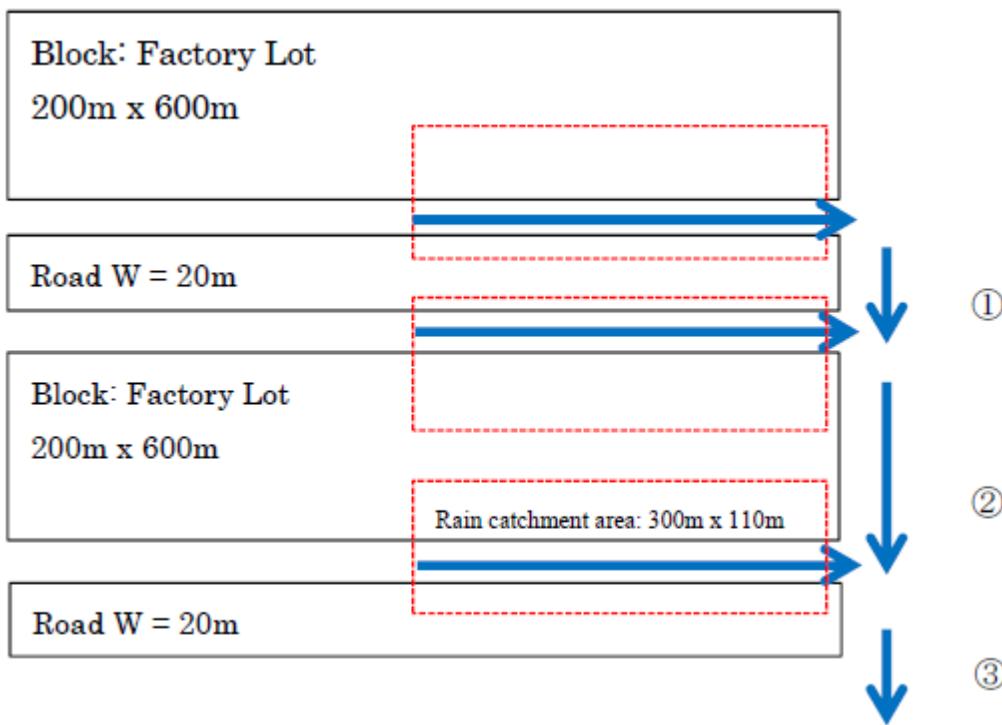
Since the area of the retention pond is 19,014.07 m², the depth of the retention pond becomes;
 $84,749 / 19,014 = 4.5 \text{ m}$

It is extremely important to set up a better trained operation team once the operation of the Economic Zone begins.

3) Investigation of U-channel Dimension (Related to Section: 3.4 Drainage System)

As a first step, the rain flow route needs to be planned in order to decide the dimension and alignment of the u-channel. As explained previously, the road was designed in order to divide the factory block by approximately 200m x 600m on average. The following rain discharging route can be considered.

By making a slight slope from the centre of the factory block and covering half the area of the road, the basic rain catchment area becomes 350m x 110m approximately.

Figure 1-2: Rain Flow Route

From the rain intensity pattern, the maximum intensity is 38.3mm/h. From the rain catchment area, the rain volume in the red rectangular becomes;

$$38.3\text{mm/h} \times 300\text{m} \times (100\text{m} + 10\text{m}) = 1,264\text{ m}^3/\text{h}$$

The discharging velocity of u-channel "V" is given using the Manning Equation.
 $V = 1/n \times R^{2/3} \times I^{1/2}$,

where

n (roughness factor) = (concrete case: 0.013)

R (hydraulic radius) = A (flow cross section) /S (wetted perimeter)

I (slope) = (assumed 1/1,000)

The discharging volume (Q) is given by $Q = A \times V$. The discharging volume of each u-channel is shown in the following table.

Table 1-2: Discharging Volume of U-channel by Manning Formula

| Type of u-channel Height is assumed 1m. Water Depth is assumed 80cm. | V (m/s) | Q (m ³ /h) |
|--|---------|-----------------------|
| W = 70cm | 0.948 | 1,912.00 |
| W = 1m | 1.109 | 3,193.00 |
| W = 1.5m | 1.292 | 5,581.00 |
| For reference: RCP, Diameter 1m | 0.965 | 2,182.355 |

From figure 1-2 (above)

At point ① :

Rain Volume $1,264\text{ m}^3/\text{h} < 1,912\text{ m}^3/\text{h}$, if u-channel W = 70cm is used.

At point ② :

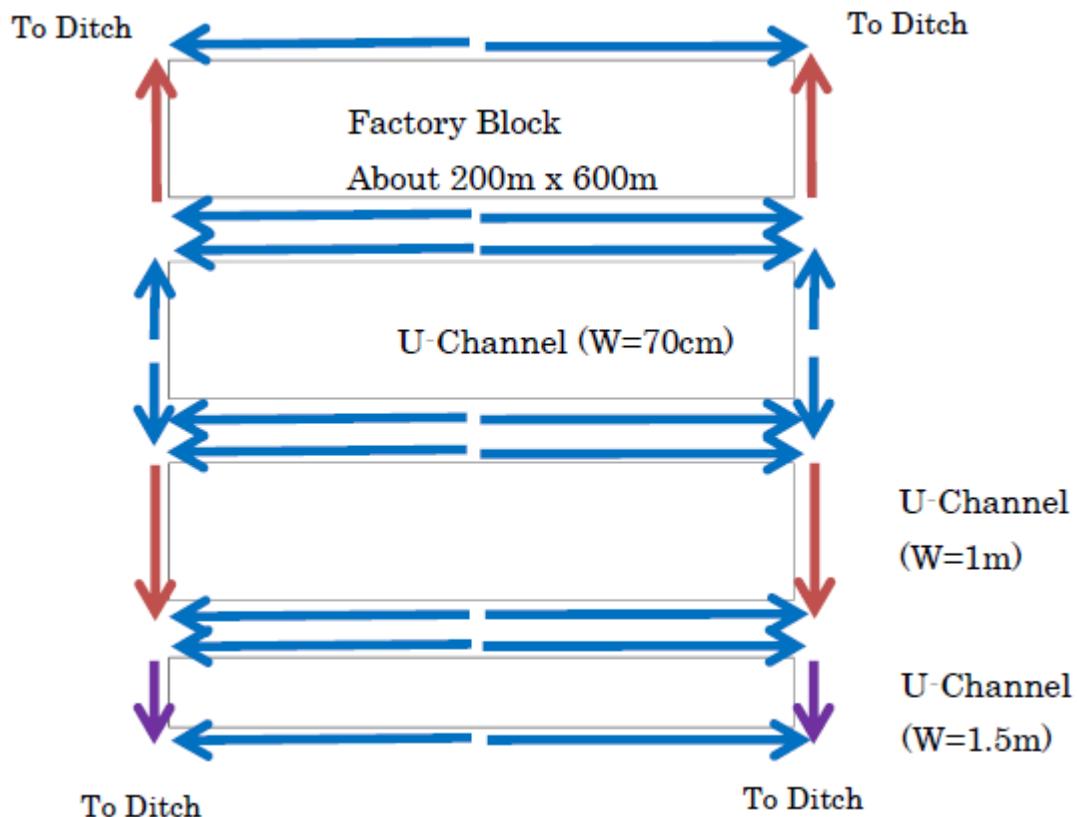
Rain Volume $1,264 + 1,264 = 2,528 \text{ m}^3/\text{h} < 3,193 \text{ m}^3/\text{h}$, if u-channel W =1m is used.

At point ③ :

Rain Volume $2,528 + 1,264 = 3,792 \text{ m}^3/\text{h} < 5,581 \text{ m}^3/\text{h}$, if u-channel W = 1.5m is used.

The dimensions of the u-channel are shown in the following Figure.

Figure 1-3: Dimensions of U-Channel



2. Design of Water Supply Treatment Plant

Mixing basin

Considering the capacity of the treatment plant is about $30,000\text{m}^3/\text{day}$ (i.e. 24 hrs.). The total quantity will be treated in 3 shifts; 8 hr. in each shift.

Flow per minute: $30,000\text{m}^3/\text{day} \sim 7,924,680 \text{ gallon/day} \sim 2,641,560 \text{ gallon/8hrs} \sim 1,059,449.197 \text{ cuft/day} \sim 353,149.73 \text{ cuft/8hrs} \sim 44,143.7 \text{ cuft/hr} \sim 735.7 \text{ cuft/min} \sim 55,032 \text{ gallon/min}$

Considering the mixing period to be 30 min,

The capacity of the mixing tank $736 \times 30 = 22,082 \text{ cu.ft.}$

In order to prevent sedimentation in the mixing tank, the velocity of flow should preferably be somewhat greater than 1 fpm.

If minimum velocity is considered to be 1 fpm and length is 30 ft. then the required cross section is $\frac{22080}{30} = 736 \text{ sq. ft.}$

This could be supplied by a section 10ft deep and 73.6ft wide. Because it is desirable to have velocity somewhat greater than 1 fpm, then the width of the tank maybe reduced to 40ft and depth 10 ft. The length of the tank will be $\frac{22080}{10 \times 40} = 55.2 \text{ ft.}$ considering it as 55 ft.

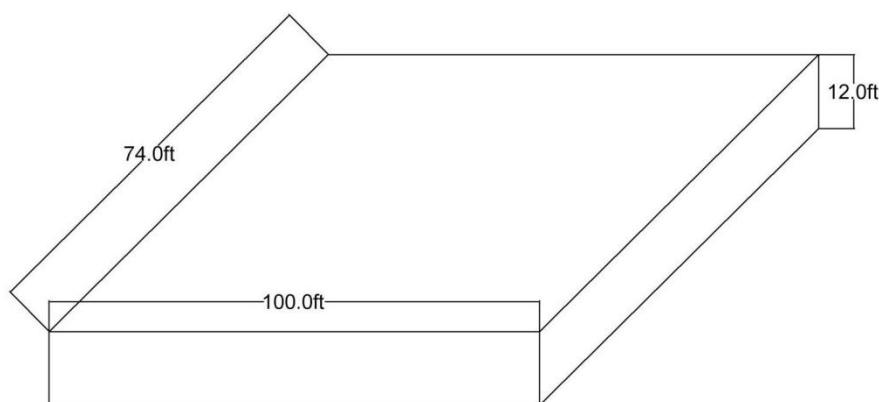
Desired velocity of flow $\frac{55}{30} = 1.84 \text{ fpm}$, which is satisfactory.

Sedimentation Tank

Since the estimated flow $736 \text{ cu. ft. /min} = 44,160 \text{ cu.ft./hr.}$ and the detention for settling time is 4 hrs. The required capacity of the sedimentation tank must be $44,160 \times 4 = 176,640 \text{ cu. ft.}$

In order to provide flexibility of control, there must be at least two sedimentation tanks, in which each basin will have a capacity of 88320 cu. ft. Since the rate of flow is 0.4 fpm and then the maximum permissible length of each tank would be $60 \times 4 \times 0.4 = 96 \text{ ft} \sim 100$, considered the velocity of flow will be $\frac{100}{4 \times 60} = 0.416 \text{ fpm}$ which is satisfactory. The cross sectional area will be $\frac{88320}{100} = 883 \text{ sq. ft.}$ A width of 74 ft. and depth 12ft the capacity of each tank will then be $100 \times 74 \times 12 \text{ ft} = 88,800 \text{ cu. ft.}$ 2 Units will be required.

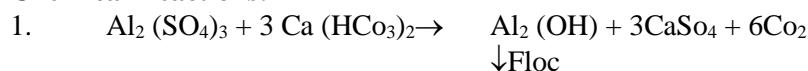
Figure 2-1: Typical dimension of sedimentation tank unit



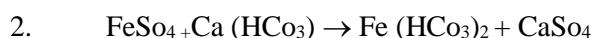
Chemicals to be used:

Coagulants commonly used are Alum or Aluminium Sulphate, Copper Sulphate, Iron Sulphate and lime.

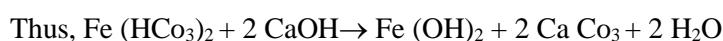
Other less commonly used coagulants are Sodium aluminate, ferric chloride, ferric sulphate, chlorinated coppers and activated silica etc.

Chemical Reactions:

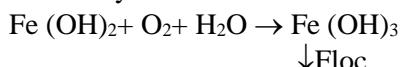
For water having low natural alkalinity, it would be necessary to add alkalies such as lime or soda ash in order that the coagulant remains active and is completely precipitated out during the chemical action.



The bicarbonate of iron is changed to iron hydroxide by the addition of caustic lime.



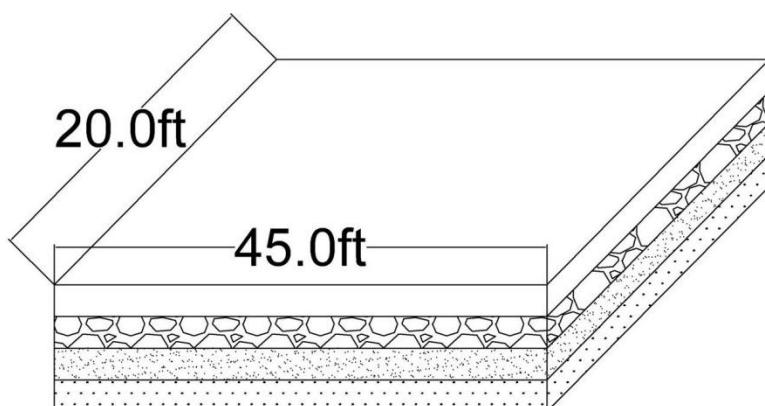
The reaction continues with the oxidation of the Ferrous hydroxide, by the oxygen present in the water, to Ferric hydroxide.

**Filters**

Since the flow is 5503 gallon/min) and the rate of filtration is 2 gallon/ sq. ft. of filter area, the required filter area is $\frac{5503}{2} = 2751$ gallon/sqft. Every filter plant should have at least three filtering units and if three units are provided in this plant the minimum area of each unit will be $\frac{2751}{3} = 917$ sq.ft.

For design purposes, it will be assumed that a filter unit will wash, drain and return to service in 15 minute which is about 3% of an 8 hr. run. Since not more than one filter will be washed in any one day, it may be assumed that all three units will be out of service only $\frac{3}{3} = 1\%$ of the time and the surface area of the filters should be about 1% greater than that required for full time operation. Therefore 908 sq. ft. represents 99% of the required area of the filter unit. If each unit is made $45 \times 20 = 900$ sq. ft., this is nearer to 908sft. which may be taken into consideration.

Figure 2-2: Typical diagram of a filter basin



Clear Water Reservoir

A clear water reservoir should be constructed after the filter bed. It may be rectangular or circular having a capacity of 10,000 m³ of water. The pipe gallery should be placed in the filter or at the end of the filter bed and connected to the clear water reservoir. From the clear water reservoir the delivery pipe will delivery water through a pumping system to the distribution network directly or to the elevated tank for supply to the basement of the industry.

Back Wash Water Tank

Washing to filters requires 15 gpm per sq. ft. For surface area i.e. 900 x 15 = 13,500gpm of water is required. The wash water should not enter the filter with a velocity greater than 10 fps and the pressure at the strainer should be about 15 psi. This is equivalent to 35 ft. of head. Thus the wash water tank, in which the low-water level should be 40ft above filter, will provide satisfactory pressure. The wash water tank must have a capacity of at least 0.04 x 2,641,560 = 105,662.4 gallon tank may be used. Since the low water level of the wash water in the tank is to be 4' above the water surface in the filters, the tank will have to be mounted on supports. An elevated tank of standard type will provided.

For 60,000 m³/day, 2 complete units of 30,000m³ treatment plants should be used to ensure better operation.

3. On and Offsite Infrastructure Requirement and Cost

The design concept, principle and costs are shown in the following sections. All the construction costs have been derived from the latest cost schedule of LGED and PWD. It is common practice in Bangladesh to obtain estimation.

3.1. Preparation (Land Clearing, Dredging, and Grading)

The development area is basically flat area and simple clearing work might be necessary for the entire field. It is assumed that surface soil is stripped by 30cm. According to the topological analysis in the site assessment, the designed elevation for grading should be EL+12m which will be done by dredging.

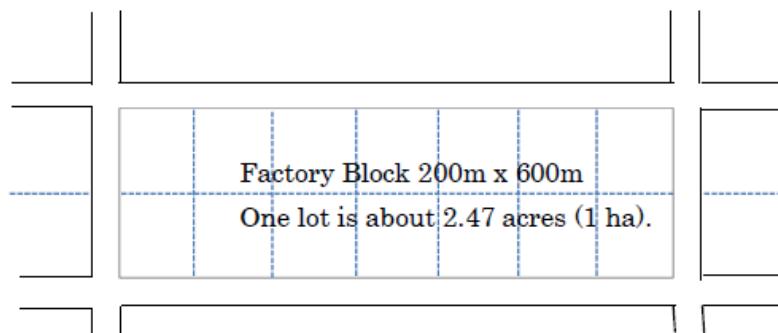
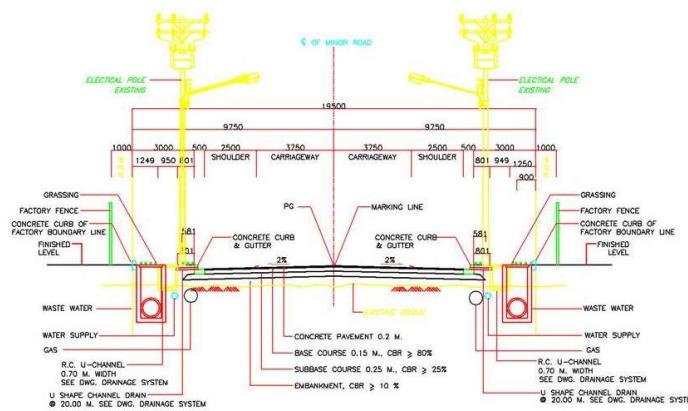
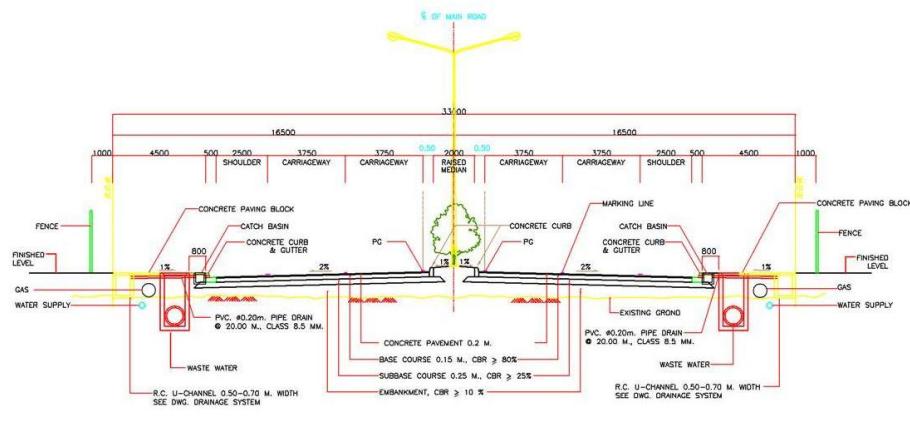
3.2. Road System

3.2.1. Roads inside the Economic Zone

Two types of road are selected for the road network design; main Road (width: 33m) and a minor Road (width: 19.5m). The main road is divided by the central median. The carriageway of each direction of traffic is 7.50 m. (3.75 m. per lane) with 2.50 m. shoulder. A 4.50 m. sidewalk is also provided on both sides of the road beyond the shoulder. Plants will be provided on the central reservation and street lighting is provided on the central reservation on the main road. The minor road is planned to be an undivided 2-lane concrete pavement. The carriageway of each direction of traffic is 3.75 m. with 2.50 m. shoulder. The 3.25 m. sidewalk is to be also provided on both sides of the road beyond the shoulder. Street lighting is to be provided on both sides of the sidewalk. A cross section of the main and minor road is shown in the following figures.

The main Road is planned from the entrance to the very back of the economic zone for smooth traffic flow of incoming and outgoing vehicles.

The entrance/exit of factories should not be along the main road but along the minor road. It will smooth the transport flow inside the economic zone. The road network is planned in order to divide the factory lot block by approximately 200m x 600m, on average, for optimizing the traffic flow.

Figure 3.2.1-1: Standard Factory Block and Road Network**Figure 3.2.1-2: Typical Cross Section of Main Road and Minor Road**

3.2.2. Road Widening in front of the Economic Zone

An additional carriageway for both sides of the existing highway should be added to widen the road all along the front of the industrial zone in order to reduce congestion.

3.3. Dike System

A dike is necessary to block the flood from outside and a ditch/retention pond is necessary to stop the overflow of the rain falling inside the EZ. First, rain falls on the Economic Zone ground or factory roof. Next, the rain water flows into the drainage u-channel and flows into the ditch along the dike. Finally the rain reaches the retention pond which should be located along the ditch. During the rainy season, the retained rain water will be pumped out by the mechanical pumps which are equipped at the pump sump structure (pump house). According to the past maximum, river surface elevation is EL+9.68m (section 3.1.4). The designed finishing ground level is EL+12m. Due to the unforeseen and potential risk such as the effects of global warming; it is very difficult to forecast the future flooding level. With this situation, the dike elevation is designed as +14m which will give confidence to incoming tenants.

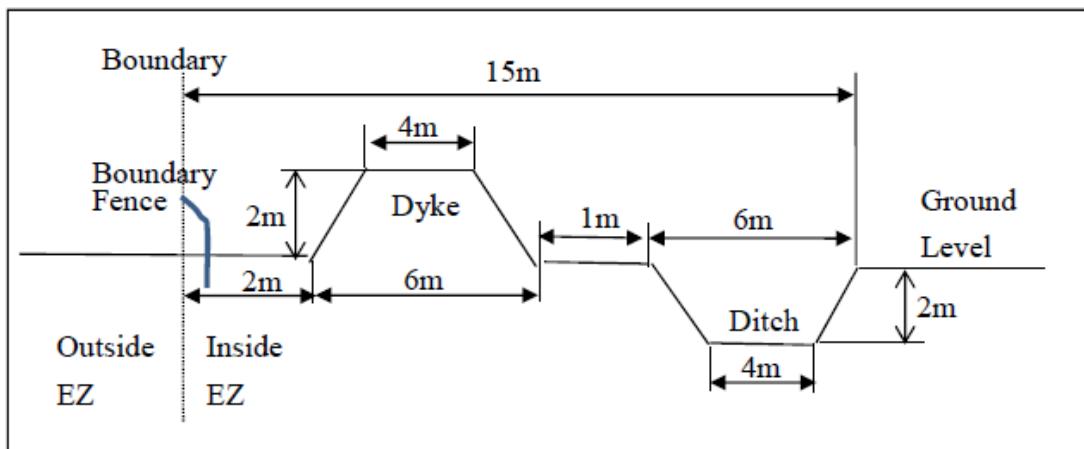
The following dimensions are recommended:

- Dike (height is 2m, side slope is 1:0.5)
- Ditch along the dike: (depth 2m, side slope is 1:0.5)

The dike is embanked by the excavated soils from the ditch in order for the soil volume to be balanced. The excavated soils from the retention pond will be used for levelling the EZ area. The standard cross section of dike/ditch and the cost for the Dike System are shown in the following figure and table, respectively.

The engineering calculation for the drainage system is shown in Annex (Chapter 3).

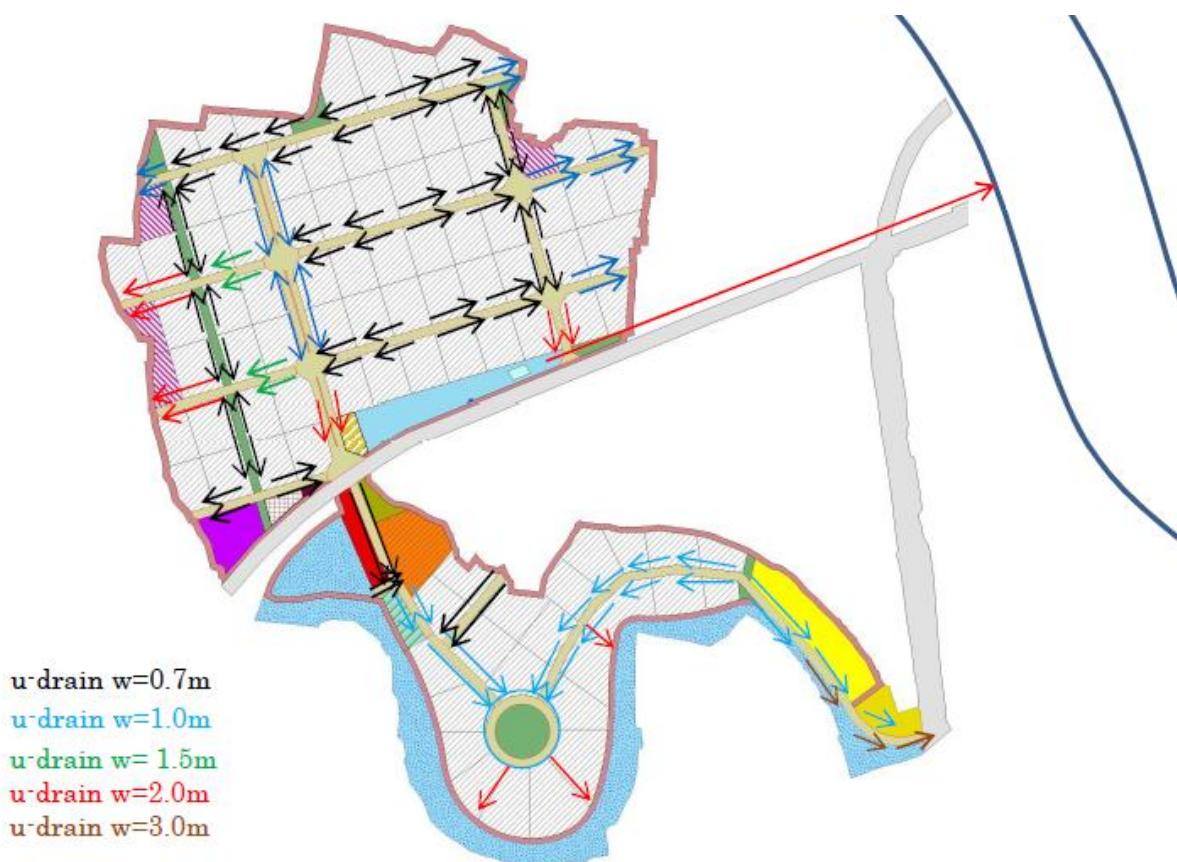
Figure 3.3-1: Standard Cross Section of Dike System



3.4. Drainage System

The dimension of U-channel (width 0.7~2.0m, average depth 1m) is selected through engineering analysis shown in the Annex-4 (Section 1).

Following these analysis, the quantity of the drainage system is calculated. The cost estimate and drainage network are summarized in the following table and figure.

Figure 3.4.1: Drainage System

3.5. Water Supply Treatment System

3.5.1. Standard

The standard for water supply is given in the following tables.

Table 3.5.1-1: Water Quality General Standard for Industrial Water

| No . | Item | Unit | General Standard in Japan | General Standard in Bangladesh |
|------|--------------------------------|------------------------|---------------------------|--------------------------------|
| 1 | Turbidity | NTU | 20 | |
| 2 | pH | | 6.5 – 8.0 | 6-9 |
| 3 | Total Alkalinity | CaCO ₃ mg/L | 75 | 120 |
| 4 | Total Hardness | CaCO ₃ mg/l | 120 | 500 |
| 5 | Iron | mg/L | 0.3 | 1.0 |
| 6 | Mn | mg/L | 0.2 | 5.0 |
| 7 | Evaporation residual substance | mg/L | 250 | |
| 8 | Ion Chlorine | Cl ⁻ mg/L | 80 | 600 |
| 9 | Total Coli form | Count/100mL | 0 | |
| 10 | Arsenic | mg/l | 0 | 0.05 |
| 11 | BOD | mg/l | | 50 |

Table 3.5.1-2: Water Quality Standard for Drinking Water

| Test | | | WHO | Cambodia | Bangladesh |
|------|-------------------|-------|-----------|-----------|------------|
| No. | Parameter | Unit | | | |
| I | Basic Measurement | | | | |
| 1 | Color | TCU | '1/15 | '1/5 | 15 |
| 2 | Temperature | °C | | | 20-30 |
| 3 | Conductivity | µs/cm | 400 | 1,500 | |
| 4 | pH | | 6.5 – 8.5 | 6.5 – 8.5 | 6.5-8.5 |
| 5 | Turbidity | NTU | 5 | 5 | 10 |
| 6 | Suspended Solid | mg/l | 1 | | 10 |

3.5.2. Water Supply Treatment Plant

River Intake

For extraction of a good quality of water, the river intake should be placed at a distance free from habitation, so that less contamination of river water should occur and less turbid and suspended solid free water may be available.

The surface water contains organic and inorganic impurities and both types may be in the form of suspended, colloidal and dissolved forms. Water analysis is to be carried out to ascertain various types of impurities present in it. It is the analysis of water which sets out the outline for treatment of water. Analysis of the water will indicate what types of impurities and to what extent they are present in the water and what units are necessary. Where the level of water in the river is fairly constant and the river bank is steep, the intake work can be constructed adjacent to the bank. In this case water is drawn from the river through a pipe laid horizontally.

The following points should be taken into consideration:

- a) The water intake should be located in a place where there is no fast current which may endanger the intake causing interruption of water supply.
- b) The ground near the intake should be stable. A straight part of the river is always preferable as the risk of erosion of the bank in this case is minimal.
- c) Approach to the intake should be free from obstacles.
- d) The intake should be well below the surface of the river for receiving clear water and for preventing the entry of floating matter. To prevent the entry of suspended matter near the bottom, the inlet point should also be well above the bottom of the water body.
- e) To avoid possible contamination of the bank, the intake should be located at some distance from the bank.
- f) The intake should be located upstream of the town.

The main current, lowest water level in the river and navigation facilities should be considered in locating the intake. A curtain wall may be constructed for diverting water into the intake structure at the bank in order to draw clear water from the stream. The intake structure and course and fine screens should be provided so that floating matter may not enter the supply system. Considering the fluctuation in water level, the intake may be provided in the well at various levels.

Since the quality of water varies from source to source and also season to season, it is essential to take and analyse daily samples. The river intake and treatment plant should be set in such a way that it can be run from time to time according to the demand.

It is suggested that the location of the water supply treatment plant should be as close as possible to the river intake. This will avoid clogging the transmission main by sedimentation of raw water. But as

there is no space available near the river intake site; the water is to be transported to the site using the transmission main and then treated.

Water Treatment

Water available from various sources contains various types of impurities. The raw water available cannot be used unless it is made safe for the purpose. The object of treatment of water is to eliminate all such impurities which cause troubles and make water unsafe. All the harmful impurities need not be fully eliminated, but should be reduced to such an extent that water becomes suitable for the intended use. Therefore, the nature of the treatment to be given to raw water depends upon the initial quality of the raw water and the desired degree of purity to be attained after treatment.

Impurities in Water

The impurities in water may be physical, chemical, and bacteriological. Physical impurities which give colour, taste and odour, are the least important, though they assume importance from the point of view of the consumers. The chemical impurities may be either inorganic or organic. The bacteriological impurities are the most important from the public health point of view. The presence of a pathogenic strain of E.coli bacteria makes water unfit for human consumption.

Objectives of Treatment

The objectives of treatment processes are to remove all the undesirable impurities, to extent where they do not cause any trouble to human health and water is available to the consumer as per health standards with the following objectives:

- (i) To remove colour, dissolved gases and murkiness of water.
- (ii) To remove objectionable taste and odour from the water.
- (iii) To kill troublesome bacteria.
- (iv) To eliminate the corrosive and tuberculation properties of water. This treatment is essential from pipes and pipe fittings safety point of view.
- (v) To make water safe for drinking and domestic purposes and also for various industrial purposes like brewing, dyeing, steam boilers etc.

Treatment Process:-

Treatment processes are given below. It is not essential that all these processes will have to be employed in all places, but it depends upon the quality of the raw water. In the case of raw water, obtained from rivers, aeration is generally not required. Similarly, in the case of water obtained from lakes, screening and sedimentation are not required because suspended and floating debris have already settled in the lake basin. But aeration is a must because lake waters have generally an objectionable odour. If raw water is obtained from deep wells, practically no treatment is required. Only disinfection is needed before being supplied to the consumers. Therefore, the character and degree of treatment directly depends upon the nature of water or in other words on the source.

Treatment Processes

1. Screening: It is used to exclude floating matter. This is accomplished at the intake.
2. Aeration: This process is employed, where elements causing taste and odour have to be removed.
3. Plain Sedimentation: In this process, suspended impurities like silt, clay and sand etc. are removed.
2. Sedimentation with coagulation: Fine suspended particles and some bacteria are removed.
2. Filtration: This process is employed to remove very fine particles and colloidal matter which may have escaped from sedimentation processes. Micro-organisms are also removed.
3. Disinfection: To render water safe against disease producing bacteria.
4. Other process: There are some processes which are used in some specific cases only.
 - (i) Removing hardness if it is beyond permissible limits.
 - (ii) Removing colour taste and odour if any.
 - (iii) Removing iron and manganese if present.

- (iv) Maintaining fluorides between 1 to 1.5 ppm. By adding if in deficiency and removing if in excess.

Methods of Treatment

A list of Treatment processes involved in the treatment of water. The sole aim of treatment of water is to render it safe for domestic and other purposes. There is no hard and fast rule in regard to the sequence of various treatment units in a water treatment plant. It actually depends on the nature of raw water and the desired standard of treated water. All the treatment processes are not necessarily always required. For example, as previously stated, if raw water is being taken from a deep well, it will not require any treatment except disinfection or possibly softening along with disinfection. Similarly water obtained from river requires treatments like screening, sedimentation, filtration and disinfection, but not like aeration, softening etc. Lake water does not require screening and sedimentation, but may require aeration, coagulation, filtration, and disinfection.

If ground water or surface water sources are well protected and turbidity of water is less than 10 JTU and also water is free from odour and colour, only plain disinfection by chlorination is considered adequate, before water is supplied to the consumers.

Where ground water contains excessive iron, dissolved CO₂ and odorous gases, aeration followed by flocculation and sedimentation, rapid gravity, or pressure filtration and chlorination may be necessary. If it contains only CO₂ or odorous gases, aeration followed by disinfection may be sufficient. If surface water contains turbidity not more than 50 JTU and where a sufficient area is available, plain sedimentation followed by slow sand filtration and disinfection may be adopted.

Conventional treatment including pre-chlorination, aeration, flocculation and sedimentation, rapid gravity filtration, and post-chlorination are adopted for highly polluted surface waters, laden with algae, or microscopic animals. Water with excessive hardness needs softening followed by rapid sand filtration and post-chlorination. For removal of dissolved solids, de-mineralization by ion exchange may form a part of the domestic or industrial water treatment units.

Location of Treatment Plants:-

Correct location of the treatment plant plays a very important role in its success. Location of the treatment plant depends, on the relative position of the source of water. As far as possible, the treatment plant should be located in a place from where water can be distributed easily. A good location ensures that the treated water reaches the consumers immediately and chances of its contamination during transmission from treatment plant to the consumer are reduced. Loss of head is also reduced and water at the top becomes available at higher pressure. However, if the area is located near the bank of the river, the treatment plant should be located near the source. This will reduce the length of the rising main, in which wear and tear due to muddy water may be more.

If the source of water supply is tube-well, practically no treatment plant is required. However, if a plant has to be set up for removal of hardness or for disinfection purpose, it should be located in the central part of the project. If the project area is quite large and water cannot be supplied from one tube well, the area may be divided into zones and each zone provided with a separate tube-well or well field system with all the necessary treatment plant attached to it, but there should be inter connection in between them.

Layout of Treatment Plants:-

A complete water treatment plant consists of:

- (i) Intake works including pumping plant.
- (ii) Plain sedimentation.
- (iii) Sedimentation with coagulation.
- (iv) Filtration.

- (v) Disinfection.
- (vi) Pure water storage reservoir.
- (vii) Pumping plant for pumping purified water from clear water storage reservoir to the elevated service reservoir.
- (viii) If water is hard, sometimes, softening plant is used, before the filtration plant.
- (ix) Distribution system.

Around 30 acres of land will be required for construction of a complete water treatment plant.

While planning the layout of the treatment plant the following points should be considered:-

1. All the processes should be located in such a sequence that water may be flowing from one process to the other, automatically.
2. Elevations of different processes should be such that no pumping is required and water keeps on flowing from one plant to the other but for houses or flats, pumping is necessary.
3. All the plants should be located in such a way that minimum area is covered by it. Adequate space should remain available for the future extension.
4. Residential colony should be located by the side of the water works. This facilitates better working and control on the working of different processes.
5. A well established laboratory should be located at the site, so that the quality of water may be checked, before treatment and after treatment. Turbidity, test for solids, hardness, PH values, chlorides, biological tests, etc. can be carried out in the laboratory. Even research work may also be undertaken in order to suitably modify any process.

It is not possible to find absolutely pure water in nature. Pure water is that which contains two parts of hydrogen and one part of oxygen (H_2O) and nothing else. Water drops just emitting from the clouds, may be considered pure water. But as the drops fall, certain gases are dissolved in it and make water impure. After falling over the ground, the water dissolves certain minerals and salts and thus water becomes more and more impure. If this water, before supplying to the consumer, is to be completely purified, it will require a very exhaustive treatment. Absolute purification of water is not required, because certain dissolved salts are good for health and make water taste good. By purification of water, it is meant that only those impurities are to be removed by treatment which is not good for health. Impurities that are not harmful and some useful impurities are not to be removed during treatment. Such water which does not contain harmful impurities and does contain other salts and impurities either good for health or not harmful to health is called potable or wholesome water. The degree of purity of water also depends upon its use. The purity of water required for civic purposes may not be enough for the water used in domestic purposes. Therefore, the term pure water is a relative term and it has to be interpreted in relation to its use. The concept of pure water, potable water, or wholesome water, in relation to its various uses can be understood.

1. Domestic Use: Degree of purity required for this purpose is highest in relation to other uses of water. Water for this purpose should be free from suspended impurities, dissolved harmful salts and disease producing bacteria. Water should not be very hard, but some hardness is tolerable.
2. Civil uses: Water requirements for this purpose are large and the nature of use of water is such that any degree of impurity of water will do. But water mixed with waste and other refuse cannot be tolerated. Purified effluent from Waste treatment plants which is more or less pure water may be tolerated for this purpose. In other words, water having a large amount of suspended and dissolved impurities may be allowed for this purpose.
3. Trade use: Purity of water for this purpose depends upon the nature of trade. For example, water required for laundry should not be hard, but if required in stables for cattle etc., it may contain impurities to some extent.
4. Commercial use: For this purpose water should be chemically pure. Various manufacturing units require absolutely pure water because even slight amounts of impurity may considerably influence the final product. The nature of water required by different factories may be so varying that normally factories install their own water supply plants, suiting to their requirements.

The following are the requirements of potable water for domestic use:

- (i) It should be free from disease producing bacteria.
- (ii) It should be colourless, odourless and clear.
- (iii) It should be tasty.
- (iv) It should not corrode pipes and other fittings.
- (v) It should be free from harmful salts and other objectionable matter.

The existing water body inside the Sherpur EZ site will be used as a primary sedimentation basin for the WSTP. The present condition is shown in the following photograph.



Photo: Primary Sedimentation (Retention) Lake

Rainwater

Bangladesh is a tropical country and receives heavy rainfall due to north-easterly winds during the rainy season. Rainwater can be a potential source of water supply in Bangladesh. In the coastal districts, particularly in the offshore islands of Bangladesh, rainwater has been used for drinking purposes since time immemorial. The protected ponds annually replenished by rainwater are a main source of water supply in the coastal area. Since various uses and unhygienic practices pollute these ponds, rainwater harvesting can be an alternative option for a good quality water supply. In some areas having a high salinity problem, as many as 36% of households have been found to harvest rainwater in the rainy season for drinking purposes. But the collection, storage, and use of rainwater are not organized and need development through adoption of appropriate technologies.

The average yearly rainfall in Bangladesh varies from 2,200 to 2,800mm, 75% of which occurs between May to September. The highest rainfall occurs in the eastern part of Bangladesh, including the eastern part of the coastal area and highest rainfall occurs in the north-eastern region of the country. The low rainfall, less than 1,500 mm, occurs in the western part of Bangladesh. The coastal and hilly area with high source problem intensity lies in the high rainfall areas. The high rainfall intensity in these difficult areas provides a good opportunity for rainwater harvesting. The unequal monthly rainfall distribution over the year indicates that a water supply system completely based on rainwater requires large rainwater storage reservoirs.

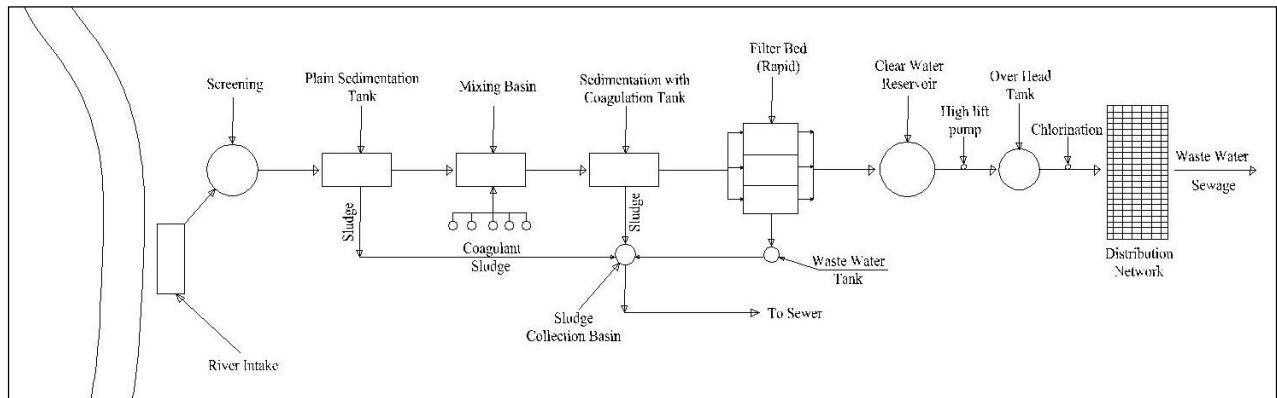
Design of Water Supply Treatment Plant

The calculation for the design of the water supply treatment plant is given in Annex (Chapter 3). The following table shows the dimensions of some parameters of the WSTP.

Table 3.5.2-1: Design of treatment Plant

| Name of Unit | Depth | Width | Length |
|--------------------|--------------|-------|--------|
| Mixing Basin | 10' | 40ft | 46' |
| Sedimentation Tank | 10' | 73' | 96' |
| Filter 3 units | 4 Filter Bed | 20ft | 38' |

The grain size of filter materials will have to be determined after sieve analysis.
Size of clean water Reservoir= 8500 m³, Back wash water tank= 90000 gallon

Figure 3.5.2-1: Diagrammatic sketch (Flow Diagram) Typical Water Supply System

3.5.3. Water Distribution System

1) Demand Forecast of Water

The maximum total water demand (60,000 m³ / day) is assumed (Section 3.3).

2) Water Supply Stations

The water supply system has two sections/functions. One is the water supply treatment plant and the other is the water distribution network. River water is selected as the main water supply source. At the water intake station, river water is pumped in and cleaned by passing through the special facilities installed at each water supply station.

3) Water Distribution Networks

Water Distribution Networks play the role of delivering water to each factory along the roads. The water supply treatment plant is planned inside the housing zone. The treatment system is composed of the following:

- River water intake
- Reservoir
- Treatment Plat
- Tank and Tower
- Distribution Pipe Network

Gravity feed system will be used to supply water to the water supply pipe line to be located along the footpath of the road inside the Project. The size of the main water supply pipe will be from 150 mm. – 300 mm. and water supply pressure is in the range of 1.0 – 3.0 bars. The main water supply pipe will be of high density polyethylene (HDPE) if available to avoid corrosion as well as breaking problems

in the future. The main water supply pipe will be connected into a loop to provide a more reliable water supply to the project area.

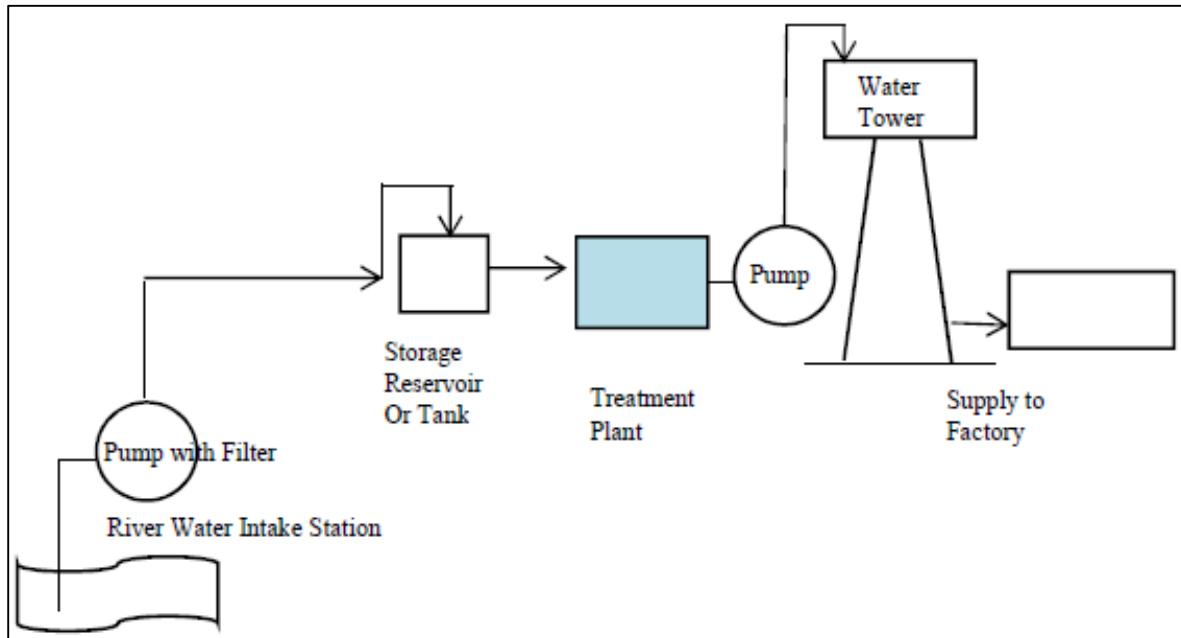
4) Fire Protection System

Besides a fire station and fire truck, fire hydrants will be provided along the project roads at the interval of approximately 200 metres or according to the local standard, to supply water in case of fire.

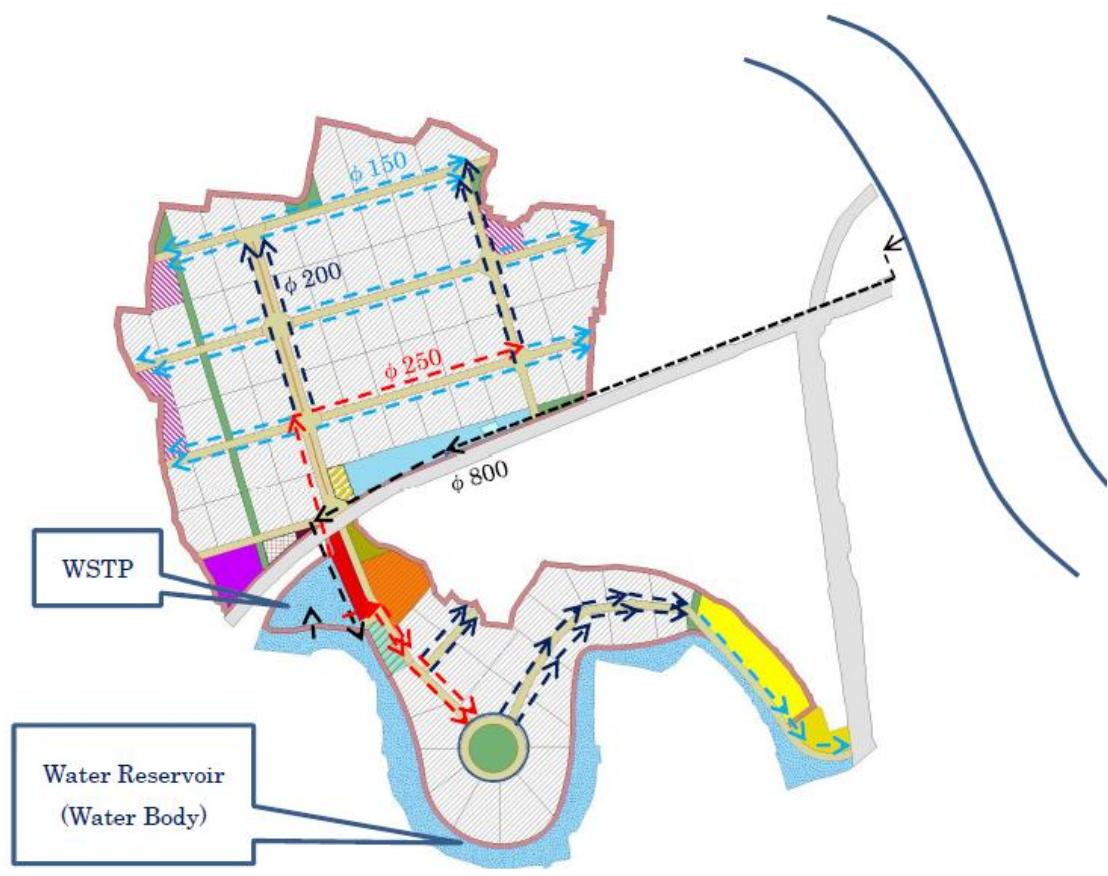
5) Basic Concept Drawing of Water Supply System

The basic water supply system is shown in the following figures.

Figure 3.5.3-1: Diagram for Water Supply System



Details of the treatment plant are explained in the section 3.5.2 (Water Supply Treatment Plant). The supply pipe network is shown in the following figure.

Figure 3.5.3-2: Water Supply Network System

3.6. Waste Water Treatment System

3.6.1. Effluent Standard

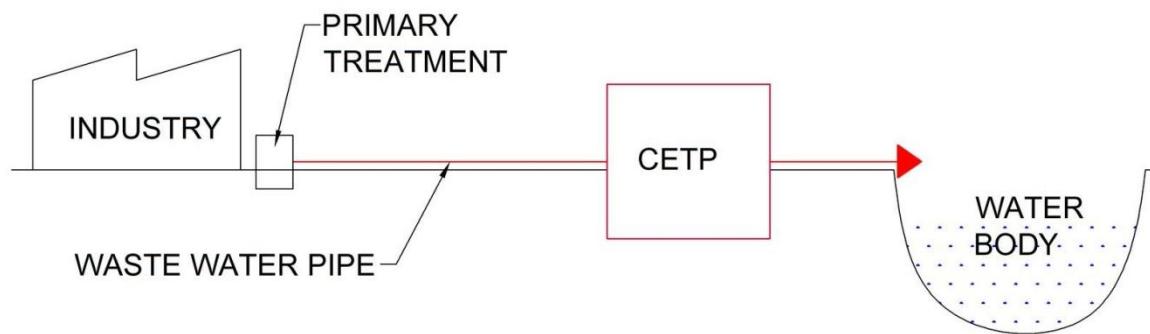
Table 3.6.1-1: Waste Water Effluent Standard

| No | Parameters | Unit | Cambodia | | Bangladesh |
|----|------------------------|------|---|-----------------------------|------------|
| | | | Allowable limits for pollutant substance discharging to | | |
| | | | Protected public water area | Public water area and sewer | |
| 1 | Temperature | °C | < 45 | < 45 | 40 |
| 2 | pH | | 6 – 9 | 5 - 9 | 6-9 |
| 3 | BOD5 (5 days at 20 °C) | mg/l | < 30 | < 80 | 250 |
| 4 | COD | mg/l | < 50 | < 100 | 400 |
| 5 | Total Suspended Solids | mg/l | < 50 | < 80 | 150 |
| 6 | Total Dissolved Solids | mg/l | < 1000 | < 2000 | 2100 |
| 7 | Grease and Oil | mg/l | < 5.0 | < 15 | 10 |
| 8 | Detergents | mg/l | < 5.0 | < 15 | |
| 9 | Phenols | mg/l | < 0.1 | < 1.2 | 1.0 |
| 10 | Nitrate (NO3) | mg/l | < 10 | < 20 | 10 |
| 11 | Chlorine (free) | mg/l | < 1.0 | < 2.0 | |
| 12 | Chloride (ion) | mg/l | < 500 | < 700 | 600 |
| 13 | Sulphate (as SO4) | mg/l | < 300 | < 500 | 400 |

| No | Parameters | Unit | Cambodia | | Bangladesh | |
|----|------------------------------|------|---|-----------------------------|------------|--|
| | | | Allowable limits for pollutant substance discharging to | | | |
| | | | Protected public water area | Public water area and sewer | | |
| 14 | Sulphide (as Sulphur) | mg/l | < 0.2 | < 1.0 | 2.0 | |
| 15 | Phosphate (PO ₄) | mg/l | < 3.0 | < 6.0 | 5.0 | |
| 16 | Cyanide (CN) | mg/l | < 0.2 | < 1.5 | 2.0 | |
| 17 | Barium (Ba) | mg/l | < 4.0 | < 7.0 | | |
| 18 | Arsenic (As) | mg/l | < 0.10 | < 1.0 | 0.05 | |
| 19 | Tin (Sn) | mg/l | < 2.0 | < 8.0 | | |
| 20 | Iron (Fe) | mg/l | < 1.0 | < 20 | 2.0 | |
| 21 | Boron (B) | mg/l | < 1.0 | < 5.0 | 2.0 | |
| 22 | Manganese (Mn) | mg/l | < 1.0 | < 5.0 | 5.0 | |
| 23 | Cadmium (Cd) | mg/l | < 0.1 | < 0.5 | 0.05 | |
| 24 | Chromium (Cr)+3 | mg/l | < 0.2 | < 1.0 | 1.0 | |
| 25 | Chromium (Cr)+6 | mg/l | < 0.05 | < 0.5 | 1.0 | |
| 26 | Copper (Cu) | mg/l | < 0.2 | < 1.0 | 3.0 | |
| 27 | Lead (Pb) | mg/l | < 0.1 | < 1.0 | 1.0 | |
| 28 | Mercury (Hg) | mg/l | < 0.002 | < 0.05 | 0.01 | |
| 29 | Nickel (Ni) | mg/l | < 0.2 | < 1.0 | 2.0 | |
| 30 | Selenium (Se) | mg/l | < 0.05 | < 0.5 | 0.05 | |
| 31 | Silver (Ag) | mg/l | < 0.1 | < 0.5 | | |
| 32 | Zinc (Zn) | mg/l | < 1.0 | < 3.0 | 10 | |
| 33 | Molybdenum (Mo) | mg/l | < 0.1 | < 1.0 | | |
| 34 | Ammonia (NH ₃) | mg/l | < 5.0 | < 7.0 | 5.0 | |
| 35 | DO | mg/l | > 2.0 | > 1.0 | 4.5-8.0 | |
| 36 | Polychlorinated Biphenyl | mg/l | < 0.003 | < 0.003 | | |
| 37 | Calcium | mg/l | < 150 | < 200 | | |
| 38 | Magnesium | mg/l | < 150 | < 200 | | |
| 39 | Carbon tetrachloride | mg/l | < 3 | < 3 | | |
| 40 | Hexachloro benzene | mg/l | < 2 | < 2 | | |
| 41 | DDT | mg/l | < 1.3 | < 1.3 | | |
| 42 | Endrin | mg/l | < 0.01 | < 0.01 | | |
| 43 | Dieldrin | mg/l | < 0.01 | < 0.01 | | |
| 44 | Aldrin | mg/l | < 0.01 | < 0.01 | | |
| 45 | Isodrin | mg/l | < 0.01 | < 0.01 | | |
| 46 | Perchloro ethylene | mg/l | < 2.5 | < 2.5 | | |
| 47 | Hexachloro butadiene | mg/l | < 3 | < 3 | | |
| 48 | Chloroform | mg/l | < 1 | < 1 | | |
| 49 | 1,2 Dichloro ethylene | mg/l | < 2.5 | < 2.5 | | |
| 50 | Trichloro ethylene | mg/l | < 1 | < 1 | | |
| 51 | Trichloro benzene | mg/l | < 2 | < 2 | | |
| 52 | Hexachloro cyclohexene | mg/l | < 2 | < 2 | | |

3.6.2. Recommendation for Waste Water Discharge Standard

The waste water will be collected from the industries through a waste water pipe network. The industries will be liable to do preliminary treatment for their waste and maintain the recommended standard in table 3.6.2-1. The following figure shows the sketch for preliminary treatment and CETP treatment system.

Figure 3.6.2-1: Proposed treatment system for waste water**Table 3.6.2-1:** Recommended First and Second Level Standard for the EZ

| Sl. No. | Parameters | Unit | First Level Standards for the Industries | Standards for CETP |
|---------|------------------------|------|--|--------------------|
| 1 | Temperature | °C | < 45 | 40 |
| 2 | pH | | 10 | 6-8 |
| 3 | BOD5 (5 days at 20 °C) | mg/l | <50 | <30 |
| 4 | COD | mg/l | < 50 | <30 |
| 5 | Total Suspended Solids | mg/l | < 50 | <30 |
| 6 | Total Dissolved Solids | mg/l | < 1200 | <1000 |
| 7 | Grease and Oil | mg/l | <10.0 | <5 |
| 10 | Nitrate (NO3) | mg/l | < 15 | <10 |
| 12 | Chloride (ion) | mg/l | <600 | < 500 |
| 13 | Sulphate (as SO4) | mg/l | <400 | <400 |
| 14 | Sulphide (as Sulphur) | mg/l | <1 | < 0.75 |
| 15 | Phosphate (PO4) | mg/l | <5.0 | < 3.0 |
| 16 | Cyanide (CN) | mg/l | <1 | < 0.75 |
| 18 | Arsenic (As) | mg/l | < 0.10 | <0.03 |
| 20 | Iron (Fe) | mg/l | <3.0 | < 1.5 |
| 21 | Boron (B) | mg/l | <2.0 | < 1.0 |
| 22 | Manganese (Mn) | mg/l | <5.0 | < 3.0 |
| 23 | Cadmium (Cd) | mg/l | < 0.1 | <0.05 |
| 24 | Chromium (Cr)+3 | mg/l | <1.0 | < 0.5 |
| 25 | Chromium (Cr)+6 | mg/l | <1.0 | < 0.5 |
| 26 | Copper (Cu) | mg/l | <2.0 | < 1.5 |
| 27 | Lead (Pb) | mg/l | <1.0 | < 0.3 |
| 28 | Mercury (Hg) | mg/l | < 0.005 | <0.002 |
| 29 | Nickel (Ni) | mg/l | <2.0 | < 0.5 |
| 30 | Selenium (Se) | mg/l | < 0.1 | <0.05 |
| 32 | Zinc (Zn) | mg/l | <15.0 | <10.0 |
| 34 | Ammonia (NH3) | mg/l | <8.0 | <5.0 |
| 35 | DO | mg/l | > 2.0 | > 7.0 |

3.6.3. Basic Design of Waste Water Treatment Plant

Before execution of the sewerage project, the first and most important aspect is its proper planning and the following points are to be considered:

- i) Size of the area, when congested, open, or well planned.
- ii) Whether the streets and roads are narrow, broad, straight, etc.

- iii) The general topography of the area.
- iv) An estimate of industries and population.
- v) Average waste water quantity and volume of sewerage is directly proportional to the water supply quantity.
- vi) General standard of the population nature, type of industry should be noted.
- vii) Proximity of water courses including sea, river, lagoon etc. should be noted.
- viii) General climate, annual average rainfall, distribution of rain fall and general temperature should be noted.
- ix) Position of sub soil water level should also be known.
- x) Possibilities of expansion of industry as well as population
- xi) Feasibility of installing a sewerage system.
- xii) System of Waste to be adopted; system may be separated, combined or partially combined.
- xiii) Quantity of Waste to be expected in each sewer line and then total quantity of waste to be handled at the out fall point.
- xiv) Disposal of waste on land and by dilution can be decided.

For industrial areas and those having international importance, a combined system can be particularly adapted. Where rainfall is evenly distributed throughout the year, a combined system is desirable.

In Bangladesh, separate systems are not usually constructed. In this system one sewer for sanitary industrial waste another for storm waste are to be provided. Installing two sewers is a costly affair. Mostly sanitary industrial sewers continue to work as designed, but storm water sewers come into use only during the rainy season. Even during the rainy season, their functioning is doubtful, because on dry days people dump garbage and other waste in the storm sewer through the openings, which may even block the sewer line.

The best course will be to go for a sewer line for sanitary industrial waste only but with suitable allowance for rain water. During the dry season there is no problem but during the rainy season, these sewers start flowing fully and within a matter of hours, the whole accumulated storm water is disposed of. Accumulated for some time this can be allowed because it is not dirty and may create nuisance.

If plenty of land area is available, the best method of waste disposal is by irrigation. This method is very economical because it may give good returns from irrigation by way of crops. If a big river is flowing by the side of the project area (For Sherpur) waste can be disposed in the river. If the situation demands treatment, it may be given to the waste before its disposal by dilution. In this case the aquatic life is to be considered.

The waste obtained from spent water in different industrial and commercial establishments is known as industrial waste. The quality and the degree of foulness depend upon the nature of the industry and processes involved. The nature of this waste is different from domestic waste and it sometimes has to be treated before allowing it to be discharged into public sewers.

Waste Disposal

Waste starts purifying after about four or five hours of its development. If waste is disposed of within this period, the treatment required to be given to waste will be relatively less exhaustive. Scientific disposal of waste will protect the health of the community and save it from bad smells, mosquitoes, obnoxious gases and other foul conditions. This will also reduce the danger of the spread of diseases like typhoid, cholera, dysentery, diarrhoea, etc.

Methods of waste disposal can be classified as follows:

1. Natural methods :
 - (i) By dilution and
 - (ii) Land treatment

2. Artificial methods :
- (i) Primary treatment and
 - (ii) Secondary treatment

In artificial methods of waste disposal, waste is given treatment which may be only primary or exhaustive before discharging the effluent into natural waters.

Disposal by Dilution

The disposal of waste, by discharge into water courses such as streams, rivers, or large bodies of water such as lakes, seas, etc. is called the dilution method or simply dilution. This method of disposal is only possible where the natural water, in required quantity is available nearby. While discharging waste in the body of water, it should be ascertained that the water is not polluted to such an extent that it becomes unfit for any other use. The waste to be disposed of may be raw or partially treated.

The waste, in time, is purified by what is known as the self-purification capacity of natural waters. The limit of waste discharge and degree of treatment of waste are determined by the capacity of self-purification of natural waters. The important factor in determining whether or not dilution is sufficient is the relationship between the organic loads due to waste.

Methods of Waste Treatment

Waste contains minerals and organic matters (1) in suspension (2) in the colloidal state and (3) in solution. Living organisms notably bacteria and protozoa, find, in the organic constituents of waste and abundant source of energy. The activities of the organisms result in the decomposition of the organic matter. Uncontrolled decomposition of waste renders offensive to the senses of smell and sight. The presence of disease producing organisms makes waste dangerous. Removal or stabilization of organic matters is accomplished in treatment works by a number of different operations or by a suitable combination of these operations into effective treatment processes. The individual units or operations and the purification affected in them.

Removal of solids by screening, skimming sedimentation and chemical precipitation filtration, stabilization of putrescible matter in suspension and sludge treatment is called primary treatment.

Further removal of solids with the aid of living organisms is called secondary treatment. The combination of primary and secondary treatments constitutes complete treatment.

Industrial waste may be liquid, solid, in gaseous form. Gas wastes directly go into the atmosphere and are disposed of automatically. If gas wastes are large, they may pollute the atmosphere, but they do not pollute the physical environment much. Solid dry waste resulting from the manufacturing process, if stabilized, do not create any problem in their disposal. But if they are in an un-stabilized state, they are generally mixed with water and converted into liquid form. Liquid wastes are the wastes which mostly result from the industries which are creating problems. The resulting waste water or industrial waste therefore, varies in quantity and nature according to use in each industry. It is not possible to lay down a common standard for industrial waste, because the industrial waste differs widely from industry to industry.

The quantity and strength of waste water from an industry varies widely depending upon the manufacturing process employed and method of control in different plants.

There are two methods of disposing of industrial wastes. One is to discharge the waste into the normal sewer system. The other method is to design and construct a separate plant to treat the industrial waste alone. In case of strong industrial waste it is to be given pre-treatment by the owners of industry before admitting it into the normal waste system. It may have to be neutralized for excess acidity, alkalinity, or other objectionable characteristics. Giving pre-treatment to industrial waste is generally the responsibility of the industry owners.

When the industrial waste and general waste are treated together, it may be assumed that the characteristic of the mixture of waste and industrial wastes are similar to domestic waste. Treatment will therefore follow the general procedure in the treatment of domestic waste. When separate treatment is provided for industrial waste some units of the treatment plant differ considerably in design from the units employed in waste treatment, though the same general method may be used.

The general methods are screening for grit removal, sedimentation, and chemical participation, biological processes such as filtration, neutralization, and chlorination. In all sorts of industrial wastes, it is not necessary that all these methods have to be adopted.

- a) Screening – The solids suspended in industrial waste are often so coarse that screens and racks achieve a degree of removal.
- b) Skimming - Grease traps and skimming tanks are used for the removal of grease, oil and from industrial Waste. Aeration and chlorination prove helpful in the removal of these substances.
- c) Sedimentation and coagulation – The sedimentation facilitation is often relatively simple. Lagoons, settling ponds in an earth basin and low laying areas may provide storage space for several years.
Coagulating chemicals are widely used. Draw and fill operation of tanks for the chlorination of chemically treated waste is commonly employed.
- d) Adsorption and Biological treatment – Some waste materials themselves possess useful absorptive properties. Some waste is very rich in organic matter.
Their anaerobic decomposition at higher temperatures is possible when the waste is especially thick.
- e) Irrigation -The disposal of industrial wastes by irrigation on land for cropping is simple. Preliminary treatment may be required to handle the waste water.
- f) Sludge Disposal - Some industrial sludge is sufficiently stable to be disposed of directly to the field or dumping area. Others may require digestion or incineration.
- g) Other treatment Method - The destruction of toxic metals in industrial waste water is normally achieved by chemical methods. There are various chemical methods. Its application for different chemicals is different.
- h) Radio-active waste - Radioactive waste is produced by the nuclear activities in that type of industry.
 - i) Storage for long time.
 - ii) Dilution in a natural water course.
 - iii) Burial in the ground
 - iv) Burial at sea.

Disposal by dilution in the natural bodies of water is not completely satisfactory as it needs a huge amount of water. If wastes are small they can be easily disposed by dilution. For larger amounts, disintegration is the only satisfactory method, but it takes a very long time. The requirement of land for a sewage treatment plant is 5 acres.

The treated waste water will be discharged in the Kushiyara River through a pipeline of 2,000 mm dia installed along the Dhaka-Sylhet Highway and disposed at 800 metres downstream from the proposed river intake point. Figure 3.5.1 shows the waste water discharge route for this EZ.

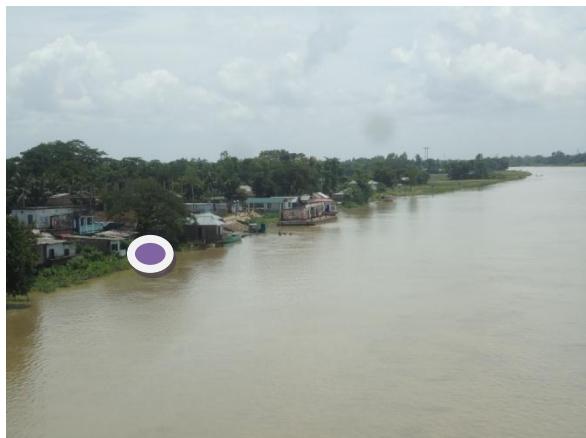
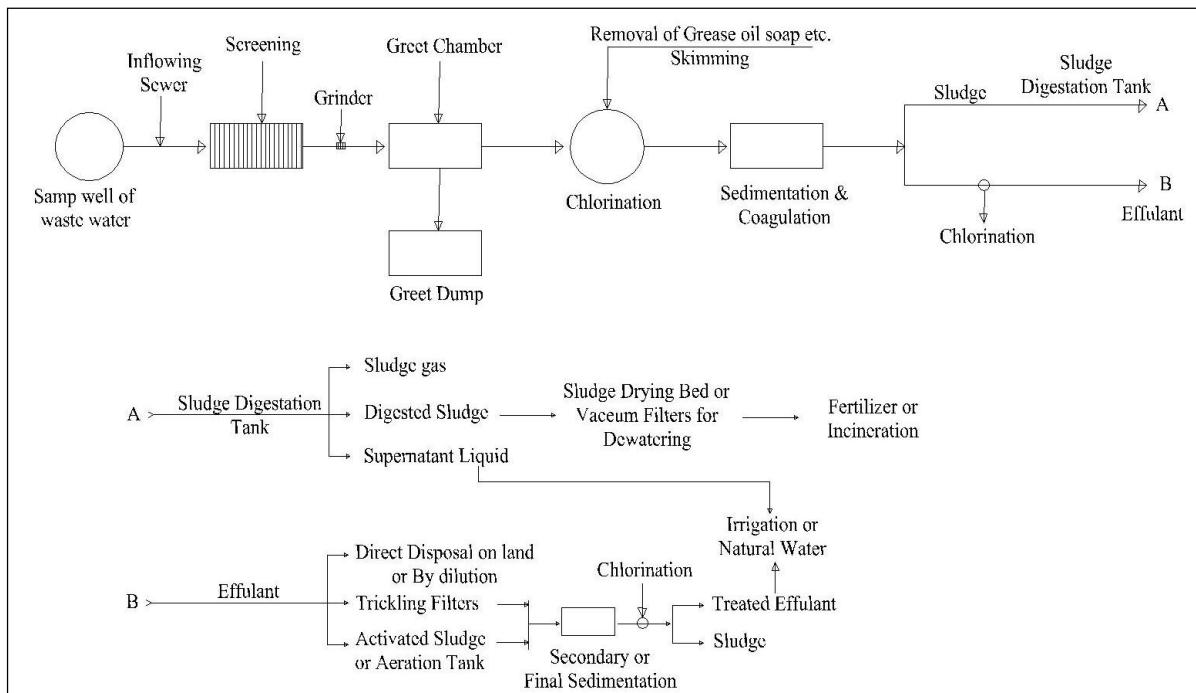


Photo: Effluent discharge point

Figure 3.6.3-1: Waste Water Treatment Flow Diagram



3.6.4. Waste Water Collection System

1) Treatment System

The following criteria will be used for designing of the wastewater system:

- Wastewater quantity discharged to the system will be 80% of the water supply.
- Gravity flow will be used for the sewerage pipe design as much as possible. In case the pipe depth is more than 3.5 – 4.0 metres, wastewater lifting station will be required.
- Sewer manhole will be provided at an interval of approximately 40 metres.
- Wastewater pipe material will be selected with consideration of the corrosion problem as well as optimum in cost. (RCP is recommended.)
- Pre-treatment for toxic and chemical constituent elimination from each factory is required prior to discharging to the wastewater system.
- Maximum value for some critical wastewater parameters that can be discharged to the

central wastewater treatment plant will be set up to prevent overloading of the treatment operation.

- Suitable building guidelines will be prepared before beginning the operation.
- Treated water can be used for recycled water for maintaining trees or greenery inside the zone through underground u-pvc pipes.

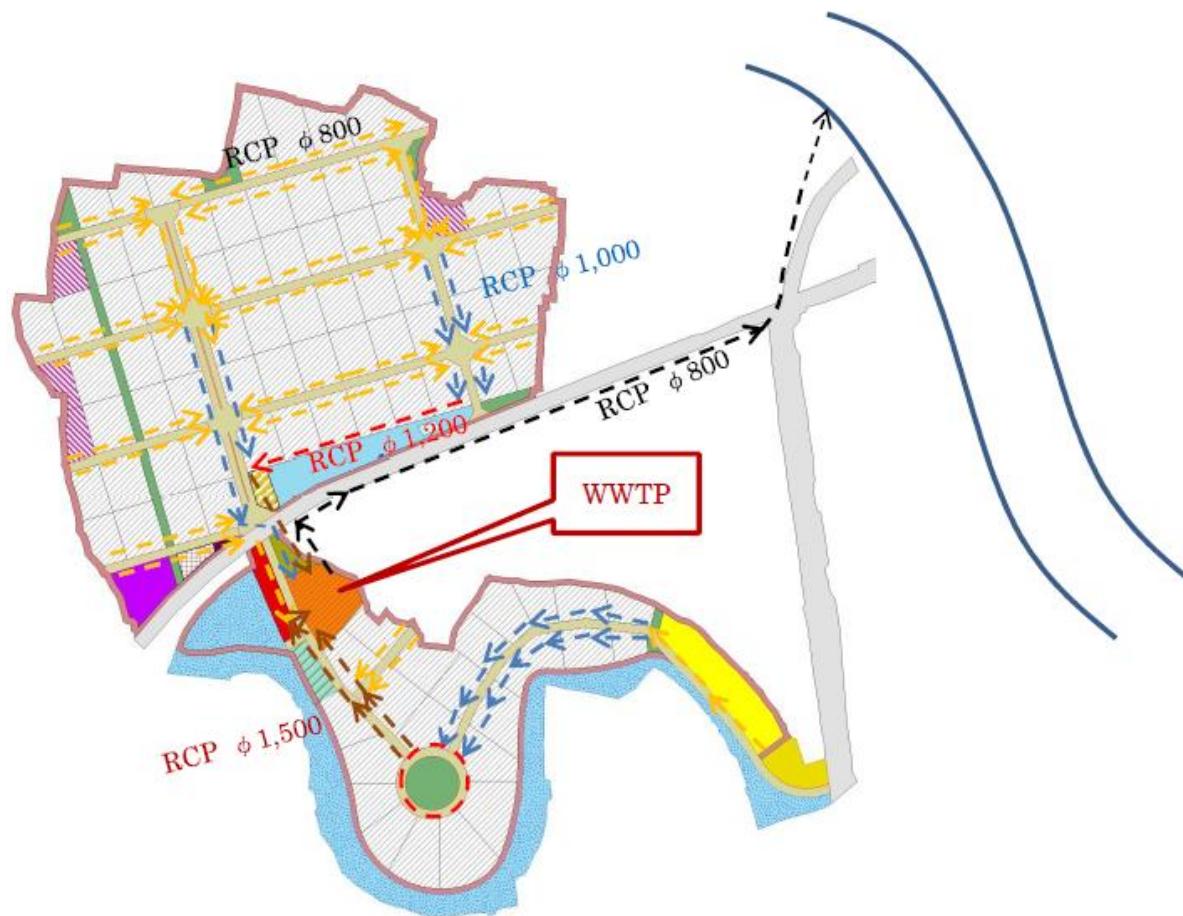
2) Forecast of Waste Water Volume

The wastewater flow volume is assumed about 80% of water supply volume. The assumed volume is 48,000 m³ / day (80% of the Water Supply Demand as estimated to be 60,000 m³/day in Section 3.4.3 of Chapter 3).

3) Basic Diagram of Wastewater Collection System

The basic process of the waste water collection system and its plant details are explained in the section 3.6.3 of Annex 4 (Waste Water Treatment Plant). Waste water collection pipe network is shown in the following figure.

Figure 3.6.4-1: Waste Water Flow Network



3.7. Electrical Power System (Distribution in Economic Zone)

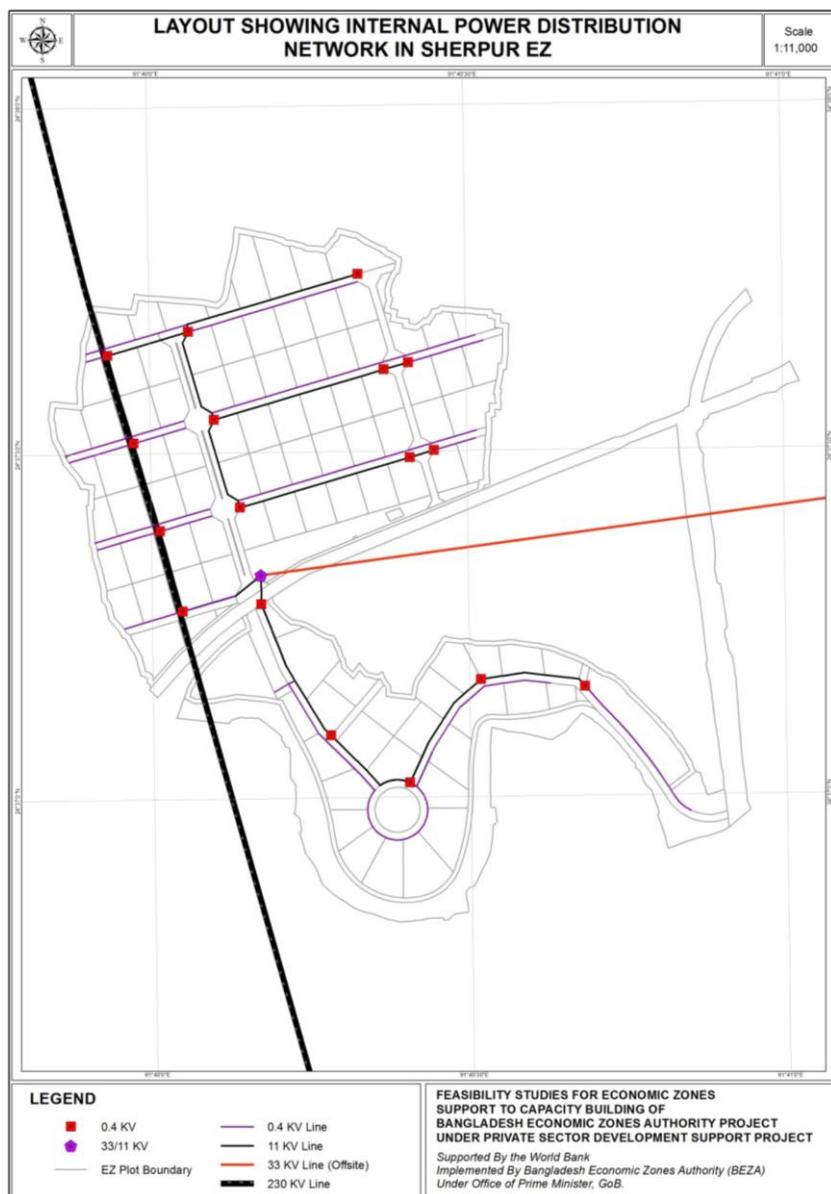
1) Forecast of Electrical Demand

The total demand of Sherpur EZ comprising textile and relevant industries will be 45 MW.

2) Basic Electrical Power Distribution System (On-site)

The concept of distribution of power inside the EZ is shown previously in figure 3.7.1-1. The connection system in the EZ will require a substation of 132/33KV which is proposed in the Master Plan covering a total area of about 1 acre. It'll also require two more substations of 33/11KV to divide the load into the north and south part of the EZ. A total of 12 in the northern part and 4 in the southern part 11/0.4KV transformers will be installed in the EZ. A total of 10,580 metre internal network is to be drawn to provide electrical connection to industrial plots and various other supporting facilities. The following figure (figure 3.7-1) shows the internal connection of electrical power within the EZ.

Figure 3.7-1: Power Connection (Onsite) for Sherpur EZ



3.8. Gas System (Distribution inside the EZ)

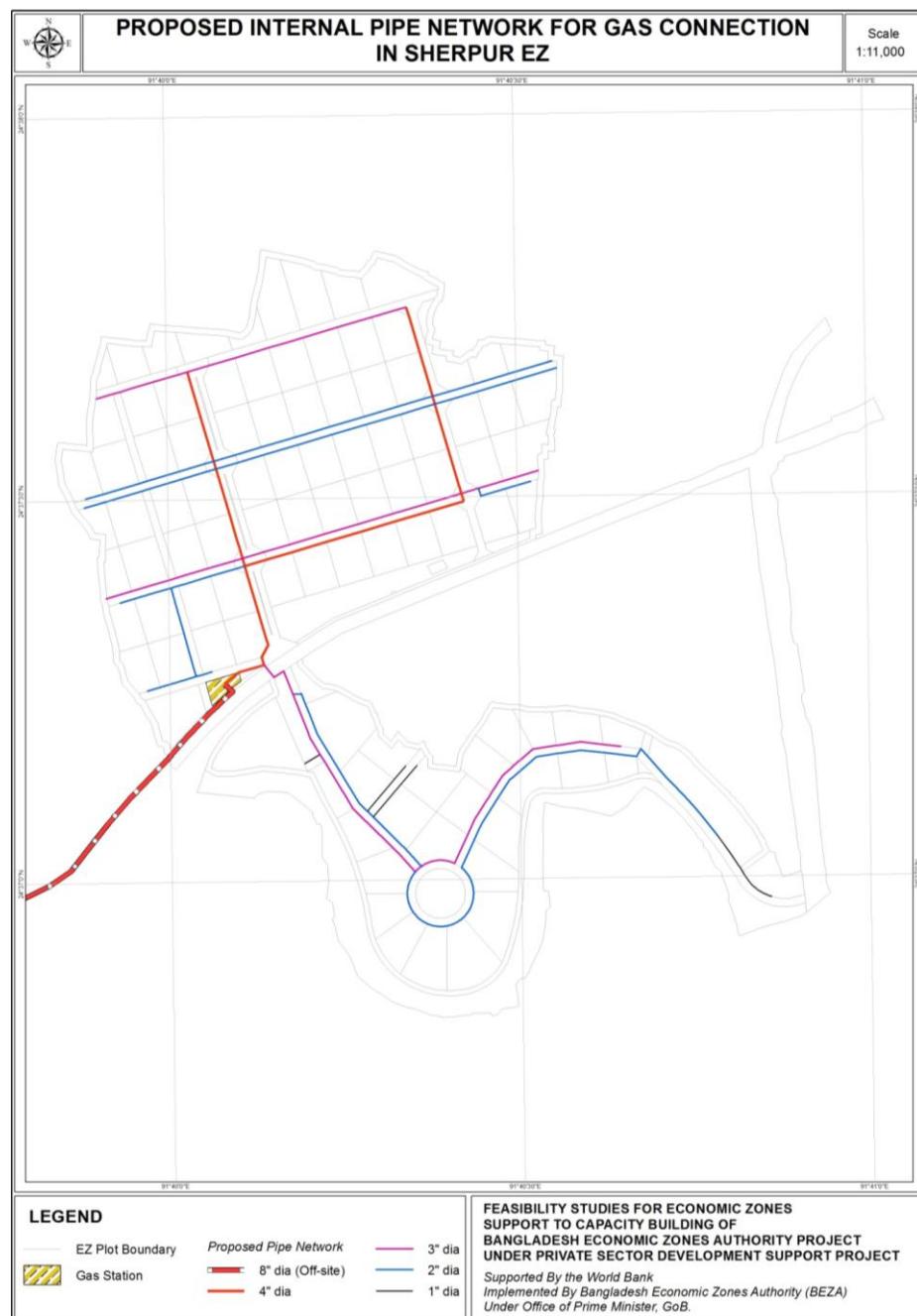
1) Forecast of Gas Demand

The total demand for Gas in Sherpur EZ comprising textile and relevant industries will be 565,624.5 m³/day (Estimated in section 3.4.3).

2) Gas Distribution System (Onsite)

The gas distribution system inside the EZ will comprise of pipe network of 4, 3, 2 and 1 inch dia. The total length of gas distribution network is 10,620 m. Figure 3.8-1 shows the internal gas distribution network in the EZ.

Figure 3.8-1: Internal gas connection network in Sherpur EZ



3.9. Communication Network System (Network inside the EZ)

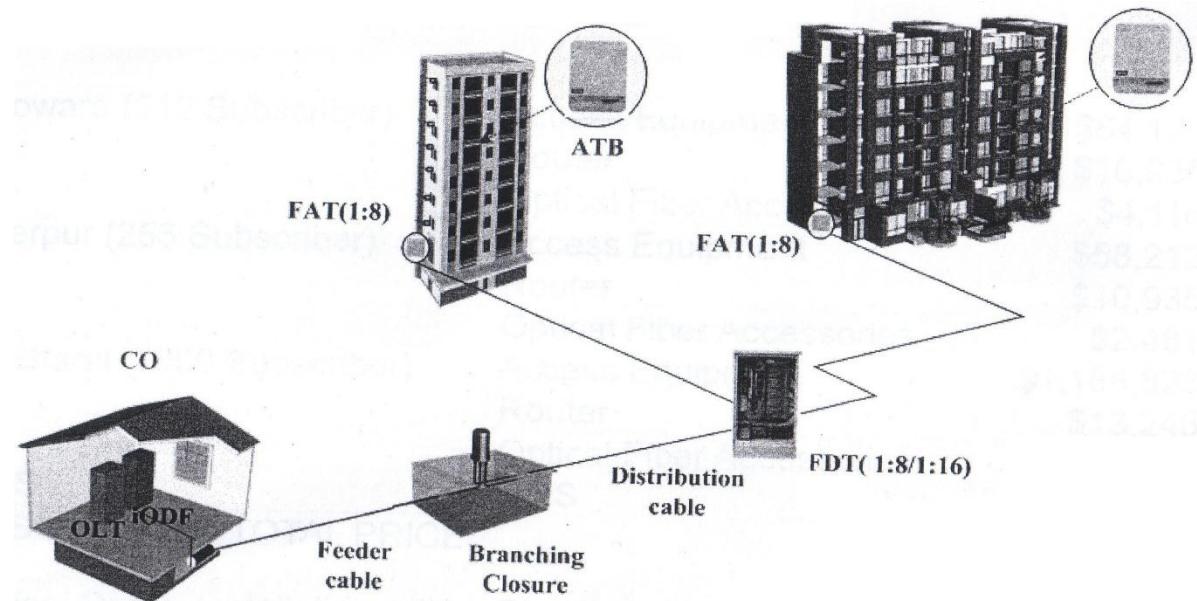
1) Forecast of Demand

From previous experience and from visits to various EPZs in the country the total telephone demand for the EZ is estimated at 300-400 lines. It is also estimated that the demand for internet connection per industry will be 3 mbps. So the total demand will be about 15 mbps considering that, all internet users will not use the internet at the same time. This demand will be enough to handle online video conferencing, video call etc.

2) Telecom Network (Onsite)

The number of industries has been taken as 36. Considering other connections such as, connections in BEZA (Bangladesh Economic Zone Authority) administrative office, customs office and some residential connections, the total number of distribution points are considered to be 50 and capacity of telephone exchange is considered to be 512 LU. A room will be provided in the control office building. It will be a room for a 512 line exchange, router and switching system. It will also support internet facility. The offsite FOC connection will connect the onsite exchange with the Tajpur Exchange and a main line will go to the manholes constructed at convenient points of the EZ. From here connection will be provided from DPs (Distribution Points) to the users. Figure 3.9-1 shows the diagram of onsite connection and Figure 3.9-2 shows the connection diagram for the telephone network.

Figure 3.9-1: Communication diagram for Sherpur EZ



3) Recommendations:

As in all EPZ in Bangladesh, BTCL have their PSTN network. It is recommended that Telecom development works in EZs shall be offered to BTCL. BTCL has two modes of financial systems, a) Contributory work and b) Self- financed work.

- Contributory work:** When a corporate body asks BTCL to establish a telephone network, BTCL submits estimates for contribution of funds. After placing the fund by the corporate body, BTCL expands the network as required.

- b) **Self-financed work:** when BTCL finds that, an area is under development, BTCL includes expansion work in an ongoing or future project and expands their network for expansion of own business from their own resources.
- c) Due to the abrupt fall of revenue rate of BTCL service, BTCL has become reluctant to do any self-financed work. One BTCL responsible person remarked that, if the government is interested in these works and place the required budget, BTCL can do it with their own finance.

Finally, it is proposed that, BEZA shall write to BTCL through the Ministry of Telecommunication, informing them of the future prospect and demand. They should be informed that three EZs are going to be built, at (a) Sherpur, Maulavibazar in Sylhet Division, (b) Mirershori, Chittagong in Chittagong Division and (c) Anwara (Gohira), Chittagong in Chittagong Division as a part of infrastructure development of Bangladesh. Finally, request should be made to the Ministry to instruct BTCL to include the following places in their future expansion project.

In case of urgency, BTCL could be asked for an estimate for contributory work, showing the demand of the EZ sites. Particularly as Sherpur EZ is going to be developed on a priority basis, BTCL may be requested by BEZA to include the development work of telecom in future development work in an on-going Project of BTCL.

Also, information can be given to the approved private PSTN Operators, Mobile Phone Operators and ISPs that, they can expand their networks for their own business expansion. It is recommended that Bangla Phone can be given the opportunity to establish their network without any conditions.

Figure 3.9-2: Communication Network (Onsite) For Sherpur EZ



3.10. Buildings

1) Administration/One-Stop Service Building

Administration/One-Stop Service Building shall be built at the right side of the entrance with two (2) storied building having a total floor area of 4,000 m² (2000 m² on each floor).

The following functions shall be included:

- One-Stop Service Division (about 10 staffs)
- Economic Zone Administration Division (about 30 staffs)
- Security Office (10 staffs: 24 hours)
- Presentation/Seminar Room (50 people can be accommodated)
- Meeting Rooms (3 Rooms)
- Small clinic for workers
- Bank
- Canteen

2) Supporting Buildings: Fire Station, Clinics and Police Station

In order to support the Sherpur Economic Zone investors in dealing with fire and accidents requiring urgent attention, a fire station, a small clinic and a police station shall be constructed near the controlling building. All of these supporting buildings are on one floor with the total area of 500 m².

3) Staff Quarter for Administrative Staff

A staff quarter will be established in the southern part of the EZ. The size will be 2,500 sft and it will have two storeys. There will also be two 1,500 and 1,000 sft. five-storied and four 600 sft. 5-storied buildings. These will house the administrative staff of BEZA working in the EZ.

B. Calculation of Unit Rate of Utility Demand

For the calculation of demand forecasting, the following data is used. The particular industries are selected from several samples of existing tenants in Bangladesh according to the industry mix chosen by the marketing investigation.

Hearing at Dhaka EPZ

Administrative Office (General Manager Mr. Ashraful Kabir) and Factories (Owners)

Date: 21-Sep-13

Integrated Textile Industry

| | |
|--|--|
| Company Selected EPZ | Queen South Textile Mills Ltd (QST) Dhaka EPZ |
| Land Area | 10,566.57 m ² 1.06 hectar |
| Monthly Water Consumption | 52,771 m ³ / month |
| Daily Water Consumption | 2,030 m ³ / day |
| Unit Rate (m ³ /day/ha) | 1,921 m ³ / day / ha |
| Electrical Monthly Consumption Data | 1,051,390.00 kwh/month June 2013 |
| Daily Consumption | 35,046.33 kwh/day assuming 30 days / month assuming 3 shifts / day, |
| Hourly Consumption | 1460.26 kw working hours are 24 kw |
| Unit Rate (kw/ha) | 1,381.97 kw/ha |
| Unit Rate (MW/ha) | 1.38 MW/ha |
| Gas Consumption | Captive 74,548 Industrial 449,266 Total 449,266 m ³ /month |
| Daily Consumption | 14,976 m ³ /day |
| Unit Rate (m ³ /day/ ha) | 14,173 m ³ /day/ha |

Spinning Industry

| | | | |
|--|--|----------------------------|--|
| Company Selected EPZ | Adjusted Data from QST Dhaka EPZ | | |
| Land Area | 10,566.57 m ² | 1.06 hectare | |
| Monthly Water Consumption | 52,771 m ³ / month | | |
| Daily Water Consumption | 2,030 m ³ / day | | |
| Adjustment | 203 | 10% of Integrated Industry | |
| Unit Rate (m ³ /day/ha) | 192 | m ³ / day / ha | |
| Electrical Monthly Consumption Data | 1,051,390.00 | kwh/month | |
| Daily Consumption | 35,046.33 | kwh/day | assuming 30 days / month assuming 3 shifts / day, |
| Hourly Consumption | 1460.26 | kw | working hours are 24 |
| Unit Rate (kw/ha) | 1,381.97 | kw/ha | |
| Adjustment | 207.29 | 15% of Integrated Industry | |
| Unit Rate (MW/ha) | 0.21 | MW/ha | |
| Gas Consumption Adjustment | 15% of the integrated textile industry | | |
| Unit Rate (m ³ /day/ ha) | 2,126 m ³ /day/ha | | |

Weaving Industry

| | |
|---|--|
| Company Selected EPZ Land Area Monthly Water Consumption Daily Water Consumption Adjustment Unit Rate (m3/day/ha) | Adjusted Data from QST Dhaka EPZ 10,566.57 m2 1.06 hectar 52,771 m3 / month 2,030 m3 / day 203 10% of Integrated Industry 192 m3 / day / ha |
| Electrical Monthly Consumption Data Daily Consumption Hourly Consumption Unit Rate (kw/ha) Adjustment Unit Rate (MW/ha) | 1,051,390.00 kwh/month Aug. 2013 35,046.33 kwh/day assuming 30 days / month 1,460.26 kw assuming 3 shifts / day, 1,381.97 kw/ha working hours are 24 207.29 15% of Integrated Industry 0.21 MW/ha |
| Gas Consumption Adjustment Unit Rate (m3 /day/ ha) | 15% of the integrated textile industry 2,126 m3/day/ha |

Dyeing / Finishing Industry

| | |
|---|--|
| Company Selected EPZ Land Area Monthly Water Consumption Daily Water Consumption Adjustment Unit Rate (m3/day/ha) | Adjusted Data from QST Dhaka EPZ 10,566.57 m2 1.06 hectar 52,771 m3 / month 2,030 m3 / day 1,624 80% of Integrated Industry 1,537 m3 / day / ha |
| Electrical Monthly Consumption Data Daily Consumption Hourly Consumption Unit Rate (kw/ha) Adjustment Unit Rate (MW/ha) | 1,051,390.00 kwh/month Aug. 2013 35,046.33 kwh/day assuming 30 days / month 1,460.26 kw assuming 3 shifts / day, 1,381.97 kw/ha working hours are 24 967.38 70% of Integrated Industry 0.97 MW/ha |
| Gas Consumption Adjustment Unit Rate (m3 /day/ ha) | 70% of the integrated textile industry 9,921 m3/day/ha |

Ceramics

Hearing from Director of Mono Ceramic Ltd

Sep 15 2013

Hearing from Mr. Asif (Director of Great Wall Ceramic Ltd)

Nov 23 2013

| | |
|-------------------------------------|---|
| Company Selected | Mono Ceramic Ltd |
| Location | Dhaka |
| Land Area | 21 acres 4.00 hectar |
| Monthly Water Consumption | 9,600 m ³ / month |
| Daily Water Consumption | 320 m ³ / day |
| Unit Rate (m ³ /day/ha) | 80 m ³ / day / ha |
| | |
| Electrical Consumption | Great Wall Ceramic Ltd |
| Production Capacity | 24,000 m ² /day |
| Electrical Monthly Consumption | 264,137.00 kwh/month |
| Land Area | 8.5 hectar |
| Daily Consumption | 8,804.57 kwh/day assuming 30 days / month assuming 3 shifts / day, working hours are 24 |
| Hourly Consumption | 366.86 kw |
| Unit Rate (kw/ha) | 43.16 kw/ha |
| Unit Rate (MW/ha) | 0.04 MW/ha |
| Gas Consumption | Great Wall Ceramic Ltd |
| | 1,509,872 m ³ /month |
| | 58,072 m ³ /day |
| Unit Rate (m ³ /day/ ha) | 6,832 m ³ /day/ha |

Ceramics

Hearing from Engr Rezaul Karim (Engineer of China Bnlabangla Tiles Ltd)

Nov 24 2013

| | |
|-------------------------------------|---|
| Company Selected | China Bnlabangla Tiles Ltd) |
| Location | Dhaka |
| Land Area | 19 acres 4.00 hectar |
| Monthly Water Consumption | 1,800 m ³ / month |
| Daily Water Consumption | 60 m ³ / day |
| Unit Rate (m ³ /day/ha) | 15 m ³ / day / ha |
| | |
| Electrical Consumption | Great Wall Ceramic Ltd |
| Electrical Monthly Consumption | 180,000.00 kwh/month |
| Land Area | 8.5 hectar |
| Daily Consumption | 6,000.00 kwh/day assuming 30 days / month assuming 3 shifts / day, working hours are 24 |
| Hourly Consumption | 250.00 kw |
| Unit Rate (kw/ha) | 29.41 kw/ha |
| Unit Rate (MW/ha) | 0.03 MW/ha |
| Gas Consumption | Great Wall Ceramic Ltd |
| | 0 m ³ /month |
| | 0 m ³ /day |
| Unit Rate (m ³ /day/ ha) | 0 m ³ /day/ha |

Food Processing Industry

Hearing from Mr. Mohammad Kader (DGM of FU-WANG) 23-Nov-13

| | | |
|--------------------------------------|-----------------------------------|--|
| Company Selected | FU-WANG (Food Processing Company) | |
| Location | Gazipur | |
| Land Area | 12,100 m ² | 1.21 hectar |
| Monthly Water Consumption | 1,200 m ³ / month | |
| Daily Water Consumption | 40 m ³ / day | |
| Unit Rate (m ³ /day/ha) | 33 m ³ / day / ha | |
| Electrical Monthly Consumption Data | 38,400.00 kwh/month | |
| Daily Consumption | 1,280 kwh/day | assuming 30 days / month assuming 3 shifts / day, |
| Hourly Consumption | 53.33 kw | working hours are 24 |
| Unit Rate (kw/ha) | 44.08 kw/ha | |
| Unit Rate (MW/ha) | 0.04 MW/ha | |
| Gas Consumption | 1,400 m ³ /month | |
| | 54 m ³ /day | |
| Unit Rate (m ³ / day/ ha) | 45 m ³ /day/ha | |

Packaging Industry

Hearing from Mr. Atikullah (MG of Alfa Packageing Ltd)

Sep 21 2013

| | | |
|-------------------------------------|------------------------------|--|
| Company Selected | Alfa Packaging Ltd | |
| EPZ | Dhaka EPZ | |
| Land Area | 2,000 m ² | 0.2 hectar |
| Monthly Water Consumption | 468 m ³ / month | |
| Daily Water Consumption | 16 m ³ / day | |
| Unit Rate (m ³ /day/ha) | 78 m ³ / day / ha | |
| Electrical Monthly Consumption Data | 3,362.00 kwh/month | |
| Daily Consumption | 112.07 kwh/day | assuming 30 days / month assuming 1 shifts / day, |
| Hourly Consumption | 14.01 kw | working hours are 8 |
| Unit Rate (kw/ha) | 70.04 kw/ha | |
| Unit Rate (MW/ha) | 0.07 MW/ha | |

Hearing at ClassNK, Nippon Kaiji Kyokai
E-2 (5th Floor), House #171, Road #5, Mirpur (DOHS)
Dhaka-1216, Bangladesh
Contact: Mr Mubassir A.M. (Surveyor)
Date: 21-Nov-13

Shipbuilding Industry

| | | |
|--|---|--|
| Company Selected EPZ | Khnina Shipyard Ltd (KSL) | |
| Land Area | 70 acres | 28.34 hecter |
| Historical Data | Numbers of workers: 250 | |
| Dayly Water Consumption | 500 m3 / day (Facility and workers) | |
| Unit Rate (m3/day/ha) | 18 m3 / day / ha | |
| Electrical Monthly Consumption Data | 4,500,000.00 kwh/month Data from ClassNK | |
| Dayly Consumption | 150,000.00 kwh/day | assuming 30 days / month assuming 2 shifts / day, working hours are 16 |
| Hourly Comsumption | 9375.00 kw | |
| Unit Rate (kw/ha) | 330.80 kw/ha | |
| Unit Rate (MW/ha) | 0.33 MW/ha | |

Shipbuilding Parts Manufacturing Industry

| | | |
|----------------------------------|---------------------------|--|
| Company Selected | Khulna Shipyard Ltd (KSL) | |
| EPZ | 70 acres | 28.34 hecter |
| Land Area | | |
| Historical Data | Numbers of workers: 250 | |
| Dayly Water Consumption | 500 m3 / day | (Facility and workers) |
| Ratio (30% of Shipbuilding Ind.) | 150 m3 / day | (Facility and workers) |
| Unit Rate (m3/day/ha) | 5 m3 / day / ha | |
| Electrical Monthly Consumption | 4,500,000.00 kwh/month | |
| Data from ClassNK | | |
| Dayly Consumption | 150,000.00 kwh/day | assuming 30 days / month assuming 2 shifts / day, |
| Hourly Comsumption | 9375.00 kw | working hours are 16 |
| Ratio (30% of Shipbuilding Ind.) | 2812.50 kw | multiply by 0.3 |
| Unit Rate (kw/ha) | 99.24 kw/ha | |
| Unit Rate (MW/ha) | 0.10 MW/ha | |

Port / Stock Yard Industry

| | |
|---|---|
| Company Selected EPZ Land Area Historical Data Dayly Water Consumption Ratio (10% of Shipbuilding Ind.) Unit Rate (m3/day/ha) | Khulna Shipyard Ltd (KSL) 70 acres 28.34 hecotor Numbers of workers: 250 500 m3 / day (Facility and workers) 50 m3 / day (Facility and workers) 2 m3 / day / ha |
| Electrical Monthly Consumption Data Dayly Consumption Hourly Comsumption Ratio (10% of Shipbuilding Ind.) Unit Rate (kw/ha) Unit Rate (MW/ha) | 4,500,000.00 kwh/month Data from ClassNK 150,000.00 kwh/day assuming 30 days / month assuming 2 shifts / day, 9375.00 kw working hours are 16 937.50 kw multiply by 0.1 33.08 kw/ha 0.03 MW/ha |

Steel Mill

Hearing from Engr. Santosh (Chief Engineer)

Nov 23 2013

| | |
|---|---|
| Company Selected Location Land Area Historical Data Dayly Water Consumption Unit Rate (m3/day/ha) | Rahim Steel Mills 150 acres 60.73 hecotor 2400 m3 / day with 2 shifts 40 m3 / day / ha |
| Electrical Monthly Consumption Data Dayly Consumption Hourly Comsumption Ratio (10% of Shipbuilding Ind.) Unit Rate (kw/ha) Unit Rate (MW/ha) | kwh/month kwh/day assuming 30 days / month assuming 2 shifts / day, kw working hours are 16 55000.00 kw multiply by 0.1 905.67 kw/ha 0.91 MW/ha |

Cement using ashes + clinker

Nov 24 2013

Hearing from Mr. Hafizur Rahman (Chief Process Manager)

| | |
|---|--|
| Company Selected Location Land Area Production Capacity Dayly Water Consumption Unit Rate (m3/day/ha) | Cemex Cement Industry Bandar Narayanganj 2.5 acres 1.01 hecotor 1,800 ton/day 30 m3 / day (Facility and workers) 30 m3 / day / ha |
| Electrical Monthly Consumption Data Dayly Consumption Hourly Comsumption Unit Rate (kw/ha) Unit Rate (MW/ha) | 960,000.00 kwh/month 32,000.00 kwh/day assuming 30 days / month assuming 2 shifts / day, 2,000 kw working hours are 16 1,976.00 kw/ha 1.98 MW/ha |

Moto Bike & Components

Data from monthly bill of EPZ in Bangladesh (June 2013)

| | |
|--------------------------------|---|
| Company Selected | ALITA |
| EPZ | Chittagong EPZ |
| Land Area | 0.5 acres 0.2 hectare |
| Monthly Water Consumption | m3 / month |
| Dayly Water Consumption | 14 m3 / day (Data of June 2013) |
| Unit Rate (m3/day/ha) | 70 m3 / day / ha |
| Electrical Monthly Consumption | 50,564.28 kwh/month |
| Data | Monthly Report |
| Dayly Consumption | 1,685.48 kwh/day assuming 30 days / month assuming 3 shifts / day, |
| Hourly Comsumption | 70.23 kw working hours are 24 |
| Unit Rate (kw/ha) | 351.14 kw/ha |
| Unit Rate (MW/ha) | 0.35 MW/ha |

Auto, Electronics and Precision Machinery Parts Industry

| | |
|--|--|
| Company Selected EPZ | Meiji Chittagong EPZ |
| Land Area | 4,000 m ² 0.4 hectare |
| Monthly Water Consumption | 210 m ³ / month |
| Dayly Water Consumption | 7 m ³ / day |
| Unit Rate (m ³ /day/ha) | 18 m ³ / day / ha |
| Electrical Monthly Consumption Data | 79,726.96 kwh/month Monthly Report |
| Dayly Consumption | 2,657.57 kwh/day assuming 30 days / month assuming 2 shifts / day, working hours are 16 |
| Hourly Comsumption | 166.10 kw |
| Unit Rate (kw/ha) | 415.24 kw/ha |
| Unit Rate (MW/ha) | 0.42 MW/ha |

Auto Assembly Indutry

| | | |
|--|------------------------------|--|
| Company Selected EPZ | | |
| Land Area | m ² | hectare |
| Monthly Water Consumption | m ³ / month | |
| Dayly Water Consumption | m ³ / day | |
| Unit Rate (m ³ /day/ha) | 56 m ³ / day / ha | Assuming 80% of Motor Bike Industry |
| Electrical Monthly Consumption Data | kwh/month | |
| Dayly Consumption | kwh/day | assuming 30 days / month assuming 2 shifts / day, |
| Hourly Comsumption | kw | working hours are |
| Unit Rate (kw/ha) | kw/ha | |
| Unit Rate (MW/ha) | 0.42 MW/ha | Assuming 120% of Motor Bike Industry |

Textile (Spinning & Weaving) Industry

| | |
|---|---|
| Company Selected EPZ Land Area Monthly Water Consumption Dayly Water Consumption Adjustment Unit Rate (m3/day/ha) | Queen South Textile Mills Ltd (QST) Dhaka EPZ 10,566.57 m ² 1.06 hectar 52,771 m ³ / month 2,030 m ³ / day 406 m ³ /day 20% of Integrated Industry 384 m ³ / day / ha |
| Electrical Monthly Consumption Data Dayly Consumption Hourly Comsumption Unit Rate (kw/ha) Adjustment Unit Rate (MW/ha) | 1,051,390.00 kwh/month 35,046.33 kwh/day assuming 30 days / month assuming 3 shifts / day, working hours are 24 1460.26 kw 1,381.97 kw/ha 414.59 kw/ha 30% of Integrated Industry 0.41 MW/ha |

Garments (high Tech & Knitting) Industry

| | |
|---|--|
| Company Selected EPZ Land Area Monthly Water Consumption Dayly Water Consumption high tech and knitting Unit Rate (m3/day/ha) | Ring Shine Dhaka EPZ 74,000 m ² 7.4 hectar 442,381 m ³ / month 14,746 m ³ / day 2,949 20% 399 m ³ / day / ha |
| Electrical Monthly Consumption Data Dayly Consumption Hourly Comsumption Unit Rate (kw/ha) high tech and knitting Unit Rate (MW/ha) | 2,276,394.89 kwh/month Monthly Report Multiply by 2 (gas use) 75,879.83 kwh/day assuming 30 days / month assuming 3 shifts / day, working hours are 24 3,161.66 kw 427.25 kw/ha 85.45 20% 0.09 MW/ha |

Garments (Supporting) Industry

| | |
|---|--|
| Company Selected EPZ Land Area Monthly Water Consumption Dayly Water Consumption Unit Rate (m3/day/ha) | YKK Dhaka EPZ 22,000 m ² 2.2 hectar 19,949 m ³ / month 665 m ³ / day 302 m ³ / day / ha |
| Electrical Monthly Consumption Data Dayly Consumption Hourly Comsumption Unit Rate (kw/ha) Unit Rate (MW/ha) | 264,137.00 kwh/month Monthly Report 8,804.57 kwh/day assuming 30 days / month assuming 3 shifts / day, working hours are 24 366.86 kw 166.75 kw/ha 0.17 MW/ha |

For All Economic Zones **Investigation on Unit Rate**

Commercial, Housing, Residential

Data from Phnom Penh Economic Zone in Cambodia (Aug 2013)

| | |
|------------------------------------|--|
| Economic Zone Selected | Phnom Phen Special Economic Zone (PPSEZ) |
| Water Consumption | |
| Unit Rate (m ³ /day/ha) | 20 m ³ / day / ha |
| Electrical Monthly Consumption | |
| Unit Rate (MW/ha) | 0.25 MW/ha |

C. Detail Project Information

| SHERPUR EZ COST ESTIMATE OF ONSITE INFRASTRUCTURES | | | | | | | | |
|---|----------|----------------|-------------------|--------------------------|-----------------------|----------------------------|-------------------------------|--|
| PER PHASE | | | | | | | | |
| Road Network Costs | | | | | | | | |
| Description of Items | Quantity | Unit | Unit price (Taka) | Total cost (with Taxes*) | List Phase of Project | List Years of Construction | First Year Construction Costs | Second Year Construction Costs |
| <i>Minor Road (Northern Area)</i> | | | | | 1 | 2017 ~ 2018 | | |
| Replacing unsuitable soils | 79,528 | m ³ | 353 | 28,073,319 | | | | Required CBR Test > 11% |
| Subgrade | 51,975 | m ² | 90 | 4,677,750 | | | | FDT (Field Density Test) > 95% |
| Sub-basecourse | 51,975 | m ² | 746 | 38,773,350 | | | | Laterite, Required CBR Test > 30% |
| Basecourse | 51,975 | m ² | 392 | 20,374,200 | | | | Aggregate C30, Required CBR > 90% |
| <i>Concrete Pavement</i> | | | | | | | | |
| Form Works | 51,975 | m ² | 355 | 18,451,125 | | | | |
| Re-bar Works | 51,975 | m ² | 930 | 48,336,750 | | | | Diameter of re-bar 12mm @ 250mm c/c both way weight = 7.14 kg/m ² for single layer (14.28 kg/m ² for double layer) |
| Concrete Works | 10,395 | m ³ | 8,858 | 92,078,910 | | | | Designed strength = 21N/cm ² |
| Labor | 51,975 | m ² | 240 | 12,474,000 | | | | |
| Curb and Gutter | 7,700 | m | 900 | 6,930,000 | | | | |
| Side Walk | | | | | | | | Both sides |
| Clearing and Compacting Work | 23,100 | m ² | 556 | 12,843,600 | | | | |
| Asphalt Pavement | 23,100 | m ² | 654 | 15,107,400 | | | | |
| <i>Sub-Total (Minor Road)</i> | | | | 298,120,404 | | | | |
| <i>Main Road (Northern Area)</i> | | | | | 1 | 2,017 | | |
| Replacing unsuitable soils | 18,775 | m ³ | 353 | 6,627,479 | | | | Required CBR Test > 11% |
| Subgrade | 9,815 | m ² | 90 | 883,350 | | | | FDT(Field Density Test) > 95% |
| Sub-basecourse | 9,815 | m ² | 746 | 7,321,990 | | | | Laterite, Required CBR Test > 30% |
| Basecourse | 9,815 | m ² | 392 | 3,847,480 | | | | Aggregate C30, Required CBR > 90% |
| <i>Concrete Pavement</i> | | | | | | | | |
| Form Works | 9,815 | m ² | 355 | 3,484,325 | | | | |
| Re-bar Works | 9,815 | m ² | 930 | 9,127,950 | | | | Diameter of re-bar 12mm @ 250mm c/c both way weight = 7.14 kg/m ² for single layer (14.28 kg/m ² for double layer) |
| Concrete Works | 1,963 | m ³ | 8,858 | 17,388,254 | | | | Designed strength = 21N/cm ² |
| Labor | 9,815 | m ² | 240 | 2,355,600 | | | | |
| Curb and Gutter | 1,454 | m | 900 | 1,308,600 | | | | |
| Side Walk | | | | | | | | Both sides |
| Clearing and Compacting Work | 4,362 | m ² | 556 | 2,425,272 | | | | |
| Asphalt Pavement | 4,362 | m ² | 654 | 2,852,748 | | | | |
| <i>Sub-Total (Main Road)</i> | | | | 57,623,048 | | | | |
| <i>Minor Road (Southern Area)</i> | | | | | 1 | 2018 ~ 2019 | | |
| Replacing unsuitable soils | 50,982 | m ³ | 353 | 17,996,683 | | | | Required CBR Test > 11% |
| Subgrade | 18,837 | m ² | 90 | 1,695,330 | | | | FDT (Field Density Test) > 95% |
| Sub-basecourse | 18,837 | m ² | 746 | 14,052,402 | | | | Laterite, Required CBR Test > 30% |
| Basecourse | 18,837 | m ² | 392 | 7,384,104 | | | | Aggregate C30, Required CBR > 90% |
| <i>Concrete Pavement</i> | | | | | | | | |
| Form Works | 18,837 | m ² | 355 | 6,687,135 | | | | |
| Re-bar Works | 18,837 | m ² | 930 | 17,518,410 | | | | Diameter of re-bar 12mm @ 250mm c/c both way weight = 7.14 kg/m ² for single layer (14.28 kg/m ² for double layer) |
| Concrete Works | 3,767 | m ³ | 8,858 | 33,368,086 | | | | Designed strength = 21N/cm ² |
| Labor | 18,837 | m ² | 240 | 4,520,880 | | | | |
| Curb and Gutter | 2,790 | m | 900 | 2,511,000 | | | | |
| Side Walk | | | | | | | | Both sides |
| Clearing and Compacting Work | 18,837 | m ² | 556 | 10,473,372 | | | | |
| Asphalt Pavement | 18,837 | m ² | 654 | 12,319,398 | | | | |
| <i>Sub-Total (Southern Area)</i> | | | | 128,526,800 | | | | |
| Total | | | | 484,270,253 | | | | |

| Water Supply Costs | | | | | | | | | 41,940,000 |
|--|----------|------|----------------------|-------------------------|-----------------------|----------------------------|-------------------------------|--------------------------------|--|
| Description of items | Quantity | Unit | Unit price (Taka) | Total cost (with Taxes) | List Phase of Project | List Years of Construction | First Year Construction Costs | Second Year Construction Costs | Specification |
| Pipe Work inside EZ (Northern Area) | 10,666 | m | 1,151 | 12,276,698 | 1 | 2016 | | | U-pvc ϕ 150~ ϕ 250 |
| Pipe Work inside EZ (Southern Area) | 6,207 | m | 650 | 4,034,560 | 1 | 2017 | | | U-pvc ϕ 150~ ϕ 250 |
| Valve Work (Northern Area) | 36 | ea | 38,028 | 1,368,997 | 1 | 2016 | | | Valve for ϕ 150~ ϕ 250 |
| Valve Work (Southern Area) | 17 | ea | 36,235 | 615,999 | 1 | 2017 | | | Valve for ϕ 150~ ϕ 250 |
| Fire Hydrant (Northern Area) | 89 | ea | 351,573 | 31,289,994 | 1 | 2016 | | | Hydrant for ϕ 150~ ϕ 250 |
| Fire Hydrant (Southern Area) | 31 | ea | 331,290 | 10,270,002 | 1 | 2017 | | | Hydrant for ϕ 150~ ϕ 250 |
| River Intake Pipe | 1,800 | m | 23,300 | 41,940,000 | 1 | 2016 | | | Iron Ductile Pipe ϕ 600 |
| River Intake Jetty | 1 | set | 2,999,970 | 2,999,970 | 1 | 2016~2017 | | | |
| River Intake Pump | 1 | set | 2,087,070 | 2,087,070 | 1 | 2016 | | | Pump 250 m ³ /hr, 4 pumps |
| River Intake GI Sanction Pipe | 1 | set | 500,010 | 500,010 | 1 | 2016 | | | GI Sanction Pipe ϕ 200 |
| Reservoir Tank | 1 | set | 400,000,023 | 400,000,023 | 1 | 2017 | | | Reserving Volume 8,700 m ³ |
| Water Tower | 1 | set | 55,999,971 | 55,999,971 | 1 | 2017 | | | 900 m ³ , 4 towers |
| Treatment Plant (Structure/Facility) | | set | 699,999,888 | | 1 | 2017 ~2018 | | | |
| Office and Other Supporting Struc | 1 | set | 51,445,986 | 51,445,986 | | | | | 650 m ² Office and 90 m ² Supporting Structure |
| Tanks | 1 | set | 389,132,341 | 389,132,341 | | | | | Total Capacity 60,000 m ³ |
| Pumps, Electrical Works and Acc | 1 | set | 259,421,561 | 259,421,561 | | | | | Aeration Pump, Centrifugal Pumps and Electrical Works |
| Sub-Total (Water Supply Treatment Plant) | | | 699,999,888 | | | | | | |
| Total | | | 1,263,383,183 | | | | | | |
| Waste Water Costs | | | | | | | | | |
| Description of items | Quantity | Unit | Unit price (Taka) | Total cost (with Taxes) | List Phase of Project | List Years of Construction | First Year Construction Costs | Second Year Construction Costs | Specification |
| Pipe Work inside EZ (Northern Area) | 11,586 | m | 4,889 | 56,644,018 | 1 | 2016 | | | RCP ϕ 800~ ϕ 1200 |
| Pipe Work inside EZ (Southern Area) | 6,800 | m | 2,879 | 19,577,922 | 1 | 2017 | | | RCP ϕ 800~ ϕ 1200 |
| Pipe Work between EZ and River | 1,784 | m | 5,287 | 9,432,008 | 1 | 2016 | | | RCP ϕ 1500 |
| Manhole Work (Northern Area) | 449 | ea | 167,984 | 75,424,995 | 1 | 2016 | | | Manhole for ϕ 800~ ϕ 1500 |
| Manhole Work (Southern Area) | 38 | ea | 431,800 | 16,408,392 | 1 | 2017 | | | Manhole for ϕ 800 |
| Recycling Pipe Work (Northern Area) | 11,542 | m | 1,225 | 14,138,950 | 1 | 2016 | | | U-pvc ϕ 200 |
| Recycling Pipe Work (Southern Area) | 6,800 | m | 1,225 | 8,330,000 | 1 | 2017 | | | U-pvc ϕ 200 |
| Lifting Tower and Pumps for Recyc | 1 | set | 3,999,990 | 3,999,990 | 1 | 2016 | | | |
| Total | | | 203,956,275 | | | | | | |
| Gas Costs | | | | | | | | | |
| Description of items | Quantity | Unit | Unit price (Taka) | Total cost (with Taxes) | List Phase of Project | List Years of Construction | First Year Construction Costs | Second Year Construction Costs | Specification |
| Gas Pipe Work including Natural Gas Supply Point (Northern Area) | 6,227 | m | 1,936 | 12,052,920 | 1 | 2016 ~ 2017 | | | MS Pipe dia 1" ~ 4" |
| Gas Pipe Work (Southern Area) | 6,700 | m | 510 | 3,419,626 | 1 | 2017 | | | |
| Total | | | 15,472,546 | | | | | | |
| Power Costs (average voltage) | | | | | | | | | |
| Description of items | Quantity | Unit | Unit price (Taka) | Total cost (with Taxes) | List Phase of Project | List Years of Construction | First Year Construction Costs | Second Year Construction Costs | Specification |
| Sub Station (33/11kv line) | 1 | set | 15,000,021 | 15,000,021 | 1 | 2016 ~2017 | | | |
| Transformer (110.4kv) (Northern Area) | 3 | set | 8,000,000 | 24,000,000 | 1 | 2018 | | | |
| Transformer (110.4kv) (Southern Area) | 1 | set | 8,000,000 | 8,000,000 | 1 | 2019 | | | |
| Interval Line (Northern Area) | 3 | km | 1,634,000 | 4,902,000 | 1 | 2018 | | | 11 Kv line |
| Interval Line (Southern Area) | 1 | km | 1,634,000 | 1,945,500 | 1 | 2019 | | | 11 Kv line |
| Interval Line (Northern Area) | 1 | set | 3,316,005 | 3,316,005 | 1 | 2018 | | | 0.4 Kv line |
| Interval Line (Southern Area) | 1 | set | 1,421,604 | 1,421,604 | 1 | 2019 | | | 0.4 Kv line |
| Testing and Commissioning (Northern Area) | 1 | set | 249,998 | 249,998 | 1 | 2018 | | | |
| Testing and Commissioning (Southern Area) | 1 | set | 249,998 | 249,998 | 1 | 2019 | | | |
| Total | | | 59,085,126 | | | | | | |

| <i>Electricity BT & Public Light (Low Voltage)</i> | | | | | | | | |
|--|----------|------|-------------------|--------------------------|-----------------------|----------------------------|-------------------------------|--|
| Description of Items | Quantity | Unit | Unit price (Taka) | Total cost (with Taxes) | List Phase of Project | List Years of Construction | First Year Construction Costs | Second Year Construction Costs |
| Street Lighting (Northern Area) | 4 | mile | 132,501 | 530,002 | 1 | 2018 | | |
| Street Lighting (Southern Area) | 2 | mile | 132501 | 250,000 | 1 | 2019 | | |
| Total | | | | 780,002 | | | | |
| <i>Waste Water Treatment Pl</i> | | | | | | | | |
| Description of Items | Quantity | Unit | Unit price (Taka) | Total cost (with Taxes*) | List Phase of Project | List Years of Construction | First Year Construction Costs | Second Year Construction Costs |
| Structure and Facility | | | | | 1 | 2017 ~ 2018 | | |
| Office and Other Supporting Stru | 1 | set | 51,445,986 | 51,445,986 | | | | 650 m ² Office and 90 m ² Supporting Structure |
| Tanks | 1 | set | 389,132,341 | 389,132,341 | | | | Total Capacity 48,000 m ³ |
| Pumps, Electrical Works and Acc | 1 | set | 259,421,561 | 259,421,561 | | | | Aeration Pump, Centrifugal Pump and Electrical Works |
| Total | | | | 699,999,888 | | | | |
| <i>ICT Network Costs</i> | | | | | | | | |
| Description of Items | Quantity | Unit | Unit price (Taka) | Total cost (with Taxes*) | List Phase of Project | List Years of Construction | First Year Construction Costs | Second Year Construction Costs |
| Cable Works (Northern Area) | 1 | set | 16,088,341 | 16,088,341 | 1 | 2018 | | |
| FTTc | 1 | set | 3,924,144 | 3,924,144 | | | | FTTc Exchange: Fiber to the Cabinet Exchange |
| OFC Cable Networking | 6,766 | m | 1,500 | 10,148,463 | | | | OFC: Optical Fiber Connection |
| DC (Router) | 1 | set | 1,377,670 | 1,377,670 | | | | |
| ODF (24 Ports) | 1 | set | 18,064 | 18,064 | | | | ODF: Optical Distribution Framework |
| Power System | 1 | set | 120,000 | 120,000 | | | | |
| AC Installation | 2 | set | 150,000 | 300,000 | | | | |
| Room Preparation | 1 | set | 200,000 | 200,000 | | | | |
| Sub-Total (Cable Works: Northern Area) | | | | 16,088,341 | | | | |
| Cable Works (Southern Area) | | | | | 1 | 2019 | | |
| FTTc | 0 | set | 3,924,144 | 0 | | | | FTTc Exchange: Fiber to the Cabinet Exchange |
| OFC Cable Networking | 3,076 | m | 1,500 | 4,614,256 | | | | OFC: Optical Fiber Connection |
| DC (Router) | 0 | set | 1,377,670 | 0 | | | | |
| ODF (24 Ports) | 0 | set | 18,064 | 0 | | | | Optical Distribution Framework |
| Power System | 0 | set | 120,000 | 0 | | | | |
| AC Installation | 0 | set | 150,000 | 0 | | | | |
| Room Preparation | 0 | set | 200,000 | 0 | | | | |
| Sub-Total (Cable Works: Southern Area) | | | | 4,614,256 | | | | |
| Total | | | | 20,702,597 | | | | |
| <i>Fencing, Open Spaces (Plantation), and Drainage System</i> | | | | | | | | |
| Description of Items | Quantity | Unit | Unit price (Taka) | Total cost (with Taxes) | List Phase of Project | List Years of Construction | First Year Construction Costs | Second Year Construction Costs |
| Fencing | | | | | | | | |
| Fencing (Northern Area) | 6,154 | m | 4,400 | 27,077,570 | 1 | 2016 ~ 2017 | | |
| Fencing (Southern Area) | 3,995 | m | 4,400 | 17,578,000 | 1 | 2017 | | |
| Sub-Total (Fencing) | | | | 44,655,570 | | | | |
| Plantation | | | | | | | | |
| Plantation (Northern Area) | 2,891 | ea | 1,031 | 2,979,199 | 1 | 2018 | | |
| Plantation (Southern Area) | 400 | ea | 1,200 | 479,995 | 1 | 2019 | | |
| Sub-Total (Plantation) | | | | 3,459,194 | | | | |
| Drainage System | | | | | | | | |
| U-drain inside EZ (Northern Area) | 10,547 | m | 14,621 | 154,203,390 | 1 | 2016 ~ 2017 | | U-channel Width = 0.7 m ~ 2.0 m |
| U-drain inside EZ (Southern Area) | 7,869 | m | 12,129 | 95,441,112 | 1 | 2018 | | U-channel Width = 0.7 m ~ 2.0 m |
| U-drain between EZ and River | 3,000 | m | 16,500 | 49,500,000 | 1 | 2016 | | |
| Sub-Total (Drainage System) | | | | 299,144,502 | | | | |
| Total | | | | 347,259,266 | | | | |

| COST ESTIMATE OF OFFSITE INFRASTRUCTURES | | | | | | | | | |
|--|----------|----------------|-------------------|--------------------------|-----------------------|----------------------------|-------------------------------|--------------------------------|--|
| PER PHASE | | | | | | | | | |
| Road Network | | | | | | | | | |
| Description of Items | Quantity | Unit | Unit price (Taka) | Total cost (with Taxes*) | List Phase of Project | List Years of Construction | First Year Construction Costs | Second Year Construction Costs | Specification |
| <i>Highway Windings</i> | | | | | 1 | 2,016 | | | |
| Dyke for Highway Winding | 89,843 | m ³ | 353 | 31,714,579 | | | | | |
| Concrete Road | 1,021 | m | 77,290 | 78,913,431 | | | | | |
| | | | | | | | | | |
| Total | | | | 110,628,010 | | | | | |
| <i>Other Infrastructure and Utilities for last mile connection</i> | | | | | | | | | |
| DETAIL EACH UTILITY SEPARATELY | | | | | | | | | |
| Description of Items | Quantity | Unit | Unit price (Taka) | Total cost (with Taxes*) | List Phase of Project | List Years of Construction | First Year Construction Costs | Second Year Construction Costs | Specification |
| <i>Electrical Connection</i> | | | | | 1 | 2,016 | | | |
| 33KV Line from Fenchu | 27,000 | m | 3,000 | 81,000,000 | | | | | |
| Sub-Total (Electrical Connection) | | | | 81,000,000 | | | | | |
| <i>Communication Connection</i> | | | | | 1 | 2,016 | | | |
| OFC Connection | 13 | km | 1,015,833 | 13,205,829 | | | | | OFC: Optical Fiber Connection |
| Terminal Equipment | 2 | set | 150,008 | 300,015 | | | | | |
| Sub-Total (Communication Connection) | | | | 13,505,844 | | | | | |
| <i>Gas Pipe Connection</i> | | | | | 1 | 2,016 | | | |
| 8" dia MS Pipe Works | 6,893 | m | 4,000 | 27,572,005 | | | | | |
| TBS and DRS including RMS and SCADA | 1 | set | 200,000,000 | 200,000,000 | | | | | TBS: Town boarding station (1000 psig to 300 psig or 150 psig or 50 psig) *psig = pounds per square inch gauge DRS: District regulatory system (150 psig to 50 psig) RMS: Regulating meter station (1000 psig to 400 psig, 380 psig, 85 psig or 50 psig) SCADA: Supervisory control and data acquisition **Estimate is based on RMS. |
| Sub-Total (Gas Pipe Connection) | | | | 227,572,005 | | | | | |
| Total | | | | 322,077,849 | | | | | |
| Total (Off-Site) (1) | | | | | | | | | |
| INLAND CONTENA DEPO | | | | | | | | | |
| Description of Items | Quantity | Unit | Unit price (Taka) | Total cost (with Taxes*) | List Phase of Project | List Years of Construction | First Year Construction Costs | Second Year Construction Costs | Specification |
| <i>ICD Structure</i> | | | | | 1 | 2016 ~ 2017 | | | |
| Entry Gate | 40 | sqm | 6,000 | 240,000 | | | | | ICD entry gate 40 sqm |
| Boundary Wall | 318 | m | 16,400 | 5,215,200 | | | | | RCC foundation |
| Office Building 2 stories | | | | | | | | | |
| Foundation | 558 | sqm | 7,552 | 4,214,916 | | | | | |
| Superstructure | 1,116 | sqm | 11,200 | 12,499,200 | | | | | |
| <i>Steel Structure</i> | | | | | | | | | |
| Warehouse | 297 | m | 18,500 | 5,494,500 | | | | | |
| Multiple Shed | 297 | sqm | 12,000 | 3,564,000 | | | | | |
| RCC Work | 4,870 | sqm | 10,175 | 49,552,250 | | | | | RCC Work at Yard |
| Drainage | 318 | m | 14,350 | 4,563,300 | | | | | U-drain, width 70cm |
| Generator | 1 | set | 3,063,543 | 3,063,543 | | | | | 200 KVA |
| Sub-station | 1 | set | 1,800,000 | 1,800,000 | | | | | Electrical substation |
| Security Post | 4 | set | 100,000 | 400,000 | | | | | |
| Water Supply Pipe Works | 250 | m | 7,745 | 1,936,250 | | | | | Pipe, dia 150mm |
| Fire Hydrant | 4 | ea | 245,000 | 980,000 | | | | | |
| Septic Tank | 1 | ea | 105,751 | 105,751 | | | | | For 50 users |
| Soak well | 1 | ea | 50,683 | 50,683 | | | | | For 50 users |
| Area Lighting | 7 | set | 500,000 | 3,500,000 | | | | | High Mast Light |
| Parking Shed | 140 | sqm | 8,000 | 1,120,000 | | | | | 30 x 50 ft |
| Sub-Total (ICD Structure) | | | | 98,298,693 | | | | | |
| <i>Truck Parking</i> | | | | | 1 | 2016 ~ 2017 | | | |
| Entry Gate | 40 | sqm | 6,000 | 240,000 | | | | | Parking entry gate 40 sqm |
| Boundary Wall | 422 | m | 16,400 | 6,920,800 | | | | | RCC Foundation |
| Steel Structure | 859 | sqm | 14,383 | 12,354,997 | | | | | Warehouse, Canteen, Restaurant |
| Site Improvement | 9,035 | sqm | 5,294 | 47,831,401 | | | | | |
| Generator | 1 | set | 3,063,543 | 3,063,543 | | | | | 250 KVA |
| Sub-station | 1 | set | 1,800,000 | 1,800,000 | | | | | Electrical substation |
| Drainage | 422 | m | 14,350 | 6,055,700 | | | | | U-drain width 70cm |
| Water Supply Pipe Work | 325 | m | 7,745 | 2,517,125 | | | | | Pipe dia 150mm |
| Fire Hydrant | 6 | ea | 245,000 | 1,470,000 | | | | | |
| Septic Tank | 1 | ea | 206,104 | 206,104 | | | | | For 200 users |
| Soak well | 1 | ea | 67,677 | 67,677 | | | | | For 200 users |
| Area Lighting | 8 | set | 500,000 | 4,000,000 | | | | | High Mast Light |
| Sub-Total (Truck Parking) | | | | 86,527,347 | | | | | |
| Total | | | | 184,826,040 | | | | | |

| COST ESTIMATE OF ALL EARTHWORKS | | | | | | | | | |
|----------------------------------|-----------|----------------|-------------------|--------------------------|-----------------------|----------------------------|-------------------------------|--------------------------------|----------------------------------|
| PER PHASE | | | | | | | | | |
| Land Leveling and Filling | | | | | | | | | |
| Description of Items | Quantity | Unit | Unit price (Taka) | Total cost (with Taxes*) | List Phase of Project | List Years of Construction | First Year Construction Costs | Second Year Construction Costs | Specification |
| <i>Preparation</i> | | | | | | | | | |
| Site Clearing (Northern Area) | 990,247 | m ² | 10 | 9,902,470 | 1 | 2016 | | | |
| Site Clearing (Southern Area) | 444,851 | m ² | 10 | 4,448,510 | 1 | 2016 | | | |
| <i>Sub-Total (Preparation)</i> | | | | 14,350,980 | | | | | |
| <i>Dredging</i> | | | | | | | | | |
| Dredging (Northern Area) | 1,043,498 | m ³ | 139 | 145,046,224 | 1 | 2016 | | | |
| Dredging (Southern Area) | 2,001,830 | m ³ | 139 | 278,254,346 | 1 | 2016 | | | |
| Leveling (Northern Area) | 2,002,610 | m ³ | 90 | 180,234,918 | 1 | 2016 | | | |
| Leveling (Southern Area) | 4,005,230 | m ³ | 90 | 360,470,715 | 1 | 2016 | | | |
| <i>Sub-Total (Dredging)</i> | | | | 964,006,203 | | | | | |
| Total | | | | 978,357,183 | | | | | |
| Cost of Dyke Construction | | | | | | | | | |
| Description of Items | Quantity | Unit | Unit price (Taka) | Total cost (with Taxes*) | List Phase of Project | List Years of Construction | First Year Construction Costs | Second Year Construction Costs | Specification |
| <i>Dyke System</i> | | | | | | | | | |
| Dyke (Northern Area) | 50,090 | m ³ | 353 | 17,681,742 | 1 | 2016 | | | |
| Dyke (Southern Area) | 62,891 | m ³ | 353 | 22,200,560 | | 2016 ~ 2017 | | | |
| Ditch (Northern Area) | 50,090 | m ³ | 353 | 17,681,742 | | 2016 | | | |
| Ditch (Southern Area) | 35,350 | m ³ | 353 | 12,478,560 | | 2016 ~ 2017 | | | |
| Retention Pond (Northern Area) | 84,749 | m ³ | 136 | 11,525,850 | | 2016 | | | |
| Membrane (Northern Area) | 28,910 | m ² | 250 | 7,227,504 | | 2016 | | | |
| Pump Sum Structure | 1 | set | 2,282,880 | 2,282,880 | | 2016 ~ 2017 | | | Foundation: RC with Piling |
| Pumps | 5 | set | 500,000 | 2,500,000 | | 2017 | | | Pump: 30m ³ /min/pump |
| RCP | 4 | set | 60,000 | 240,000 | | 2017 | | | D = 1m, L = 10m |
| Earth Work (Leveling) | 84,749 | m ³ | 408 | 34,577,592 | | 2016 | | | |
| <i>Sub-Total (Dyke System)</i> | | | | 128,396,430 | | | | | |
| Total | | | | 128,396,430 | | | | | |

| <i>Master Planning</i> | | | | |
|--|--|---------------------|-----------|---------------------|
| Number of Phases | | | 1 | |
| Total m ² per phase | | | 1,430,701 | |
| Year when each phase is to be developed | | Northern Area: 2018 | | Southern Area: 2019 |
| Total number of plots per phase | | | 91 | |
| Total leasable plots per phase | | | 90 | (Number of plots) |
| Total m ² of leasable plots per phase | | | 856,629 | |
| Total number of rentable plots per phase | | | 1 | |
| Total m ² of rentable plots per phase | | | 21,897 | |
| Total non-leasable plots per phase | | | 0 | |
| Total non-rentable plots per phase | | | 0 | |
| Yearly cost for maintenance of the project | | | 1.212 | (\$ million) |
| Total number of households to be resettled | | | 5 | |
| Total cost of resettlement | | | 0.125 | (\$ million) |

| <i>Pre-built Factory Costs</i> | | | | |
|---------------------------------------|------------|----------------|----------------|--------------------------|
| Description of Items | Total Size | Unit | M2 Cost (Taka) | Total cost (with Taxes*) |
| Pre-Built Factories | 28,000 | m ² | 34,610 | 969,080,000 |
| Total | | | | 969,080,000 |

| <i>Administration and Custom</i> | | | | |
|---|------------|----------------|----------------|--------------------------|
| Description of Items | Total Size | Unit | M2 Cost (Taka) | Total cost (with Taxes*) |
| Administration | 2,000 | m ² | 33,750 | 67,499,988 |
| Customs Building | 220 | m ² | 34,091 | 7,500,000 |
| Total | | | | 74,999,988 |

| <i>Other Building Costs</i> | | | | |
|------------------------------------|------------|----------------|----------------|--------------------------|
| Description of Items | Total Size | Unit | M2 Cost (Taka) | Total cost (with Taxes*) |
| | | m ² | | 0 |
| Total | | | | 0 |

| <i>Residential Facilities and I</i> | | | | |
|--|------------|----------------|----------------|--------------------------|
| Description of Items | Total Size | Unit | M2 Cost (Taka) | Total cost (with Taxes*) |
| Administration Staff Quarter | 9,453 | m ² | 38,708 | 365,903,580 |
| Total | | | | 365,903,580 |

ANNEX 4

CHAPTER 4: ENVIRONMENT & SOCIAL REVIEW

Other Environmental Impacts and Mitigation Measures for the Sherpur EZ Project Component

| Impact Description | Magnitude/Significance of the Impact | Mitigation Measures | Implementation Responsibility | Preliminary Costing |
|---|---|--|--|---|
| Location impacts | | | | |
| Loss of livelihood. During earthwork there may be disruption of trees, commercial activities of roadside shops. | I/P | A Resettlement Plan detailing compensation schemes, social rehabilitation measures, grievance mechanisms, monitoring and evaluation plan and institutional arrangements will be prepared and implemented. | The PIU at Maulvibazar/Sylhet, will prepare the RP, with assistance from the project consultants. Implementation of the RP will be undertaken by EA (BEZA). | Part of RP cost |
| Design Impacts | | | | |
| Groundwater contamination The installation of wells may lead to pollution of the aquifer from possible sources of contamination such as surface run-off, garbage dumps, latrines, etc. | I/P | Approved DOE and WHO guidelines and protocols will be strictly followed in the construction of EZ Site, approach road and associated industries. Establishment of a test or production well in order to ensure the integrity of the aquifer. | Incorporation of measures in the Project design -Project Consultant | Measures shall be integrated in the detailed design |
| Seismic hazards The EZ is located in the high seismic risk area (zone-1) on the national Seismic Zoning Map | I/P | The EZ site including industrial establishment and facilities, will be designed consistent with internationally accepted standards related to the seismicity risk of the area so to minimize or prevent damage to the structures during earthquakes. | Project consultant | Measures shall be integrated in the detailed design |
| Construction Impacts | | | | |

| Impact Description | Magnitude/Significance of the Impact | Mitigation Measures | Implementation Responsibility | Preliminary Costing |
|---|---|--|--|----------------------------|
| Health hazards due to construction activities | I/T | <p>Standard environment health and safety guidelines of WB will be followed to ensure health hazards to workers and neighbouring settlement</p> <p>Exposure to dust, noise can be prevented by containment, regular inspections and proper precautions when working around or with the material.</p> | Construction Contractor, Construction Supervision Consultant | Cost included in Contract |
| Pollution of water resources Direct discharge of construction run-off may cause siltation of surrounding surface water bodies. | M/T | <p>Adequate run-off and drainage control in construction areas will be provided. Sediment laden construction water will be discharged into settling ponds prior to final discharge. Direct discharge into surface watercourses will not be allowed. Earth, stones and solid wastes will be properly stockpiled and disposed of so that these do not block rivers and streams, thereby avoiding adverse impact on water quality and flow regime</p> | Contractor | - |
| Dust and noise from construction of EZ facilities. Elevated | M/T | The following measures will be implemented to minimize impacts to local communities during construction | Contractor | minimal |

| Impact Description | Magnitude/Significance of the Impact | Mitigation Measures | Implementation Responsibility | Preliminary Costing |
|--|---|---|--------------------------------------|----------------------------|
| noise levels and dust emission may be experienced by nearby households | | of EZ and associated structures: (i) provision of cover on haul trucks transporting filling materials, gravel, excavated soil and other construction materials, (ii) water spraying on exposed areas to suppress dust emission, (iii) proper maintenance of equipment and use of mufflers, as appropriate, to minimize noise and (iv) scheduling of noise generating activities during daytime, as much as possible, to avoid disturbance to nearby households. | | |
| Removal of vegetation The construction of EZ as well as approach road will require vegetation clearing. | M/T | Much of the clearing will be undertaken along the roads where the dominant vegetation are various species of grasses. Although cutting of trees may be necessary in some areas, impacts may not deemed significant as the Project will involve removal of common tree species that are widely found in the area. There are no endangered or rare species of vegetation in the Project area that may be affected during | - | - |

| Impact Description | Magnitude/Significance of the Impact | Mitigation Measures | Implementation Responsibility | Preliminary Costing |
|---|---|--|--------------------------------------|--|
| | | construction. However, the proposed detailed EIA study will further address these issues including land acquisition. | | |
| Safety hazards during construction This impact is considered negligible provided appropriate safety precautions are observed at all times. | I/T | Workers will be oriented on safe practices and will be provided with appropriate personnel protective gear (e.g., safety shoes, hard hats, etc.). There will be provision of adequate protection to the general public, such as safety barriers where excavation is being undertaken and other measures, as necessary. | Contractor | Orientation shall be undertaken by EHS Officer to be hired by the contractor |
| O & M Impacts | | | | |
| Hazard of land subsidence Land subsidence may occur due to over extraction of groundwater. | I/P | Geotechnical investigations will be conducted to appropriately design the site stability and associated establishment | Project Consultants | Orientation shall be undertaken by EHS Officer to be hired by the contractor |
| Pollution due to improper treatment of wastes, sludge disposal methods | M/P | Impacts due to improper treatment of wastes, disposal of sludge will be avoided through the implementation of a sludge management plan. | BEZA | Formulation of sludge management plan: US\$ |

Note: Magnitude: I-insignificant, M-moderate or S-significant and impact duration: T-temporary or P-permanent

Earthquake Zones in Bangladesh



Source: Geological Survey of Bangladesh

Environmental Management and Monitoring

A. Project Management

| Sub-project Activity | Potential Environmental Impact(s) | Mitigation Measures | Location | Estimated Mitigation Cost | Responsibility | |
|-----------------------------|--|--|---------------------------------|----------------------------------|-------------------------------------|--------------------|
| | | | | | Implementation | Supervision |
| Site clearance | Vegetation removal | Tree clearances for easement establishment to only involve cutting trees off at ground level or pruning as appropriate, with tree stumps and roots left in place and ground cover left undisturbed. | Throughout the site | N/A | Construction Supervision Consultant | Contractor |
| Mechanized construction | Noise, vibration and operator safety, efficient operation | Construction equipment to be well maintained. | Throughout the site | N/A | Construction Supervision Consultant | Contractor |
| Air Quality | -Emissions from vehicles -Emissions through burning of waste -Dust emissions | -Limitations of size, weight or axle loads of vehicles using particularly difficult roads. -Reduction of speed and limited movement of vehicles. -Routine service and regular maintenance of vehicles and machines to reduce engine emissions. -Burning of rubbish on site must be strictly forbidden. -Construction equipment shall be maintained to a good standard and idling of engines discouraged. -Machinery causing excessive pollution (visible smoke) shall be banned from construction sites. -Despite its dust reduction potential, access roads shall only be sprayed in exceptional cases due to scarcity of water | Throughout the site | N/A | Construction Supervision Consultant | Contractor |
| Waste Production | -Waste generation | -Development of a Waste Management Plan within the HSE Management Plan considering following principles: (i) waste | Construction yard, workers camp | N/A | Construction Supervision Consultant | Contractor |

| Sub-project Activity | Potential Environmental Impact(s) | Mitigation Measures | Location | Estimated Mitigation Cost | Responsibility | |
|-----------------------------|--|--|--------------------|----------------------------------|-----------------------|--------------------|
| | | | | | Implementation | Supervision |
| | | <p>management hierarchy of avoidance-minimisation-reuse-treatment-disposal; (ii) segregation of waste; (iii) minimisation of construction waste by good technical planning; (iv) training of staff.</p> <ul style="list-style-type: none"> -Implementation of a Waste Management System. -Provision of construction sites and workers' camps with functional sanitary equipment. -Training of workers regarding proper waste and waste water handling according to environmental management requirements. -Solid waste and garbage will be collected in bins and disposed of daily, according to a brief and basic waste management plan prepared by the contractor and approved by BEZA-PMO, prior to commencement of civil works. - All solid waste will be collected and removed from the work camps and disposed of in local waste disposal sites -Any spoil generated by the construction activity should be disposed at an approved location. -Littering should be prevented by providing adequate number of containers which shall be emptied regularly. -After completion of construction the site shall be properly cleaned and properly rehabilitated or re-vegetated. | | | | |
| Oil spillage | Contamination of | Oil storage facilities and located | Construction yard, | N/A | Construction | Contractor |

| Sub-project Activity | Potential Environmental Impact(s) | Mitigation Measures | Location | Estimated Mitigation Cost | Responsibility | |
|-----------------------------|--|--|---------------------------------|----------------------------------|-------------------------------------|--------------------|
| | | | | | Implementation | Supervision |
| | soil and water bodies | within secure and impervious bunded areas with appropriate storage capacity. Safe handling and disposal of phased out equipment | workers camp | | Supervision Consultant | |
| Health and Safety | General Health and Safety impacts | Development of an EHS Policy for the construction phase. -Development of an EHS Management Plan for construction (shall include a Waste Management Plan). -Installation of an EHS Management System (EHS-MS) during the construction phase. -Clean work environment including good drainage around camp sites will be provided to avoid creation of stagnant water bodies -Provide adequate sanitation and waste disposal facilities at campsites -Provide education to the workforce on prevention of communicable | Construction yard, workers camp | N/A | Construction Supervision Consultant | Contractor |

B. Monitoring Plan

| Environmental Indicator | Parameters/ Units | Location | Means of Monitoring | Frequency / Duration Standards | Responsibilities | | Estimated Cost |
|--------------------------------|---|------------------------|--|---------------------------------------|-------------------------|-------------|-----------------------|
| Soil and Water Resources | -Removal of temporary infrastructure -Replanting of unneeded access roads, lay down areas, and other work sites -Provision of | Throughout the project | -Visual control of downstream water quality (turbidity), -Regular measurements of upstream / downstream basic water parameters, | Regular/DoE-WB Regulations | Implementation | Supervision | N/A |

| Environmental Indicator | Parameters/ Units | Location | Means of Monitoring | Frequency / Duration Standards | Responsibilities | | Estimated Cost |
|-------------------------|---|----------------|----------------------------|--------------------------------|------------------|-------------|----------------|
| | separate storage tanks for further treatment of oily wastewater | | | | | | |
| Flora | Supervision of maintenance procedures | Specific sites | Visual (Quantity check) | Periodical Inspection | Implementation | Supervision | |
| Waste Production | Quality and quantity of solid and liquid wastes | Specific sites | Instrumental quality check | Regular monitoring | Implementation | Supervision | |

Source: Review of environmental analysis, January 2014

References

- BEZA Project documents, May, 2013
- Department of Environment, Environmental Policies, Act and Regulations 1995, 1997
- Inception Report, “Support to Capacity Building of Bangladesh Economic Zones Authority Project” Under Private Sector Development Support Project, Japan Development Institute, In association with Maxwell Stamp Ltd., Sheltech (Pvt.) Ltd. July 2013
- Interim Report, , “Support to Capacity Building of Bangladesh Economic Zones Authority Project” Under Private Sector Development Support Project, Japan Development Institute, In association with Maxwell Stamp Ltd., Sheltech (Pvt.) Ltd. October, 2013
- The Bangladesh Economic Zones Act, 1st August 2010, Act No. 42 of 2010
- World Bank, Environmental Assessment Sourcebook, Volume II, Sectoral Guidelines, Washington DC, 1991

Reply to WB Comments on Sherpur EZ.

Environment Component, PSDSP, BEZA, February 09, 2014

01 WB query

Provide a brief project description in sufficient details to provide context for EIA.

Consultant's Reply

Sherpur is under Maulavibazar Sadar Upazila with an area of 344.34 km² and has 40,573 units of households. It is located at 24°28'40"N 91°46'00"E 24.4778°N 91.7667°E.

Reference to the [1991 Bangladesh census](#), Moulvibazar Sadar has a population of 239378. Males constitute 51.56% of the population, and females 48.44%. This Upazila's eighteen up population is 126,303. Moulvibazar Sadar has an average literacy rate of 32.4%.

The main exports of this zone (Moulvibazar) are [bamboo](#), tea, pineapple, [cane](#), [jackfruit](#), oranges, [agar](#), [rubber](#), [mangoes](#) and lemons. Ninety-one of Bangladesh's 153 tea gardens are located in Moulvibazar.

Water (potable) at a depth of six meter is widely available in this zone. This area is now barren. Out of total 352.89 acres of land, 113.95 acre is GoB khas land. In wet season most of this land remains under one meter deep water. The river Monu is around 400 m away. Dredged material from the Monu may raise this area.

There is no shrine and there is no plantation. Both natural gas and electricity is available around. Here the socio-economic condition is vulnerable. **There are all the reasons to believe that the proposed project is likely to have a significant impact on the environment.**

Through EIA we are to identify the environmental, social and economic impacts of a project prior to decision-making. It will aim to predict environmental impacts at an early stage in project planning and design, find ways and means to reduce adverse impacts, shape projects to suit the local environment and present the predictions and options to decision-makers. By using EIA both environmental and economic benefits can be achieved, such as reduced cost and time of project implementation and design, avoided treatment/clean-up costs and impacts of laws and regulations.

02 WB query

Provide maps and/or drawing of the project component and activities

Consultant's Reply

Map enclosed

03 WB query

Describe the utility requirements for the project.

Consultant's Reply

The utility requirement of the project is:

- (a) Water Supply.

Underground water in this zone is potable. Good drinking water is available at a depth of six meter. The river Monu is only 400 m away. Water in a bulk quantity may be extracted from there. This water

is indeed free from salinity. For other water quality parameters, a water sample from the River Monu may be tested.

(b) Natural Gas supply and

Natural gas is available in the vicinity of the project. This gas mainly comes from “Rashidpur Gas Field”.

(c) Power Supply

Electricity is also available in this area, which mainly comes from Shahji Bazar Power Station.

02. WB query

Describe the concerns and issues expressed by the public and the action taken to address those concerns and issues, including how public input was incorporated into the project development, impact mitigation and monitoring. Present with photograph of consultation meeting and the signature of the attendees.

Consultant's Reply

Public Consultation:

Venue: Khalilpur Union Parishad Office (number one). Union: Khalilpur, Upazila: Maulavibazar Sadar, Dist: Maulavibazar. Date: 07/07/2013, Time: 1630 hrs. (Bangladesh Standard Time).

A public consultation meeting was held at the said venue. The venue was in the vicinity of the proposed Economic Zone site. Twenty six people attended the meeting, who are noted and permanent resident of the area. Dr. Md. Nurunabi Mridha the project director of BEZA coordinated, where as Mr Ashraful Alam Khan, the UNO of Maulavibazar Sadar conducted the meeting. Mr Raza Mia, the union Parishad Chairman, Mr Nazmul Islam, member ward # 01, Mr Masud Rana, member ward # 02, Mr Asraf Ali Khan, member ward # 03, Ms. Puspa Begum, member ward # 01, 02 & 03, Ms. Saleha Begum, member ward # 04, 05 & 06, Ms. Ruby Begum, member ward # 07, 08 & 09 and teacher Sahabuddina were present among the noted participants.

The participants were spontaneous and appreciated the proposed “Economic Zone” project. The project gained the full support of the communities. According to them this project will provide better employment opportunity and as such their standard of living will come up. Various potential environmental hazards via water/air/sound pollution were discussed in the meeting. Their queries were answered by the environment specialist of the consultant, to the satisfaction of the participants. Proper mitigation measure would avert there hazards, the local elites opined.

The significant suggestions made during the meeting are as follows:

- (i) Water will be spread at regular interval to stop dust pollution.
- (ii) Speed breakers will be made to control the speed of the vehicles.
- (iii) Proper silencer pipe will be fitted with all the vehicles to reduce noise emission.
- (iv) Vehicular movement will be restricted to a certain time span.

Photograph of the attendees attached at the site is as below, but the signature sheet is not available.



04 WB query

Discuss the impacts of various planned activities of the proposed project those are sensitive...
Consultant's Reply

There may be (i) water pollution, (ii) Dust pollution, (iii) Six and NOx pollution, (iv) Noise pollution, (v) Pollution due to improper solid waste disposal, (vi) water logging due to improper drainage etc.
 A detailed study will be made collecting data from different relevant sources during EIA.

05 WB query

Is the river located in the site or how far from the site?

Consultant's Reply

The “Economic Zone” site is by the side/bank of the river Monu. This river is only 400 m away from the proposed “Economic Zone” area.

06 WB query

What about Flora and Fauna. Does the site has any trees and their cutting required?

Consultant's Reply

The proposed “Economic Zone” area is free from all kinds of plantation, vegetation, flora and fauna. No cutting of trees will be required/needed.

07 WB query

How far are the religious structures from the site? Does any permission are required, if they are very close to the site?

Consultant's Reply

There is no religious structures there.

08 WB query

Please highlight all the impacts resulting from the various proposed industries and other planned activities including power plant, port & dock, staff quarter, security barrack, hospital, dikes, WTP, access way etc.

Consultant's Reply

Not applicable for this Economic Zone.

09 WB query

Impacts from tidal/storm surge, dredging, earth fill, borrow pit, industrial waste, losses of terrestrial and aquatic habitat etc. needed to be discussed.

Consultant's Reply

(a) Tidal/Storm Surge :

A storm surge is an offshore rise of water associated with a [low pressure](#) weather system, typically [tropical cyclones](#) and strong [extra tropical cyclones](#). Storm surges are caused primarily by high [winds](#) pushing on the [ocean](#)'s surface. The wind causes the water to pile up higher than the ordinary [sea level](#). Low pressure at the center of a weather system also has a small secondary effect, as can the [bathymetry](#) of the body of water.

Here there is no sea around the proposed “Economic Zone” in Maulavibazar Sadar. Only one river called Monu is around 400 m away. As such there is no possibility of tidal/storm surge in this area.

(b) Dredging :

A dredger is a device/ machine/ vessel that is used to excavate and remove material from the bottom of a water body. Dredging is an [excavation](#) activity or operation usually carried out in underwater. Here to raise the ground level of the proposed “Economic Zone” above the highest flood level (HFL) dredged material from the adjacent (400 meter apart) Monu river will be required. This dredging will also to keep the Monu river waterway navigable.

This dredging may create disturbance in [aquatic ecosystems](#), often with adverse impacts in the proposed Sherpur Economic Zone.

(c) Earth Fill :

The “Earth Fill” work consists of the construction of earth embankments. This earth fill is composed of natural earth materials that can be placed and compacted by construction equipment operated in a conventional manner. Earth backfill is composed of natural earth material placed and compacted in confined spaces. For earth fill all the fill material will be obtained from required excavations and designated borrow areas. For this, the base should be stripped i.e. removal of vegetation will be required, this might have a negative impact on the environment.

(d) Barrow Pit :

A borrow pit, in generally known as a sand box, it is a term used in [construction](#). It describes an area where material (usually [soil](#), [gravel](#), or [sand](#)) has been dug to be used at another location. Here in Sherpur the borrow pits may be found in the vicinity of the project and may be used for [landfill](#) and [waste disposal](#).

(e) Industrial Waste :

Industrial waste is the waste produced by industrial activity which includes any material that is rendered useless during a manufacturing process such as that of factories, mills and mines. It has existed since the outset of the industrial revolution. Sewage treatment can be used to clean water tainted with industrial waste. Some examples of industrial waste are paints, sand paper, paper products, industrial by-products, metals, radioactive wastes, etc. Industrial solid waste and [Municipal solid waste](#) are designations of industrial waste. [Sewage treatment](#) can be used to clean water tainted with industrial waste.

Here in the proposed Sherpur Economic Zone, penalties and fees are created as enforcement actions and to ensure that violating conditions are corrected in a timely manner to ensure consistent treatment of industrial dischargers; to eliminate economic advantages for violations; and to ensure that states recover expenses attributable to violations.

(f) Losses of Terrestrial and Aquatic Habitat :

Loss and degradation of terrestrial and aquatic habitats are the primary causes of species destruction in the proposed Sherpur Economic Zone.

Habitat [destruction](#), [alteration](#) and [fragmentation](#) are probably the most serious causes of current and future amphibian population declines and species extinctions. Amphibians are found in a great variety of ecosystems in the proposed Sherpur Economic Zone area.

Habitat destruction is defined as the complete elimination of a localized or regional ecosystem leading to the total loss of its former biological function. This habitat destruction will be most obvious in Sherpur, when amphibian habitat is drained/cut. This species is widely found in or near aquatic habitats. Habitat alteration is the changes made to the environment that adversely affect ecosystem function. Whereas the habitat fragmentation is a secondary effect of habitat destruction.

10 WB query

Why dredging? Is the site a pond or water logged?

Consultant's Reply

There are lot of ponds/beels and water logged areas in the proposed Economic Zone area of Sherpur. As such dredging will be needed. This dredged material will come from adjacent (400 meter away) Monu River.

11 WB query

Approximate number and nature of trees, uprooting is required.

Consultant's Reply

The proposed “Economic Zone” at Sherpur is free from all types of plantation and vegetation. As such no uprooting of trees is required.

12 WB query

Please update this in line with the Environment Management Framework (EMF) of the project.

Consultant's Reply

Please look page 18, section 6, for details.

13 WB query

No regular monitoring of “Water Quality”? This shall be included.

Consultant's Reply

Please look page 22, Table 7.1 for details.

14 WB query

ToR shall be included as an outcome of IEE.

Consultant's Reply

ToR included in the text, Please look page 19, 20 & 21.

15 WB query

Harbor is not mentioned in the project description.

Consultant's Reply

Not applicable for this “Economic Zone” in Sherpur

16 WB query

(Design Impact), which guide lines and who approves?

Consultant's Reply

Department of Environment GoB and World Health Organization (WHO) Guidelines.

Please turn page # 25 and 26, for details.

ANNEX 5

CHAPTER 6: FINANCIAL AND ECONOMIC MODELLING

(COMPONENT 4)

Annex 5 (a): Financial Modelling

Land Lease Projection

Table 3.5.3-2 Demanded Area by Industries and Projection of Land Lease/Sale by Industry over time

| Land | Land | Area | Demanded Land Area (Hectare) | | | | | Total Area | | |
|--------------------|----------------------|--------------------|------------------------------|------|----------|---------|------|------------|---------|--------|
| | | | Year | 2016 | 2017 | 2018 | 2019 | 2020 | Hectare | Acres |
| Demanded Land | Industry Plot | Integrated Textile | | 0 | 17.30 | 0 | 0 | 0 | 17.30 | 42.73 |
| | | Ceramics | | 0 | 11.17 | 3.68 | 0 | 0 | 14.85 | 36.68 |
| | | Pharmaceuticals | | 0 | 25.06 | 5.92 | 0 | 0 | 30.98 | 76.52 |
| | | Paints | | 0 | 0 | 4.76 | 0 | 0 | 4.76 | 11.76 |
| | | Food Processing | | 0 | 9.36 | 8.41 | 0 | 0 | 17.77 | 43.89 |
| | Rental Factory | | | 0 | 2.19 | 0 | 0 | 0 | 2.19 | 5.41 |
| | Commercial Zone | | | 0 | 0.83 | 0 | 0 | 0 | 0.83 | 2.05 |
| | Total Area (Hectare) | | | 0.00 | 65.91 | 22.77 | 0.00 | 0.00 | 88.68 | |
| Total Area (Acres) | | | | 0 | 162.7977 | 56.2419 | 0 | 0 | | 219.04 |

Notes

The market research (Table 2.4.2.2-1 Projected Demand and Timeframe of Investment in Sherpur), the developed land is strongly demanded.

Assumption

2017 Industries (Integrated Textile, Ceramic, Pharmaceuticals, Food Processing) acquire the industry plots in the northern area.

2018 Industries (Ceramic, Pharmaceuticals, Paint, Food Processing) acquire the industry plots in the southern area.

Note: Construction Progress of Rental Factory

| Year | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Total (m2) |
|---|------|-------|-------|------|-------|-------|------------|
| Floor Area (m2) | 0 | 13245 | 13144 | 1612 | | | 28000 |
| Leasing Schedule of Rental Factory | | | | | | | |
| Leasing Schedule of Rental Factory | | | | 6622 | 9883 | 7403 | 4092 |
| Cumulative Leasing Schedule of Rental Factory | | | | 6622 | 16505 | 23908 | 28000 |

Utility Demand

Table 3.5.3-7 Operating Land and Utility Demand

| Operating Land and Utility Demand | | Year | | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | |
|---|--|---|---------------------|---------|------------------------------|------|------|---------|-----------|---------|---------|--|
| Items | | Project Stage | | LA & DD | Construction in Single Phase | | | | Operation | | | |
| Cumulative Land under Operation (Hectare) | | Unit | Hector | 0 | 0 | 0 | 0 | 32.96 | 60.82 | 82.99 | 88.68 | |
| Cumulative Power Demand (KW) | | | KW | 0 | 0 | 0 | 0 | 15,466 | 24,253 | 32,513 | 33,039 | |
| Cumulative Water Demand (m ³ /day) | | | m ³ /day | 0 | 0 | 0 | 0 | 25,630 | 42,321 | 57,073 | 59,011 | |
| Cumulative Gas Demand (m ³ /day) | | | m ³ /day | 0 | 0 | 0 | 0 | 273,363 | 464,338 | 628,166 | 655,312 | |
| Notes | | LA & DD: Land acquisition and detail design If the land acquisition is overdue, the whole schedule will be shifted by the overdue years. | | | | | | | | | | |

Cost Cash Flow

| Scope/Year | 2016 | 2017 | 2018 | 2019 | Total (BDT) | Total (USD) |
|--------------------------------------|-------------|-------------|-------------|-------------|--------------------|--------------------|
| Preparation | | | | | | |
| Site Clearing (1) | 9,902,470 | | | | 9,902,470 | 123,781 |
| Site Clearing (2) | 4,448,510 | | | | 4,448,510 | 55,606 |
| Dredging (1) | 145,046,224 | | | | 145,046,224 | 1,813,078 |
| Dredging (2) | 278,254,346 | | | | 278,254,346 | 3,478,179 |
| Leveling (1) | 180,234,918 | | | | 180,234,918 | 2,252,936 |
| Leveling (2) | 360,470,715 | | | | 360,470,715 | 4,505,884 |
| Road | | | | | | |
| Road (Minor Road) (1) | | 86,371,332 | 211,749,072 | | 298,120,404 | 3,726,505 |
| Road (Main Road) (1) | | 57,623,048 | | | 57,623,048 | 720,288 |
| Road (Minor Road) (2) | | | 20,689,680 | 107,837,120 | 128,526,800 | 1,606,585 |
| Dike System | | | | | | |
| Dike (1) | 17,681,742 | | | | 17,681,742 | 221,022 |
| Dike (2) | 3,052,577 | 19,147,983 | | | 22,200,560 | 277,507 |
| Ditch (1) | 17,681,742 | | | | 17,681,742 | 221,022 |
| Ditch (2) | 1,715,802 | 10,762,758 | | | 12,478,560 | 155,982 |
| Retention Pond (1) | 11,525,850 | | | | 11,525,850 | 144,073 |
| Membrane (1) | 7,227,504 | | | | 7,227,504 | 90,344 |
| Pump Sum Structure (1) | 837,056 | 1,445,824 | | | 2,282,880 | 28,536 |
| Pumps (1) | | 2,500,000 | | | 2,500,000 | 31,250 |
| RCP (1) | | 240,000 | | | 240,000 | 3,000 |
| Earth Work (Leveling) (1) | 34,577,592 | | | | 34,577,592 | 432,220 |
| Fencing (1) | 4,804,085 | 22,273,485 | | | 27,077,570 | 338,470 |
| Fencing (2) | | 17,578,000 | | | 17,578,000 | 219,725 |
| Drainage | | | | | | |
| U-drain inside EZ (1) | 12,732,390 | 141,471,000 | | | 154,203,390 | 1,927,542 |
| U-drain inside EZ (2) | | | 95,441,112 | | 95,441,112 | 1,193,014 |
| U-drain between EZ and River (1) | 49,500,000 | | | | 49,500,000 | 618,750 |
| Plantation | | | | | | |
| Plantation (1) | | | 2,979,199 | | 2,979,199 | 37,240 |
| Plantation (2) | | | | 479,995 | 479,995 | 6,000 |
| Water Supply System | | | | | | |
| Pipe Work inside EZ (1) | 12,276,698 | | | | 12,276,698 | 153,459 |
| Pipe Work inside EZ (2) | | 4,034,560 | | | 4,034,560 | 50,432 |
| Valve Work (1) | 1,368,997 | | | | 1,368,997 | 17,112 |
| Valve Work (2) | | 615,999 | | | 615,999 | 7,700 |
| Fire Hydrant (1) | 31,289,994 | | | | 31,289,994 | 391,125 |
| Fire Hydrant (2) | | 10,270,002 | | | 10,270,002 | 128,375 |
| River Intake (Iron ductile pipe) (1) | 41,940,000 | | | | 41,940,000 | 524,250 |
| River Intake (Jetty) (1) | 2,466,642 | 533,328 | | | 2,999,970 | 37,500 |

| | | | | | | |
|--|------------|-------------|-------------|-----------|-------------|-----------|
| River Intake Pump (1) | 2,087,070 | | | | 2,087,070 | 26,088 |
| River Intake (GI sanction pipe) (1) | 500,010 | | | | 500,010 | 6,250 |
| Treatment Plant (Reservoir tank) (1) | | 400,000,023 | | | 400,000,023 | 5,000,000 |
| Treatment Plant (Water tower) (1) | | 55,999,971 | | | 55,999,971 | 700,000 |
| Treatment Plant (Structure/facility) (1) | | 427,450,912 | 272,548,976 | | 699,999,888 | 8,749,999 |
| Waste Water System | | | | | | |
| Pipe Work inside EZ (1) | 56,644,018 | | | | 56,644,018 | 708,050 |
| Pipe Work inside EZ (2) | | 19,577,922 | | | 19,577,922 | 244,724 |
| Pipe between EZ and River (1) | 9,432,008 | | | | 9,432,008 | 117,900 |
| Manhole Work (1) | 75,424,995 | | | | 75,424,995 | 942,812 |
| Manhole Work (2) | | 16,408,392 | | | 16,408,392 | 205,105 |
| Recycling Pipe Work (1) | 14,138,950 | | | | 14,138,950 | 176,737 |
| Recycling Pipe Work (2) | | 8,330,000 | | | 8,330,000 | 104,125 |
| Tower and Pump (1) | 3,999,990 | | | | 3,999,990 | 50,000 |
| Treatment Plant (1) | | 427,450,912 | 272,548,976 | | 699,999,888 | 8,749,999 |
| Electrical System | | | | | | |
| Sub Station (33/12 kv line) (1) | 11,229,066 | 3,770,955 | | | 15,000,021 | 187,500 |
| Transformer (11/0.4 kv) (1) | | | 24,000,000 | | 24,000,000 | 300,000 |
| Transformer (11/0.4 kv) (2) | | | | 8,000,000 | 8,000,000 | 100,000 |
| Interval Line (11 kv line) (1) | | | 4,902,000 | | 4,902,000 | 61,275 |
| Interval Line (11 kv line) (2) | | | | 1,945,500 | 1,945,500 | 24,319 |
| Interval Line (0.4 kv line) (1) | | | 3,316,005 | | 3,316,005 | 41,450 |
| Interval Line (0.4 kv line) (2) | | | | 1,421,604 | 1,421,604 | 17,770 |
| Street Lighting (1) | | | 530,002 | | 530,002 | 6,625 |
| Street Lighting (2) | | | | 250,000 | 250,000 | 3,125 |
| Testing and Commissioning (1) | | | 249,998 | | 249,998 | 3,125 |
| Testing and Commissioning (2) | | | | 249,998 | 249,998 | 3,125 |
| Communication System | | | | | | |
| Cable Works (1) | | | 16,088,341 | | 16,088,341 | 201,104 |
| Cable Works (2) | | | | 4,614,256 | 4,614,256 | 57,678 |
| Buildings | | | | | | |

| | | | | | | | |
|--------------------------|----------------------|----------------------|----------------------|--------------------|----------------------|-------------------|--|
| Control Office (1) | 28,151,256 | 46,848,732 | | | 74,999,988 | 937,500 | |
| Control Office (2) | | 40,997,600 | 267,509,340 | 57,396,640 | 365,903,580 | 4,573,795 | |
| Rental Factory (1) | | 458,395,755 | 454,909,856 | 55,774,389 | 969,080,000 | 12,113,500 | |
| Gas System | | | | | | | |
| Gas Pipe Work (1) | 6,136,032 | 5,916,888 | | | 12,052,920 | 150,662 | |
| Gas Pipe Work (2) | | 3,419,626 | | | 3,419,626 | 42,745 | |
| Off Site Infrastructure | | | | | | | |
| Highway Widening | 110,628,010 | | | | 110,628,010 | 1,382,850 | |
| Electrical Connection | 81,000,000 | | | | 81,000,000 | 1,012,500 | |
| Communication Connection | 13,505,844 | | | | 13,505,844 | 168,823 | |
| Gas Pipe Connection | 227,572,005 | | | | 227,572,005 | 2,844,650 | |
| ICD and Parking Yard | 135,124,920 | 49,701,120 | | | 184,826,040 | 2,310,326 | |
| Total (BDT) | 2,004,610,028 | 2,339,136,127 | 1,647,462,557 | 237,969,502 | 6,229,178,214 | | |
| Total (USD) | 25,057,625 | 29,239,202 | 20,593,282 | 2,974,619 | | 77,864,728 | |

Summary of Cost (Sherpur EZ)

| Scope/Year | 2016 | 2017 | 2018 | 2019 | Total (BDT) | Total (USD) |
|--------------------|----------------------|----------------------|----------------------|--------------------|----------------------|-------------------|
| On-site Cost | 1,436,779,249 | 2,289,435,007 | 1,647,462,557 | 237,969,502 | 5,611,646,315 | 70,145,578.94 |
| Off-site Cost | 567,830,779 | 49,701,120 | 0 | 0 | 617,531,899 | 77,191,48.74 |
| Total (BDT) | 2,004,610,028 | 2,339,136,127 | 1,647,462,557 | 237,969,502 | 6,229,178,214 | |
| Total (USD) | 25,057,625 | 29,239,202 | 20,593,282 | 2,974,619 | | 77,864,728 |

Note: Construction Progress of Rental Factory

| Year | 2,016 | 2,017 | 2,018 | 2,019 | 2,020 | 2,021 | Total (m2) |
|-----------------|-------|--------|--------|-------|-------|-------|------------|
| Floor Area (m2) | 0 | 13,245 | 13,144 | 1,612 | | | 28,000 |

Renting Schedule of Standard Factory Building

| | | | | | | |
|--|--|-------|--------|--------|--------|--------|
| Renting Schedule of Standard Factory Building | | 6,622 | 9,883 | 7,403 | 4,092 | 28,000 |
| Cumulative Renting Schedule of Standard Factory Building | | 6,622 | 16,505 | 23,908 | 28,000 | |

Revenue Stream

| Revenue from the Sale of Industrial Plots of Sherpur, Sylhet | | | | | | | | | \$ in million | | | | | | |
|--|------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|--|----|----|----|----|------------------|
| Year/Item | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | Total | Situation of Lease-serviced land price | | | | | |
| Leasing Price per sq meter (in US \$) | | 50 | 60 | 70 | 80 | | | | | 1 | 1 | 50 | 60 | 70 | 80 |
| Vol. of Sale of Ind. Plots (hectare) | | 44.02 | 34.81 | 6.831 | | | | | 85.66 | 2 | 45 | 54 | 63 | 72 | |
| Total Revenue from Industrial Plots | | \$22.012 | \$20.884 | \$4.782 | \$0.000 | | | | \$47.68 | | | | | | |
| Revenue from the Sale of Commercial Land | | | | | | | | | | | | | | | |
| Leasing Price per sq meter | | 60 | 70 | 80 | 90 | | | | | 1 | 1 | 60 | 70 | 80 | 90 |
| Vol. of Sale of Com. land (hectare) | | 0.83 | | | | | | | 0.83 | 2 | 54 | 63 | 72 | 81 | |
| Total Revenue from Commercial Land | | \$0.50 | | | | | | | \$0.50 | | | | | | |
| Total Revenue from sale of lands | | \$22.51 | \$20.88 | \$4.78 | \$0.00 | | | | \$48.17 | | | | | | |
| | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | | Thereafter | | | | | | 0.6111371 |
| Revenue from the Rent of Rental Standard Factory Building Space | | | | | | | | | | | | | | | |
| Rate of Rent per sq meter per month | | | 2.75 | 2.75 | 2.75 | 2.75 | 2.75 | 2.75 | 2.75 | | | | | | 45.234 |
| Vol. of Rental standard factory building space (sqm) | | | 6622 | 16505 | 23908 | 28000 | 28000 | 28000 | 28000 | | | | | | 30.356 |
| Total Revenue from Rent of Standard Factory Building Space | | | 0.2185 | 0.5447 | 0.7890 | 0.9240 | 0.9240 | 0.9240 | 0.9240 | | | | | | 12.180 |
| Utilities and Service Fees for Sherpur EZ | | | | | | | | | | | | | | | 50.18 |
| Year/Item | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | Thereafter | Service Charge/Fees | | | | | |
| Land Occupied (Hector) | | | | 32.96 | 60.82 | 82.99 | 88.68 | 88.68 | 88.68 | | | | | | |
| Water Supply (m ³ /d) | | | | 25,630 | 42,321 | 57,073 | 59,011 | 59,011 | 59,011 | | | | | | |
| Charge for Water Supply (\$0.3 cm (300d/y) | | | | \$2.3067 | \$3.8089 | \$5.1366 | \$5.3110 | \$5.3110 | \$5.3110 | | | | | | \$0.30 per cm |
| Waste Water (85% of Water Supply) | | | | 21785 | 35973 | 48512 | 50160 | 50160 | 50160 | | | | | | |
| Charge for Waste Water(\$0.35 cm (300d/y) | | | | \$2.2875 | \$3.7771 | \$5.0938 | \$5.2668 | \$5.2668 | \$5.2668 | | | | | | \$0.35 per cm |
| Power (Kwh) | | | | 15466 | 24253 | 32513 | 33039 | 33039 | 33039 | | | | | | |
| Surchrage as service fees (0.15*6.11/80) kwh, 10h/d, 300 d/y | | | | \$0.53 | \$0.83 | \$1.12 | \$1.14 | \$1.14 | \$1.14 | | | | | | \$0.0115 kwh |
| Gas (m ³) | | | | 273363 | 464338 | 628166 | 655312 | 655312 | 655312 | | | | | | 0.1 per mcf |
| Surchrage as service fees (0.15*6.45/80)cm/d, 300 d/y | | | | \$0.9918 | \$1.6847 | \$2.2791 | \$2.3776 | \$2.3776 | \$2.3776 | | | | | | 0.0120938 per cm |
| EZ Service Fee (\$1.92/sqm/y) | | | | \$0.633 | \$1.168 | \$1.593 | \$1.703 | \$1.703 | \$1.703 | | | | | | \$1.92 per sqm/y |
| | | | | | | | | | | 1 | 1 | | | | |
| | | | | | | | | | | 2 | 2 | | | | \$1.73 per sqm/y |

Capital Cost

| Capital Costs of Sherpur EZ, Sylhet | | | | | | | | 1.886 | Basis | 96.37 | 144.91 | 111.61 | 352.89 | Govt. | Private | Homestead |
|--|--------------|---------------|--------------|--------------|-------------|--------|-------|-------|----------------------------------|----------------------------------|------------|-----------|--------|---------|---------|-----------|
| Cost of Public lands | 1.886 | \$ in million | | | | | | | Estimated Price of One crop land | Estimated Price of Two crop land | Water Body | | 114.21 | 235.68 | 3 | |
| Year/Item | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Taka per acre | 4,064,096 | 5,689,735 | 1,219,229 | | 23.07 | 22.526 | |
| Land Acquisition | | | | | | | | | \$ per acre | 50,801 | 71,122 | 15,240 | | 15.38 | 15.38 | 15.017 |
| Costs/Compensation costs | 22.526 | | | | | | | | \$ per sqm | 12.55 | 17.57 | 3.77 | | 1230.37 | 0.00 | 0.000 |
| Relocation Costs: | 0.125 | | | | | | | | | | | | | | | |
| On-Site Inf. Costs: | | | | | | | | | | | | | | | | |
| Construction Cost -SEZ | | | | | | | | | | | | | | | | |
| Phase 1 | | | | | | | | | 2016 | 2017 | 2018 | 2019 | 2020 | | | |
| Land Development (Preparation & Dredging) | | | | | | | | | 12.229 | | | | | 7.69 | 7.509 | |
| Road (North & South) | | | | | 1.800 | 2.905 | 1.348 | | | 1.800 | 2.905 | 1.348 | | | | |
| Dike System | | | | | 1.239 | 0.924 | | | | 1.239 | 0.924 | | | | | |
| Drainage System | | | | | 0.778 | 1.768 | 1.193 | | | 0.778 | 1.768 | 1.193 | | | | |
| Plantation | | | | | | 0.037 | 0.006 | | | | | | | | | |
| Water Supply System | | | | | 1.149 | 11.236 | 3.407 | | | 1.149 | 11.236 | 3.407 | | | | |
| Waste Water System | | | | | 1.995 | 5.897 | 3.407 | | | 1.995 | 5.897 | 3.407 | | | | |
| Electrical System | | | | | 0.140 | 0.047 | 0.412 | 0.148 | | 0.140 | 0.047 | 0.412 | 0.148 | | | |
| Communication System | | | | | | 0.201 | 0.058 | | | | 0.201 | 0.058 | | | | |
| Buildings | | | | | 0.352 | 1.098 | 3.344 | 0.717 | | 0.352 | 1.098 | 3.344 | 0.717 | | | |
| Rental Factory (1) | | | | | 5.730 | 5.686 | 0.697 | | | | | | | | | |
| Gas Pipe Network | | | | | 0.077 | 0.117 | | | | | | | | | | |
| Offsite inf. Costs | | | | | | | | | | | | | | | | |
| Highway Widening | | | | | | | | | | | | | | | | |
| Electrical Connection | | | | | | | | | | | | | | | | |
| Communication Connection | | | | | | | | | | | | | | | | |
| Gas Pipe Connection | | | | | | | | | | | | | | | | |
| ICD+ Parking Yard | | | | | | | | | | | | | | | | |
| Total Capital Costs | 24.54 | 17.96 | 28.62 | 20.59 | 2.97 | - | | | \$0.0 | \$0.0 | \$0.0 | \$0.0 | \$0.0 | | | |

| | | |
|---|----------------------------------|---|
| 1 | Govt does not develop it | 1 |
| 2 | Govt develops it | |
| 1 | Govt does not develop LD | 1 |
| | Govt develops it | 2 |
| | Both develop it equally | 3 |
| 1 | Govt does not develop Road | 1 |
| | Govt develops it | 2 |
| | Both develop it equally | 3 |
| 1 | Govt does not develop Dike | 1 |
| | Govt develops it | 2 |
| | Both develop it equally | 3 |
| 1 | Govt does not develop Water Su | 1 |
| | Govt develops it | 2 |
| | Both develop it equally | 3 |
| 1 | Govt does not develop Waster W | 1 |
| | Govt develops it | 2 |
| | Both develop it equally | 3 |
| 1 | Govt does not develop electrical | 1 |
| | Govt develops it | 2 |
| | Both develop it equally | 3 |
| 1 | Private Sector bears compensati | 1 |
| | Private Sector bears compensati | 2 |
| | Govt bears it | 3 |
| | Govt and Private Sectors bear it | 4 |

Operation and Maintenance Cost

| Operation and Maintenance Costs | | | | | | | | | \$ in million |
|---|------|------|--------|--------|--------|--------|--------|-------|---------------|
| Year/Head | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | After |
| Administration | | | 0.059 | 0.081 | 0.098 | 0.165 | 0.202 | 0.235 | 0.235 |
| Marketing | | | 0.0625 | 0.0625 | 0.0625 | 0.0625 | 0.0625 | 0.025 | 0.025 |
| Operation and Maintenance Costs | | | | | | | | | |
| 2% of Capital Costs excluding land dev. Costs | | | | 0.115 | 0.687 | 1.099 | 1.158 | 1.158 | 1.158 |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| Operation Of All utilities | | | | 0.038 | 0.038 | 0.038 | 0.038 | 0.038 | 0.038 |
| Total O&M Costs | | | 0.122 | 0.296 | 0.885 | 1.364 | 1.461 | 1.456 | 1.456 |

Financial IRR

| Capital Costs | O&M Cost | Total Costs | Total Benefits | Net Benefits (Costs) | NPV @ 12% | NPV @ 15% | NPV @ 20% |
|---------------|----------|-------------|----------------|----------------------|-----------|-----------|-----------|
| 24.54 | | 24.5366 | | -24.5366 | (\$24.54) | (\$24.54) | (\$24.54) |
| 17.96 | 0.1220 | 18.0817 | | -18.0817 | (\$16.14) | (\$15.72) | (\$15.07) |
| 28.62 | 0.2962 | 28.9141 | 22.5095 | -6.4046 | (\$5.11) | (\$4.84) | (\$4.45) |
| 20.59 | 0.8848 | 21.4780 | 21.1021 | -0.3759 | (\$0.27) | (\$0.25) | (\$0.22) |
| 2.97 | 1.3636 | 4.3382 | 12.0766 | 7.7384 | \$4.92 | \$4.42 | \$3.73 |
| | 1.4607 | 1.4607 | 12.0608 | 10.6001 | \$6.01 | \$5.27 | \$4.26 |
| | 1.4556 | 1.4556 | 16.1443 | 14.6886 | \$7.44 | \$6.35 | \$4.92 |
| | 1.4556 | 1.4556 | 16.7175 | 15.2619 | \$6.90 | \$5.74 | \$4.26 |
| | 1.4556 | 1.4556 | 16.7175 | 15.2619 | \$6.16 | \$4.99 | \$3.55 |
| | 1.4556 | 1.4556 | 16.7175 | 15.2619 | \$5.50 | \$4.34 | \$2.96 |
| | 1.4556 | 1.4556 | 16.7175 | 15.2619 | \$4.91 | \$3.77 | \$2.46 |
| | 1.4556 | 1.4556 | 16.7175 | 15.2619 | \$4.39 | \$3.28 | \$2.05 |
| | 1.4556 | 1.4556 | 16.7175 | 15.2619 | \$3.92 | \$2.85 | \$1.71 |
| | 1.4556 | 1.4556 | 16.7175 | 15.2619 | \$3.50 | \$2.48 | \$1.43 |
| | 1.4556 | 1.4556 | 16.7175 | 15.2619 | \$3.12 | \$2.16 | \$1.19 |
| | 1.4556 | 1.4556 | 16.7175 | 15.2619 | \$2.79 | \$1.88 | \$0.99 |
| | 1.4556 | 1.4556 | 16.7175 | 15.2619 | \$2.49 | \$1.63 | \$0.83 |
| | 1.4556 | 1.4556 | 16.7175 | 15.2619 | \$2.22 | \$1.42 | \$0.69 |
| | 1.4556 | 1.4556 | 16.7175 | 15.2619 | \$1.98 | \$1.23 | \$0.57 |
| | 1.4556 | 1.4556 | 16.7175 | 15.2619 | \$1.77 | \$1.07 | \$0.48 |
| | 1.4556 | 1.4556 | 16.7175 | 15.2619 | \$1.58 | \$0.93 | \$0.40 |
| | | | | | \$23.57 | \$8.47 | (\$7.79) |
| | | | | IRR = | | 17.27% | |

Income Statement of SPV

| | | Income Statement of SPV Co. (\$ in million) (Base Case) | | | | | | | | | | | | | | | | | | | | |
|-----------------------------|--|---|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|
| | | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 |
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| Total Revenue | | 0 | 0 | 22.510 | 21.102 | 12.077 | 12.061 | 16.144 | 16.718 | 16.718 | 16.718 | 16.718 | 16.718 | 16.718 | 16.718 | 16.718 | 16.718 | 16.718 | 16.718 | 16.718 | 16.718 | |
| Operating Costs/Expenses | | 0 | 0.122 | 0.296 | 0.885 | 1.364 | 1.461 | 1.456 | 1.456 | 1.456 | 1.456 | 1.456 | 1.456 | 1.456 | 1.456 | 1.456 | 1.456 | 1.456 | 1.456 | 1.456 | 1.456 | |
| Commercial LT Debt Expenses | | | 5.60 | 3.29 | 2.82 | 2.05 | 1.25 | 0.66 | 0.22 | 0.02 | 0.00 | 0.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Commercial ST Debt Expenses | | | 0.137 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Depreciation | | | 0.53 | 3.32 | 4.80 | 4.92 | 5.24 | 5.24 | 5.24 | 5.24 | 5.24 | 5.24 | 5.24 | 5.24 | 5.24 | 5.24 | 5.24 | 5.24 | 5.24 | 5.24 | 5.24 | |
| Total Expenses | | 0 | 0.653 | 9.350 | 8.972 | 9.097 | 8.746 | 7.946 | 7.357 | 6.918 | 6.720 | 6.695 | 6.695 | 6.695 | 6.695 | 6.695 | 6.695 | 6.695 | 6.695 | 6.695 | 6.695 | |
| Net Profit | | 0.00 | -0.65 | 13.16 | 12.13 | 2.98 | 3.31 | 8.20 | 9.36 | 9.80 | 10.00 | 10.02 | 10.02 | 10.02 | 10.02 | 10.02 | 10.02 | 10.02 | 10.02 | 10.02 | 10.02 | |
| Depreciation (From Above) | | | 0.53 | 3.32 | 4.80 | 4.92 | 5.24 | 5.24 | 5.24 | 5.24 | 5.24 | 5.24 | 5.24 | 5.24 | 5.24 | 5.24 | 5.24 | 5.24 | 5.24 | 5.24 | 5.24 | |
| EBDA | | 0.00 | -0.12 | 16.48 | 16.93 | 7.90 | 8.55 | 13.44 | 14.60 | 15.04 | 15.24 | 15.26 | 15.26 | 15.26 | 15.26 | 15.26 | 15.26 | 15.26 | 15.26 | 15.26 | 15.26 | |
| Interest from Above) | | 0 | 0 | 5.73 | 3.29 | 2.82 | 2.05 | 1.25 | 0.66 | 0.22 | 0.02 | 0.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| EBITDA | | | -0.12 | 22.21 | 20.22 | 10.71 | 10.60 | 14.69 | 15.26 | 15.26 | 15.26 | 15.26 | 15.26 | 15.26 | 15.26 | 15.26 | 15.26 | 15.26 | 15.26 | 15.26 | 15.26 | |

Cash Flow of SPV

| Cash Flow of SPV Co. (\$ in million) Base Case (Scenario 1) | | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 |
|---|--|---------------|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| Revenue | | 0 | 0 | 22.51 | 21.10 | 12.08 | 12.06 | 16.14 | 16.72 | 16.72 | 16.72 | 16.72 | 16.72 | 16.72 | 16.72 | 16.72 | 16.72 | 16.72 | 16.72 | 16.72 | 16.72 | |
| Operating Costs | | 0 | -0.12 | -0.30 | -0.88 | -1.36 | -1.46 | -1.46 | -1.46 | -1.46 | -1.46 | -1.46 | -1.46 | -1.46 | -1.46 | -1.46 | -1.46 | -1.46 | -1.46 | -1.46 | -1.46 | |
| Capital Expenditures | | (24.54) | (17.96) | (28.62) | (20.59) | (2.97) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Net Project Cash Flow | | -24.54 | -18.08 | -6.40 | -0.38 | 7.74 | 10.60 | 14.69 | 15.26 | 15.26 | 15.26 | 15.26 | 15.26 | 15.26 | |
| LT Loans | | 18.2 | 12.6 | 20.0 | 14.4 | 2.1 | 0.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| LT Loan Arrangement Fee | | -1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ST Loans | | 0.12 | 0 | | | | | | | | | | | | | | | | | | | |
| LT Debt Service | | 0 | 0 | (9.03) | (9.24) | (12.77) | (14.88) | (14.51) | (10.48) | (7.53) | (3.32) | (0.42) | -8.993E-17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ST Debt Service | | 0 | 0.0 | -0.138 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | |
| Equity Drawn for Capex | | 7.36 | 5.39 | 8.59 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| <i>Annual cash Surplus/Shortage</i> | | <i>0.00</i> | <i>0.00</i> | <i>13.04</i> | <i>4.80</i> | <i>-2.95</i> | <i>-4.28</i> | <i>0.18</i> | <i>4.78</i> | <i>7.73</i> | <i>11.94</i> | <i>14.85</i> | <i>15.26</i> | <i>15.26</i> | <i>15.26</i> | <i>15.26</i> | <i>15.26</i> | <i>15.26</i> | <i>15.26</i> | <i>15.26</i> | <i>15.26</i> | <i>15.26</i> |
| Retained Cash Used for Capex | | 0 | 0 | 0.0 | 6.18 | 0.89 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | |
| Equity Drawn to clear deficit | | 0 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Retained Cash Used to Clear Deficits | | 0 | 0 | 0 | 0 | 2.95 | 4.28 | -0.18 | | | | | | | | | | | | | | |
| Cumulative Cash Balance | | 0 | 0.00 | 13.04 | 17.85 | 14.89 | 10.61 | 10.79 | 15.57 | 23.30 | 35.24 | 50.09 | 65.35 | 80.61 | 95.87 | 111.14 | 126.40 | 141.66 | 156.92 | 172.18 | 187.45 | 202.71 |

Free Cash Flow of Equity Holder of SPV

Annex 5 (b): Economic Modelling

Annex 5 (b) – 1

| World Bank's Consultant's comments on the Economic modeling work | JDI/MSL/Sheltech's observation |
|--|---|
| <p>1.1. Economic Model should be fully linked to Financial Model to integrate all financial model inputs that affect the economic model, and to allow user to compare EIRR and IRR for each scenario. This includes all capital, operating cost and revenues.</p> <p>1.2. Several links in the Summary (HR) sheet in Economic Model should be either corrected if this sheet is needed for the analysis, or delete it if the sheet is not used in the analysis (as mentioned in the notes).</p> <p>1.3. Economic analysis assumed all capital and operating costs (Adjusted for Conversion factors) whether paid by GoB or by Investor as a cost to the GoB and all project revenues (Adjusted for Conversion factors) as revenues to GoB.</p> <p>The analysis should have dealt with the economic effect of project revenue and construction cost factors as follows:</p> <ul style="list-style-type: none"> • Revenue indirect effect on the economy and taxes if any, • Cost paid by the government as direct cost (net of all taxes and duties), • Duties and taxes on cost paid by the developer on the construction of the zone as a benefit. <p>1.4. Studies didn't account for any revenues from government fees charged to businesses and staff in zones. The type of fees and revenues should be added to the government revenues from the zone and would include things like company registration and renewal fees, developer fees (to government), work permits for zone workers, government inspection fees for buildings along with other possible fees.</p> <p>1.5. Lost government revenue from local businesses relocation to the Zone should be addressed, such as the effect of tax holiday (if applicable).</p> <p>Added value from new businesses open in the zone should be addressed, such as using inputs from local market or taxes and duties on goods producing in the zone for local use.</p> | <p>It has been taken care of.</p> <p>It has been taken account of.</p> <p>It has been taken account of.</p> <p>It has been taken account of.</p> <p>Account has been taken of fees charged to businesses, and of liable personal income taxes against staff in zones, with appropriate assumptions. Effects of 10-year tax-holiday have been correctly accounted for, as has been lost government revenue from local businesses relocation to the zone.</p> <p>Added value from new businesses open in the zone has been addressed.</p> |

Annex 5 (b) – 2

- This annex leads on to the four spreadsheets, containing the detailed calculations of the Economic Internal Rates of Returns (EIRRs).
- The informational content of the various worksheets in these spreadsheets is now presented.
- The first worksheet presents the on-site capital outlays, following the methods described in the main text, including enforcing the scheme to apportion the capital outlays using, broadly, a five-part decomposition into labor, nontradables, tradables, rentals and other overheads. Rentals are further divvied up into energy-sensitive outlays and others.
- The second worksheet presents the off-site capital outlays, all net of taxes, following the methods described in the main text, including enforcing the scheme to apportion the capital outlays using, broadly, a five-part decomposition, like for on-site costs.
- The third worksheet presents the capital costs. These values have been taken from the financial modeler's financial costs at market prices.
- The work-sheet titled 'economic conversion' is where we account for on-site and off-site differently. All off-site costs are net of appropriate taxes---tradable outlays being net of border taxes including 'para-tariffs'. Other outlays, being in the nature of expenditures on domestic, largely non-tradable, resources, are net of value-added taxes, of roughly 4% relative to the gross value of sales. All net-of-tax outlays thus obtained are again multiplied by 0.97, this being the standard conversion factor (SCF), in order to deal with the overvaluation of the currency. As pointed out already, rentals are divvied up into energy-sensitive outlays and other. The distinction is important: outlays on energy-sensitive items draw forth a small subsidy from the public exchequer, while other outlays need to be adjusted downwards relative to market-values. By assumption, one third of 'general overheads' are attributable to repair, maintenance and other miscellaneous kinds of outlays. Two thirds of general overheads are assumed to comprise of gross profits of business carrying out the implementation of the on-site and off-site outlays, the latter being on behalf of the government. (Some government revenue is assumed to occur on account of profit taxation from the second part of 'overheads').
- The next worksheet is about revenues. Revenues include private developer's revenues from selling all manners of land, all other charges from the tenants in the zone. Revenues also include all direct and indirect revenues by the Government from a whole variety of fees, taxes, para-tariffs, trade licenses, signboard fees, work-permit fees, Board of Investment fees from investors who want to buy or lease land on the BEZA, taxes on profits, etc. However, subsidies and revenue losses from enterprises relocating from elsewhere into the zones and availing of the tax-holiday incentive are *deducted* from government revenue, as they ought to be.
- The next worksheet is about the O&M cost and the one thereafter presents the Economic Internal Rates of Return (EIRR).

Note: All the detailed worksheets have been included in the CV attached in this report. For present purposes, we include only the EIRR worksheet here.

Economic Internal Rates of Return (EIRR)-Baserun

| | Year | Cost | | Benefits | Total Economic Costs | Incremental Wage Benefits | Dynamic Efficiency | Second Order Econ benefit | Total Economic benefits | Net (E-4) | NPV @12% | NPV @15% | NPV @20% |
|----|------|--------------|-----------|------------|----------------------|---------------------------|--------------------|---------------------------|-------------------------|-------------|-------------|-------------|-------------|
| | | Capital Cost | O&M | | | \$ 0.020 | | | | | | | |
| 0 | 2015 | \$ 23,800 | \$ - | \$ - | \$ 23,800 | \$ - | \$ - | \$ - | \$ (23,800) | \$ (23,800) | \$ (23,800) | \$ (23,800) | |
| 1 | 2016 | \$ 22,288 | \$ 0.115 | \$ 0.903 | \$ 22,403 | \$ - | \$ 0.018 | \$ 0.018 | \$ 0.921 | \$ (21,482) | \$ (19,180) | \$ (18,680) | \$ (17,901) |
| 2 | 2017 | \$ 24,899 | \$ 0.283 | \$ 25,141 | \$ 25,181 | \$ - | \$ 0.488 | \$ 0.488 | \$ 25,629 | \$ 0.447 | \$ 0.357 | \$ 0.338 | \$ 0.311 |
| 3 | 2018 | \$ 16,845 | \$ 0.853 | \$ 22,754 | \$ 17,698 | \$ - | \$ 0.441 | \$ 0.441 | \$ 23,196 | \$ 5,498 | \$ 3,913 | \$ 3,615 | \$ 3,182 |
| 4 | 2019 | \$ 2,573 | \$ 1.313 | \$ 11,917 | \$ 3,886 | \$ 4,721 | \$ 0.231 | \$ 4,952 | \$ 16,868 | \$ 12,983 | \$ 8,251 | \$ 7,423 | \$ 6,261 |
| 5 | 2020 | \$ - | \$ 1.405 | \$ 11,661 | \$ 1,405 | \$ 9,030 | \$ 0.226 | \$ 9,256 | \$ 20,917 | \$ 19,512 | \$ 11,072 | \$ 9,701 | \$ 7,841 |
| 6 | 2021 | \$ - | \$ 1.399 | \$ 15,662 | \$ 1,399 | \$ 11,107 | \$ 0.304 | \$ 11,411 | \$ 27,073 | \$ 25,674 | \$ 13,007 | \$ 11,100 | \$ 8,598 |
| 7 | 2022 | \$ - | \$ 1.399 | \$ 16,217 | \$ 1,399 | \$ 11,107 | \$ 0.315 | \$ 11,422 | \$ 27,639 | \$ 26,240 | \$ 11,870 | \$ 9,864 | \$ 7,323 |
| 8 | 2023 | \$ - | \$ 1.399 | \$ 16,218 | \$ 1,399 | \$ 11,107 | \$ 0.315 | \$ 11,422 | \$ 27,640 | \$ 26,241 | \$ 10,598 | \$ 8,578 | \$ 6,103 |
| 9 | 2024 | \$ - | \$ 1.399 | \$ 16,217 | \$ 1,399 | \$ 11,107 | \$ 0.315 | \$ 11,422 | \$ 27,639 | \$ 26,240 | \$ 9,462 | \$ 7,459 | \$ 5,085 |
| 10 | 2025 | \$ - | \$ 1.399 | \$ 16,218 | \$ 1,399 | \$ 11,107 | \$ 0.315 | \$ 11,422 | \$ 27,640 | \$ 26,241 | \$ 8,449 | \$ 6,486 | \$ 4,238 |
| 11 | 2026 | \$ - | \$ 1.399 | \$ 16,217 | \$ 1,399 | \$ 11,107 | \$ 0.315 | \$ 11,422 | \$ 27,639 | \$ 26,240 | \$ 7,543 | \$ 5,640 | \$ 3,532 |
| 12 | 2027 | \$ - | \$ 1.399 | \$ 16,218 | \$ 1,399 | \$ 11,107 | \$ 0.315 | \$ 11,422 | \$ 27,640 | \$ 26,241 | \$ 6,735 | \$ 4,905 | \$ 2,943 |
| 13 | 2028 | \$ - | \$ 1.399 | \$ 16,217 | \$ 1,399 | \$ 11,107 | \$ 0.315 | \$ 11,422 | \$ 27,639 | \$ 26,240 | \$ 6,013 | \$ 4,265 | \$ 2,452 |
| 14 | 2029 | \$ - | \$ 1.399 | \$ 16,662 | \$ 1,399 | \$ 11,107 | \$ 0.323 | \$ 11,430 | \$ 28,092 | \$ 26,693 | \$ 5,462 | \$ 3,773 | \$ 2,079 |
| 15 | 2030 | \$ - | \$ 1.399 | \$ 16,661 | \$ 1,399 | \$ 11,107 | \$ 0.323 | \$ 11,430 | \$ 28,092 | \$ 26,693 | \$ 4,877 | \$ 3,280 | \$ 1,732 |
| 16 | 2031 | \$ - | \$ 1.399 | \$ 16,662 | \$ 1,399 | \$ 11,107 | \$ 0.323 | \$ 11,430 | \$ 28,092 | \$ 26,693 | \$ 4,354 | \$ 2,853 | \$ 1,444 |
| 17 | 2032 | \$ - | \$ 1.399 | \$ 16,661 | \$ 1,399 | \$ 11,107 | \$ 0.323 | \$ 11,430 | \$ 28,092 | \$ 26,693 | \$ 3,888 | \$ 2,480 | \$ 1,203 |
| 18 | 2033 | \$ - | \$ 1.399 | \$ 16,662 | \$ 1,399 | \$ 11,107 | \$ 0.323 | \$ 11,430 | \$ 28,092 | \$ 26,693 | \$ 3,471 | \$ 2,157 | \$ 1,003 |
| 19 | 2034 | \$ - | \$ 1.399 | \$ 16,661 | \$ 1,399 | \$ 11,107 | \$ 0.323 | \$ 11,430 | \$ 28,092 | \$ 26,693 | \$ 3,099 | \$ 1,876 | \$ 0,836 |
| 20 | 2035 | \$ - | \$ 1.399 | \$ 16,662 | \$ 1,399 | \$ 11,107 | \$ 0.323 | \$ 11,430 | \$ 28,092 | \$ 26,693 | \$ 2,767 | \$ 1,631 | \$ 0,696 |
| | | \$ 90,404 | \$ 24,953 | \$ 318,191 | | | | | | | \$ 82,208 | \$ 54,943 | \$ 25,160 |
| | | | | | | | | | | | EIRR= | 27.712% | |

Economic Internal Rates of Return (EIRR): All costs up by 10%

| | Year | Cost | | Benefits | Total Economic Costs | Incremental Wage Benefits | Dynamic Efficiency | Second Order Econ benefit | Total Economic benefits | Net (E-4) | NPV @12% | NPV @15% | NPV @20% |
|----|------|--------------|-----------|------------|----------------------|---------------------------|--------------------|---------------------------|-------------------------|-------------|-------------|-------------|-------------|
| | | Capital Cost | O&M | | | | \$ 0.020 | | | | | | |
| 0 | 2015 | \$ 26.181 | \$ - | \$ - | \$ 26.181 | \$ - | \$ - | \$ - | \$ (26.18) | \$ (26.181) | \$ (26.181) | \$ (26.181) | |
| 1 | 2016 | \$ 24.516 | \$ 0.126 | \$ 0.903 | \$ 24.643 | \$ - | \$ 0.018 | \$ 0.018 | \$ 0.921 | \$ (23.722) | \$ (21.180) | \$ (20.628) | \$ (19.768) |
| 2 | 2017 | \$ 27.388 | \$ 0.311 | \$ 25.141 | \$ 27.699 | \$ - | \$ 0.488 | \$ 0.488 | \$ 25.629 | \$ (2.071) | \$ (1.651) | \$ (1.566) | \$ (1.438) |
| 3 | 2018 | \$ 18.529 | \$ 0.938 | \$ 22.754 | \$ 19.467 | \$ - | \$ 0.441 | \$ 0.441 | \$ 23.196 | \$ 3.728 | \$ 2.654 | \$ 2.451 | \$ 2.158 |
| 4 | 2019 | \$ 2.830 | \$ 1.444 | \$ 11.917 | \$ 4.274 | \$ 4.721 | \$ 0.231 | \$ 4.952 | \$ 16.868 | \$ 12.594 | \$ 8.004 | \$ 7.201 | \$ 6.074 |
| 5 | 2020 | \$ 1.546 | \$ 11.661 | \$ 1.546 | \$ 9.030 | \$ 0.226 | \$ 9.256 | \$ 20.917 | \$ 19.371 | \$ 10.992 | \$ 9.631 | \$ 7.785 | |
| 6 | 2021 | \$ 1.539 | \$ 15.662 | \$ 1.539 | \$ 11.107 | \$ 0.304 | \$ 11.411 | \$ 27.073 | \$ 25.535 | \$ 12.937 | \$ 11.039 | \$ 8.551 | |
| 7 | 2022 | \$ 1.539 | \$ 16.217 | \$ 1.539 | \$ 11.107 | \$ 0.315 | \$ 11.422 | \$ 27.639 | \$ 26.100 | \$ 11.806 | \$ 9.812 | \$ 7.284 | |
| 8 | 2023 | \$ 1.539 | \$ 16.218 | \$ 1.539 | \$ 11.107 | \$ 0.315 | \$ 11.422 | \$ 27.640 | \$ 26.101 | \$ 10.542 | \$ 8.532 | \$ 6.070 | |
| 9 | 2024 | \$ 1.539 | \$ 16.217 | \$ 1.539 | \$ 11.107 | \$ 0.315 | \$ 11.422 | \$ 27.639 | \$ 26.100 | \$ 9.412 | \$ 7.419 | \$ 5.058 | |
| 10 | 2025 | \$ 1.539 | \$ 16.218 | \$ 1.539 | \$ 11.107 | \$ 0.315 | \$ 11.422 | \$ 27.640 | \$ 26.101 | \$ 8.404 | \$ 6.452 | \$ 4.215 | |
| 11 | 2026 | \$ 1.539 | \$ 16.217 | \$ 1.539 | \$ 11.107 | \$ 0.315 | \$ 11.422 | \$ 27.639 | \$ 26.100 | \$ 7.503 | \$ 5.610 | \$ 3.513 | |
| 12 | 2027 | \$ 1.539 | \$ 16.218 | \$ 1.539 | \$ 11.107 | \$ 0.315 | \$ 11.422 | \$ 27.640 | \$ 26.101 | \$ 6.699 | \$ 4.878 | \$ 2.927 | |
| 13 | 2028 | \$ 1.539 | \$ 16.217 | \$ 1.539 | \$ 11.107 | \$ 0.315 | \$ 11.422 | \$ 27.639 | \$ 26.100 | \$ 5.981 | \$ 4.242 | \$ 2.439 | |
| 14 | 2029 | \$ 1.539 | \$ 16.662 | \$ 1.539 | \$ 11.107 | \$ 0.323 | \$ 11.430 | \$ 28.092 | \$ 26.554 | \$ 5.433 | \$ 3.753 | \$ 2.068 | |
| 15 | 2030 | \$ 1.539 | \$ 16.661 | \$ 1.539 | \$ 11.107 | \$ 0.323 | \$ 11.430 | \$ 28.092 | \$ 26.553 | \$ 4.851 | \$ 3.263 | \$ 1.723 | |
| 16 | 2031 | \$ 1.539 | \$ 16.662 | \$ 1.539 | \$ 11.107 | \$ 0.323 | \$ 11.430 | \$ 28.092 | \$ 26.554 | \$ 4.331 | \$ 2.838 | \$ 1.436 | |
| 17 | 2032 | \$ 1.539 | \$ 16.661 | \$ 1.539 | \$ 11.107 | \$ 0.323 | \$ 11.430 | \$ 28.092 | \$ 26.553 | \$ 3.867 | \$ 2.467 | \$ 1.197 | |
| 18 | 2033 | \$ 1.539 | \$ 16.662 | \$ 1.539 | \$ 11.107 | \$ 0.323 | \$ 11.430 | \$ 28.092 | \$ 26.554 | \$ 3.453 | \$ 2.146 | \$ 0.997 | |
| 19 | 2034 | \$ 1.539 | \$ 16.661 | \$ 1.539 | \$ 11.107 | \$ 0.323 | \$ 11.430 | \$ 28.092 | \$ 26.553 | \$ 3.083 | \$ 1.866 | \$ 0.831 | |
| 20 | 2035 | \$ 1.539 | \$ 16.662 | \$ 1.539 | \$ 11.107 | \$ 0.323 | \$ 11.430 | \$ 28.092 | \$ 26.554 | \$ 2.753 | \$ 1.622 | \$ 0.693 | |
| | | | | | | | | | | \$ 73.694 | \$ 46.849 | \$ 17.634 | |
| | | \$ 99.445 | \$ 27.448 | \$ 318.191 | | | | | | EIRR= | 24.953% | | |

Economic Internal Rates of Return (EIRR): All benefit down by 10%

| | Year | Cost | | Benefits | Total Economic Costs | Incremental Wage Benefits | Dynamic Efficiency | Second Order Econ benefit | Total Economic benefits | Net (E-4) | NPV @12% | NPV @15% | NPV @20% |
|----|------|--------------|-----------|------------|----------------------|---------------------------|--------------------|---------------------------|-------------------------|-------------|-------------|-------------|-------------|
| | | Capital Cost | O&M | | | | \$ 0.020 | | | | | | |
| 0 | 2015 | \$ 23.800 | \$ - | \$ - | \$ 23.800 | \$ - | \$ - | \$ - | \$ (23.80) | \$ (23.800) | \$ (23.800) | \$ (23.800) | |
| 1 | 2016 | \$ 22.288 | \$ 0.115 | \$ 0.813 | \$ 22.403 | \$ - | \$ 0.016 | \$ 0.016 | \$ 0.829 | \$ (21.574) | \$ (19.262) | \$ (18.760) | \$ (17.978) |
| 2 | 2017 | \$ 24.899 | \$ 0.283 | \$ 22.627 | \$ 25.181 | \$ - | \$ 0.439 | \$ 0.439 | \$ 23.066 | \$ (2.115) | \$ (1.686) | \$ (1.600) | \$ (1.469) |
| 3 | 2018 | \$ 16.845 | \$ 0.853 | \$ 20.479 | \$ 17.698 | \$ - | \$ 0.397 | \$ 0.397 | \$ 20.876 | \$ 3.179 | \$ 2.262 | \$ 2.090 | \$ 1.839 |
| 4 | 2019 | \$ 2.573 | \$ 1.313 | \$ 10.725 | \$ 3.886 | \$ 4.721 | \$ 0.208 | \$ 4.929 | \$ 15.654 | \$ 11.768 | \$ 7.479 | \$ 6.728 | \$ 5.675 |
| 5 | 2020 | \$ 1.405 | \$ 10.495 | \$ 1.405 | \$ 9.030 | \$ 0.204 | \$ 9.234 | \$ 19.729 | \$ 18.323 | \$ 10.397 | \$ 9.110 | \$ 7.364 | |
| 6 | 2021 | \$ 1.399 | \$ 14.096 | \$ 1.399 | \$ 11.107 | \$ 0.273 | \$ 11.381 | \$ 25.477 | \$ 24.078 | \$ 12.199 | \$ 10.410 | \$ 8.064 | |
| 7 | 2022 | \$ 1.399 | \$ 14.595 | \$ 1.399 | \$ 11.107 | \$ 0.283 | \$ 11.390 | \$ 25.986 | \$ 24.587 | \$ 11.122 | \$ 9.243 | \$ 6.862 | |
| 8 | 2023 | \$ 1.399 | \$ 14.596 | \$ 1.399 | \$ 11.107 | \$ 0.283 | \$ 11.390 | \$ 25.986 | \$ 24.587 | \$ 9.930 | \$ 8.038 | \$ 5.718 | |
| 9 | 2024 | \$ 1.399 | \$ 14.595 | \$ 1.399 | \$ 11.107 | \$ 0.283 | \$ 11.390 | \$ 25.986 | \$ 24.587 | \$ 8.866 | \$ 6.989 | \$ 4.765 | |
| 10 | 2025 | \$ 1.399 | \$ 14.596 | \$ 1.399 | \$ 11.107 | \$ 0.283 | \$ 11.390 | \$ 25.986 | \$ 24.587 | \$ 7.916 | \$ 6.078 | \$ 3.971 | |
| 11 | 2026 | \$ 1.399 | \$ 14.595 | \$ 1.399 | \$ 11.107 | \$ 0.283 | \$ 11.390 | \$ 25.986 | \$ 24.587 | \$ 7.068 | \$ 5.285 | \$ 3.309 | |
| 12 | 2027 | \$ 1.399 | \$ 14.596 | \$ 1.399 | \$ 11.107 | \$ 0.283 | \$ 11.390 | \$ 25.986 | \$ 24.587 | \$ 6.311 | \$ 4.596 | \$ 2.758 | |
| 13 | 2028 | \$ 1.399 | \$ 14.595 | \$ 1.399 | \$ 11.107 | \$ 0.283 | \$ 11.390 | \$ 25.986 | \$ 24.587 | \$ 5.635 | \$ 3.996 | \$ 2.298 | |
| 14 | 2029 | \$ 1.399 | \$ 14.996 | \$ 1.399 | \$ 11.107 | \$ 0.291 | \$ 11.398 | \$ 26.394 | \$ 24.995 | \$ 5.114 | \$ 3.533 | \$ 1.947 | |
| 15 | 2030 | \$ 1.399 | \$ 14.995 | \$ 1.399 | \$ 11.107 | \$ 0.291 | \$ 11.398 | \$ 26.393 | \$ 24.994 | \$ 4.566 | \$ 3.072 | \$ 1.622 | |
| 16 | 2031 | \$ 1.399 | \$ 14.996 | \$ 1.399 | \$ 11.107 | \$ 0.291 | \$ 11.398 | \$ 26.394 | \$ 24.995 | \$ 4.077 | \$ 2.671 | \$ 1.352 | |
| 17 | 2032 | \$ 1.399 | \$ 14.995 | \$ 1.399 | \$ 11.107 | \$ 0.291 | \$ 11.398 | \$ 26.393 | \$ 24.994 | \$ 3.640 | \$ 2.323 | \$ 1.127 | |
| 18 | 2033 | \$ 1.399 | \$ 14.996 | \$ 1.399 | \$ 11.107 | \$ 0.291 | \$ 11.398 | \$ 26.394 | \$ 24.995 | \$ 3.250 | \$ 2.020 | \$ 0.939 | |
| 19 | 2034 | \$ 1.399 | \$ 14.995 | \$ 1.399 | \$ 11.107 | \$ 0.291 | \$ 11.398 | \$ 26.393 | \$ 24.994 | \$ 2.902 | \$ 1.756 | \$ 0.782 | |
| 20 | 2035 | \$ 1.399 | \$ 14.996 | \$ 1.399 | \$ 11.107 | \$ 0.291 | \$ 11.398 | \$ 26.394 | \$ 24.995 | \$ 2.591 | \$ 1.527 | \$ 0.652 | |
| | | | | | | | | | | \$ 70.578 | \$ 45.302 | \$ 17.795 | |
| | | \$ 90.404 | \$ 24.953 | \$ 286.372 | | | | | | EIRR= | 25.414% | | |

Economic Internal Rates of Return (EIRR): All costs up by 10% and benefit down by 10%

| | Year | Cost | | Benefits | Total Economic Costs | Incremental Wage Benefits | Dynamic Efficiency | Second Order Econ benefit | Total Economic benefits | Net (E-4) | NPV @12% | NPV @15% | NPV @20% |
|----|------|--------------|-----------|------------|----------------------|---------------------------|--------------------|---------------------------|-------------------------|-------------|-------------|-------------|-------------|
| | | Capital Cost | O&M | | | \$ 0.020 | | | | | | | |
| 0 | 2015 | \$ 26.181 | \$ - | \$ - | \$ 26.181 | \$ - | \$ - | \$ - | \$ (26.18) | \$ (26.181) | \$ (26.181) | \$ (26.181) | |
| 1 | 2016 | \$ 24.516 | \$ 0.126 | \$ 0.813 | \$ 24.643 | \$ - | \$ 0.016 | \$ 0.016 | \$ 0.829 | \$ (23.814) | \$ (21.263) | \$ (20.708) | \$ (19.845) |
| 2 | 2017 | \$ 27.388 | \$ 0.311 | \$ 22.627 | \$ 27.699 | \$ - | \$ 0.439 | \$ 0.439 | \$ 23.066 | \$ (4.634) | \$ (3.694) | \$ (3.504) | \$ (3.218) |
| 3 | 2018 | \$ 18.529 | \$ 0.938 | \$ 20.479 | \$ 19.467 | \$ - | \$ 0.397 | \$ 0.397 | \$ 20.876 | \$ 1.409 | \$ 1.003 | \$ 0.926 | \$ 0.815 |
| 4 | 2019 | \$ 2.830 | \$ 1.444 | \$ 10.725 | \$ 4.274 | \$ 4.721 | \$ 0.208 | \$ 4.929 | \$ 15.654 | \$ 11.379 | \$ 7.232 | \$ 6.506 | \$ 5.488 |
| 5 | 2020 | \$ 1.546 | \$ 10.495 | \$ 1.546 | \$ 9.030 | \$ 0.204 | \$ 9.234 | \$ 19.729 | \$ 18.183 | \$ 10.317 | \$ 9.040 | \$ 7.307 | |
| 6 | 2021 | \$ 1.539 | \$ 14.096 | \$ 1.539 | \$ 11.107 | \$ 0.273 | \$ 11.381 | \$ 25.477 | \$ 23.938 | \$ 12.128 | \$ 10.349 | \$ 8.017 | |
| 7 | 2022 | \$ 1.539 | \$ 14.595 | \$ 1.539 | \$ 11.107 | \$ 0.283 | \$ 11.390 | \$ 25.986 | \$ 24.447 | \$ 11.058 | \$ 9.190 | \$ 6.823 | |
| 8 | 2023 | \$ 1.539 | \$ 14.596 | \$ 1.539 | \$ 11.107 | \$ 0.283 | \$ 11.390 | \$ 25.986 | \$ 24.447 | \$ 9.874 | \$ 7.992 | \$ 5.686 | |
| 9 | 2024 | \$ 1.539 | \$ 14.595 | \$ 1.539 | \$ 11.107 | \$ 0.283 | \$ 11.390 | \$ 25.986 | \$ 24.447 | \$ 8.816 | \$ 6.949 | \$ 4.738 | |
| 10 | 2025 | \$ 1.539 | \$ 14.596 | \$ 1.539 | \$ 11.107 | \$ 0.283 | \$ 11.390 | \$ 25.986 | \$ 24.447 | \$ 7.871 | \$ 6.043 | \$ 3.948 | |
| 11 | 2026 | \$ 1.539 | \$ 14.595 | \$ 1.539 | \$ 11.107 | \$ 0.283 | \$ 11.390 | \$ 25.986 | \$ 24.447 | \$ 7.028 | \$ 5.255 | \$ 3.290 | |
| 12 | 2027 | \$ 1.539 | \$ 14.596 | \$ 1.539 | \$ 11.107 | \$ 0.283 | \$ 11.390 | \$ 25.986 | \$ 24.447 | \$ 6.275 | \$ 4.569 | \$ 2.742 | |
| 13 | 2028 | \$ 1.539 | \$ 14.595 | \$ 1.539 | \$ 11.107 | \$ 0.283 | \$ 11.390 | \$ 25.986 | \$ 24.447 | \$ 5.603 | \$ 3.973 | \$ 2.285 | |
| 14 | 2029 | \$ 1.539 | \$ 14.996 | \$ 1.539 | \$ 11.107 | \$ 0.291 | \$ 11.398 | \$ 26.394 | \$ 24.855 | \$ 5.086 | \$ 3.513 | \$ 1.936 | |
| 15 | 2030 | \$ 1.539 | \$ 14.995 | \$ 1.539 | \$ 11.107 | \$ 0.291 | \$ 11.398 | \$ 26.393 | \$ 24.854 | \$ 4.541 | \$ 3.054 | \$ 1.613 | |
| 16 | 2031 | \$ 1.539 | \$ 14.996 | \$ 1.539 | \$ 11.107 | \$ 0.291 | \$ 11.398 | \$ 26.394 | \$ 24.855 | \$ 4.054 | \$ 2.656 | \$ 1.344 | |
| 17 | 2032 | \$ 1.539 | \$ 14.995 | \$ 1.539 | \$ 11.107 | \$ 0.291 | \$ 11.398 | \$ 26.393 | \$ 24.854 | \$ 3.620 | \$ 2.310 | \$ 1.120 | |
| 18 | 2033 | \$ 1.539 | \$ 14.996 | \$ 1.539 | \$ 11.107 | \$ 0.291 | \$ 11.398 | \$ 26.394 | \$ 24.855 | \$ 3.232 | \$ 2.008 | \$ 0.934 | |
| 19 | 2034 | \$ 1.539 | \$ 14.995 | \$ 1.539 | \$ 11.107 | \$ 0.291 | \$ 11.398 | \$ 26.393 | \$ 24.854 | \$ 2.886 | \$ 1.746 | \$ 0.778 | |
| 20 | 2035 | \$ 1.539 | \$ 14.996 | \$ 1.539 | \$ 11.107 | \$ 0.291 | \$ 11.398 | \$ 26.394 | \$ 24.855 | \$ 2.577 | \$ 1.519 | \$ 0.648 | |
| | | \$ 99.445 | \$ 27.448 | \$ 286.372 | | | | | | \$ 62.063 | \$ 37.208 | \$ 10.269 | |
| | | | | | | | | | | EIRR= | 22.867% | | |

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