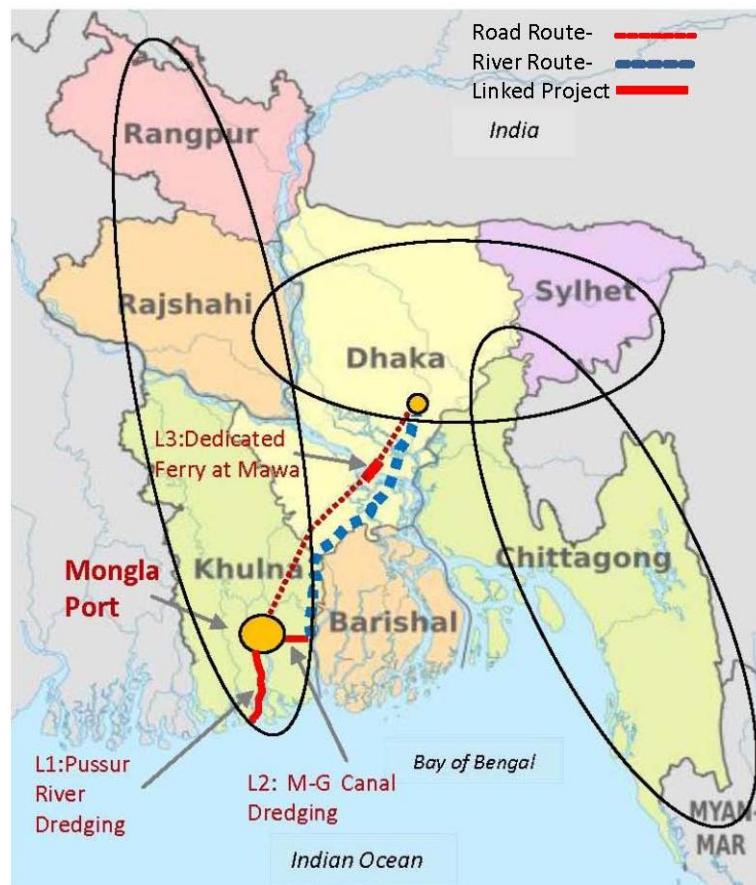




Mongla Port Authority Feasibility Study

DEVELOPMENT OF TWO JETTIES AT MONGLA PORT THROUGH PPP



Volume 1 of 2
MAIN REPORT

March 2013



Infrastructure Investment Facilitation Company
Deloitte Touche Tohmatsu India Pvt. Ltd.
Mahindra Consulting Engineers

Draft Final Report

Feasibility Study

**DEVELOPMENT OF TWO JETTIES
AT MONGLA PORT THROUGH PPP**

**Volume 1 of 2
MAIN REPORT**

March 2013



Contents

Volume 1 of 2: Main Report

Executive Summary	13
1 Background	23
1.1 Project Background	23
1.2 History of Mongla Port	23
1.3 Location of Mongla Port	23
1.4 The Project	25
1.5 Current Status of Mongla Port	26
1.6 Existing Facilities	26
1.7 Key Development Plans of Mongla Port	27
1.8 Regional Profile	28
1.9 Connectivity	30
2 Linked Projects	38
2.1 Linked Project 1: Dredging of Pussur River	39
2.2 Linked Project 2: Dredging of Mongla-Ghasiakhali Canal	42
2.3 Linked Project 3: Improving the Ferry Service at Mawa	47
2.4 Linked Project 4: Environmental Impact Assessment and Social Impact Assessment	48
3 TRAFFIC ANALYSIS	50
3.1 Traffic Analysis and Projection Methodology	50
3.2 Analysis of Existing Traffic	50
3.3 Review of Existing Reports/Studies	53
3.4 Stakeholder Consultation & Primary Data Collection	53
3.5 Identification of Hinterland for Mongla Port	54
3.6 Analysis of Key Development Plans	59
3.7 Scenarios for Traffic Projections	62
3.8 Export Traffic Projection	65
3.9 Import Traffic Projection	75
3.10 Total Traffic for Mongla Port	87
3.11 Total Traffic for New Project	90
4 Technical Aspects	97
4.1 Scope of PPP Project	97
4.2 Physical Options for PPP	97
4.3 Operation of Terminals	104
4.4 Project Design	109
4.5 Dredging Needs	114
4.6 Construction Plan and Procurement Schedule	119
5 Cost Estimates	120
5.1 Approach	120
5.2 Facilities at the Terminal	120
5.3 Civil Costs	122

5.4	Terminal Operation Equipment	124
5.5	Capital Cost Estimates	126
5.6	O&M Cost Estimates	128
6	TARIFF STRUCTURE	131
6.1	Tariff Structure of Terminal Operator	131
6.2	Methodology of Tariff Application and Revisions	134
7	Commercial Aspects	136
7.1	Institutional Framework	136
7.2	PPP History and Legal Framework of Bangladesh	139
7.3	Broad PPP Contractual Structure	139
7.4	PPP Business Models	140
7.5	Assessment of the PPP Options	143
7.6	Risk Allocation and Mitigation	144
8	Financial Analysis	149
8.1	Introduction	149
8.2	Terminal Operator Business Model	151
8.3	Objectives and Methodology of Financial Analysis and Financial Model	151
8.4	Structure of the Financial Model	153
8.5	PPP Model Assumptions	157
8.6	Key Financial Model Parameters	158
8.7	Traffic Projection	166
8.8	Capital Cost Estimate	167
8.9	Assets Schedule	169
8.10	Depreciation	170
8.11	Revenue Projection	171
8.12	Operation and Maintenance Costs	172
8.13	Results of Financial Model	173
8.14	Sensitivity Analysis	174
8.15	Scenario Analysis	175
8.16	Economic Benefits	179
9	Major Terms and Conditions	182
9.1	Technical Terms and Conditions	182
9.2	Commercial Terms and Conditions	182
10	Relevant Legislation and Regulations	189
10.1	Historical Legal Background of Bangladesh	189
10.2	Maritime Regulations	189
10.3	Environmental Regulations	191
10.4	The Bangladesh Labour Code	192
10.5	Privatization Related Issues	193
10.6	Other Relevant Legislation	194
11	Investor Selection or Bidding Process	196
11.1	Planning for Engaging Terminal Operator	196
11.2	Obtaining Approvals	196
11.3	Qualification	196
11.4	Tendering or RFP	196
11.5	Qualification Criteria of Potential Tenderers	197
12	Project Implementation	199
12.1	Stage 1: Engagement of Terminal Operator	199

12.2	Stage 2: Project Implementation	200
12.3	Stage 3: Operation and Maintenance	200
12.4	Environmental Clearances	201
13	<i>Conclusions and Recommendations</i>	203
13.1	Linked Projects	203
13.2	PPP Option	203
13.3	Tariff Rate	203
13.4	Next Steps	203

List of Tables

Table 1.1: Key Development Projects at Mongla Port	28
Table 1.2: Statistics of Containers and Containerised Cargo Handled in Mongla Port.....	36
Table 2.1: List of Linked Projects.....	38
Table 2.2: Dredging Requirements of Pussur River	39
Table 2.3: Cost Estimate – Dredging of Pussur River	40
Table 3.1: Import of cement raw materials through Mongla Port (MT).....	82
Table 3.2: Import of LPG through Mongla Port (MT).....	83
Table 3.3: ImportedCoal based Power Plants.....	84
Table 3.4: Projected import of general cargo (MT)	85
Table 3.5: Diverted cargo from other cargo generation centers (MT)	87
Table 3.6: Diverted Bulk cargo to Mongla Port under each scenario (MT)	87
Table 3.7: Total projected container traffic for export at Mongla Port (Number of TEUs)	88
Table 3.8: Import of containerised traffic at Mongla Port (Number of TEUs).....	89
Table 3.9: Non-containerised Import through Mongla Port (Metric Ton).....	89
Table 3.10: Total containerised traffic for Mongla Port (No. of TEUs)	90
Table 3.11: Total non-containerised traffic for Mongla Port (Metric Ton).....	90
Table 3.12: Projected Container Traffic under Each Scenarios for Option A.....	91
Table 3.13: Projected non-container/bulk cargo under each scenarios for Option A.....	92
Table 3.14:Projected container traffic under each scenarios for Option B	93
Table 3.15: Projected non-container/bulk cargo under each scenarios for Option B	94
Table 3.16: Projected container traffic under each scenarios for Option C	95
Table 3.17: Projected non-container/bulk cargo under each scenarios for Option B	96
Table 4.1: Delineation of Responsibilities.....	99
Table 4.2: Terminal Capacity in Option A and Option B	108
Table 4.3: List of RCC Piles for J3 and J4	112
Table 4.4: History of Dredging in Mongla Port	115
Table 4.5: Tentative Project Implementation Schedule (Base Case).....	119
Table 5.1: Civil Construction Cost for Option A (2013 values).....	123
Table 5.2: Equipment Requirement for Terminal Operation.....	124
Table 5.3: Equipment Cost for Option A (2013 values)	125
Table 5.4: Total Project Cost for Option A (2013 values).....	126
Table 5.5: Total Project Cost for Option B, Phase I (2013 values)	127
Table 5.6: Total Project Cost for Option B, Phase II (2013 values)	127

Table 5.7: Total Project Cost for Option B (2013 values)	127
Table 5.8: O&M Cost Basis as per World Container Terminal Survey Report	129
Table 5.9: Operation and Maintenance Cost for Option A	129
Table 5.10: Operation and Maintenance Cost for Option BPhase I.....	130
Table 5.11: Operation and Maintenance Cost for Option B, Phase II.....	130
Table 6-1: Schedule of Charges.....	131
Table 6-2: Charges for Loading and Discharging Containers	132
Table 6-3: Storage Charges for Containers	132
Table 6-4: Charges for Extra Container Movement	133
Table 6-5: Charges for Reefer Container Services	133
Table 6-6: Charges for Lift on /Lift off of Containers	133
Table 6-7: Charges for Stuffing/Unstuffing of Containers	134
Table 7.1: Advantages and Disadvantages of Model A.....	141
Table 7.2: Advantages and Disadvantages of Model B.....	142
Table 7.3: Advantages and Disadvantages of Model C.....	142
Table 7.4: Advantages and Disadvantages of Model D.....	143
Table 7.5: Preliminary Risk Allocation and Mitigation.....	144
Table 8.1:Overview of Key Parameters in Base Case.....	151
Table 8.2: Flow Chart of the Financial Model	153
Table 8.3: Loan Assumptions	159
Table 8.4: Mongla Port Tariff Schedule.....	160
Table 8.5: Tariff Rates	161
Table 8.6: Timeline Assumptions	161
Table 8.7: Terminal Assumptions.....	163
Table 8.8: Container Traffic Assumptions.....	164
Table 8.9: Cost Assumptions.....	165
Table 8.10: Traffic Projection for Option A	166
Table 8.11: Traffic Projection for Option B	166
Table 8.12: Traffic Projection for Option C	167
Table 8.13: Civil Cost Estimate for Option A and Option B	168
Table 8.14: Equipment Cost Estimate for Option A and Option B	168
Table 8.15: Total Capital Cost Estimate for Option A and Option B	169
Table 8.16: Assets Schedule for Option A and Option B.....	170
Table 8.17: Depreciation Schedule	170
Table 8.18: Container Data of Mongla Port for 2011-2012	171
Table 8.19: Revenue Items.....	171

Table 8.20: O&M Items	172
Table 8.21: Key Financial Indicators in the Base Case	173
Table 8.22: Equity IRR Sensitivity	174
Table 8.23: The Scenarios Analyzed.....	176
Table 8.24: Results of Scenario Analysis with Tariff Rate 120%	177
Table 8.25: Results of Scenario Analysis with Tariff Rate 100%	178

List of Figures

Figure 1-1: Location of Mongla Port	24
Figure 1-2: Mongla Port Site	24
Figure 1-3: Location of 5 existing Jetties and the Project Site J3 and J4 in box.....	25
Figure 1-4: Piles at J3 and J4	26
Figure 1-5: Bangladesh with Road Network	29
Figure 1-6: Road Connectivity with Mongla.....	31
Figure 1-7: Mongla Port's Channel.....	35
Figure 2-1: Construction of a bridge without its links.....	38
Figure 2-2: Pussur Channel showing Proposed Area for Dredging	41
Figure 2-3: Mongla to Dhaka River Route.....	42
Figure 2-4: Water route of Mongla river to Ghashaikhali river including M-G canal	43
Figure 2-5: Toll River and Sand Mining PPP Project.....	45
Figure 2-6: Conceptual Model of Tidal River Management (TRM)	46
Figure 2-7: Dedicated Ferry Service at Mawa	48
Figure 2-8: Initiating EIA in a PPP Project	49
Figure 3-1: Methodology for traffic projection.....	50
Figure 3-2: Sea Borne trade of Bangladesh.....	51
Figure 3-3: Import through Mongla Port	52
Figure 3-4: Export through Mongla Port.....	53
Figure 3-5: List of industrial clusters and cargo generation centers.....	54
Figure 3-6: Major cargo generation and consumption centers in Bangladesh.....	55
Figure 3-7: Primary & Secondary/Expanded Hinterland of Mongla Port	59
Figure 3-8: Competitive Port from Major Cargo generation/consumption centers.....	59
Figure 3-9: Key development projects at Mongla Port.....	60
Figure 3-10: Scenarios for Traffic Projection	63
Figure 3-11: Competitive Port under each of the proposed scenarios.....	64

Figure 3-12: Methodology for projection of export cargo.....	66
Figure 3-13: Export of Jute & Jute Products through Mongla & Chittagong Port	67
Figure 3-14: Exhibit 1: Jute yield in Bangladesh and other countries.....	68
Figure 3-15: Projected traffic for Jute and Jute Products (Metric Ton).....	69
Figure 3-16: Production center and export of Shrimps/Fish through Sea Ports	70
Figure 3-17: Projected traffic for shrimps/frozen fish through Mongla Port (Metric Ton)	71
Figure 3-18: Projected Export of General Cargo (Metric Ton)	72
Figure 3-19: Projected export through Chittagong Port.....	72
Figure 3-20: Share of traffic diverted to Mongla Port under each scenarios	73
Figure 3-21: Diverted traffic of Garments to Mongla Port (Metric Ton)	74
Figure 3-22: Diverted traffic of Leather goods to Mongla Port (Metric Ton)	74
Figure 3-23: Diverted traffic of General cargo to Mongla Port (Metric Ton)	74
Figure 3-24: Traffic diverted from other cargo generating centers after implementation of key development projects.....	75
Figure 3-25: Methodology for projection of import	76
Figure 3-26: Import of food grains by Bangladesh	77
Figure 3-27: Import of food grain through land and sea ports.....	77
Figure 3-28: Projected Import of food grain (cereal and non-cereal) through Mongla Port (MT).....	78
Figure 3-29: Import of Fertilizers and type of fertilizers imported.....	79
Figure 3-30: Projected import of fertilizers through Mongla Port (MT)	79
Figure 3-31: Import of clinker through Mongla & Chittagong Port	80
Figure 3-32: Consumption/demand for cement.....	81
Figure 3-33: Import demand of LPG	83
Figure 3-34: Existing and upcoming LPG plants in Chittagong & Mongla Port area.....	83
Figure 3-35: Import of coal through Mongla Port (MT)	85
Figure 3-36: Import of general cargo through Mongla Port	85
Figure 3-37: Projected Import through Chittagong Port	86
Figure 4-1: Proposed Conceptual Plan of J3 and 4 with Backup Facilities.....	98
Figure 4-2: Proposed Conceptual Plan of J3, 4 and 5 (part) with Backup Facilities (for Option B).....	102
Figure 4-3: Delineation of Responsibilities and Process Flow	103
Figure 4-4: Road and Water distance from Dhaka to MPA, Chittagong Port and Deep Sea Port	106
Figure 4-5: Proposed Manpower Requirement for Terminal Operation (Full operation, in 2 shifts).107	107
Figure 4-6: Graphical outputs of the STAAD analysis (for Mongla Port Jetty).....	109
Figure 4-7: Incomplete Piles at J3 and J4 (plan view)	110
Figure 4-8: Incomplete Piles at J3 and J4 (side view).....	111
Figure 4-9: View of the existing old pile under deck slab of J5.....	111

Figure 4-10: Identified Dredging Locations for 7.5 m draft vessels.....	117
Figure 4-11: Identified Dredging Locations for 8.0 m draft vessels.....	118
Figure 5-1: Back-up Facilities at Terminal	122
Figure 7-1: Institutional Framework during Project Preparation	136
Figure 7-2: Institutional Framework during Tendering.....	137
Figure 7-3: Institutional Framework during Negotiation	138
Figure 7-4: Institutional Framework during Implementation of the Contract	138
Figure 7-5: General Contractual Framework for PPP	140
Figure 7-6: Comparison of PPP Options.....	143
Figure 8-1: PPP Option for the Project.....	150
Figure 8-2: Determining the Financial Viability.....	152
Figure 8-3: Option A: Two Jetty Model.....	157
Figure 8-4: Option B: Three Jetty Model.....	157
Figure 8-5: Option C: BGMEA/BKMEA Model.....	158
Figure 8-6: Option A Timeline	162
Figure 8-7: Option B Timeline	162
Figure 8-8: Project Cost Spread for the two Options.....	169
Figure 8-9: DSCR of the Project in Base Case.....	174
Figure 8-10: Equity IRR Sensitivity	175
Figure 8-11: Traffic Projection at MP after Pussur River Dredging.....	179
Figure 11-1: Tendering Process.....	197
Figure 12-1: Sequence of Proposed Activities	199



Volume 2 of 2: Annexures

Table of Content

Annexures

- I. Cost Estimates
- II. Financial Model
- III. (Not used intentionally)
- IV. Outline Specifications of Terminal Yard Equipment
- V. List of Meetings
- VI. Meeting Records
- VII. Site Visit Pictures
- VIII. List of Books/Reports Consulted
- IX. Initial Environmental Examination (IEE) Report

Drawings and Maps

X. Technical Drawings:

- Drawing MPA-1: Layout Plan of Mongla Port (Permanent Port Site)
- Drawing MPA-2: Area Development Plan of Mongla Port Area
- Drawing MPA-3: Plan of Piles at Jetty No. 3 and Jetty No. 4
- Drawing MPA-4: Disposition Plan of Girders at Jetty No. 3 and Jetty No. 4
- Drawing MPA-5: Reinforcement Details of Jetty Structure of Jetty No. 3 & 4
- Drawing MPA-6: Side Elevation of Piles at Jetty No. 3 and Jetty No. 4
- Drawing MPA-7: Proposed Conceptual Plan Back-up facilities of Jetty No. 3, and 4 (Option-A)
- Drawing MPA-8: Proposed Conceptual Plan Back-up facilities of Jetty No. 3, 4 and 5 (Option-B)
- Drawing MPA-9: Hydrographic Chart of Pussur Channel showing Proposed area for Dredging

XI. Project Related Maps:

- Map MPA-1: Global Map of Mongla Port Area
- Map MPA-2: Map showing view of Mongla Port (from Fairway Buoy to Hiron Point)
- Map MPA-3: Map of Mongla Port Area(from Base Creek to Digradj/ Bazua Bazar)
- Map MPA-4: Map of Dhaka-Mongla Waterways (indicating MG Canal)
- Map MPA-5: Bangladesh Inland Waterways Map (showing Dhaka, CPA & MPA)
- Map MPA-6: Bangladesh Road Network Map

ABBREVIATIONS AND GLOSSARY

BEZA	:	Bangladesh Economic Zones Authority
BIWTA	:	Bangladesh Inland Water Transport Authority
BIWTC	:	Bangladesh Inland Water Transport Corporation
BOO	:	Build Own Operate
BOT	:	Build Own Transfer
BR	:	Bangladesh Railway
C&F	:	Clearing and Forwarding
CD	:	Capital Dredging
CEGIS	:	Center for Environmental and Geographic Information Services
CFS	:	Container Freight Station
COD	:	Commercial Operations Date
cum	:	Cubic Metres
CPA	:	Chittagong Port Authority
DWT or dwt	:	Dead Weight Tonne
EIA	:	Environmental Impact Assessment
EPZ	:	Export Processing Zone
FCL	:	Full Container Load
FLT	:	Forklift Truck
GDP	:	Gross Domestic Product
GOB	:	Government of Bangladesh
GRT	:	Gross Registered Tonnage
ICD	:	Inland Container Depot
ICT	:	Inland Container Terminal
IDC	:	Interest During Construction
IEE	:	Initial Environmental Examination
IIFC	:	Infrastructure Investment Facilitation Company
IPFF	:	Investment Promotion and Financing Facility
IRR	:	Internal Rate of Return

IWT	:	Inland Water Transport
km	:	kilometre
kV	:	kilovolt
kWh	:	kilowatt hour
LCL	:	Less than Container Load
LIBOR	:	London Inter-bank Offered Rate
LS	:	Lump sum
m	:	Metre
m/s	:	metre per second
MG	:	Mongla-Ghasiakhali
MOS	:	Ministry of Shipping
MPA	:	Mongla Port Authority
MT	:	Metric Ton
MWh	:	Mega watt hour
O&M	:	Operations and Maintenance
PDB	:	Power Development Board
PPP	:	Public Private Partnership
PPPO	:	Public Private Partnership Office
RHD	:	Roads and Highways Department
SIA	:	Social Impact Assessment
sqm	:	square meter
TCS	:	Twenty foot Container Slot
TEU	:	Twenty foot Equivalent Unit
TO	:	Terminal Operator
USD/US\$/฿	:	United States Dollar
V	:	Voltage
WASA	:	Water and Sewerage Authority

EXECUTIVE SUMMARY

The port sector in Bangladesh provides the main gateway for its trade with the outside world. Bangladesh has two seaports –Chittagong and Mongla. Total cargo handled by these ports was 43.5 million MT during 2011-12. The country's import and export has been growing by 15% per annum most of which is being done through the Chittagong port. Currently, Chittagong Port handles around 94% of the total sea borne trade and rest 6% is handled at Mongla Port.

Mongla Port is located about 131 km inland from the Bay of Bengal on the river Pussur at its confluence with Mongla River in Khulna. The potential of Mongla port has not yet been utilized as in the case of the Chittagong port. The inbuilt facilities available on-shore is not fully utilized due to less cargo traffic. The primary reason is insufficient depth in the main Pussur Channel. The other reasons include inadequate road connectivity with the hinterland and major cargo generation centers of the country and insufficient and lack of manufacturing industries in and around the port installation and the port's hinterland. GoB is actively considering revitalizing the port to become a national port with comparable capacity/activity to the Chittagong port.

Originally, the Mongla port was designed for eleven jetties. Five jetties were completed and are now in operation. Two jetties (nos. 3 and 4) were left incomplete, although the pile-work had been partially completed. Completion of these two jetties and operating them for a certain period comprises the present scope of the PPP project. Under the PPP project, a Terminal operator will construct two jetties along with ancillary facilities, procure, install and maintain terminal equipment and provide services throughout the term.

The proposed site is rectangular and has the dimensions of approximately 365m by 245m. It is fully developed and is above the flood plain. Over three hundred piles have already been constructed. They are steel-encased piles constructed in the mid-seventies. They are generally in good condition. The decks for the jetties will be constructed on these piles.

The activities of Mongla Port can be divided into 2 types of cargoes:

- *Containers:* Mostly handled at the public jetty; and
- *Bulk:* Mostly handled at the anchorage and at private jetties.

The port has very limited cargo-handling activities of general cargoes, since almost all general cargoes have already been containerized. During year 2012, Mongla Port was called by 35 ships, or less than 1 ship per week. The nominal service frequency for general cargo ships is 8-10 days. The frequency increases to every 10 days or sometimes to weekly during the shrimp season (summer time).

During 2012, Mongla Port handled around 2.6 million tons of sea borne trade. Out of total trade, import accounted for around 95% of the total traffic which is usually bulk or breaks bulk. Some of the major commodities imported include food grain, clinker, Slag, fertilizer, Gas, Machineries and Motor Vehicles etc. Food grain, fertilizer and clinker are the major commodities handled at Mongla Port, together account for around 90% of the total import. The import growth during the last 5 year was around 30% per annum, which is higher than that import growth at Chittagong Port. Some of the key factors attributing to increase in import traffic are because Government of Bangladesh has mandated import of some specific commodities through Mongla Port.

In Bangladesh, over 90% of the cargo transported via road, but transportation of cargo between Central Bangladesh to Mongla Port becomes challenging because of ferry crossing.

This is one of the major obstacles for central Bangladesh not using Mongla Port as the ferry service get disrupted by low water or heavy fog and also less priority given to cargo than passenger at ferry service resulting in longer time. Currently, there is no direct rail connectivity between major cargo generating centers with Mongla Port. The water transport sector has been a traditionally important part of the transport system in Bangladesh. Especially most of inland cargo and passenger traffic to and from southern and southwestern part of the country is catered by inland waterways. However, siltation and shrinkage of the navigable network in dry season has been an increasing problem for the inland water transport industry in Bangladesh. The Mongla-Dhaka route is currently disrupted due to siltation in the MG canal (length - 30km. depth at low tide - 1 meter).

Linked Projects

The connectivity to and from the Mongla Port is a critical factor for ensuring the feasibility of the proposed PPP terminal project at Mongla. The success and attractiveness of traffic for two jetties on PPP depends upon implementation of some of the key projects and obligations by the Government which are termed as "Linked Projects". In this situation, the executing agency (MPA) will need to take steps for fast tracking the implementation of the Linked Project activities. PPP Office of the government will have an important role in the entire process, so that operation of the PPP project may not be delayed due to delay in associated public sector Linked Projects. The Linked Projects in public sector, vital for success of this PPP project are listed below:

Primary Linked Projects (Immediate)	Implementing Entity
Linked Project No. 1: Pussur River Dredging, by MPA: for entry channel deepening(Main channel improvement)	MPA
Linked Project No. 2: M-G Canal Dredging, by BIWTA: for facilitating opening up inland water ways from Dhaka to Mongla Port (IWT route improvement)	BIWTA ¹
Linked Project No. 3: Dedicated Cargo Ferry service at Mawa ghat, by BIWTC: for smooth transportation of road cargo from Dhaka to Mongla(Road link improvement)	BIWTA/ BIWTC
Linked Project No. 4: Environmental Impact Assessment and Social Impact Assessment performed well in advance, for facilitating quick financing.	MPA/ IPFF
Linked Project No. 5: Setup of grease/oil trap and waste reception facilities in the port area by MPA; for receiving the used oil and grease and preventing those to be thrown in the main channel	MPA
Secondary Linked Projects (Long Term)	
Linked Project No. 6: Construction of Padma bridge across Padma river by BBA and approach roads by RHD	BBA/ RHD
Linked Project No. 7: Rail Connectivity between Dhaka and Mongla by BR	BR
Linked Project No. 8: Industrialization of Western Region with access to Gas and Power	PDB, Petrobangla
Linked Project No. 9: Development of Coal Zone in the northern region of the country	Petrobangla/ other agencies
Linked Project No.10 Development of the Mongla Economic Zone	BEZA

¹ If L2 and L3 are implemented under PPP then PPP Office will also be involved

Linked Project 1 (L1): Dredging of Pussur River is required for access of ships of 8.0 m draft. This is a critical factor for not only the two jetties, but also for the future of the entire Mongla Port. Unless sufficient vessels can reach Mongla Port, exporters and importers will have little confidence in their cargo reaching desired destination in time through Mongla Port. Therefore, it is imperative that the Pussur River undergoes a capital dredging for desired draft.

Linked Project 2 (L2): The main waterway route from Dhaka to Mongla Port (around 297 km) is currently closed due to siltation in the Mongla-Ghasiakhali (M-G) and its nearby approach canals (length 30 km. depth: Low tide 1 to 1.5 meter). This clogging has caused closing off the river route from Mongla to Dhaka. MG canal needs to be dredged to achieve at least Class I Level route (3.5m depth) in the canal for developing better waterway access to the Mongla Port.

The dredging may be conducted by the Government or alternatively be done through a back-to-back PPP project using the Toll River and Mining Sand PPP concept. A private investor may be selected through a tendering process by the authority to handle both capital and maintenance dredging for a stipulated term. The investor will be responsible for conducting maintenance dredging once/twice a year, and ensure Class 1 river depth (3.5 m) throughout the year. The investor will have two sources of finance – charging the container carrying barges and selling the silt to interested purchasers. It is envisaged that silt is a valuable economic resource and has ready market for interested real estate developers for township/industrial land development.

Linked Project 3 (L3): Presently, there is no direct road route from Mongla to Dhaka to lack of bridge in the river Padma. The traffic towards Mongla and southern parts from Dhaka needs to cross the river Padma through ferry at Mawa Ghat. However, this ghat is a general-purpose terminal with a significant volume of inland passengers and cargo traffic. It is not suitable for catering export-import traffic unless a dedicated inland container terminal is constructed.

The linked project may be implemented by the Government or by another PPP project. Under the PPP model, private investor will be responsible for setting up a dedicated ferry terminal for container cargo from/to the Dhaka region. Investor will also procure an appropriate number of ferries, construct access roads to the ghats and set up special pontoons. Investor will collect ferry charges from importers and exporters who use the dedicated ferry to transport covered vans or container trucks.

Traffic Forecast

Traffic analysis of Mongla Port has been carried out as part of the study to prepare a traffic projection for the two jetties over the term of the PPP Agreement. The traffic modeling exercise involves allocating cargo transferred between a set of Origins and Destinations (OD) to Mongla and Chittagong Port. For this purpose, a set of all routes for each OD set have been evaluated and the least distance port has been taken for purpose of cargo allocation. For the purpose of traffic projection for Mongla Port and new proposed jetties four alternative traffic growth scenarios have been developed which are linked to the key development/link projects (shown in figure below).

	KEY DEVELOPMENT ACTIVITIES AFFECTING TRAFFIC GROWTH AT MONGLA PORT		
SCENARIOS	Dredging of Pussur River	Dedicated Terminal at Mawa Ferry	Dredging of Mongla - Ghasiakhali Canal
Scenario I			
Scenario II			
Scenario III			
Scenario IV			

These scenarios have been developed considering the existing traffic growth characteristics at Mongla Port, key constraints at the port, and the development of key connectivity projects which can retain traffic of its own hinterland and attract traffic from other cargo generating centers.

At present, jute & jute goods, frozen cargo and other general cargoes are normally exported from Mongla port. After commissioning of the linked projects, there will be bright prospects in exporting garments, tea etc. through Mongla Port. Moreover, import of heavy machinery & equipments, fertilizer, food grain, sugar, motor vehicles, raw materials of industry etc. through Mongla Port will increase with respect to the present rate. Once linked project 2 & 3 is implemented, traffic growth will be the highest as the Mongla Port will be able to attract maximum traffic from the Dhaka and surrounding regions which is highest cargo generation and consumption center of Bangladesh.

The total potential traffic which can come to Mongla Port under various scenarios is estimated in the traffic model. The traffic for Mongla Jetties PPP project is estimated using assumption that, a portion of existing as well as new traffic of Mongla Port will be diverted to the two new Jetties to be developed under PPP mode. Under the different traffic scenarios, traffic forecast for the new jetties under three different PPP models are forecasted to be used for financial analysis.

PPP Options

The project needs to be structured in such a manner so that it provides a feasible solution for implementing the project through private sector investment with sufficient return. Therefore, we propose two broad physical options for the private sector participation:

- Option A: Two Jetties (base case)
- Option B: Three Jetties
- Option C: Two or three jetties with participation of recognized business associations

Option A: In this option, MPA will provide the right to use the land for two jetties (J3 and J4) and back-up area and the existing assets (old piles) of J3 and J4 to the selected Terminal Operator. The selected Terminal Operator will complete the additional piles and construct the two jetties (J3 and J4), construct backup facilities for the terminal operation, which include administrative office building, workshop building, internal road, drain and culvert, boundary wall and other utilities, procure cargo handling equipment and operate the terminal (of 2 Jetties) for a stipulated duration.

Option B: Under this model, Terminal Operator will be engaged to operate J5 and utilize backup ancillary facilities for J5 until traffic throughput reaches a pre-determined amount defined in the PPP Contract. Once the desired traffic level is reached, it will become obligatory for Terminal Operator to complete construction of J3 and J4 within a fixed period of construction time. After completion of construction of the J3 and J4, J5 will be handed over to MPA. Terminal Operator will operate the two jetties until the end of the contract term.

Option C: Under this model, negotiations maybe carried out with BGMEA and/or BKMEA where their members are offered a certain percentage of shares (say 25 to 30%) in the PPP project company. Normal tendering will then occur for selecting the PPP Terminal Operator, with the tender documents mentioning the participation of BGMEA/BKMEA. The advantage of this model is that the jetties will have traffic on a more assured basis from BGMEA/BKMEA members. The associations are financially strong to implement the construction with the PPP investor as well as having the ability to create traffic demand through the port. Currently 98% of garments and knitwear export is through Chittagong port. Approximately 70% of the country's total export comprises of garments goods. 75% of the garments industries are located in the Dhaka region. If the two jetties are handed over to BGMEA/ BKMEA for their own use, there will be a diversion of garments goods traffic to Mongla Port from Dhaka. This will not only help the booming garments export sector but also create demand for traffic at Mongla Port.

Technical Aspects

It is planned that the terminal operation for both Option A and Option B will be responsible for all shore-based operations, including ship to shore transfer of containerized and non-containerized cargo. Prospects for receipt /delivery by Inland Water ways (IWW) mode in the short term does not exist, since the river route from Mongla to Dhaka is blocked. However, after completion of Linked Project L2 (dredging of MG canal), the port is expected to receive substantial cargo through the waterways.

After physical inspection and viewing the piles of existing jetties and reviewing the analyses of structures, it is observed that for Jetties J3 and J4, four rows of piles in the riverside are installed. These were erected in the year 1976. The remaining piles and the deck slabs were not constructed and these two Jetties were left incomplete. The steel encased piles are more than three decade old. These seem generally in good condition. The decks for jetties J3 and J4 are to be constructed on these existing 4 rows and some more rows of newly erected piles. The construction of jetties (J3 and J4) will be as multipurpose berth, to handle general cargo as well as containers. It is felt that the conditions of existing piles at J3 and J4 and the detail design for new piles and deck slab are sufficient for construction of the jetties. The original design for the deck-slab of the jetty of J3 and J4 is 183 m long and about 64 m wide. These are inconsistent with other existing Jetties no. 3 to 9. After consulting with Mongla Port officials and reviewing the jetty designs in other ports and terminals, it is recommended that the jetty may be constructed with maximum 40 m width.

The Investors will be given opportunity for due diligence on the existing conditions² of the jetty structures and its design. The pre-qualified bidders of this project will be given at least 2 months time for investigation into the matter before submission of their bids.

Dredging Requirements

The Institute of Water Modeling (IWM) has carried out a hydrographic survey in the Pussur channel in 2011 and has identified the areas to be dredged for access of 7.5 m and 8.0 m deep vessels in the Mongla Jetty area. The maintenance dredging of the jetty head is also required for handling ships at the jetty.

Cost Estimates

Cost estimate for construction of the two jetties and procurement of terminal equipment was undertaken by the Consultant.

² unless this opportunity is provided by the MPA to the potential investors, the investors and/or their lenders are likely to require more assurance from the MPA with regards to the integrity of the piles.

The total project cost for development of the Terminal as PPP project under Option A has been estimated and is given in the table below.

Item	Amount (m Tk.)	Amount (m USD)
1. Civil Construction Cost (Jetty and Backup)	1,817	22.71
2. Equipment Cost (initial procurement)	1,412	17.65
3. Sub-Total	3,229	40.36
4. Contingency	484	6.05
5. Soft costs	518	6.48
Total Project Cost (Base Option A)	4,231	52.90

The soft costs are:

- working capital of 3 months O&M
- interest during construction as calculated from the financial model, and
- project management and development fees.

Cost estimate for Option B Phase I (operation of Jetty 5 only), has been estimated and is given in the table below.

Item	Amount (m Tk.)	Amount (m USD)
1. Civil Construction Cost (Jetty and Backup)	454	5.67
2. Equipment Cost (initial procurement)	706	8.83
Sub-Total	1,160	14.50
3. Contingency	174	2.18
Total Project Cost (option B-I)	1,334	16.68

Cost estimate for Option B Phase II (operation of Jetty 3 and 4), has been estimated and is given in the table below.

Item	Amount (m Tk.)	Amount (m USD)
1. Civil Construction Cost (Jetty and Backup)	1,416	17.69
2. Equipment Cost (initial procurement)	706	8.83
Sub-Total	2,122	26.52
3. Contingency	318	3.98
Total Project Cost (Option B-II)	2,440	30.50

In addition operation and maintenance cost of the Terminal was estimated by the Consultant.

Tariff Structure

MPA is a government owned entity. Hence, the policy of formulation of tariff structure of MPA has been depending more on other factors than the port's own factors. However, with the engagement of a private operator for two new jetties, MPA will have to face competition. Nevertheless, participation of private sector is also required to encourage increased port efficiency. As such, it is suggested that Terminal Operator be given the power

to enhance the tariff structure within a range of limitation (up to 30 percent of the existing MPA tariff). It is also recommended that Terminal Operator be allowed to raise his tariff levels by a maximum of 3% every year. If Government raises the Tariff Schedule of MPA to a level, which is higher than the existing Tariff Rate Schedule of the Terminal Operator at that year, Terminal Operator will also be allowed to raise his Tariff Rates to be consistent with that of MPA.

Commercial Aspects

In most PPP investment, the private investors are selected through open tendering. This creates a perception of transparency and competition among the private investors and generates a better deal for the government.

The following models may be considered as business models for participation of the Terminal Operator in the project, either through open tendering or on a negotiated basis.

<i>Partnership by Contract (PPP)</i>	1. Model A:	Build Own Operate (BOO)
	2. Model B:	Build Operate Transfer (BOT)
	3. Model C:	Lease
<i>Partnership by Shares (JV)</i>	4. Model D:	JV Special Purpose Company

Since this PPP project can be treated as a pioneer project in the port sector and it has inherent high risks due to its low traffic at present, certain fiscal incentives have been assumed for the project to make it attractive. The fiscal incentives to be provided to the project is proposed to be the same as that provided to IPP power projects under the 1996 Private Sector Power Generation Policy. Over 30 power projects have enjoyed the incentives under this policy so far and this nationally important port project may also receive similar incentives.

Financial Analysis

Financial analysis was carried out to determine the viability of the project under different traffic scenarios and PPP models. Sensitivity analysis was also carried out which identified Traffic at the port and the Tariff level as the two biggest factors affecting the viability of the project. Scenario analysis was carried out for different scenarios as shown in the table below:

		PPP Option		
		Option A	Option B	Option C
Traffic Scenario	Scenario 0 (no linked projects)	X	X	X
	Scenario I (with L1)	Base Case	Analyzed	Analyzed
	Scenario II (with L1& L3)	X	X	X
	Scenario III (with L1& L2)	X	X	X
	Scenario IV (with L1, L2 & L3)	Analyzed	Analyzed	Analyzed
	Scenario V (with L1 & Padma Bridge)	X	X	X

Results of the analysis are given below:

Tariff Rate : **120%**

Equity IRR			
	Option A	Option B	Option C
Scenario - I	4.4%	6.6%	8.5%
Scenario - IV	12.1%	21.3%	25.6%
Project IRR			
Scenario - I	4.3%	5.8%	7.1%
Scenario - IV	9.4%	13.4%	14.5%
Average DSCR			
Scenario - I	0.30	0.39	0.47
Scenario - IV	1.20	1.58	1.86
Equity Payback Period			
Scenario - I	24	23	21
Scenario - IV	15	9	8
Project Payback Period			
Scenario - I	23	21	20
Scenario - IV	13	12	11

The above results indicate that the project is financially viable only in Traffic Scenario IV-Option B and Traffic Scenario IV-Option C.

Traffic Scenario IV-Option C is the best possible scenario for the project with a return of 25.6% and a DSCR of 1.86. The project will be attractive for private investment in this scenario and the terminal will generate enough revenue to pay off debt.

The project is unviable in Traffic Scenario I, which means that additional linked projects to Pussur River dredging needs to be implemented to make the project feasible. Option A is also unviable in Traffic Scenario IV, which indicates that Option B or Option C needs to be implemented to make the project feasible.

Economic Benefits

Implementation of the PPP project will be significantly beneficial to Mongla Port Authority as well as Mongla Port itself. The project is also expected to have a big positive impact in the country's economy as well as playing a key role in the development of the southeastern region of the country.

Implementation of the PPP project will mean that Government has to put special emphasis on completion of two linked projects that are vital for increasing cargo traffic at Port. The linked projects, (i) clearance of the MG canal (L2), and (ii) dedicated ferry service at Mawa (L3), will ensure that cargo from the central region is able to reach Mongla easily which will not only benefit the PPP project but also Mongla Port.

Existing employees of MPA will continue working as-is and there will be no interruption of the service of the existing employees. In fact, current employees of MPA will have the opportunity to join the workforce of the Terminal Operator at higher salaries and benefits. There will be a quota system in place where at least 30% of the TO workforce will need to be engaged from the existing workforce of MPA under certain set criteria established by the MPA.

MPA will also be benefitted financially as implementation of the PPP project will result in the Terminal Operator paying land lease and fixed royalty to MPA, which MPA will not otherwise receive if the land and jetties remains unutilized. Terminal Operator may also use MPA's existing warehouses/ storage facility and pay service charges to MPA, which will boost MPA revenue.

Financial analysis shows that the Government will receive approximately **US\$ 114 million (Tk 909 crore)** as taxes from the project over a period of 30 years.

If Option A is chosen, MPA will receive **US\$ 100,000 per year** (escalated at 2% per annum) as land lease for Jetty 3 and Jetty 4 from the Terminal Operator. If Option B or C is chosen as the preferred PPP Option, MPA will receive an **additional US\$ 200,000 per year** (escalated at 2% per annum) as Jetty 5 fixed royalty during the period that the TO uses Jetty 5.

In addition, variable royalty will be a bidding parameter for the project. Depending on the PPP model chosen, MPA will also receive variable royalty over the term of the PPP Agreement on a per TEU container basis.

Traffic analysis shows that the Ready Made Garments (RMG) and Knitwear industries of the country have a huge potential of growth in the future. Chittagong Port is already congested and has limited options for growth. An alternative to Chittagong Port will be needed to handle the growth of traffic expected. Mongla Port has vast unutilized lands, which can grow at par with the import and export volume requirements of the country. Development of Mongla Port is imperative for economic growth of the nation.

In addition to being a viable alternative to Chittagong Port, development of the port will have significant economic impacts to the country especially in the under developed northern and southeastern regions. Cargo from/ to the northern and western regions of the country can be exported/ imported much more cost effectively through Mongla Port than Chittagong Port. Industries set up at the Mongla EPZ and surrounding areas will be able to easily export/ import cargo through the port instead of having to go through Chittagong. The port may also be used as a transit point for supplying coal, to coal fired power plants scheduled to be constructed in the region.

Terminal Operator is expected to employ at least 150 new workers at the two new jetties. In addition, it is expected that there will be significant indirect employment generation in the region due to increased port traffic and infrastructure.

Recommendations

The results of the study indicate that construction of two jetties at Mongla Port through PPP will be financially viable as long as some major steps are taken to structure the project. The proposed steps are:

Linked Projects: It is imperative that the linked projects (L1, L2 and L3) identified by the Consultants are implemented by the Government. Dredging of Pussur River to allow regular ship traffic to the port is a fundamental requirement for the success of the project. However, just dredging the Pussur River is not enough, as the Port needs to attract traffic from the Dhaka region to Mongla. Diversion of traffic from Dhaka will require two other linked projects to be implemented: (a) clearance of MG Canal for inland waterways cargo transport, and (b) dedicated ferry service at Mawa for attracting more cargo traffic through roadways.

PPP Option: The project is not financially viable if Option A is used even if all linked projects have been implemented. Construction of two jetties upfront when the port has a shortage of traffic will also be counterproductive to investment norms. Option B or Option C should be chosen as the PPP model for implementing the project. Financial analysis also shows that the project will be more viable if BGMEA/BKMEA are minority shareholders in the project company. Inclusion of the two associations in the project company will ensure Dhaka traffic to the port as well as making the project more attractive to Terminal Operators.

Tariff Rate: Terminal Operator should be given the freedom to raise his tariff upto a defined ceiling. Sensitivity analysis indicates that tariff rate is the biggest factor affecting the equity IRR of the project. Allowing the Terminal Operator to increase the tariff will make the project more attractive to Terminal Operators.

Based on the analysis, it is the opinion of the Consultants that Traffic Scenario IV (all linked projects implemented), Option C as PPP option and freedom to raise tariff) is implemented for this project.

Next Steps: For successful project implementation, it is important to have a Project Management Unit in place in MPA. The unit needs to be assigned with the responsibility of project implementation including all the critical issues regarding this project.

The appropriate model of inviting Terminal Operators and the Terminal Operator's scope of work that is suitable for the investors needs to be decided by MPA. A list of potential investors needs to be prepared, and the concept needs to be conveyed and consulted through a consultation paper in the Investor Promotion Meeting. Based on the written feedback, major terms and conditions will need be designed and approved by the appropriate authority.

Based on the major terms and conditions, tender documents will be prepared and investors will be invited through international tender notice.

After submission of this feasibility report, following steps need to be taken:

- 1) *Approval of Major Terms and Conditions* –MoS/MPA
- 2) *Approval of fiscal incentives* –NBR/PPPO
- 3) *Government decision on PPP Option and Model* –MoS/MPA/PPPO
- 4) *Preparation of RFQ document* - Consultant
- 5) *Identification of potential investors* – PPPO/ Consultant /MPA
- 6) *Implementation modality for linked projects L2 and L3* –MoS/BIWTA/PPPO
- 7) *Proceeding with the preparation of the EIA* – MPA/IPFF

1 BACKGROUND

1.1 Project Background

Mongla Port Authority (MPA), under the Ministry of Shipping, intends to develop the two jetties through Public Private Partnership (PPP) in the Mongla port. MPA requested support from the Public Private Partnership Office through technical assistance from Investment Promotion and Financing Facility (IPFF) project, Bangladesh Bank for feasibility study and transaction services.

The consultant consortium of Infrastructure Investment Facilitation Company (IIFC), Deloitte Touche Tohmatsu India Private Limited and Mahindra Consulting Engineers Limited, India (MACE) has been engaged by the IPFF program for conducting detailed feasibility study of the construction of two jetties at Mongla Port through PPP.

1.2 History of Mongla Port

There are two main seaports in Bangladesh, namely Chittagong Port and Mongla Port. Chittagong Port is a gateway port handling about 94% of the entire sea borne trade. The installations of Chittagong Port are situated along the bank of the river Karnafuli, about 16 km from its outfall into the Bay of Bengal. The maximum permissible draft ranges from 8.50 m to 9.20 m with length restriction of vessels upto 186 m.

Mongla Port is located in Pussur River in Khulna about 131 km inland from the bay and its draft ranges from 7.0 m to 8.5 m with length restriction of vessel being 225 m.

The Mongla Port started functioning in beginning as 'Chalna Anchorage' at a location near Chalna town in the Pussur River. Primary objective of the Anchorage was export of raw jute bales. The anchorage was shifted to the present site at Mongla in 1954 as the place could accommodate sea-going vessels with greater drafts and handle other cargoes.

At the present site, the Mongla port was designed for 11concrete jetties. Mongla Port Authority planned to construct seven (seven) jetties in the beginning. Under the project "Permanent Port on Pussur river", five jetties (J5, J6, J7, J8 and J9) were constructed in the year 1976 to 1978. In two jetties, (J3 and J4) only part of the pile driving works were completed. The Jetties J1 & J2 and J10 & J11 were left vacant, without any construction, for future expansion.

1.3 Location of Mongla Port

Mongla port is essentially a river port located 131 km upstream from Bay of Bengal on the river Pussur at its confluence with Mongla River. The port is situated in Bagerhat district in southwestern Bangladesh. It is situated on the riverbank opposite to the Mongla Pourashava town, in Dacope thana of Bagerhat district in Khulna administrative division. The Global view of Mongla Port area is given in Google map.

Figure 1-1: Location of Mongla Port



1.3.1 The Port Site

The Port is surrounded and well protected by the Sundarban mangrove forest. The name Mongla originated from Mongla River presently known as Mongla Nulla. Mongla River originated from Pussur and Rampal is situated beside Pussur.

Figure 1-2: Mongla Port Site



1.4 The Project

1.4.1 Scope of the PPP Project

MPA intends to appoint an Investor-cum Operator for construction and operation of two jetties at Mongla Port on PPP basis. Investor will construct two jetties along with ancillary facilities, procure, install and maintain terminal equipment and provide services throughout the term.

Originally, the Mongla port was designed for eleven jetties. Five jetties were completed and are now in operation. Two jetties (nos. 3 and 4) were left incomplete, although the pile-work had been partially completed. Completion of these two jetties and operating them for a certain period comprises the present scope of the PPP project.

An Initial Environmental Examination (IEE) for the project has been carried out by the consultants. This report also provides a summary and conclusion for finding ways to mitigate the potential extent of environmental changes, with available information. This IEE Report has been attached as Annexure – IX.

1.4.2 Project Site

The proposed site is rectangular and has the dimensions of approximately 365m by 245m. It is fully developed and is above the flood plain. The topography at the site is flat. The general slope is towards the Pussur River. Geology of the project area is underlain by deltaic and alluvial deposits of the river systems.

The Layout Plan of Mongla Port is given in Drawing no. MPA-1, **showing** all the jetties of Mongla Port. Presently, 5 Jetties (J5, J6, J7, J8 and J9) are completed. Four jetty sites (J1, J2, J10 and J11) are vacant. Two jetties (J3 and J4) are left incomplete, with the pile-work partially completed. In Drawing no.MPA-2, the details of the port jetties are shown, with locations of other existing and proposed installations like transit sheds, warehouses and back-up area facilities, etc.

Figure 1-3: Location of 5 existing Jetties and the Project Site J3 and J4 in box



1.4.3 Existing Piles at Site

Over three hundred piles have already been made. A view of the piles is shown in Figure 1-4. They are steel-encased piles constructed in the mid-seventies. They are generally in good condition. The decks for the jetties will be constructed on these piles.

Figure 1-4: Piles at J3 and J4



1.5 Current Status of Mongla Port

At present, the port annually handles about 3 million MT of imports and exports of general cargo and 25,000 TEUs of containers. The port has trade links with almost all major ports of the world, although vessels arriving here are mostly from ports of Asia, the Middle East, Australia, Europe and North America.

The potential of Mongla port has not yet been utilized as in the case of the Chittagong port. The inbuilt facilities available on shore are not fully utilized due to less cargo traffic. The primary reason is insufficient depth in the main Pussur Channel. The other reasons include inadequate road connectivity with the hinterland and major cargo generation centers of the country and insufficient and lack of manufacturing industries in and around the port installation. The GoB is actively considering revitalizing the port to become a national port with comparable capacity/activity to the Chittagong port.

1.6 Existing Facilities

The total land area of the Port is about 950 ha, of which some 90% is at the waterfront location on Mongla River.

The main port facility is a pile-mounted concrete deck with length of 915 m, almost in a straight line, providing berthing for five ships. In addition, there are seven mooring, in-stream buoys and 14 anchorage areas. Hence, altogether, the port can accommodate 26 ships. It has four on-dock transit sheds, each with about 20,000 sqm and 2 warehouses of similar size. In addition, there is a paved container yard of 3.6 ha that can store 2,200 TEUs (one tier), including 120 reefer plugs³. The dock is equipped with four rail-mounted, electrical cranes with lifting capacity of 3 tons. These cranes are old and designed for handling bags; they are not useful for handling containers that weigh up to 30 tons. There is also an old, 100-ton crawler crane that, at least in theory, can handle containers to/from ships. Yard handling of containers can be provided by old three straddle carriers, although it is understood that because of their poor condition, it is mostly provided by a top-lift.

³ A Study of Mongla Port's Strategic Development Options for The World Bank, by Asaf Ashar, April 2010

The jetty protrudes into the main channel of the river and therefore interferes with the water flow. As a result, there is a constant accumulation of sediments along the jetty. Usually, some of this accumulation is washed away by ships' propellers. This, however, is not the case with Mongla's jetty, which is called by very few ships.

Both the jetty and the sheds are in good working condition. Likewise, the Port overall appears clean and well maintained.

The Port has leased about 65 hectares of waterfront land to private industries; among them four cement factories (clinker grinding), two LPG bottling plants and one petroleum terminal. All these seven plants have their own jetties and cargo handling installations; they do not use Mongla's public port facilities. The cement plants also use anchorages, especially at Harboria, for lightering clinker ships.

The port provides facilities for handling of cargoes in the river as well as alongside the jetty. Mongla Port has 26 berths.

- Jetty Berths : 5
- Mooring Buoys: 5
- Anchor Berths: 8
- Private Jetty Berths: 5

At present two jetty berths are functional in respect of depth. 6.5 m draft ship can take berth at the jetties. Mooring buoys are also for berthing. Draft of 7.0 m ship can be secured in the mooring berths. 8.5 m ships can anchor and carryout unloading and loading in the anchorage. There are four transit sheds and two warehouses with the total capacity of 60,000 M ton. Mongla Port also has sufficient cargo handling equipment and vessels for smooth port operation.

An Export Processing Zone (EPZ), with an area of 460-ha, is located adjacent to the port.

1.6.1 Utilities

The port has sufficient supply of fresh water and electricity for its own cargo handling operations. The development of industrial activities in the port area will mandate additional investments in utilities.

1.7 Key Development Plans of Mongla Port

In Bangladesh, most of the industries are located in and around Dhaka and Chittagong. During the stakeholder consultation process, it has been observed that, the business community of Dhaka and its surrounding areas prefers Chittagong Port and is less interested to use Mongla Port because of number of constraints such as lack of fair connectivity through waterways, roads and bridges, low draft at the jetty area as well as in Pussur Chanel because of siltation issue.

Because of the above constraints, traffic at Mongla port has been significantly low and significantly underutilized capacity (almost 90%). Considering this, in order to expedite the development of the Mongla Port including development of new proposed project, it is important to identify the key development projects to be implemented to revive the operation of the port. Some of the key development projects which can affect the traffic of Mongla Port are discussed below:

It is understood that, the government has given top priority for developing port facilities at Mongla port up to international standard. To develop the port, a number of development

projects have been identified to be undertaken in the short to medium term. It is expected that after implementation of these projects port will be able to attract adequate traffic from its hinterland. The key development projects along with its benefits and expected time of completion are as follows:

Table 1.1: Key Development Projects at Mongla Port

Name of development projects	Expected Benefits	Indicative Timeline
1. Procurement of Container and Cargo Handling Equipment	Increase in operational efficiency of the port	2014
2. Procurement of Cutter Suction Dredger, Pilot and Dispatch Boat for Mongla Port	Maintenance of sufficient depth at jetty area will facilitate entry of heavy ships	2013
3. Navigational Aids to Mongla Port	Improvement in movement of sea-going vessels in the channel	2013
4. Dredging at the Outer Bar in the Pussur Channel	Increase navigability at the Outer bar area of the Pussur Channel to facilitate entrance of more than 9 meter draft ships into Mongla Port area	2014
5. Dredging in the Harbour Channel of Mongla Port	Increase the navigability of the Harbour Channel of the Pussur River	2013

Source: Mongla Port Authority

Among the development projects highlighted above, development plan no. 1 will improve the operational performance of the existing port (5 jetties) and other development plans specially the dredging of Pussur Channel will have direct impact on feasibility of proposed project (J3 and 4). Bangladesh Export Promotion Policy, 2012 also envisages the capital dredging to facilitate movement of container ships in Mongla Port.

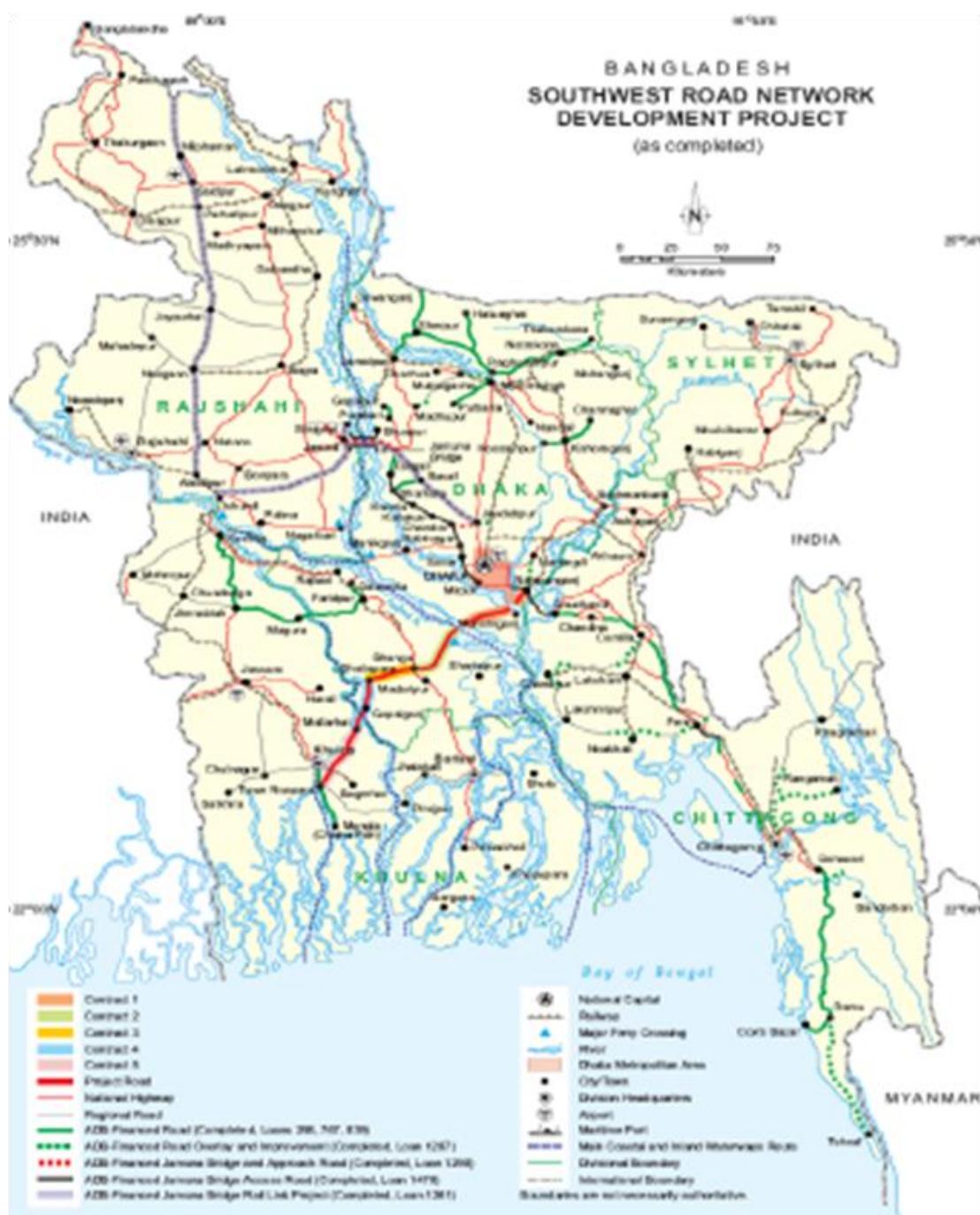
Based on the above, the development of above projects are critical success factor for not only the two proposed jetties, but also for the future of Mongla Port. Unless sufficient number of vessels can reach Mongla Port, exporters and importers will have little confidence and predictability of their cargo reaching desired destination. Therefore, it is necessary that the Pussur River undergoes a capital dredging for desired draft. At least 5 m depth capital dredging needs to be ensured and at some points i.e. in the Jetty front and Mooring Buoy Area, 7.5 m is required.

1.8 Regional Profile

The south-west portion of Bangladesh remains one of the least developed regions in the country. Basic high-quality infrastructure is lacking and connectivity to major centers of growth is fairly low. To maximize the multiplier effects from the Padma Bridge Project, and to accelerate growth and poverty reduction in the south-west region, a more integrated and cross-sector approach is needed. The Padma Bridge Project could be used as an anchor for further regional projects with the potential to be transformational in nature. The development of Mongla Port, the subject of this study, is one of these projects.

Mongla Port is the only international port serving the south-west portion of Bangladesh. Mongla has a “huge potential”, which until now was unrealized mainly due the lack of connectivity to the rest of the country and siltation in Pussur River. The dredging of Pussur River and construction of Padma Bridge and later on extending the railway, will greatly improve Mongla’s connectivity with the Dhaka region, the center of Bangladesh economic activity and, especially its imports and exports.

Figure 1-5: Bangladesh with Road Network



There are three sources of potential growth for Mongla:

- Diversion of the Dhaka's region foreign trade presently using Chittagong Port. Following the opening of the new bridge the road distance between Dhaka and Mongla will be reduced to 189 km, 74 km shorter than the present 264 km distance between Dhaka and Chittagong – and the road will be much less congested.
- The relocation of export-related industries to Mongla following the improvement in connectivity along with the establishment of new industrial complexes and/or export free zones in Mongla, taking advantage of the vast land reserves of Mongla.
- The cross-border trade, especially if transit of Indian traffic is facilitated.

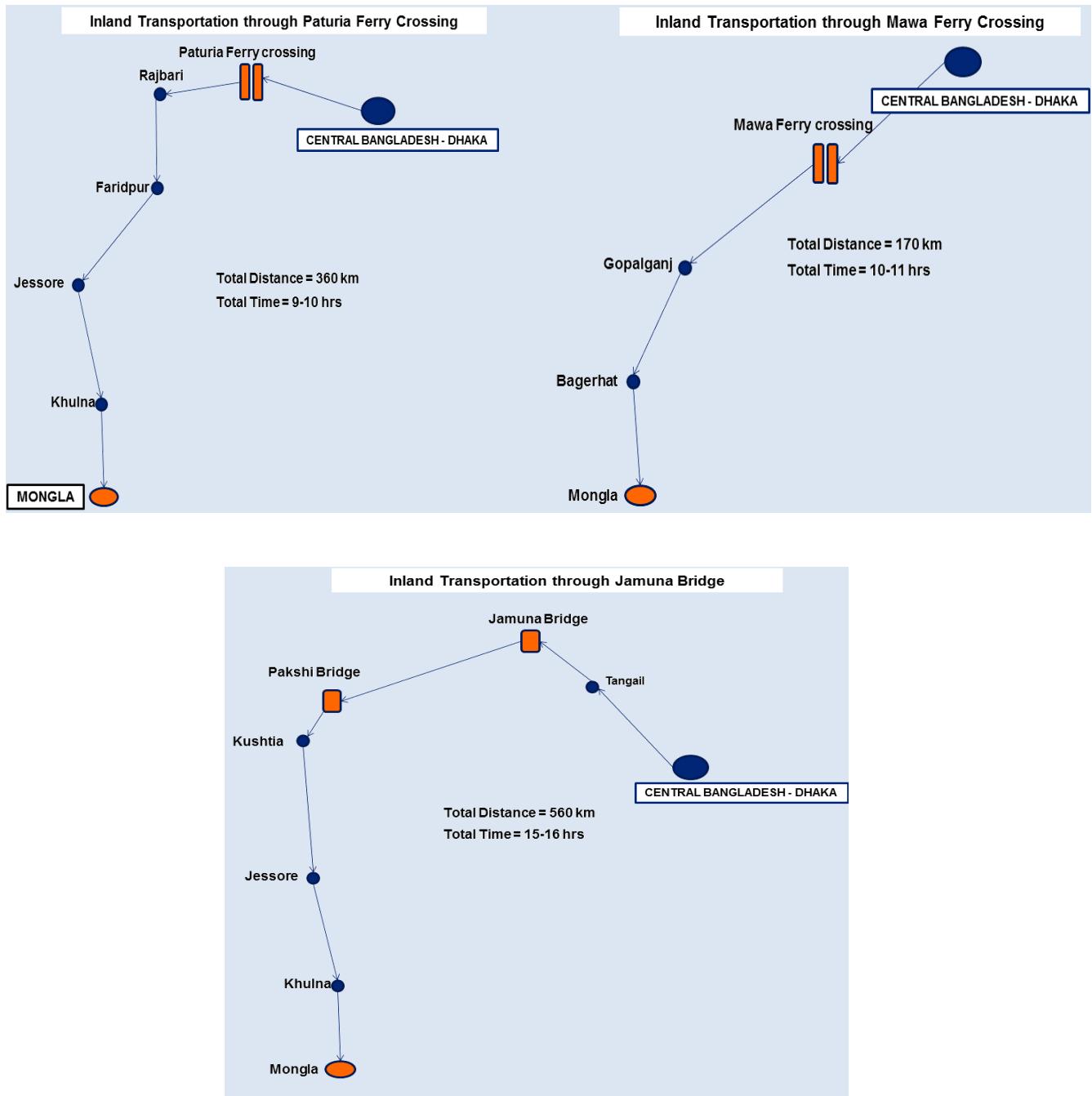
Accommodating this growth potential, according to the World Bank pre-study observations, could take place in several phases; the first one includes increasing the utilization of Mongla's existing capacity, followed by several phases of facility expansion.

1.9 Connectivity

1.9.1 Road Connectivity

In Bangladesh, over 90% of the cargo transported via road, but transportation of cargo between Central Bangladesh to Mongla Port becomes challenging because of ferry crossing. This is one of the major obstacles for central Bangladesh not using Mongla Port as the ferry service get disrupted by low water or heavy fog and also less priority given to cargo than passenger at ferry service resulting in longer time. Once the Padma bridge is constructed or provision of dedicated service at Mawa ferry can be provided, Mongla Port will be able to attract traffic from Dhaka and surrounding region. With the construction of bridges on Jamuna and at Pakshi, road link has been established with the North Bangladesh. However, there is no bridge connection on the southwestern side. Currently, there are three main road routes, which can be used for transport between Dhaka and Mongla. The commonly used route is through Mawa or Paturia ferry crossing, while it is possible also to use Jamuna Bridge but the distance and time taken is much longer as compared to ferry crossing. The Government of Bangladesh has planned to construct a new Padma bridge at the vicinity of Mawa Ferry, which is expected to reduce the transportation distance as well as time between Dhaka and Mongla. The three routes for road transportation from Dhaka region to Mongla Port are presented in the figure below.

Figure 1-6: Road Connectivity with Mongla



1.9.2 Construction of Padma Bridge

The Government of Bangladesh has proposed to construct Padma Bridge at Mawa point. The bridge will connect the two seaports of the country as well as provide access of the largest cargo generation center – Central Bangladesh to Mongla Port. The bridge is expected to revive the Mongla port, which is now operating at very low capacity due to the current long travel time required to reach Dhaka or elsewhere. Padma Bride will also establish the missing link along the Asian Highway hence enhancing the regional connectivity. When Padma bridge will be operational, the distance from Dhaka to Mongla will be 170 Km. So, the business community of Dhaka and its surrounding areas will be more interested to use

Mongla Port for importing and exporting cargos as the transportation distance from Dhaka to Mongla will be shorter than Dhaka to Chittagong.

1.9.3 Rail Connectivity

Currently, there is no direct rail connectivity between major cargo generating centers with Mongla Port. Even the rail connectivity in southwestern and north Bangladesh is upto Khulna only. Recently, GoB has undertaken the Khulna Mongla railway project. It is expected that this rail connectivity project will provide smooth movement of cargo within south western and north Bangladesh.

The government has taken up the project for constructing a multipurpose bridge (including rail line) over the River Padma. The Padma railway link project is proposed to have connectivity up to Bhanga under Phase I and this link will be extended to Jessore in Phase II. This link will provide rail access to Mongla Port.

1.9.4 Waterways

The water transport sector has been a traditionally important part of the transport system in Bangladesh. Especially most of inland cargo and passenger traffic to and from southern and southwestern part of the country is catered by inland waterways. However, siltation and shrinkage of the navigable network in dry season has been an increasing problem for the inland water transport industry in Bangladesh.

Due to poor inland road connections, most commodities in and out of Mongla Port are handled by inland water transport but limited to the Khulna region.

There has been a regular established inland waterway route from Mongla to Dhaka until 2010, which was used by Bangladesh Inland Water Transport Corporation (BIWTC) plying passenger vessels of moderate size. The inland waterway distance between Mongla to Dhaka and between Mongla to Chittagong is very close:

- Dhaka - Chittagong : 307 km
- Dhaka - Mongla: 304 km

However, the Mongla-Dhaka route is currently disrupted due to siltation in the MG canal (length - 30km. depth at low tide - 1 meter). This is suggested as a linked project and an obligation of the government to arrange for regular dredging of the canal, if Mongla Port is to be connected with the central region of Bangladesh (Dhaka).

Currently, detour is used by vessels via Sundarban Bogi canal. However, Forest Department imposes restrictions in using the Bogi canal due to possible environmental damage to the Sundarbans.

At present, no container is transported through waterways. Only bulk cargo is transported through cargo ships. However, an inland river container terminal is close to completion at Pangaon, Narayanganj, and the knitwear and fabrics hub near Dhaka. After the terminal becomes operational, the country's river route will be open for container transport.

1.9.5 Water Access⁴

Mongla Port is 131 km upstream from the Bay of Bengal, on the Pussur River.

⁴ A Study of Mongla Port's Strategic Development Options for the World bank, by AsafAshar, April 2010

Figure 1-7 provides a schematic depiction of Mongla's location and access channel relative to the Bay of Bengal.

In terms of navigation, the channel has three segments:

1.9.5.1 Open Sea (Outer Bar)

The first 40 km of Fairway is in the Bay of Bengal. This segment is a self-navigable channel, marked by a series of buoys. In the upper portion of it, there is a sand bar, an elevated area whereby the river drops its sediments, referred to as the Outer Bar. Water depth at the bar is about 6 m. Hence, ships drawing more than that must wait on anchor for the high tide, which might add 1.2 – 3.5 m of water to the channel depth. Accordingly, ships drawing 7.5 m can cross the bar in all seasons and up to 8.5 m during the wet season.

1.9.5.2 Hiron Point to Mongla (Inner Anchorages)

This is the main segment of the channel. The pilot station is at Hiron Point, located near a deep sheltered basin where ships can wait for pilot. The sailing from Hiron to Mongla, about 90 km, requires about 5 hours and usually takes place during the second tide cycle, since there are several shallow areas along the way. There is a second deep basin of about 17 m at Akram Point, about 20 km up-river from Hiron Point or about 60 km from the Fairway buoy Bay of Bengal.

1.9.5.3 Mongla Port

The upper segment includes the turning basin and jetties of Mongla Port. Ideally, this area is dredged to create a “berthing pocket” alongside the jetty, allowing continuous operations (cargo handling) of ships, regardless of the tide situation. Another area of interest, about 5 km south of the port, is a naturally deep basin of about 8.5 m, called Harbaria, used by clinker and other bulk ships for lightering to river barges. Because of its proximity to Mongla, and despite its shallower depth than Akram Point, shipping lines prefer Harbaria for lightering because of its closer location to Mongla Port.

To facilitate navigation, Mongla's Harbor Master publishes a table of permissible drafts in various segments of the river according to the hours of the day and respective tide. The permissible draft in the jetty area ranges from a low of 5.04 m to a high of 6.47 m. A clarification of terms is warranted here: depth relates to the bottom of the navigation channel while draft relates to the bottom (keel) of the ship. The difference between the two depends on the size of the ship and water conditions. In the relatively calm conditions of Mongla's channel, the difference should be about 0.5 m to avoid grounding. Depths are marked on the Navigation Map and usually are referred to as Chart Datum. The Chart Datum, in turn, usually refers to depth during the lowest tide.

The most restricting segment of Mongla's channel is that near the port, where ships have to stay during the cargo handling process and therefore cannot take advantage of the tide to reach the deeper segments of the river. The depth alongside Mongla's jetty restricts the size and respective capacity of ships presently serving Mongla. For example, Figure 3 presents the particulars of PIL's ship, Kota Ratina, deployed on the only container service presently calling at Mongla. As seen in this figure, this ship's full draft is 8.123 m. Hence, when this ship calls Mongla, she can only utilize 75% (6/8) of its carrying capacity. One option to eliminate this restriction is to deepen the channel. According to study by the Institute of Water Modeling, the deepening requires a combination of dredging, bank support structures and digging tidal basins. Another option is simply to encourage lines to deploy smaller ships.

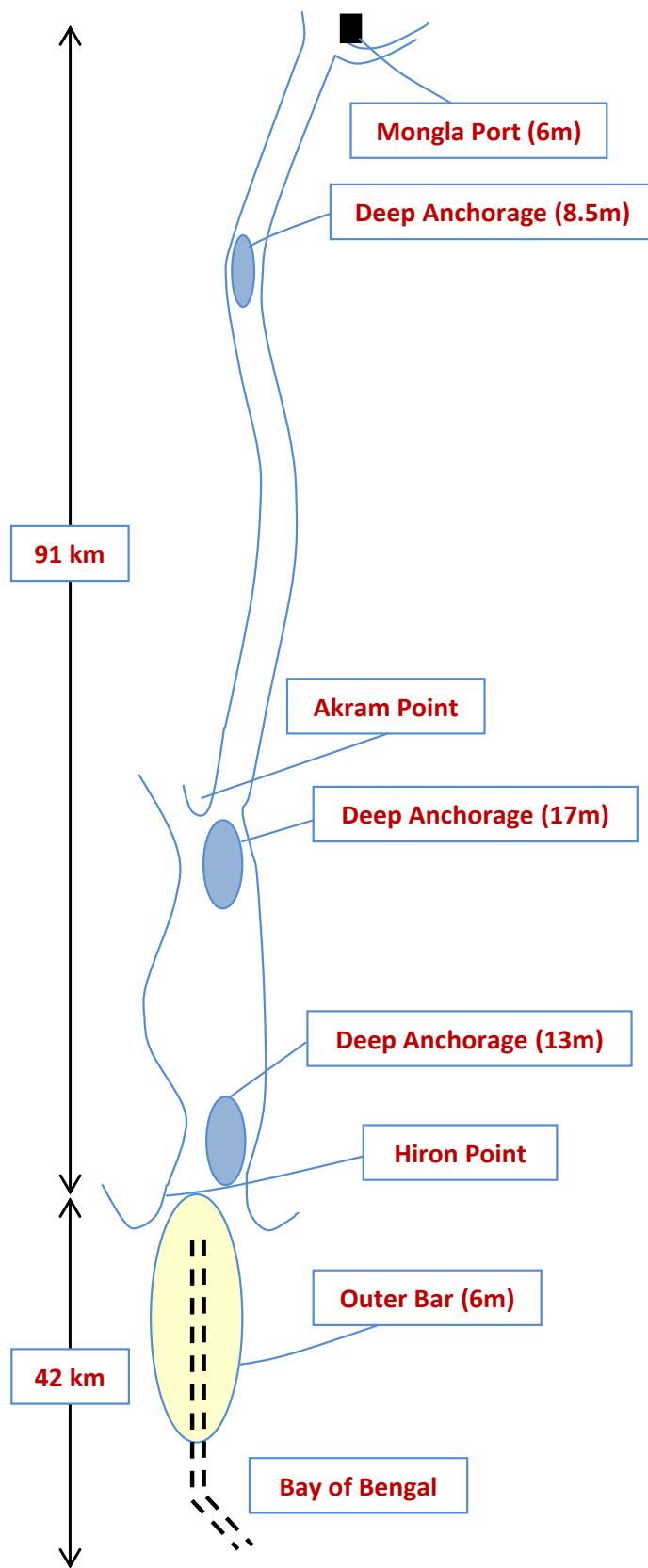
Both measures involve additional costs, however. Deepening the channel involves capital investments and maintenance costs by the Port; smaller ships are more costly to operate by shipping lines.

1.9.6 Land Access

Mongla's main road connection is with Khulna, the third largest city in Bangladesh with population of about 1 million. The 40 km road along the river to the north is in good condition, except for the last portion of it at the entrance to the port, which requires resurfacing. About 10 km north of the port, this road intersect with a road toward the proposed Padma Bridge through Mawa. The road to the Bridge is almost new and in a very good condition.

There is no rail connection in Mongla. The nearest connection is in Khulna. However, a rail connection between Khulna and Mongla is at an advanced stage.

Figure 1-7: Mongla Port's Channel



1.9.7 Port Throughput

The activities of Mongla Port can be divided into 2 types of cargoes:

- **Containers:** Mostly handled at the public jetty; and
- **Bulk:** Mostly handled at the anchorage and at private jetties.

The port has very limited cargo-handling activities of general cargoes, since almost all general cargoes have already been containerized. This is in line with a worldwide trend of containerization, which has been expanded to bulk cargoes such as wheat, sugar, coffee, etc. Most of the Port activity, both in terms of the number of ships and tonnage handled, has been related to bulk imports at the anchorage and private jetties. During year 2012, Mongla Port was called by 35 ships, or less than one ship per week. The nominal service frequency for general cargo ships is 8-10 days. The frequency increases to every 10 days or sometimes to weekly during the shrimp season (summer time).

It is observed that, the total number of containers handling in Mongla Port has increased in last few years. In year 2012, a total of 30,045 TEUs were handled by the port where it was 18,928 TEUs in year 2001. The following table provides statement of containers and containerized cargo handled in Mongla port from 2001 to 2012:

Table 1.2: Statistics of Containers and Containerized Cargo Handled in Mongla Port

Year	Number of Ships	Container ('000 TEUS)			Import ('000 tons)		Export ('000 tons)	
		Discharged	Loaded	Total	Machinery	General Cargo	Jute, Jute Goods and Others	Frozen Cargo
2000-01	47	9.54	9.39	18.93	0.85	17.58	87.67	25.15
2001-02	59	10.49	10.44	20.93	1.17	31.20	105.77	24.34
2002-03	65	11.73	12.01	23.74	0.32	26.01	122.16	23.25
2003-04	51	13.68	13.47	27.15	0.72	44.57	121.43	28.94
2004-05	46	12.99	12.66	25.65	0.32	58.03	94.00	34.50
2005-06	44	12.73	12.84	25.57	1.32	24.77	110.14	37.19
2006-07	47	12.55	12.79	25.34	0.85	18.71	107.19	41.61
2007-08	39	10.59	10.30	20.89	4.67	25.74	79.78	35.59
2008-09	47	10.44	10.76	21.20	0.76	24.54	78.97	38.11
2009-10	33	10.28	10.37	20.65	2.38	25.91	78.35	37.62
2010-11	44	13.70	13.42	27.12	2.70	70.65	98.94	39.14
2011-12	35	15.46	14.59	30.05	3.23	120.37	94.00	34.03

The major export commodity, handled in Mongla port, is Jute, Jute goods and others. For example, in year 2002, the Port handled 87,670 tons of jute and jute goods, which was 93,996 tons in year 2012. The frozen cargo exports have been increased since 2002, and remained almost unchanged during the last 4 years. The quantity of General Cargo Import through Mongla Port was raised in 2012 from previous year increasing more than 50,000 tons. Import of capital machineries was also at peak in year 2012 compared to previous years.

It is estimated that majority of the entire shrimp exports has been conducted through Mongla, about 70% of which destined to Europe and the rest to the US. Typically, the exported shrimps were farmed in the Khulna region. Jute export is about twice the volume (in TEUs) of shrimps. Clinker is one of the major components in Mongla port's general cargo imports for the local cement plants. The number has been increased in last few years due to regional infrastructural development projects. In the past, when food grain imports were controlled by the government, the government directed some food grain cargo to Mongla Port in addition to Chittagong Port. If Mongla attracts more traffic, the number of shipping service may increase and even ICD be developed there.

1.9.8 *Port Operations*

The port operation in Mongla Port is relatively efficient as revealed from shipping lines. Cargo loading and unloading normally starts immediately after ship berthing and continues until completion. The entire handling process takes about 40-50 hours including discharging considerable number of containers and loading the same. Cargo handling is normally performed by ship's gear/ derrick.

1.9.9 *Shipping Service Patterns*

The present service pattern of feeder service calling to Mongla Port is Singapore – Chittagong – Mongla – Singapore. Service to any other regional hubs is not available currently although service from Kolkata and Haldia were available previously.

2

LINKED PROJECTS

The connectivity to and from the Mongla Port is a critical factor for ensuring the feasibility of the proposed PPP terminal project at Mongla. The success and attractiveness of traffic for two jetties on PPP depends upon implementation of some of the key projects and obligations by the Government, which are termed as “Linked Projects”. In many cases, as illustrated in the picture, missing linked projects may make a project unable to provide the service for which it was intended⁵. In PPP projects, since the project needs to provide service, without which it cannot earn its revenues, it is important to ensure that all Linked Projects are implemented on a timely basis and the project is fully functional.

In order to expedite the development of a PPP project, it is imperative to identify the Linked Projects (associated public sector projects) during the feasibility stage. While the main PPP project will be implemented by the private sponsor, the Linked Projects will be carried out through the public sector by different entities under different ministries of the government. In most cases, a private sector project moves forward rapidly. On the other hand, the public sector projects take much longer time for implementation, primarily due to long approval process. This mismatch between the speed of implementation of the PPP project and its associated Linked Projects needs to be managed carefully, and if allowed to occur, could have setback on the project as a whole.

In this situation, the executing agency (MPA) will need to take steps for fast tracking the implementation of the Linked Project activities. PPP Office of the government will have an important role in the entire process, so that operation of the PPP project may not be delayed due to delay in associated public sector Linked Projects. The Linked Projects in public sector, vital for success of this PPP project are listed below:

Table 2.1: List of Linked Projects

Primary Linked Projects (Immediate)	Implementing Entity
Linked Project No. 1: Pussur River Dredging, by MPA: for entry channel deepening(Main channel improvement)	MPA
Linked Project No. 2: M-G Canal Dredging, by BIWTA: for facilitating opening up inland water ways from Dhaka to Mongla Port(IWT route improvement)	BIWTA

⁵ In the example shown, the bridge was expected to connect the transportation of goods and services between the left and right hand sides of the bridge. However, without its links, it cannot give its intended service.

Primary Linked Projects (Immediate)		Implementing Entity
Linked Project No. 3:	Dedicated Cargo Ferry service at Mawa ghat, by BIWTC: for smooth transportation of road cargo from Dhaka to Mongla(Road link improvement)	BIWTC
Linked Project No. 4:	Environmental Impact Assessment and Social Impact Assessment performed well in advance, for facilitating quick financing.	MPA
Linked Project No. 5:	Setup of grease/oil trap and waste reception facilities in the port area by MPA; for receiving the used oil and grease and preventing those to be thrown in the main channel	MPA
Secondary Linked Projects (Long Term)		
Linked Project No. 6:	Construction of Padma bridge across Padma river by BBA and approach roads by RHD	BBA/ RHD
Linked Project No. 7:	Rail Connectivity between Dhaka and Mongla by BR	BR
Linked Project No. 8:	Industrialization of Western Region with access to Gas and Power	PDB, Petrobangla
Linked Project No. 9:	Development of Coal Zone in the northern region of the country	Petrobangla/ other agencies
Linked Project No.10	Development of the Mongla Economic Zone	BEZA

The details of three primary linked projects that need immediate development are described below.

2.1 **Linked Project 1: Dredging of Pussur River**

Dredging of Pussur River is required for access of ships of 8.0 m draft. This is a critical factor for not only the two jetties, but also for the future of the entire Mongla Port. Unless sufficient vessels can reach Mongla Port, exporters and importers will have little confidence in their cargo reaching desired destination in time through Mongla Port. Therefore, it is imperative that the Pussur River undergoes a capital dredging for desired draft. At least 5 m depth dredging needs to be ensured and at some points *i.e.* in the Jetty front and Mooring Buoy Area, 7.5 m is required. The following table provides the dredging requirements of Pussur River:

Table 2.2: Dredging Requirements of Pussur River

Area No	Dimensions	Dimensions	Dredge Depth (m CD)	Estimated Volume (m ³)
A1	Sabur Beacon Turning Ground	400mx 400m/ 200m	5	260,000
A2	Jetty Front	915m x 50m	7.5	229,000
A3	Jetty Channel	915m x 150m	5	239,000
A4	Confluence Channel	4,235m x 200m	5	1,150,000
A5	Mooring Buoy Area	1,60m x 400m	7.5	1,900,000
A6	Base Creek Area	4,100mx200m	5	414,000

Total	4,192,000
--------------	------------------

Source: Tender Document - Harbor Area Dredging Contract, 2011

The Port authority has invited international companies for the work. Tender has been received by MPA in January 2013 and the evaluation is under process for allotting the work to the preferred bidder.

The salient features of the tender are as follows:

Name of Work:	Dredging in Pussur Channel and in Harbour area of Mongla Port
Quantity of dredging:	4,196,000 cubic meter (4.196 m cum)
Estimated Cost:	Tk. 1320,000,000 (Tk. 1,320 million)

It is expected that the tender will be awarded soon and the dredging work will be completed before the present PPP project comes into operation. The following table gives the cost estimate of dredging of Pussur channel and related work items.

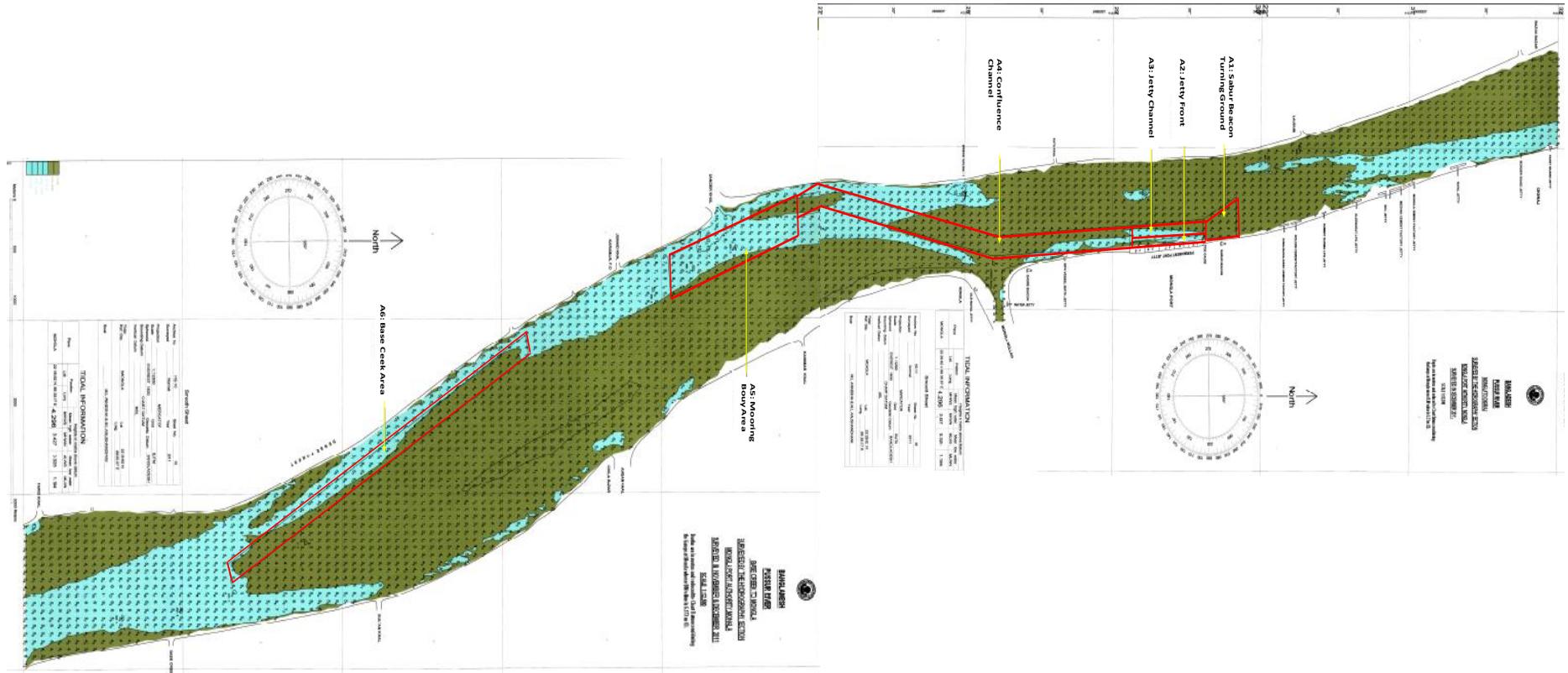
Table 2.3: Cost Estimate – Dredging of Pussur River

Item of Work	Unit (million m ³)	Amount (Taka million)
1. Monitoring by Hydraulics Expert.	L/S	12.0
2. Administrative cost.	L/S	1.0
3. Dredging at		
4. Sabur Beacon Turning Ground	0.26	76.7
Jetty front	0.23	67.6
Jetty Channel.	0.24	70.5
Confluence channel	1.15	340.4
Mooring buoy (M 5 to M.7)	1.90	560.5
Base creek to Anchorage A-4	0.41	122.1
5. Pre and Post Hydrographic Surveys	L/S	6.2
6. Earthwork for dumping compartment	E/W Mm ³	21.0
7. Block Allocation	L/S	0.4
8. Price Contingency	L/S	29.0
9. Physical Contingency	L/S	12.5
Total	4.20	1320.0

The overall unit cost of dredging in Mogla Port and Pussur channel come to Tk. 314 per cum.

The layout of dredging areas is shown in Figure 2-2.

Figure 2-2: Pussur Channel showing Proposed Area for Dredging



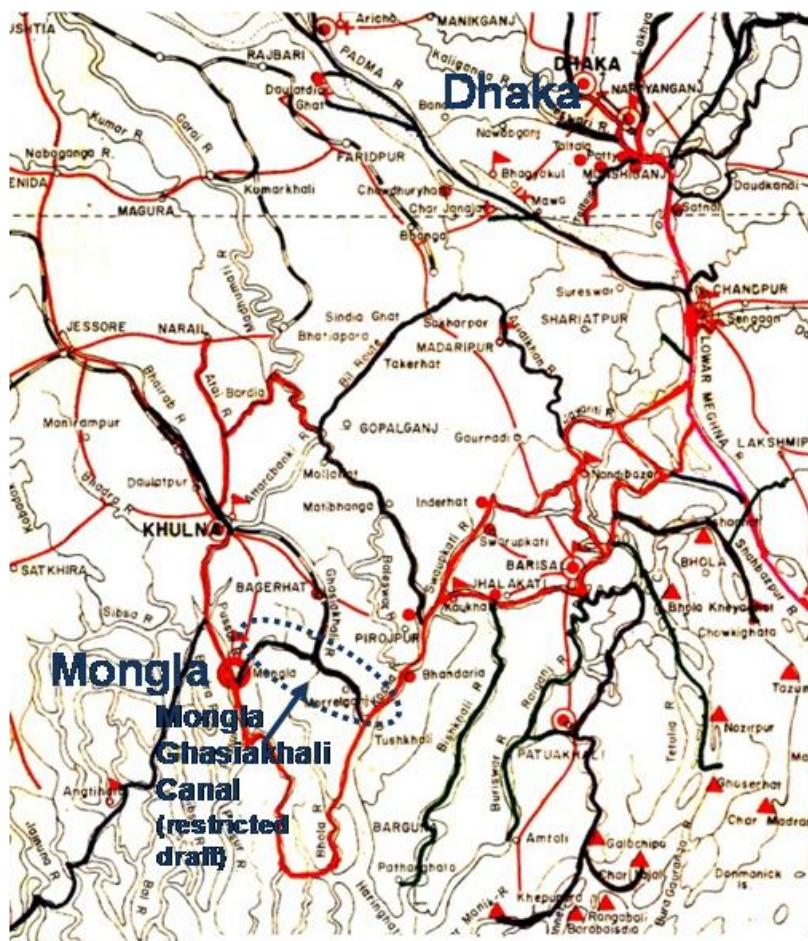
2.2 Linked Project 2: Dredging of Mongla-Ghasiakhali Canal

The main waterway route from Dhaka to Mongla Port (around 297 km) is currently closed due to siltation in the Mongla-Ghasiakhali (M-G) and its nearby approach canals (length 30 km. depth: Low tide 1 to 1.5 meter). This clogging has caused closing off the river route from Mongla to Dhaka.

Currently, a detour is used by vessels via Sundarban Bogi canal. However, the Forest department imposes restrictions in using the Bogi canal due to possible environmental concerns to the Sundarbans. Therefore, MG canal needs to be dredged to achieve at least Class I Level route (3.5m depth) in the canal for developing better waterway access to the Mongla Port.

This dredging is necessary for the PPP Project to be attractive. The following picture shows the path and location of the silted area:

Figure 2-3: Mongla to Dhaka River Route



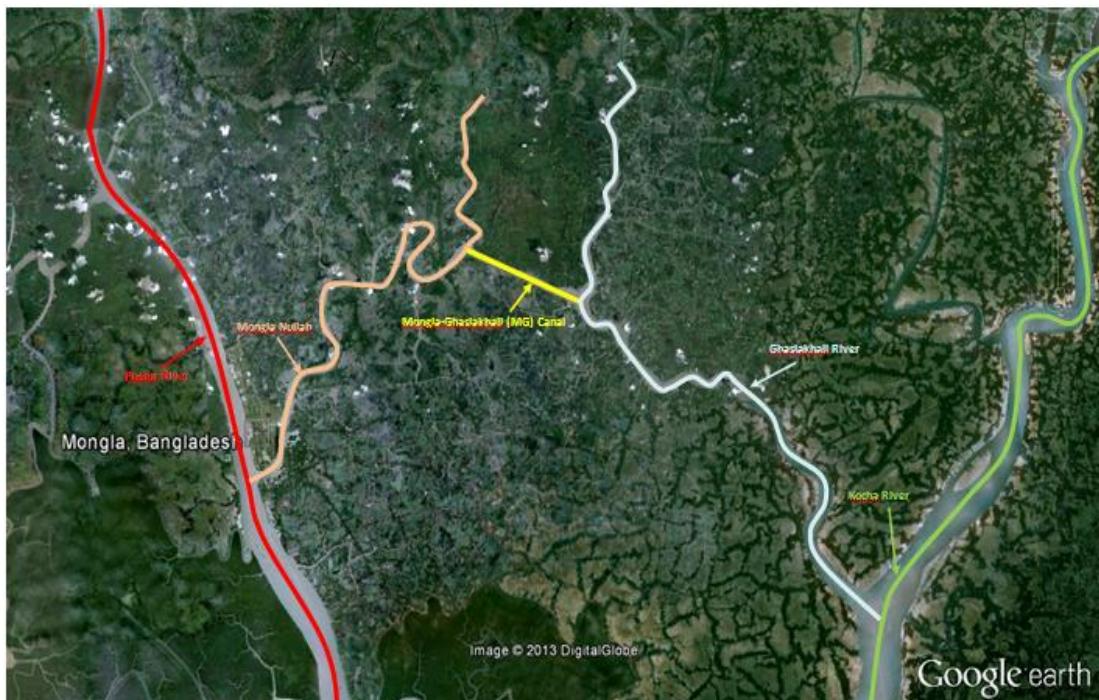
2.2.1 Options for Making M-G Canal Navigable

The total length of the Mongla-Ghasiakhali Canal is 6.5 km. It is a man-made canal built in the seventies by the Government. The water route of Mongla River to Ghashaikhali River is about 30 km. The silted waterways is about 10 km, having 0.5 m draft only, in low water. At the time of high tide, the channel gets upto 2.5 m of draft, when some vessels pass the canal. This silted portion of the route needs to be dredged. In the absence of this route, the existing inland vessels have to ply additional 60 km of waterways via Sundarbans to reach

Mongla.

Mongla-Ghasiakhali canal is very important navigation route for passage of inland water vessels plying from Dhaka to Mongla. Presently this canal has been silted up and inland river navigation is hampered. For getting more cargo traffic from Dhaka to Mongla Port, revival of this canal is very important, especially after commissioning of the Pangoan ICT by May 2013. The picture below shows the M-G route to the port.

Figure 2-4: Water route of Mongla river to Ghashaikhali river including M-G canal



A study conducted by CEGIS, Dhaka has suggested that the dredging of this canal will not be sustainable under the present condition of empoldering of surrounding areas, and blocking of free flow of tide water. However, the Ministry of Shipping is serious and eager to open up this waterway, to avoid longer alternate water route through the Sundarbans, which is hampering natural ecology of the Sundarbans.

In recent past, BIWTA started dredging this MG Canal, for an estimated quantity of 3 million cubic meters at an approximate cost of Tk 170 /cum. A dredging company was hired by BIWTA, to dredge the channel with three dredgers. However, it was observed that the rate of dredging silt was not enough to retain the anticipated draft of 3 m, due to higher rate siltation. Therefore, the project was abandoned after dredging 0.2 million cubic meter silt. It is observed that the rate of siltation is higher than the rate of removing sand from the bed, in those areas. Moreover, higher rate of siltation may cause spoil dumping difficulties due to enough space required for it. It may be noted that an area of about 500 meter width along the MG canal is owned by BIWTA, which makes the spoil management easy for dredging activities. However, a hydrographic survey is needed to find the exact siltation locations and mechanisms for silt removal.

A brief study was carried out by the Consultant for a sustainable solution of maintaining the navigability of the mentioned route. There are three options for achieving the target of uninterrupted river traffic flow in Mongla-Ghasiakhali waterway. These are:

- (a) Dredging
- (b) Navigation Lock, and
- (c) Tidal River Management (TRM).

(a) Dredging:

2.2.1.1 By the Government:

Maintenance of waterways is the responsibility of BIWTA. The dredging of water route of Mongla River to Ghasiakhali River (30 km) may be carried out by BIWTA. The dredging activities may be done by BIWTA itself or by outsourcing a party by tendering. Initially, BIWTA may conduct a hydrographic survey, find siltation location and siltation rate, calculate the volume of dredging required, estimate the cost and establish a toll rate etc.

A regular maintenance dredging has to be carried out after completion of the capital dredging. Both Capital dredging and maintenance dredging may be done either by BIWTA or by outsourced party. Schedule of Maintenance dredging is subject to rate of siltation. It may be once or twice a year.

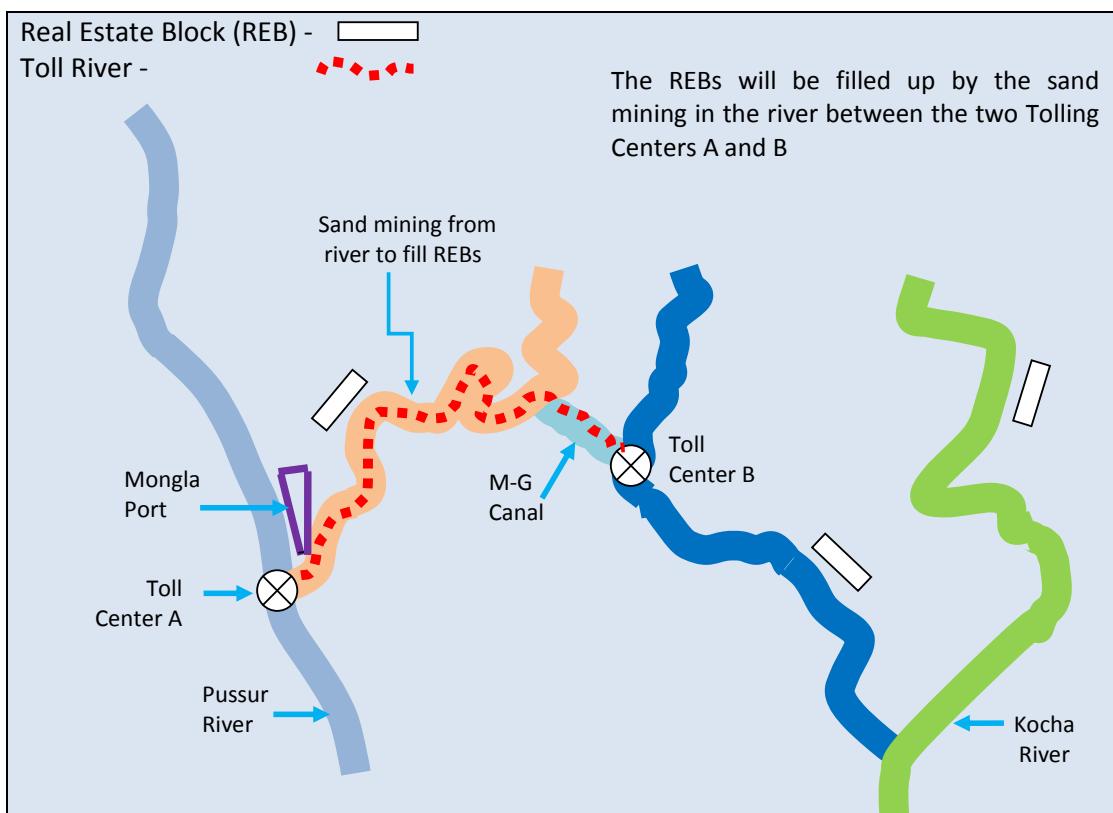
2.2.1.2 Through a Toll River and Mining Sand PPP:

Dredging of the aforesaid water route can also be implemented under PPP through Toll River and Mining Sand (TRAMS) project. A private investor may be selected through a tendering process by the authority to handle both capital and maintenance dredging for a stipulated term, for example 20 years under a TRAMS concession. The investor will be responsible for conducting maintenance dredging once/twice a year, and ensure Class 1 river depth (3.5 m) throughout the year. The other features for good maintenance of a river, such as bank management will also be a part of the investor's obligations under the concession agreement. They will estimate the cost for the required dredging volume and establish a toll rate for the users of the river. There will be tolling stations at the two ends. Considering the economic benefit of the country and accelerating MPA's trading business from Dhaka to Mongla, the improvement of the navigability of the Mongla to Ghasiakhali river route is of fundamental importance. It is noteworthy that in a recent study, CEGIS has concluded that the rate of siltation in this stretch of river is very high and it may not be feasible to dredge the river as it is likely to fill up again within 2 to 3 months.

However, a stretch of river with a perennial source of silt can be a boon, rather than a bane⁶. It is important to realize that silt can be an important economic resource. In Bangladesh, it serves two basic purposes. The first is for use as aggregate for the construction of buildings and civil structures. The second is for use as dredge filling material to create residential or industry grade land. Example of dredge filling to create high value land is the Uttara residential area expansion in Dhaka adjacent to the beri bund. The sand carriers and their sand-slurry pipes can be seen crossing under the beri bund road. The sand-slurry pipe technology is now well developed/understood in Bangladesh and sand can be deposited with pin-point accuracy for developing a certain area of land.

⁶ It is understood that the high siltation rate at this stretch of river may be because it is located at the tidal meeting point. At this point, the velocity of the water in the river is low (or zero) and hence there is excessive dropping of silt.

Figure 2-5: Toll River and Sand Mining PPP Project



In a TRAMS PPP project, it is envisaged that the investor will have two sources of revenues. The first one will be to charge the container carrying barges⁷ plying between Dhaka and Mongla port. The second will be from the sale of silt to real estate developers who will develop real estate blocks (REBs) at designated spots beside the river or some economic distance from it. The adjacent schematic shows the concept of a toll river in combination with sand mining for the development of REBs. The REBs will consist of small townships where residential plots are sold, in a manner similar to the townships around Dhaka city. The REBs may also include the development of economic zones for enhancing the industrial growth of the country. Both are cash rich activities and it is likely that with these two revenue streams, a PPP investor can be attracted to a toll river cum sand mining PPP project along the Mongla-Ghasiakhali river route.

It is suggested that a pre-feasibility study be carried out to evaluate the technical and commercial aspects of the project.

(b) Tidal River Management:

Tidal River Management (TRM) involves taking full advantage of the natural tide movement in rivers. During flood tide, tide is allowed to enter into an embanked low-lying (tidal basin) where the sediment carried in by flood tide is deposited. During ebb tide, water flows out of the tidal basin with greatly reduced sediment load and eventually erodes the downstream riverbed. The natural movement of flood and ebb tide into the tidal basin and along the downstream river maintains a satisfactory water depth in that river.

The adaption of tidal basin will increase flow velocity due to increase of tidal volume.

⁷ and other major rivercraft

However, maintenance dredging will also be required to maintain proper navigation depth and to guide the increased flow through the navigation channel.

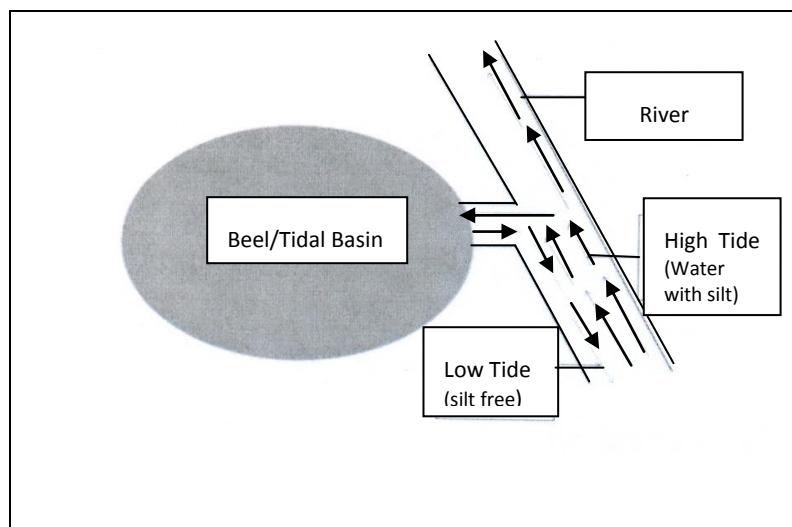
The main principle for the improvement in navigability is to maintain a uniform, deep channel by concentrating the tidal flow. The most common option of developing navigability of river is dredging. That has an immediate benefit, but in some cases, it becomes prohibitive due to short-life arising from high rates of siltation. In addition, for long-term sustainable solution, introduction of engineering measures like sheet piling, guide bunds, bank revetment and TRM may be considered.

As another option, for overcoming siltation problem of Mongla-Ghasiakhali water route, the tidal river management in combination with canalization has been suggested. The construction of tidal basin will generate increased tidal volume and due to the increased tidal volume, the flow velocity in the navigable channel will be increased and will deepen the channel sufficiently to navigate vessels/cargos through the route.

Before TRM operation, the critically silted stretches of the river needs to be de-silted by capital dredging and manual excavations to increase the drainage capacity otherwise TRM will not be effective. The figure below shows the conceptual model of TRM. The functional mechanism of the TRM is as follows:

- Tidal prism of the river is calculated.
- Then comparison is made between the existing tidal prism and the required tidal prism to maintain the design cross-section.
- A beel/ tidal basin with adequate volume to accommodate the tidal prism is selected.
- Design and construction of link canal.
- Finally connecting the beel/ tidal basin to the river through the link canal.

Figure 2-6: Conceptual Model of Tidal River Management (TRM)



(c) Navigation Lock:

A lock is a system for raising and lowering vessels and cargos between stretches of water of different levels on river and canal waterways. The distinguishing feature of a lock is a fixed chamber in which the water level can be varied. In a caisson lock, a cargo lift, or on a canal inclined plane, it is the chamber itself that rises and falls.

Locks are used to make a river more easily navigable, or to allow a canal to take a reasonably direct line across land that is not level.

In addition, a pound lock is a type of lock that is used almost exclusively nowadays on canals and rivers. A pound lock has a chamber (the pound) with gates at both ends that control the level of water in the pound. In contrast, an earlier design with a single gate was known as a flash lock.

For arriving at estimated cost for each option, further studies and investigations will be required, which is not the scope of this assignment.

2.3 Linked Project 3: Improving the Ferry Service at Mawa

Presently, there is no direct road route from Mongla to Dhaka to lack of bridge in the river Padma. The traffic towards Mongla and southern parts from Dhaka needs to cross the river Padma through ferry at Mawa Ghat. The proposed linked project under PPP will improve the road route from Mongla to Dhaka. The distance is approximately 225 km.

However, this ghat is a general purpose terminal with a significant volume of inland passengers and cargo traffic. It is not suitable for catering export-import traffic unless a dedicated inland container terminal is constructed.

2.3.1.1 Implementation by Government

The linked project may be implemented by Bangladesh Inland Water Transport Authority (BIWTA) and dedicated container ferry may be provided and operated by BIWTC. This project will need some approach roads to be built and maintained by Roads and Highways Department (RHD).

Essential components of this project and indicative costs are provided below:

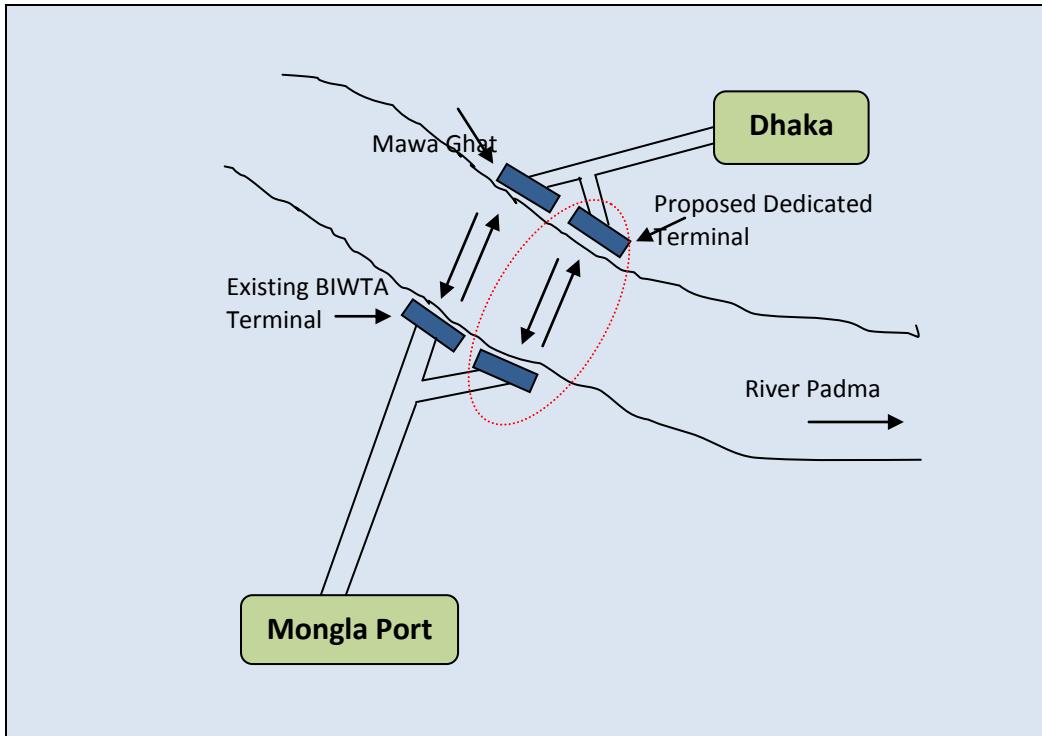
- a. Develop special ferry-ghat with facilities for Container Cargo at two sides of Mawa Ghat : @ Tk. 50 lac x 2 = Tk. 10.0 million (By BIWTA)
- b. Special Pontoons for dedicated Ferries at two sides of Mawa Ghat :@ Tk. 1.0 crore x 2 = Tk. 20.0 million (By BIWTC)
- c. Two Dedicated Ferries for Container Cargo only at Mawa Ghat @ Tk. 40.0 crore x 2 = Tk. 800.0 million (By BIWTC)
- d. Approx. 5 km approach road on each side of the new ferry ghat: @ Tk. 1.5 crore x 10= Tk. 150.0 million (By RHD)
- e. The total cost of the project will be Tk. 1020 million.

Preliminary indicative estimates have been prepared on best assumptions. However, this needs further detailing and further investigations for more accurate costs and engineering details.

2.3.1.2 Implementation under PPP

This linked project may also be implemented under a PPP model. Private investor will be responsible for setting up a dedicated ferry terminal for container cargo from/to the Dhaka region. Investor will also procure an appropriate number of ferries, construct access roads to the ghats and set up special pontoons. Investor will collect ferry charges from importers and exporters who use the dedicated ferry to transport covered vans or container trucks.

Figure 2-7: Dedicated Ferry Service at Mawa



Implementation of the project through PPP will remove some of the problems associated with the project if implemented by Government such as extensive coordination between various Government agencies (BIWTA, BIWTC, RHD etc.)

2.4 **Linked Project 4: Environmental Impact Assessment and Social Impact Assessment**

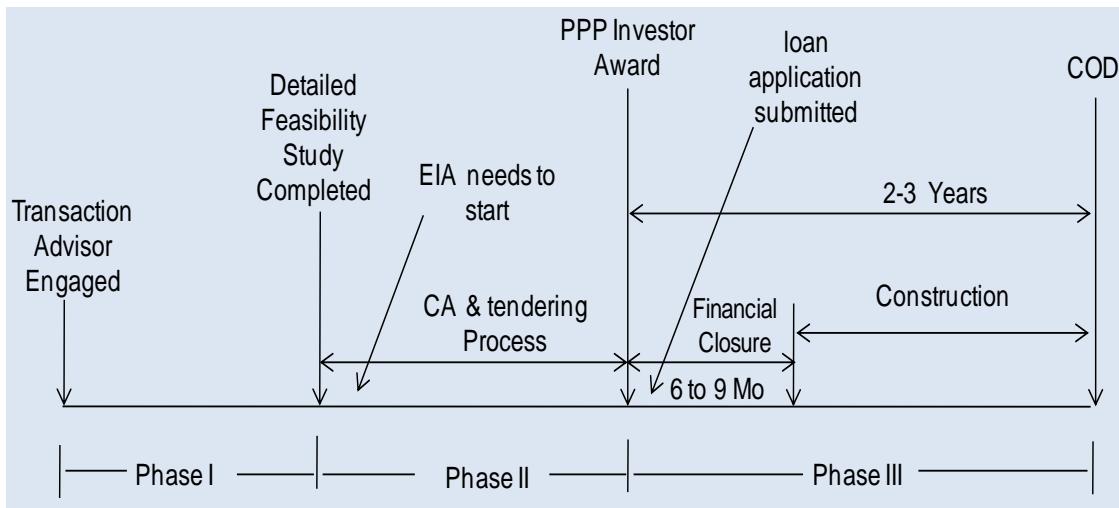
The Environmental Impact Assessment (EIA) and Social Impact Assessment (SIA) is a systematic, well-documented and multidisciplinary procedure, where the direct and indirect impacts of a project are identified on different environmental and social factors such as soil, water, air, climate, landscape, cultural heritage, flora and fauna, human beings and also interactions among these various factors.

There is a need to conduct two EIAs in this project. The first EIA (called E1) will be for the environmental impacts from the PPP project. Although it should be carried out by the PPP investor, as explained later in this section, it should be started by the Government as early as possible in order to prepare a quality EIA and enhance the chances for financial closure.

The second EIA (called E2) needs to cover the dredging project in the Pussur River and the jetty heads. E2 may also cover the linked projects number 2 and 3. E2 will need to be carried out by the Government.

The following figure depicts three phases in a transaction of a PPP project and the appropriate timing for initiating EIA preparation in a PPP project (E1).

Figure 2-8: Initiating EIA in a PPP Project



Under the present practice, an investor in a PPP project is expected to carry out the EIA preparation. In phase I, feasibility study is carried out and in phase II, concession agreement (CA) preparation and tendering are carried out by the Executing Agency (EA). At the end of phase II, the project is awarded to the Terminal Operator. After the award, the Investor needs to usually achieve financial closure within 6-9 months and COD within 2-3 years time as per the terms of the CA. The borrower has to carry out EIA (which is pre-requisite for IPFF financing). However, within the limited period of 6-9 months, Investor cannot carry out a quality EIA (and SIA) along with other formalities for achieving financial closure. As is well known, the EIA itself may require more than a year after engagement of consultant. If EIA (and SIA) has to be done within the financial closure period, this period needs to be at least 1 ½ years. However, currently in Bangladesh, Executing Agencies do not allow such a period for financial closure. The result is that poor quality EIA (and SIA) is prepared by the Investor and this leads to delay in financing from lenders.

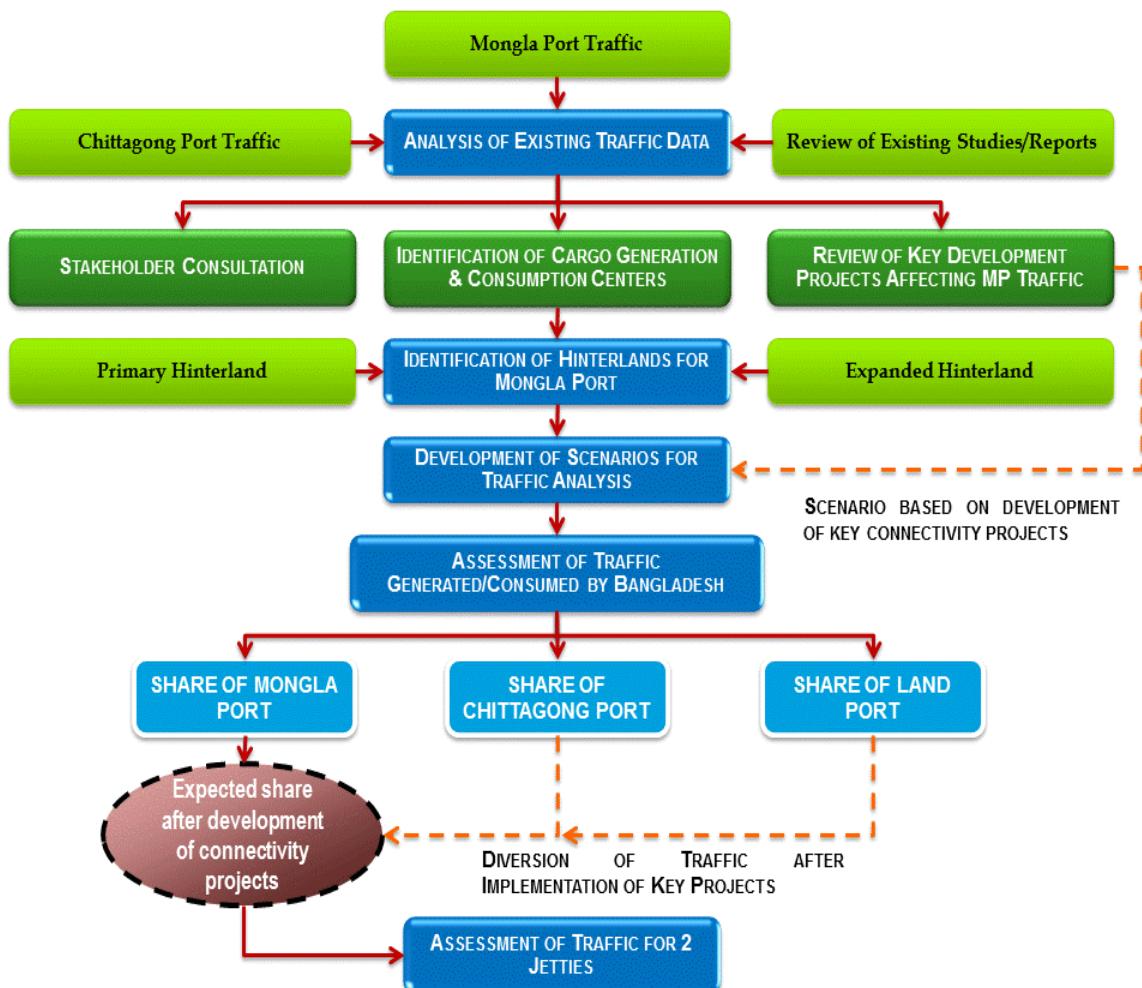
In order to have sufficient time, the EIA has to be initiated just after the Feasibility Study is completed. The Executing Agency, possibly supported by the IPFF project, may prepare the EIA and take the project forward till the project is awarded to the Terminal Operator. Either before or soon after the award, the EIA can be completed and the loan application to IPFF may then include a good quality EIA. This will decrease the time for approval of the loan.

3 TRAFFIC ANALYSIS

3.1 Traffic Analysis and Projection Methodology

This chapter presents an overview of the techniques employed for projection of traffic for the Mongla Port as well as new proposed project for up to 30 years after commencement of operation. Different approaches have been employed depending on the type of commodities to obtain an objective estimate which is then suitably qualified to take into account subjective factors. In order to determine the potential of each cargo centers, a desk based research was undertaken initially and then the traffic analysis began with analysis of existing data/information collected from Port Authorities (Mongla and Chittagong), stakeholders and information available in public domain. Subsequently, stakeholder consultation were undertaken to understand the growth potential of major commodities handled at Mongla Port and key bottleneck affecting the traffic growth for Mongla Port as well as the proposed project. The methodologies used for analysis and projection of potential traffic for new project is presented in the exhibit below.

Figure 3-1: Methodology for traffic projection



3.2 Analysis of Existing Traffic

After collection of data/information from various sources, the trend of existing traffic flow

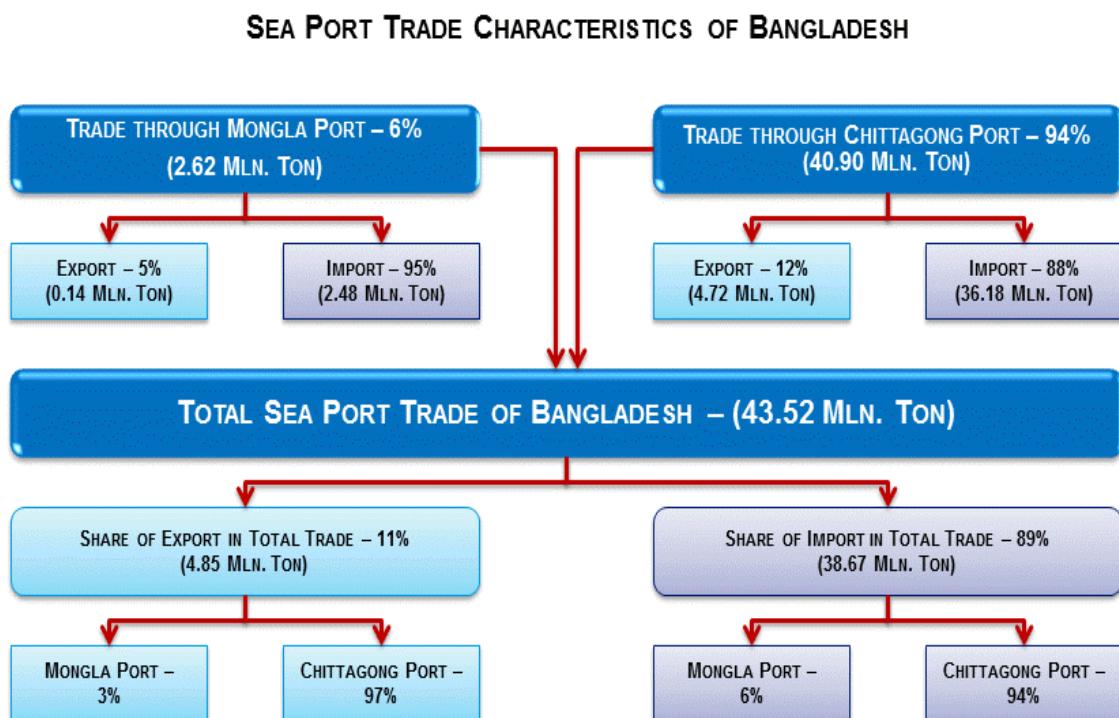
currently handled at Mongla & Chittagong Port has been analyzed. The growth, profile and share of each of the commodities handled at both the ports have been assessed. Brief analysis of overall sea borne trade is discussed below.

3.2.1 Total Sea Borne Trade of Bangladesh

There are two sea ports in Bangladesh, Chittagong Port and Mongla Port. Total cargo handled by these ports was 43.5 million tons during 2011-12. Out of total sea borne trade, import accounted for around 89% and export accounted for only 11%.

The country's import and export has been growing by 15% per annum most of which is being done through the Chittagong port. Currently, Chittagong Port handles around 94% of the total sea borne trade and rest is handled at Mongla Port. The sea port based traffic characteristics of Bangladesh are summarized in the exhibit below.

Figure 3-2: Sea Borne trade of Bangladesh



Source: Deloitte/IIFC Analysis

3.2.2 Trade through Chittagong Port

Chittagong Port is the principle sea port of Bangladesh handling about 94% (40.90 million tons) of total sea borne trade of the country. Out of total sea borne trade handled at Chittagong port, import account for 88%. In recent years, neighboring countries, such as India and China, have looked to the Chittagong port city as a future gateway to landlocked southern Asia, including northeast India, Bhutan, Nepal, southwest China and parts of Burma etc. Chittagong intends to emerge as a regional economic hub in South and East Asia, and is undertaking various megaprojects, including a deep sea port.

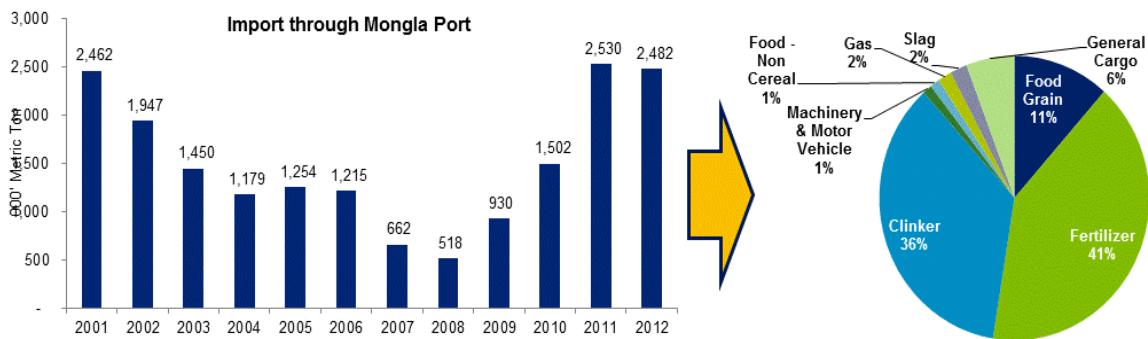
Chittagong Port is considered the heart of the economy of Bangladesh. The geographic location of this port creates the opportunity of easy and cost-effective foreign trade to be carried out through this port with all the South Asian countries as well as other Asian countries. Based on the trade statistics provided in the exhibit above, it can be concluded that it is the most preferred port of Bangladesh for handling sea borne trade. Some of the key reasons for this are:

- It is closer to major cargo generating centers i.e. Dhaka & Chittagong
- Availability of containers on time
- Better connectivity of the port through road, rail and waterways
- Availability of required infrastructure facilities (stack yard, container depot, processing area)

3.2.3 Trade through Mongla Port

Mongla Port is the second largest port of Bangladesh; during 2012, it handled around 2.6 million tons of sea borne trade. Out of total trade, import accounted for maximum around 95% of the total traffic, which is usually bulk or breaks bulk. Some of the major commodities imported include food grain, clinker, Slag, fertilizer, Gas, Machineries and Motor Vehicles etc. Food grain, fertilizer and clinker are the major commodities handled at Mongla Port, together account for around 90% of the total import. There has been increase in import during the last 5 years, majorly because of increase in import of food grain, fertilizers, clinker and general cargo. The import growth during the last 5 year was around 30% per annum, which is higher than that import growth at Chittagong Port. Some of the key factor attributing to increase in import traffic is because Government of Bangladesh has mandated import of some specific commodities through Mongla Port. Import through Chittagong port has grown at the rate of 8% per annum and total sea borne import increased at the rate of 9% per annum. Total import traffic and type of traffic handled at Mongla Port during last 10 years are given in exhibit below.

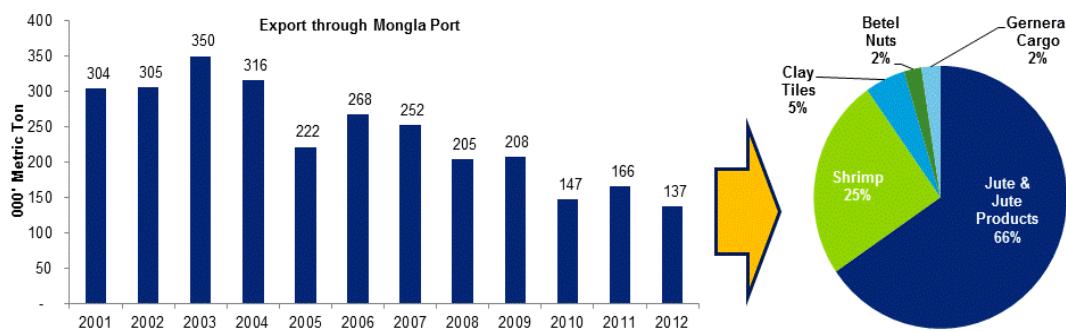
Figure 3-3: Import through Mongla Port



Source: Mongla Port Authority

The share of export is only 5% of the total traffic handled at Mongla port. Some of the major commodities exported include jute, jute products, frozen food/shrimps, clay tiles, betel nuts etc. Most of the exported commodities are handled in containers. Jute, jute products and shrimps accounts for over 90% of total export. There has been continuous decline in export traffic at the Mongla Port since 2003 because of various physical constraints. The export traffic has shown negative growth of 8% per annum in the last 5 year. While there has been increase in export traffic at the rate of 7% per annum at Chittagong port and around 6% of the total sea borne trade of Bangladesh. Total export traffic and type of traffic handled at Mongla Port during last 10 years are given in exhibit below.

Figure 3-4: Export through Mongla Port



Source: Mongla Port Authority

The export growth of sea borne trade through Chittagong port has been quite close to the sea borne export of Bangladesh because over 97% of export traffic is handled through Chittagong port. At the same time export traffic growth at Mongla Port has shown negative growth during the same period because of various reasons such as:

- Insufficient draft in the Pussur channel - low frequency of ships calling at Mongla Port
- Lack of efficient connectivity with major industrial centers
- Low industrialization in the hinter land such as Khulna, Rajshahi, Rangpur etc.

Currently, Mongla Port has a handling capacity for around 6.5 million tons of cargo however it is handling only about 1.6 million tons for the year 2011-12. This is about 24% of the total capacity. The under-utilization of the Port is because of the above constraints.

3.2.4 Foreign Hinterland

In addition to these two ports, there are around 17 land ports along the Bangladesh border. These ports are used for handling trade with neighbouring countries such as India, Nepal, Bhutan & Myanmar. The total traffic handled through land ports is quite low as compared to sea borne trade. Very limited number of commodities is handled through Land ports. These land ports are connected mainly through road network from major industrial centers of Bangladesh.

3.3 Review of Existing Reports/Studies

The Government of Bangladesh has carried out a number of studies to improve the performance of the Ports in Bangladesh. Earlier reports made available to us by the Mongla Port Authority include Port Upgradation Project (1998), Master Plan and Trade Facilitation Study, Mongla Port Area Development Plan, etc. All these reports and other available material, like the industry perspectives on jute, food grains, cement/clinker, fertilizers, etc. have been studied and reviewed. The main objective of this exercise has been to understand the potential of major commodities handled at Ports, key constraints at the ports, methodologies adopted for traffic forecasting and review of forecasts made in the different reports.

3.4 Stakeholder Consultation & Primary Data Collection

In order to determine the potential of each cargo belt and commodities traded, a desk based research was undertaken initially. Subsequently, various stakeholders were identified, shortlisted and contacted for detailed interaction. The key agenda of the stakeholder's consultation was to understand their perspective on development of Mongla Port, potential

of each of the commodities traded in Bangladesh, key constraints at Mongla Port, likely scenario of traffic growth of various commodities etc. Some of the key stakeholders interacted includes:

- Exporters
- Importers
- Port authorities
- Chambers of Commerce and Industries
- Shipping companies
- Clearing & forwarding agents
- Freight forwarders
- Export promotion bodies



3.5 Identification of Hinterland for Mongla Port

The competitive position of a port is largely dependent upon the quality and reach of its hinterland connections. In order to identify the different market segments for generation and consumption of cargo, the entire hinterland has been divided into three different cargo generation belts. The methodology used for selection of major cargo generation centers of Bangladesh is described below.

3.5.1 Major Cargo Generation/Consumption Centres in Bangladesh

Bangladesh is divided into seven major administrative regions called divisions. Each division is named after the major city within its jurisdiction that serves as the administrative capital of that division. These divisions are further divided into districts. These divisions are the key cargo generator as well as consumer of sea borne cargo. The population and key industrial activities of these divisions are highlighted in the exhibit below.

Figure 3-5: List of industrial clusters and cargo generation centers

Name of Divisions/Clusters	Population (2011)	Key Industrial /Economic Activities
Khulna	15,563,000 (11%)	Raw Jute, Jute Products, Shrimps/Fish, LPG, Clay Tiles, Cement, Betel Nuts, Tobacco,
Barisal	8,147,000 (6%)	Fish, Betel Nuts,
Rajshahi	18,329,000 (13%)	Jute, Textile, Agriculture , Power
Rangpur	15,665,000 (11%)	Jute, Tobacco, Agricultural,
Dhaka	46,729,000 (33%)	Textile, Garments, Leather Products, Food Processing,
Sylhet	9,807,000 (7%)	Natural Gas, Tea, LPG, Fish
Chittagong	28,079,000 (20%)	Jute Goods, Frozen Food/Shrimps, Textile, Garments, Leather Products, Tea, Chemical , Oil Refineries, LPG

For the purpose of analysis of key cargo generation for export and consumption center for import, these seven divisions have been considered. These seven divisions are grouped into 3 major clusters/cargo generation & consumption centers which contributes majority of cargo for sea borne trade. The names of divisions covered under each of the clusters are given in the exhibit below.

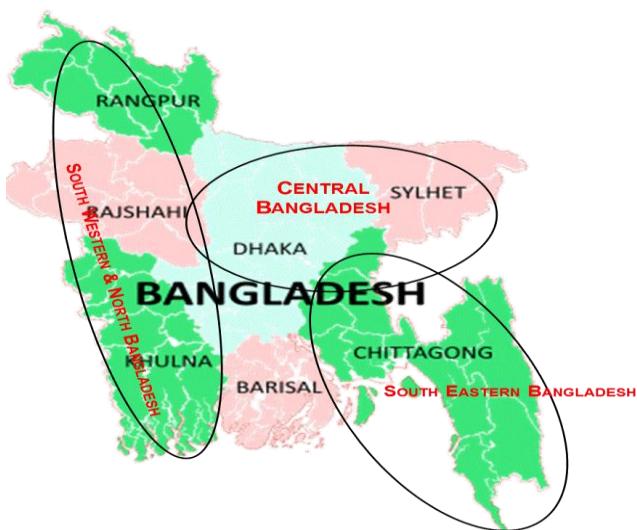
Figure 3-6: Major cargo generation and consumption centers in Bangladesh

Name of Clusters	Divisions Covered	% Contribution to Trade
Central Bangladesh	Dhaka, Syhlet	60-70%
South Eastern Bangladesh	Chittagong	20-30%
South Western & North Bangladesh	Khulna, Barisal, Rajshahi, Rangapur	10-15%

Source: Stakeholder Consultation, Deloitte/IIFC research

3.5.1.1 Central Bangladesh - Dhaka & Surrounding

This is the largest cargo generation and consumption centers for various type of cargo. This cargo center accounts for around 60-70% of the total trade of Bangladesh. Dhaka is the commercial heart of Bangladesh. With around 15 million inhabitants, Dhaka is now the eighth-largest city in the world, projected to become the third-largest by 2020. Dhaka is located in the center of Bangladesh and is accessible from across all locations in the country. The city has a growing middle class population, driving the market for development of industries and is a consumption center of various goods



imported from outside countries. The main commercial areas of the city include Motijheel, Dilkusha, Paltan, New Market, Shahbag, Gulshan, Mohakhali, Karwan Bazar, Farmgate, Tejgaon and Hazaribagh etc. Currently, there are 3 Export Processing Zones located in and around this center.

The key divisions considered for the purpose of traffic analysis include Dhaka and surrounding and Sylhet.

Because of the geometry of the port system as an “equilateral triangle”, with Dhaka at the apex, both seaports consider themselves to be in favourable positions to serve the greater Dhaka area. In particular, all the other things being equal, as already mentioned, Mongla Port is significantly closer to Dhaka than Chittagong. Although distance between Dhaka and Mongla is less than Chittagong but currently, majority of traffic generated from Central Bangladesh is handled at Chittagong Port, because there is no direct connectivity to Mongla Port.

3.5.1.2 South Eastern Bangladesh

Chittagong is the main seaport and second largest city of Bangladesh located in southeastern Bangladesh. It is one of the fastest growing cities in the world. A commercial and industrial hub, Chittagong is home to many of the largest and oldest corporations in Bangladesh. Major industrial centers in the South Eastern Bangladesh are Chittagong and surrounding regions. It is the second largest industrial center of the Bangladesh after Dhaka. It accounts for over 20-30% of the total trade of Bangladesh. The main industries located in this region are garments, leather goods, jute mills, oil refinery, cement manufacturing, food processing, textile, shipping, tea, automotive industries etc. The entire cargo generated in the South Eastern Bangladesh is handled at Chittagong Port as it is the closest port.

3.5.1.3 South Western & North Bangladesh

Like other big cities of Bangladesh, notably Dhaka and Chittagong, Khulna is undergoing a major transformation, due to its immensely growing population and its status as Bangladesh's third largest city. Because of its strategic location of being only 45 km from the port of Mongla, Khulna is considered as a port city like Chittagong. Khulna is known as the city of shrimp, because 75% of shrimp exported from Bangladesh are cultivated in the Khulna zone. It is also known for its lobster, prawn, catfish, and crab. Khulna has some heavy and medium industries like Khulna Hardboard Mills, Bangladesh Oxygen Company, Khulna Oxygen Company, Platinum Jubilee Jute Mills, Star Jute Mills, and Khulna Ship Yard Ltd.etc.

In addition to Khulna, we have considered divisions such as Rangpur, Rajshahi, and Barisal as part of South Western & North Bangladesh cargo generation/consumption centers. Rangpur is one of the major cities in Bangladesh, it is a land of agriculture. Several agricultural products are the major driving power of the economy of this district such as rice, jute (called the golden fiber of Bangladesh), wheat, tobacco, potato etc. Rajshahi division is a district in north-western Bangladesh.

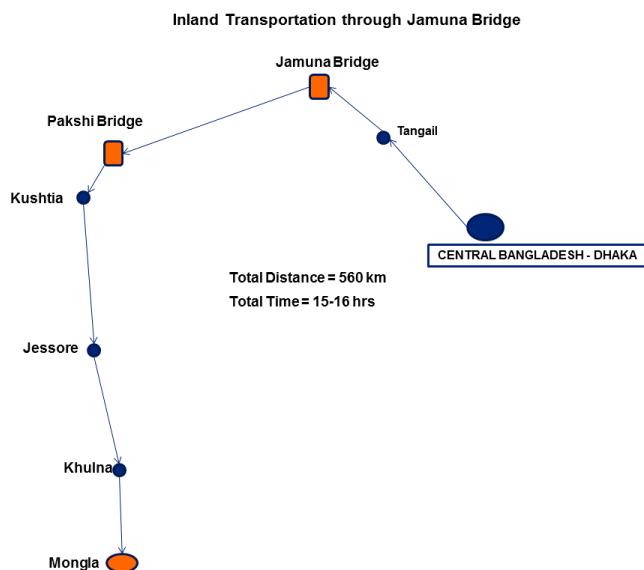
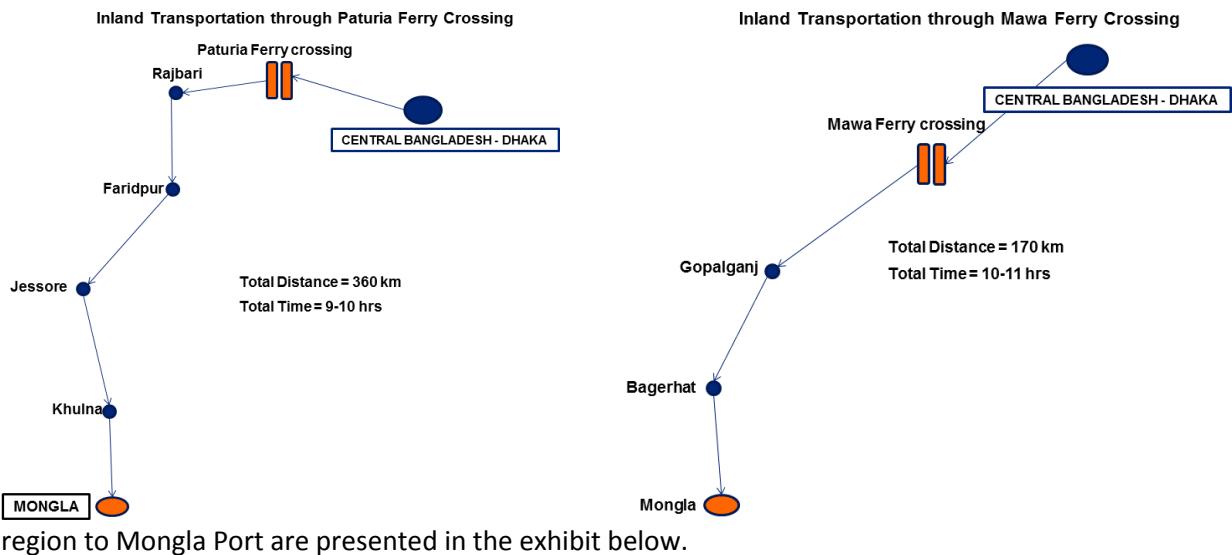
Barisal is also one of the seven administrative divisions of Bangladesh. Located in the south-central part of the country bounded by Dhaka division on the north, the Bay of Bengal on the south, Chittagong division on the east and Khulna division on the west. Barisal is an important rice producing area of the country. Since the middle ages, Barisal has acted as a trans-shipment center for rice, hides, and pulses for the Bengal. Bakery, textile, and pharmaceutical products are the output of a few industrial installations.

These divisions of Bangladesh have huge export/consumption potential but are under-developed because of geographical disadvantages, lack of availability of gas reserves, oil refineries, lack of water, and low government attention etc. The entire south western and north Bangladesh generates only around 10-15% of the total cargo. These cargo generation centers are closer to Mongla Port. Some of their cargo is also handled at land ports of India and Nepal since these divisions share border with these countries.

3.5.2 Connectivity of Mongla Port to Cargo Generation/Consumption Centres

3.5.2.1 Road Connectivity

In Bangladesh, over 90% of the cargo transported is via road, but transportation of cargo from Central Bangladesh to Mongla Port becomes challenging because of ferry crossing. This is one of the major obstacles for Central Bangladesh in using Mongla Port, as the ferry service gets disrupted by low water or heavy fog and also less priority is given to cargo than passenger at ferry service resulting in longer waiting time. Once the Padma Bridge is constructed or provision of dedicated service at Mawa ferry can be provided, Mongla Port will be able to attract traffic from Dhaka and surrounding region. With the construction of Yamuna bridge and Pakshi bridge road link has been established with the North Bangladesh. However, there is no bridge connection on south western side. Currently, there are 3 main road routes that can be used for movement of goods between Dhaka and Mongla. The commonly used route is through Mawa or Paturia ferry crossing, while it is also possible to use Jamuna Bridge, but the distance and time taken is much longer as compared to ferry crossing. The Government of Bangladesh has planned to construct a new Padma bridge in the vicinity of Mawa Ferry, which is expected to reduce the transportation distance as well as time between Dhaka and Mongla. Various routes for road transportation from Dhaka



3.5.2.2 Rail Connectivity

Currently, there is no direct rail connectivity between major cargo generating centers and Mongla Port. Even the rail connectivity in south western and north Bangladesh is upto Khulna only. Recently, GoB has undertaken the Khulna Mongla railway project. It is expected that, this rail connectivity project will provide smooth movement of cargo within south western and north Bangladesh. However, Mongla Port will still be disconnected with Dhaka region and hence the Port will not be able attract traffic through the largest cargo generating center.

The government has taken up the project for constructing a multipurpose bridge (including rail line) over the River Padma. The Padma railway link project is proposed to have connectivity up to Bhanga under phase-I and this link will be extended to Jessore in phase-II. This link will provide rail access to Mongla Port.

3.5.2.3 Waterways

The water transport sector has been a traditionally important part of the transport system in Bangladesh. Especially most of inland cargo and passenger traffic to and from southern and south western part of the country is catered by inland waterways. However, siltation and

shrinkage of the navigable network in dry season has been an increasing problem for the inland water transport industry in Bangladesh. Due to poor inland road connections, most commodities in and out of Mongla Port are handled by inland water transport but limited to the Khulna region.

There has been a regular established inland water way route from Mongla to Dhaka Until 2010, which was used by Bangladesh Inland Water Transport Corporation (BIWTC) plying passenger vessels of moderate size. The inland waterway distance between Mongla to Dhaka and between Mongla to Chittagong is very close, for instance distance between Dhaka to Chittagong is 299 km and Dhaka to Mongla is 297 km.

However, the Mongla-Dhaka route is currently disrupted due to siltation in the MG canal (length 30k.m. depth: Low tide 1 meter). This is suggested as a linked project and an obligation of the government to arrange for regular dredging of the canal, if Mongla Port is to be revived. Currently detour is used by vessels via Sundarban Bogi canal. However, Forest Department imposes restrictions in using the Bogi canal due to possible environmental damage to the Sundarbans.

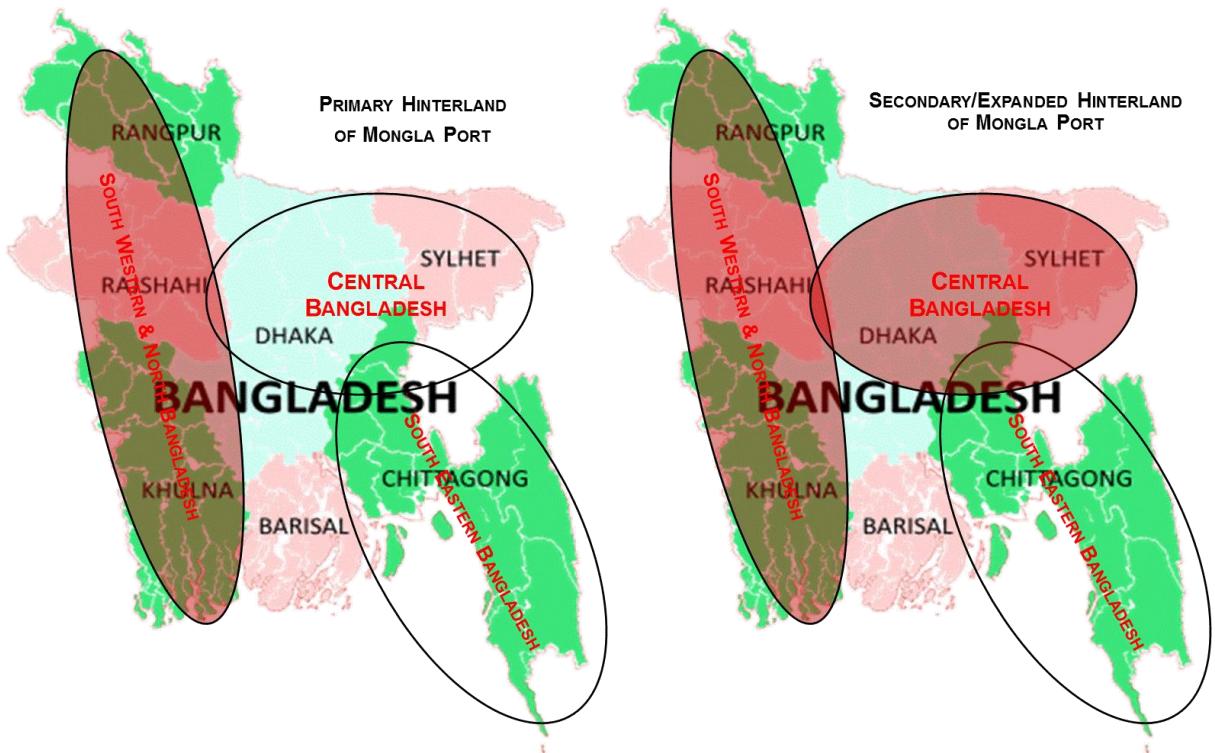
Currently no container is transported through waterways. Only bulk cargo is transported through cargo ships. However, an inland river container terminal is close to completion at Pangaon, Narayangaj, the knitwear and fabrics hub near Dhaka. After the terminal becomes operational, the country's river route will be open for container transport.

3.5.3 Identification of Hinterland for Mongla Port

The traffic modeling exercise essentially involves allocating cargo transferred between a set of Origins and Destinations (OD) to Mongla and Chittagong Port. For this purpose, a set of all routes for each OD set have been evaluated and the least distance port has been taken for purpose of cargo allocation. For instance, an item of cargo originating or consumed in South Eastern Bangladesh will use Chittagong Port as it is the closest port.

Currently, majority of the cargo generated from these centers is transported through Road. Roads handle around 90% of the total cargo, followed by railways and waterways, together accounting for only around 5-10%. For the purpose of identification of least distance port it has been assumed that, cargo will be transported through road only so that comparison of least distance port can be identical. Also, it is to be noted that, in some cases even though the road distance between cargo generation centers and ports is least, there is possibility that the least distance port is not used for sending/receiving cargo because of number of constraints, such as bad condition of roads, lack of availability of connectivity bridges, lack of availability of containers, low frequency of shipping lines calling at the ports etc. Hence, once these constraints are removed the preference for sending/receiving cargo may change. For instance, after implementation of some key connectivity projects, Mongla Port can become competitive port and start attracting traffic from Central Bangladesh & surrounding area. Therefore, there can be two hinterland of Mongla one is primary hinterland which South Western & North Bangladesh and Central Bangladesh after improvement of connectivity projects. The two possible hinterland of Mongla Port is presented in the exhibit below.

Figure 3-7: Primary & Secondary/Expanded Hinterland of Mongla Port



The exhibit below provides the distance matrix used for establishing the most attractive/competitive and least distance port from among the set of all routes for each OD set.

Figure 3-8: Competitive Port from Major Cargo generation/consumption centers

Divisions/Clusters	In Km		Road Distances to Ports		Competitive Port
	Cargo Centers	Divisions	Mongla Port	Chittagong Port	Name of Port
South Western & North Bengal		Khulna	50	700	Mongla Port
		Barisal	370	541	Mongla Port
		Rajshahi	334	534	Mongla Port
		Rangpur	536	600	Mongla Port
Central Bangladesh		Dhaka	170/360/560#	264	Chittagong Port
		Sylhet	742	425	Chittagong Port
South Eastern Bangladesh		Chittagong	700	0	Chittagong Port

Distance through Mawa/Paturia ferry/Jamuna bridge

Based on the distance matrix classification, the least distance port for South Western & North Bengal is Mongla Port. For the purpose of the traffic analysis, it has been assumed that the cargo generated from this center will use Mongla Port with assumption that there will not be any physical constraints. The change of preference of least distance port has been discussed under various scenarios.

3.6 Analysis of Key Development Plans

In Bangladesh, most of the industries are located in and around Dhaka and Chittagong. During the stakeholder consultation process, it has been observed that, the business community of Dhaka and its surrounding areas prefers Chittagong Port and is less interested to use Mongla Port because of number of constraints such as lack of fair connectivity through waterways, roads and bridges, low draft at the jetty area as well as in Pussur Chanel

because of siltation issue.

Because of the above constraints, traffic at Mongla port has significantly reduced during the last 10 years and currently the port is experiencing negative growth in traffic. Considering this, in order to expedite the development of the Mongla Port including development of new proposed project, it is important to identify the key development projects to be implemented to revive the operation of the port. Some of the key development projects which can affect the traffic of Mongla Port are discussed below:

3.6.1 Mongla Port Development Plans

It is understood that, the government has given top priority for developing port facilities at Mongla port up to international standard. To develop the port, a number of development projects have been identified to be undertaken in the short to medium term. It is expected that after implementation of these projects port will be able to attract adequate traffic from its hinterland. The name of key development projects along with its benefits and expected time of completion is as follows:

Figure 3-9: Key development projects at Mongla Port

Sr. No.	Name of development projects	Expected Benefits	Indicative Timelines
1	Procurement of Container & Cargo Handling Equipment	Increase in operational efficiency of the port	2014
2	Procurement of Cutter Suction Dredger, Pilot and Dispatch Boat for Mongla Port	Maintenance of sufficient depth at jetty area will facilitate entry of heavy ships	2013
3	Navigational Aids to Mongla Port	Improvement in movement of sea-going vessels in the channel	2013
4	Dredging at the Outer Bar in the Pussur Channel	Increase navigability at the Outer bar area of the Pussur Channel to facilitate entrance of more than 9 meter draft ships into Mongla Port area	2014
5	Dredging in the Harbour Channel of Mongla Port	Increase the navigability of the Harbour Channel of the Pussur River	2013

Source: Mongla Port Authority

Among the development projects highlighted above, development plan no. 1 will improve the operational performance of the existing port (5 jetties) and other development plan specially the dredging of Pussur Channel will have direct impact on feasibility of proposed project (Jetty 3 & 4). Bangladesh Export promotion policy, 2012 also envisages the capital dredging to facilitate movement of container ships in Mongla Port.

Based on above, the development of above projects are critical success factor for not only the two jetties, but also for the future of Mongla Port. Unless sufficient number of vessels touches Mongla Port, exporters and importers have little confidence and predictability of their cargo reaching desired destination. Therefore, it is necessary that the Pussur River

undergoes a capital dredging for desired draft. At least 5 m depth capital dredging needs to be ensured and at some points i.e. in the Jetty front and Mooring Buoy Area, 7.5 m is required.

3.6.2 Development of Key Link projects affecting the traffic of Mongla Port

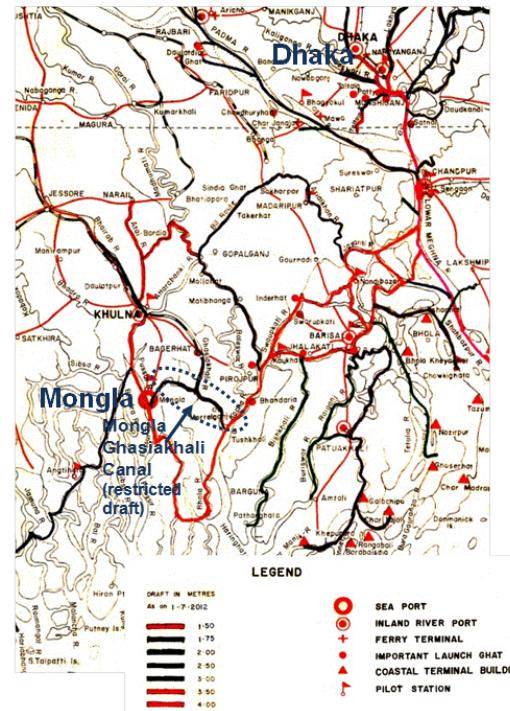
The connectivity to Mongla Port is a critical factor for determining the feasibility of the proposed project at Mongla. The success and attractiveness of traffic for two jetties on PPP depends upon implementation of some of the key connectivity projects by the government which is termed as “Linked Projects”. We have identified three such linked projects that are needed to be carried out by the government to make the project viable on PPP mode. These link projects are described below.

3.6.2.1 Dredging of Pussur River

As highlighted in Mongla Port development plan, the dredging of Pussur river is required for access of ships of 8.0 m draft. This is a critical success factor for not only the two jetties, but also for the future of the entire Mongla Port. Unless sufficient numbers of vessels touch Mongla Port, exporters and importers have little confidence and predictability of their cargo reaching desired destination in time. Therefore, it is necessary that the Pussur River undergoes a capital dredging for desired draft. At least 5 m depth CD needs to be ensured and at some points i.e. in the Jetty front and Mooring Buoy Area, 7.5 m is required.

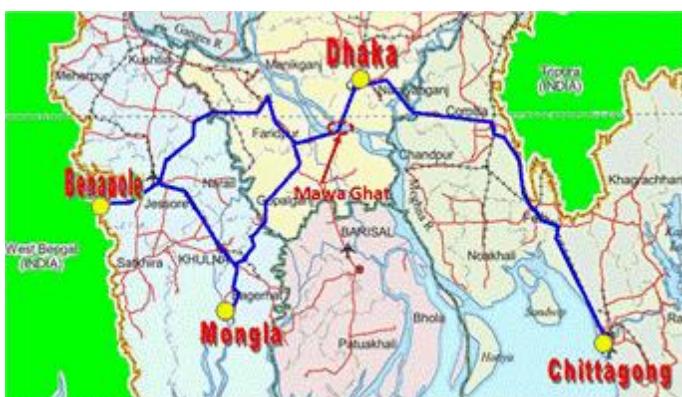
3.6.2.2 Dredging of Mongla - Ghasiakhali Canal

This is a man-made canal which was created for shortening the distance from Mongla towards Dhaka. The main waterways route from Dhaka to Mongla (around 297 km) is currently closed due to siltation in Mongla - Ghasiakhali (MG) canal (length 30 Km. depth: Low tide 1 meter). This clogging caused closing off the river route from Mongla to Dhaka. Currently detour is used by vessels via Sundarban Bogi canal. However, Forest department imposes restrictions in using the Bogi canal due to possible environmental concerns to the Sundarbans. Therefore, MG canal needs to be dredged to achieve at least 3m depth in the canal for the future of Mongla Port. It is also necessary for the PPP Project to be attractive. This route can provide access to Mongla Port through waterways.



It is envisaged that, the above associated/linked public sector projects shall be started and completed on priority basis. While the new proposed project will be carried out by the private sector, the associated/linked projects will be carried out through the public sector. In most cases, a private sector project moves forward rapidly; on the other hand a public sector project takes much more time for implementation, primarily due to lengthy procurement and approval processes. This mismatch, if allowed to occur, could have large financial implications for the Government. MPA will need to take the necessary steps to get approval of the projects from the concerned Ministries and arrange for the budgets from the Planning Commission/Finance Division for the timely implementation of such projects.

3.6.2.3 Provision for Dedicated Ferry Service at Mawa Ghat



This is the most direct route from Dhaka to Mongla which passes through Molla Hat and Gopalgonj and uses Mawa Ferry over the Padma River. This route is approximately 170 km long compared with approximately 250 km from Chittagong to Dhaka. This route is currently very poor and gives impression of several bottlenecks along this route. Currently, the traffic

towards Mongla and southern parts from Dhaka needs to cross the river Padma through ferry at Mawa Ghat. The map shows the route between Dhaka and Mongla.

However, this ghat is a general purpose terminal with a significant volume of inland passengers and cargo traffic. It is not suitable for catering export-import traffic unless a dedicated inland container terminal is provided by Bangladesh Inland Water Transport Authority or through PPP and a dedicated ferry service by Roads and Highways Department. Once the dedicated services will be provided at Mawa ferry, it is assumed that some portion of traffic which is currently using Chittagong Port will get diverted to Mongla Port. It is assumed that, this project will be completed by end of 2015.

3.6.2.4 Construction of Padma Bridge

The Government of Bangladesh has proposed to construct Padma bridge at Mawa point. The bridge will connect the two sea ports of the country as well as provide access of the largest cargo generation center – Central Bangladesh to Mongla Port. The bridge is expected to revive the Mongla port which is now operating at very low capacity due to the current long travel time required to reach Dhaka or elsewhere. Padma Bride will also establish the missing link along the Asian Highway hence enhancing the regional connectivity. When Padma bridge will be operational, the distance from Dhaka to Mongla will be 170 Km. So, the business community of Dhaka and its surrounding areas will be more interested to use Mongla Port for importing & exporting cargos as the transportation distance from Dhaka to Mongla will be shorter than Dhaka to Chittagong. However, the construction of Padma Bridge may take more than expected time for implementation hence this link project has not been considered for the purpose of traffic projection.

3.7 Scenarios for Traffic Projections

The revival and viability of Mongla Port as well as the new proposed project is dependent on the key development projects discussed above. For the purpose of traffic projection for Mongla Port and new proposed jetties four alternative traffic growth scenarios have been developed which are linked to the key development/link projects. These scenarios have been developed considering the existing traffic growth characteristics at Mongla Port, key constraints at the port, and the development of key connectivity projects which can retain traffic of its own hinterland and also attract traffic from other cargo generating centers. The key development activities considered under each of the scenario are highlighted in the exhibit below.

Figure 3-10: Scenarios for Traffic Projection

KEY DEVELOPMENT ACTIVITIES AFFECTING TRAFFIC GROWTH AT MONGLA PORT			
SCENARIOS	Dredging of Pussur River	Dedicated Terminal at Mawa Ferry	Dredging of Mongla - Ghasiakhali Canal
Scenario I			
Scenario II			
Scenario III			
Scenario IV			

At present, Jute & jute goods, frozen cargo and other general cargoes are normally exported from Mongla port. After commissioning of the linked projects, there will be bright prospects in exporting garments, tea and leather etc. through Mongla Port. Moreover, import of heavy machinery & equipments, fertilizer, food grain, sugar, motor vehicles, raw materials of industry etc. through Mongla Port will increase with respect to the present rate. As a consequence, the act of establishing different types of new industries in the south-western part of the country, scope of huge employment, expansion of trade & business and overall activities of Mongla Port will increase and develop rapidly.

Once linked project 2 & 3 gets implemented, traffic growth will be the highest as the Mongla Port will be able to attract maximum traffic from the Dhaka and surrounding regions which is highest cargo generation and consumption center of Bangladesh. Some of the key rationale for diversion of traffic from Dhaka and surrounding regions are:

- After construction of link projects, the overall cost of transportation is expected to reduce because of reduction in time and distance between Dhaka & Mongla Port
- The highway is often congested as its capacity is limited that leads to increase in transportation time from Dhaka to Chittagong
- Productivity at Chittagong Port suffers from because of high volume of trade through this port
- The Dhaka-Chittagong train connection offers limited capacity
- Limited availability of land around Chittagong Port hence there is limited scope for expansion of the port and port facilities

At present, suppliers are making adjustments and managing around these issues by incorporating additional transport days into planning because they do not have any choice to send their cargo through other Port. Once the above connectivity project will fall into place, Mongla Port will be able to attract traffic from Dhaka and surrounding regions. The changes in preference of using Mongla Port instead of Chittagong Port under different scenarios are evaluated in the exhibit below.

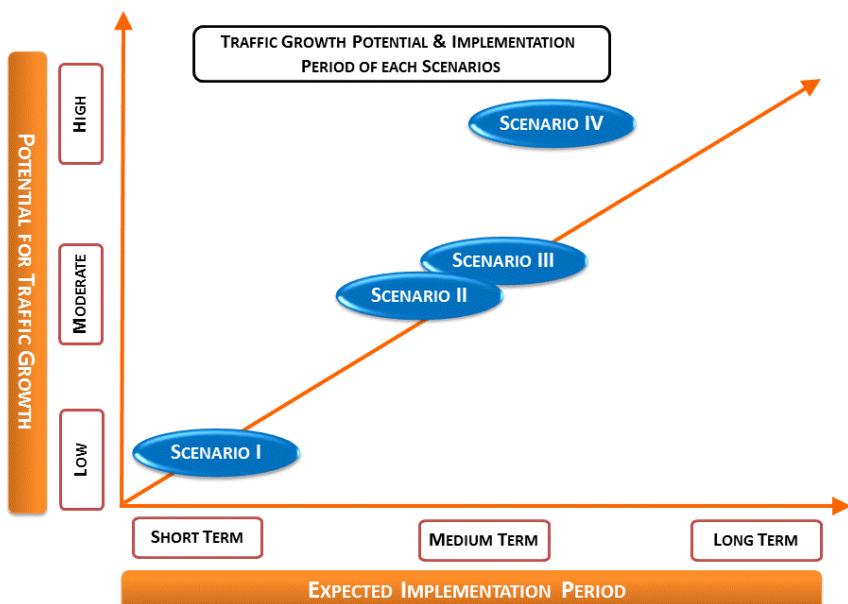
Figure 3-11: Competitive Port under each of the proposed scenarios

Divisions/Clusters	Cargo Centers	Divisions	Least Distance/Competing Port			
			Scenario I	Scenario II	Scenario III	Scenario IV
South Western & North Bengal	Khulna	Mongla Port	Mongla Port	Mongla Port	Mongla Port	Mongla Port
	Barisal	Mongla Port	Mongla Port	Mongla Port	Mongla Port	Mongla Port
	Rajshahi	Mongla Port	Mongla Port	Mongla Port	Mongla Port	Mongla Port
	Rangpur	Mongla Port	Mongla Port	Mongla Port	Mongla Port	Mongla Port
Central Bangladesh	Dhaka	Chittagong Port	Mongla Port	Mongla Port	Mongla Port	Mongla Port
	Sylhet	Chittagong Port	Chittagong Port	Chittagong Port	Chittagong Port	Chittagong Port
South Eastern Bangladesh	Chittagong	Chittagong Port	Chittagong Port	Chittagong Port	Chittagong Port	Chittagong Port

The traffic growth potential and implementation period of each of the development projects are indicated in the diagram below.

3.7.1 Scenario I – Dredging of Pussur River (Base Case)

During interaction with key officials of MPA and other stakeholders, it has been found that lack of sufficient depth in the Pussur channel is one of the major reasons for low frequency of shipping line calling at Mongla Port. Under this scenario, it is assumed that the capital dredging will get completed by 2015 and accordingly traffic has been projected. Once the dredging is completed, it is expected that, Mongla Port will be able retain the entire traffic generated of its



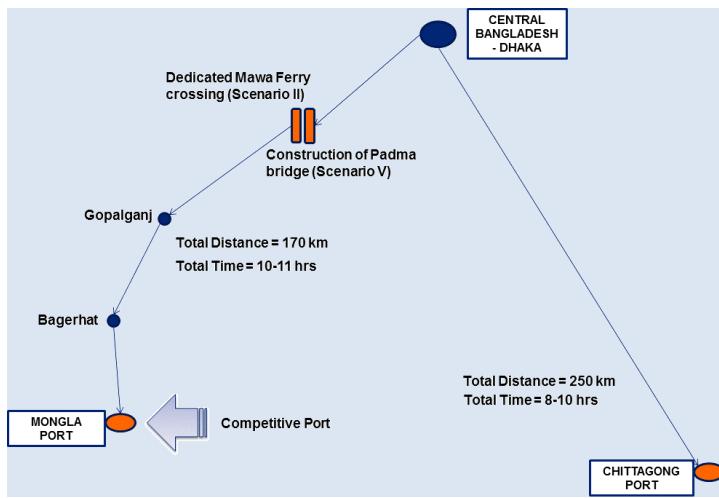
existing hinterland i.e. Mongla, Khulna, Rajshahi, Rangpur, Barisal etc. In addition, it has been assumed that, the exporters/importers of the Mongla Port hinterland which are currently using Chittagong Port will start using Mongla Port. This is a base case for traffic projection.

In this scenario, traffic growth will be the lowest as the Mongla Port hinterland generates only around 10-15% of the total cargo and continued poor access to Mongla Port by Road and Rail from either Khulna or Dhaka persists.

3.7.2 Scenario II – Base Case + Dedicated Ferry Service at Mawa Ghat

It is understood that, there is severe traffic congestions at Mawa Ferry crossing because of thousands of vehicles and passengers using the ferry services daily and trucks carrying cargo have been given least priority as a result of which the cargo keeps lying at the ferry and

results in delays in the transportation of cargo to final destinations. Under this scenario it is assumed that a separate dedicated terminal would be created at Mawa Ghat to handle cargo only; this will reduce waiting time for ferry. This initiative is expected to attract traffic from Dhaka area to Mongla Port. It is to be noted that even after creation of a separate terminal, the diversion of traffic may be moderate because of number



of challenges such as the ferry crossing being prone to suspension or cancellation due to flood, manually operated boats, fog and inclement weather conditions etc. In this scenario, traffic growth is expected to be moderate.

3.7.3 Scenario III – Base Case + Dredging of MG Canal

Under this scenario it assumed that, in addition to the base case, the main waterways route from Dhaka to Mongla will be cleared and maintained which is currently closed due to siltation in Mongla Ghasiakhali (MG). This route may attract traffic from Dhaka and surrounding region to Mongla using MG canal, as transportation through this route may be more economical than road/rail transport route. In this scenario, traffic growth is expected to be moderate because of challenges such as the canal being prone to suspension or cancellation due to flood, manually operated boats, fog and inclement weather conditions etc.

3.7.4 Scenario IV – Base Case + Dedicated Mawa Ferry Service + Dredging of MG Canal

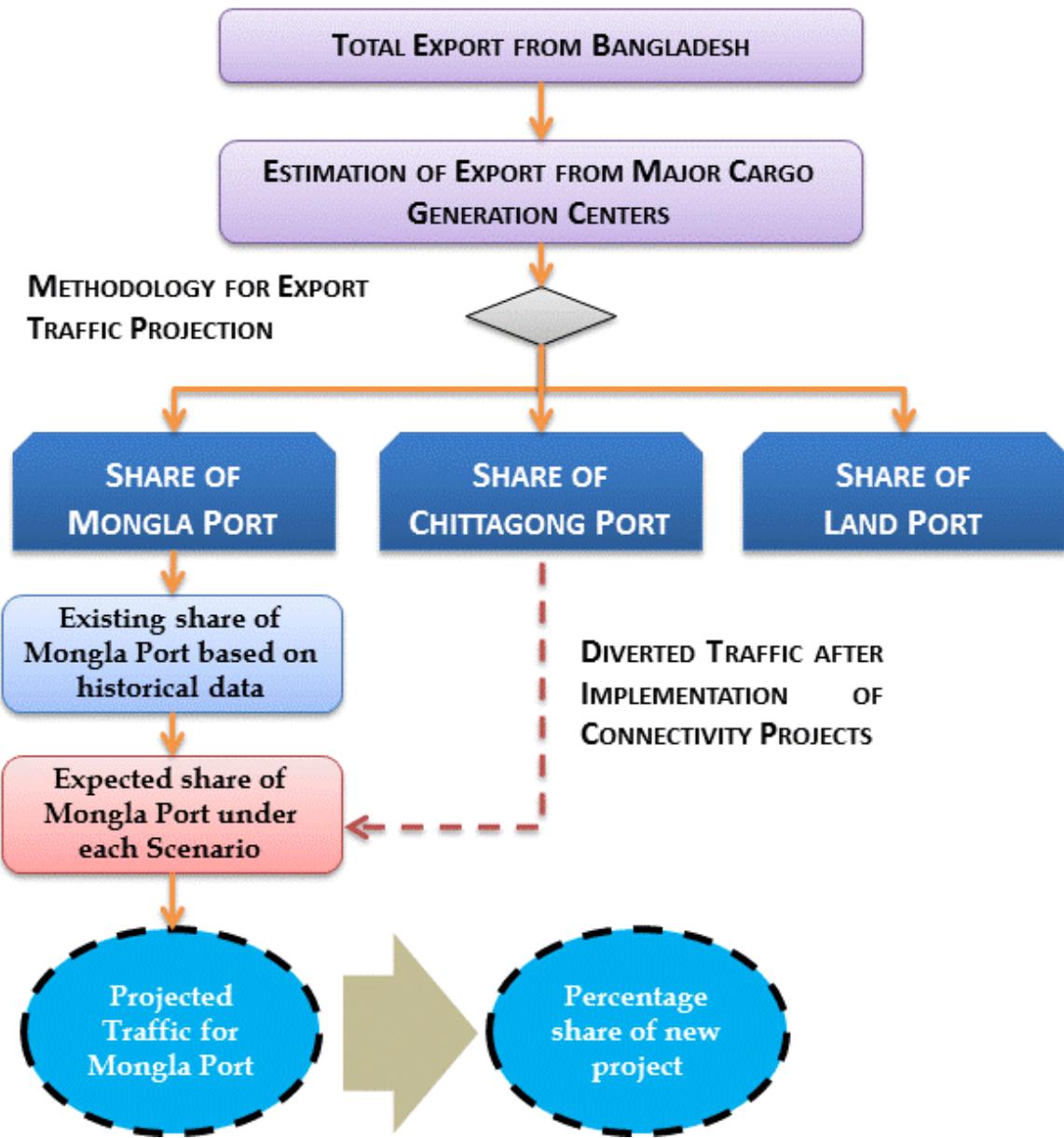
Under this scenario it assumed that, in addition to the base case, both provision of dedicated ferry service at Mawa Ghat and dredging of Mongla Ghasiakhali (MG) will be completed. After implementation of both projects, the benefits discussed above can be leveraged. Under this scenario, Mongla Port will be able to attract adequate traffic from Dhaka and surrounding area using dedicated Mawa Ferry services and waterways through MG canal. In this scenario, traffic growth is expected to be slightly higher than scenario II & III because of challenges such as the route through Ferry-crossing and the canal being prone to suspension or cancellation due to flood, manually operated boats, fog and inclement weather conditions etc.

3.8 Export Traffic Projection

Major commodities exported through Mongla Port include jute, jute products, frozen food/shrimps, clay tiles, betel nuts etc. Most of the exported commodities handled at Mongla Port are containerized. For the purpose of detailed export traffic projection, commodities which account for around 95% of the total exports have been considered.

Other commodities are considered as part of general cargo and have been projected based on the past trend and historical data/information. Also, there are some commodities which are not currently handled at the Port but may be handled in future such as coal, garments, leather, machineries etc., these commodities have also been considered in the traffic projection. The common methodology adopted for projection of export traffic of commodities is presented in the exhibit below.

Figure 3-12: Methodology for projection of export cargo

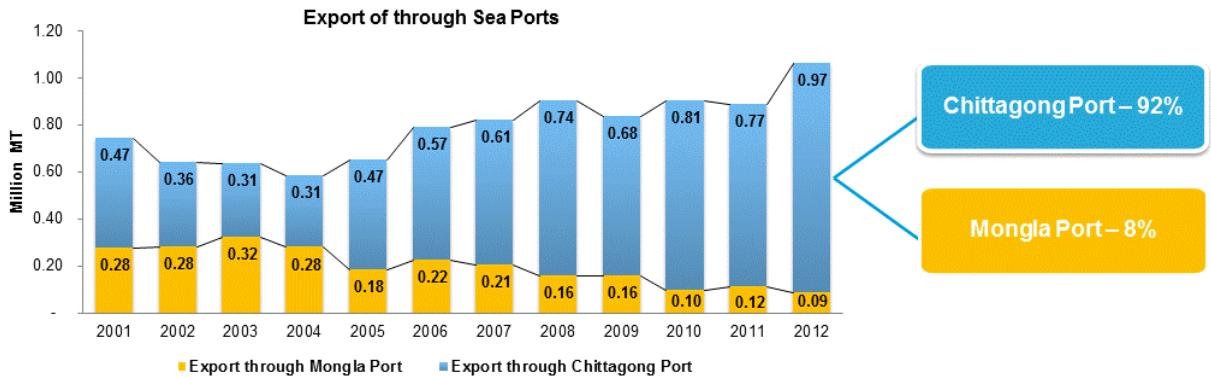


3.8.1 Jute and Jute Products

Bangladesh is the leading exporter of jute and jute products in the world. Jute accounts for over 22% of total export through sea port (Mongla & Chittagong Port) by volume. Jute products (processed from raw jute) account for around 75% of the total jute and jute products exports. During the last 10 years, trading in both jute and jute products have grown at the average rate of 2%. However, in the last five years export of jute products has grown at the rate of 9% and raw jute have shown negative growth of 2% during the same period. It

is understood that, the major reason for shift in export from raw jute to jute product is because of incentive provided by GoB to jute products exporters to boost employment and develop processing/skill based industries. The export of jute and jute products in the last 10 years through sea ports are shown in the exhibit below.

Figure 3-13: Export of Jute & Jute Products through Mongla & Chittagong Port



Source: Mongla & Chittagong Port Authority, BJMC

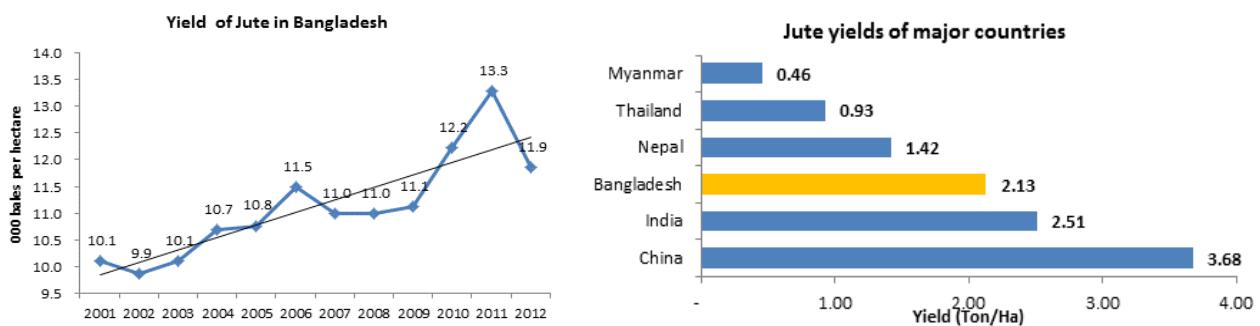
As can be seen from the exhibit above, the share of jute & jute products handled at Mongla Port has shown a declining trend in the last 10 years, from almost 50% in 2003, it has declined to 8% in 2012. Currently, most of the jute mills are located in Dhaka & Chittagong area, together these account for around 70% of the total production/export. Production/Export share of Khulna & Rajshahi division (forming part of Mongla Port Hinterland) is only around 30%. As is evident, there is considerable difference between the share in production from Mongla port Hinterland and the share in exports through Mongla Port.

The key reasons for declining jute traffic at Mongla Port are:

- Limited availability of ships at Mongla Port (as per one of the jute exporter average waiting time for ship is 15-20 days)
- Limited availability of containers for export as most of the export at Mongla Port is containerized while import is non-containerized, so for exports empty containers are to be brought from Chittagong Port which as an additional cost
- Non availability of private yard for stuffing and de-stuffing of cargo

Demand for Jute & Jute Products/Export Potential: The export growth of both jute and jute products has been erratic in the last 10 years, because of seasonal variations and slump in global demand due to various factors (recession, price rise etc.). Other major jute producing countries are India, China, Thailand, and Myanmar etc. The yield performance revealed that, Bangladesh has an yield of around 2.13 tonnes/hectare. It is expected that, yield will remain static/moderate as Bangladesh has already achieved optimum yield in comparison to other countries.

Figure 3-14: Exhibit 1: Jute yield in Bangladesh and other countries



Source: International Jute Study Group, Directorate of Jute

The export growth of jute and jute products has grown at a CAGR of 2% per annum during the last 10 years. Some of the major reasons for lower/static growth are:

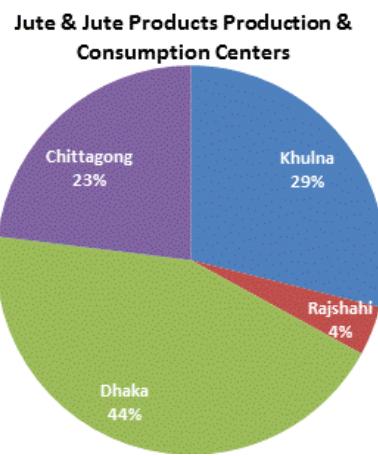
- Competition with paddy for land –land area dedicated to jute has been declining because of competition from rice.
- Competition from synthetics limits the demand of jute and jute products
- Limited initiative in finding new markets and failure to follow modern marketing procedures are likely to limit growth of world demand for jute in the future.
- Slowdown in global demand due to recession
- Falling price and competition in the international market
- Lack of significant efforts and required investments towards product development and
- Inability to undertake the technological transformation undermined jute's prospects as a fibre.

Governments and private sectors in Bangladesh lately have started to undertake initiatives to address the above concerns. This renewed emphasis has been spurred due to the resurgence of global demand for jute as an environment-friendly commodity. A number of technological breakthroughs favouring diversified uses of jute fibre will also help in maintaining the export growth potential. Accordingly, it is expected that, the export growth will remain in the range of 2-4% in the short to medium term and is expected to decline and then remain static in the medium to long term. The growth is expected to remain in the range of 1-2% over the long term. Using the above assumption, export of both jute and jute products have been projected for a period of 30 years.

Export of Jute & Jute Products through Mongla Port:

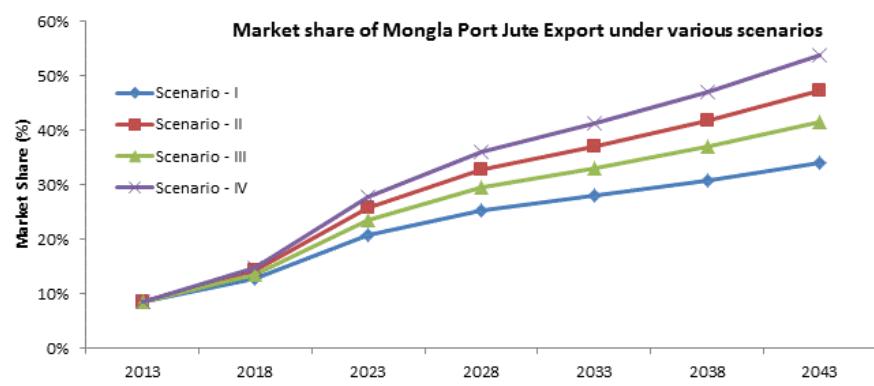
About 92% of the jute products were exported through Chittagong port during 2012, while Mongla port handled only 8% of total jute export. In the Mongla Port hinterland, currently there are more than 50 jute companies which are exporting Jute and Jute products to various countries. Most of these mills (around 80-90%) have started using Chittagong Port because of low frequency of shipping lines calling at Mongla Port, limited availability of containers and space for stuffing/de-stuffing out of port area etc.

As indicated by major jute exporters during the



stakeholder's consultation, there are huge jute/jute products exports potential through Mongla Port if the constraints such as low draft, low frequency of shipping lines, availability of containers for export, provision of backyard etc. can be addressed. It was also highlighted that, around 20 more jute mills/exporters are expected to come up in the next 5-7 years in the Mongla Port hinterland, which can generate additional traffic for Mongla Port if the said constraints can be removed. As highlighted in the graph, export share of Mongla Port is likely to be in the range of 30-35% of the total export through sea port under base case scenario instead of current share of only 8%.

However, the share of Mongla Port is expected to increase further due diversion of traffic from other centers after implementation of key connectivity projects. The share of



Mongla Port under each scenario is presented in the diagram.

Based on the above assumptions, total export of jute and jute products under various scenarios is presented in the exhibit below.

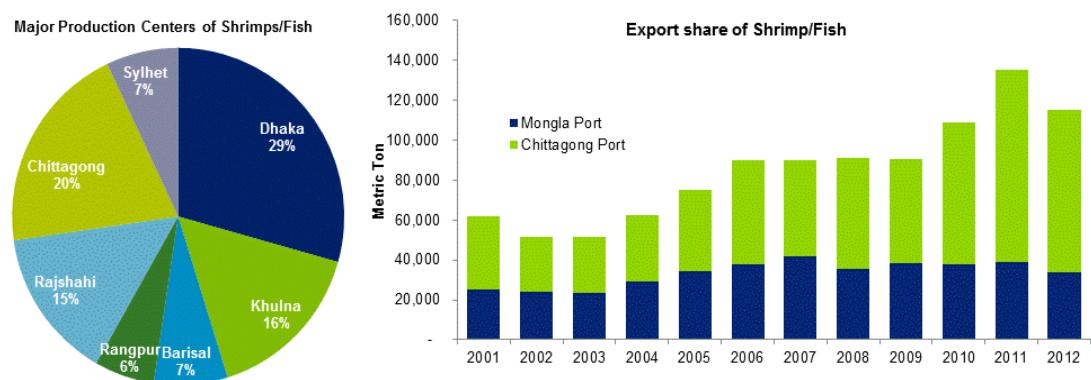
Figure 3-15: Projected traffic for Jute and Jute Products (Metric Ton)

YEAR	2013	2018	2023	2028	2033	2038	2043
Scenario-I	92,037	165,927	320,803	430,335	519,433	602,750	699,432
Scenario -II	92,037	182,694	395,415	556,012	687,742	817,809	972,474
Scenario-III	92,037	175,858	363,945	502,242	615,196	724,434	853,068
Scenario- IV	92,037	189,705	429,210	614,913	768,048	922,247	1,107,405

3.8.2 Shrimps & other Frozen Fish

Bangladesh is endowed with rich and extensive fisheries resources. Due to natural conditions and geographical location, Bangladesh has huge fisheries resources having high potential to increase fisheries production and export. Shrimp is one of the leading exportable products in Bangladesh. Bangladesh exports frozen shrimp and other fish and fisheries products to EU, USA, Japan, Russia, Hong Kong, Singapore, Saudi Arabia, Sudan and many other developed countries. Total frozen food (covering shrimps, white fish, fish dry etc.) accounts for about 2% of total export volume of Bangladesh. Majority of the export (around 70%) takes place through Chittagong Port because of higher frequency and greater availability of ships which ensures timely delivery of order to the destination countries. Mongla Port handles only about 30% of total export, which are mostly produced in Khulna region. Year wise export volume of shrimp and other fish products are shown in the exhibit below.

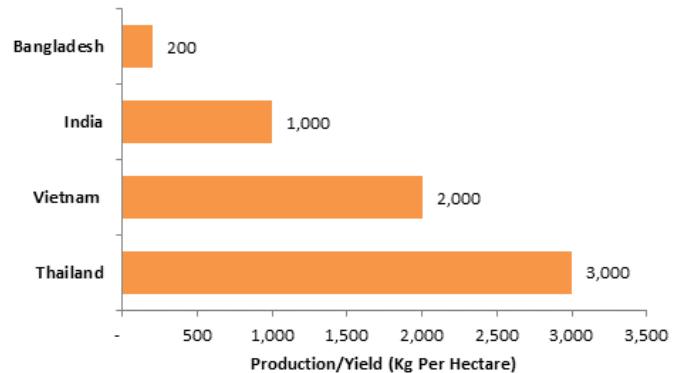
Figure 3-16: Production center and export of Shrimps/Fish through Sea Ports



Source: Mongla & Chittagong Port Authority, Department of Fisheries

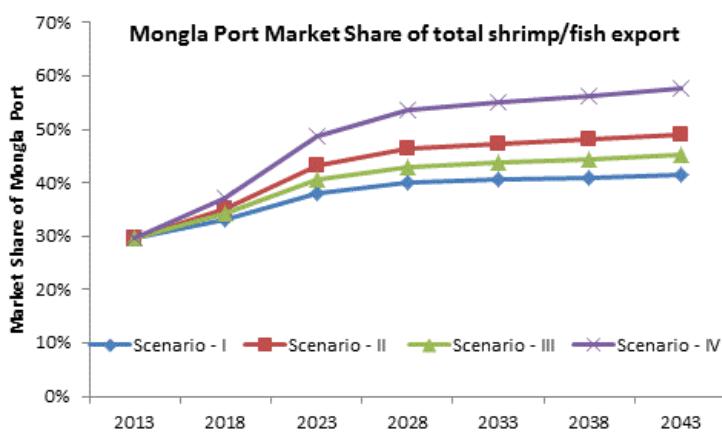
Export Growth Potential: Shrimp production per hectare in Bangladesh is very low as compared to other countries because industry in Bangladesh still follows traditional method of farming, however other countries have shifted to more scientific and innovative methods of production. The traditional methods of production resulted into low production and yield per hectare. Bangladesh's typical yields are less than one tenth of Thailand and one fifth of India as presented in the diagram.

Total export of frozen food during the year 2011-12 was around 0.13 million MT which was 22% higher than previous year. Although export in terms of volume is increasing but value of export is declining because of decrease in demand due to lower consumption in the world market because of recession and other countries such as Vietnam, Thailand etc. are offering the same type of fish/shrimp at a much lower price. The export of frozen food has grown at an annual growth rate of 8% per annum in the last 10 years. However, as per Bangladesh Frozen Food Exporters Association, the growth rate is expected to come down due to effect of recession and impose of ban by some countries because of quality related issues. Accordingly, it has been assumed that, the export growth will remain in the range of 6-7% in the short to medium term (3-5 years). To give further boost to this industry, Bangladesh Export promotion policy, 2009-12 shrimps production and export have been given highest priority for development. Government has taken a number of policy initiatives to intensify the cultivation and increase per hectare yield. These policy initiatives are expected to get implemented over next 5-10 years. It is expected that with the introduction of scientific method of shrimp culture, the present production of shrimp will be increased substantially. So, in the long term export is expected to grow at the rate of 8-10% per annum and continue to grow at the same rate till the projection period. Using these assumptions, export of frozen food covering shrimp, fish etc. has been projected for 30 years.



Estimation of export of shrimps/frozen fish through Mongla Port: Out of total export through Mongla Port, frozen fish accounts for around 24% of total export. Currently, around 60-70% of the total shrimps/fish export is originating from Khulna area which falls under hinterland of Mongla Port. Out of total export from Khulna around 60-80% of export volume is going through Mongla Port and rest is through Chittagong port. The exporters of Mongla hinterland are compelled to use Chittagong Port because frequency and availability of ships at Mongla Port is low and keeping frozen food refrigerated for such a long time becomes

expensive for the exporters. At least one ship per week is required to cater to the existing exporter's need. If this situation continues for long, Mongla Port may further lose its share to Chittagong Port even if cost of transportation between production center and Mongla Port is lower.



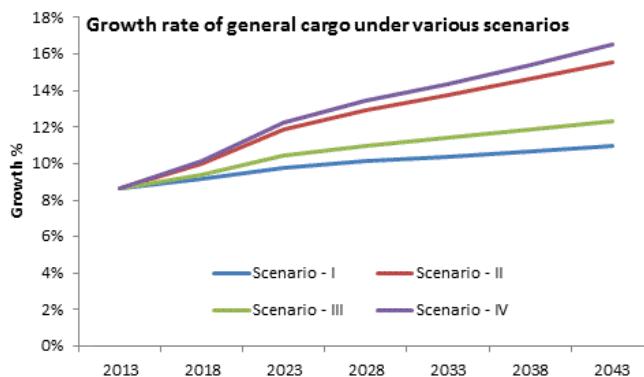
the share of Mongla Port is expected to increase further due diversion of traffic from other centers after implementation of key connectivity projects. The share of Mongla Port under each scenario is presented in the diagram. The export projection through Mongla Port under various scenarios is presented in the exhibit below.

Figure 3-17: Projected traffic for shrimps/frozen fish through Mongla Port (Metric Ton)

YEAR	2013	2018	2023	2028	2033	2038	2043
Scenario - I	35,990	54,163	98,302	165,950	270,622	441,315	719,672
Scenario - II	35,990	57,348	111,336	192,376	315,676	518,003	850,009
Scenario - III	35,990	55,740	104,644	178,726	292,366	478,262	782,357
Scenario - IV	35,990	60,656	125,838	222,506	367,397	606,637	1,001,665

3.8.3 General Cargo

General cargo consists of commodities such as, Machineries, Leather products, Tobacco, Betel Nuts, Clay tiles and other miscellaneous commodities. All these commodities combined together account for over 5% of the total export volume through Mongla Port. Exports of these commodities are not consistent and vary from year to year, on an average export of these commodities have grown at the rate of 9% per annum in the last 5 years. Most of these commodities are manufactured in either Export Processing Zones (EPZ) or small industries in Mongla hinterland. Most of these commodities are handled in LCL (Loose Cargo Load). During stakeholder's consultation it has been found that, there are limited LCL facilities



available at Mongla Port so small exporters are compelled to use Chittagong Port and other land port to send their cargos.

It was highlighted by these exporters that, the demand of these commodities is continuously rising and export growth is expected to be in the range of 10-15% in the years to come. Accordingly, it has been assumed that, the export will initially grow at the rate of 10% in the short term and the growth will remain around 10-15% in the medium to long term.

It is expected that, with the development of Mongla Port and after implementation of new project the number of small industries in Mongla EPZ as well as in the region will increase and hence the export will increase. The projected exports of general cargo are presented in the exhibit below.

Figure 3-18: Projected Export of General Cargo (Metric Ton)

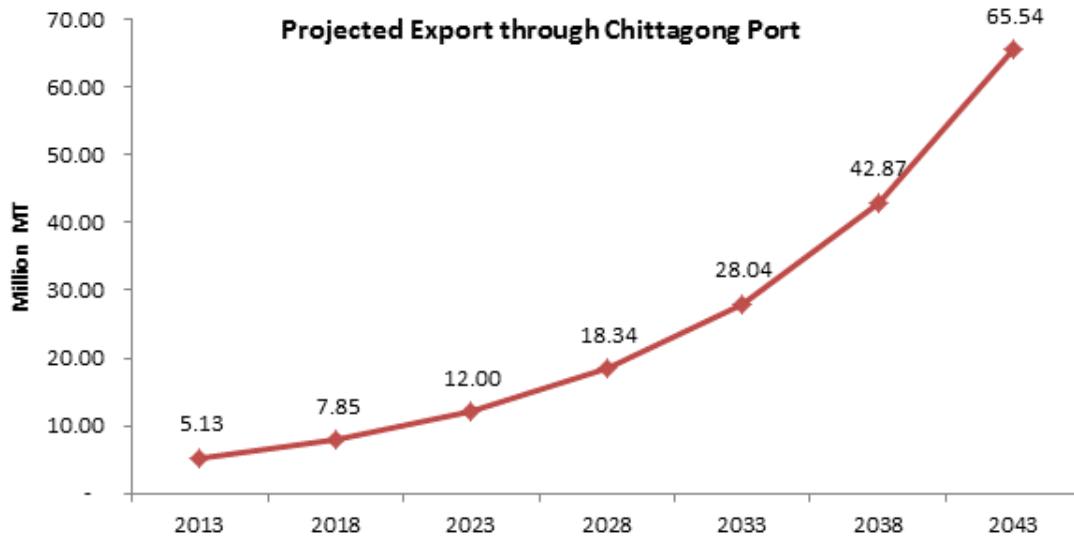
YEAR	2013	2018	2023	2028	2033	2038	2043
Scenario - I	15,903	24,271	38,361	61,879	101,018	166,866	278,974
Scenario - II	15,903	24,634	41,928	75,773	142,107	276,758	560,898
Scenario - III	15,903	24,390	39,474	65,985	112,451	195,353	346,182
Scenario - IV	15,903	24,696	42,593	78,606	151,322	304,163	640,053

3.8.4 *Diversion of Traffic after implementation of link projects*

Under Scenario II, III and IV it is envisaged that once the key link projects will be in place there would be possibility of diversion of traffic from the largest hinterland i.e. Dhaka and surrounding region to Mongla Port. These link projects are expected to reduce travel distance between Dhaka and Mongla. The extent of diversion of traffic will depend on the type of link project implemented. For instance, Scenario IV i.e. development of dedicated Mawa Ferry service and Clearance of MG Canal will attract maximum traffic towards Mongla Port than the development of individual link projects such as Mawa Ferry and MG Canal.

The current traffic of major commodities such as Jute & jute goods, frozen cargo and other general cargoes are normally exported from Mongla port and it is assumed to be exported in future also from Mongla port. The commissioning of the link projects will create a bright prospect in exporting some of the commodities which are getting generated in Dhaka & surrounding region such as garments, leather, tea, general cargo etc. through Mongla Port. However, few other commodities such as Petroleum, Naphtha, Ammonia, Tea etc. which are currently generated in Chittagong Region and handled at Chittagong Port will continue to use the same port. Under these scenarios, traffic growth is expected to be quite high as the Mongla Port will be able to attract traffic from the Dhaka and surrounding regions which is biggest cargo generation and consumption center of Bangladesh. In order to estimate the potential traffic that can be diverted to Mongla Port which are currently handled at Chittagong Port, we have projected the traffic of Chittagong Port based on the growth rate provided by Chittagong Port Authority. The projected traffic at Chittagong Port in the next 30 year is given in the exhibit below.

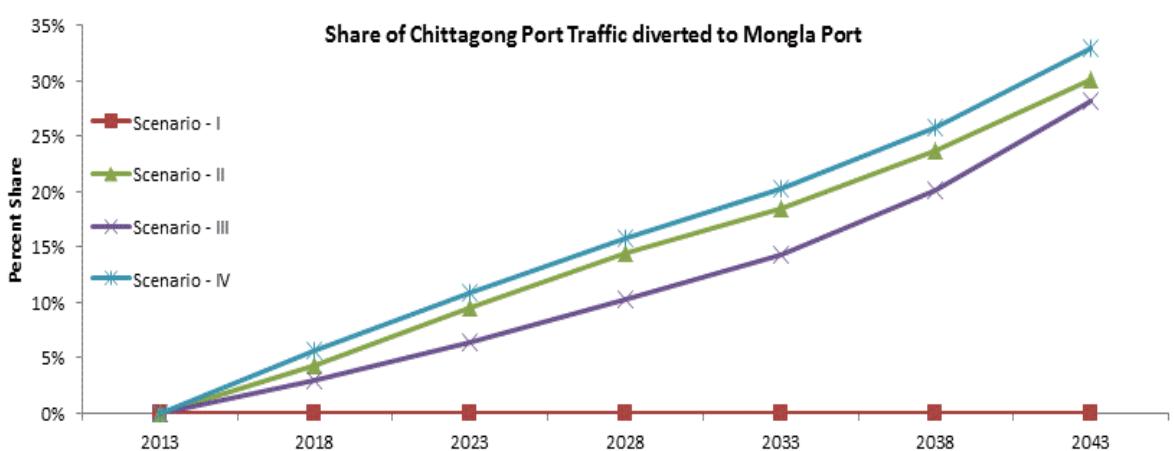
Figure 3-19: Projected export through Chittagong Port



Source: Chittagong Port Authority

It is assumed that, the commodities which are generated in Dhaka & surrounding region such as Garments, Knitwear, Leather goods, General Cargo etc. will get diverted to the Mongla Port. While the traffic which are generated in other cargo center such as cargo generated in Chittagong and surrounding region will continue to use Chittagong Port even after improvement of connectivity projects. It is assumed that, initially traffic will get diverted at slower pace but expected to increase at faster rate after establishment of linkage of exporters/importers with port logistics including port authorities, transporters, clearing & forwarding agents, freight forwarders etc. Accordingly, it is estimated that the share of diverted traffic will initially be in the range of 4-5% initially and will increase upto 30-40% of the total traffic exported through Chittagong Port depending on the type of link projects implemented. Using this assumption projection of diverted traffic has been carried out. The share of traffic that can be diverted to Mongla Port for Garments, Leather & General Cargo under various scenarios are presented in the exhibit below.

Figure 3-20: Share of traffic diverted to Mongla Port under each scenarios



Some of the potential commodities which may get diverted to Mongla Port are estimated below.

3.8.4.1 Garments and Knitwear

Currently, with the exception of a few containers through Mongla, Chittagong Port accounts for almost all of the garment industry cargo both for import of textiles and raw materials and

export of finished products. Out of total export through Chittagong port Garments account for around 44% by volume, most of these Garments (around 80-90%) are generated in Dhaka and surrounding region and remaining in Chittagong region. It is assumed that, once the connectivity projects will be in place, some portion of Garments cargo generated from Dhaka & surrounding region will start using Mongla Port instead of Chittagong Port. Total garments cargo expected to be diverted to Mongla Port under each scenario are presented in the exhibit below.

Figure 3-21: Diverted traffic of Garments to Mongla Port (Metric Ton)

YEAR	2013	2018	2023	2028	2033	2038	2043
Scenario - I	-	-	-	-	-	-	-
Scenario - II	-	148,354	496,705	1,162,528	2,268,253	4,425,677	8,635,109
Scenario - III	-	98,903	331,136	82,0154	1,758,556	3,770,654	8,084,947
Scenario - IV	-	191,267	572,006	1,269,832	2,477,617	4,834,175	9,432,146

3.8.4.2 Leather Goods

Leather industry is one of the growing industries of Bangladesh. Government has identified leather as a thrust sector for export to exploit country's full potentialities in this sector. Hides & skins of Bangladesh have well reputation and good demand in world market for its fine fiber structure and good grains. Leather export has grown at the 17% in 2011-12. Majority of the leather processing and manufacturing industries are located in and around Dhaka. It is expected that, some portion of traffic which is currently sent through Chittagong Port will get diverted to Mongla Port after development of connectivity projects. Total expected diverted traffic in next 30 years are projected and presented in exhibit below.

Figure 3-22: Diverted traffic of Leather goods to Mongla Port (Metric Ton)

YEAR	2013	2018	2023	2028	2033	2038	2043
Scenario - I	-	-	-	-	-	-	-
Scenario - II	-	1,479	4,952	11,590	22,613	44,121	86,087
Scenario - III	-	986	3,301	8,176	17,532	37,591	80,602
Scenario - IV	-	1,907	5,703	12,659	24,700	48,194	94,033

3.8.4.3 General Cargo

Similar to the general cargo which is currently being exported through Mongla Port, cargo generated from Dhaka & surrounding regions is handled at Chittagong Port. Most of these commodities are generated in 3 EPZs in and around Bangladesh. It is expected that, with the higher growth, economic reform scenario, general cargo exports would increase. With an increased array of improved quality goods in the export market this category could grow in the order of 10% per annum. It has been assumed that, after implementation of key development projects the LCL cargo will start shifting to Mongla Port. The projected export of general cargo is presented in the exhibit below.

Figure 3-23: Diverted traffic of General cargo to Mongla Port (Metric Ton)

YEAR	2013	2018	2023	2028	2033	2038	2043
Scenario - I	-	-	-	-	-	-	-
Scenario - II	-	90,495	302,987	709,136	1,383,623	2,699,640	5,267,372
Scenario - III	-	60,330	201,991	500,290	1,072,710	2,300,079	4,931,776
Scenario - IV	-	116,672	348,921	774,591	1,511,334	2,948,822	5,753,560

3.8.4.4 Total Diverted Traffic

As discussed above, after implementation of key development projects, Mongla Port will be able to attract traffic from its own hinterland as well traffic from Dhaka and surrounding region. The estimated diverted traffic after implementation of key development projects is estimated in the exhibit below.

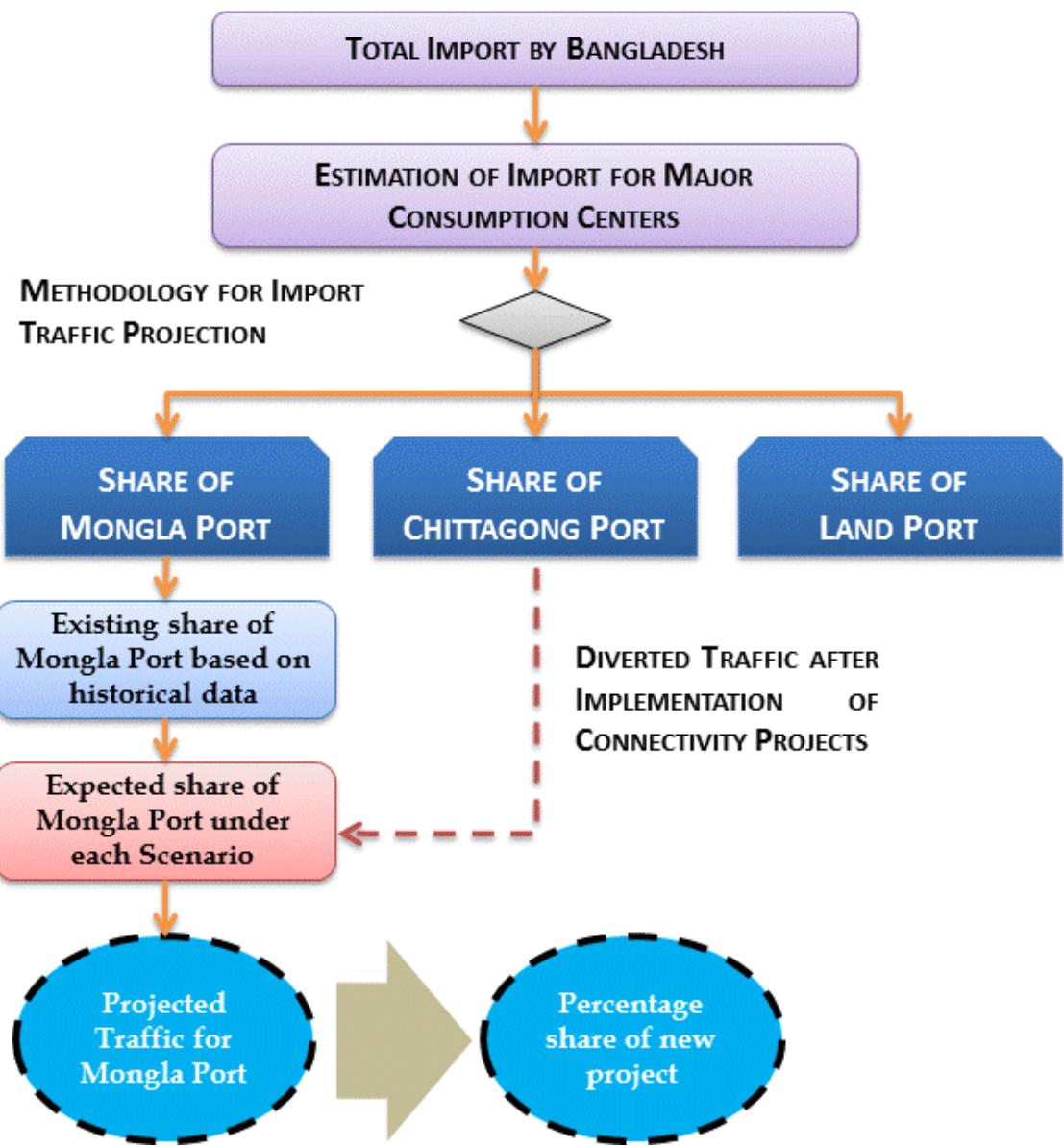
Figure 3-24: Traffic diverted from other cargo generating centers after implementation of key development projects

YEAR	2013	2018	2023	2028	2033	2038	2043
Additional traffic after dredging	0	63,072	214,798	336,878	453,428	602,243	82,2610
Diversion of traffic after Mawa Ferry	0	260,644	895,857	2,049,249	3,928,940	7,571,077	1,467,3871
Diversion of traffic after MG canal	0	171,847	587,027	1,417,410	2,977,737	6,295,442	13,380,854
Diversion of traffic after MF + MG	0	340,543	106,6805	2,314,942	4,409,344	8,453,306	16,330,785

3.9 Import Traffic Projection

Out of the total traffic handled at Mongla Port, import accounts for around 95% of the total traffic which is usually ‘bulk’ or ‘breaks bulk’. Some of the major commodities imported include food grain, clinker, Slag, fertilizer, Gas, Machineries and Motor Vehicles etc. Food grain, fertilizer and clinker together account for over 90% of the total import. There has been an increase in imports during the last 5 years, majorly because of increase in imports of food grain, fertilizers, clinker and general cargo. The import growth during the last 5 year was around 30% per annum. For the purpose of detailed import traffic projection, commodities that together account for over 90% have been considered. Other commodities have been projected based on the past trend and historical data/information. In addition, there are some commodities which are not currently handled at the Port but may be handled in future such as coal, machineries etc. These have also been considered for the projection of import traffic. The common methodology used for projection of import traffic for Mongla Port as well as new PPP project is presented in the exhibit below.

Figure 3-25: Methodology for projection of import

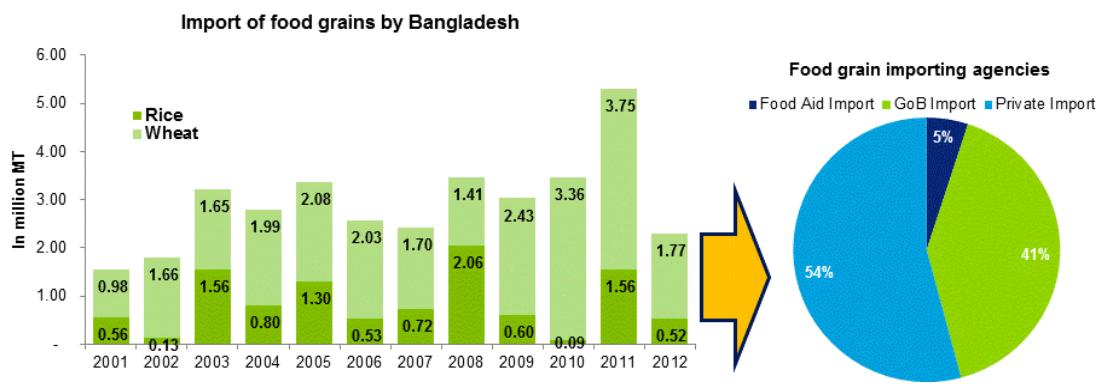


3.9.1 Food Grain – Cereal & non-cereal

Bangladesh has been importing around 2.29 million tons of food grain per annum in recent years. The majority consists of wheat along with moderate volumes of rice in years of poor harvests. Wheat accounts for over 70% of the total food grains import while the remaining is rice. The key importers of food grains include GoB, private importer and food aid agencies. Imports were controlled by government bodies in the past, but private sector imports have increased significantly in recent years. Majority of the import is done by private importers and it accounts for around 54%, followed by GoB.

The import accounts for about 7-8% of Bangladesh's food grain requirements. Bangladesh has been almost self-sufficient in rice for many years, producing about 19 million tonnes in a good year. However, it produces only about half its wheat requirements. Annual production is about 1.5 million tones with another 1.5 million tones being imported. The trend of food grain import for past decade and key agencies importing food grains are presented in exhibit below.

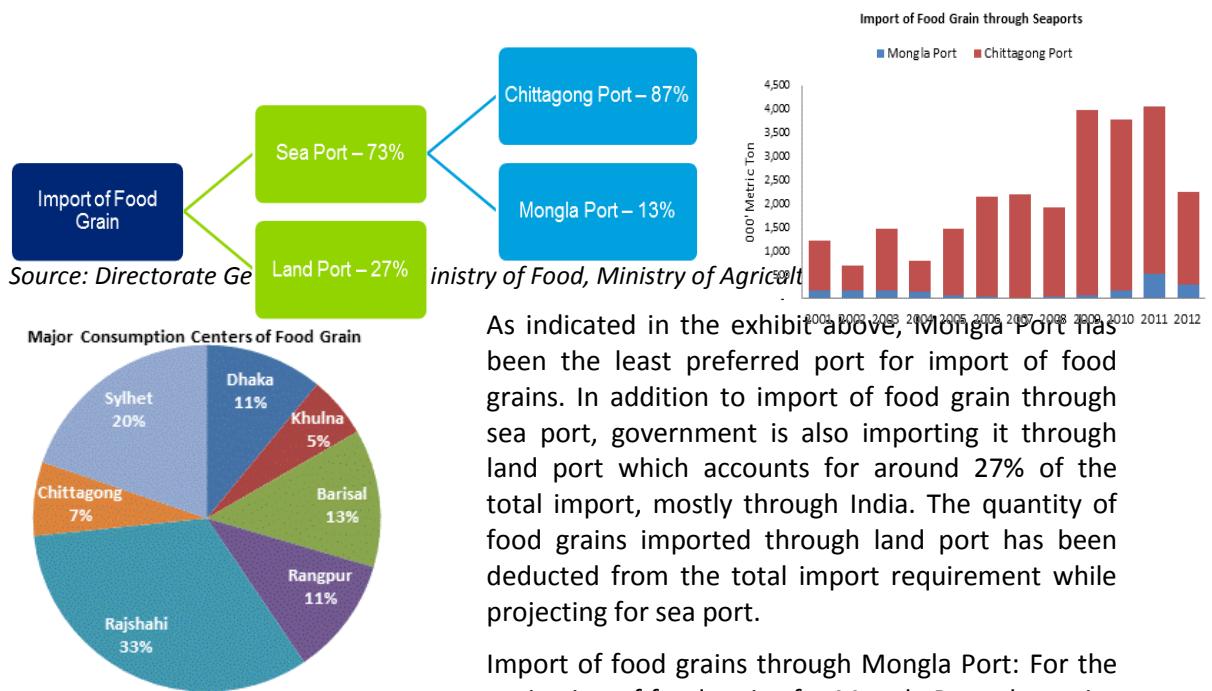
Figure 3-26: Import of food grains by Bangladesh



Source: Directorate General of Food, Ministry of Food, Bangladesh

Import of food grains through land and sea port: The majority of the food grain is imported through sea port i.e. through Chittagong and Mongla Port. There is continued dominance of Chittagong despite government's intentions. In order to encourage importers to use Mongla Port, the policy of the department of food is to direct 40-60% of import via Mongla Port. However, in practice importers prefer Chittagong where turnaround is faster. On an average around 87% of the total sea port import is through Chittagong Port and remaining through Mongla Port.

Figure 3-27: Import of food grain through land and sea ports



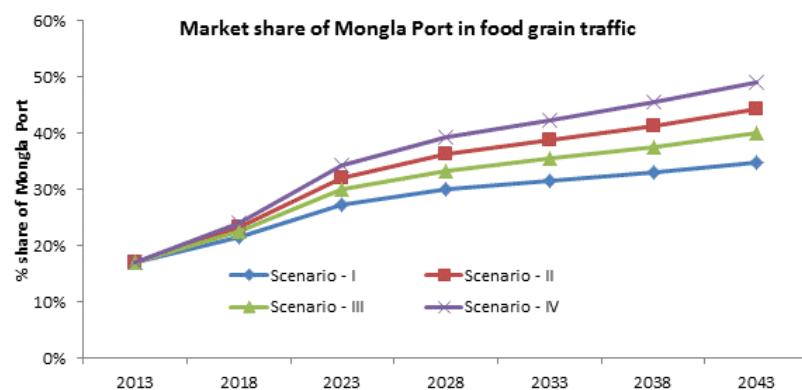
As indicated in the exhibit above, Mongla Port has been the least preferred port for import of food grains. In addition to import of food grain through sea port, government is also importing it through land port which accounts for around 27% of the total import, mostly through India. The quantity of food grains imported through land port has been deducted from the total import requirement while projecting for sea port.

Import of food grains through Mongla Port: For the projection of food grains for Mongla Port, the major consumption centers in Bangladesh have been

identified based on the population of each of divisions. It has been assumed that, food requirement for the divisions which are closer to the Mongla will be part Mongla Port hinterland and hence use Mongla Port for import of food grain i.e. divisions such as Khulna, Barisal, Rangpur, Rajshahi etc. will use Mongla Port for import of food grain for their consumption. Based on population, these divisions would require around 41% of the total food import for Bangladesh. However, currently, only around 13% of the total import is happening via Mongla Port because of number of constraints at the Port. The share of Mongla Port is expected to increase with implementation of various development and

connectivity projects.

GoB has taken several policy initiatives through National Agriculture Policy, to make the nation self-sufficient in food through increasing production of all crops including cereals and ensure a dependable food security system for all. In addition, GoB is taking appropriate steps to develop an efficient irrigation and cultivation system with a view to increase cropping intensity and yield. It is expected that, import of food grain would consist of minor volumes of rice and larger volumes of wheat. Based on the past trend and studies conducted by various agencies, it has been assumed that growth of rice import will be around 3% per annum and wheat will be 9% per annum initially and would come down to around 7% in next 5-7 years once the policy will get implemented making Bangladesh self-sufficient in food grain production.



In addition to rice and wheat, Bangladesh also imports non-cereal food items covering oilseed, edible oil, pulses, onions, sugar and salts etc. The demand of these commodities is growing at the rate of 5% per annum; it is assumed that the demand will continue to grow at the same rate. The share of Mongla Port has been estimated using the same assumptions used for rice and wheat. Total projected food grain (both cereal & non-cereal) to be imported through Mongla Port is presented in the exhibit below.

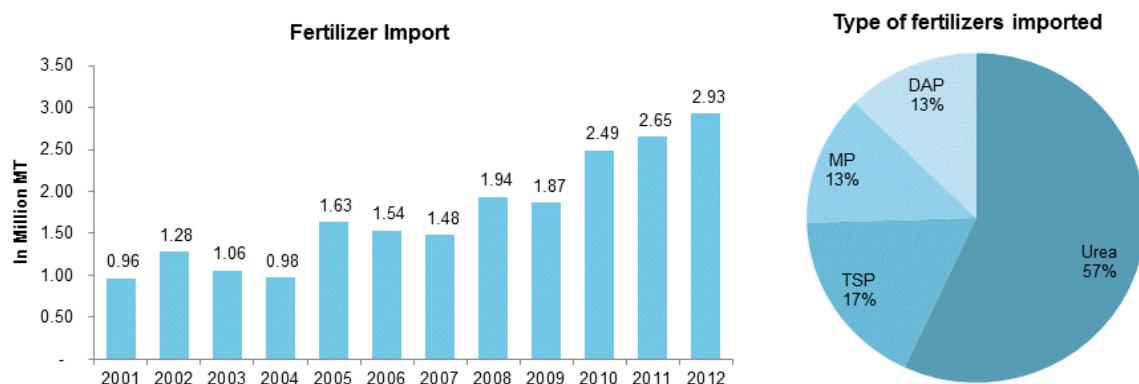
Figure 3-28: Projected Import of food grain (cereal and non-cereal) through Mongla Port (MT)

YEAR	2013	2018	2023	2028	2033	2038	2043
Scenario - I	420,468	787,378	1,433,394	2,190,311	3,225,101	4,765,153	7,061,564
Scenario - II	420,468	857,513	1,720,666	2,746,958	4,175,330	6,384,936	9,820,887
Scenario - III	420,468	825,089	1,581,579	2,469,875	3,690,399	5,537,272	8,339,946
Scenario - IV	420,468	888,928	1,860,224	3,029,565	4,676,326	7,275,231	11,407,675

3.9.2 Fertilizer

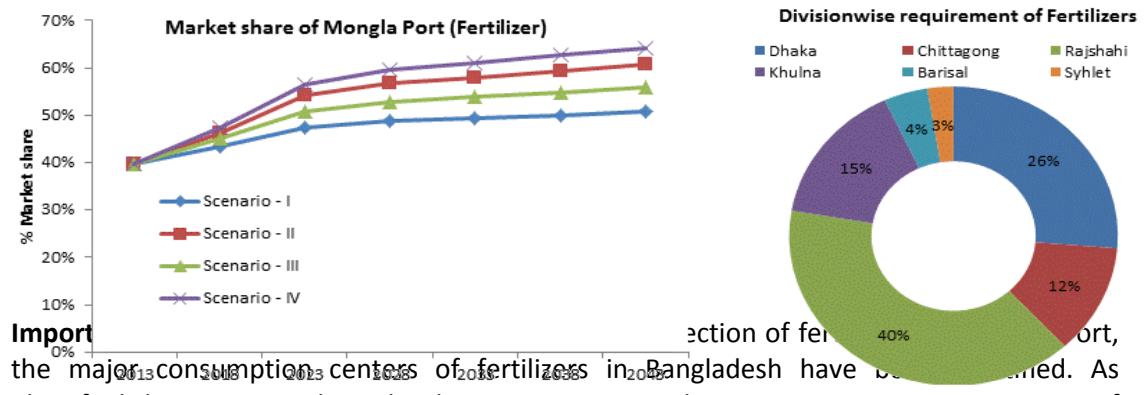
Fertilizers have been considered as an essential input for Bangladesh agriculture for meeting the food requirements of the growing population of the country. The expansion of modern agricultural practices together with intensified cultivation has led to an increasing demand for fertilizers in Bangladesh. A mix of Urea, TSP and MP is the most used fertilizer combination used in Bangladesh. More than half of the import of fertilizers consists of urea accounts for 57%. Total import of fertilizer and their type are given in the exhibit below.

Figure 3-29: Import of Fertilizers and type of fertilizers imported



Source: Ministry of Agriculture, Bangladesh

Demand for fertilizers: As per National Agriculture Policy, in Bangladesh, only 4.14 percent of net cultivable land remains as current fallow, which means that there is hardly any scope for increasing cultivable land. Currently, cropping intensity is around 185 percent. Thus, the only possible option for increasing agricultural production is to increase both the cropping intensity and yields simultaneously. To increase yield from the same amount of land fertilizer will play an important role. Studies have shown that around 50 to 60% of the enhanced food production in Bangladesh could be attributed to use of fertilizers. Under these circumstances, it has been assumed that import growth rate for fertilizer will be in the range of 8-10% per annum during the projection period (30 years).



Import of fertilizers through Mongla Port, the major consumption centers of fertilizers in Bangladesh have been outlined. As identified during National Food Policy Capacity Strengthening Programme, Government of Bangladesh, the division-wise fertilizer requirements are given in the graph.

The maximum fertilizers requirement is in the Rajshahi division and the lowest demand is in Sylhet district. The divisions which fall under Mongla Port hinterland are: Khulna, Barisal, Rangpur, Rajshahi etc. These divisions collectively consume around 59% of the total fertilizers imported. However, currently, only around 40% of the total import is happening using Mongla because of number of constraints at Mongla Port. The share of Mongla Port is expected to increase with implementation of various development and link projects. Based on the above assumptions, total fertilizers to be imported under various scenarios are presented in the exhibit below.

Figure 3-30: Projected import of fertilizers through Mongla Port (MT)

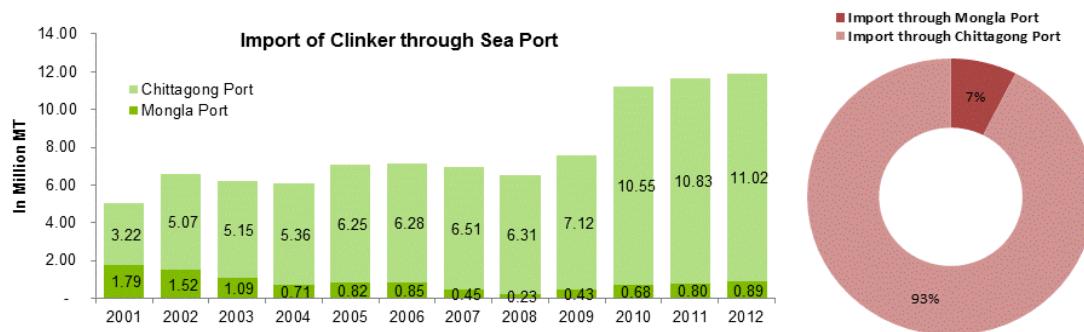
YEAR	2013	2018	2023	2028	2033	2038	2043
Scenario - I	1289009	2240112	3597718	5433026	8083185	12026055	17892205

Scenario - II	1289009	2390146	4098177	6316347	9485587	14245001	21392460
Scenario - III	1289009	2319323	3857708	5889470	8806064	13167020	19687618
Scenario - IV	1289009	2441607	4277665	6637798	9999382	15063373	22691924

3.9.3 Cement & Cement Clinker

Most of Bangladesh's cement requirements are met through imports in the form of clinker and related raw materials such as slag, fly ash, gypsum etc. Currently, around 93% of the import in this category is handled at Chittagong Port leaving only 7% for Mongla Port. The key reason for this is that most of the cement manufacturing firms are on Dhaka and Chittagong side and also demand from Central and South Western Bangladesh is much higher as compared to South Eastern and North Bangladesh. Import of clinker and other cement manufacturing raw materials are given in the exhibit below.

Figure 3-31: Import of clinker through Mongla & Chittagong Port



Source: IIFC/Deloitte Research

Demand for Cement/Clinker: It is believed that in Bangladesh currently there is vast gap in the required and available Infrastructure facilities. The situation is almost similar to what prevailed in India in the past decades. As can be seen from the graph shown below, per capita consumption of cement in Bangladesh is one of the lowest in the world. However, India fares slightly better than Bangladesh, the same figure for India is also very low and was even lower in the past few years.

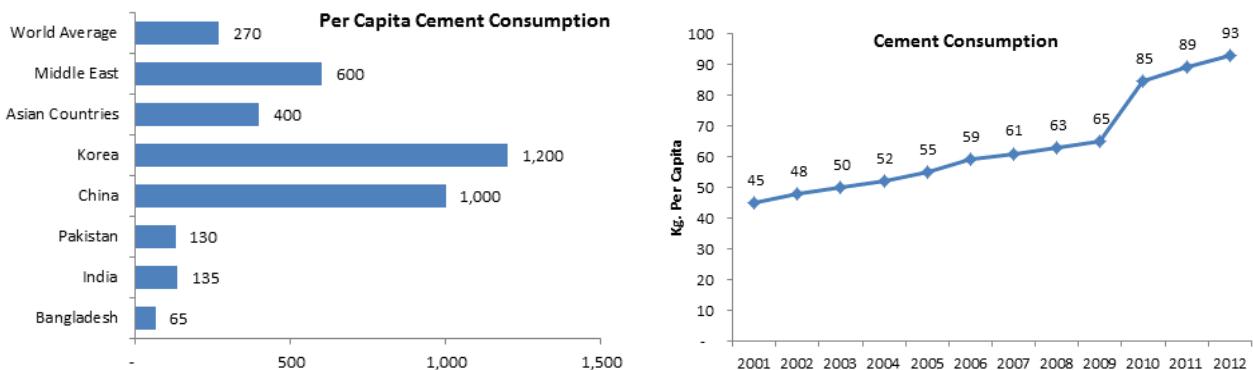
Under such scenario, there exists huge growth potential for cement industry in Bangladesh. As a matter of fact, the Indian cement industry has shown impressive growth with production in 2010 being almost 1.6 times than production in the year 2005. In India, the demand in this sector has grown at a CAGR of 8.3% over a 15 year period (from FY 97-11). Comparing this to situation in Bangladesh, it can be seen that cement production in Bangladesh has almost doubled in the past five years (from 7.6 m tonnes to 13.93 m tonnes). It can hence be reasonably believed that, Bangladesh cement sector will grow in similar fashion with the possibility of growth rates being even higher than those of India.

The outlook for the cement demand in Bangladesh seems positive for a number of reasons. First, the government seems to be on a war footing to increase both the amount and the efficiency of spending in social and physical infrastructure. Second, the private sector is also energized because of certain tax advantages, on real estate investment. Third, a number of large infrastructure construction projects (such as the Padma Bridge) are on the horizon. Both the government and the private sector are soliciting funds for such projects. If implemented, these projects would significantly improve demand for construction materials

including cement.

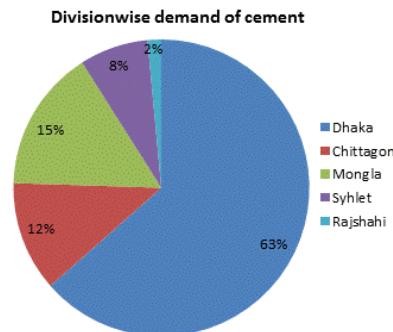
Bangladesh has a high need for basic infrastructure, housing and services, and therefore a robust growth in the demand for cement. Cement consumption has steadily been rising and more than doubled in the last 10 years. Per capita consumption remains poor when compared with the other Asian countries and world average, which underlines tremendous scope for growth in the Bangladesh cement demand in the long term.

Figure 3-32: Consumption/demand for cement



Source: IIFC/Deloitte Research

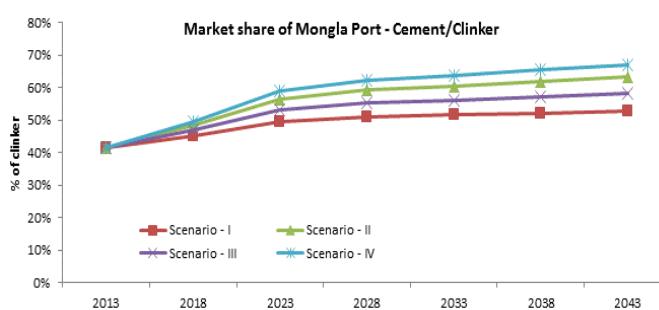
Currently, Bangladesh cement industry is at the beginning of growth stage and growing at average growth rate of around 7% per annum. It has been assumed that, the growth of demand for cement will be linked to the growth of construction industry which is currently growing at the rate of 8% per annum. Accordingly, it has been estimated that in short to medium term (3-5 years) overall cement demand in Bangladesh will grow at around 7-8% while growth is expected to be over 10% after five years owing to overall development in construction activities including development of big infrastructure projects (Padma Bridge, Flyovers, highways, power plants), growth in real estate sector (construction of houses, apartment blocks, public utilities etc.) due to growth in urbanization etc.



It is understood that, in the past most of the Bangladesh's cement requirements have been met by imports in the form of finished cement but since last 5-6 years only raw materials used for manufacturing of cement such as Clinker, Fly ash, Gypsum and Slag etc. are imported. Currently, majority of cement used in the country is Ordinary Portland Cement (OPC), with a 95% to 5% mix of clinker and gypsum hence among the total import of raw materials for cement, clinker accounts for around 93% and rest is Slag, Fly ash & Gypsum etc. However, worldwide Portland Composite Cement (PCC) has become popular which requires less clinker (around 65-80%). In addition, since overall price of cement is driven by price of clinker, industry will shift slowly towards manufacturing of PCC. Using these above assumptions, total demand for each of the raw materials for cement has been projected for 30 years.

Import of Cement through Mongla Port: Currently most of the cement manufacturing plants are on western part of Bangladesh and these plants uses Chittagong Port for importing raw material for cement manufacturing. Based on various studies on Bangladesh Cement

industries, the division-wise estimate is presented in the diagram. It is understood from the diagram that, currently Dhaka is the largest consumer of cement and is also expected to continue as a dominant consumer in the long term.



Share of Mongla in total demand including Rajshahi is around 17%. The reason for low demand is the low economic and project development activities in the region. However, the development of this region is due since long, it is expected that after development of some of the key link projects overall economic development of

the region will happen at faster rate and hence demand of cement will increase in the long term.

Table 3.1: Import of cement raw materials through Mongla Port (MT)

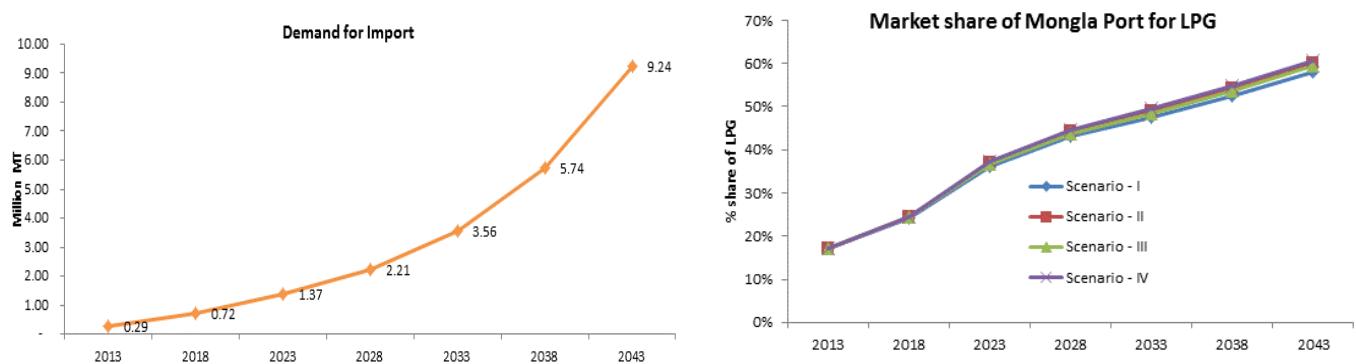
YEAR	2013	2018	2023	2028	2033	2038	2043
Scenario - I	1192358	2504974	4703839	9432644	14694046	18203450	25093968
Scenario - II	1192358	2672747	5358164	10966237	17243409	21562196	30003104
Scenario - III	1192358	2593551	5043763	10225106	16008135	19930492	27612049
Scenario - IV	1192358	2730292	5592836	11524330	18177412	22800940	31825613

3.9.4 Liquid Petroleum Gas

The increasing demand for LPG from the fast-expanding housing sector is encouraging many entrepreneurs to set up plants and grab a share of the growing market. Some 30 companies have already applied to the government, seeking permission to install LPG plants. Nearly a dozen companies have already established their plants that include four state-owned firms. In fact, a cut in Value Added Tax (VAT) and duty reduction for imports have encouraged the entrepreneurs to land into the business. Importers can now easily import gas from Abu Dhabi, Singapore, Malaysia and Indonesia.

Demand of LPG in Bangladesh: As per Bangladesh Petroleum Corporation (BPC), demand of LPG during 2011-12 was around 3,00,000 tons which is expected to get doubled by 2015-16. The projected annual demand for LPG would be around 500,000 to 600,000 tons a year against a supply of only about 60%. Out of total demand, 20% of demand is met through domestic sources and the remaining requirement is met through import. Huge demand and supply shortfall leads to a dramatic rise in prices of the product at local markets. It is expected that, the demand will continue to grow at the rate of 20% per annum during the next 5-7 years and then will come down to around 10% as per estimates provided by BPC.

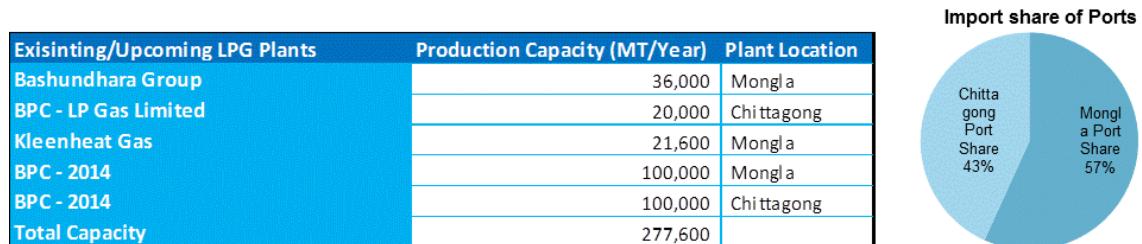
Figure 3-33: Import demand of LPG



Source: Bangladesh Petroleum Corporation, Deloitte/IIFC analysis

Import of LPG through Mongla Port: Currently, import of LPG through Mongla Port accounts for around 5% of total import by volume. Import of LPG through Mongla Port has grown at the rate of 22% during the last five years. The reason for significant growth is because of setting up of a number of LPG production units in Mongla area. Currently, around 41% of the total demand of LPG in Bangladesh is handled at Mongla Port, and it is expected that the share will increase further because of a number LPG production units which are currently under development and will be ready for operation in next 3-5 years. The existing and upcoming LPG plants around Mongla and Chittagong Port are given in the exhibit below.

Figure 3-34: Existing and upcoming LPG plants in Chittagong & Mongla Port area



Source: Bangladesh Petroleum Corporation, Deloitte/IIFC Analysis

Using the above assumptions, the import requirement of LPG through Mongla Port has been projected for next 30 years as presented in the exhibit below.

Table 3.2: Import of LPG through Mongla Port (MT)

YEAR	2013	2018	2023	2028	2033	2038	2043
Scenario - I	49571	173295	496227	952919	1694417	3012900	5357337
Scenario - II	49571	174972	506827	978307	1744682	3111412	5548797
Scenario - III	49571	174412	503272	969777	1727777	3078246	5484272
Scenario - IV	49571	175533	510403	986904	1761740	3144912	5614036

3.9.5 Coal

Coal serves as the prime raw material for generation of power and a key resource for industry, transport and household sectors. With the current known resources, major

alternative energy fuel available in Bangladesh is coal. Coal has the potential to contribute to the national economy by way of supplying energy for power generation, as well as for heat applications in industries.

Demand for Imported Coal: It has been estimated that, there would be 33,708 MW⁸ power requirements by year 2030. The Government of Bangladesh has plans to generate around 20,500 MW of power using coal (both domestic and imported). Although, Bangladesh has extensive reserves of coal to meet the domestic requirements but government will prefer importing coal for generation of power in the near future (3-5 years). Bangladesh's Power Development Board and India's National Thermal Power Corporation (NTPC) have joined to set up a 1320 MW power plant at Rampal in Khulna. NTPC has already conducted the feasibility study to install a plant in Khulna, and another plant of 1320 MW capacity in Chittagong. A number of imported coal based power plants have been planned by government of Bangladesh to be set up by 2030 as indicated in the table below.

Table 3.3: Imported Coal based Power Plants

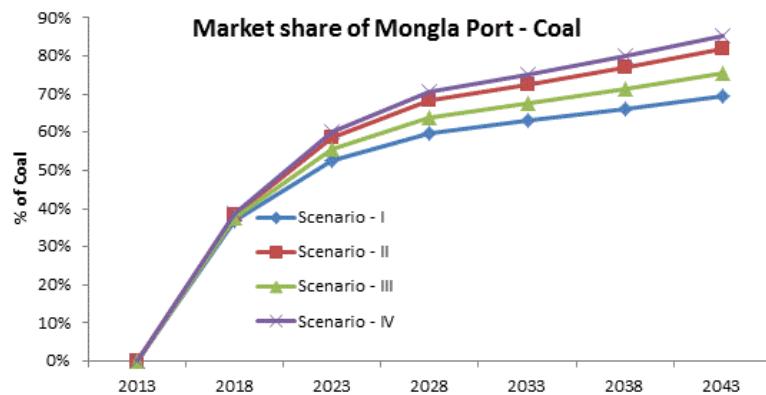
Name of Planned Projects	Capacity (MW)	Location	Least Distance Port
Khulna 1300 MW Coal based TPSC Project	1320	Rampal, Khulna	Mongla Port
Chittagong 1300 MW Coal based TPSC Project	1320	Anawara, Chittagong	Chittagong Port
Mosheshkhali 5320 Coal based TPSC Project	5320 (1320+4000)	Moheshkhali, Cox's Bazar	Chittagong Port
Chittagong	901.67	Chittagong	Chittagong Port
Labonchora, Khulna	282.67	Labonchora, Khulna	Mongla Port
Maowa, Munshiganj	522	Maowa, Munshiganj	Chittagong Port
Total	9,666		

Source: IIFC Analysis

It is estimated that out of the total coal requirement for power generation around 47% (9,666 MW) would be met through imported coal. Accordingly, in order to meet the demand of imported coal based plants, Bangladesh is in discussion with Indonesia over lease of coalmine sites to feed the Khulna and Chittagong plants, which would require around three million tons of coal annually. Seven other countries have been approached by GoB—Australia, South Africa, China, Canada, Vietnam, Kazakhstan & Poland for import of coal. It is expected that, the above projects will start operations 2016 onwards and hence requirement of imported coal will rise after that.

Import of Coal through Mongla Port: It understood that, Bangladesh is also importing coal using land port from India through Meghalaya and Assam, it is assumed around 5% of the total requirement of coal will be imported through land port and remaining will be imported through sea port i.e. through Chittagong and Mongla Port.

⁸ Overview of energy sector in Bangladesh prepared by IIFC



The least distance port for the upcoming coal based power plants is indicated in the table above. Accordingly, it has been assumed that, the coal for Rampal & Labonchora, Khulna will be imported through Mongla Port. The total coal imported through Mongla Port under different scenarios is presented in the exhibit below.

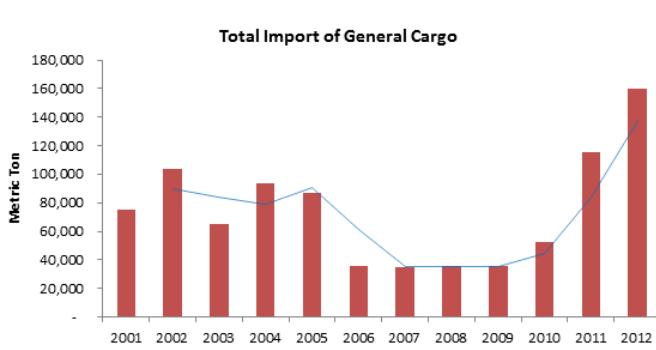
Figure 3-35: Import of coal through Mongla Port (MT)

YEAR	2013	2018	2023	2028	2033	2038	2043
Scenario - I	0	985655	3481566	4108893	4556550	5156615	5987385
Scenario - II	0	1025113	3874522	4687905	5250321	6000814	7036850
Scenario - III	0	1005288	3673624	4389959	4892386	5564142	6492614
Scenario - IV	0	1035099	3978389	4843482	5437977	6230662	7324449

3.9.6 General Cargo

The general cargo consisting of machineries, motor vehicles, and other general cargos together accounts for around 6% of total import by volume. For the purpose of traffic projection, these items are considered together for analysis. The import of general cargo has not been consistent in the past.

Figure 3-36: Import of general cargo through Mongla Port



For instance, till 2009 the reconditioned motor vehicle used to be imported through Chittagong Port but because of government mandate to avoid congestion at Chittagong Port, these vehicles are now imported through Mongla Port. Machineries cargos are imported for the use of various capital projects, industrial raw materials, electrical goods etc.

Together these cargos have grown at the rate of 4% in the last 10 years. It is assumed that the general cargo will continue to grow at the same rate.

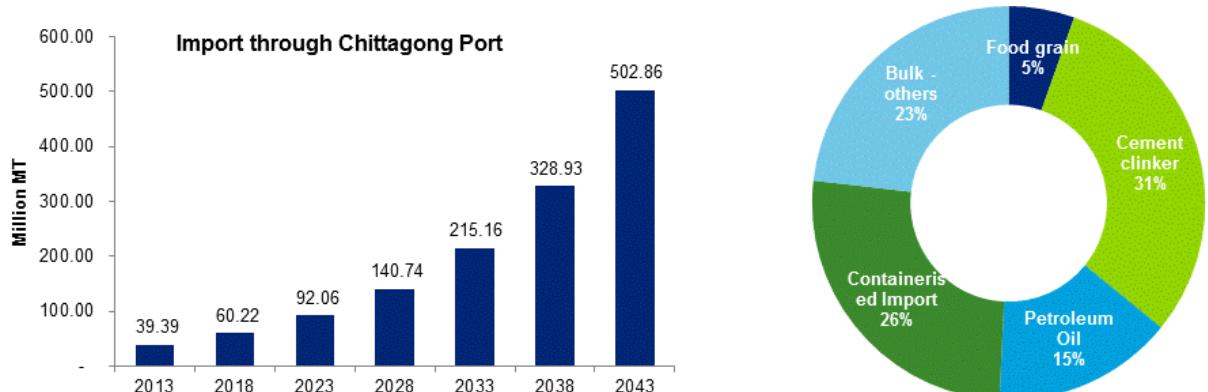
Table 3.4: Projected import of general cargo (MT)

YEAR	2013	2018	2023	2028	2033	2038	2043
Scenario - I	167058	208307	265014	343556	448567	589527	780000
Scenario - II	167058	209404	273018	365392	503001	715038	1052902
Scenario - III	167058	209072	270410	356844	476642	644438	882384
Scenario - IV	167058	210534	282335	394483	565656	833136	1262843

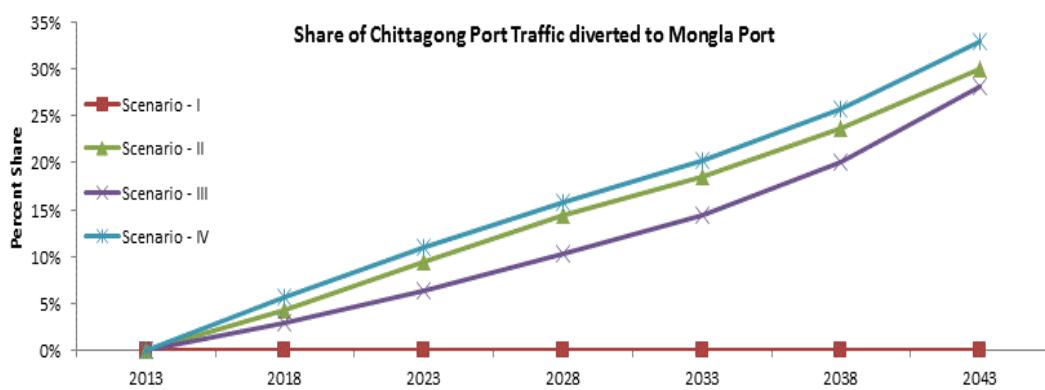
3.9.7 Diversion of Import Traffic after development of link projects

After implementation of key development projects envisaged under Scenario II, III& IV, similar to export traffic, certain proportion of import traffic will also get diverted to Mongla Port. As the commissioning of the link projects will create a bright prospect in exporting garments, leather, tea, and general cargo etc. the raw materials used by these industries will also be imported through Mongla Port. Moreover, import of heavy machinery & equipments, fertilizer, food grain, sugar, motor vehicles, raw materials of industry etc. through Mongla Port will increase with respect to the present rate. As a matter of consequence, the act of establishing different types of new industries in the south-western part of the country, scope of huge employment, expansion of trade & business and overall activities of Mongla Port will increase and develop rapidly. Project import of major commodities are presented in the exhibit below.

Figure 3-37: Projected Import through Chittagong Port



Source: Chittagong Port Authority



3.9.7.1 Container Cargo

Currently, majority of the items which are consumed by individuals consisting of electronic goods, leather goods, machineries used in various types of motor vehicles, raw materials for garments and leather industries are imported in containers. The same containers are used to send the export cargo. Total containerized import accounts for around 26% of total import volume and around 70-80% of this is consumed in Dhaka & surrounding region. It has been assumed that, after implementation of key development projects the LCL cargo will start shifting to Mongla Port. The projected export of general cargo is presented in the exhibit below.

Table 3.5: Diverted cargo from other cargo generation centers (MT)

YEAR	2013	2018	2023	2028	2033	2038	2043
Scenario - I	-	-	-	-	-	-	-
Scenario - II	-	678680	1830293	3399620	5738162	9685350	16347745
Scenario - III	-	387130	844137	1509849	2548450	4301487	7260410
Scenario - IV	-	904907	2651466	5204914	8785290	14828547	25028863

3.9.7.2 Bulk Cargo

The miscellaneous bulk cargo currently imported through Chittagong Port accounts for around 10% of total import by volume. After implementation of key development projects, it is assumed that certain portion of the cargo specially consumed in Dhaka and surrounding region will get diverted to Mongla Port. The estimated diverted traffic from Chittagong Port under various scenarios is given in the exhibit below.

Table 3.6: Diverted Bulk cargo to Mongla Port under each scenario (MT)

YEAR	2013	2018	2023	2028	2033	2038	2043
Scenario - I	-	-	-	-	-	-	-
Scenario - II	-	240849	649532	1206452	2036351	3437123	5801464
Scenario - III	-	137384	299566	535813	904390	1526506	2576564
Scenario - IV	-	321132	940948	1847113	3117711	5262334	8882207

3.10 Total Traffic for Mongla Port

The projection of major commodities for both export and import is estimated above. This section provides the summary of projection of total traffic expected to be handled at Mongla Port under different scenarios.

3.10.1 Export through Mongla Port

3.10.1.1 Containerized Traffic

Presently, nearly 100% of the export is containerized. Earlier raw jute used to be handled partly in bulk and partly in containers, but now it is also getting 100% containerized. In Bangladesh container penetration is gradually increasing, it has reached at a level of 40% in case of sea borne trade and is expected to become over 50% in the medium to long term. Based on the historical data of Mongla Port, the average weight per TEU is around 11 tonnes in case of export and around 3 tonnes in case of import. The key reason for wide variation in weight per TEU is because of the fact that, all the import at Mongla Port is non-containerized while export is containerized. Under this circumstance, exporters have to bring empty containers from Chittagong Port to Mongla Port to send their export cargo. It is estimated that around 60% of the total container requirement of Mongla port is repositioned from Chittagong Port. Hence, per tones weight of import is significantly low as compared to export. In order to project total container traffic, total containerized tonnage traffic has been projected for each of the export commodities including the traffic diverted from Chittagong Port after implementation of key connectivity projects. Total tonnage containerized traffic is then divided by average weight per TEU, 7 tonnes per TEU (average of export and import TEU per ton). Using the above assumptions, total projected container traffic estimated is given in the exhibit below.

Name of Export Commodities	Containerisation Ratio
Jute Products	100%
Raw Jute	90%
Shrimp/Fish	100%
General Cargo	100%
Garments	100%
Leather Goods	100%
Tobacco	100%
Clay Tiles	100%
Betel Nuts	100%

Table 3.7: Total projected container traffic for export at Mongla Port (Number of TEUs)

YEAR	2013	2018	2023	2028	2033	2038	2043
Scenario - I	19919	33818	63311	91087	123321	167588	235007
Scenario - II	19919	69890	150369	270741	482001	878201	1488359
Scenario - III	19919	57601	130561	259447	429868	834041	1675437
Scenario - IV	19919	80948	210953	411465	662552	1208030	2253608

3.10.1.2 Non Containerized Traffic

Since, almost all export is containerized, so there is non-containerized export traffic to be handled at Mongla Port.

3.10.2 Import through Mongla Port

3.10.2.1 Containerized Traffic

The level of containerized trade in case of import at Mongla Port is quite low as compared to export. Since most of the commodities imported are bulk and break bulk comprising of food

Name of Import Commodities	Containerisation Ratio
Food Grain	0%
Fertilizer	0%
Clinker	0%
LPG	0%
Coal	0%
General Cargo	80%

grain, clinker, fertilizers etc. Only few commodities included in the general cargo categories are imported in containers, these include electronic, electrical items, plastic items, leather items, machineries etc. It is assumed that, around 80% of these items

imported in containers. Total projected import from Mongla Port is given in the exhibit below.

Table 3.8: Import of containerized traffic at Mongla Port (Number of TEUs)

YEAR	2013	2018	2023	2028	2033	2038	2043
Scenario - I	18496	24505	33009	42792	58976	81588	107949
Scenario - II	18496	126893	248710	403009	682692	1143153	1740099
Scenario - III	18496	82925	145300	245620	363620	600431	990640
Scenario - IV	18496	161113	434674	833381	1282247	2155048	3619546

3.10.2.2 Non Containerized Traffic

As highlighted above, most of the import is non-containerized i.e. bulk/break bulk. The non-containerized for Mongla Port is estimated in the exhibit below. It is to be noted that, most the traffic estimated in the exhibit below may not be entirely handled at Mongla Port. This is because of the fact that, bulk of the cargo operations (around 80-90%) are undertaken in the Pussur river anchorage and mooring buoys, barges and river crafts carry the discharged goods or goods to be loaded to and from private jetties along river. The key reasons for the high percentage of cargo handled in the river is the adequate draft available at the anchorage point which is not the case at the jetty area, loading/unloading can be done on both sides of the vessels simultaneously which facilitates faster turnaround.

Table 3.9: Non-containerized Import through Mongla Port (Metric Ton)

YEAR	2013	2018	2023	2028	2033	2038	2043
Scenario - I	2984817	6722661	13739246	22152149	32275728	43164172	61392459
Scenario - II	2984817	7332539	16072806	26637132	39349926	53710346	77863123
Scenario - III	2984817	7052061	14911662	24381731	35781667	48345726	69420094
Scenario - IV	2984817	7543888	16953462	28446863	42263516	58198751	85081240

3.10.3 Total Traffic to be handled at Mongla Port

Based on the above assumptions, total containerized and non-containerized traffic for both export and import are given the exhibit below.

Table 3.10: Total containerized traffic for Mongla Port (No. of TEUs)

YEAR	2013	2018	2023	2028	2033	2038	2043
Scenario - I	38415	58323	96320	133879	182297	249176	342955
Scenario - II	38415	196784	399079	673750	1164693	2021353	3228458
Scenario - III	38415	140526	275861	505067	793488	1434472	2666077
Scenario - IV	38415	242061	645627	1244847	1944799	3363078	5873154

Table 3.11: Total non-containerized traffic for Mongla Port (Metric Ton)

YEAR	2013	2018	2023	2028	2033	2038	2043
Scenario - I	2984817	6722661	13739246	22152149	32275728	43164172	61392459
Scenario - II	2984817	7332539	16072806	26637132	39349926	53710346	77863123
Scenario - III	2984817	7052061	14911662	24381731	35781667	48345726	69420094
Scenario - IV	2984817	7543888	16953462	28446863	42263516	58198751	85081240

3.11 Total Traffic for New Project

The total potential traffic which can come to Mongla Port under various scenarios is estimated above. The traffic for Mongla Jetties PPP project is estimated using assumption that, a portion of existing as well as new traffic of Mongla Port will get diverted to the New 2 Jetties to be developed under PPP mode. Accordingly, this section estimates the traffic for new project.

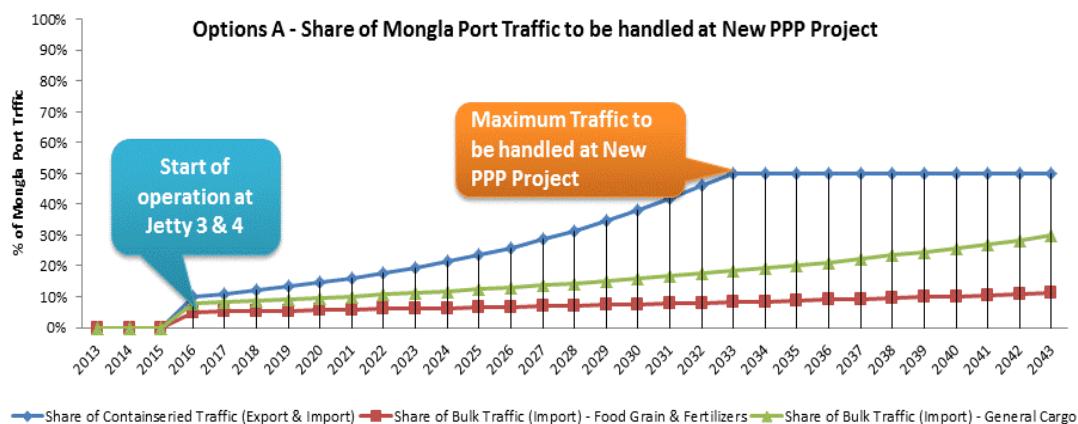
In order to make the project attractive from Terminal Operator's point of view and minimize the overall Viability Gap Funding (VGF) requirements, three physical options have been considered for the purpose of traffic estimation for new PPP project. These options have been structured in such a manner so that it provides a feasible solution for implementing the project through private sector investment with sufficient return. Through these options, all possible efforts have been made, to reduce VGF funding to a minimum level. These options have been detailed out in Chapter 4. The key assumptions used and amount of traffic estimated under these options have been described below.

3.11.1 Option A: Providing Two Jetties (Base Case)

Under this option, MPA will provide the right to use the land for two jetties (Jetty 3 & 4) and back-up area and the existing assets (old piles) of Jetty 3 & 4 to the selected Terminal Operator. It has been assumed that, the Terminal Operator will start operation at Jetty 3 & 4 in the year 2016 after necessary addition and construction of new facilities on the existing assets. Using the above assumptions the percentage of traffic of Mongla Port that can be diverted to New PPP Project has been estimated. Some of the key assumptions used for estimating the share are highlighted below.

- Operation at Jetty 3 & 4 will start in year 2016
- Major export commodities to be handled at new port will be Frozen fish/shrimps, Jute & Jute Products, Garments, Leather Goods, General Cargo, and any other container traffic
- Major import commodities includes Food Grain, Fertilizers, Containerized Import, and General Cargo
- Maximum container traffic that can be diverted to New Project will be 50%
- Maximum non-container/bulk traffic that can be diverted to New Project will be Food Grain/Fertilizer - 10% and General Cargo – 30%
- Maximum capacity of each Jetty 70,000 TEUs Plus 2,40,000 Metric Ton

Using the above assumptions, the estimated percent of diverted traffic from Mongla Port to New PPP Projects is presented in the exhibit below.



3.11.1.1 Containerized Traffic

As indicated in the previous section, the entire export traffic handled at Mongla Port is containerized and also some portion of import is also containerized. The major containerized commodities to be handled at new port will be Frozen fish/shrimps, Jute & Jute Products, Garments, Leather Goods, General Cargo, and any other container traffic. It has been assumed that, initially around 10% of the total container traffic will be handled at New PPP project and traffic will gradually increase at growth rate of 10%. The container traffic will increase till year 2032 and will become static once it reaches the maximum limit of 50%. The share of container traffic over projection period of 30 years is presented in the above diagram. Using these assumptions the projected container traffic under each scenarios for Option A are given in the exhibit below.

Table 3.12: Projected Container Traffic under Each Scenario for Option A

YEAR	2013	2018	2023	2028	2033	2038	2043
Scenario - I	-	6253	16053	34735	72474	102887	140000
Scenario - II	-	21995	72006	140000	140000	140000	140000
Scenario - III	-	15622	49429	140000	140000	140000	140000
Scenario - IV	-	27133	116576	140000	140000	140000	140000

3.11.1.2 Non-Containerized/Bulk Traffic

The proportion of traffic diverted to new project will be lower than the container traffic. This is because of the fact that, majority of the bulk cargos are handled at anchorage and mooring buoys at Mongla Port and also major portion of the commodities imported by private firms like Cement/Clinker, LPG, and Coal etc. are handled at their private jetties. Other commodities such as Food Grain, Fertilizers, imported by both government and private sector, while the import by government sector can be entirely handled at Mongla Port but portion of import by private sector may be handled at New PPP Project. Similar portion of general cargo, which mostly imported by private sector, can be handled at New PPP Project. Accordingly, it has been assumed that around 5-10% of Mongla Port's Food Grain & Fertilizer traffic would be handled at New PPP Project. As regard to the General Cargo, it is assumed that, initially around 10% of the total cargo will be handled at New PPP project and traffic will gradually increase at growth rate of 10%. The share of non-container traffic over projection period of 30 years is presented in the above diagram. Using these assumptions the projected non-container/bulk cargo under each scenarios for Option A are given in the exhibit below.

Table 3.13: Projected non-container/bulk cargo under each scenarios for Option A

YEAR	2013	2018	2023	2028	2033	2038	2043
Scenario - I	-	178966	339214	480000	480000	480000	480000
Scenario - II	-	190742	388555	480000	480000	480000	480000
Scenario - III	-	185235	364921	480000	480000	480000	480000
Scenario - IV	-	195237	409223	480000	480000	480000	480000

3.11.2 Option B: Providing Three Jetties

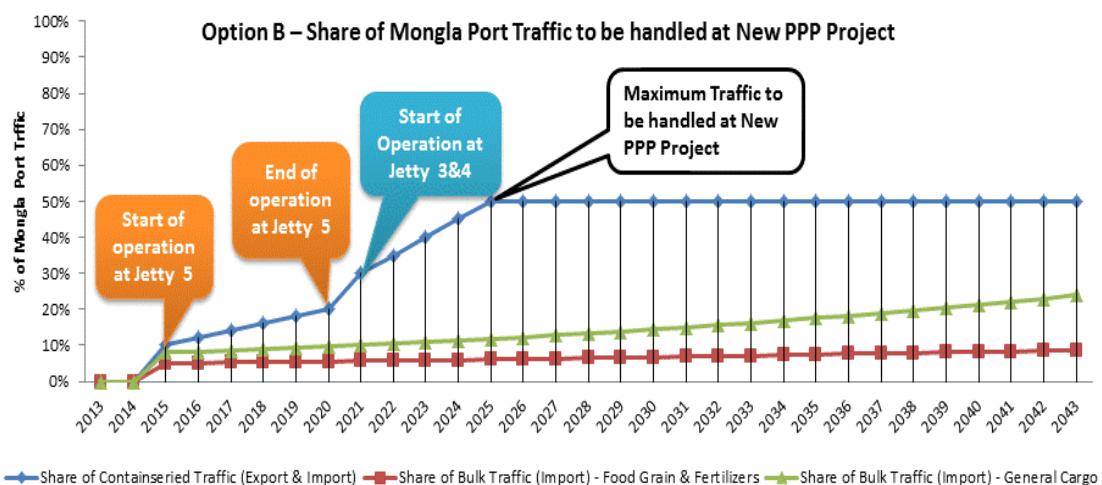
It is understood that, currently traffic at Mongla Port is quite low due to siltation of Pussur River Channel preventing regular movement of ships. It is expected that traffic will increase once the channel is fully dredged. However, full utilization of current jetties will require a few more years even after regular movement of ships. Under this situation, investment in two new jetties without traffic demand is likely to make the project unviable and unattractive to investors. To avoid this, the construction of the two new jetties may be delayed until traffic demand reaches to a certain level.

Under this option, it is proposed that, MPA will provide the right to operate Jetty 5 until the traffic demand reaches the target level. The period of operation may be 5-6 years after which Terminal Operator will complete construction of Jetty 3 & 4 and hand over Jetty 5 to MPA. This arrangement will not have much impact on MPA traffic as based on the traffic projected for entire Mongla Port; this Jetty will remain idle in the next 5 - 6 years i.e. the potential traffic of the Mongla Port will be less than maximum traffic handling capacity of all the existing five Jetties. Under this option it is assumed that, once the desired traffic level is reached it will become obligatory for Terminal Operator to complete construction of Jetty 3 & 4 within a fixed period of construction time. After completion of construction of the Jetty 3 & 4, Jetty 5 will be handed over to MPA. Some of the key assumptions used for estimating the share are highlighted below.

- Operation at Jetty 5 will start in year 2015 and ends at 2020
- Operation at Jetty 3 & 4 will start in year 2021
- Major export commodities to be handled at new port will be Frozen fish/shrimps, Jute & Jute Products, Garments, Leather Goods, General Cargo, and any other

- container traffic
- Major import commodities includes Food Grain, Fertilizers, Containerized Import, and General Cargo
- Maximum container traffic that can be diverted to New Project will be 50%
- Maximum non-container/bulk traffic that can be diverted to New Project will be Food Grain/Fertilizer - 10% and General Cargo – 30%
- Maximum capacity of Jetty 5 will be 60,000 TEUs Plus 2,00,000 Metric Ton
- Maximum capacity of each Jetty of 3 & 4 will be 70,000 TEUs Plus 2,40,000 Metric Ton

Using the above assumptions, the estimated percent of diverted traffic from Mongla Port to New PPP Projects is presented in the exhibit below.



3.11.2.1 Containerized Traffic

The major containerized commodities to be handled at new port under these options will be same as Option A i.e. Frozen fish/shrimps, Jute & Jute Products, Garments, Leather Goods, General Cargo, and any other container traffic. It has been assumed that, initially around 10% of the total container traffic will be handled at Jetty 5 and traffic will gradually increase at growth rate of 10% till it reaches to its maximum capacity of 60,000 containers. Once Jetty 5 reaches its maximum capacity, the operation of Jetty 3 & 4 will start. The traffic at Jetty 3 & 4 will increase at the rate 5% p.a. till it reaches its 50% of Mongla Port traffic or 1,40,000 containers. As indicated in the diagram above, the container traffic will reach its maximum capacity in 2025. The share of container traffic over projection period of 30 years is presented in the above diagram. Using these assumptions the projected container traffic under each scenarios for Option B are given in the exhibit below.

Table 3.14:Projected container traffic under each scenarios for Option B

YEAR	2013	2018	2023	2028	2033	2038	2043
Scenario - I	-	7616	28939	51244	71218	99881	140000
Scenario - II	-	28427	140000	140000	140000	140000	140000
Scenario - III	-	20002	97762	140000	140000	140000	140000
Scenario - IV	-	35218	140000	140000	140000	140000	140000

3.11.2.2 Non-Containerized/Bulk Traffic

Similar to Option A, the proportion of traffic diverted to new project will be lower than the container traffic. This is because of the fact that, majority of the bulk cargos are handled at anchorage and mooring buoys at Mongla Port and also major portion of the commodities imported by private firms like Cement/Clinker, LPG, and Coal etc. are handled at their private jetties. Other commodities such as Food Grain, Fertilizers, imported by both government and private sector, while the import by government sector can be entirely handled at Mongla Port but portion of import by private sector may be handled at New PPP Project. Similar portion of general cargo, which mostly imported by private sector, can be handled at New PPP Project. Accordingly, it has been assumed that around 5-10% of Mongla Port's Food Grain & Fertilizer traffic would be handled at New PPP Project. As regard to the General Cargo, it is assumed that, initially around 10% of the total cargo will be handled at New PPP project and traffic will gradually increase at growth rate of 10%. The share of non-container traffic over projection period of 30 years is presented in the above diagram. Using these assumptions the projected non-container/bulk cargo under each scenarios for Option B are given in the exhibit below.

Table 3.15: Projected non-container/bulk cargo under each scenarios for Option B

YEAR	2013	2018	2023	2028	2033	2038	2043
Scenario - I	0	179385	323753	480000	480000	480000	480000
Scenario - II	0	191166	370777	480000	480000	480000	480000
Scenario - III	0	185658	348256	480000	480000	480000	480000
Scenario - IV	0	195665	390487	480000	480000	480000	480000

3.11.3 Option C: Providing Three Jetties with BGMEA/BKMEA

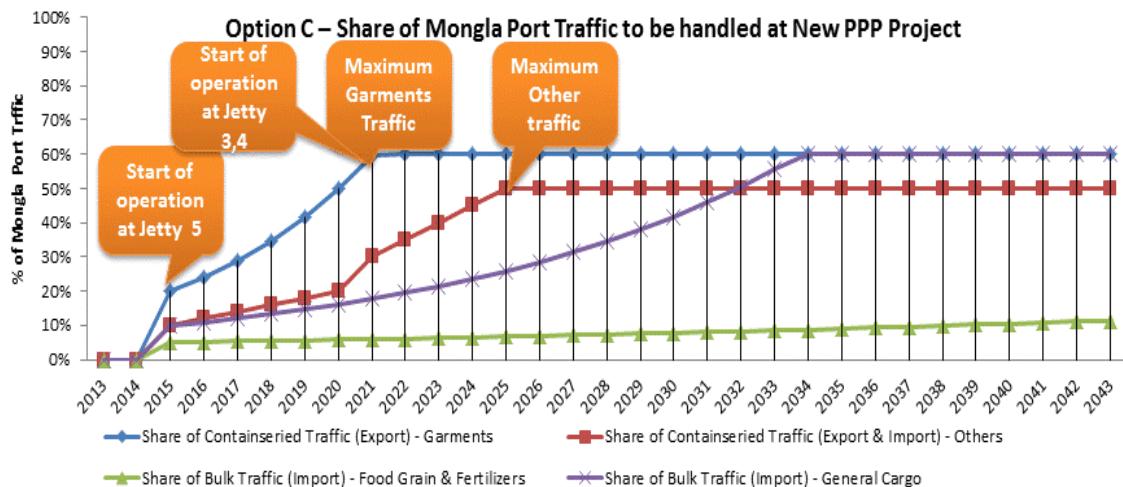
This option is similar to option B, except additional traffic of Garments. The key rationale of this option is, in most PPP deals, Terminal Operators are selected through open tendering. This creates transparency and competition among the Terminal Operators and generates better terms for the Government. However, in some cases negotiated deals may be easier if it is provided to a nationally recognized business association, for the use of their members strengths. In this case, Bangladesh Garments Manufacturers and Exporters Association (BGMEA) or Bangladesh Knitwear Manufacturers and Exporters Association (BKMEA) are suitable candidates for such an agreement as the members of these associations are prime customers of the proposed port facilities. Under this arrangement, it assumed that the new PPP project will be able attract addition traffic of Garments from BGMEA/BKMEA.

Some of the key assumptions used for estimating the share are highlighted below.

- Operation at Jetty 5 will start in year 2015 and ends at 2020 or early
- Operation at Jetty 3 & 4 will start in year 2021 or early
- Major export commodities to be handled at new port will be Frozen fish/shrimps, Jute & Jute Products, Leather Goods, General Cargo, and any other container traffic
- Additional Garments export traffic from BGMEA/BKMEA
- Major import commodities includes Food Grain, Fertilizers, Containerized Import, and General Cargo
- Additional container Garments import as raw material from BGMEA/BKMEA

- Maximum Garments traffic that can be diverted to New Project will be 60%
- Maximum other export traffic that can be diverted to New Project will be 50%
- Maximum non-container/bulk traffic that can be diverted to New Project will be Food Grain/Fertilizer - 10% and General Cargo – 30%
- Maximum capacity of Jetty 5 will be 60,000 TEUs Plus 2,00,000 Metric Ton
- Maximum capacity of each Jetty of 3 & 4 will be 70,000 TEUs Plus 2,40,000 Metric Ton

Using the above assumptions, the estimated percent of diverted traffic from Mongla Port to New PPP Projects is presented in the exhibit below.



3.11.3.1 Containerized Traffic

The major containerized commodities to be handled at new port under this option will be same as Option B i.e. Frozen fish/shrimps, Jute & Jute Products, Garments, Leather Goods, General Cargo, and any other container traffic. In addition to this additional traffic of Garments would be handled initially at Jetty 5 and then at Jetty 3 & 4. It has been assumed that, initially around 10% of the total container traffic (other than Garments) will be handled at Jetty 5 and traffic will gradually increase at growth rate of 10% till it reaches to its maximum capacity of 60,000 containers. Once Jetty 5 reaches its maximum capacity, the operation of Jetty 3 & 4 will start. The traffic at Jetty 3 & 4 will increase at the rate 5% p.a. till it reaches its 50% of Mongla Port traffic or 1,40,000 containers.

As regard to the Garments traffic, it is assumed that, initially around 20% of the total Garments container traffic will be handled at Jetty 5 and traffic will gradually increase at growth rate of 20% till it reaches to its maximum capacity of upto 60% level. Once Jetty 5 reaches its maximum capacity, the operation of Jetty 3 & 4 will start. As indicated in the diagram above, the Garments traffic will reach its maximum capacity in year 2021 while other container traffic will reach maximum capacity by year 2025. The share of container traffic over projection period of 30 years is presented in the above diagram. Using these assumptions the projected container traffic under each scenarios for Option C are given in the exhibit below.

Table 3.16: Projected container traffic under each scenarios for Option C

YEAR	2013	2018	2023	2028	2033	2038	2043
Scenario - I	0	8673	32400	60317	94450	132747	140000

YEAR	2013	2018	2023	2028	2033	2038	2043
Scenario - II	0	50733	140000	140000	140000	140000	140000
Scenario - III	0	33546	130334	140000	140000	140000	140000
Scenario - IV	0	60000	140000	140000	140000	140000	140000

3.11.3.2 Non-Containerized/Bulk Traffic

Similar to Option B, the proportion of traffic diverted to new project will be lower than the container traffic. This is because of the fact that, majority of the bulk cargos are handled at anchorage and mooring buoys at Mongla Port and also major portion of the commodities imported by private firms like Cement/Clinker, LPG, and Coal etc. are handled at their private jetties. Other commodities such as Food Grain, fertilizers, imported by both government and private sector, while the import by government sector can be entirely handled at Mongla Port but portion of import by private sector may be handled at New PPP Project. Similar portion of general cargo, which mostly imported by private sector, can be handled at New PPP Project. Accordingly, it has been assumed that around 5-10% of Mongla Port's Food Grain & Fertilizer traffic would be handled at New PPP Project. As regard to the General Cargo, it is assumed that, initially around 10% of the total cargo will be handled at New PPP project and traffic will gradually increase at growth rate of 10%. The share of non-container traffic over projection period of 30 years is presented in the above diagram. Using these assumptions the projected non-container/bulk cargo under each scenarios for Option B are given in the exhibit below.

Table 3.17: Projected non-container/bulk cargo under each scenarios for Option B

YEAR	2013	2018	2023	2028	2033	2038	2043
Scenario - I	0	193137	375471	480000	480000	480000	480000
Scenario - II	0	200000	427081	480000	480000	480000	480000
Scenario - III	0	199627	402481	480000	480000	480000	480000
Scenario - IV	0	200000	449286	480000	480000	480000	480000

4 TECHNICAL ASPECTS

4.1 Scope of PPP Project

The present PPP project comprises Development of the two jetties (J3 and J4) and operating the same for a certain period of time. It is proposed that the Investor will construct two jetties along with ancillary back-up facilities; procure, install and maintain terminal equipment; and then operate the Terminal and provide services throughout the term.

4.2 Physical Options for PPP

The project needs to be structured in such a manner so that it provides a feasible solution for implementing the project through private sector investment with sufficient return. For this PPP investment, depending upon the project configuration chosen, there may a need for Viability Gap Funding (VGF). Therefore, all possible efforts should be made, to reduce such funding need to a minimum. These measures though may apparently seem to be not necessary, in fact, can add significant value to the project. These are within jurisdiction of MPA and therefore, can be more conveniently achieved. The VGF can be reduced by:

- reducing upfront investment needed from Terminal Operator and
- providing readily available customers with an operating facility.

Therefore, we propose two broad physical options for the private sector participation:

Option A: Two Jetties (base case)

Option B: Three Jetties

Option C: Two or three jetties with participation of recognized business associations

4.2.1 Option A: Two Jetty Option

4.2.1.1 Physical Scope

In this option, MPA will provide the right to use the land for two jetties (J3 and 4) and back-up area and the existing assets (old piles) of J3 and 4 to the selected Terminal Operator.

Mongla Port Authority, MPA will:

- handover to the selected investor, the site of J3 and J4, which are incomplete (only 4 rows of piles at river front are in place)
- handover to the selected investor, about 20 acres of land behind the two jetties for construction of ancillary back-up facilities

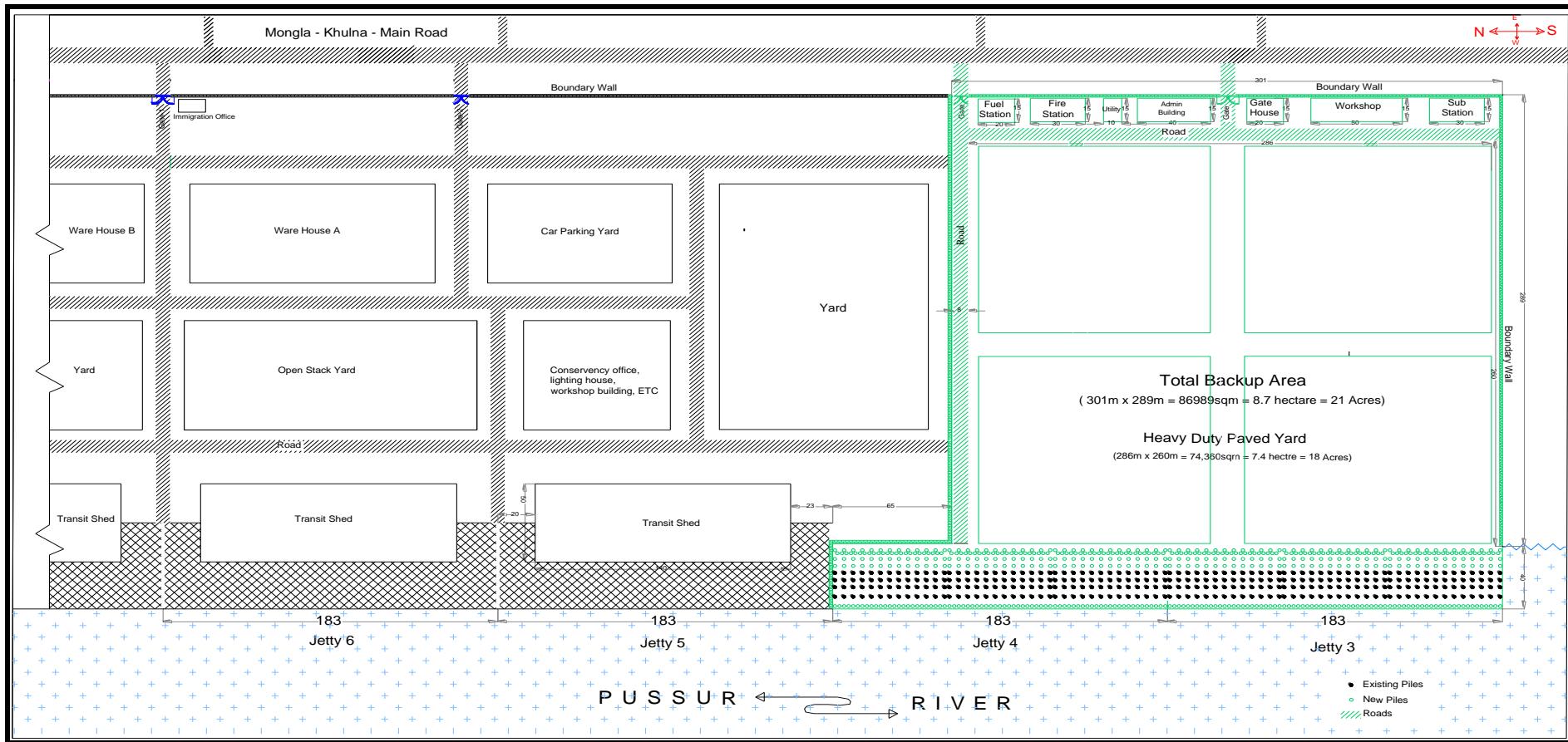
The selected Terminal Operator will:

- complete the additional piles and construct the two jetties (J3 and J4), for the terminal
- construct backup facilities for the terminal operation, which include administrative office building, workshop building, internal road, drain and culvert, boundary wall and other utilities
- procure cargo handling equipment, as per requirement
- operate the terminal (of 2 Jetties) for a stipulated duration.

4.2.1.2 Layout for Option A

The figure shows the area to be provided to the Terminal Operator in this option. It is a semi-rectangular shape, due to the fact, that MPA has already planned a car parking yard along some part of the J4.

Figure 4-1: Proposed Conceptual Plan of J3 and 4 with Backup Facilities



For drawing up a practical and optimum layout of the proposed terminal back-up area, the consultants made physical site visits, formal discussions with MPA officials and exchanged views on different technical aspects. The proposed terminal area is in the vicinity of J5, located adjacent to J5. It is accessible via road leading to the present main gate of the port enclosure. The backup land area is presently vacant land. The proposed 366m berth is designed to have full backup facilities to be developed simultaneously, so that jetty could be used along with backup facilities and construction schedule drawn accordingly.

Based on existing MPA's physical facilities, a conceptual layout for the J3 and J4 is prepared which is indicative. The facilities will be developed after proper engineering assessment. For operating the terminal, the operator will consult with MPA before finalization of backup facilities. There are some facilities which are common, and to be used by Terminal Operator as well as by port authority jointly.

The Terminal Operator shall develop all backup facilities (BUFAC) as stated above, so that terminal productivity and efficiency are enhanced to international standard terminals.

A sketch for the 'Proposed Conceptual Plan of J3 and J4 with Backup Facilities' is given below in Figure 3.5

It is proposed that the key structure of the backup facilities of the proposed 2 berth terminal will include the following:

- a. Heavy duty paved yard
- b. Administrative Building
- c. Workshop
- d. Fire station
- e. Fuel service station
- f. Entrance and exit gates
- g. Gate House
- h. Utilities

For Option A, the 'Proposed Conceptual Plan of J3 and 4 with Backup Facilities' is given in Drawing no. 7, showing the jetties to be constructed and the back-up area to be developed for operation of the Terminal.

4.2.1.3 Delineation of responsibilities

In addition to above, there are responsibilities and rights that need to be shared to provide an optimum arrangement, with balance of both private and public sector interest, as provided in the following table:

Table 4.1: Delineation of Responsibilities

MPA	Terminal Operator
<ul style="list-style-type: none">• Provision of the Land• Broad layout of the Jetties for setting up the equipment and facilities and delineation of internal space• Defining terms and conditions and the interrelationship between private and the public sector• Preparation of information memorandum on the project and the market• Provision of off-site infrastructure, like	<ul style="list-style-type: none">• Developing the two jetties with back-up yard• Internal development of roads, drainage and standardized industrial floor spaces.• Attracting customers• Environmental and social impact mitigation• Reporting to MPA and relevant authorities• Payment of royalties and license fees to the Government, if any

MPA	Terminal Operator
<ul style="list-style-type: none"> road, power and water supply to the project • Site clearance and environmental clearance of the site, as required • Regulation of the activities of the private operator • Providing license to the Terminal Operator as a jetty operator 	

4.2.2 Option B: Three Jetties

Container and cargo traffic at Mongla Port is currently low due to siltation of Pussur River Channel preventing regular movement of ships. It is expected that traffic will increase once the channel is fully dredged. However, full utilization of current jetties will require a few more years even after regular movement of ships. Investment in two new jetties without traffic demand is likely to make the project unviable and unattractive to investors. To avoid this, the construction of the two new jetties may be postponed until traffic demand increases to a certain level. A Terminal Operator may be engaged to operate J5 until the traffic demand increases and reaches the target level. The period of operation may be 8-10 years after which Terminal Operator will complete construction of J3 and J4 and hand over J5 to MPA.

Under this model, Terminal Operator will be engaged to operate J5 and utilize backup ancillary facilities for J5 until traffic throughput reaches a pre-determined amount defined in the PPP Contract. Once the desired traffic level is reached it will become obligatory for Terminal Operator to complete construction of J3 and J4 within a fixed period of construction time. After completion of construction of the J3 and J4, J5 will be handed over to MPA. Terminal Operator will operate the two jetties until the end of the contract term.

4.2.2.1 Physical Scope

In this option, in addition to J3 and J4, MPA provides J5, as a way forward. However, J5 will be provided temporarily in the initial stage for a limited period, upto the point the annual traffic volume increases to an agreed throughput (say 60,000 TEU). On approaching the agreed throughput, the Terminal Operator will start construction of J3 and 4.

After completion of construction of J3 and J4, the Terminal Operator will return J5 to MPA. In the long run, the Terminal Operator will operate the Terminal with J3 and J4 only for the remaining period of the contract.

In this option, Mongla Port Authority, MPA will:

- ▶ handover two incomplete jetties J3 and J4, for completion and operation for the term as per contract, and
- ▶ allow the Terminal Operator initially to operate the J5 temporarily, till completion of the jetties J3 and J4 (when MPA will get back the J5).

The selected Terminal Operator will:

- ▶ construct back-up facilities like office building, workshop, etc. in the back-up area of J3 and J4 and half of the hard paved yard for cargo storage for terminal operation
- ▶ procure cargo handling equipment for one jetty and will start operating terminal, with jetty at J5 and stack-yard behind J3 and J4.
- ▶ start construction of J3 and J4, as soon as port traffic reaches pre-agreed volume

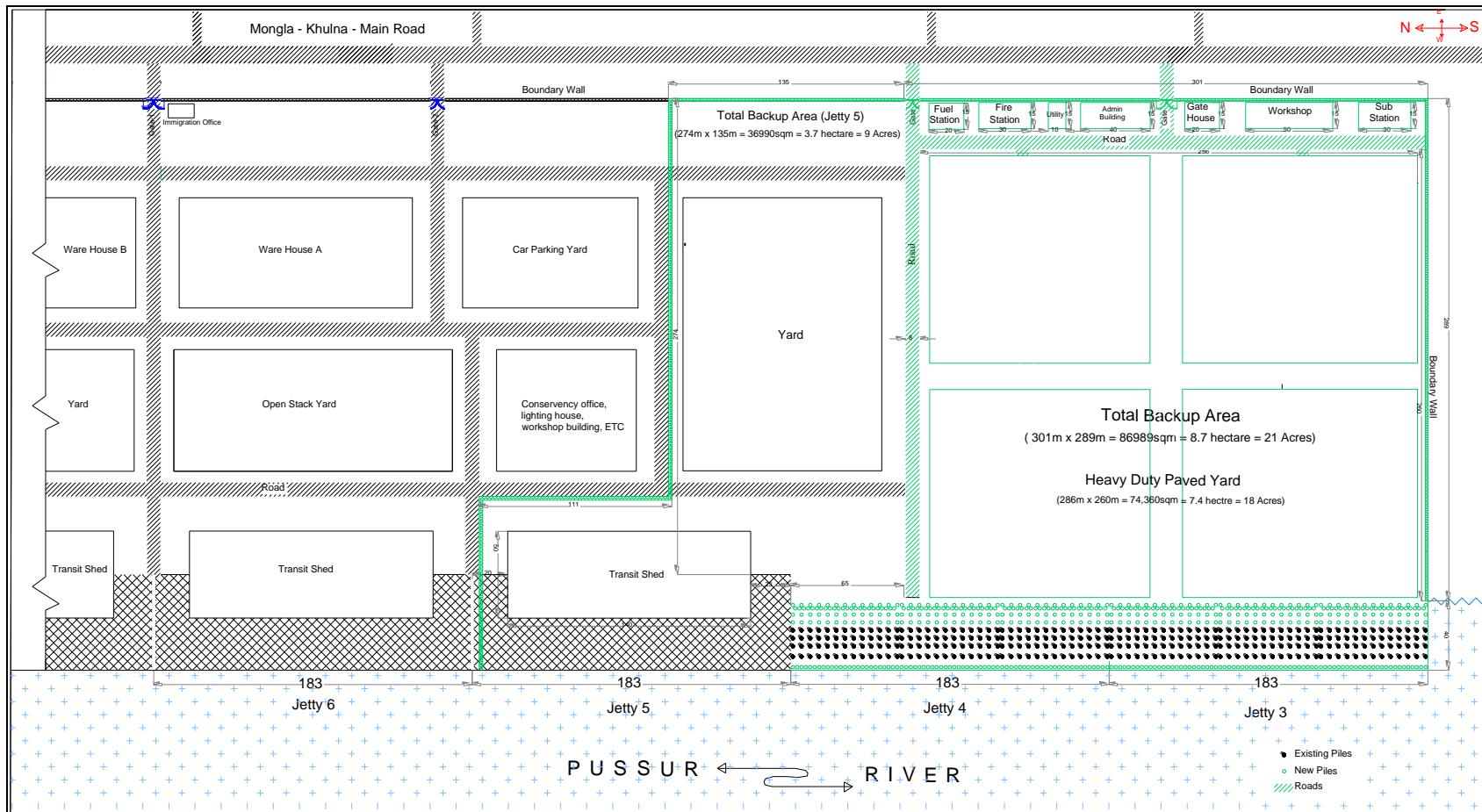
- ▶ return J5 to MPA, when J3 and J4 are completed
- ▶ procure more equipment for terminal operation
- ▶ operate the jetties J3 and J4 as terminal, for the remainder term of the contract.

For Option B/C, the ‘Proposed Conceptual Plan of J3, 4 and 5 (part) with Backup Facilities’ is given in Drawing no. 8, showing the jetty front and back-up area, for operation of the Terminal in Option B/C.

4.2.2.2 Layout for Option B/C

The figure shows the areas to be provided to the Terminal Operator in this option. Like in Option A, it is also a semi-rectangular shape, to avoid existing structures.

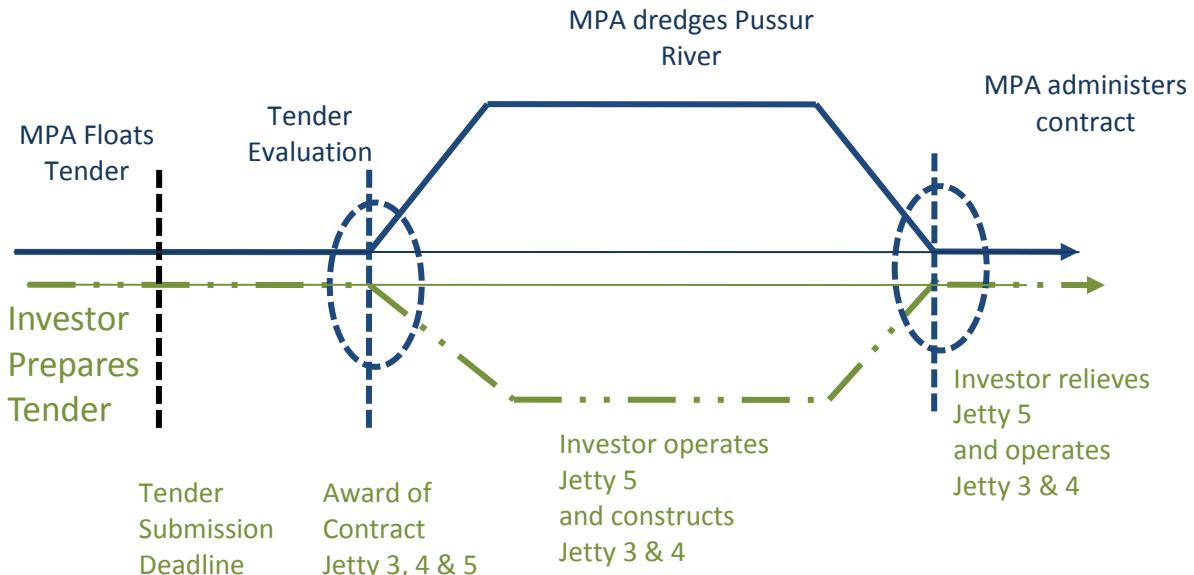
Figure 4-2: Proposed Conceptual Plan of J3, 4 and 5 (part) with Backup Facilities (for Option B)



4.2.2.3 Delineation of responsibilities

The following picture shows the project structuring concept (*i.e.* sharing of responsibilities) for Option B in a process flow:

Figure 4-3: Delineation of Responsibilities and Process Flow



Floating tender and tender evaluation and getting necessary approvals in this regard is the role of MPA. Once the evaluation is approved, MPA will award the contract for J3 and J4 along with J5. J3 and J4 is to be awarded for the whole term of the contract, while J5 will be provided for a limited period (8 to 10 years). Other responsibilities will be same as Option A.

4.2.3 Option C: Providing Three Jetties with Participation of Recognized Business Associations

In most PPP deals, Terminal Operators are selected through open tendering. This creates transparency and competition among the Terminal Operators and generates better terms for the Government. However, in some cases negotiated deals may be easier if it is provided to a nationally recognized business association, for the use of their members strengths. In this case, Bangladesh Garments Manufacturers and Exporters Association (BGMEA) or Bangladesh Knitwear Manufacturers and Exporters Association (BKMEA) are suitable candidates for such an agreement as the members of these associations are prime customers of the proposed port facilities.

Under this model, negotiations maybe carried out with BGMEA and/or BKMEA where their members are offered a certain percentage of shares (say 25 to 30%) in the PPP project company. Normal tendering will then occur for selecting the PPP Terminal Operator, with the tender documents mentioning the participation of BGMEA/BKMEA.

The advantage of this model is that the jetties will have traffic on a more assured basis from BGMEA/BKMEA members. The associations are financially strong to implement the construction with the PPP investor as well as having the ability to create traffic demand through the port. Currently 98% of garments and knitwear export is through Chittagong port. Approximately 70% of the country's total export comprises of garments goods. 75% of the garments industries are located in the Dhaka region. If the two jetties are handed over to BGMEA/ BKMEA for their own use, there will be a diversion of garments goods traffic to Mongla Port from Dhaka. This will not only help the booming garments export sector but also create demand for traffic at Mongla Port. This will be a truly win-win situation.

4.2.3.1 Physical Scope

MPA will provide J3, J4 and J5 with back-up yard to a Special Purpose Company (SPC). J5 can be provided for 7 to 10 years as a short term lease. MPA will provide the right to use the land for two jetties (J3 and J4) and J5 and the back-up area and the existing assets (old piles) of J3 and J4 to the selected Terminal Operator. The provision of such right will be through a PPP agreement which will provide a contract to the Terminal Operator to do jetty operation business in J5 and in J3 and J4 after necessary addition and construction of new facilities over the existing piles.

4.2.3.2 Management and Governance

In this option, MPA will invite a Terminal Operator to refurbish the existing facilities and build the jetties with a given set of specifications. After the Terminal Operator is selected, an SPC will be formed. The SPC will be owned jointly by the selected winning investor with majority share-holding and a recognized business association (*i.e.* BGMEA and/or BKMEA).

The shareholding and equity contribution will be pre-agreed between the winning investor and the business associations. Some of the SPC's management positions will be filled up by the winning investor and some by associations. The SPC will manage the whole business and the employees.

4.2.3.3 Delineation of responsibilities

Delineation of responsibilities will be similar as in Option B.

4.3 Operation of Terminals

It is planned that the terminal operation for both Option A and Option B will be responsible for all shore based operations, including ship to shore transfer of containerized and non-containerized cargo. Flow of cargo/container through a modern terminal is a complex series of interconnecting activities or sub-system commonly called Terminal system. The output of whole system is dependent on the capacity of the weakest link in that chain while performance of each sub-system can be affected by that of others. There is a great deal of inter-dependence between all terminal activities and handling operations within a terminal. These are in fact a series of distinct and interdependent activities, their nature depending on cargo/container status (FCL, LCL, empty) and the range of services developed /provided in backup yard adjacent to the berth structures in J3, J4 and J5.

4.3.1 Ship Operation

The first activity commonly known as ship operation consists of loading /unloading of cargo /container between ship and jetty side deck. It is often referred as dominant system as it ultimately determines terminal handling rates since all inbound and outbound cargo /container pass through the ship operation. Mobile harbour crane (MHC) with 40 ton capacity will be used for ship handling in all the jetties. The overall throughput of terminal is dependent on the loading / discharging the cargo to and from the ships. In effect, the berth capacity is dependent on MHC performance, number of MHC engaged and level of utilization.

4.3.2 Jetty/Berth Transfer Operation

This operation involves movement between Jetty /Berth side and the yard which has a direct influence on ship loading /unloading rates that is productivity. In case of containerized cargo, incoming containers stored temporarily in the yard when documentation formalities are completed and taken to hook point for loading in the vessels. Generally the movement of containers between jetty side and yard is carried out by tractor-trailer between hook point and storage slot in the yard. In case of import transfer the tractor with empty trailer

below to MHC to receive a container, then transports to the yard for stacking by the yard equipment.

4.3.3 Storage Operation

Storage operation in the Yard for container/non-container cargo provides a buffer between ship operation and terminal handling activities. The yard is primarily used to stack container awaiting onward movement. In case of general cargo, the transit shed behind jetty is used. The yard behind J3 and J4 will provide temporary storage of in-bound or out-bound containers while documentation formalities either by Port Authority or Customs Authority is completed for delivery of import containers or loading of export on to vessel. In fact storage operation in a terminal is developed a buffer between ship operation and receipt/delivery operators.

4.3.4 Receipt/ Delivery Operation by different modes

It is a terminal activity connected with the direct movement of cargo /container with their contents intact between different modes of transport like road, rail and inland waterways. In this activity containers are moved between yard and road, rail and inland water ways interchange points and then to gate House in case of road traffic where terminal formalities are completed. However an overview of receipt / delivery of cargo /container through inland distribution system is visualized in the following scenario:

4.3.4.1 Inland Water Ways

Prospects for receipt /delivery by Inland Water ways (IWW) mode in the short term does not exist, since the physical facilities for transport of container by barges does not exist in Bangladesh. Chittagong Port and BIWTA has jointly taken up for development, one ICT at Pangoan in Dhaka for facilitating the handling of container by barges from Chittagong port to Pangoan and vice versa. The proposed ICT is planned to handle 1,16,000 TEUs of container per year and it is expected that the ICT will be completed soon and put into operation. The transportation of container between Chittagong port and Pangoan ICT is a new horizon in the IWW sector which has potential opportunities to get the share of container not only by Chittagong Port, rather a substantial portion may be captured by Mongla Port using the river ways. On commissioning of Pangoan ICT, diversion of Dhaka's traffic from Chittagong to Mongla appears especially promising for low cost and less time sensitive imports and even some of the more time-sensitive garments cargo and shrimps exports.

4.3.4.2 Rail

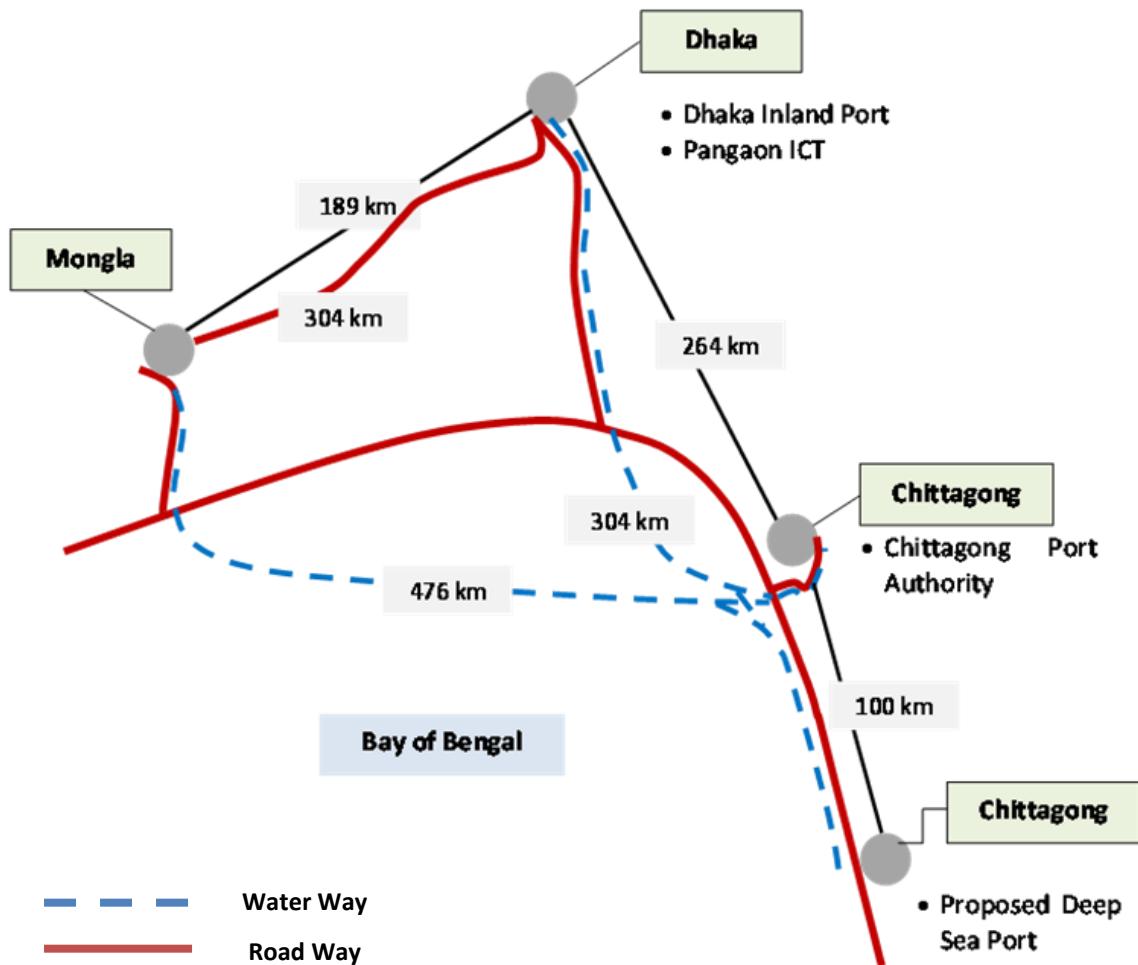
Presently Mongla Port is not connected with railway network with Dhaka. The nearest rail station is in Khulna. GoB approved for laying 53 km rail track between Khulna and Mongla. The rail link with the Mongla Port will not be available in the short term. As such there is no possibility of handling cargo by rail to the hinterland.

4.3.4.3 Road

The receipt /delivery operation will entirely be connected with cargo / container moved by road transport in the short term to even some more years till the linked projects are completed. The proposed terminal will have two lane gate complex for entry and exit of cargo / container by road vehicles which will enter the yard and will be checked at the gate and directed to specific points in the yard where they will be unloaded or loaded by cargo handling equipment.

A diagram showing the road and water distances among the seaports, proposed deep sea port (DSP) and the inland container terminal (ICT) at Pangoan Dhaka is provided below.

Figure 4-4: Road and Water distance from Dhaka to MPA, Chittagong Port and Deep Sea Port



4.3.5 Proposed Manpower Requirement for Terminal Operation

Proper setup of the Terminal Operator is a pre-condition to ensure maximum productivity for the proposed 2-berth terminal. Structure of organizational setup can define level, jurisdiction and responsibility of the different aspects of the terminal. The areas of responsibility will be well defined as well as ear-marked and by appointing qualified, experienced personnel who will be able to achieve the desired goal of the terminal by adopting best management practices. Keeping these in view the proposed organizational structure has been set with proper manning schedule.

The Chief Executive Officer (CEO) will be the head of the terminal. He (or she) will be directly assisted by Terminal Manager(TM), Financial Controller (FC) and Managers of different fields. The CEO along with Terminal Manager and Financial Controller will decide the policy issues and maintain rapport with govt. regulatory body, corporate body and stakeholders. The Managers will head separate departments and discharge their responsibilities with the assistance of Asst. Managers. The TM will work as Pivot point of whole operational system and act as focal point between field level and policy makers.

Following the practice in modern port terminals, the manpower for operation and maintenance has been assessed and shown in the table below:

**Figure 4-5: Proposed Manpower Requirement for Terminal Operation
(Full operation, in 2 shifts)**

Employee	Nos.
Managerial Level	
1. Chief Executive Officer	1
2. Financial Controller	1
3. Terminal Manager (Operation)	1
4. Plant Manager	1
5. Manager (Commercial)	1
6. Manager HRD	1
Supervisory Level	
7. Security Chief	1
8. Asst. Manager IT	1
9. Asst. Manager (Accounts and Finance)	1
10. Asst. Manager (Marketing and Commercial)	1
11. Security Officer	1
12. IT Support Officer	1
13. Operation Supervisor (2 Persons/Berth)	4
14. Workshop Supervisor (SAE)	3
15. Tractor Trailer (TT) Operator (2 /TT)	20
Supporting Staff	
16. Senior Equipment Operator (4 /Shift)	8
17. Junior Equipment Operator (4 /Shift)	8
18. Security Inspector (1/Shift)	3
19. Account Assistant	1
20. Lorry Operator	12
21. Admin Assistant	1
22. Technician/Mechanics (4 /Shift)	8
23. Technical Helper	8
24. Store Keeper (2/Shift)	4
25. Gate Control Asst. (2 Person/Shift)	6
26. Vehicle Driver	6
27. Security Guard (12/Shift)	36
28. Office Support Staff	10
Total	150

The manpower requirement is assessed based on 3 shift operation in general. But in particular, the number of handling equipment to be deployed in the proposed terminal will depend on number of shifts, 2 or 3 (or even 2 if the cargo volume is very less, as in the beginning). It may be mentioned that for creating more employment for local personnel, the Terminal Operator may employ at least 80% Bangladeshi nationals in terminal operation from COD and 90% from 3rd anniversary of COD.

4.3.6 Terminal Capacity Calculation

Generally the capacity of a modern multipurpose terminal is determined by the capacity for performing each of four (4) inter connected activities as stated earlier considering the nature of 2 jetties (J3 and J4). it is recommended to use mobile harbour crane (MHC) for ship

handling. The speed with which the MHC loads and discharges containers determines ship handling / operation time loading for fixing overall throughput of the terminal.

The terminal capacity for ship operation may be worked out multiplying yearly MHC productivity. It is obtained by multiplying the average hourly handling rates by MHC operating hours. The MHC productivity is calculated to be 43,434 boxes per MHC per annum for 3 shift operation, assuming the following working conditions:

- No of working days 350
- No of workshift per day 3
- No of hours worked per shift 7
- Berth occupancy 67%
- MHC productivity 18 boxes per hour
- MHC availability 70%
- Weather Factor 0.70

The yearly crane productivity: $350 \times 18 \times 21 \times 0.67 \times 0.70 \times 0.70 = 43,434$ boxes. As boxes consist of 20' as well as 40' sizes, the total number of TEUs handled per MHC per year will be 60,807 TEU.

The estimated capacity at Jetty – 3, 4 and 5 of the proposed terminal is shown below:

Table 4.2: Terminal Capacity in Option A and Option B

Option	Berths	No of MHC per berth	Capacity per berth / per crane	Annual Throughput (containers only)
Option A	J3	2	43,434 boxes	121,614 TEU
	J4	2	43,434 boxes	121,614 TEU
Total 2 Jetties, (J3+J4)			86,868 boxes	243,228TEU
Option B (Phase I) 1 Jetty. J5	J5	2	43434 boxes	121,614 TEU
Option B (Phase II) 2 Jetties, J3+4	J3 and J4	4	86,868 boxes	243,228TEU

The annual capacity for container handling for J3 and J4 is estimated at $4 \times 43434 = 173,736$ boxes, equal to 243,228TEUs.

We can assume for planning purposes, that on average, the maximum capacity of each berth will be 100,000 TEU per year which is a good potential traffic volume for the Terminal Operator.

However, the terminal is designed to be a multipurpose terminal, handling both containers and general cargo. With both these types, the capacity of the terminal is expected to be:

- Containers 70,000 TEUs/year/berth
- General Cargo 240,000 tons per year/berth

The above figure, that forms the basis for the financial modeling, is calculated upon:

- Container ships take 3 days for loading/unloading
- Container ships average capacity 1000 TEUs
- General cargo ships take 6 days for loading/unloading

- General Cargo ships capacity 10,000 tons
- Monthly berthing, 18 days for containers and 12 days for general cargo

4.4 Project Design

4.4.1 Existing Structures and their Assessment

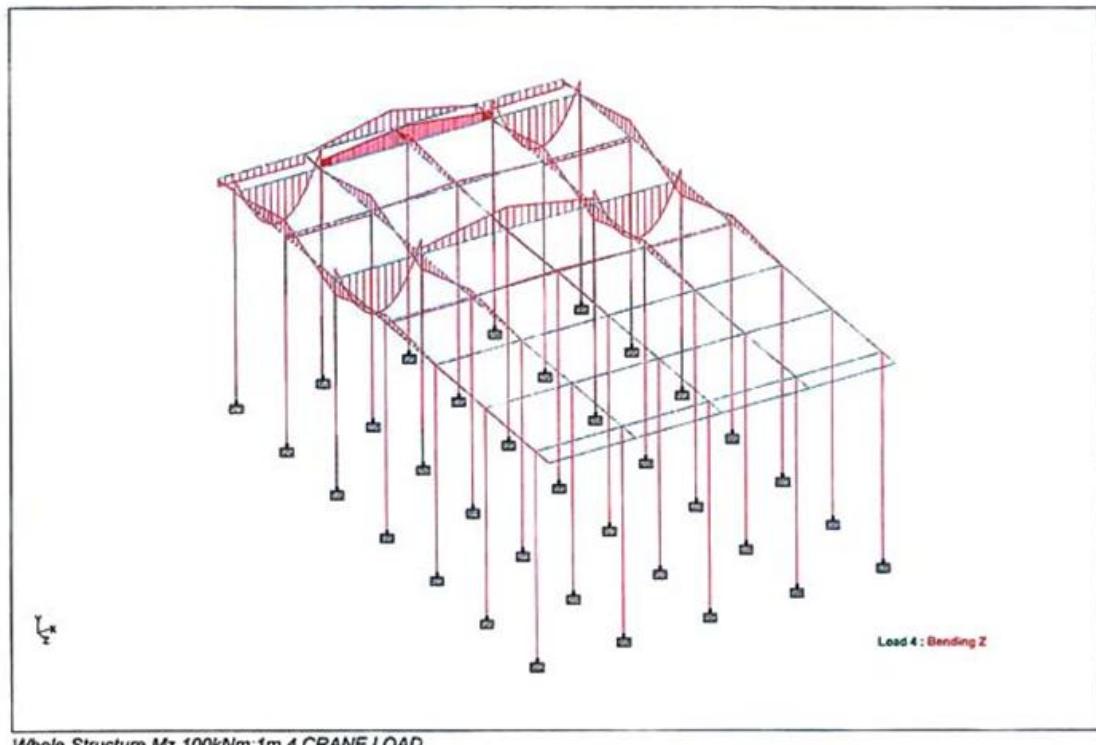
A study was undertaken in July 2011, by the Asian Development Bank (ADB) on “Port and Logistics Efficiency Improvement”, for possible improvement of Port facilities in Bangladesh. The Consultants, M/s G-MAPS, Drewry Consultancy, IWM and others, have carried out the assignment. Drewry Consultancy is a world renowned consulting company in the field of port and harbour engineering.

In their study, Drewry Consultancy has made structural analysis of the port structures, using STAAD Pro v8i. A detailed structural analysis of the existing berths for operation of cargo handling equipment of different capacities was carried out by them. The details are available in the report mentioned above.

In their Report on Mongla Port (Final Report, Volume 2, July 2011), the Consultants have concluded that the design and condition of existing jetty platforms with the existing piles are good enough to handle 43 ton Mobile Harbour Cranes (MHC). However, it is not suitable for using 40 Ton Quay Gantry Cranes (QGC) or Ship-to-shore Gantry Crane (SSG).

The following figure gives an example of one of their graphical outputs of the STAAD analysis.

Figure 4-6: Graphical outputs of the STAAD analysis (for Mongla Port Jetty)



Considering the findings of the earlier Consultants and study during this assignment, it is suggested to use 40 Ton MHC for operation of the Terminal. Quay Gantry Girders are not recommended, as the existing jetties will not support them. Since the potential investor will have to construct the 2 Jetties afresh, on some existing and some new piles, they have the option to make provisions for strengthening the jetties capable for use of heavier cargo

handling equipment, if they so desire.

4.4.2 Review of Structural design of Jetty

After physical inspection and viewing the piles of existing jetties and reviewing the analyses of structures, it is observed that for Jetties J3 and J4, four rows of piles in the riverside are installed. These were erected in the year 1976. The remaining piles and the deck slabs were not constructed and these two Jetties were left incomplete. The steel encased piles are more than three decade old. These seem generally in good condition. The detail structural and layout drawing of the structures are available with MPA.

The decks for jetties J3 and J4 are to be constructed on these existing 4 rows and some more rows of newly erected piles. The construction of jetties (J3 and J4) will be as multipurpose berth, to handle general cargo as well as containers. It is felt that the conditions of existing piles at J3 and J4 and the detail design for new piles and deck slab are sufficient for construction of the jetties. However, if desired by the prospective investors, those may further be reviewed by some independent agencies of their choice (such as BRTC of BUET or other reputed consulting agency).

There are over three hundred piles that have already been completed at J3 and J4. Pictures of constructed incomplete piles of jetty 3 and 3 were captured at site. The figures 4.7 and 4.8 below show the present view of the existing old piles at J3 and 4.

Figure 4-7: Incomplete Piles at J3 and J4 (plan view)



Figure 4-8: Incomplete Piles at J3 and J4 (side view)



Figure 4.9 below shows the present view of the existing old pile under deck-slab of J5.

Figure 4-9: View of the existing old pile under deck slab of J5



The piles are designed as steel casing RCC piles of 600 mm and 650 mm dia. The piles constructed are generally in good condition. Structural analysis has shown that the existing piles and RCC deck-slab is capable of handling port cargo with 40 T MHC.

The original design of the structure, the jetty deck slab is about 40cm thick RCC slab, resting on a frame of beams and girders over the pile caps. The detailed designs are available with the engineering department of MPA.

4.4.3 Review of Jetty Dimensions

The original design for the deck-slab of the jetty of J3 and J4 is 183 m long and about 64 m wide. These are inconsistent with other existing Jetties no. 3 to 9. After consulting with Mongla Port officials and reviewing the jetty designs in other ports and terminals, it is recommended that the jetty may be constructed with maximum 40 m width. The Chittagong port presently plans its jetties with this width. Such a reduction from 64 m to 40 m will result in substantially lower civil structure costs, without any loss in cargo handling efficiency. The jetty length remains 183 m long, keeping similarity with the existing jetties on the river side.

Drawing no.MPA-3, in the Annexure, gives the plan of the jetties, with 9 rows.

The disposition plan of girders of the jetty structures is shown in Drawing no. MPA-4.

The Reinforcement details of the jetty structure are shown in Drawing no. MPA-5.

Side elevation of the piles for J3 and 4 is given in Drawing no. MPA-6.

4.4.3.1 The Jetty configurations

No of Jetties:	2 nos. (J3 and J4)
Length of each Jetty:	183 m
Width of each Jetty:	40 m
Total Berth length:	$2 \times 183 = 366$ m
Total Jetty Area:	$366 \times 40 = 14,640$ sqm

4.4.3.2 Details of the Piles

The pile layouts design for 65m wide jetty in the old design is with 15 rows of piles. The consultants have revised the pile layout, for the 40m wide jetty with 9 rows of piles.

In the new design, the rows of piles are as follows:

- 7 vertical piles (Rows 1 to 7 from riverside)
- 2 batter piles (Rows 8 and 9, the last 2 rows at the land side)
- 1 additional batter piles (beside row 1)
- 2 additional batter piles (between rows 2 and 3)
- 2 additional batter piles (between rows 5 and 6)

Total no of rows: 14 (9 main rows and 5 rows of batter piles in intermediate rows)

A table showing row-wise Pile numbers, for each Jetty is given below.

Table 4.3: List of RCC Piles for J3 and J4

Main Rows	Batter Rows	Existing Piles	New Piles
1		0	73
2		38	0
3		38	0
4		38	0
5		38	0
6		0	38
7		0	38
8		0	70
9		0	38

Main Rows	Batter Rows	Existing Piles	New Piles
	beside 1	0	6
	beside 2	6	0
	beside 3	6	0
	beside 5	0	6
	beside 6	0	6
Total Piles Per Jetty		164	275
Total Piles Per Jetty			439
For 2 Jetties		328	550
Total no of Piles			878

As shown above, out of the total rows, 4 rows of main piles in row 2, 3 4 and 5 is already in place. In addition, 2 rows of intermediate batter piles between rows beside 2 and 3 are also in place.

For two Jetties, total number of piles is 878, out of which 328 numbers are existing. This makes the number of new piles to be erected is 550 for both the jetties.

4.4.4 Preliminary Design Criteria

The consultants recommend the following preliminary design criteria for structures of the proposed terminal and berths.

4.4.4.1 Jetty /Berth Construction

The Mongla Port requirement is that the jetties J3 and J4 be designed as multipurpose berth, to cater the need of vessels with maximum draft 8.5m. There are different types of berth construction viz: gravity type or closed construction and open type construction. The open type construction comprises an apron supported on piles. This type of construction is flexible and may be adapted to the existing soil conditions.

4.4.4.2 Yard Construction

'Heavy Duty Paved Yard' comprises of three general layers: the soil, the base and the surface. The yard should be minimum depth ranging from 1m to 1.5 m with sand and aggregate consolidation. There will be 3 layer brick soling, then sand and stone consolidation and lastly 20 cm RCC pavement. This type of pavement is designed for heavy loads, and it needs good consolidation of sub-soil.

4.4.4.3 Building Construction

The main construction methods used in Bangladesh are reinforced cement concrete (RCC) and brick masonry. The major construction materials used for buildings are: steel, cement, stone aggregates, sand and timber. The RCC works requires strict control of the concrete mix and quality and proper curing.

4.4.4.4 Fencing

The terminal yard will be protected and properly enclosed partly by masonry boundary wall and partly by barbed-wire fencing with horizontal and vertical strands. The inner partitions will be made by chain link fencing.

4.4.5 Verification of Conditions by Potential Investors

In this assignment, due to limitations in time and budget, there was little scope for detail

designing and detailed laboratory checking of the structures. The old designs are available at the Mongla Port Authority office. The consultants have consulted the design of earlier consultants. They also had detailed discussions with the MPA engineering staff that are responsible for the civil structures.

The Investors will be given opportunity for due diligence on conditions of jetty structures and its design. The pre-qualified bidders of this project will be given at least 2 months time for investigation into the matter before submission of their bids.

The pre-qualified bidders may engage a local consultant or a reputed consulting house to do these services for evaluating the latest conditions of the structures which presently exist in unused condition. The independent consultant may perform the pile load test, concrete strength test, non-destructive tests, etc. which they may feel important. The findings of this independent engineer will be more up-to-date and more acceptable to the potential bidders, rather than Government carrying out the same tests and providing the bidders with the information.

It may be a better idea that all the pre-qualified bidders jointly appoint an independent engineer for the above purpose, acceptable to all the bidders.. This will provide the desired data in an efficient way, by sharing the cost of the consultancy between the bidders. It is to be noted that sufficient time is to be provided for carrying this out during the proposal stage. The technical verification options as discussed above will be included in the bid documents.

4.4.6 *Codes and Standards for Design and Construction*

The relevant sections of the following Codes and Standards, in their latest editions, are the reference and guidelines to be followed by the Terminal Operator in the design and construction for the proposed project⁹.

4.5 Dredging Needs

4.5.1 General

According to the findings of earlier IWM studies, it has been concluded that a huge volume of sediments carrying flow from upstream gets deposited in a wider part of the Pussur river entrance.

Improvements of tidal and coastal waterways are consequences of requirements for navigation. Dredging instances are sufficiently available, where works have resulted in

⁹ • The Bangladesh National Building Code (BNBC): 2006
• Bangladesh Standards for Water Supply (NBC)
• Bangladesh General Standards for Drainage and Sanitation (NBC)
• Bangladesh Provisions for Electrical Installations (NBC)
• Bangladesh General Provisions for Fire Protection (NBC)
• Structural Design Regulations (NBC)
• Bangladesh Provisions for Electrical Installations (NBC)
• International Electro-Technical Committee (IEC) regulations
• British Standards (BS): BS 8110 BS 8004(1996)
• British Standards Code of Practice for Maritime Structure BS 6349 1988
• American National Standard Institute (ANSI) standards
• American Association of State Highway and Transportation Officials (AASHTO) standards
• American Concrete Institute (ACI) standards
• American Iron and Steel Institute (AISI) standards
• Soil Mechanics, Foundations, and Earth Structures NavFac DM-7 Design Manual
• Harbor and Coastal Facilities, NavFac DM-26 Design Manual
• Recommendation of the Committee for Waterfront Structures, EAU, 1990
• Shore Protection Manual, US Army Coast Engineering Research Center, 1984
• Technical Standards for Port and Harbor Facilities in Japan, 1989
• BS EN 1991-1-4:2005 Eurocode 1, Actions on structure, General actions, Wind actions.

encouraging quick improvements in depth.

The navigability of Pussur River is vital for efficient operation of the vessels coming to and going from Mongla Port. The depths in and around the Port area and Pussur river reduced significantly, after construction of the jetties. Regular maintenance dredging is required in the entrance channel and at Jetty head to keep the port accessible and the jetties operable. A study was carried out by MPA for a sustainable solution, with three options:

- i) dredging
- ii) dredging and canalization through structural interventions, and
- iii) dredging and canalization through Tidal river Management (TRM).

The last option has been found most suitable for the Port. The combined effect of these 2 will increase the velocity in the navigable channel. Construction of tidal basin will generate increase tidal volume at and around the jetty area.

Since late seventies, regular maintenance dredging of the Pussur Channel and Jetty front is being carried out. The Institute of Water Modeling (IWM) has made a study for prediction of erosion/ deposition pattern after one year in the Pussur River, based on morphological simulation. The study shows that in one year, the maintenance dredging in channel from Sabur beacon to Base Creek is about 2 M cum.

4.5.2 History of Dredging in Mongla Port

In 2011, the IWM made a study and on the basis of those survey results they have defined the dredging locations and alignment in the navigational access channel in Pussur river for access of 7.5 meter draft vessels and 8.0 m draft vessels. The figure 22 and 23 given below, shows the proposed alignment with dredging locations.

There have been regular dredging activities since beginning of the port operation.

A history of dredging at Mongla Port since 1979 is provided in the next paragraph, showing the quantities and cost of dredging at the Port area.

The following table gives a history of dredging activities at Mongla Port.

Table 4.4: History of Dredging in Mongla Port

Period	Dredging Organization	Area of Dredging	M cum	Cost mTk.
1979-81	BWDB	Jetty Front	0.32 5	8.96
1983-87	BIWTA	Jetty Front	0.69 5	30.94
1988-90	BWDB	Jetty Front and Confluence	0.52 3	28.56
1991-92	Capital Dredging at Pussur Channel (by China Harbor Egg. Co. Ltd.)	Southern Anchorage(1200m x 200m) Confluence(1950m x 400m) Jetty Front(1950m x 80m) Sabur Beacon Turning Ground(1150m x 200-400m)	1.00 0 0.70 7 0.41 4 1.42 2	308.8
1993-1996	Chittagong Port A's Cutter Suction	Southern Anchorage and Confluence, Sabur Beacon	0.22 6	29.889

Period	Dredging Organization	Area of Dredging	M cum	Cost mTk.
Dredger				
1994-2001	BWDB	Jetty Front	0.81 3	97.144
2000-2004	Pussur Channel Maintenance Dredging	Southern Anchorage(4500m x 200m) Confluence (1700m x 200m)	1.36 0.43 2	454.8
		Jetty Front(1225m x 50m)	0.25 2	
		Sabur Beacon Turning Ground(2220m x 200m)	0.45 1	
		Southern Anchorage near Confluence	0.28 8	
2003-2004	BWDB	Jetty Front	0.06 9	8.047
2004-2005	Basic Dredging Co.	Jetty Front	0.05 4	7.24
2005-2006	BWDB	Jetty Front	0.06 9	9.54
2007-2008	BWDB	Jetty Front	0.10 7	19.4
2012-2014	*INAI KIARASON, BHD Malaysia	Capital Dredging comprising of 6 areas: Sabur Beacon, Jetty Front, Channel, Confluence, Mooring Buoy and Base Creek	4.19 6	13,200

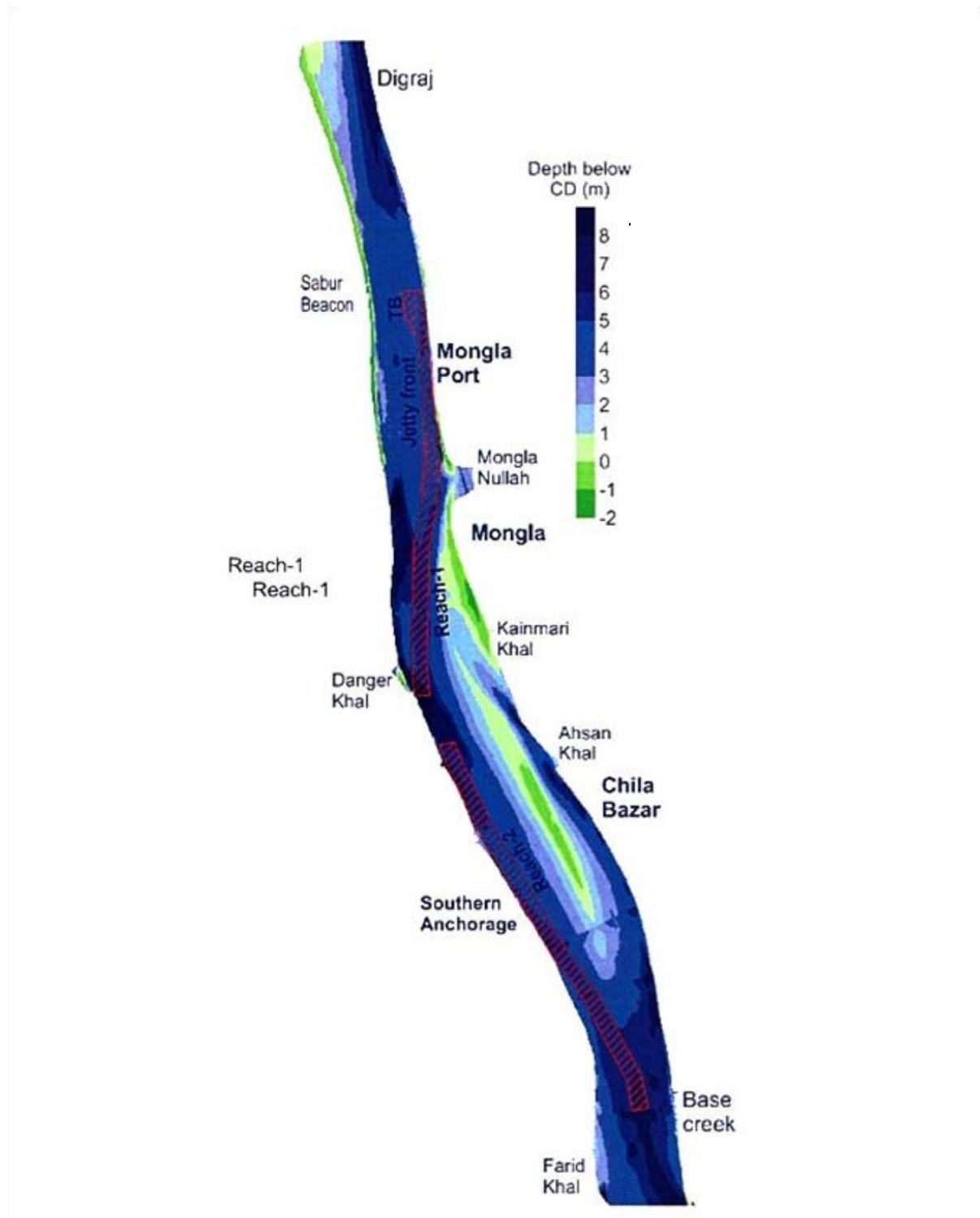
* Bid award could not be materialized rather re-tendered in March 2013

4.5.3 Dredging of Main Channel and Jetty-head

The Institute of Water Modeling (IWM) has carried out a hydrographic survey in the Pussur channel in 2011 and has identified the areas to be dredged for access of 7.5 m and 8.0 m deep vessels in the Mongla Jetty area. The sketches of the charts of the study are given in the next pages. Originals are available with MPA office. The details of the study and channel dredging location maps are available with the Port Authority.

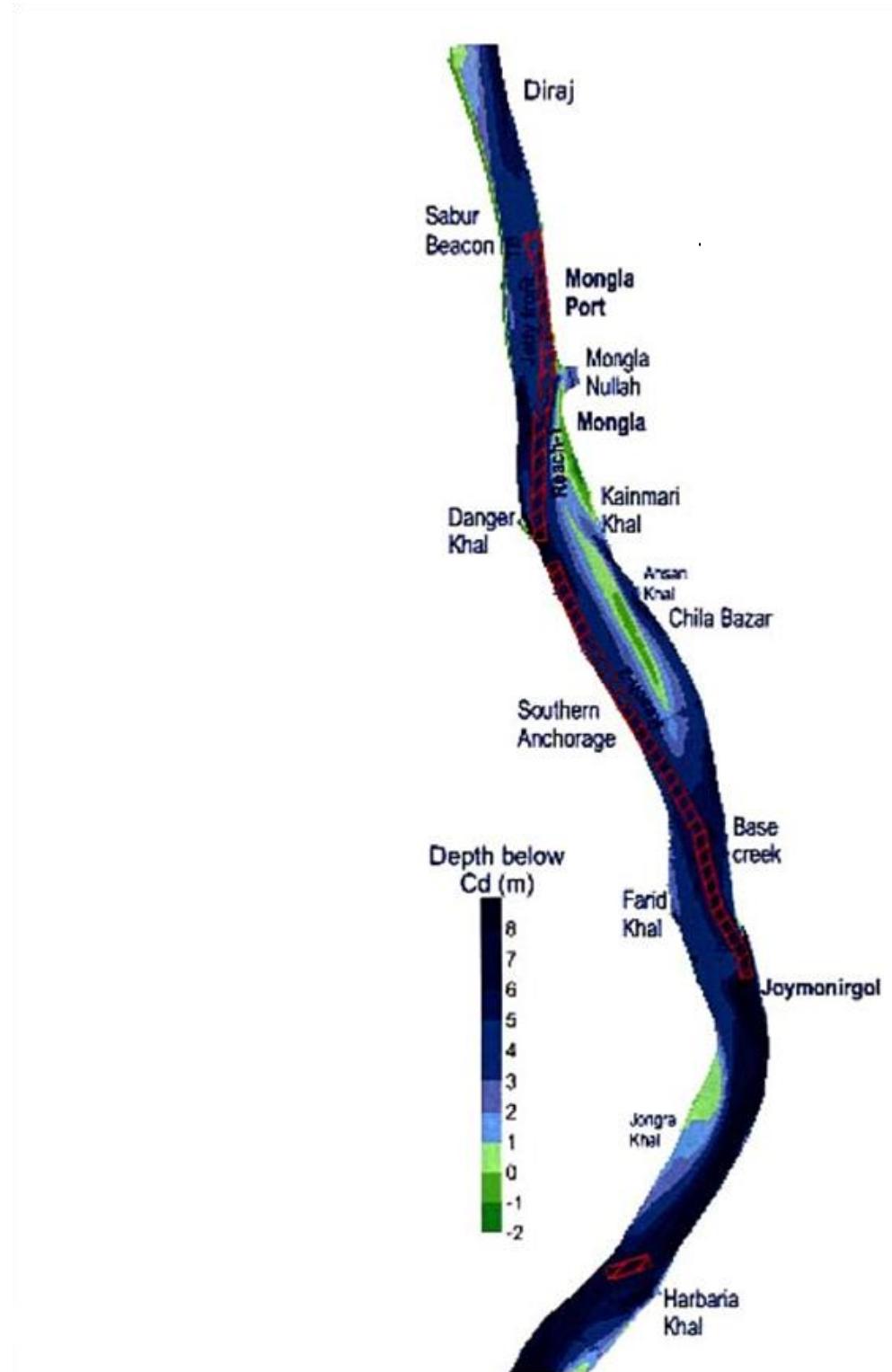
The maintenance dredging of the jetty head is required for handling ships at the jetty, and this item has been included in the dredging works undertaken. A hydrographic chart of Pussur channel is given in Drawing no. 9, which shows the proposed area for dredging.

Figure 4-10: Identified Dredging Locations for 7.5 m draft vessels



Source: IWM 2011 Survey

Figure 4-11: Identified Dredging Locations for 8.0 m draft vessels



Source: IWM 2011 Survey

4.6 Construction Plan and Procurement Schedule

The detail construction Plan and Project Implementation Schedule will be prepared by the investor.

However an indicative construction schedule, for the base case Option-A, is given below. The Construction of J3 and 4 will take 24 months, while Back up Facilities will take 12 months for its completion. Procurement of Cargo handling Equipment will be as per projected volume of cargo to be handled and will be in a phased manner It is expected that total procurement will be completed by 18 months. (Q1, Q2, Q3 and Q4 denotes quarters of a year).

Table 4.5: Tentative Project Implementation Schedule (Base Case)

Sl. No	Particulars	Year 1				Year 2				Remarks
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
1	Construction of Jetties J3 and J4									21 months
i	Mobilization and Erection of Piles									
ii	Construction of Pile Caps									
iii	Construction of Deck Slab									
2	Construction of Back-up Facilities									12 months
i	Boundary Walls									
ii	Admin. Block and Other Buildings									
iii	Heavy Duty Yard and Internal Roads									
iv	Miscellaneous Finishing Works									
3	Procurement of Cargo Handling Equipment									18 months
i	Procurement of First Lot									
ii	Procurement of Second Lot									
iii	Procurement of Last Lot									

5 COST ESTIMATES

5.1 Approach

The proposed site for Development of two jetties at Mongla Port through PPP is the area of two proposed jetties (J3 and J4) within Mongla Port area, along with the area behind it for development of back-up facilities. The site is rectangular in shape and has dimension of 301m by 289m. The land is fully developed and it is above flood level. No land filling is required for site development. Topography at the site is flat. The general slope is towards Pussur River. There are 328 numbers steel encased RCC piles existing at the site, that have been driven in mid-seventies. Two jetties (J3 and J4) were left incomplete although the pile-work has been partially completed. Except those incomplete piles, the land is empty and there is no structure or construction at the site. Practically the site is green-field site and there is ample opportunity for project design and implementation works.

It has been observed that the piles are in apparently good condition. The consultants, from their physical inspection, discussion with MPA technical officials and considering analytic reports of other consultants, are of the opinion that proposed 2 jetties can be constructed keeping the 4 rows of piles intact and erecting the remaining required rows. However, if the prospective investors so desire, those may be inspected by Independent agency. Under PPP model, the investor will complete the Construction of J3 and J4 with complete backup facilities (BUFAC), procure, install, maintain handling equipment and operate two jetties throughout the term.

The proposed 2 Berth (J3 and J4) for the proposed terminal has a length of 366m (each berth 183m) with width of 40m. The land for backup facilities, available at the hinter of these jetties, is about 22 Acres.

The documents, maps and prior studies made available to us have been carefully analyzed. In addition to considering the detailed design, the cost estimate has been arrived at based on the industry norms developed by various port authorities and PPP projects. We have also considered the existing traffic characteristics and facilities at Mongla Port to arrive at estimated cost for development of the 2 jetties.

It may be noted here that the cost estimates have been prepared in Bangladesh Taka with 2013 price and the conversion into US Dollars have been calculated at 1 USD = 80 Taka, the prevailing exchange rate in February 2013.

5.2 Facilities at the Terminal

5.2.1 The Jetty /Berthing Facilities

Based on the contract signed for dredging in Pussur Channel, it is envisaged that the draft available in the navigation channel will be 7.5 m and on the berth 8.5 m. It is presumed that, the navigation would be carried out during the high tide to ensure the vessel of 8.5 m draft brought in on berth. A typical vessel of 8.5 m draft will be around 8,000 DWT with length overall (LOA) of 165 m and beam of 23 - 25 m. Allowing enough space for tagging up the vessels at the berth and also sufficient gap in between the vessels, we believe that each berth of 183 m, same as the length of existing constructed Jetties, is adequate. It is to be noted that, dredging cost has not been assumed as it will be responsibility of Mongla Port Authority. The berth cost includes provisions of crane tracks, fenders, bollards, fairleads etc. Total area of construction of 2 berths is estimated to be 14,640 sqm. Both the berths will be used for general cargo as well as for containers.

5.2.2 *Cargo Storage Facilities for Bulk/Break Bulk*

The area earmarking for cargo storage has been done based on the cargo profile and traffic to be handled at the port. It is assumed that, different type of storage facilities would be required to ensure efficient handling of cargo within port premises.

It is understood that, bulk/break bulk cargo would predominately be import items, consisting of food grain, fertilizers, clinkers etc. Cargo from the holds of vessels will be lifted by the grabbing cranes and unloaded on to trucks of approx. 20-30 tons capacity with the help of mobile hoppers. The trucks will carry the cargo to the open storage and unload it there. The cargo storage will be high stacked using proper equipment. These shall also be used for delivering the cargo to the importers, whenever required. It is to be noted that, no bagging/stitching and standardizing of bulk cargo weight will be considered inside the port premises, since such operation would preferably be carried out in consignee's premises.

5.2.3 *Cargo Storage Facilities for Containers*

It is understood that at Mongla Port, most of the export is containerized while import is non-containerized so the container traffic will consist of both laden and empty containers. The traffic volume will get built over a period of time, not immediately. Though rubber tyre gantries are the preferred equipment for container stacking in yards, these will be justified only when the traffic of laden containers alone reaches around 50,000 TEUs laden or more. In a scenario in which the traffic growth will be spread over a period, the preferred equipment is reach stacker. Each such equipment can handle upto 10,000 TEUs per year. It is suggested that, the port should start with 2 such stackers and one more should be added once the laden containers traffic crosses over 20,000 TEUs. It is also suggested that, the containers should be stacked 4 high. The net area requirement per TEUs will be 15 sqm per TEU while gross area requirement per TEU will be 30 sqm.

5.2.4 *Back-up Facilities*

The back-up area facilities (BUFAC) area available for this Terminal of 2 Jetties is about 21 acre.

Back-up facilities will include administrative building, workshops, store for spare parts/consumables, power supply, water supply and IT Installation etc. Building will consist of space for administrative staff, space for other staff, space for statutory authority, banking services etc., accommodation for users (exporters/importers/agents), shelter for workers, canteen facilities, first aid centers, etc. It is suggested that an area of 1,200 sqm needs to be earmarked for buildings. Further, it is envisaged that there would be separate space for workshop building consisting of space for welding/cutting machines, space for spare parts/consumable items, electric repair shops etc. It is suggested that area of 750 sqm would be required for workshops.

The following back-up facilities are suggested for this terminal of 2 Jetties:

Figure 5-1: Back-up Facilities at Terminal

Back-up Facilities (BUFAC)			
1	Heavy-duty Paved Yard	74,360	sqm
2	Admin. Building (2 storied)	1200	sqm
3	Workshop	750	sqm
4	Fire station	450	sqm
5	Electric substation	450	sqm
6	Fuel Service Station	300	sqm
7	Utility building	150	sqm
8	Gate House	300	sqm
9	Internal Roads	4600	sqm
10	Drains and Culverts	575	m

5.2.5 Other Facilities

Other facilities will include power facilities would be required for refrigeration purpose, water and sewage pumps, security lighting etc. We estimate that, 2000 KVA required for power supply. A lump-sum provision of Tk. 86 million has been made for development of power supply, distribution and sanitation facilities.

Boundary walls and fencing and office furniture etc will be part of other general facilities. Two gates have been considered for the Terminal back-up area.

5.3 Civil Costs

The civil construction cost consists of mainly the following two components:

- a) The Jetty (with piles and RCC deck slab)
- b) The Back-up facilities (consisting of structures and buildings required for operation of the terminal efficiently, and some ancillary components like boundary wall, fencing etc.)

The estimated cost break-down of civil costs, for the 2 jetties, backup and various facilities required at the port, for Option A (base case), is given in the table below.

Table 5.1: Civil Construction Cost for Option A (2013 values)

Item	Unit	Quantity	Unit Rate (Tk.)	Amount(m Tk)	Amount (m USD)
A RCC Jetty					
1 Completion of Remaining Piles for 2 Jetties	Nos.	550	500,000	275.0	3.44
2 RCC Jetty Deck, for 2 Jetties (with pile-cap, girder and beams)	cum	76,448	11,000	840.9	10.51
Sub-total of Jetty (A)				1,115.9	13.95
B Back-up Facilities (BUFAC)					
3 Heavy-duty Paved Yard	sqm	74,360	7,000	520.5	6.51
4 Admin. Building (2 storied)	sqm	1200	10,000	12.0	0.15
5 Workshop	sqm	750	6,000	4.5	0.06
6 Fire station	sqm	450	6,000	2.7	0.03
7 Electric substation	sqm	450	6,000	2.7	0.03
8 Fuel Service Station	sqm	300	6,000	1.8	0.02
9 Utility building	sqm	150	6,000	0.9	0.01
10 Gate House	sqm	300	6,000	1.8	0.02
11 Internal Roads	sqm	4600	4,000	18.4	0.23
12 Drains and Culverts	m	575	15,000	8.6	0.11
13 Gates	Nos.	2	100,000	0.2	0.00
Sub-total of BUFAC (B)				574.1	7.18
C General Facilities					
14 Electrical Works, Water Supply and Sanitation		15% of Back-up facilities		86.1	1.08
15 Boundary Wall and Fencing	m	894	40,000	39.4	0.49
16 Office Furniture and Misc.	LS			1.0	0.01
Sub-total Gen Facilities (C)				126	1.58
Sum of (A+B+C)				1,817	22.71
TOTAL CIVIL COST				1,817	22.71

5.4 Terminal Operation Equipment

5.4.1 Cargo Handling Equipment

Upon completion of the proposed berth, having 366 m in length, the Terminal Operator will bring only the required handling equipment to handle the projected cargo throughput. At the initial stage after COD the flow of cargo will gradually increase over the time, addition of new equipment will be needed to see the market demand of vessel carrying inboard and outboard cargo. Considering the nature of traffic and space available in the proposed Terminal at Jetties 3 and 4, we suggest to use MHC, which is widely used in Asian ports. Rail Mounted Portal Crane, (RMPC) are sometimes used in place of MHC, which is slightly cheaper. However, it is preferable to use MHC. Usually MHC is tyre mounted with their engine so that they can travel from one Jetty to another Jetty. For practical purposes, the MHC is recommended for this Terminal.

Other Cargo handling equipments are also considered for general, bulk and combined cargo. In any modern terminal the operation is comprised a series of 4 distinct activities viz. (1) Ship to shore transfer (2) Transfer between jetty side and yard (3) Yard operation (4) Receipt / deliver operation. The output of whole system is dependent on the selection of equipment by the Terminal Operator, resulting in improved operating system like other terminals.

It should be noted that quayside improvement and landside improvement is very important to select the handling equipment. The Terminal Operator will be responsible for all shore operation. Considering all the factors, consultants recommend that the following major equipment to be procured to handle both general and mixed cargo for commercial operation.

It is envisaged that the equipment and facilities provided for Mongla Port should be versatile capable of handling each type of cargo such as containers, dry bulk and break bulk etc. for both export and import. It is also assumed that, the vessels coming to Mongla Port will be equipped with their own derrick/gears capable of handling containers. It is also understood that the port may be installed with versatile equipment, which can handle containers also, in addition to the dry bulk/break bulk, whenever necessary either as a backup or for augmenting the rate of handling at the jetty area. The following fleet of various types of cargo handling equipment along with their capacities and number of equipment required for efficient running of terminal operation is recommended.

Table 5.2: Equipment Requirement for Terminal Operation

SI No.	Equipment	Capacity	Purpose	Units
1.	Mobile Harbour Cranes (MHC) (2 per berth)	40 T	Ship to Shore Operation	4
2.	Mobile Cranes	10 T	Yard Operation	2
3.	Tractor Trailer (4 per hook and 2 stand by)	15 T- 20T	Jetty to Yard transfer Operation	10
4.	Hight mast Fork Lift Trucks (FLT)	5T	Yard/ Delivery Operation	2
5.	Low mast Fork Lift Trucks (FLT)	3 T	Yard/ Delivery Operation	2
6.	Reach Stacker	30-40 T	Stacking and Hoisting Operation	2
7.	Mobile Hopper (1 per hook)		Handling of Bulk Receipt	4
8.	Lorry/Truck (2 per crane)	3-5 T	Delivery of Bagged Cargo	8

5.4.2 Workshop and Maintenance equipment

Considering the type and numbers of cargo handling equipment to be deployed in the proposed 2 Berth terminal under PPP project, the workshop and its other facilities is to be developed by Terminal Operator. A workshop is to be designed for the maintenance of cargo handling equipment and into which all types of equipment can be repaired. It will have equipment workshops for different types of equipment and standard benches. Generally workshop facilities includes overhead traveling crane having a safe working load of 10 tons, various types of machinery, plants and tools, welding bay and machinery compressors to inflate the tyres of equipment, maintenance area with washing facilities for equipment to be used in terminal. In addition, engine over hauling room with related facilities, spare parts stocking facilities will be required. The workshop will have an internal storage space for spare parts with a fenced off storage space for small spare parts. Tires etc. may be storied outside the workshop in a dedicated area.

A lump-sum provision of Tk. 10 million has been made for procuring workshop equipment and facilities. Like other terminals, a fuel service station with dispensing unit and a compressor space is preferable to be close to the workshop.

5.4.3 Equipment Cost

The estimated cost breakdown of equipment costs, for the 2 jetties and backup area required at the port, for Option A, is given in the table below.

Table 5.3: Equipment Cost for Option A (2013 values)

Equipment	Units	Unit Cost (m Tk.)	Amount (m Tk.)	Total Cost (m USD)
1. Mobile Harbour Cranes, MHC 40 T (2 per berth)	4	250.0	1,000.0	12.50
2. Mobile Cranes 10 T	2	2.5	5.0	0.06
3. Tractor Trailer (4 per hook and 2 stand by)	10	2.5	25.0	0.31
4. High Mast Fork Lift Trucks (FLT), 5 T	2	5.0	10.0	0.13
5. Low Mast Fork Lift Trucks (FLT), 3 T	2	3.0	6.0	0.08
6. Reach Stackers, 30-40 T	2	40.0	80.0	1.00
7. Mobile Hopper	4	7.2	28.8	0.36
8. Lorry/Truck 3-5 T (2 per crane)	8	4.0	32.0	0.40
9. Workshop Equipment	LS		10.0	0.13
Sub- Total				1,197 14.96
CD VAT (18% of above)				215 2.69
TOTAL EQUIPMENT COST				1,412 17.65

5.5 Capital Cost Estimates

5.5.1 Total Capital Cost - Option A

Option A: Two Jetty Model (Base case)

Based on the assumptions for Option A, the total project cost for development of the Terminal as PPP project has been estimated and is given in the table below.

Table 5.4: Total Project Cost for Option A (2013 values)

Item	Amount (m Tk.)	Amount (m USD)
1. Civil Construction Cost (Jetty and Backup)	1,817	22.71
2. Equipment Cost (initial procurement)	1,412	17.65
3. Sub-Total	3,229	40.36
4. Contingency	484	6.05
5. Soft costs	518	6.48
TOTAL PROJECT COST (Base Option A)	4,231	52.90

The soft costs are:

- working capital of 3 months O&M
- interest during construction as calculated from the financial model, and
- project management and development fees.

The details of the cost estimates are provided in Annexure I.

5.5.2 Total Capital Cost - Option B

In Option B (3 Jetty Model), construction and operation of the Terminal will take place in 2 Phases, as mentioned below:

Option B Phase I:

The Terminal Operator will refurbish J5 and construct the back-up facilities in back-up area of J3 and J4. He will construct half of the heavy duty Paved Yard. Terminal Operator will procure 50% of the full capacity equipment. Terminal Operator will operate the J5 for a period till the throughput reaches an agreed level (say 90,000 TEU).

After that (say on year 8) the Terminal Operator will start construction of Jetties J3 and J4.

Option B Phase II:

In Phase II, the Terminal Operator will construct 2 Jetties (J3 and J4) and remaining portion of the heavy duty paved yard. The Terminal Operator will procure remaining 50% of the full capacity equipment. Then Terminal Operator will return the area of J5 to MPA.

The Terminal Operator will operate the terminal with J3 and J4, for the remaining contract period.

5.5.3 Total Capital Cost - Option B, Phase I

Option B, Phase I: Initially with One Jetty

Based on the assumptions described above, the total project cost for development of the Terminal as PPP project, in Option B Phase I, has been estimated and is given in the table below.

Table 5.5: Total Project Cost for Option B, Phase I (2013 values)

Item	Amount (m Tk.)	Amount (m USD)
1. Civil Construction Cost (Jetty and Backup)	454	5.67
2. Equipment Cost (initial procurement)	706	8.83
Sub-Total	1,160	14.50
3. Contingency	174	2.18
TOTAL PROJECT COST (Option B-I)	1,334	16.68

5.5.4 Total Capital Cost - Option B, Phase II

5.5.4.1 Option B, Phase II: Later Two Jetty option

Based on the assumptions described above, the total project cost for development of the Terminal as PPP project, in Option B Phase II, has been estimated and is given in the table below.

Table 5.6: Total Project Cost for Option B, Phase II (2013 values)

Item	Amount (m Tk.)	Amount (m USD)
1. Civil Construction Cost (Jetty and Backup)	1,416	17.69
2. Equipment Cost (initial procurement)	706	8.83
Sub-Total	2,122	26.52
3. Contingency	318	3.98
TOTAL PROJECT COST (Option B-II)	2,440	30.50

The details of the cost estimates are provided in Annexure I.

5.5.5 Total Capital Cost - Option B

Option B: Three Jetty Model

Based on the assumptions for Option B, the total project cost for development of the Terminal as PPP project has been estimated and is given in the table below.

Table 5.7: Total Project Cost for Option B (2013 values)

Item	Amount (m Tk.)	Amount (m USD)	Amount (m Tk.)	Amount (m USD)
	<i>Phase I</i>		<i>Phase II</i>	
1. Civil Construction Cost (Jetty and Backup)	454	5.67	1,416	17.69
2. Equipment Cost (initial procurement)	706	8.83	706	8.83
3. Sub-Total	1,160	14.50	2,122	26.52
4. Contingency	174	2.18	318	3.98
5. Soft costs	194	2.42	277	3.46
TOTAL PROJECT COST (Base Option B)	1,528	19.10	2,440	33.96

The soft costs are:

- working capital of 3 months O&M
- interest during construction as calculated from the financial model, and
- project management and development fees.

The details of the cost estimates are provided in Annexure I.

5.6 O&M Cost Estimates

5.6.1 O&M Costs

The annual operating and maintenance costs including costs incurred on repairs can be best estimated separately on each relevant component of the above estimated costs. For this purpose, the following factors need to be taken into consideration:

- Life of each type of infrastructure / equipment / asset
- Nature / Frequency of repair works required
- Nature / Frequency of maintenance works required

A realistic assessment of the operations and maintenance cost however often proves difficult as it varies from project to project depending on the actual use of the equipment and the works, maintenance standards, workforce employed and the local environment. As a practical approach the annual O&M expense is fixed as a percentage of the capital expense.

Given the above, the table below shows such percentages assumed for the purpose of estimation of their pairs and maintenance and admin and operating costs. The percentage of these costs will vary as the equipments become old and need more attention than in the early years.

Other Management and general overhead expenses of O&M cost consists of

- Salaries of management and administration staff including welfare and other expenses
- Maintenance of computers and other office equipment
- Other miscellaneous cost

Operation of any terminal involves up-to-date skills to achieve the desired goal through modern handling equipment and best management practices. It is very difficult to project O & M costs as the rapid technological advancement in port sector is taking place frequently. Estimation of O & M costs depends on many factors, which may influence the cost item off and on during operational tenure of proposed terminal ant Mongla Port. Such factors with respect to Bangladesh and global economic conditions are price inflation, rise of cost of spare parts and consumable unexpectedly, economic recession, change of govt. policy, political stability and so other factors.

The estimation major components of O & M cost, as provided in the 'World Container Terminal Survey Report' are as follow:

Table 5.8: O&M Cost Basis as per World Container Terminal Survey Report

Type of O*& M Cost	Basis per Year
1. Civil Maintenance Cost	0.2 % of Civil Cost
2. Maintenance of equipment	5% of cost
3. Utilities *(Electricity and water)	Based on use and KWH and LS charges
4. Administrative expensive	As per operation staff list

For this project, the following assumptions are made:

- Civil Maintenance 1% (Civil Cost)
- O & M costs of handling Equipment 5% [All electrical and Mech. equip]
- Manpower cost As per detailed estimation
- Administration cost Estimated
- Insurance cost 0.6% of gross fixed asset value
- other cost 0.6% of gross fixed asset value

The details of the cost estimates are provided in Annexure I.

5.6.2 O&M Cost – Option A

Based on the assumptions described above, the annual O&M cost for project, in Option A, has been estimated and is given in the table below.

Table 5.9: Operation and Maintenance Cost for Option A

Item	Taka m (2013 values)
1. Repair and Maintenance of Civil asset	18.2
2. Repair and maintenance of mechanical and electrical equipment including spares	28.2
3. Insurance	9.1
4. Salary Expenses	54.6
5. Office Maintenance	7.2
6. Fuel /Diesel	117.0
7. Electricity	0.6
Sub-Total of O&M Cost	234.9
8. Other expenses (Misc. unforeseen) LS	11.7
Total O&M Expenses	247

5.6.3 O&M Cost – Option B Phase I

Based on the assumptions described above, the annual O&M cost for project, in Option B, has been estimated and is given in the table below.

Table 5.10: Operation and Maintenance Cost for Option B Phase I

Item	Taka m (2013 values)
1. Repair and Maintenance of Civil asset	4.5
2. Repair and maintenance of mechanical and electrical equipment including spares	14.1
3. Insurance	2.3
4. Salary Expenses	35.4
5. Office Maintenance	7.2
6. Fuel /Diesel	58.5
7. Electricity	0.6
Sub-Total of O&M Cost	122.6
8. Other expenses (Misc. unforeseen) LS	6.1
Total O&M Expenses	129

5.6.4 O&M Cost – Option B Phase II

Based on the assumptions described above, the annual O&M cost for project, in Option B, has been estimated and is given in the table below.

Table 5.11: Operation and Maintenance Cost for Option B, Phase II

Item	Taka m (2013 values)
1. Repair and Maintenance of Civil asset	18.2
2. Repair and maintenance of mechanical and electrical equipment including spares	28.2
3. Insurance	9.1
4. Salary Expenses	54.6
5. Office Maintenance	7.2
6. Fuel /Diesel	117.0
7. Electricity	0.6
Sub-Total of O&M Cost	235.0
8. Other expenses (Misc. unforeseen) LS	11.8
Total O&M Expenses	247

6 TARIFF STRUCTURE

6.1 Tariff Structure of Terminal Operator

The existing ‘Schedule of Charges’ of MPA is levied under the Mongla Port Authority Ordinance, 1976. The charges were revised on 18.06.2003. Following are the main heads of MPA tariff.

Table 6-1: Schedule of Charges

SL.	Tariff Item No.	Tariff Head	Remarks
1.	1.1	Port Dues	Not Applicable
2.	1.2	Pilotage Fees	Not Applicable
3.	1.3.3	Berthing or unberthing	Applicable to Terminal Operator
4.	2.1	Berth Occupancy Charge	Applicable to Terminal Operator
5.	3.1	River Dues	Not Applicable
6.	3.2	Landing Charge	Applicable to Terminal Operator
7.	3.3	Shipping Charge	Applicable to Terminal Operator
8.	3.4	Hoisting Charge	Applicable to Terminal Operator
9.	4.1	Landing or Discharging Charge	Applicable to Terminal Operator
10.	4.3	Extra Container Movement Charge	Applicable to Terminal Operator
11.	4.4	Reefer Container Service Charge	Applicable to Terminal Operator
12.	4.8	Hoisting Charge	Applicable to Terminal Operator
13.	4.10	Lift on/ Lift off Charge	Applicable to Terminal Operator

Source: MPA Tariff Schedule

Terminal Operator will have a tariff structure that is equal to the MPA Tariff Schedule, with the option of increasing the tariff rates upto a maximum ceiling which will be pre-determined by MPA. Some of the major tariff rates that Terminal Operator will be allowed to charge are described below.

6.1.1 Loading and Discharging Containers

This tariff item includes the operations like movement of containers and their contents between the jetty and the storage areas and to and from the point of stuffing/ un-stuffing plus the cost of free storage for the free storage period. Extra movements, such as stacking or restacking are also included. The rate structure against this tariff item is:

Table 6-2: Charges for Loading and Discharging Containers

Type of Containers	Not exceeding 21' length	Exceeding 21' length
FCL per Container	USD. 43.40	USD. 65.10
LCL per Container	USD.130.00	USD. 195.00
Empty per Container	USD. 22.10	USD. 33.20

There was no Mobile Harbour crane at the time of formulating the existing tariff of MPA. Operation mentioned against this tariff item does not include lifting of container onto and from vessel. The actual operation which takes place under the purview of this tariff item covers movement of containers and their contents between the jetty and the storage area including the movement between storage area and stuffing/ un-stuffing point of LCL containers as well as extra movement.

6.1.2 Storage Charge

This tariff item will include the operation of safe and intact storage of any container, loaded or empty within the terminal.

Rent for storage of user owned equipment will not be applicable for Terminal Operator because Terminal Operator is expected to have enough number of equipment to cater the need of the users. However, as far as free time on containers in MPA is concerned, the free storage period respectively for FCL import, FCL export, LCL export, Transshipment container and Empty container is 4 days, 7 days, 7 days, 28 days and 15 days respectively.

Table 6-3: Storage Charges for Containers

	Not exceeding 21' length	Exceeding 21' length.
Per loaded container	USD 1.50	USD 3.00
Per Empty container		
First 7 days after free days	USD 1.50	USD 3.00
Thereafter	USD 3.00	USD 6.00

The new Terminal is expected to be operated through most modern technology. Its backup area i.e. imports storage area and export storage area will play a very vital role in maintaining its efficient operational chain. To remain always ready to receive import container from cranes, the import storage area will not be in a position to allow long storage of any container. The present average dwell time of import container in MPA is high. So, unless the dwell time is minimized to an acceptable range the success of the terminal cannot be achieved.

6.1.3 Extra Container Movement

This tariff covers the movement or restacking of container on obtaining request from any user. In the existing procedure, such request takes place normally in case of appraisal and fumigation. In case of appraisal, only one extra movement charge is realized. However, in case of appraisal cum delivery, such extra movement charge is not realized, rather only one lift off charge is realized. This tariff charge is also applicable in case of change of status of a container. The tariff structure is as under:

Table 6-4: Charges for Extra Container Movement

Type of Containers	Not Exceeding 21' length	Exceeding 21' Length
<i>Per loaded container</i>	<i>USD.42.60</i>	<i>USD.63.90</i>
<i>Per empty container</i>	<i>USD.21.70</i>	<i>USD.32.50</i>

In the new Terminal, this tariff item will be applicable generally in case of appraisement and change of status.

6.1.4 Reefer Container Service

This tariff item will include the operation of pre-trip inspection, supply of electricity and connecting and disconnecting of reefer containers and their monitoring service.

Table 6-5: Charges for Reefer Container Services

Type of Services	Basis of Charges	Rates
<i>Pre-trip Inspection</i>	<i>Per Container</i>	<i>USD. 2.00</i>
<i>Supply of electricity and connecting and disconnecting reefers</i>	<i>Per container per day</i>	<i>USD 5.00</i>
<i>Monitoring Service</i>	<i>Per container per change</i>	<i>USD. 4.00</i>

6.1.5 Lift on/Lift off Charges

This tariff item is charged when a container is received from or delivered to outside road, rail, and river transport. This item covers the movement of container between the storage point of container and the road, rail or river transport subsequent to or prior to lift on or lift off. Placement of import FCL for stripping and delivery, on chassis delivery, receiving of export container for storage at the export yard normally will fall under the purview of this tariff item. The tariff structure is as under:

Table 6-6: Charges for Lift on /Lift off of Containers

Type of Containers	Not Exceeding 21' length	Exceeding 21' Length.
<i>Per loaded container</i>	<i>Taka 1000.00</i>	<i>Taka 1500.00</i>
<i>Per empty container</i>	<i>Taka 500.00</i>	<i>Taka 750.00</i>

6.1.6 Stuffing/ Unstuffing Charges

This tariff item is applicable when containers are stuffed with contents for export bound or unstuffed for delivery of container contents to the premises of importers through covered vans/trucks at CFS. This tariff item covers for the movement of the container contents between the CFS or equivalent and the container including stacking/ unstacking in the CFS and the movement of the container from the container yard to the CFS and back to the container yard. This charge also includes any uses of mechanical equipment for stuffing/ unstuffing and movement of containers within the CFS.

Table 6-7: Charges for Stuffing/Unstuffing of Containers

Type of Services	Basis of charges	Rates
Stuffing	<i>Per 1,000 kg or part thereof of contents</i>	Taka 75.00
Unstuffing	<i>Per 1,000 kg or part thereof of contents</i>	Taka 92.00

6.2 Methodology of Tariff Application and Revisions

The methodology of structuring tariff schedule of a private operated container terminal may differ from terminal to terminal. It depends mainly upon the economic policy of that country and the terminal owner, strategic situation in regard to competitiveness of the terminal with other terminals and the limitation of authoritarian liberty given to the operator by the owner in their bilateral agreement.

Normally there can be three probable methods of framing tariff schedule in a private operated terminal. In the first probability, the operator will have full authority to frame their own tariff structure and the terminal owner will have no interference only except realization of their royalty. This situation may be viable when there exists a truly competitive situation with a few number of independent terminals owned or operated both in government and private sector in the port area competing for the same market share. In the second probability, the operator exercises no authority in formulating the tariff. The owner of the terminal remains absolutely empowered in this sector. This situation may be viable when there will be no competition and most likely the terminal is owned by government. In the third probability, the owner of the terminal will formulate the tariff structure but the operator may be given the right to enhance or reduce the rate of charges within a limited range. This probability may be exercisable when there will be limited competition only between two or three terminals and the policy of the government emphasises more private participation in port sector.

MPA is a government owned entity. Hence, the policy of formulation of tariff structure of MPA has been depending more on other factors than the ports' own factors. However, with the engagement of a private operator for two new jetties, MPA will have to face competition. Nevertheless, participation of private sector is also required to encourage increased port efficiency.

Considering all these aspects, it appears that the third probability will be more viable in case of the project by which MPA will formulate the tariff structure by giving the Terminal Operator a right to enhance the rate of charges within a Tariff Rate Ceiling which will be fixed by MPA.

As such it is suggested that Terminal Operator shall be entitled to realise charges from their users/ clients such as shipping lines, MLOs, C&F agents etc. against the services they will render to them in accordance with MPA tariff. It is further suggested that Terminal Operator may be given the power to enhance the tariff structure within a range of limitation (up to 30 percent of the existing tariff). In this connection, Terminal Operator will be required to declare and publish the enhanced tariff structure and circulate the same among the users and all other concerned agencies including MPA.

Terminal Operator will also be allowed to raise his tariff levels by a maximum of 3% every year. If Government raises the Tariff Schedule of MPA to a level, which is higher than the

existing Tariff Rate Schedule of the Terminal Operator at that year, Terminal Operator will also be allowed to raise his Tariff Rates to match that of MPA.

River dues on container and containerized cargo may be realized by Terminal Operator from the concerned agencies and subsequently the whole amount be remitted to MPA on regular basis. Terminal Operator should provide MPA with relevant documents and statistical information as per requirement of MPA to ensure correctness of remittable amount on account of river dues as well as other remittances. In this connection, there should be a mutually agreed upon working procedure between MPA and the Terminal Operator. Charges on vessels like port dues, pilotage, tug hire etc. should be realized as usual by MPA directly from the concerned shipping agent.

To ensure proper remittance of foreign currency, Terminal Operator, in-line with the existing system, should formulate a procedure under the guidance of MPA, by which Bangladesh Bank can regularly be updated about the required statistics and information against those tariff items where foreign currency is involved.

7

COMMERCIAL ASPECTS

The overall PPP framework of the project will be governed by the PPP Policy and Strategy 2010 and the guidelines of the PPP Office. However, apart from them, MPA being the executing agency of the project, the major terms and conditions with respect to PPP will be needed to be accepted by MPA.

7.1 Institutional Framework

The pattern of institutional framework will vary depending upon the stage of the project development. The following broad stages are envisaged for the defining institutional framework:

- 1) During project preparation
- 2) During tendering
- 3) During negotiation and tender award
- 4) During implementation of the contract (post award)

7.1.1 During Project Preparation

During project preparation, (*i.e.* feasibility study and other tender documentation), IPFF has designated and vested responsibility to the PPP Office for oversight. Especially the feasibility study and major terms and conditions will need to be approved by PPP Office. The project preparation stage involves the following three phases as per PPP Policy and Strategy 2010:

- Phase 1: **Project Identification** – The project is already identified by MPA as a PPP project
- Phase 2: **“In Principle” Approval** – The project has been approved by CCEA
- Phase 3: **Feasibility Study** – This has been assigned to IIFC and its associates by IPFF with the oversight of the PPP Office. The **major terms and conditions**, which is a part of the feasibility study, need to be first approved by PPP Office in consultation with MPA.

The institutional framework during project preparation is shown in the following figure:

Figure 7-1: Institutional Framework during Project Preparation



The figure shows that PPP Office plays a central role during project preparation, while MPA provides main data support for the study. However, the main role of MPA is to consider the major terms and conditions proposed and execute the PPP agreement with the selected private investor.

7.1.2 During Tendering

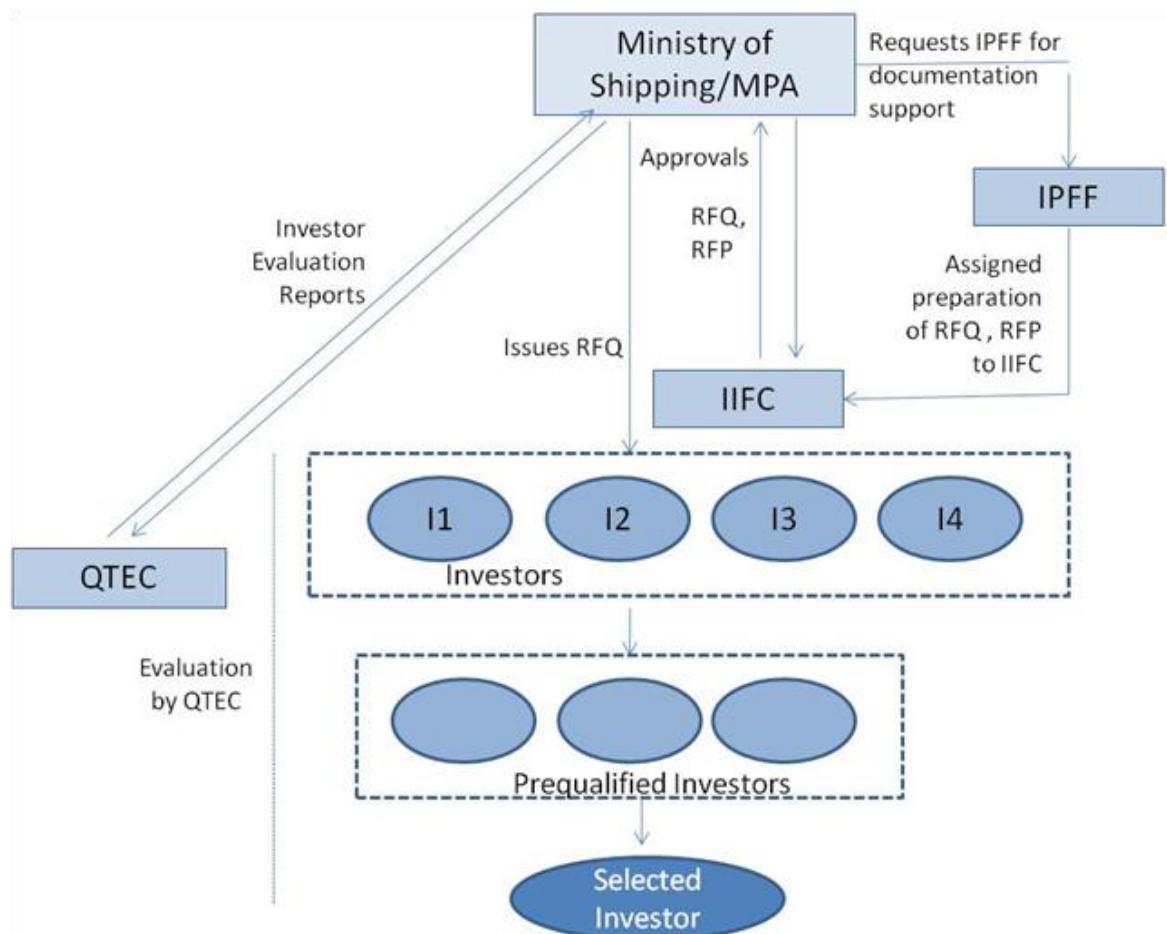
The PPP Policy and Strategy 2010 provides for two phases during this stage of project development and progression:

Phase 4: Request for Qualification

Phase 5: Request for Proposal

MPA will play a central role in receiving the RFQ and RFP documents from IIFC and issuing them to the investors. The qualification document and tender documents will be prepared by IIFC. MPA will issue the qualification documents to the interested bidders. Qualification and Tender Evaluation Committee (QTEC) will play an important role at this stage, especially in evaluating the proposals. The proposals of interested bidders will be shortlisted by QTEC. Then MPA will issue RfP to the shortlisted bidders. QTEC will evaluate the proposal of shortlisted bidders and recommend selected bidder. MPA/Ministry of Shipping will approve the selection of the bidder. The following figure shows the institutional framework during tendering and award of the project:

Figure 7-2: Institutional Framework during Tendering



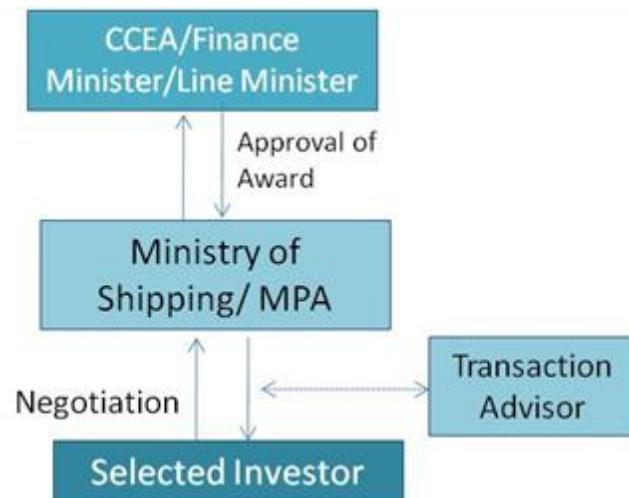
The above figure shows that Ministry of Shipping and MPA has a significant role during tendering. In fact, all the activities will be centred around Ministry of Shipping and MPA. MPA will first issue RFQ to the interested investors. The interested investors will submit qualification proposals to MPA. QTEC will evaluate the proposals and recommend a short-list of investors, which MPA may approve and issue RfP to the shortlisted investors. The role of

QTEC will also be critical. QTEC will evaluate the submissions of the prequalified investors and recommend ranking of investors for approval of MPA and the MOS.

7.1.3 During Negotiation and Award

It is a critical stage of the investor selection process. However, from institutional point of view it is simpler than the framework in the previous stages. MPA and Ministry of Shipping will play the central role in negotiation. The role of the transaction advisor at this stage becomes vital in terms of assisting MPA in selecting negotiation points and participating in the negotiation with the selected investor.

Figure 7-3: Institutional Framework during Negotiation



The final award is to be given by the CCEA/Finance Minister/Line Minister depending upon the size of the project (*i.e.* small, medium or large as per PPP Policy and Strategy 2010). Based on the capital cost of the project, it is classified as a large project. IIFC's role as transaction advisor will end at this point.

7.1.4 During Implementation of the Contract (Post award)

The project progression during implementation of the contract at the post award phase, will be mostly between MPA and the selected investor. At this stage, MPA may instruct the Project Management Unit (PMU) for overseeing the implementation of the contract by the selected investor. MPA may also engage a separate consultant to assist in following up and tracking the relevant provisions of the contract or carry out the function with in-house staff. The following figure provides the proposed institutional framework during implementation of the contract.

Figure 7-4: Institutional Framework during Implementation of the Contract



The formation of PMU is an important point that needs to be considered by MPA, because the level of monitoring and dealing with the selected investors, involves significant amount of work and needs care, understanding and management. Retention of a separate consultant at this stage may significantly assist the PMU in understanding the progress and streamlining critical issues, especially with respect to financing and construction of the project.

7.2 PPP History and Legal Framework of Bangladesh

Beginning of a significant PPP development in Bangladesh started through Private Sector Power Generation Policy, under which a number of independent power plants has been built in PPP. For creating a more comprehensive framework for PPP for multiple sectors Private Sector Infrastructure Guidelines (PSIG), 2004 was adopted. The PPP program was led by BoI under guidance by Private Infrastructure Committee (PICOM) headed by the Principal Secretary.

Due to need of larger PPP development in the country, Ministry of Finance issued a Position Paper, 2009: "Invigorating Investment Initiative through Public-Private Partnership" and created a separate budget for PPP development. The budget is provided in following components:

- Technical Assistance Financing
- Viability Gap Financing
- Infrastructure financing

In parallel, Policy and Strategy for Public-Private Partnership, 2010 was created to replace PSIG. PPP Office has been established to drive the PPP development program. PPP projects currently need to be processed through PPP Office. Presently, the institutional framework consists of the following institutions:

1. CCEA;
2. PPP Office;
3. Ministry of Finance, Finance Division, PPP Unit;
4. Line Ministry/implementing agency

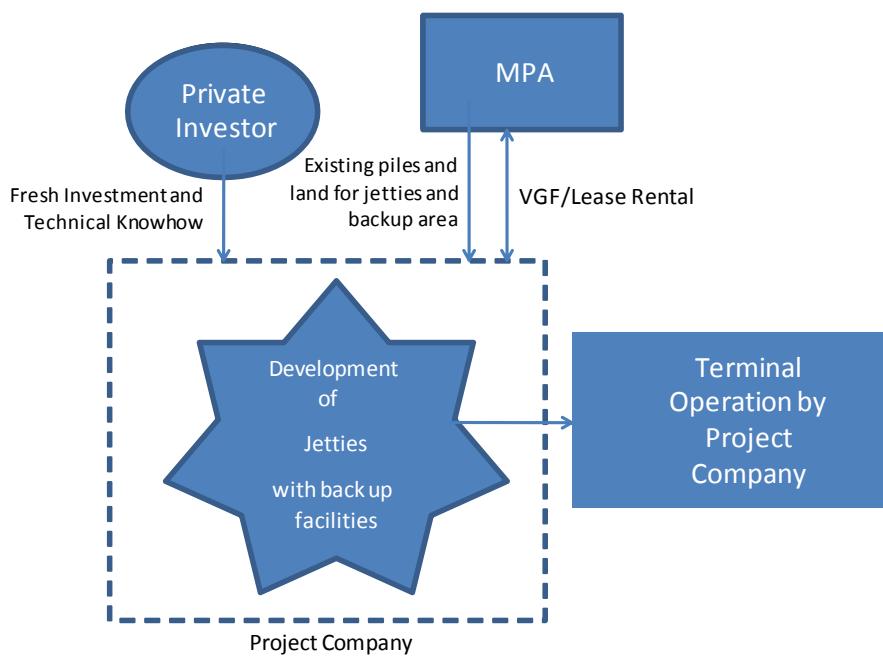
Policy and Strategy for Public-Private Partnership, 2010 provides the roles of each institution.

7.3 Broad PPP Contractual Structure

An appropriate model of private sector participation needs to be decided upon, before the private sector can participate in development and operation of the jetties. The model defines the interrelationship between the parties, flow of equity and payments, and financial selection criteria.

The following figure shows a flow chart, which is a general contractual framework for private sector participation in anyone of the models:

Figure 7-5: General Contractual Framework for PPP



MPA will provide the land for two jetties and adjacent back-up area to the project company. The project company will take charge of the project. The Terminal Operator will make fresh investment and will carry out development of the jetties over the existing piles, lay new piles as required, develop the back-up area under the project company for jetty operation. The Terminal Operator will also procure cargo and container handling facilities as needed, at its own discretion. MPA may need to provide a VGF to the Terminal Operator, depending upon the need.

7.4 PPP Business Models

In most PPP deals, the private investors are selected through open tendering. This creates a perception of transparency and competition among private investors and generates a better deal for the government.

The following models may be considered as business models for participation of the Terminal Operator in the project, either through open tendering or on a negotiated basis.

<i>Partnership by Contract (PPP)</i>	1. Model A:	Build Own Operate (BOO)
	2. Model B:	Build Operate Transfer (BOT)
	3. Model C:	Lease
<i>Partnership by Shares (JV)</i>	4. Model D:	JV Special Purpose Company

The following paragraphs describe the models with advantages and disadvantages:

7.4.1 Model A: Built Own Operate (BOO)

In this model, MPA will provide the right to use the designated land (the land for jetties and back-up area) and the existing assets (old piles) to the selected Terminal Operator. The provision of such right will be through the BOO agreement which will provide a power of attorney to the Terminal Operator to do jetty operation business with the existing assets

after necessary addition and construction of new facilities. However, MPA will not prescribe the facilities that the SPC will install, except necessary investment to be made for setting up the jetties and back-up yard and to operate the assets.

The Terminal Operator will form a Special Purpose Company or SPC and will employ its own human resources in the SPC as per requirement. At the end of the term, the Terminal Operator may make the site as it was provided by MPA and leave the place or may return to MPA as built by the Terminal Operator at a price for the additional facility built by the Terminal Operator.

The SPC will be formed with fresh equity from the Terminal Operator. The Terminal Operator will add the new assets and select the additional workforce on its own responsibility.

Table 7.1: Advantages and Disadvantages of Model A

Advantage	Disadvantage
<ol style="list-style-type: none"> 1. Provides flexibility to the Terminal Operator for the facilities to be provided 2. The contract structure is simpler than BOT arrangement, as the provision of transfer of the facilities may not be significant. 3. Less supervision requirements from MPA 4. Lower possibility of litigation with investor 	<ol style="list-style-type: none"> 1. MPA will: <ol style="list-style-type: none"> (a) renew the PPP agreement based upon parameters/criteria stated in the PPP agreement (b) select a new concessionaire, or (c) purchase the assets at a price calculated by a pre-determined methodology.

7.4.2 Model B: Build Operate Transfer (BOT)

In this model, MPA will provide the right to use the designated land (the land for jetties and back-up area) and the existing piles to the selected Terminal Operator. The provision of such right will be through the BOT agreement which will provide a power of attorney to the Terminal Operator to do jetty operation business with the existing assets after necessary addition and construction of new facilities. The Terminal Operator will form a Special Purpose Company or SPC.

MPA will prescribe the facilities that the SPC will install, including necessary investment to be made for setting up the jetties, back-up yard and cargo handling facilities. However, the Terminal Operator will employ its own human resources in the SPC as per requirement.

At end of the term, the Terminal Operator will return to MPA the facilities built by the Terminal Operator at a depreciated value for the additional facility, built by the Terminal Operator.

The SPC will be formed with fresh equity from the Terminal Operator. The Terminal Operator will add the new assets and select the workforce for operating the designated jetties on its own responsibility.

Table 7.2: Advantages and Disadvantages of Model B

Advantage	Disadvantage
Government gains a contractual right on the assets and facilities added by the Terminal Operator, at the end of the term.	Provides less flexibility to the Terminal Operator on the facilities to be provided.

7.4.3 Model C: Lease

In this model, MPA will provide the right to use the designated land and the existing assets to the selected Terminal Operator, as a capital lease. The provision of such right will be through a lease agreement which will provide a power of attorney to the Terminal Operator to do jetty operation business. The Terminal Operator may or may not form a Special Purpose Company or SPC, as a lease contract should provide more flexibility to the lessee in doing other business.

MPA will not prescribe the facilities that the SPC will install, except that it will use the assets provided for jetty operations only. The Terminal Operator will use its own human resources for jetty operation as per requirement.

At end of the term, the lessee may make the site as-is as it was provided by MPA assets or may return to MPA as-built by the lessee at a price for any additional facility built by the Terminal Operator.

Table 7.3: Advantages and Disadvantages of Model C

Advantage	Disadvantage
<ol style="list-style-type: none"> 1. Provides freedom to the Terminal Operator on the facilities to be added 2. The contract structure is simpler than BOO or BOT arrangement, as the provision of transfer of the facilities is not significant. 3. Government may not need to provide VGF, as MPA is providing a lease of the land only and the viability of jetty operation remains solely the Lessee's business. 	Government will have limited jurisdiction over the lessee, in terms of operation of the jetties

7.4.4 Model D: JV with MPA

In this model, MPA will invite a Terminal Operator to refurbish the existing facilities and build the jetties with a given set of specifications. After the Terminal Operator is selected, a Special Purpose Company (SPC) will be formed. The SPC will be owned jointly by the selected winning investor with majority share-holding and MPA.

The assets of MPA will be book-transferred to the SPC. In exchange for the assets transferred to SPC, MPA will receive shares in the SPC, equivalent to the value of the assets transferred. Terminal Operator will inject fresh cash equity to the SPC, upto a pre-agreed amount, for refurbishing the existing assets and setting up the new jetties.

Some of the SPC's management positions will be filled up by the existing personnel and some from the winning investor. The SPC will manage the whole business and the employees. The existing piles and new assets added will be on the books of SPC. However, the Terminal Operator will receive fresh equity shares in the SPC, to the amount spent for investing in additional facilities.

The Terminal Operator and MPA, as shareholders of SPC, will receive dividends from the income of SPC as it accrues, which will be distributed on pro-rata basis based on number of shares held by the investor and MPA.

After end of the tenure (or before the end of the tenure, as agreed), the investors can off-load their shares to MPA or other investors.

Table 7.4: Advantages and Disadvantages of Model D

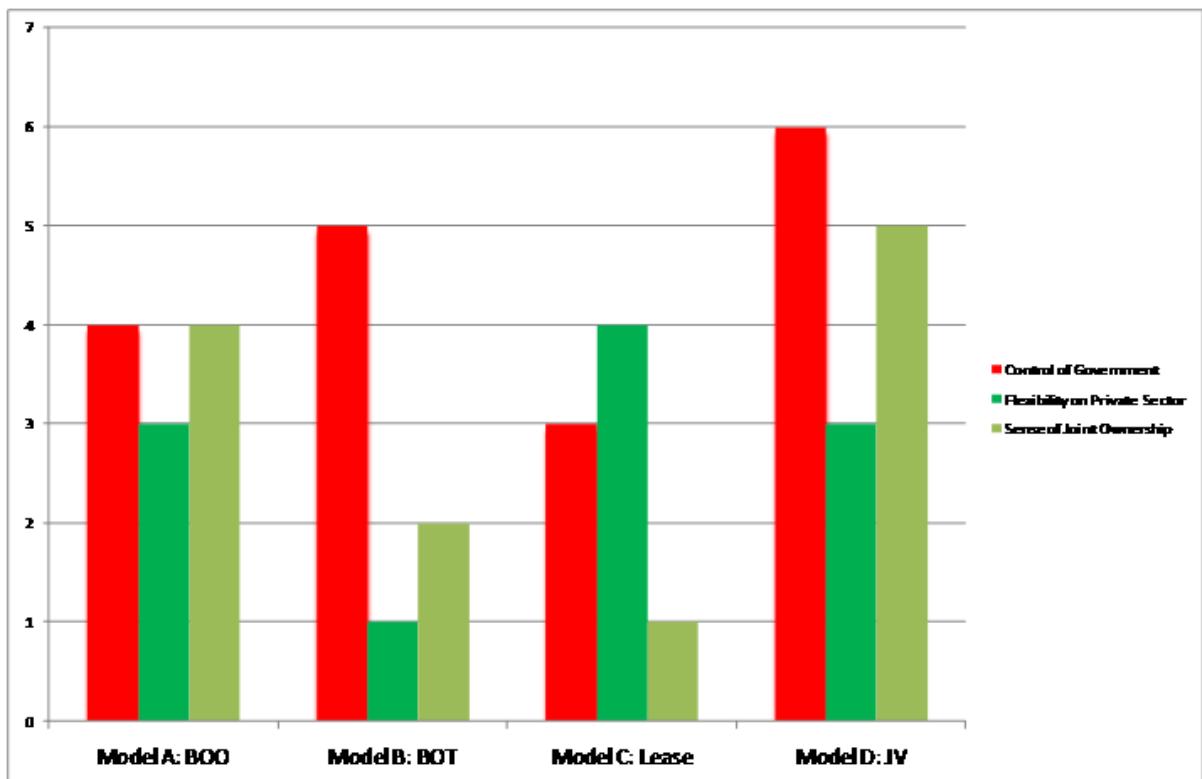
Advantages	Disadvantages
It raises a spirit of mutual trust between MPA and the Terminal Operator	There may be a conflict of interest with other jetties of Mongla Port

7.5 Assessment of the PPP Options

As per our assessment of PPP options and experience, the BoT model often leads to over-sizing of a project, due to the fact that BoT involves a “T” or “Transfer” of facilities free of cost to the executing agency. It also needs complex provisions and extra expenses on the Terminal Operator in terms of guarantee for maintaining the facilities to a desired standard at the time of approaching the end of the term. It also limits flexibility of the Terminal Operator in making decisions of capital addition based on demand and commercial judgment of the investor. These factors add to the reasons, why Terminal Operators are usually detracted.

The following figure shows the comparison of different options in terms of level of government control, level of flexibility of Terminal Operator and sense of joint ownership:

Figure 7-6: Comparison of PPP Options



BOO provides greater flexibility to the Terminal Operator, to make capital investment

decisions as per the need and demand. The structure of the contract will be simpler as the provisions for transfer of the facilities is not significant.

Lease provides even more flexibility to the Terminal Operator in terms of doing business and capital decisions. However, this may lead to loss of focus on developing two operating jetties for Mongla port, though the structure of the contract will be simpler than BOT and BOO. The lease option has a distinct advantage of all other options, in that it relieves the government from providing a VGF to the Terminal Operator.

The JV special purpose company model will provide a sense of joint ownership of both MPA and the Terminal Operator in the development of jetties. It will facilitate necessary approvals from MPA. However, from competition of view, there will be conflict on the part of MPA between promoting other jetties of MPA vis-à-vis these two jetties and it may not work in the long run.

The discussion leads to a preference of model, as BOO is the most suitable model followed by lease and JV.

7.6 Risk Allocation and Mitigation

Terminal Operator's participation in PPP allows public sector to transfer associated business risks to the private sector. Risk in such PPP projects are heightened by the large capital outlays, by a long lead-time typically associated with such projects, lenders and investors having to rely primarily on project cash flow for returns and repayments. The identification and management of risks therefore plays a key role in structuring and financing of PPP projects has to be handled in a well-organized and disciplined manner.

The risk profile of this PPP project will be allocated among the parties through the PPP contract focusing on the following broad areas:

- a. Political risks
- b. Commercial risks
- c. Legal risks
- d. Project development risks
- e. Construction/completion risks
- f. Operating risks

Particular risks for associated parties under this PPP agreement will be managed based on the risk bearing capacity of the party that mostly suits to deal with it, in terms of control or influence and costs.

There are some risks usually associated with a PPP deal, which need special care especially on the part of the government/MPA. These are as follows:

Table 7.5: Preliminary Risk Allocation and Mitigation

Risk	Key Points	Mitigation Measures	Who can bear or should bear	Comment
1. Commitment to the project	Ownership and commitment of the project concept on the part of the government is highly essential, so that the	Clear decision from appropriate authorities of the government needs to be taken beforehand	Ministry of Shipping/ MPA	As capacity of MPA has been under-utilised due to draft limitation and so the business of Terminal Operator will also be

Risk	Key Points	Mitigation Measures	Who can bear or should bear	Comment
		executing agency is motivated to award the project to private sector. Several linked projects need to be carried out by the MPA for the success of the project.		limited, it is envisaged that there will be little surplus of the Terminal Operator to keep MPA motivated for this project.
2. Regulatory Gap	If the approval processes are not clearly defined and established and the laws and policies are not clear, then there is a significant risk of the project not moving forward and the Terminal Operator not attracted.	The existing approval processes need to be reviewed in detail and additional approvals if needed are to be identified and taken before hand.	Ministry of Shipping/ MPA	The regulatory provision of allowing the private jetties to operate in a commercial manner in competition with other MPA jetties needs to be created.
3. Risk of misprocurement	Misprocurement or complexities in procurement has been a major stumbling block in developing infrastructure projects	The project specifications should be clearly defined and clear cut objective evaluation criteria needs to be designed, which leaves little room for subjective judgment. However, evaluation criteria should not be dependent upon detailed specifications that will disallow flexibility depending upon practical situation. The applicable guidelines/specifications need to be properly identified, to mitigate from overdesigned specifications.	Ministry of Shipping/ MPA	Tender document need to be designed considering this factor.
4. Motivating Terminal Operators and financial institutions	It is a challenge to attract private investment in infrastructure project due to the fact that they usually involve multiple agencies of the government and approvals are	Multiple agencies of the government that the project may need approval from need to be involved from the beginning so that their in-principle agreement is received prior to the point of taking actual	Ministry of Shipping/ MPA	PPP Unit of Finance Division needs to be involved

Risk	Key Points	Mitigation Measures	Who can bear or should bear	Comment
	subjective. In case, the project needs government subsidy, there is uncertainty of receiving such subsidy from the government.	approval.		
5. Risk of not finding investors	There are many examples where government invites private sector for participating in a PPP project but with very slim or no response from the investors.	Non response or slim response from the investors can be overcome by inviting private sector during EoI stage, and disseminating major project parameters with invitation of suggestions.	Ministry of Shipping/ MPA	MPA needs to resolve providing freedom to the Terminal Operator to operate commercially with respect to tariff and freedom of choice; i.e. customers' choice of the jetties and Terminal Operator's choice of customers.
6. Demand Risk	Usually in developing countries, the pent-up demand for infrastructure services is huge, due to long time required for new capacity additions.	Private sector should be given the demand risk. It will keep pressure on the Terminal Operator to maintain its quality of service at desired level. The Terminal Operator is best able to manage it, because it is for the investor's own interest to increase volume of business. In general, unless there is a significant risk of low demand compared to	Terminal Operator	Government needs to give freedom to the users, under a 'Users' choice' system

Risk	Key Points	Mitigation Measures	Who can bear or should bear	Comment	
		level of investment, Government should not take demand risks.			
7. Abandonment Risk	There is usually a risk that the at the middle of project development or execution Terminal Operator, leaves the project usually for some financial difficulty or for reasons where the Terminal Operator discovers that the terms and conditions that has been agreed upon has become highly unprofitable or unrealistic to the Terminal Operator.	Firstly, the terms and conditions should be so designed that it naturally fits both the parties. Then, there must be provisions in the concession agreement concerning such abandonment of the project by the Terminal Operator.	Terminal Operator	-	
8. Acquisition Risk	Government may sometimes decide that the project which was decided to be carried out through PPP, is now, whether during construction or operation, best dealt by the government.	In the concession agreement, there need to be sufficient provisions, about what government compensations are entitled by the Terminal Operator, in case of such compulsory acquisition or appropriation by the government.	Ministry of Shipping/ MPA	-	
9. Change in Law	Government may change some laws which will have adverse impact on the performance of the project in terms of revenue earning or profit making.	In the concession agreement, there must be sufficient provision to cover the Terminal Operator for any change in law.	Ministry of Shipping/ MPA	-	
10. Linked projects	Implementation of the linked projects are delayed due to delays in funding, environmental assessments etc.	The Government, with the support and recommendation from the PPP Office needs to give priority to such projects.	GOB	Without the implementation of the linked projects, the project is not likely to receive sufficient demand and hence investor interest.	
11. Environment	Although the	The MPA with the	MPA at	Without such an	

Risk	Key Points	Mitigation Measures	Who can bear or should bear	Comment
Environmental Impact Assessment	preparation of the EIA is the responsibility of the investor, there is insufficient time to do it properly during the financial closure period.	support from donors may start the EIA study and complete it upto 70 to 80%. After award, the investor will complete the remaining portion based upon the technical design as per the bid that is documented in the concession agreement.	the start and investor at the end	arrangement, financing from IPFF is likely to be delayed due to poor quality EIA preparation.

8

FINANCIAL ANALYSIS

This section presents the assumptions and results of the financial analysis of the Development of Two Jetties at Mongla Port through PPP conducted by the consultants as part of the Detailed Feasibility Study. The financial analysis is conducted from the perspective of the Terminal Operator, modeling his business during the PPP Agreement Term.

Following a brief introduction, the methodology, business models and assumptions of the financial analysis are discussed in detail and the findings and results of the analysis are presented.

8.1 Introduction

Development of two jetties at Mongla Port is proposed with the view to increasing the capacity of the port to handle more container and general cargo traffic in the future. It is envisaged that cargo traffic through Mongla Port will increase manifold once the Pussur River is dredged (i.e. project L1 implemented) and more ships can easily access the port. The completion of some other important linked projects, such as the dredging of MG Canal, allowing cargo from Dhaka region to be transported to Mongla Port through waterways (project L2) and provision of a dedicated ferry service for the Port at Mawa, allowing cargo from Dhaka to be transported easily through roadways (project L3) will increase cargo traffic at the port.



In order to maintain the standards required for a successful and efficient, high quality sea port, the development, management and operation of the two jetties needs to follow a successful model. This is best done when the on-site infrastructure development, equipment procurement and operation is undertaken by an experienced Terminal Operator. Accordingly, this chapter analyzes the financial viability of development of the two jetties from the perspective of a Terminal Operator attracted to the project through the PPP concept.

The financial analysis is based on information gathered from Mongla Port Authority, relevant sea port users, traffic forecast, and conceptual master plan of the site and development costs based on similar costs across the country. Assumptions on operational costs, cost escalations and financing structure have been made for the financial analysis.

The model has then been used to assess the viability of developing two jetties at Mongla Port through PPP; using different traffic forecast scenarios and different PPP models.

Five different traffic forecast scenarios were analyzed in the traffic model:

- a. **Scenario 0:** Natural Growth - No dredging and no linked projects
- b. **Scenario I:** Dredging of Pussur Channel (L1)
- c. **Scenario II:** Dredging of Pussur Channel and Dedicated Ferry Service (L1 + L3)

- d. **Scenario III:** Dredging of Pussur Channel and Clearance of MG Canal (L1 + L2)
- e. **Scenario IV:** Dredging of Pussur Channel, Clearance of MG Canal and Dedicated Ferry Service (L1 + L2 + L3)
- f. **Scenario V:** Dredging of Pussur Channel and Padma Bridge

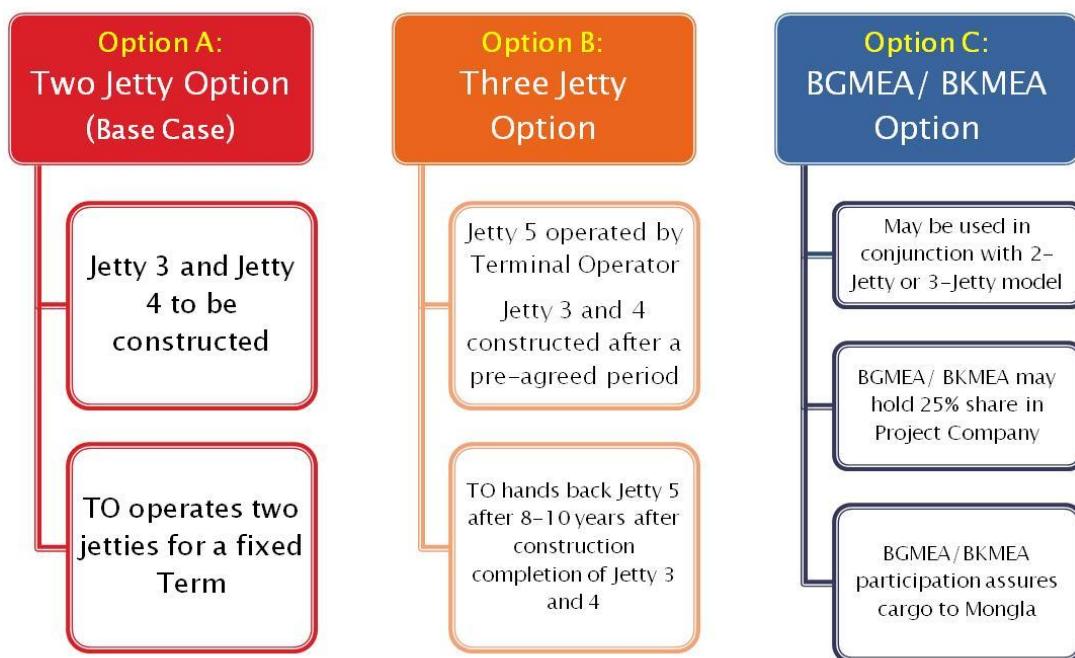
Scenario 0 forecasts the terminal traffic in the as-is scenario and the results of the project if MPA does not undertake Pussur River dredging or any other linked projects. Scenario I models the scenario where only Pussur River is dredged but other linked projects are not implemented. Scenarios II, III and IV models the cases where different combination of linked projects are implemented. Scenario V models the case of Padma Bridge being constructed along with dredging of Pussur River.

Financial analysis of the project has been extensively analyzed in Traffic Scenario I and Traffic Scenario IV.

The three different PPP models analyzed are as follows:

- a. **Option A:** Two Jetty Model (upfront development of Jetty 3 and 4)
- b. **Option B:** Three Jetty Model (deferred development of Jetty 3 and 4; Jetty 5 operated temporarily by TO for first few years)
- c. **Option C:** BGMEA/ BKMEA option used in conjunction with Option B)

Figure 8-1: PPP Option for the Project



For each scenario, the financial analysis indicates the internal rate of return (IRR) of the project and allows for sensitivity analysis on costs and other factors to see their effect on the IRR.

The base case for the model assumes that Pussur River dredging has been implemented by the Government (Traffic Projection Scenario I) and the PPP Model used is Option A: Two Jetty Model.

Key parameters for the base case scenario are presented in Table 8.1 and discussed in more

detail in this chapter.

Table 8.1: Overview of Key Parameters in Base Case

Category	Parameter
Traffic Scenario	Scenario I: Dredging of Pussur Channel
PPP Model	Option A: Two Jetty Model
Term of PPP Agreement	30 years
Contract Signing	December 2013
Construction Start	January 2014
Construction Completion	December 2015
Jetty 3 and 4 Commercial Operation Date	January 2016
Pussur River Dredging Complete	end 2015
Tariff Rate	120 % of MPA Tariff
Tariff Rate Escalation	3% per year
Terminal Capacity	70,000 TEUs/ year/ jetty and 240,000 MT per year/ jetty (non-containerized cargo)
Debt/ Equity Ratio	75% (75% Commercial Debt, 25% Equity or Reinvested Cash)
Long-term Loan for Infrastructure	80% of loan from IPFF at interest rate of 5.0%.
Fiscal Incentive from Government	10 years tax holiday

8.2 Terminal Operator Business Model

The core business of the Terminal Operator (TO) is to operate the two jetties and charge tariff to shipping agents and consignees for containers and general cargo handled and stored within his facility. TO will also collect berthing fees from ships that use the two jetties.

After signing of the PPP Agreement, Mongla Port Authority (MPA) will hand over Jetty 3 and Jetty 4 incomplete piles to the Terminal Operator along with the backup area. TO will be responsible for completing the construction of the remaining piles for the two jetties, constructing the jetty deck and developing the backup area with necessary infrastructure and backup facility. TO will also procure equipment required to operate the terminal. After construction completion, TO will operate and maintain the terminal throughout the Term of the PPP Agreement. TO will pay yearly lease rental to MPA for using the land for the facility.

A Special Purpose Vehicle (SPV) would be established by the Terminal Operator. The Terminal Operator SPV will be financed by the Terminal Operator's own equity and loans from Investment Promotion and Financing Facility (IPFF) and commercial lenders or from other sources of finance.

8.3 Objectives and Methodology of Financial Analysis and Financial Model

A financial model was prepared to model the Terminal Operation business from the perspective of the Terminal Operator. The key objectives of the financial model are as follows:

- a. to demonstrate the financial viability of development of two jetties based upon traffic forecast, expected tariffs, cost estimates, terminal planning parameters and

other information.

- b. to illustrate the sensitivity of the financial and commercial viability to key parameters and to identify the areas which could be adjusted (tariff and other issues) to influence the profitability of the project.
- c. to determine the requirement of initial support and later on to implement project on a commercial footing.
- d. To understand the split of responsibility between the public sector and the private sector in the PPP project.

The main approach was to determine the financial viability of the project on the basis of an assessment of traffic forecast for the port, capital cost estimate for the project, revenue projection and capital cost phasing (Figure 8-2).

Financial analysis of the project took into consideration, such factors as:

- a. Short and long-term financial obligations; projected revenue stream, projected costs (fixed and variable), depreciation schedule and asset construction and procurement schedule;
- b. Tariff structure and the impact of amendments in that structure;
- c. Phasing the construction of the jetties and its impact;
- d. Sources and cost of capital.

The financial model developed, covered the following:

1. Determination of the revenue projection, projection income statements and cash flow statements over the life of the project.
2. Calculate various matrices such as IRR, payback periods and debt-service coverage ratio for assessment of project viability.
3. Sensitivity analysis on the major parameters including capital cost, O&M cost, tariff rate etc. were made in order to explore its sustainability under different changing situations.
4. Financial analysis on options for cost recovery of capital investments and recurrent costs under different PPP scenarios of investment and different traffic forecasts.
5. Exploring the need for Viability Gap Funding (VGF) for the project in different scenarios.

The result of combining cost and revenue projections is presented as output indicators. The financial model, comprising projected revenue, income statement and cash flow projections, was prepared in order to assess the impact of the proposed project on financial performance and viability.

The financial model is prepared on US\$ basis since the majority of the income in a terminal business (for example the tariffs of the Mongla port and Chittagong port) are denominated in US\$. The cash flows are nominal basis i.e. current dollar analysis, in contrast to the real



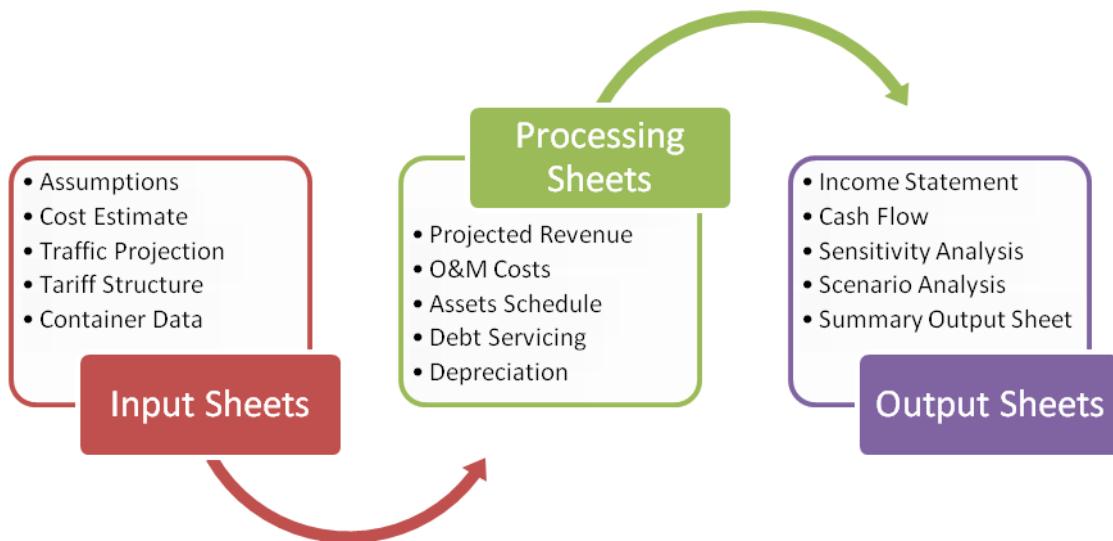
Figure 8-2: Determining the Financial Viability

basis i.e. constant dollar analysis.

8.4 Structure of the Financial Model

The financial analysis undertaken for the project employs a spread sheet based model providing: (1) a projection of each component of cost and expenses on the basis of a consistent set of background financial/economic assumptions; and, (ii) the revenue generated by a given structure of revenue sources. The results of combining cost and revenue projection is presented as output indicators as shown in Table 8.2.

Table 8.2: Flow Chart of the Financial Model



The model contains interlinked sheets keeping in view the available data and information. The sheets of the model are:

Input and Input Support Sheets

- 1) Assumptions
- 2) Capital Cost
- 3) Traffic Forecast
- 4) Tariff Structure
- 5) Container Data

Processing Sheets

- 6) Debt Servicing
- 7) Projected Revenue
- 8) Depreciation
- 9) O&M Costs
- 10) Asset Schedule

Result Sheets

- 11) Income Statement
- 12) Cash Flow
- 13) Sensitivity Analysis
- 14) Scenario Analysis
- 15) Summary Output Sheet

The input and input support sheets accommodate all the basic inputs of the project required for the financial model. These inputs have connection with other sheets

(processing/intermediate calculation) where specific calculations are made. Then the outcomes of the individual sheets have been connected to the result sheets to obtain the final results. Sensitivity analysis has also been included in the model to test its sensitiveness on change of different important parameters.

The model has analysis and charts, which gives an indication of the viability of the project, depicting the relationship with the revenue and the results of different options. The interlinked sheets as used in the financial model are briefly described below.

8.4.1 Input and Input Support Sheets

The input sheets include (1) assumption sheet (2) project cost sheet (3) traffic forecast sheet (4) tariff structure sheet and (5) personnel cost sheet.

8.4.1.1 Assumptions Sheet

This sheet contains all the assumptions for determining operating cost and revenue generation as well as financing structure and applicable tax and VAT.

8.4.1.2 Capital Cost Sheet

Capital cost includes hard costs and soft costs of the project. Hard costs is composed of civil construction cost and equipment procurement cost. Hard cost also incorporates the contingency amount and working capital requirement during construction. Soft costs include the project management costs, working capital and interest during construction (IDC).



This worksheet provides a summary of the project costs for the Terminal Operation business. This worksheet has an onward relationship with depreciation sheet, asset schedule sheet and cash flow sheet.

8.4.1.3 Traffic Forecast Sheet

Traffic Forecast for the project is summarized in this sheet. This sheet is the output of the Traffic Model. The sheet provides different traffic projections based on different traffic scenarios as described above. The projected traffic is used for determining the projected revenue and projected variable costs for the project.

This sheet has an onward relationship with the Revenue Sheet.

8.4.1.4 Tariff Structure Sheet

Tariff structure sheet gives a summary of the Tariff Rates for different revenue items of the Terminal Operator. In the base case scenario, the tariff rate is exactly the same as that of Mongla Port Tariff Schedule, apart from the Mobile Harbour Crane charge. The mobile Harbour Crane charge is based on the Crane charge in the Chittagong Port since it is not yet established for the Mongla port.

This sheet has an onward relationship with the Revenue Sheet.

8.4.1.5 Container Data Sheet

This sheet forecasts the percentage breakdown of different types of containers that will be handled by the Terminal Operator. Ratio of import/ export containers, ratio of 20' and 40' containers and ratio of FCL, LCL and Empty containers to be handled by the TO are calculated in this sheet. The output of this sheet is used in the Revenue sheet in conjunction with the Tariff Structure and Traffic Forecast sheet to calculate the projected revenue of the Terminal Operator.

8.4.1.6 Personnel Cost Sheet

The personnel cost sheet provides an organogram of the Terminal Operator company with respective salary structure. The sheet is used to determine the manpower requirement of the project company as well as annual salary expenditure for the TO.

This sheet has an onward relationship with the O&M Sheet.

8.4.2 Processing Sheets

The processing sheets compute and process data as provided in the assumption and capital cost sheets. The processing sheets are follows:

- (1) debt servicing
- (2) revenue
- (3) depreciation
- (5) O&M Costs, and
- (6) asset schedule.

8.4.2.1 Debt Servicing Sheet

This worksheet sets out a consolidated summary of debt service stating separately the yearly amount of debt service of principal and interest in US dollars. The computation of yearly principal, interest and total debt service is derived from capital cost, debt equity ratio and interest rate in each category loan as shown in this sheet. The debt service (interest + principal) of this sheet has link to the cash flow sheet and interest from this sheet will be used as an input in the income statement sheet.

8.4.2.2 Revenue Sheet

This worksheet calculates the projected revenue of the TO from the following sources:

- a. Dues from ships
- b. Dues from Containers
- c. Dues from General Cargo

Revenue is calculated based on the traffic forecast and the tariff rates. The output of the revenue sheet is processed in the income statement sheet to calculate the projected net income of the TO.

8.4.2.3 Depreciation Sheet

Depreciation sheet calculates the depreciation value of the TO assets yearly. The sheet takes data from project cost sheet and after computation, the depreciation expense from this sheet goes to the income statement. The “*declining balance*” method is used in the model for depreciation calculation.

8.4.2.4 O&M Costs Sheet

This sheet receives data from the input sheet and input support sheets regarding operation cost, maintenance cost and fixed costs of the project. The output of the O&M costs sheet is used in the income statement sheet to calculate the projected net profit of the TO.

8.4.2.5 Asset Schedule Sheet

The asset schedule sheet is used for capital cost phasing of the project. Phasing of civil construction cost during construction period and procurement of initial equipment and

replacement equipment during the term of the PPP agreement is projected in this sheet.

8.4.3 Financial Statements

Results of operating performance and financial position at periodic intervals are the essence of financial statements. The financial model provides projected financial statements such as, income statements and cash flow statements depicting profitability, liquidity and overall financial health of the entity. The result sheets include:

- (1) Income Statement, and
- (2) Cash Flow.

8.4.3.1 Income Statement

The financial model provides income statements for each year from contract signing date to the end of Term. The revenue stream over the year from terminal operation has been shown in the income statement. The statement also shows the operating expenses (fixed and variable), financing expenses and depreciation expenses as deductions from the revenues to obtain net income before tax. After deducting applicable tax, the net income for the equity holder has been derived. The income statement does not show provision for dividend payout of the company.

8.4.3.2 Cash Flow Analysis

Cash flow statement is an important financial output in the model, especially to arrive at the appropriate cash requirements of the project. The financial model incorporates the cash flow analysis for the project and determines the Project and Equity IRR and the DSCR for long-term liabilities. It also provides residual cash flow to equity after meeting all the expenses to determine return on equity, as residual surplus.

8.4.4 Result (Financial Indicator) Sheets

8.4.4.1 Summary Output Sheet

The key requirement for the Terminal Operator is that it is capable of maintaining financial viability and is able to earn profit and keep up sufficient cash flow that is sufficient to finance all necessary future investments.

This sheet gives the results of the model run in summarized form. The key results are:

1. Internal Rate of Return (IRR) on capital employed in the total project and on equity. This is the ultimate parameter to determine the viability of the project.
2. Debt Service Coverage Ratio (DSCR)
 - a. Maximum
 - b. Average
 - c. Minimum
3. Total Capital Payback Period
4. Equity Payback Period

8.4.4.2 Sensitivity Analysis Sheet

Sensitivity analysis is used to test the robustness of the results to variation in key inputs and assumptions. Cash flow as well as financial indicators depend on the interplay of several factors including capital cost, O&M cost and revenue and charge it earns from different category of services. It can be used to identify the values, if any, at which economic preference for one option is switched to preference for another. Considering these

varyations of parameters putting into the model the change of output /results could be found through this analysis.

8.4.4.3 Scenario Analysis Sheet

The model incorporates five different traffic forecast scenarios and three different PPP option scenarios. This sheet analyses the results of some of these scenarios in different combinations.

8.5 PPP Model Assumptions

Three different PPP options are modeled for financial analysis. The PPP options are:

- a. **Option A:** Two Jetty Model (upfront development of Jetty 3 and 4)
- b. **Option B:** Three Jetty Model (deferred development of Jetty 3 and 4; Jetty 5 operated temporarily by TO for first few years)
- c. **Option C:** BGMEA/ BKMEA option used in conjunction with Option B

The options are explained below.

8.5.1 Option A: Two Jetty Model

Option A is the base case option. In this model, the Terminal Operator completes the construction of Jetty 3 and 4, constructs the backup facilities and infrastructure, procures equipment for operation of the two jetties and operates and maintains the terminal throughout the term of the PPP Agreement. In return for using MPA land for operation of its facility, the Terminal Operator will pay yearly lease rent to MPA (Figure 8-3).

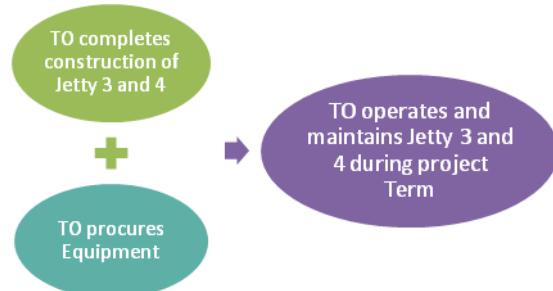


Figure 8-3: Option A: Two Jetty Model

8.5.2 Option B: Three Jetty Model

Cargo traffic at Mongla Port is currently very low compared to the capacity of the port. It is expected that the traffic will increase once the dredging of Pussur River is implemented and other linked projects such as the clearance of MG Canal is completed. However, even with linked projects implemented as scheduled, it will take a few years for the port to reach its capacity.

Construction of two new jetties when port capacity remains under-utilized will result in over capacity of the port as well as discourage potential investors in investing in the construction

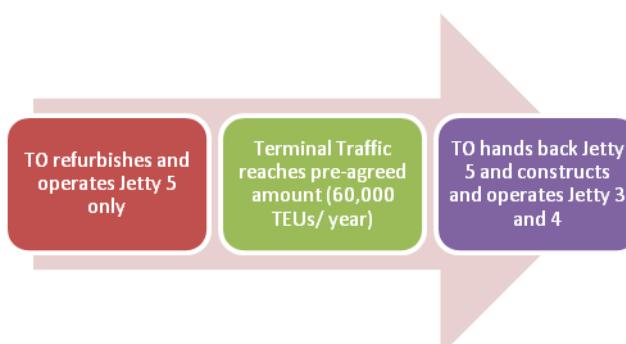


Figure 8-4: Option B: Three Jetty Model

of new jetties. Therefore, Option B is analyzed where construction of the two jetties are deferred until traffic at the terminal is close to reaching full capacity

Under Option B, Terminal Operator will temporarily receive lease and operate Jetty 5 of Mongla Port until traffic at port and terminal increases. Terminal Operator will be responsible for refurbishing Jetty 5, developing backup facilities and infrastructure and procuring equipment for cargo and container handling at Jetty 5. Once traffic at the terminal reaches a pre-agreed amount, Terminal Operator will be obligated to start construction of Jetty 3 and 4. Once construction of Jetty 3 and 4 are complete, TO will hand back Jetty 5 to MPA and operate and maintain Jetty 3 and 4 for the remainder of its term (Figure 8-4).

8.5.3 Option C: BGMEA/ BKMEA Model

Readymade Garments and Knitwear exporters are the largest sea port users of the country. The Bangladesh Garments Manufacturers and Exporters Association (BGMEA) and the Bangladesh Knitwear Manufacturers and Exporters Association (BKMEA) generate almost 70% of country's export cargo. Currently all the garments and knitwear cargo is transported through the Chittagong Port. To increase cargo traffic at Mongla Port it is vital that some of this cargo is transported through Mongla Port.

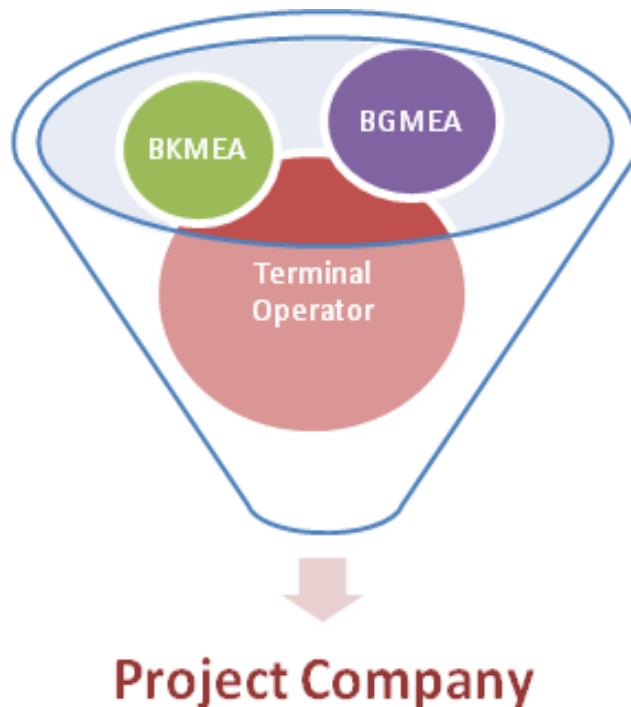


Figure 8-5: Option C: BGMEA/BKMEA Model

Under Option C, BGMEA and BKMEA will be given a minority shareholding in the project company set up by the Terminal Operator (Figure 8-5). It is expected that involvement of BGMEA/BKMEA in the project company will make it more attractive for the garments and knitwear exporters to send their cargo through Mongla Port and hence increase the project's viability. This option will be used in conjunction with Option B.

8.6 Key Financial Model Parameters

8.6.1 Term/Business Period

It is important to know the business period over which the Terminal Operator will be allowed to operate to get return on his invested capital along with profit. A term of **30 years** from signing of the PPP Agreement as the tenure of the Terminal Operator was assumed for this model.

8.6.2 Source of Finance

The total capital cost has been assumed to be financed by a debt to equity ratio of 75:25. The debt component is expected to be funded by US dollar loans. The debt component is expected to be funded mainly from the Investment Promotion Financing Facility (IPFF).

The assumed financing structure is shown in Table 8.3.

Table 8.3: Loan Assumptions

Loan Details	% of Loan	Amount (m USD)	Tenor	LIBOR rate	Spread	Cost of Fund for PFI	Margin of PFI	Rate for Hedging	Effective Rate	Grace Period
Loan A (IPFF)	80%	33.53	15	0.46%	0.5%		3%	1%	5.0%	5
Loan B (PFI)	20%	8.58	5			3%	3%	1%	6.5%	2

Loan Drawdown	Amount (m USD)	Year 1 (1 st Half)	Year 1 (2 nd Half)	Year 2 (1 st Half)	Year 2 (2 nd Half)
Loan A (IPFF)	33.53	20%	30%	30%	20%
		6.71	10.06	10.06	6.71
Loan B (PFI)	8.38	20%	30%	30%	20%
		1.68	2.52	2.52	1.68

A 15 years repayment period for the loan is assumed in the model for the IPFF loan and a 5 year repayment period for the commercial loan. It is also assumed that the IPFF loan will allow a grace period of 5 years.

8.6.3 Tariff Rate

The tariff rate for services provided by the Terminal Operator is assumed to be 1.2 times as that of the Mongla Port Tariff Schedule in the base case option. The tariff rates used in the model is shown in

Table 8.5.

8.6.4 Corporate Tax Rate

The TO will have to pay income taxes on ‘Income from Business or Profession’ as per the Income Tax Ordinance, 1984. The ordinance allows deductions from total income or revenue for cash and non-cash expenses (*i.e.* depreciation and amortization), to arrive at Net Income before Tax (NIBT). The applicable corporate tax rate is then applied to NIBT to derive income tax to be paid. As per Finance Act 2009 (anuchched Kha), Income Tax rate for the companies, which are not publicly traded, is **37.5%**. This rate has been used in the financial model for calculating the income tax payable to the government for the entire term.

Due to the low traffic in the first few years of operation, and considering that other infrastructure projects, such as IPPs in the power sector are enjoying a 10-year tax holiday under the 1996 Private Sector Power Generation Policy, it has been assumed that this project, because of its national importance, will also receive all the fiscal incentives given by the Government for the power sector. In other words, the project has been assumed to receive a 10 year tax holiday.

Table 8.4: Mongla Port Tariff Schedule

Dues on Vessels								
Berthing Fee			US\$/ ship		88.50			
Berth Occupancy Charge			US\$ / GRT / day		0.03			
Dues on Conventional Cargo								
		Landing/ Handling Charge		Shipping Charge				
<i>Item</i>		<i>Import (Tk)</i>	<i>Import (US\$)</i>	<i>Export (Tk)</i>	<i>Export (US\$)</i>			
Bagged Cargo - wheat and rice		40.00	0.50		per 1000 kg			
Bagged Cargo - Cement, fertilizer, salt, sugar etc.		32.00	0.40		"			
Cement, clinker, limestone upto 1000 kg		60.00	0.75		"			
Wheeled or tracked equipment, not in cases		175.00	2.19		"			
All other Imports not exceeding 3000 kg		90.00	1.13	30.00	0.38			
All other Imports exceeding 3000 kg not exceeding 20,000 kg		180.00	2.25	180.00	2.25			
All other Imports exceeding 20,000 kg		250.00	3.13	250.00	3.13			
Raw materials of cement - gypsum, flyash		60.00	0.75		"			
Jute and jute goods				21.00	0.26			
Tea in chest				18.00	0.23			
Sylhet sand				30.00	0.38			
Garments, cotton and fabric				15.00	0.19			
Hoisting Charge		100%	of Handling Charge					
Storage Charge		<i>Tk/sqm/month</i>	37.50					
		<i>US\$/sqm/month</i>	0.47					
Dues on Containers								
Tariff for 20 ft containers (boxes)								
<i>Tariff Item</i>			FCL	LCL	Empty			
Loading or Discharging charge		<i>US \$/ Container</i>	43.4	130	22.1			
Storage charge		<i>US\$ / day</i>	1.50	1.50	1.50			
Extra movement		<i>US \$ / Cont./ move</i>	42.60	42.60	21.70			
Reefer container		<i>US \$/ Container</i>	11.00	11.00	11.00			
Lift on/Lift off charge		<i>US \$/ Container</i>	12.50	12.50	6.25			
Tariff for 40 ft containers (boxes)								
<i>Tariff Item</i>			FCL	LCL	Empty			
Loading or Discharging charge		<i>US \$/ Container</i>	65.10	195.00	33.20			
Storage charge		<i>US\$ / Cont./ day</i>	3.00	3.00	3.00			
Extra movement		<i>US \$ / Cont./ move</i>	63.90	63.90	32.50			
Reefer container		<i>US \$/ Container</i>	11.00	11.00	11.00			
Lift on/Lift off charge		<i>US \$/ Container</i>	18.75	18.75	0.94			
Stuffing/Unstuffing ¹		<i>US\$ / 1000 kg</i>	0.94					
Hoisting Charge ¹		"	0.94					

A composite tariff rate of US \$ 1.00 per 1000 kg of non-containerized cargo has been assumed for revenue calculation.

Table 8.5: Tariff Rates

Tariff Assumptions			
Tariff Escalation	3%	<i>per year</i>	
Mobile Harbour Crane Charge	20'	40'	
<i>Loaded Container (US \$/ container)</i>	15.00	22.50	
<i>Empty Container (US \$/ container)</i>	7.50	11.25	

Mobile harbour crane charges assumed to be charged are shown in the table above. All other tariff charges are assumed to be 120% of Mongla Port Traffic Schedule. An escalation rate of 3% yearly is assumed for all the tariff rates.

Table 8.5 shows the assumptions in the model with regards to the tariff rate.

8.6.5 Project Timeline Assumptions

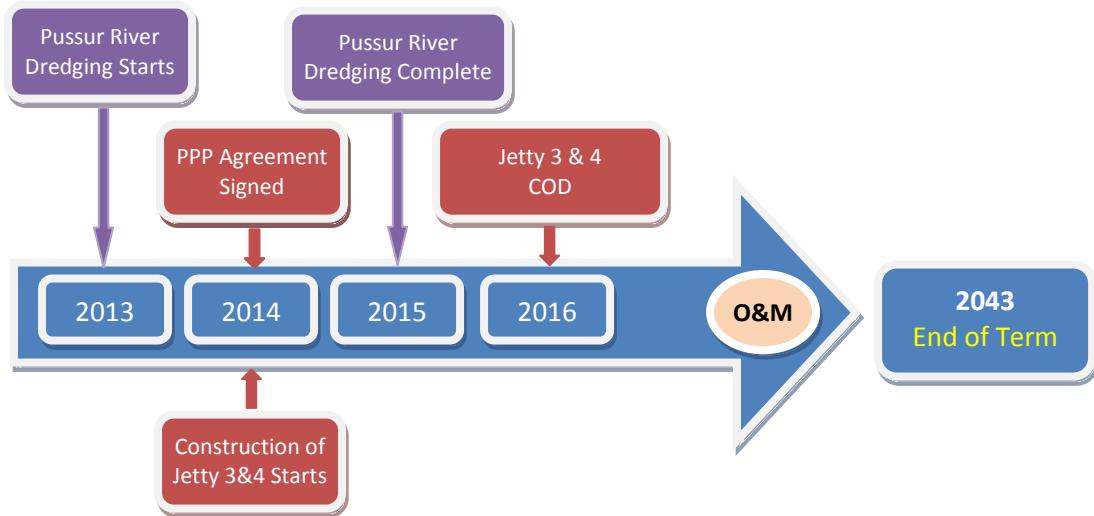
Table 8.6 shows the assumptions in the model with regards to the timeline of implementation of the project.

Table 8.6: Timeline Assumptions

Timeline Assumptions	
Agreement Signing Date	December 2013
Civil Construction Start	January 2014
Option A	
Construction Start	January 2014
COD	January 2016
Option B	
Refurbishment Start	January 2014
Jetty 5 COD	January 2015
Jetty 3 and 4 Construction Start	January 2019
Jetty 3 and 4 COD	January 2021
Dredging Complete	December 2015

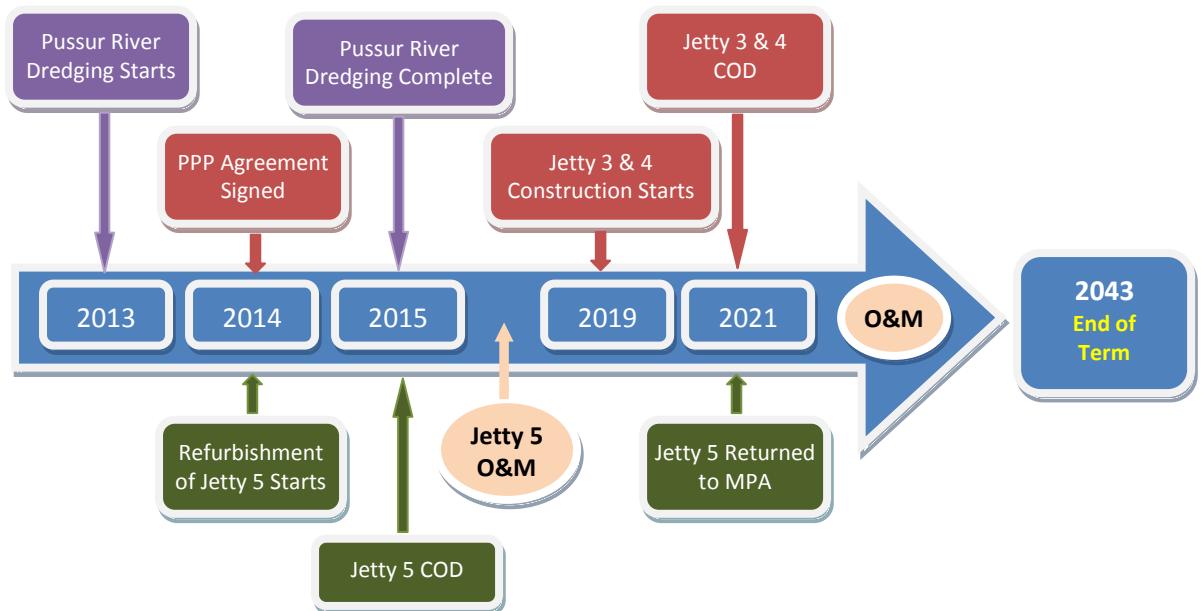
In Option A, commercial operation date (COD) of the project is assumed to be on 2016. A construction period of 2 years has been assumed (Figure 8-6).

Figure 8-6: Option A Timeline



In Option B, Jetty 5 COD is assumed to be on 2015 (one year period for refurbishment and equipment procurement has been estimated). It is assumed that the construction of Jetty 3 and 4 will commence when traffic at port reaches close to full capacity. Based on traffic projection from traffic model, this amount of traffic is projected to be reached seven years from date of Contract signing (2021). Construction of Jetty 3 and 4 will start at 2019 and COD is projected to be on 2021 in the model (Figure 8-7).

Figure 8-7: Option B Timeline



The model also assumes that Pussur River dredging will be completed by 2015 in all traffic scenarios except Scenario 0.

8.6.6 Terminal Assumptions

Assumptions made in regards to Terminal operation and capacity are given in Table 8.7.

Table 8.7: Terminal Assumptions

Terminal Assumptions		
Before Dredging		
Average Vessel Capacity		
	<i>Container Ships</i>	500 TEUs/ <i>ship</i>
	<i>GC ships</i>	8,000 MT/ <i>ship</i>
Average GRT of Vessels		
	<i>Container Ships</i>	7,000 MT
	<i>GC Ships</i>	12,000 "
Average Berth Occupancy per vessel		
	<i>Container Ships</i>	3 days
	<i>GC Ships</i>	6 days
TEU to Container proportion		1.38 TEU/container
MT per TEU		9
After Dredging		
Average Vessel Capacity		
	<i>Container Ships</i>	1,000 TEUs/ <i>ship</i>
	<i>GC ships</i>	10,000 MT/ <i>ship</i>
Average GRT of Vessels		
	<i>Container Ships</i>	14,000 MT
	<i>GC Ships</i>	24,000 "
	<i>Container Ships</i>	3 days
	<i>GC Ships</i>	6 "
% of days (berth occupancy)		
	<i>Container Ships</i>	60%
	<i>GC Ships</i>	40%
		6 ships/month
		2 "
Terminal Capacity		70,000 TEUs per Jetty/yr
		240,000 MT per Jetty/yr
TEU to Container proportion		1.38 TEU/container
MT per TEU		9

It is assumed that each jetty of the Terminal will be able to handle a maximum of 70,000 TEUs per year and 240,000 MT of non containerized cargo per year.

8.6.7 Container Traffic Assumptions

Table 8.4 shows the assumptions in the model with regards to different types of traffic to the TO jetties. These assumptions have been based on the current scenario of traffic at Mongla Port. In case of Lift on/ lift off tariff, it is assumed that once waterways transportation of goods is implemented more cargo will require this charge.

Table 8.8: Container Traffic Assumptions

Container Traffic Assumptions		
% of Import Containers	52%	
% of Export Containers	48%	
Containers Needing Reefer Service	25%	<i>of export containers</i>
Containers needing Extra Movement	15%	<i>of all containers</i>
Cargo Needing Space for storage	20%	<i>of all general cargo</i>
<i>Storage</i>	15	<i>sqm/TEU</i>
	1.67	<i>sqm/ MT</i>
Containers needing storage beyond Free Period	40%	<i>of all containers</i>
No. of days stored	7	<i>days</i>
Containers needing Lift on/ Lift off service	40%	<i>of all containers</i>

It is also assumed that empty container traffic in the port will reduce significantly once traffic at port increases. LCL containers will also be a part of container traffic once private sector operates the terminal.

8.6.8 Cost Assumptions

Table 8.9 shows the assumptions in the model with regards to different types of costs in the model. It is assumed that the **TO will pay US\$ 100,000 per year to MPA** yearly as lease rental for the land. This amount will escalate at 2% yearly. If Jetty 5 is given to be operated by TO (PPP Option B/C), **TO will pay an additional US\$ 200,000 per year** to MPA during the period it operates Jetty 5.

Civil construction cost during year 1 of construction is assumed to be 50% of the total civil costs and 50% in the second year. Contingency for all costs for capital cost estimation is assumed to be 15%. O&M costs for different items and a yearly cost escalation value for all items is also shown in Table 8.9.

Table 8.9: Cost Assumptions

Cost Assumptions			
Lease Rental	0.1	<i>m US \$</i>	for land
	0.2	<i>m US \$</i>	for Jetty 5 rental
Lease Rental Escalation	2%		
Civil Cost Breakdown			
Construction Year 1		50%	
Construction Year 2		50%	
Contingency	15%		
O&M Costs			
Civil Structure Maintenance	1%	<i>of civil cost</i>	
Equipment Maintenance	2%	<i>of equipment cost for 1st 5 years</i>	
	5%	<i>of equipment cost thereafter</i>	
Insurance	0.5%	<i>of gross fixed assets value</i>	
Office Maintenance	0.6	<i>m Taka/month</i>	
Electricity	50,000	<i>Taka/month</i>	
Other expenses	5%	<i>of O&M costs</i>	
Escalation			
Civil Cost Escalation	2.5%	<i>yearly (avg. of last 14 yrs US\$ inflation)</i>	
Equipment Cost Escalation	2.5%	<i>"</i>	
Civil Maintenance Cost Escalation	1%	<i>per year</i>	
Equipment Maintenance Escalation	2%	<i>first year</i>	
	5%	<i>after first year</i>	
Salary Escalation	2%	<i>per year</i>	
Fuel Cost Escalation	2.5%	<i>"</i>	
Electricity Escalation	1%	<i>"</i>	

8.7 Traffic Projection

Traffic projection for different traffic scenarios has been covered in detail in Chapter 3. The following tables illustrate the traffic projections used in the model for some of the different options.

Container traffic projection through the Terminal for the first 8 years is shown in Table 8.10, Table 8.11 and Table 8.12. Traffic for two different scenarios are shown: (1) projected traffic through port if only one of the linked projects, Pussur River dredging, is implemented, and (2) projected traffic through port if all proposed linked projects are implemented. Traffic projections if different PPP models are used are also shown

Table 8.10: Traffic Projection for Option A

Contract Year		1	2	3	4	5	6	7	8
Calendar Year	2013	2014	2015	2016	2017	2018	2019	2020	2021
TEUs	Scenario - I	0	0	0	4,179	5,151	6,253	7,642	9,426
"	Scenario - IV	0	0	0	14,216	19,637	27,133	37,704	52,672
Terminal Capacity		0	0	0	140,000	140,000	140,000	140,000	140,000

Projected Traffic at Terminal under Option A

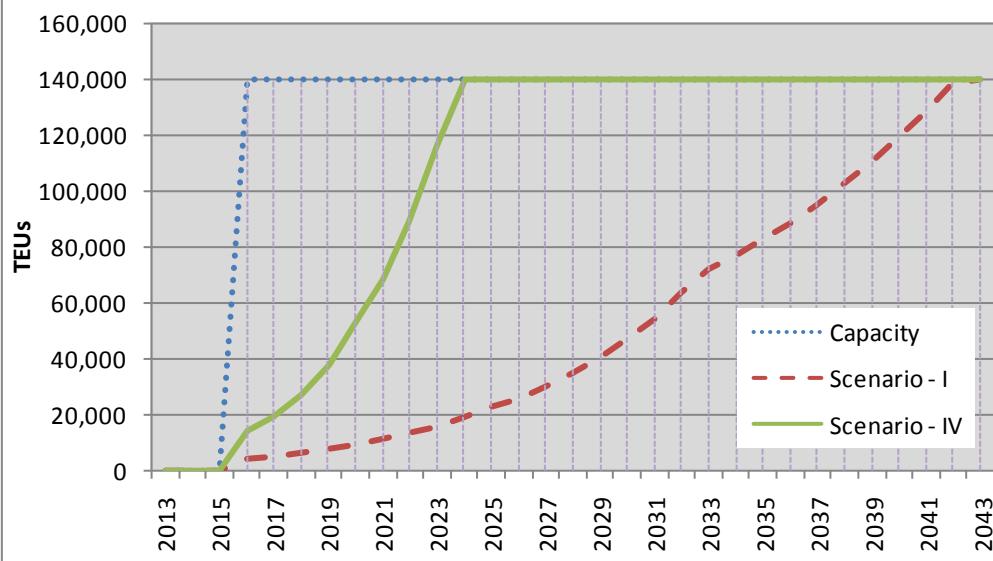


Table 8.11: Traffic Projection for Option B

Contract Year		1	2	3	4	5	6	7	8
Calendar Year	2013	2014	2015	2016	2017	2018	2019	2020	2021
TEUs	Scenario - I	0	0	3,764	4,745	6,079	7,616	9,523	11,920
"	Scenario - IV	0	0	3,764	16,790	24,513	35,218	50,163	60,000
Terminal Capacity		0	0	70,000	70,000	70,000	70,000	70,000	140,000

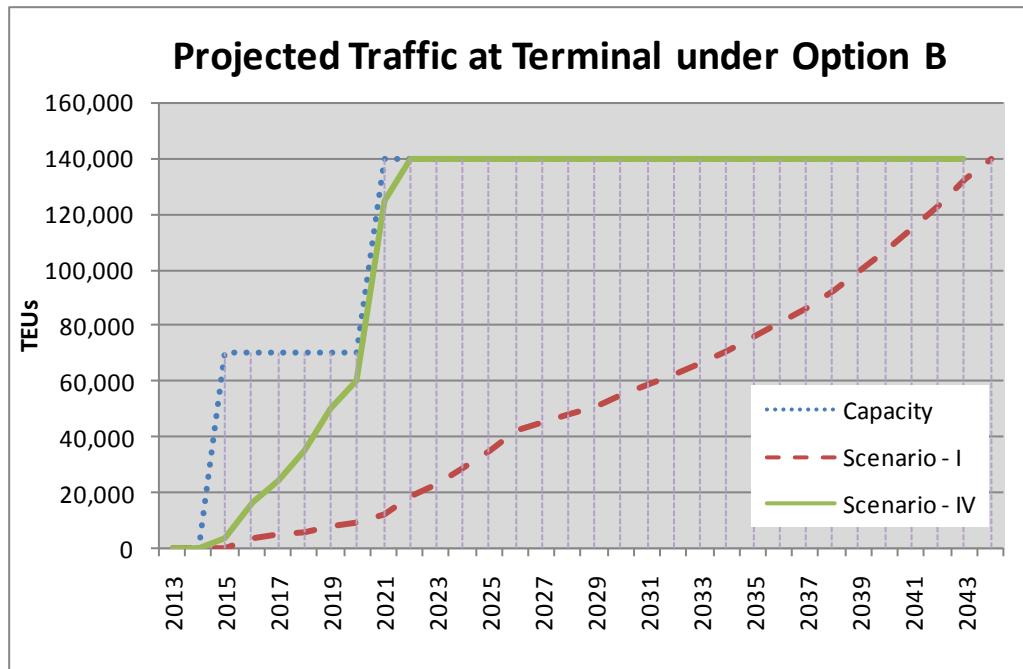
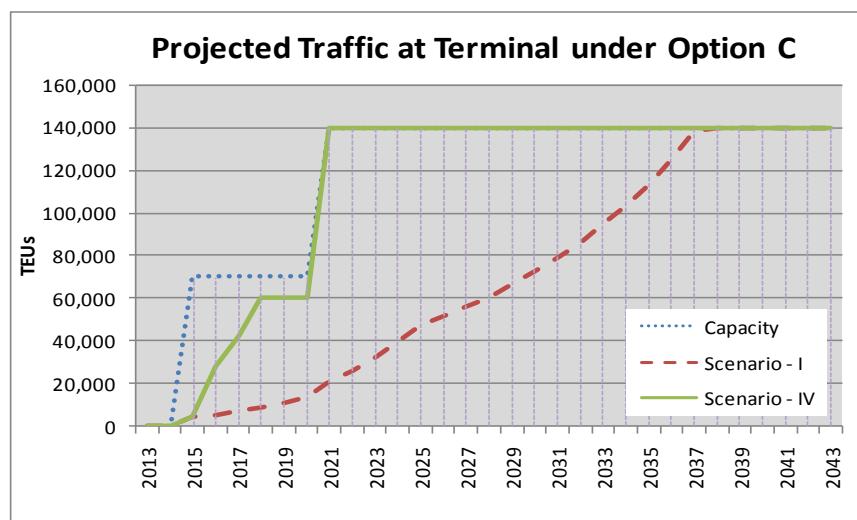


Table 8.12: Traffic Projection for Option C

Contract Year	Calendar Year	1	2	3	4	5	6	7	8
		2013	2014	2015	2016	2017	2018	2019	2021
TEUs	Scenario - I	0	0	4,167	5,309	6,886	8,673	10,879	13,636
"	Scenario - IV	0	0	4,167	28,087	42,562	60,000	60,000	140,000
Terminal Capacity		0	0	70,000	70,000	70,000	70,000	70,000	140,000



8.8 Capital Cost Estimate

Capital Cost estimate for different PPP options has been covered in detail in Chapter 5. The following tables illustrate the capital cost estimate used in the model. All cost estimates are in 2013 values.

Table 8.13: Civil Cost Estimate for Option A and Option B

Civil Costs		Total Cost (m Tk)	Total Cost (m US\$)	Total Cost (m Tk)	Total Cost (m US\$)	Total Cost (m Tk)	Total Cost (m US\$)
		Option A		Option B			
				Phase I		Phase II	
A	Jetty and Apron						
1	Completion of Remaining Piles for 2 Jetties	275	3.44	0	0	275	3.44
2	RCC Jetty Deck, For 2 Jetty (with pilecap, girder & beams)	841	10.51	0	0	841	10.51
	Sub-total of Jetty	1,116	13.95	0.00	0.00	1,116	13.95
B	Back-up Facilities (BUFAC)						
3	Heavy-duty Paved Yard	521	6.51	260	3.25	260	3.25
4	Admin. Building (2 storied)	12	0.15	12	0.15		
5	Workshop	5	0.06	5	0.06		
6	Firestation	3	0.03	3	0.03		
7	Electric substation	3	0.03	3	0.03		
8	Fuel Service Station	2	0.02	2	0.02		
9	Utility building	1	0.01	1	0.01		
10	Gate House	2	0.02	2	0.02		
11	Internal Roads	18	0.23	18	0.23		
12	Drains and Culverts	9	0.11	9	0.11		
13	Gates	0	0.00	0	0.00		
	Sub-total of BUFAC	574	7.18	314	3.92	260	3.25
C	General Facilities						
14	Electrical Works, Water Supply & Sanitation	86	1.08	47	0.59		
15	Boundary Wall and Fencing	39	0.49	47	0.58	39	0.49
16	Office Furniture and Misc.	1	0.01	1	0.01		
	Sub-total Gen Facilites	126	1.58	95	1.18	39	0.49
D							
	Overhauling of Jetty 5 (for Option B)			45	0.57		
	Total Civil Cost	1,817	22.71	454	5.67	1,416	17.69

Civil cost estimate for Option A is estimated to be **US\$ 22.71 million** (Tk 181.7 crore). Civil cost estimate for Option B is estimated to be **US \$ 5.67 million** (Tk 45.4 crore) in Phase I and **US\$ 17.69 million** (Tk 141.6 crore) in Phase II.

Table 8.14: Equipment Cost Estimate for Option A and Option B

Equipment	No. of Units	Unit Cost	Total Cost	Total Cost
1 Mobile Harbour Cranes, 40 T (2 per berth)	4	250	1000	12.5
2 Mobile Cranes 10 T	2	2.5	5	0.0625
3 Tractor Trailer, 15 to 20 T (4 per hook & 2 stand by)	10	2.5	25	0.3125
4 High Mast Fork Lift Trucks(FLT), 5 T	2	5	10	0.125
5 Low Mast Fork Lift Trucks(FLT), 3 T	2	3	6	0.075
6 Reach Stackers, 30-40 T	2	40	80	1
7 Mobile Hopper	4	7.2	28.8	0.36
8 Lorry/Truck 3-5 T (2 per crane)	8	4	32	0.4
9 Workshop Equipment	LS		10	0.125
	Sub-total of Equipment		1,197	14.96
CD VAT	18%		215	2.69
Total Equipment Cost			1,412	17.65

Equipment cost estimate for Option A is estimated to be **US\$ 17.65 million** (Tk 141.2 crore).

Equipment cost estimate for Option B is estimated to be **US \$ 8.83 million** (Tk 70.6 crore) in Phase I and **US \$ 8.83 million** (Tk 70.6 crore) in Phase II (2013 value).

Table 8.15: Total Capital Cost Estimate for Option A and Option B

Total Hard Cost	m Tk	m US \$	m Tk	m US \$	m Tk	m US \$
	Option A		Option B			
			Phase I		Phase II	
Civil Cost	1,817	22.71	454	5.67	1,416	17.69
Equipment Cost ¹	1,412	17.65	706	8.83	706	8.83
Contingency	15%	484	6.05	1.18	318	3.98
Total	3,713	46.42	1,334	16.68	2,440	30.50

Soft Cost	m Tk	m US \$	m Tk	m US \$	m Tk	m US \$
	Option A		Option B			
			Phase I		Phase II	
IDC	251.2	3.14	83.2	1.04	167.2	2.09
Working Capital ²	100	1.25	50	0.63	0	0.00
Project Management	4.5%	167	2.09	0.75	110	1.37
Total	518	6.48	194	2.42	277	3.46

Total Capital Cost	Option A		Option B			
	m Tk	m US \$	m Tk	m US \$	m Tk	m US \$
	4,231	52.90	1,528	19.10	2,440	33.96

Total capital cost estimate for Option A is estimated to be **US\$ 52.90 million** (Tk 423.1 crore). Total capital cost estimate for Option B is estimated to be **US \$ 19.10 million** (Tk 152.8 crore) in Phase I and **US \$ 33.96 million** (Tk 244.0 crore) in Phase II (2013 value).

8.9 Assets Schedule

The assets schedule sheet incorporates the phasing of capital costs in the model. In Option A, it is assumed that 50% of civil costs will be needed in Year 1 and 50% in Year 2. Equipment procurement is assumed to be undertaken in year 2 of construction.

Service life of different equipment procured is identified and replacement costs at respective years are also incorporated in the assets schedule.

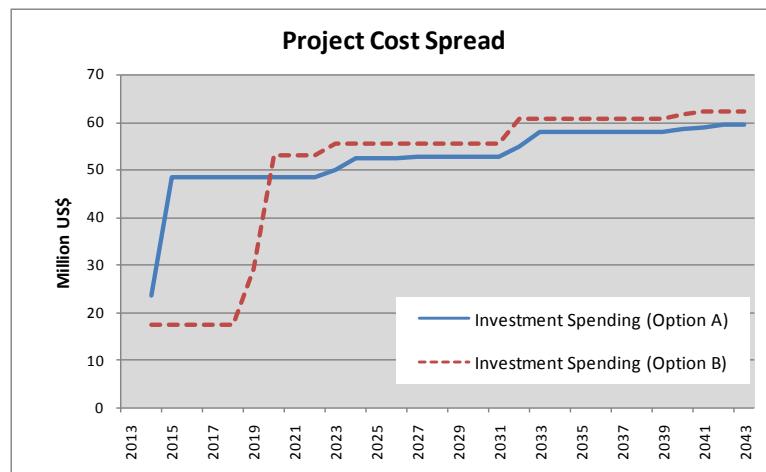


Figure 8-8: Project Cost Spread for the two Options

In Option B, it is assumed that civil cost at year 1 of construction will only include refurbishment cost of Jetty 5 and construction of backup facilities and infrastructure. Equipment procured will only be those that are needed to operate one jetty (Jetty 5). The civil costs for completion of Jetty 3 and 4 and procurement cost of another set of equipment is deferred until year 6 when Terminal Operator will start construction of the Jetty 3 and Jetty 4.

Table 8.16 and Figure 8-8 shows the costs at some different years for the two Options.

Table 8.16: Assets Schedule for Option A and Option B

	Contract Year	1	2	6	7
	Calendar Year	2014	2015	2019	2020
Civil Cost (mil US\$)	Option A	13.38	13.71		
	Option B	6.69		11.78	12.08
Equipment Cost (mil US\$)	Option A	10.18	10.89		
	Option B	10.63			11.79
Total Capital Cost (mil US\$)	Option A	23.56	24.60		
	Option B	17.32		11.78	23.86

8.10 Depreciation

Depreciation is a non-cash expense. Though it does not directly influence cash flow, it influences tax obligations from income of the business, by offering tax savings adding to depreciation. Depreciation like interest is a tax deductible item considered by the tax authorities.

8.10.1 Basis of Depreciation

The Income Tax Ordinance, 1984 allows deduction of depreciation of assets from the income of the particular year to determine the taxable income for that period. Section 29(1)(VII) and (IX) of the Income Tax Ordinance provides provisions for the following methods of depreciation:

- (a) Normal Depreciation
- (b) Accelerated Depreciation

The ordinance also provides prescribed rates of depreciation irrespective of actual life of the assets. Normal Depreciation method is used in the model. It is briefly described in the following section.

8.10.2 Normal Depreciation

The Income Tax Ordinance 1984¹⁰, prescribes the following depreciation schedule. The following table provides the prescribed rates for normal depreciation.

Table 8.17: Depreciation Schedule

Types of Assets	Depreciable amount as Percentage of written down value
Building (general)	10%
Factory building	20%
Furniture and fixture	10%
Machinery and plant (general rate)	20%

¹⁰ Third Schedule, revised in 1998

Each year, depreciation will be charged by the above prescribed percentage on the written down value *i.e.* the value of asset less accumulated depreciation in the previous years. In accounting concept, it is referred to as declining balance method. Depreciation each year will be reduced as the same percentage as applied on a declining balance. This method of depreciation has been used in the financial model as the base case, as the depreciation is mainly calculated for determining taxable income and thereby tax to be paid.

Depreciation Rates ¹¹	
Building and Civil Construction	10%
Machinery and Equipment	20%

In the depreciation schedule, the above depreciable assets have been considered for tax purpose.

8.11 Revenue Projection

The Terminal Operator's revenue is expected to be generated from the sources shown in Table 8.4. The traffic model provides the traffic forecast for calculating the projected revenue of the TO. There are three major components of the revenue source:

- 1) Dues from Ships
- 2) Dues from Non-Containerized Cargo
- 3) Dues from Containerized Cargo

Breakdown of TEU projection into number of containers and traffic projection of different types of containers (20', 40', Loaded and Empty for both import and export) was estimated using the container traffic data for Mongla Port in 2011-2012. Table 8.18 shows the projected percentage of each type of containers that will be handled by the TO.

Table 8.18: Container Data of Mongla Port for 2011-2012

	FCL		LCL		Empty		Total
Import	20'	40'	20'	40'	20'	40'	
%	45.17%	19.62%	15.07%	4.12%	3.48%	12.54%	100%
Export							
%	35.51%	29.31%	10.93%	8.28%	10.34%	5.63%	100%

Revenue from different tariff items and their corresponding model assumptions are shown in Table 8.19.

Table 8.19: Revenue Items

Revenue Source	Model Assumptions
Dues on Ships	
Berthing Fee	1,000 TEUs/ship may be transported after

¹¹ Normal depreciation rates as per Income Tax Ordinance 1984, Third Schedule, revised in 1998

	dredging (500 before dredging)
Berth Occupancy Charge	Avg. berth occupancy time of 2.73 days/ ship
Dues on Non-Containerized Cargo	
Handling Charge	Non-containerized cargo are all import cargo (food, fertilizers, cement raw materials etc.)
Hoisting Charge	Same as Handling Charge
Cargo Storing Charge	20% of all general cargo will need storage over free period
Dues on Containerized Cargo	
Crane Charge	Mobile Harbour Cranes to handle ship to shore container movement
Loading and Discharging Charge	Estimated based on percentage breakdown of container types as shown in Table 8.18
Container Storage Charge	40% of all containers will need storage over free period
Reefer Container Charge	25% of export containers will need reefer service
Extra Movement Charge	15% of containers will need extra movement
Lift on/ Lift off Charge	40% of containers will need lift on/ lift off

It is estimated that average revenue/ TEU for containers will be approximately **US\$ 80** at start of operations. Revenue per ton for general cargo is calculated to be approximately US\$ 4.5.

8.12 Operation and Maintenance Costs

Calculation of O&M costs are covered in detail in Chapter 5. Table 8.20 shows the O&M cost items used in the financial model.

Table 8.20: O&M Items

O&M Costs	Estimates
Fixed Costs	
Civil Structure Maintenance	US\$ 0.23 million per year
Salary Expenses	US\$ 0.68 million per year
Office Maintenance	US\$ 0.09 million per year
Land Lease Rental	US\$ 0.1 million per year
Electricity Charges	US\$ 0.01 million per year
Insurance Expense	0.5% of gross fixed assets value
Variable Costs	
Equipment Maintenance	2.52 US\$/ year/ TEU for first 5 year 6.30 US\$/ year/ TEU thereafter

O&M Costs	Estimates
Fuel/ Diesel	10.45 US\$/ year/ TEU
Other expenses	5% of all O&M expenses

At full operation, it is calculated that O&M cost/ TEU will be approximately **US\$ 30**.

8.13 Results of Financial Model

8.13.1 Results of the Base Case Scenario (Option A)

Key financial indicators of the project in the base case scenario are presented in Table 8.21 in terms of US \$, including the Equity IRR of the project, the project IRR, the project and equity payback periods and the debt service coverage ratios. The table gives an indication of the viability of the project, both in terms of attractiveness to private operators and also bankability of the project in terms of obtaining financing.

Table 8.21: Key Financial Indicators in the Base Case

Output	Option A
Equity IRR	4.45%
Project IRR	4.27%
DSCR	
Average	0.30
Maximum	0.84
Minimum	(0.14)
Equity Payback Period (year)	24
Project Payback Period (year)	23

8.13.2 Return from the Project in the Base Case

The internal rate of return (IRR) on a project is the annualized effective compounded return rate or discount rate that makes the net present value of all cash flows from the project equal to zero. Internal rates of return give an indication on the desirability of investments or projects. The higher a project's IRR, the more desirable it is to undertake the project.

The equity IRR of the project is calculated from the projected cash flow to the equity holder (the Terminal Operator). The equity IRR of below 20% in the base case scenario indicates that the project is not financially viable in the base case scenario. Hence, if Pussur River is dredged but the other linked projects are not implemented, Option A is not a viable scenario.

8.13.3 Debt Service Coverage Ratio (DSCR) in the Base Case

The debt service coverage ratio (DSCR) is the ratio of cash available for debt servicing to interest, principal and lease payments. It is used in the measurement of an entity's ability to produce enough cash to cover its debt payments. The higher this ratio is, the easier it is to obtain a loan. Typically, most commercial banks require a DSCR ratio of above 1.50 to ensure that sufficient cash flow to

cover loan payments is available on an ongoing basis. A project having a debt coverage ratio of more than 1 indicates that the project generates enough revenue to cover annual debt payments.

The DSCR of the project in the base case scenario is shown in Figure 8-9. The average DSCR is always below 1.0 which means the project will not generate enough revenue to cover loan payments. Overall, the DSCR shows that the project will not be bankable and viable to lenders in the base case scenario.

8.14 Sensitivity Analysis

Various factors affect the equity IRR of the project. In order to understand the importance of each factor in determining the viability of the project, it is important to carry out a sensitivity analysis. The following factors have been analyzed for examining their impact on the equity IRR:

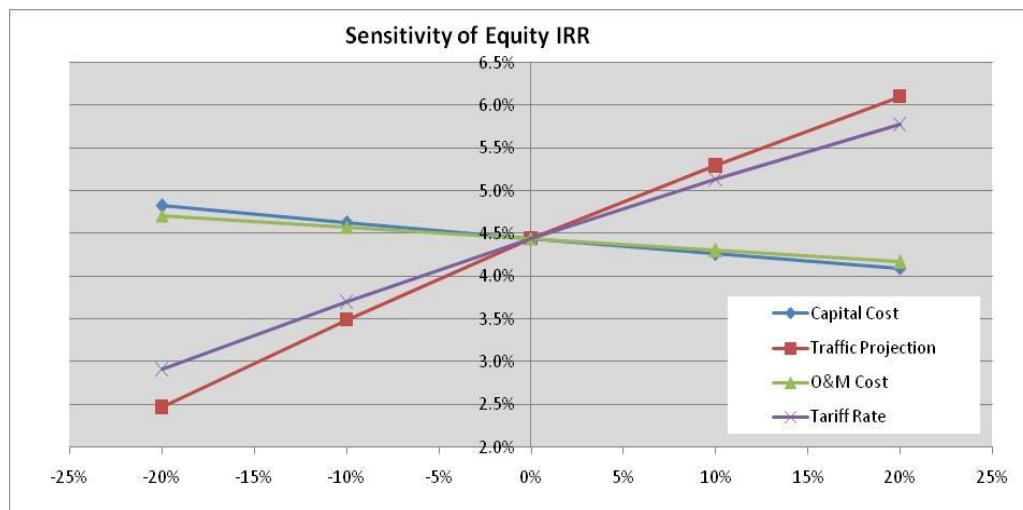
- Capital Cost
- Traffic Projection
- O&M Expense
- Tariff Rate

Each of the above factors was varied by 10% in both directions and the effect on the equity IRR observed. The result is shown in Table 8.22 and Figure 8-10.

Table 8.22: Equity IRR Sensitivity

Equity IRR Sensitivity	-20%	-10%	0%	10%	20%
Capital Cost	4.8%	4.6%	4.4%	4.3%	4.1%
Traffic Projection	2.5%	3.5%	4.4%	5.3%	6.1%
O&M Cost	4.7%	4.6%	4.4%	4.3%	4.2%
Tariff Rate	2.9%	3.7%	4.4%	5.1%	5.8%
Capital Cost	4.8%	4.6%	4.4%	4.3%	4.1%

Figure 8-10: Equity IRR Sensitivity



From the above figure, it is clear that Traffic in the Terminal and Tariff Rate are the two factors which have the biggest impact on the IRR of the project.

Increased traffic in the port through implementation of linked projects are imperative for making the project viable for investors. Using Option C (BGMEA/BKMEA option) as the PPP option will also increase the traffic volume for the project and hence viability of the project.

Increasing the Tariff Rate increases the Revenue of the TO and allows more return on equity. A fixed increment of 3% per year (as assumed in the model) of Tariff Rate may be allowed for the TO to make the project more viable. If Government raises the tariff of Mongla Port, the TO will also be able to raise his rate to that level if his yearly incremented Tariff rate at that point is lower than the Government rate.

Capital and O&M costs also have significant effect on the equity IRR of the project. Capital cost needs to be low for the project to be viable. Procuring more than the required equipment or increasing civil construction scope will make the project less viable to investors.

8.15 Scenario Analysis

8.15.1 Results in different scenarios

The financial model was used to model fifteen different scenarios of different combinations of traffic projections and PPP options. The five traffic scenarios are as follows:

- Scenario 0:** Natural Growth - No dredging and no linked projects
- Scenario I:** Dredging of Pussur Channel
- Scenario II:** Dredging of Pussur Channel and Dedicated Ferry Service (L3)
- Scenario III:** Dredging of Pussur Channel and Clearance of MG Canal (L2)
- Scenario IV:** Dredging of Pussur Channel, Clearance of MG Canal and Dedicated Ferry Service
- Scenario V:** Dredging of Pussur Channel and Padma Bridge

The three PPP models are as follows:

- Option A:** Two Jetty Model (upfront development of Jetty 3 and 4)
- Option B:** Three Jetty Model (deferred development of Jetty 3 and 4; Jetty 5 operated temporarily by TO for first few years)

Option C: BGMEA/ BKMEA option used in conjunction with Option B

However, out of the fifteen scenarios, six scenarios were analyzed in detail. Table 8.23 shows the scenarios that are analyzed in this report.

Table 8.23: The Scenarios Analyzed

		PPP Option		
		Option A	Option B	Option C
Traffic Scenario	Scenario 0	X	X	X
	Scenario I	Base Case	Analyzed	Analyzed
	Scenario II	X	X	X
	Scenario III	X	X	X
	Scenario IV	Analyzed	Analyzed	Analyzed
	Scenario V	X	X	X

Scenario 0 is the as-is traffic scenario where no linked projects, including Pussur River dredging (linked project L1), is not implemented. MPA has already taken steps to implement this linked project, hence the results of this scenario is not analyzed. Scenario II and III are traffic projections where linked projects L3 and L2 are implemented respectively with L1. These scenarios are not analyzed as Traffic Scenario IV is analyzed where all linked projects have been implemented. Scenario V is the case where Padma Bridge has been constructed. This scenario is also not analyzed in this report as its development is based upon factors other than the port. It is a soft link rather than the hard links analyzed in this study, as the hard links are controllable as part of this project and hence will provide more comfort to the investors and their lenders.

The Equity IRR, Project IRR, Average Debt Service Coverage Ratio, Equity Payback Period and Project Payback Period for each of the six different scenarios are given in Table 8.24.

Table 8.24: Results of Scenario Analysis with Tariff Rate 120%

Tariff Rate :		120%		
Equity IRR				
	Option A	Option B	Option C	
Scenario - I	4.4%	6.6%	8.5%	
Scenario - IV	12.1%	21.3%	25.6%	
Project IRR				
Scenario - I	4.3%	5.8%	7.1%	
Scenario - IV	9.4%	13.4%	14.5%	
Average DSCR				
Scenario - I	0.30	0.39	0.47	
Scenario - IV	1.20	1.58	1.86	
Equity Payback Period				
Scenario - I	24	23	21	
Scenario - IV	15	9	8	
Project Payback Period				
Scenario - I	23	21	20	
Scenario - IV	13	12	11	

An equity IRR of below 20% indicates that the project is not financially viable and unattractive to Terminal Operators. A DSCR of below 1.50 means the project will not be bankable to lenders. The above results indicate that an Equity IRR of above 20% and DSCR of above 1.50 is only achieved in Traffic Scenario IV-Option B and Traffic Scenario IV-Option C.

Traffic Scenario IV-Option C is the best possible scenario for the project with a good return of 25.6% and a DSCR of 1.86. The project will be attractive for private investment in this scenario and the terminal will also generate enough revenue to pay off debt.

The project is unviable in Traffic Scenario I which means that additional linked projects to Pussur River dredging needs to be implemented to make the project feasible. Option A is also unviable in Traffic Scenario IV which indicates that Option B or Option C needs to be implemented to make the project feasible.

A tariff rate of 120% of MPA tariff has been assumed for the analysis. Results of the analysis if tariff rate is equal to Mongla Port tariff is used is given in Table 8.25. The results indicate that a tariff rate of 100% of Mongla Port tariff will reduce the return and viability of the project.

Table 8.25: Results of Scenario Analysis with Tariff Rate 100%

Tariff Rate : 100%			
Equity IRR			
	Option A	Option B	Option C
Scenario - I	2.9%	4.5%	6.2%
Scenario - IV	9.3%	15.5%	18.1%
Project IRR			
Scenario - I	3.1%	4.2%	5.5%
Scenario - IV	7.6%	10.6%	11.5%
Average DSCR			
Scenario - I	0.23	0.28	0.35
Scenario - IV	0.95	1.22	1.45
Equity Payback Period			
Scenario - I	26	25	23
Scenario - IV	17	15	13
Project Payback Period			
Scenario - I	25	23	22
Scenario - IV	15	14	13

The analysis of the different scenarios indicates that the project will only be viable if all the linked projects identified are implemented. Implementation of only Pussur River dredging is not enough to make the project financially viable as it is imperative that traffic from Dhaka is attracted to the port. Traffic from Dhaka may be diverted once the MG Canal is dredged and inland waterways transportation is utilized for cargo transport. In addition, setting up a dedicated ferry service to ease transport by roadways to Mongla needs to be implemented.

Scenario analysis also indicated that project will not be viable in Option A even if all linked projects are implemented. Option B, where the construction of the two jetties are deferred by a few years, along with the linked projects will make the project financially viable. If additional incentives are given such as inclusion of BGMEA/BKMEA (Option C) in the project company and the freedom of raising the tariff to 120% by TO, the project will be even more attractive to Terminal Operators.

In Option B or Option C, MPA will also benefit in getting an additional US\$ 200,000 per year (escalated at 2% per annum) as rental or royalty for Jetty 5.

8.15.2 Viability Gap Funding

Government of Bangladesh has published the Guideline for Viability Gap Funding for Public-Private Partnership (PPP) projects, 2012, for subsidizing economically viable projects that are not financially viable. If options which are not viable are chosen as the preferred option for implementation, VGF from Government will be needed to successfully implement the project.

It is understood from the Ministry of Shipping that the Government will not prefer a scenario wherein the project will need VGF. Therefore, all efforts have been made to avoid VGF by structuring the technical configuration of the project such that idle capacity in the facility is avoided. This has led to the development of Option B and Option C.

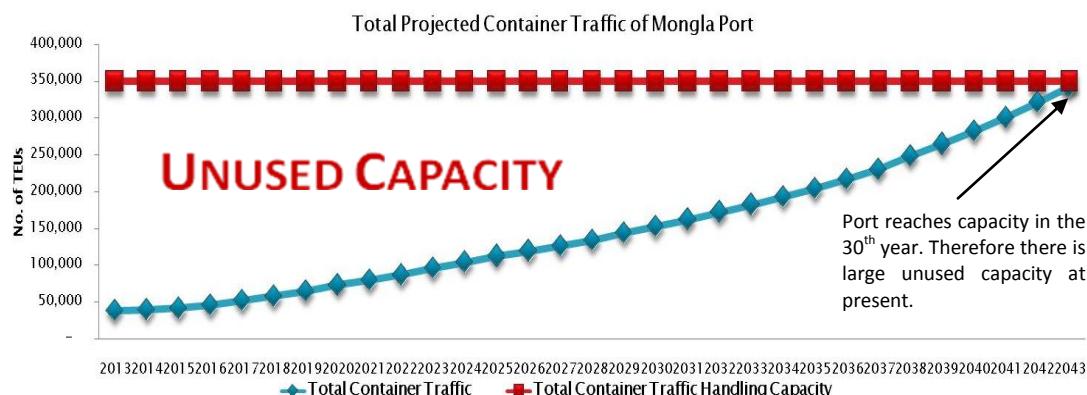
8.16 Economic Benefits

Implementation of the PPP project will be significantly beneficial to Mongla Port Authority as well as Mongla Port itself. The project is also expected to have a big positive impact in the country's economy as well as playing a key role in the development of the south eastern region of the country. This section highlights some of the benefits of implementing the PPP project.

8.16.1 Benefits to Mongla Port

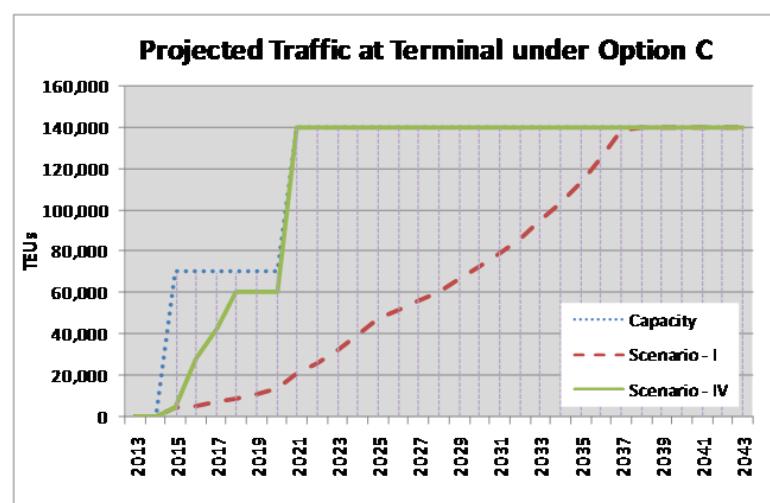
Mongla Port currently is unable to function at full capacity due to inability of ships to reach port berths and lack of cargo traffic from different regions of the country. MPA has already taken steps to undertake dredging of the Pussur channel which will allow ships of 8m draft to reach the port. However, traffic analysis (Chapter 3) indicates that just dredging of Pussur channel is not enough to increase cargo traffic at the Port. Hinterland of Mongla Port in the northern and south eastern region of Bangladesh accounts for only 10-20% of country's cargo. Figure 8-11 shows that jetties at port will still be un-utilized after Pussur River dredging.

Figure 8-11: Traffic Projection at MP after Pussur River Dredging



It is imperative that steps be taken to divert cargo from the Central region of the country which is the major cargo generation hub of Bangladesh. Currently cargo from this region cannot reach Mongla Port easily due to the absence of a bridge over Padma River and long waiting time to cross the river through ferries. Siltation at the MG Canal also prevents waterways movement of cargo from Dhaka to Mongla.

Implementation of the PPP project will mean that Government has to put special emphasis on completion of two linked projects that are vital for increasing cargo traffic at Port. The linked projects, (i) clearance of the MG canal (L2), and (ii) dedicated ferry service at Mawa (L3), will ensure that cargo from the central region is able to reach Mongla easily



which will not only benefit the PPP project but also Mongla Port.

With the linked projects implemented, Mongla Port will start to receive cargo which will mean that capacity of the port will need to be increased with a long-term view of handling future traffic. Currently, Jetty 3 and Jetty 4 of Mongla Port are undeveloped due to lack of funds. The PPP project will mean that the unutilized land and jetty area will be built to international standards and modern cargo handling equipment will be procured at very low cost to MPA or the Government. If Option B or Option C is selected by MPA as the preferred PPP model, the construction of the two jetties will be made in accordance to the traffic at the Port. This will ensure that the port does not suffer from over-capacity when there is low cargo traffic and as such reducing cost to Government.

Existing employees of MPA will continue working as-is and there will be no interruption of the service of the existing employees. In fact, current employees of MPA will have the opportunity to join the workforce of the Terminal Operator at higher salaries and benefits. There will be a quota system in place where 25% - 30% of the TO workforce will need to be engaged from the existing workforce of MPA. The criteria for the quota system will be prepared by the Mongla Port Authority.

MPA will also be benefitted financially as implementation of the PPP project will result in the Terminal Operator paying land lease and royalty to MPA which MPA will not otherwise receive if the land remains unutilized. Terminal Operator may also use MPA's existing warehouses/ storage facility and pay service charges to MPA which will boost MPA revenue.

Financial analysis shows that the Government will receive approximately **US\$ 114 million (Tk 909 crore)** as taxes from the project over a period of 30 years.

If Option A is chosen, MPA will receive **US\$ 100,000 per year** (escalated at 2% per annum) as land lease from the Terminal Operator. If Option B or C is chosen as the preferred PPP Option, MPA will receive an **additional US\$ 200,000 per year** (escalated at 2% per annum) as Jetty 5 rental during the period that the TO operates Jetty 5.

In addition, variable royalty will be a bidding parameter for the project. Depending on the PPP model chosen, MPA will also receive variable royalty over the term of the PPP Agreement. Although the system of bidding has not yet been designed (it will be done in the transactions phase), the likely model for variable royalty will be on a per TEU basis. This implies that MPA will receive a certain amount of dollars for each TEU that passes through the terminal.

8.16.2 Benefits to the Nation

Implementation of the PPP project will ensure that Mongla Port itself grows and develops along with the two private operator jetties. The country as a whole will benefit from the development of Mongla Port. A fully developed and functional Mongla Port will provide a much needed viable alternative to Chittagong Port. It will reduce traffic pressure at Chittagong Port and allow both Ports to run effectively. Two sea lines of communications will be created which is vital for the country.

Traffic analysis shows that the Ready Made Garments (RMG) and Knitwear industries of the country have a huge potential of growth in the future. Chittagong Port is already congested and has limited options for growth. An alternative to Chittagong Port will be needed to handle the growth of traffic expected. Mongla Port has vast unutilized lands which can grow at par with the import and export volume requirements of the country. Development of Mongla Port is imperative for economic growth of the nation.

In addition to being a viable alternative to Chittagong Port, development of the port will

have significant economic impacts to the country especially in the under developed northern and south eastern regions. Cargo from/ to the northern and western regions of the country can be exported/ imported much more cost effectively through Mongla Port than Chittagong Port. Industries set up at the Mongla EPZ and surrounding areas will be able to easily export/ import cargo through the port instead of having to go through Chittagong. The port may also be used as a transit point for supplying coal to coal fired power plants scheduled to be constructed in the region.

Terminal Operator is expected to employ at least 150 new workers at the two new jetties. In addition, it is expected that there will be significant indirect employment generation in the region due to increased port traffic and infrastructure.

9

MAJOR TERMS AND CONDITIONS

The technical and commercial terms and conditions provided in the sections below are preliminary in nature, since the project's terms will be established during the preparation of the concession agreement. Moreover, the PPP model to be used in engaging a Terminal Operator needs to be discussed and determined. The following major terms and conditions are based on a BOO PPP model of J3 and J4.

The technical and commercial terms and conditions in the sections below are therefore to be treated as indicative in nature, more for defining the scope rather being the definitive terms and conditions. *The final terms and conditions will be prepared at the time of the preparation of the Request for Proposal (RFP) and the PPP Agreement.* While it is believed that the majority of the terms and conditions represented in this document will be valid, there are likely to be some changes depending upon the feasibility study that is yet to be completed and governmental decisions with respect to the PPP model.

9.1 Technical Terms and Conditions

The detail technical specifications to be met by the Terminal Operator will be defined in the Request for Proposal (RFP), but it will consist of the following:

- Completion of construction of two incomplete jetties and construction of ancillary backup facilities
- Jetties constructed by Terminal Operator should be able to handle fresh fruit, vegetable, tea, leather, petroleum goods, edible oil, gas, clinker, gypsum, fly ash, bulk fertilizer, bulk cement and food grains and any other commodities imported and exported by the importers/ exporters.
- For the facility of construction and operation of jetty no 3 and 4, the Terminal Operator will develop the adjacent land by own cost
- Procurement and installation of terminal equipment for operating the jetties
- Operation and maintenance of the two jetties throughout its term.

After the end of Contract Term, Terminal Operator will hand over the jetty land to MPA.

9.2 Commercial Terms and Conditions

9.2.1 Contract with the Investor

The contractual relationship between the Terminal Operator and MPA shall be established through the PPP Agreement. The PPP Agreement shall specify the provision of granting the project to the Terminal Operator, construction, operation and maintenance of the facilities, collection of charges by the Terminal Operator, rights and responsibilities of Terminal Operator and MPA, events of default for Terminal Operator and MPA and remedies and penalties, dispute resolution mechanism, force majeure event and its consequence and liabilities, communication, other miscellaneous matters and schedules.

Legal due diligence is required to be carried out at the time of the preparation of the contract documents on the number of agreements and the contracting parties.

9.2.2 Term of Contract

The term of the contract will be set at **30 years** from the Contract Effective Date. The Contract Effective Date will occur no later than 120 days after signing of the PPP Agreement. The Term of the PPP Contract will include both construction period and O&M period.

9.2.3 Construction Period and Financial Closure

The construction period would be in the range of **2 to 3 years** which will start after the Contract Effective Date.

Terminal Operator will complete construction of 2 (two) jetties, no. 3 and no. 4 (4 line piling for every jetty), situated in the southern side of J5 for operation.

A period of **6 – 9 months** from the date of agreement may be given for financial closure.

9.2.4 Viability Gap Funding

Government of Bangladesh, through its Guideline for Viability Gap Funding for Public-Private Partnership Projects, 2012, has decided to subsidize economically desirable PPP projects that will not be financially viable if they are constrained to charge affordable user tariffs. In some cases, the demand for the project may not have been firmly established¹². The Government will make such PPP projects financially viable by providing a budget line known as the Viability Gap Funding (VGF).

VGF could be in the form of capital grant or annuity payment or in both forms. VGF in the form of the capital grant shall be disbursed during the construction phase of the project only after the public sector company has subscribed and expended the equity contribution required for the project. VGF in the form of annuity shall be disbursed on a periodic basis (i.e. monthly, quarterly, half-yearly, yearly etc.) during the period wherein the private sector company provides services under the PPP project after the commencement of operation.

If VGF is needed, the Finance Division will appraise the requirement of VGF after being proposed by PPP Office. VGF will be allocated to investor according to terms in the PPP Contract.

9.2.5 Bidding and Payment Provisions

The payments by Terminal Operator to MPA will be as follows:

- Fixed Royalty
- Variable Royalty

Fixed royalty will be in the form of fixed lease rental that may be collected from Terminal Operator in lieu of land being leased to investor for operation of its business. The amount of fixed royalty may be based on the lease rates of the land/jetty.

- For Jetty 3 and Jetty 4: Fixed lease rate of \$100,000 per year for the entire term
- For Jetty 5: Fixed lease rate of \$200,000 per year during the years used

Variable royalty is to be either given to MPA annually (if the project is found viable by investor) or VGF to be given by MPA to Terminal Operator in four equal payments (if the project is not found viable by investor), depending upon the competitive bid. This system will be used as the bidding parameter for the Tenderers.

¹²As in the case of this project, where the demand is dependent upon the timely completion of several linked projects.

If Tenderer finds the project viable, he will propose a Variable Royalty on a per TEU basis to be paid to MPA.

If winning Tenderer does not find the project viable, he may request for VGF. The VGF may be disbursed by the Government in 4 equal payments – two during construction phase and two during operation phase.

9.2.6 Tariff Structure

The Terminal Operator will collect various charges according to the approved tariff schedule by Mongla Port Authority (MPA). To provide incentive to the Terminal Operator, jetty operator may be given the option of raising tariff level upto a pre-determined level. The tariff rates for the jetty operator may also be allowed to increase annually based on a pre-determined percentage.

River dues, port dues, pilotage charges etc. will be collected by MPA.

Terminal Operator will receive the tariffs associated with operation of his facilities. Some of the major tariff items may be as follows:

1. Berth Occupancy Charge
2. Loading and Discharging charge
3. Handling Charge
4. Hoisting Charge
5. Jetty Crane Charge
6. Reefer Container charge
7. Extra Movement charge etc.

9.2.7 Equity Contribution

The Terminal Operator will be required to finance at least 30% of the total project cost as equity. The minimum equity contribution of the lead investor will be at least 51% of the total equity.

9.2.8 Transfer of Equity

No initial shareholder shall be allowed to transfer their shares to other investors within 5 years of the commercial operations date without prior approval of MPA. The initial shareholders may transfer their shares among themselves within the first 7 years but keeping at least 51% shares by the lead investor and 49% shares by the remaining shareholders. After 7 years of the commercial operations date, the investors are allowed to reduce their share level to 25% for the duration of the term.

The investor shall be encouraged to offload shares in the local capital market subject to above conditions and permission from the SEC.

9.2.9 Rights of MPA

MPA shall have the following rights:

- (i) right to introduce competition
- (ii) right to monitor site
- (iii) right to collect royalty from Terminal Operator

9.2.10 Obligations of MPA/ MoS

The major obligations of MPA and the Government of Bangladesh are:

- (i) enable access to the site
- (ii) carry out or cause to be carried out, all associated/linked projects (L1, L2 and L3) on a timely basis either with own funds or through PPP
- (iii) carry out maintenance dredging in the Pussur River channel and jetty fronts to ensure adequate depth for ship movement throughout the year
- (iv) assist the Terminal Operator in obtaining the required permits and approvals
- (v) assist the Terminal Operator in importing equipment and materials.
- (vi) allow ships to use the terminal based upon users' choice.
- (vii) set up an oily waste treatment plant for use by all the ships at the port

9.2.11 Rights of Terminal Operator

The Terminal Operator shall have exclusive control over the design, financing, construction and operation of J3 and J4, including the collection of tariff from the users for a period of 30 years.

9.2.12 Obligations of the Terminal Operator

The major obligations of the Terminal Operator are:

- (i) to complete the construction and bring the two jetties into operation by the Commercial Operations Date,
- (ii) to provide non-discriminatory services to all terminal users,
- (iii) to place a COD Performance Guarantee and Regular Payment Guarantee within due time,
- (iv) to comply with reporting requirements,
- (v) to maintain appropriate books of accounts according to the Generally Accepted Accounting Principles (GAAP) and records of costs and revenues,
- (vi) to ensure proper safety and security, and fire protection,
- (vii) to abide by all applicable laws (vii) to abide by all relevant civil construction codes during construction,
- (viii) ensure that locally available goods and services are used, and
- (ix) ensure transfer of technology as per the agreement.
- (x) Hire the staff of MPA as per the 30% quota, using the criteria set by the MPA

9.2.13 Tender Security

The Tender Security shall be in the order of **1% - 2%** of the project cost. The tender security will be valid for a period of 180 days.

9.2.14 Performance Guarantees

9.2.14.1 COD Performance Guarantee

The Project Company shall submit a performance guarantee (the "COD Performance Guarantee") as security at the time of signing the PPP contract to ensure that the obligations

for constructing the jetties are carried out. The guarantee will be released once the two jetties and ancillary facilities are completed.

9.2.15 Transfer of Technology

An important feature of the project shall be the transfer of technology (TOT) from the investor to Bangladeshi nationals during the course of the PPP Contract. Clauses will be inserted in the PPP Contract to make it obligatory for the Terminal Operator to train local workers.

9.2.16 General Rights, Duties and Obligations

9.2.16.1 Consents

The Terminal Operator shall at all times during the Term of the Contract maintain and comply with the applicable Consents subject to responsibilities of MPA and GOB pertaining to the Consents.

9.2.16.2 Taxes and Duties

The Terminal Operator shall during the Term of the Contract pay in a timely manner all taxes, duties, levies, value added tax (VAT), cess and charges including but not limited to income tax, sales tax, excise duty, customs duty, service tax and octroi that may be levied, claimed or demanded from time to time by any Governmental Authority including any increase therein effected from time to time from any Governmental Authority including but not limited to the Project and ancillary Facilities.

9.2.16.3 Insurance Requirement

The Terminal Operator shall, at its cost and expense, purchase and maintain as are prudent.

9.2.16.4 Insurance Cover

The Terminal Operator shall insure all insurable assets and all insurable risks associated with the Project.

9.2.16.5 Assignability

Except as otherwise provided in the Contract, the Terminal Operator shall not assign its rights, title or interest in the Contract in favor of any Persons without prior written consent of MPA. Provided that the Terminal Operator may assign its rights, interest and benefits under the Contract to the Financing Parties as security for the financial assistance.

9.2.16.6 Engagement of Contractors

The Terminal Operator may engage any Person possessing the requisite skill, expertise and capability for designing, engineering, procurement, installation, erection, operation, management and/or maintenance of the Project. Provided that the Terminal Operator shall at all times be solely responsible for all its obligations under the Contract. The Terminal Operator shall not sub-contract the entire jetty operation.

9.2.17 Operations and Maintenance

9.2.17.1 Broad Obligations with respect to O&M

The operation, management and maintenance of the jetties shall be the responsibility of the Terminal Operator which shall do so at its own cost. All Environmental Liabilities, whether to the land, air or sea resulting from the operation and maintenance of the jetties shall be the responsibility of the Terminal Operator.

The Terminal Operator shall:

- (a) Promptly commence operations upon completion of construction;
- (b) For import and export goods handling and storage purpose, follow the tariff law along with other government and port rules and regulations without the prior written intimation to MPA, not remove or replace any assets;
- (c) follow national and international rules and regulations for goods handling and storage in the jetty and surrounding project area.
- (d) Follow all relevant laws of the land, including Customs Act., manuals as amended from time to time, as it is applicable for MPA.
- (e) not handle or store any contraband goods in the jetty or surrounding project area.

9.2.17.2 Repair and Maintenance

The Terminal Operator shall, at its cost repair as necessary and maintain the two jetties, ancillary facilities or any part thereof including the recommendations of all manufacturers of Major Installations and Equipment.

9.2.17.3 Port Dues

Following the rules, the Mongla Port Authority will receive the full amount of taka collected from foreign vessels entering into the two jetties as port dues on vessel, river dues tag and piloting charge

9.2.17.4 Pollution and Environmental Damage

The Terminal Operator can not engage in any activities that cause pollution or environmental damage. If the Terminal Operator engages in such activity, compensation will be collected from the Terminal Operator along with taking necessary actions according to the relevant rules and regulation of the country.

9.2.18 Right to Contract

The Terminal Operator shall be free to contract with any customer on any terms and conditions, at prices, and based on any other contractual provisions as it may choose, in its sole discretion, without the necessity of obtaining approvals from MPA, or other Governmental Authorities with respect thereto.

The Terminal Operator shall have sole possession of, and exclusive operational control over J3 and J4 including their equipping, manning, and internal operations. None of MPA, or any other Governmental Authorities shall require the Terminal Operator to utilize such Governmental Authorities, collective bargaining agents or other labour agreements or procedures, or to utilize any particular labour authorities, unions or organizations in Bangladesh;

9.2.19 Change in Law

In the event of any Change in Law that is not of general, national or regional application that applies to the Terminal Operator, or the Project, GOB shall either exempt the Terminal Operator, and the Project therefrom (or cause them to be exempted therefrom), to the extent which is sufficient to offset the effect of the Change in Law if it would have a material adverse effect.

9.2.20 End of Term

Upon expiry of the Term, the Terminal Operator may make the site as is as it was provided by MPA and leave the place or may return to MPA as built by the Terminal Operator at a price for the additional facility built by the Terminal Operator.

9.2.21 Reporting Obligations

The Terminal Operator shall be required to report MPA about the jetty construction, operation and maintenance at regular intervals. The salient features of the reports shall be:

- (i) quarterly cost report of the development of facility prior to commercial operations date,
- (ii) monthly report about the progress of construction,
- (iii) monthly report about the jetty operation, and
- (iv) report on accidents, hazards, and so on.

Full details of the reporting obligations are to be provided in the PPP Agreement.

10

RELEVANT LEGISLATION AND REGULATIONS

The following sections give a summary of relevant legislation and regulations that may be applicable for the project.

10.1 Historical Legal Background of Bangladesh

In order to discuss the policy and regulatory framework in Bangladesh, it is important to get a general overview on the background of the Bangladesh Legal system as it demonstrates a very consistent evolutionary process that can give potential investors and developers confidence in the stability of the Bangladesh legal tradition. Bangladesh has a long legal history to match its long political history. The present legal system is not a result of revolution but an evolution starting from the earliest Hindu period. After the initial Hindu period, this legal system passed through the Muslim period between the 13th century and mid 18th century, when it was passed into the hands of the British regime. Bangladesh basically inherited most of its current laws from the British, who kept alive the personal laws of inheritance, Divorce, Marriage, Guardianship related to Hindus and Muslims. Therefore, Bangladesh legal system can be said to derive from a mixed system of Indo-Mughal and English law. The dominance of the English law is clearly reflected in the previous Pakistan legal system as well as in the present Bangladesh legal framework. For instance, *the principal legislation governing the execution of contract is set out in the Contract Act, 1872*. This said Act possesses the combined effect of common law and equity doctrine, which has been simplified and altered in some respects to accommodate the special circumstances of Indian sub-continent. Thus it is evident that although in 1971, Bangladesh emerged as an independent state, there has not yet been any significant change in the basic structure of the legal system in Bangladesh as established by the British. This traditional respect for the Rule of Law and more than 100 years of experience with the British legal system means that basic contract documents conform readily to international norms and standards.

10.2 Maritime Regulations

10.2.1 Ports Acts and Rules

The Ports Act 1908 is the principal legislation together with the Port Rules, 1966. The Act does not provide any express legislative basis for or against private sector participation. There is no legislation providing specifically for GOB undertakings to transfer their assets, rights obligations (or any part of them) in respect of their operations to private sector investors other than that which may be interpreted as part of GOB's general discretionary powers. Port facilities constructed within prescribed port limits require permission of the relevant port authority. The Bangladesh Land Port Authority Act, 2001 was designed to establish land ports to facilitate import and export of materials by road and for its operation, management, development, expansion and maintenance.

Bangladesh has two seaports, Chittagong in the east and Mongla in the west. The ports sector is the responsibility of the Ministry of Shipping (MOS). The two major ports are operated through government-owned authorities, the Chittagong Port Authority (CPA) and the Mongla Port Authority (MPA) established under their respective legislation. The Ministry of Shipping has recently extended its jurisdiction to Land Ports, operating through the Bangladesh Land Ports Authority. CPA and MPA have a measure of independence but operating and capital expenditures and staffing are subject to governmental and civil service procedures similar to those for government departments.

Bangladesh Inland Water Transport Authority (BIWTA) is responsible for the operation and

maintenance of the inland water transport system although the majority of the vessels are private. Bangladesh Inland Water Transport Corporation (BIWTC) has some vessels for carrying passengers and cargoes in specific routes but represents only a small percentage of the total commercial vessels operated on the inland waterways.

Bangladesh Shipping Corporation (BSC) operates in the international maritime seaports and contributes about 8% of the total Bangladesh sea-trade. The Department of Shipping (DOS) is the licensing authority for vessels.

The process for determining a new (or revised) tariff-schedule for the ports requires the support of the Ports Act 1908. Tariff setting is based on a consultative process with port users, clearance by the Minister of Finance, approval by the board of the respective port, approval by the Minister of Shipping and (for port dues and pilotage) by the Minister of Law.

Application

The Ports Act is applicable to all prescribed ports and terminals within Bangladesh. By a gazette notification, GOB may extend (or withdraw) the application of the Ports Act to other ports or terminals of any navigable rivers or channels. The Act does not provide for any express legislative basis for private sector participation.

Port Officials and their duties

a) Conservator

The role of the Conservator is governed by sections 7 to 18 of the Ports Act. GOB may appoint the port officer or the harbour master to be the Conservator of every port.

b) Health officer

GOB may also appoint a health officer who has power, inter alia, to enter into vessels, check documents, or question individuals for the purposes of medical examinations.

Determination of minimum wages and creation of welfare funds

GOB may by order determine the rates of minimum wages or remuneration of the persons rendering any services on contract or otherwise to GOB or to any port authority or to any other person within the limits of any port and also to create welfare funds and determine the rates of contribution to such funds notwithstanding anything contained in any other laws or contract, agreement or other instrument. See section 5A of the Port Act. However, GOB may exempt a bidder from this statutory provision.

Safety regulation

Sections 19 to 30 of the Port Act prescribe the rules for the safety of shipping and the conservation of ports. The following actions, among others, are prohibited:

- lifting, loosening or setting adrift any buoy, beacon or mooring fixed or laid lawn by the authority;
- casting or throwing of ballast, rubbish or other things detrimental to navigation;
- “graving, breaming or smoking” of any vessels;
- boiling or heating of any pitch, tar, resin, dammer, turpentine, oil or other combustible matter on board any vessel within any port;
- “drawing of spirits on board any vessel”, by an artificial light within any port;
- failure to ensure any “warp or hawser to be made fast” to the vessels in the port when required to do so;

- discharging firearms without lawful authority;
- sweeping for anchors, cables or “other stores lost or supposed to be lost”; and
- removing or carrying away any rock, stones, gravel, sand or soil or any artificial protection from the part of the bank or shore of the port.

Any such prohibited activity may only be performed with the permission of the Conservator. Failure to obtain such permission may lead to the imposition of penalties (including imprisonment).

10.2.2 Port Rules 1966

These Rules are applicable to those ports and terminals in Bangladesh where the Port Act has been extended. Some relevant rules are summarized below.

Permissions to lay mooring - Rule 73

Prior approval and written permission of the Conservator is required for the laying, placing or constructing a mooring of a permanent or temporary nature within a port pursuant to Rule 73. Permission is also required for shifting of Mooring.

License for supply of port labour- Rule 80

A license has to be obtained for the provision of stevedoring services and labour handling services within a port. A license will be granted subject to the terms and conditions determined by the Conservator and upon the payment of the prescribed fees.

License for carrying out commercial activity; cleaning contractors and plying vessels within a port - Rule 58, 106 & 107

A license has to be obtained for carrying out any commercial activity within the port pursuant to Rule 58.

10.2.3 Mongla Port Authority Ordinance 1976

The powers and functions of the Authority are stated in section 9 and 10 of the Ordinance. For carrying out the purpose of the Ordinance, MPA can enter into any contract and/or agreement of any kind whatsoever.

10.3 Environmental Regulations

10.3.1 Environment Conservation Act 1995

The Bangladesh Environment Conservation Act, 1995 (the “BEC Act”) established the Department of Environment and its powers and functions, inter alia, include:

- to co-ordinate with and assist any authority or agency having regard to the objectives of the BEC Act;
- to advise or direct the concerned person regarding the environmentally-friendly handling, storage, transportation, import and export of hazardous substance or its components; and
- to issue directions to close or prohibit or regulate any industry, initiative or process, which is responsible for environmental pollution by giving it reasonable opportunity to make its functioning environmentally sound.

In case of any contravention of any provision of the BEC Act by any company or any failure to perform any duties in accordance with any notice issued under the BEC Act, the owner, director, manager, secretary or any other officer or agent of the company in breach shall be

deemed to have violated such provision or deemed to have failed to perform the duties or order or direction unless he proves that he was ignorant of such contravention or failure or that he has exercised due diligence to prevent such contravention or failure to perform.

The BEC Act was amended in 2000 to include penal provisions for contravention of certain provisions of the BEC Act or failure to comply with any order or direction issued under the BEC Act. The penalties are imprisonment of up to ten years and/or fine up to Taka 10(ten) lacs. The Director General of the Department of Environment may also file a suit for damages in a representative capacity, on behalf of a person or class of persons who are affected by such pollution.

The Director-General has powers under the BEC Act to declare an area to be an ecologically critical area if he is satisfied that the ecosystem is being endangered. An environmental clearance must be obtained from the Director-General before any industry can be established or any project can be undertaken. Additionally, an Environmental Impact Assessment is required for all projects. However, GOB is entitled to waive this requirement.

The main regulatory authority is the Department of Environment, Ministry of Environment and Forests. In 1989, the Ministry of Environment and Forestry was established. GOB drafted the National Conservation Strategy, adopted the National Environmental Policy, 1992 and revised the old laws and restructured the entire regulatory framework. Moreover, the National Environmental Action Plan has also been prepared.

10.4 The Bangladesh Labour Code

All employers are expected to comply with GOB's labour laws, which specify employment conditions, working hours, wage levels, leave policies, health and sanitary conditions, and compensation for injured workers.

The Shops and Establishments Act 1965 and the Shops and Establishments Rules 1970 deal with holidays, payment of wages, hours of work and certain other related matters concerning the workers employed in commercial and industrial establishments.

The Employment of Labour (Standing Orders) Act, 1965 and the Employment of Labour (Standing Orders) Rules, 1968 regulate the conditions of service of workers employed in commercial and industrial establishments. These laws also stipulate the grievance procedures to be applied in disputes between the employer and workers.

Labour disputes are not always heard before a legal court. Many companies have found it effective to seek the resolution of issues before a Labour Tribunal.

10.4.1 Other Employment Related Acts

Worker's Participation in Company's Profit

Under the Companies Profits (Workers' Participation) Act 1968, any company engaged in "industrial undertakings", which has 100 or more workers employed at any shift at any time during a year, has a paid-up capital of Tk. 5m or more and has fixed assets valued Tk. 10m or more, must establish a Workers' Participation Fund and Welfare Fund. The Company must pay five percent of its net profits every year to the funds. The proportion of the payment to the Workers' Participation Fund and the Welfare Fund is 90:10. The amount paid in the said funds is available to the company for its business operations and further investment. The amount allocated for the funds is deductible from the taxable income. Income of the fund including capital gains shall be exempt from income tax. However, GOB may exempt a bidder from this Act.

10.5 Privatization Related Issues

10.5.1 Policy and Strategy for Public-Private Partnership (PPP), 2010

In August 2010, Government of Bangladesh issued the “Policy and Strategy for Public-Private Partnership (PPP), 2010” for rapidly developing infrastructure with private sector financing, management and operation.

The objectives of the policy are:

- Spell out the principles of partnership with private sector for undertaking various projects related to infrastructure as well as public service delivery;
- Define an institutional framework, which is conducive and efficient in handling PPP projects as well as effective to protect public interest; and
- Ensure balance between risk and reward for both the government and private partners while aiming to keep the undertaking attractive for the private sector

The Policy and Strategy is aimed at promoting the development of infrastructure projects in Bangladesh by the private sector through different modes of private sector participation such as Build-Operate-Transfer (BOT), Build-Own-Operate (BOO), Supply-Operate-Transfer (SOT) and others.

The tendering process for the project will follow these guidelines.

10.5.2 Acquisition and Requisition of Immovable Property Ordinance, 1982

It has been observed that over the years, the guiding principle of government institutions has always been the desire to preserve and provide a fair and equitable treatment to all persons with respect to their property, whether this is personal, chattels or immovable property. The Acquisition and Requisition of Immovable Property Ordinance, 1982 has been enacted to legally protect the rights of acquisition and the obligation for payment through subsequent compensation.

Under this Ordinance, the government of Bangladesh through the Deputy Commissioner of the District may acquire any property (including infrastructure assets in the private sector) under its jurisdiction by publication of notice to the holder of the property expressing the use of the property for public interest.

The Deputy Commissioner will however award and pay compensation to the holder of the property for the acquisition. The process of determining compensation includes the market value of the property based on the average of similar property in the vicinity of the property, during the last twelve months of the publication of the notice plus fifty percent of the market value, plus values of standing crops of trees, plus value of the damage of other assets of the property holder during acquisition and loss of earnings from the asset. However, the value of infrastructure asset may be difficult to assess as a sale history of similar assets during the past twelve months is unlikely. This act allows compensation to be negotiated beforehand, and such negotiated amounts may be included in the agreements between the government and the private investor.

10.5.3 Competitive Bidding

Government of Bangladesh adopted the Public Procurement Act, 2006 formulated by the Implementation Monitoring and Evaluation Division of the Ministry of Planning, to regulate procurement of goods, works and services for achieving the following objectives:

- Optimizing efficiency in procurement;

- Promoting competition among tenderers for the procurement of goods, works or services in the public sector;
- Providing equitable treatment to tenderers;
- Promoting fairness in the procurement process;
- Contributing to an improved business climate in the country; and
- Introducing transparent regulations of universal application to all procurement in the public sector.

The scope of application of these Regulations is not only restricted to the public sector. These Regulations can also be adopted by any person, for use in their own procurement procedures, provided that the adoption of these Regulations is clearly acknowledged. However, it is to be noted that, international bids are generally evaluated according to standards laid down by international institutions such as the World Bank and the Asia Development Bank.

10.5.4 Lenders' Security Interest

Implementation of infrastructure projects requires a large amount of investment from equity as well as debt from different local and international lenders and financial institutions. From project to project, the lending amount varies from about 60% to 80% of the total project cost of an infrastructure project. The major concern and prime requirement of the lenders is to secure their huge investment by creating security based on sound and enforceable legal system. The Bangladesh legal system comprising the Transfer of Property Act, 1882; the Registration Act, 1908; the Contract Act, 1872; and the Companies Act, 1994 provide the strong basis for creating security of assets and documents under any projects. The Transfer of Property Act deals extensively with the creation of mortgages of immovable property and subsequent registration of mortgages under the provision of the Registration Act within 4 months after execution of deed to the Sub-registrar office of the project located area and the same to be registered to Registrar of Joint Stock Companies in the prescribed manner within 21 days after the date of its creation. The Contract Act, 1872 will govern the equity commitments by the sponsor. Creation of security over shares can be done in many ways: Pledge of shares, Lien of shares and Mortgage of shares. There is no specific law for governing the mortgage of movable property and in that case the mortgage of immovable property procedure may be followed.

10.6 Other Relevant Legislation

There are also some additional laws, which may affect the Terminal Operator. These include:

10.6.1 Customs Act, 1969

Customs Act, 1969 is the governing legislation relating to the levy and collection of customs-duties on various import items.

10.6.2 Company Act, 1994

Company Act, 1994 is the governing legislation that sets out the basic principles relating to companies and other legal entities set up for business purposes. In general the Bangladesh Companies Act follows the English Companies Act of 1985 and the Indian Companies Act 1956. The 1994 Act has provisions relating to the setting up of a company, corporate governance, issue and transfer of shares, protection of minority shareholders, and accounting and reporting.

10.6.3 Investment Board Act, 1989

Investment Board Act was passed for the establishment of a board, namely the Board of Investment, to encourage investment in the private sector and to provide necessary facilities and assistance in the establishment of industries.

10.6.4 Foreign Private Investment (Promotion and Protection) Act, 1980

Foreign Private Investment (Promotion and Protection) Act, 1980 was enacted to provide fair and equitable protection for foreign investors by providing equal treatment with national investors (for example, in the provision of tax holidays, rules and regulations relating to permits, etc). There is no limit to the foreign equity participation in investments and there is no requirement to sell shares to Bangladeshis. Full repatriation of foreign capital, and the transfer of profits and dividends accruing to foreign investment, is guaranteed by this law.

10.6.5 Foreign Exchange Regulation Act, 1947

Under the Foreign Exchange Regulation Act 1947 (FERA) the Bangladesh Bank regulates day to day foreign exchange issues.

10.6.6 Value Added Tax Act, 1991

Value Added Tax (VAT) Act was enacted to outline the principles for levying an uniform rate of tax on all domestic supplies and imports.

10.6.7 Income Tax Ordinance, 1984

Income tax is administered under the Income Tax Ordinance, 1984 and the Income Tax Rules, 1984 as well as notifications made under the Ordinance. The Income Tax Ordinance 1984 spells out the different heads under which tax is payable.

10.6.8 Arbitration Act, 2001

Arbitration provision in any contract, especially a foreign investor, would like to conclude the speedy resolution of commercial disputes between the parties. Arbitration clause under UNCITRAL, ICCID or ICC is familiar worldwide for international contracts. The new Arbitration Act, 2001 of Bangladesh is framed in such a way that provides comfort to the investors for resolving disputes in a limited timeframe (90 days) with international standards. The Act provides the scope for international commercial arbitration held in Bangladesh between the national of Bangladesh and national of other countries and also provides scope for enforcement of international arbitral awards in Bangladesh court held outside Bangladesh. The Supreme Court of Bangladesh provides the secretarial support of the arbitral proceedings. Any matter whether laid out in the arbitration agreement or without arbitration agreement but with the consent that arises from any legal matters can be sent to arbitration under this Act. The main features of the Act are as follows:

This Act will be followed to conduct an arbitration in Bangladesh; No court will proceed with any activity of a dispute that is agreed to be resolved by arbitration; Arbitration proceeding and award can be initiated and given even if the matter is under court jurisdiction; Three arbitrators will conduct the arbitration proceedings if both parties do not mutually agree to one arbitrator; With both parties agreement, any nationality may be appointed as an arbitrator within 30 days. If this fails, the Chief Justice or a Judge from the Supreme Court nominated by the Chief Justice will appoint the arbitrator; The jurisdictions of the tribunals are clearly spelt out; Upon request from one party, the tribunal may give interim order which cannot be appealed: The tribunal shall allow solving the dispute in other ways; The tribunal shall not be obligated to follow the procedures of Code of Civil Procedure, 1908 and Evidence Act, 1872.

11 INVESTOR SELECTION OR BIDDING PROCESS

Engaging a Terminal Operator is typically a step-by-step process. The steps involved are described in the following paragraphs:

11.1 Planning for Engaging Terminal Operator

The plan should cover the optimum strategies and options for private sector participation. It discusses the design of interrelationship between MPA and the Terminal Operator, the strategy for good publicity and advertisement of the deal (*i.e.* communication plan), the method of sale, the steps required to reach sale, and a timeline.

A well-thought communication plan is required, so that sufficient transparency exists in the process and information is disseminated to all relevant stakeholders and the decision makers. It will prevent the risk of the program being stuck in the middle due to difficulty in making decisions.

The plan should also include the tendering method. This should contain the steps and timeline of tendering, responsibilities of government officials and advisers, production of sale documents (for example, information memorandums prospectuses), legal tasks and timeline.

11.2 Obtaining Approvals

The plan needs to be approved by the authority appropriate for MPA and PPP policy guideline of the country, so that later the progress is not restricted due to lack of decisions. Such approval is needed before notice of invitation for tender is advertised.

11.3 Qualification

The investor selection process will start with Request for Qualification (RFQ) by MPA. After feasibility study is finalized, MPA will issue a public notice for inviting qualification statements for participating in the investment. A short list of the qualified investors will be made, based on evaluation of the statements.

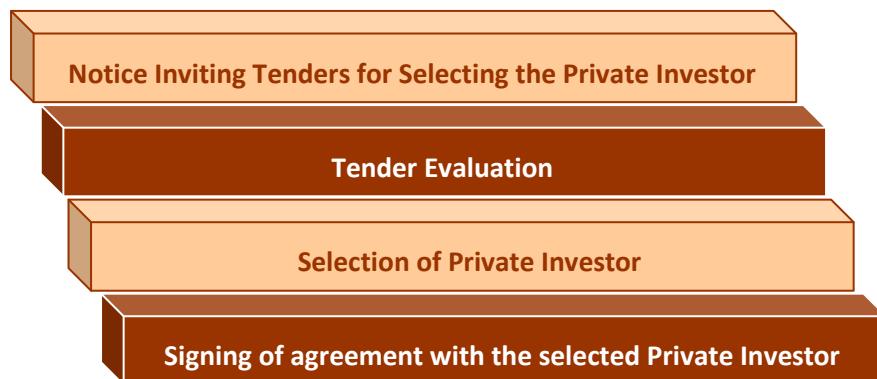
11.4 Tendering or RFP

After the approval of the short list of investors is obtained, the tendering process will start with issuance for Request for Proposal (RFP). The advertisement of notice inviting tenders will be published in the national dailies. The process of engaging Terminal Operator is illustrated below:

RFP will be issued to the short-listed investors for selecting the suitable Terminal Operator and rank them. IIFC will provide necessary support to MPA both in tendering process and selection of Terminal Operator. In this respect IIFC will prepare necessary tender documents and draft PPP agreement and evaluate the tenders for MPA.

The selected Terminal Operator will enter into an agreement with MPA. MPA will provide operation manual and catalogues and drawings to the Terminal Operator. With reference to those documents the Terminal Operator will assess the level of damage and then determine the extent of refurbishment required to bring the facilities in running condition and then refurbish or replace the machineries as necessary.

Figure 11-1: Tendering Process



11.4.1.1 Communication Plan

IIFC will assist MPA in publishing the notice in national and international publication media inviting interested and potential Investors to participate in the tender process. In national publication media, the notice shall be published over a period of three weeks in at least four newspapers (English and Bengali). The notice may also be published in the MPA's and IIFC's website.

MPA will also publish the notice in UN Development Business or in any widely circulated international publication such as investment journals, trade journals, newspapers or magazines related to the relevant sector¹³. The notice should also be circulated to all foreign embassies and High Commissions located in Bangladesh and Bangladesh embassies located in potential investment countries so as to circulate and promote the said investment to potential chambers of commerce and industries in such countries.

11.4.1.2 Investment Promotion Meeting

As part of the communication, an investment promotion meeting needs to be held where potential investors or local agents of foreign investors need to be invited to disseminate information on the potential investment and to create their interest.

This will help the investors to submit a more informed bid and reduce the possibility of dispute while implementing the deal. The investment promotion meeting will be publicized in the press, so that the people (any suitable investors, who are not aware of it) also become aware of the opportunity.

For success of the transaction, IIFC is of the opinion that this meeting will be highly necessary. The meeting may be held after some time has elapsed after RFQ notice is published and before the deadline of submission of qualification statements.

11.5 Qualification Criteria of Potential Tenderers

11.5.1 Qualification Criteria

The qualification criteria of potential investors will be judged on:

- (i) legal status
- (ii) technical and managerial capability,
- (iii) financial capability,
- (iv) ability to raise debt and equity

¹³within the first 3 weeks

- (v) project development experience,
- (vi) project operating experience, and
- (vii) current ownership experience.

11.5.2 Legal Status

The tenderer must provide all documentary evidence in support of its legal status. The documentary evidences are:

- a) certificate of incorporation (if applicable);
- b) company legal documents such as registration under local authority, partnership deed, memorandum and articles of association, joint venture agreement, etc.;
- c) tax certificate from the relevant governmental authority;
- d) notary certificate that there is no bar on the tenderer to execute a contract with MPA and others.

11.5.3 Technical and Managerial Capability

The potential tenderer must provide evidence of sufficient manpower to manage design, financing, construction, operation and maintenance of two jetties.

11.5.4 Financial Capability

Financial capability of an investor will be judged through examining the balance sheets of the investor so that sufficient fund is available to meet the requirements of, as a minimum,

- (i) at least 30% of the total project cost¹⁴ as equity,
- (ii) 10% of the total project cost, and
- (iii) the ability of providing MPA a COD Performance Guarantee on the day of signing the PPP Agreement.

11.5.5 Ability to Raise Debt and Equity

The tenderer must provide evidence of raising as debt and equity, in *one or more* similar BOO port projects, a value greater than or equal to the Project Cost (\$55 million) in developing countries (Asia, Africa and Latin America), in the last fifteen years.

11.5.6 Project Development Experience

The tenderer must provide evidence of developing at least one similar BOO port project, in the last **fifteen (15) years**, as a majority shareholder, in developing countries (Asia, Africa and Latin America). The development experience¹⁵ shall demonstrate the ability of the investor to organize financing for a port development project, carry out design, obtain all approvals and manage the construction up to commercial operations.

11.5.7 Project Operating Experience

The tenderer must have at **least 10 years** of reliable operating experience of at least one terminal of similar or greater capacity in a sea port.

11.5.8 Current Ownership in Investment

The tenderer must currently own and have had contribution of equity over **30% of Project Cost** in one or more port project companies in the last consecutive **5 years** as evidenced by the audited balance sheet.

¹⁴ As determined in the feasibility study

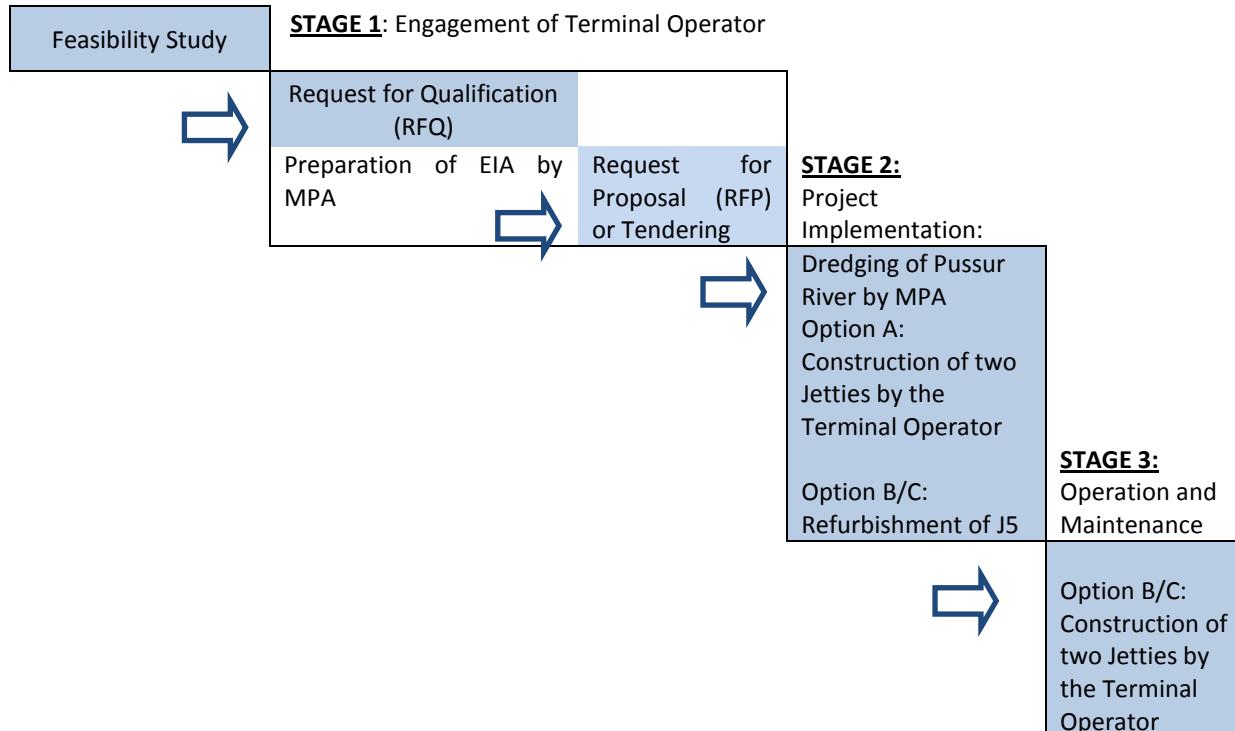
¹⁵ The project development experience shall not include acquisition

12 PROJECT IMPLEMENTATION

Project implementation includes all activities that need to be undertaken. Following sections describe the activities for successful implementation of this project.

The key stages of this project are given in the following Figure. Immediately after this study, the stages will start.

Figure 12-1: Sequence of Proposed Activities



12.1 Stage 1: Engagement of Terminal Operator

At Stage 1, MPA with the help of transaction advisor, will carry out the following activities to engage the Terminal Operator.

- Preparation and submission of Information Memorandum (IM) for the Project
- Publishing notification in newspapers for qualification document and arranging a conference for the interested investors
- Assessing qualification statements and notifying the qualified prospective investors
- Preparing tender document
- Publishing of tender notification in press and providing tender document to the prospective investors
- Arranging pre tender conference and providing clarification to the queries of the prospective investors
- Modifying tender documents (on agreed issues of the queries of investors)
- Forming a tender evaluation committee and evaluation of the tenders
- Issuing a Letter of Intent (LOI) to the successful investor, negotiating with the successful investor and receiving performance guarantee from Terminal Operator
- Signing PPP agreement (Contract) with Terminal Operator

12.2 Stage 2: Project Implementation

This phase will begin after the financial closure by the investor and issuing request for the commencement of construction by MPA. In this phase the project finance will be drawn down and the supply, EPC contractor and subcontractors, engaged by the SPC, will start construction, testing and commissioning of the different components of the project according to construction schedule.

The major responsibility, related to the implementation tasks in this phase, will be borne to the SPC. With the support of consultant, MPA will have to work intensively on Contract Management. However, a management team from MPA will need to be in place from the outset to ensure timely and satisfactory construction completion and successful operation of the project.

Project management team of MPA will oversee the tasks related to project construction and its commissioning. In this stage, the core responsibility of MPA will be:

- To take steps in resolving differences in the interpretation of tender conditions
- To monitor the progress of project delivery and quality of work
- To oversee the conduct of required tests, evaluate the test results and take decisions as required
- To consider variations in the contract and take necessary steps
- To inspect equipment to be installed
- To provide certification and approvals as may be needed under the contract.

The construction phase will end with successful commissioning of the project. The start of construction will depend upon the PPP option chosen. The milestone of this stage will be the commercial operation date (COD), and the project will start delivering the contracted services. In the case of any permitted delay, this phase will be extended for a reasonable period.

12.3 Stage 3: Operation and Maintenance

Operation and Maintenance (O&M) phase will be effected from COD. In this phase the SPC will operate the business as per the contract. Overall business operation, strategic planning in complying with the contract and necessary maintenance of the machineries will be the core responsibilities of the SPC. On a periodic basis the SPC will submit report on O&M activity to the MPA. For any material change from the contract, the SPC will need the consent from the MPA.

The major tasks, at this stage from government/MPA's side, will include the following:

- Contract Management
- SPC's O&M activity review
- Dispute Resolution as per the contract (if required)

This stage will continue up to the end of Concession Period. Intensive contract management by the government/MPA will be required at this stage. At the end of this stage, the Terminal Operator will be disengaged. The method of disengagement will depend upon the model of private sector participation.

12.4 Environmental Clearances

As per the Environment Conservation Rules, 1997 of Bangladesh, this project will fall under Red category for taking the environmental clearance from Department of Environment (DoE). If the project needs to be financed from the private sector window or any private sector financing facility of multilateral donors like the IPFF, carrying out necessary EIA and SIA as per the standard Environmental and Social Management Framework (ESMF) needs to be carried out. The following steps need to be adopted with respect to environmental clearances with respect to the new facility.

12.4.1 Obtaining Site Clearance Certificate

The new facility needs to obtain Site Clearance Certificate (SCC) first. For obtaining SCC the documents in the footnote¹⁶ needs to be submitted to the DoE. Upon receiving Site Clearance Certificate the Terminal Operator may undertake activities for land development and infrastructure development.

12.4.2 Obtaining Approval for Environmental Impact Assessment

The new facility need to have EIA report to be approved by the Department prepared on the basis of program outlined in IEE Report along with time schedule and ETP design.

As a linked project, the EIA has to be initiated by MPA, possibly supported by the IPFF project, just after the Feasibility Study is completed. Either before or soon after the award, the EIA needs to be completed. With the EIA prepared by MPA, the Terminal Operator may apply for clearance of the EIA to the DoE. Upon receiving EIA clearance from the DoE, the Terminal Operator may start seeking funds from outside sources and/or open letter of credit (L/C) for machinery and equipment.

12.4.3 Obtaining Environmental Clearance Certificate

After obtaining approval for EIA, the Terminal Operator will apply for Environmental Clearance Certificate (ECC). For obtaining SCC the documents in the footnote¹⁷ needs to be

¹⁶ For obtaining SCC the following documents need to be submitted by MPA to DOE:

- (a) Application Form
- (b) Feasibility Report
- (c) Initial Environmental Examination (IEE) report including the terms of reference for the Environmental Impact Assessment of the unit or the project and its process flow diagram
- (d) No objection certificate of the local authority.
- (e) Emergency plan relating adverse environmental impact and plan for mitigation of the effect of pollution.
- (f) Outline of relocation, rehabilitation plan (where applicable).
- (g) Other necessary information (where applicable).

¹⁷ For obtaining ECC the following documents need to be submitted by MPA to DOE:

- (a) Application Form
- (b) Feasibility Study
- (c) Description of raw materials
- (d) NoC of local authority
- (e) Income tax certificate
- (f) Location Map
- (g) Layout plan
- (h) Process flow diagram
- (i) Mouza Map
- (j) Ownership dalil or lease-holding contract
- (k) Registration of Board of Investment
- (l) Certificate from Bol/Bank/financial institution indicating date of establishment of the facility
- (m) License from Fire Service
- (n) IEE report
- (o) EMP report

submitted to the DoE. Without ECC, the new facility will not receive utility connection, and cannot start production.

12.4.4 Responsibility with respect to Environmental Clearances

The following table shows the responsibility of two parties (MPA and Terminal Operator) regarding the Environmental Clearances:

Tasks	Concerned Entity
1. Preparing IEE	Consultant (as part of the Feasibility Study – Annexure IX)
2. No Objection for Local Authority	MPA
3. Submitting application for SCC	MPA
4. Preparing EIA: - Before engagement of investor - After engagement of investor	MPA/IPFF Terminal Operator
5. Submitting application for EIA Approval and receiving EIA Approval	Terminal Operator
6. Preparing all supporting documents for submitting application for ECC (except items d, e, i, j of footnote 17)	Terminal Operator
7. Submitting application for ECC and receiving the ECC from DoE	Terminal Operator

13

CONCLUSIONS AND RECOMMENDATIONS

The results of the feasibility study indicate that construction of two jetties at Mongla Port through PPP will be financially viable when some major steps are taken to structure the project. The proposed steps are discussed below:

13.1 Linked Projects

It is imperative that all the linked projects identified in the study are implemented by the Government. Dredging of Pussur River to allow regular ship traffic to the port is a fundamental requirement for the success of the project. However, just dredging the Pussur River is not enough, as the Port needs to attract traffic from the Dhaka region to Mongla. Diversion of traffic from Dhaka will require two other linked projects to be implemented: (a) clearance of MG Canal for inland waterways cargo transport, and (b) dedicated ferry service at Mawa for attracting more cargo traffic through roadways. Both these projects need to be implemented.

13.2 PPP Option

The project is not financially viable if Option A is used even if all linked projects have been implemented. Construction of two jetties upfront when the port has a shortage of traffic will also be counterproductive to the needs of the country. Option B or Option C should be chosen as the PPP model for implementing the project. Under these models, construction of J3 and J4 will be deferred until traffic at port increases to a certain level. During this period, Terminal Operator will refurbish and operate J5. Terminal Operator will also pay **US\$ 200,000 per year** (escalated at 2% per annum) to MPA as Jetty 5 fixed royalty payment in addition to **US\$ 100,000 per year** as land lease rental. When traffic at port rises such that Mongla Port's remaining jetties are getting close to full capacity, Terminal Operator will begin construction of J3 and J4. After construction, J3 and J4 will be operated by the Terminal Operator and J5 will be returned to MPA.

Financial analysis also shows that the project will be more viable if BGMEA/BKMEA are minority shareholders in the project company. Inclusion of the two associations in the project company will ensure Dhaka traffic to the port as well as making the project more attractive to Terminal Operators.

13.3 Tariff Rate

Terminal Operator should be given the freedom to raise his tariff upto a defined ceiling. Sensitivity analysis indicates that tariff rate is the biggest factor impacting the equity IRR of the project. Allowing the Terminal Operator to increase the tariff will make the project more attractive to Terminal Operators.

Based on the analysis, the Consultants opine that Traffic Scenario IV (all linked projects implemented), Option C as PPP option and freedom to raise tariff) is implemented for this project.

13.4 Next Steps

For successful project implementation, it is important to have a Project Management Unit in place in MPA. The unit needs to be assigned with the responsibility of project implementation including all the critical issues regarding this project. The management structure should involve a project team headed by a Project Director/Manager. The

composition of the team may be changed time to time to meet the specific expertise needed during any phase of the project.

The appropriate model of inviting Terminal Operators and the Terminal Operator's scope of work that is suitable for the investors needs to be decided by MPA. The Terminal Operator's scope work may need revision based on the feed-back from the investors during RFQ process. A list of potential investors needs to be prepared, and the concept needs to be conveyed and consulted through a consultation paper in the Investor Promotion Meeting. Based on the written feed-back, major terms and conditions will need be designed and approved by the appropriate authority.

Based on the major terms and conditions, tender documents will be prepared and investors will be invited through international tender notice.

After submission of this feasibility report, following steps need to be taken:

- | | |
|---|--------------------------------|
| 1) <i>Approval of Major Terms and Conditions</i> | <i>-MoS/MPA</i> |
| 2) <i>Approval of fiscal incentives</i> | <i>-NBR/PPPO</i> |
| 3) <i>Government decision on PPP Option and Model</i> | <i>-MoS/MPA/PPPO</i> |
| 4) <i>Preparation of RFQ document</i> | <i>- Consultant</i> |
| 5) <i>Identification of potential investors</i> | <i>- PPPO/ Consultant /MPA</i> |
| 6) <i>Implementation modality for linked projects L2 and L3</i> | <i>-MoS/BIWTA/PPPO</i> |
| 7) <i>Proceeding with the preparation of the EIA</i> | <i>- MPA/IPFF</i> |