Chapter 8 Construction Program and Project Implementation

8.1 Implementation Plan of the Master Plan

The Master Plan is presented in PART II Chapter 6 "Master Plan of Port of Constantza". The Master Plan contains the future cargo traffic forecasts and the General Layout of the port for 2020, the target year of the Master Plan. The proposed plan was prepared based on existing facilities, present port operations, inland access and cargo handling methods.

The proposed Construction Schedule of the Master Plan is given in **Table 8.1.**

8.2 Implementation Plan of Short Term Development Plan

8.2.1 Short Term Development Plan

The preparation of the implementation schedule for the Short Term Development Plan is prepared based on the proposed Layout which was presented by the Study Team as the optimum Plan after holding kind and constructive discussions among MOT, CPA, Operators and the Study Team.
The main three project components and terminals proposed in the Short Term Development Plan are listed below:

(1) Grain Terminal
(2) Barge Terminal
(3) Inland Transport Facilities: Gate 5 Access

The first two items are classified as First Priority Projects, their necessity they should actually be verified by feasibility study.

8.2.2 Integrated Program of Short Term Development Plan

The implementation schedule of Short Term Development Plan was studied taking into consideration various activities including financial program arrangement, detailed design period, time span to prepare the pre-qualification and bidding schedule of the construction works.

Table 8.2 shows the integrated Construction Schedule of the Short Term Development Plan.

The main project components and facility parts of the Short Term Development Plan are listed in the table in **Section 8.3.**

Table 8.1 Construction Schedule of Project Components in Master Plan

		Project Components	2000	2001	2002 (Present)	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Notes
A	**High Revenue Project Components**																			
	A1	Container Terminal: Phase I					Financed by JBIC													South Port S2
	1)	Detailed Design																		West Terminal
	2)	Tender and Contract																		
	3)	Construction and Procurement																		
	A1	Container Terminal: Phase II																		South Port S2
	1)	Detailed Design																		West Terminal
	2)	Tender and Contract																		& East Terminal
	3)	Construction and Procurement																		
	A1	Container Terminal: Phase III																		South Port S2
	1)	Detailed Design																		East Terminal
	2)	Tender and Contract																		
	3)	Construction and Procurement																		
	A2	Grain Terminal: Phase I																		South Port S3
	1)	Detailed Design																		
	2)	Tender and Contract																		
	3)	Construction and Procurement																		
	A2	Grain Terminal: Phase II																		South Port S3
	1)	Detailed Design																		
	2)	Tender and Contract																		
	3)	Construction and Procurement																		
B	**Low Revenue Project Components**																			
	B1	Steel Product Terminal				Cargo Demand should be carefully monitored by 2010.														Privatization
	1)	Detailed Design																		
	2)	Tender and Contract																		
	3)	Construction and Procurement																		
	B2	Timber Terminal				Cargo Demand should be carefully monitored by 2010.														Timber export
	1)	Detailed Design																		
	2)	Tender and Contract																		
	3)	Construction and Procurement																		
	B3	Barge Terminal																		South Port
	1)	Detailed Design																		
	2)	Tender and Contract																		
	3)	Construction and Procurement																		
	B4	Inland Transport Facilities: Phase I																		Port access
		: Road Access																		Gate 5 Access
	1)	Detailed Design																		
	2)	Tender and Contract																		
	3)	Construction and Procurement																		
	B4	Inland Transport Facilities: Phase II																		Port Access
		: Road Access																		
	1)	Detailed Design																		
	2)	Tender and Contract																		
	3)	Construction and Procurement																		

Table 8.2 Construction Schedule of Project Components Proposed in Short Term Development Plan

		Project Components	2000	2001	Present 2002	2003	2004	2005	2006	2007	Calendar Year 2008	2009	2010	2011	2012	2013	2014	2015	2016	Notes
F	**First Priority Project Components**																			
	A2	Grain Terminal: Phase I																		S3
	1)	Financial Arrangement																		
	2)	Detailed Design																		
	3)	Tender and Contract																		
	4)	Construction Works																		
	5)	Equipment Procurement																		
	6)	Operation of Terminal																		
	B3	Barge Terminal																		South Port
	1)	Financial Arrangement																		
	2)	Detailed Design																		
	3)	Tender and Contract																		
	4)	Construction Works																		
	6)	Operation of Terminal																		
S	**Second Priority Project Components**																			
	B4	Inland Transport Facilities: Phase I																		Port access
		: Road Access																		Gate No.5
	1)	Financial Arrangement																		
	2)	Detailed Design																		
	3)	Tender and Contract																		
	4)	Construction Works																		
	6)	Operation of Access																		

8.3 Implementation Schedule of Selected Priority Projects

Out of three candidate Projects, the Grain Terminal and Barge Terminal were selected as the most urgently required projects, and hence they should be studied in detail.
This section deals with the implementation schedule of first priority project development.
The various activities in project formation can be summarized into actions in eight stages: namely,

1) Preparation Stage
2) Planning Stage
3) Financial Arrangement Stage
4) Detailed Design Stage
5) Tender and Contract Stage
6) Construction Stage
7) Maintenance Period Stage
8) Post Project Evaluation and Feedback Stage

Refer to **Table 8.3** for the major contents and activities of these stages.

8.4 Construction Schedule

The schedule covers three project components including the Grain Terminal and Barge Terminal as the First priority Projects and the Steel Product Terminal, Timber Terminal, and Inland Transport Facilities as the second priority projects..

The basic work volumes are estimated based on the major results of the preliminary design and from past similar projects. The general specifications of each of the major works were included in the proposal and all details taken into account.

The works are subdivided into two categories: namely, site preparation works and construction works. The second is further subdivided into major work components as follows:

Table 8.4 Construction Schedule, Grain Terminal: Total Construction
Table 8.5 Equipment Procurement Schedule, Grain Terminal
Table 8.6 Construction Schedule, Barge Terminal

Table 8.3 Implementation Program of Grain Terminal and Barge Terminal

No.		Works in Stage	Avarege Length Month	Notes
1	**Prepapretion Stage**			
	1.1	Prefeasibility Study		
	1.2	Preliminary Study of Financial Sources		
	1.3	Discussion among the Government Agencies		
2	**Planning Stage**			
	2.1	Preparation of Master Plan		
	2.2	Undertaking Feasibiity Study		
	2.3	Evaluation of the Proposed Project by Priority		
	2.4	Decision Making to Implement the Proposed		
3	**Financial Arrangement Stage**			
	3.1	**Finding Budgetary Resources**		
	3.2	**Finding External Resources**		
	3.3	**Application**		
	3.4	**Acceptance of Financial Support**		
	3.5	**Concluding Loan Agreement or Similar**		
4	**Detailed Design Stage**			
	4.1	Preparation of TOR for the Engineering Services	2	
	4.2	Tender for the Consultants	6	
	4.3	Undertaking Detailed Design	12	6 to 12 months
	4.4	Undertaking the Pre-qualification of Contractors	(4)	During design
	4.5	Preparation of Tender Document for Construction	(4)	During design
5	**Tender and Contract Stage**			
	5.1	Tender for Construction	8	
	5.2	Construction Contract	2	
	5.3	Issue a Notice of Proceed	2	
6	**Construction Stage**			
	6.1	Construction Works based on Contract	24	Based on the Project
	6.2	Equipment Procurement based on Contract	24	Based on the Project
	6.3	Environmental Monitoring	24	Based on the Project
	6.4	Payment	24	Based on the Project
	6.5	Final Test and Final Acceptance	2	
	6.6	Issuance of Work Acceptance Certificate	2	
	6.7	Final Payment	2	
7	**Maintenance Period**			
	7.1	Checking the Outstanding Works at the Final Test	2	
	7.2	Contractors Works and Checks	12	Normally 12 months
	7.3	Issuance of Maitenance Certificate	2	
8	**Post Evaluation and Feed-back**			
	8.1	Technical Evaluation	later	
	8.2	Financial Evaluation	later	
	8.3	Ecomomic Evaluation	later	
	8.4	Environmental Evaluation	later	
	8.5	Operation and Managemant Evaluation	later	
9	**Concession Stage for Operation**			
	9.1	Tender for the concession contract		
	9.2	Negociation and Discussion		
	9.3	Cocession Contract		
	9.4	Installation Works (Civil Works)		
	9.5	Procurement and Installation (Equipment)		
	9.6	Preparetion works for Starting		
	9.7	Start of Operation		

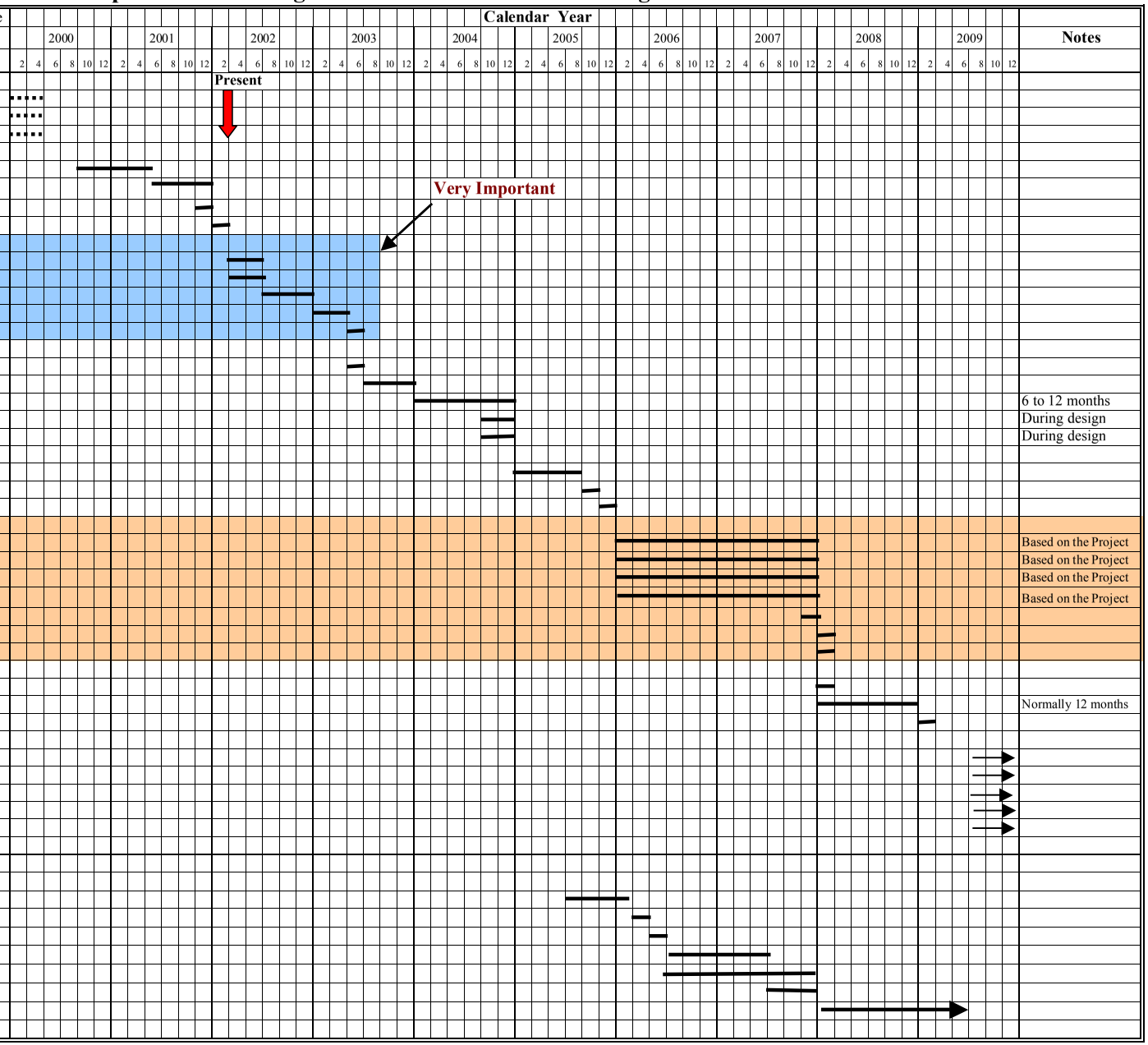

Table 8.4 Construction Schedule (Grain Terminal, Total Construction: 2006/2007)2

No	Works	Specifications	Unit	Quantity	Perform per Month	Required Month	Project Month	Notes
1	Mobilization and Demobilization		LS	1		3		
2	Temporary Works		LS	1		2		
3	Site Preparation							
	3.1 Demolishing and Removal	Obstacles	LS	1				
	3.2 Removal and Reuse	North Grion. 7 caissons	unit	7		3		
	3.3 Removal and Reuse	South Grion. 4 caissons	unit	4		3		
4	Dredging and Reclamation							
	4.1 Borrowing and Reclamation	Borrowing from the canal banks	m3					
	1) Mid-Pier . 875m*40m*19m		m3	332500	150000	2.3		Critical Works
	2) New Seawall. 675m*50m*19m		m3	320625	150000	2.1		Critical Works
	3) Terminal Site 1. 190m*325m*19m		m3	1173250	150000	7.8		Critical Works
	4) Terminal Site 2. 675m*190m*0.5*19m	25%	m3	304594	150000	2		Critical Works
	4.2 Dredging and Reclamation		m3	0				
5	Soil Improvement							
	5.1 Replacement of Soft Layers		m3	0				
	5.2 Preloading and Consolidation		m3	106548	15000	6		
6	Main Quaywall							
	6.1 New Caisson	18 Caissons - 6 Caissons	unit	12		3 + 2		
	6.2 Recycling Caissons	6 Caissons	unit	6		3		
	6.3 Caisson Foundation by Rocks	20m*3m*540m	m3	32400	4000	8		
	6.4 Selected Backfill, gravel	(8*19m and 19*19m*0.5)*540m	m3	179550	20000	9		Critical Works
	6.5 Concrete capping and apron	16m	m2	8800	1600	5.5		
	6.6 Asphalt Pavement	9m	m2	4950	1500	3.3		
	6.7 Railways	3 Tracks for 300m	m	900	300	3		
	6.8 Fittings	Fender and Moorings	m	550		3		
	6.9 Utilities		m	550		3		
7	Supplemental Quaywall							
	7.1 New Caisson	5 Caissons - 5 Caissons	unit	0				
	7.2 Recycling Caissons	5 Caissons	unit	5	2.5	2		
	7.3 Caisson Rock Foundation	20m*3m*200m	m3	12000	4000	3		
	7.4 Selected Backfill, gravel	(8*19m and 19*19m*0.5)*200m	m3	66500	10000	6.7		
	7.5 Concrete capping and apron	16m	m2	3200	1600	2		
	7.6 Asphalt Pavement	9m	m2	1800	1000	2		
	7.7 Railways		m	0				
	7.8 Fittings	Fender and Moorings	m	170		2		
	7.9 Utilities		m	170		2		
8	West Seawall							
	8.1 Improvement of Existing Seawall	325m	m	325	200	2.1		
	8.2 New Seawall	675m	m	675	100	6.8		
9	Railway located on-land							
	9.1 Center Tracks	3 Tracks for 300m	m	900	300	3		
	9.2 Sidings	4 Tracks for 325m	m	1300	300	4.3		
	9.3 Connection to outside	Single track for 675m	m	675	300	2.3		
10	Terminal Site							
	10.1 Grading	325m*195m	m2	63375	5000	12.6		
	10.2 Pavement in Asphalt	40%	m2	25110	2500	10		
	10.3 Gravel Pavement	60%	m2	37665	10000	3.7		
	10.4 Silo, Superstructure : Steel made	See equipment cost						
	10.5 Silo, Concrete pile foundation	40cm*35m, 100000*1.1*0.5/100	ea.	550	50	11		
	10.6 Supporting Steel Frames	300m2 * 0.15t/m2	ea.	20		3		
	10.7 Machinery Tower, Steel F. Structure	100m * 15m * 6Str.	m2	9000		3		
	10.8 Substructure of Receiving/ L. Station	3*27m*3.5m	m2	284		2		
	10.9 Terminal Office(Control/ Laboratory)	200m2 * 4	m2	800	150	5.3		
	#### Maintenance shop	200m2	m2	200	50	4		
	10.1 Substructure of Weigh-bridge	See equipment cost	m2	300	150	2		
	#### Substructure of Clearing Equipment		m2	20		2		
	10.1 Transformer Station House		m2	200		3		
	#### Transformer and Generator		LS	1		6		
	10.2 Lighting and Utilities		LS	1		4		
11	Fence and Gates							
12	**Cargo Handling Equipment**	See Table 8.5.5 for details						
	12.1 Silo		LS	1		15		
	12.2 Equipment	Fabrication and transport	LS	1		12 + 2		
	12.3 Equipment	Installation and Commissioning	LS	1		4 + 2		Critical Works

Table 8.5 Equipment Procurement Schedule - (Grain Terminal, Cargo Handling Equipment, Between 2006 and 2007)

System		Equipment		Outline Specifications	Number	Unit	Perform per Month	Required Month	Project Month 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	Notes
1	Unloading / Receiving System	1	Barge/Vessel Unloader (For vessels up to 55,000 DWT)	Pneumatic type, with metal detector/ magne separator 400 t/h capacity (2 x 200 t/h nozzles), with 10 t winch at boom top	2	units		4 + 2		
		2	Railway Wagon Receiving System (Length x Breadth = 27.0 x 3.5 m)	400 t/h capacity with chain conveyors 1 line x 30m with metal detector/ iron separator	2	units		4 + 2		
		3	Road Truck Receiving System (Length x Breadth = 18.0 x 3.0 m)	200 t/h capacity with chain conveyors x 70m with metal detector/ iron separator	1	units		4 + 2		
2	Receiving Conveyor Line System	1	Conveyor System From Barge/Vessel Unloaders to the Grain Storage System	Chain conveyors, 1 line x (250m+25m+135m+125m), 800 t/h	560	m		5		
				Bucket elevator, 800 t/h	1	units		5		
				Screening Device, 800 t/h	1	units		5		
		2	Conveyor System From Railway Wagon Receiving Sy to Grain Storage System	Chain conveyors, 1 linex(35m+15m), 800 t/h	50	m		5		
				Bucket elevator, 800 t/h	1	units		5		
				Screening Device, 800 t/h	1	units		5		
		3	Conveyor System From Road Truck Receiving Systen to Grain Storage System	Chain conveyors, 1 linex(25m+70m), 200 t/h	95	m		5		
				Bucket elevator, 200 t/h	1	units		5		
				Screening Device, 200 t/h	1	units		5		
3	Grain Storage System	1	Bucket Elevators	800 t/h, chain bucket	6	units		5		
				200 t/h, chain bucket	2	units		5		
		2	Distributing Conveyors over Silos	800 t/h, chain conveyor, 6 line x 90m	540	m		5		
				800 t/h, chain conveyor, 2 line x 45m	90	m		5		
		3	Retrieving Conveyors under Silos	800 t/h, chain conveyor, 6 line x 90m	540	m		5		
				800 t/h, chain conveyor, 2 line x 45m	90	m		5		
		4	Weighing System	Bulk weighers/electronical, 800 t/h	4	units		5		
				Bulk weighers/electronical, 200 t/h	2	units		5		
		5	Fumigation System	Spraying of insecticide liquid and/or tablets fo grains 800 t/h	1	units		5		
		6	Drying System	Tower dryer, 100 t/h for reducing 5% of moisture	1	units		5		
				200 t/h, bucket elevator	1	units		5		
				100 t/h, bucket elevator	2	units		5		
				100 t/h, conveyor, 1 line x 70m	70	m		5		
		7	Sampling System	Automatic rotary cross cut type samplers (80(t/h)	3	units		5		
				Core type truck probe (200 t/h)	1	units		5		
		8	Dust Collecting System	Dust emission prevention	1	units		5		
		9	Explosion Preventing System	Dust suppression	1	units		5		
		10	Temperature Sensing System	Sensing temperature of grains in silos	1	units		5		
4	Silos	1	Main Silos	Steel silo bins (excl. concrete cone bottom), 5,000 t capacity, Dia.18.3 m; H = 36.0 m	20	units		8		
		2	Buffer Silos	Steel silo bins (cone btm), 5000 t cap. eacl Diameter = 9.00 m; total height = 16 m	3	units		4		
5	Delivery Conveyor Line System	1	Conveyor System From Silo System to Ship Loade	Chain conveyors, 2 lines x (110m+45m+30m+550m), 800 t/h	1,470	m		5		
				Bucket elevator, 800 t/h	2	units		5		
		2	Conveyor System From Silo Systen to Wagon Loading Chute	Chain conveyors, 1 line x 30m, 200 t/h	30	m		5		
				Bucket elevator, 200 t/h	1	units		5		
		3	Conveyor System From Silo Systen to Truck Loading Chute	Chain conveyors, 1 line x 15m, 100 t/h	15	m		5		
				Bucket elevator, 100 t/h	1	units		5		
6	Loading / Delivery System	1	Ship Loader	Bucket elevator, with swing type dustless telescopic chute 800 t/h, vessels up to 65,000 DWT	2	units		4 + 2		
		2	Railway Wagon Loading System	Dustless telescopic chute, 200 t/h capacity	2	units		4 + 2		
		3	Road Truck Loading System	Dustless telescopic chute, 100 t/h capacity	1	units		4 + 2		
7	Common System	1	Truck Scale System	Weigh bridge, electronic, 100 t	2	units		4		
		1	Control System	Equipment/system control, automatic/sequential operation	1	units		4		
				Inventory management						
		2	Communication System	Internal communication system	1	units		4		
				External communication system						
		3	Fire Fighting System	Hydrants	1	units		4		
8	Assisting Equipment	1	Front bucket wheel loader	"Bobcat" For barge/vessel hold bottom cleaning	3	units		4		
		2	Forklift	5 t lifting capacity For maintenance work, etc., general use	1	units		4		
9	Others	1	Auxiliary Equipment	-	1	units		4		
10	Spare Parts	1	Spare Parts, etc.		1	units		4		

Legend
- Installation of steel silo bins
- Installation of equipment except steel silo bins
- Testing and commissioning

Table 8.6 Construction Schedule (Barge Terminal: 2006/2007)

No.		Works	Specifications	Unit	Quantity	Perform per Month	Required Month	Project Month	Notes
1	Mobilization and Demobilization			LS	1		3		
2	Temporary Works			LS	1		2		
3	Site Preparation								
	3.1	Demolishing and Removal	Sunk vessels	LS	1		6		
	3.2	Removal and Reuse		LS	0				
4	Dredging and Reclamation								
	4.1	Borrowing and Reclamation	Borrowing from the canal ban	m3	0				
	4.2	Dredging and Reclamation		mj3	0				
5	Soil Improvement								
	5.1	Replacement of Soft Layers		m3	0				
	5.2	Preloading and Consolidation		m3	0				
6	Supplemental Tugboat Basin								
	6.1	Dredging and Disposal	150*300*2m	m3	90000	30000	3		
	6.2	Quaywall	Gravity wall type: -4.5m	m	450	70	7		
	6.3	Apron Pavement	20m wide, Concrete: 25cm	m2	9000	2000	4.5		
	6.4	Utilities	Lighting, Water supply	m	450		2		
	6.5	Drainage		m	450		2		
	6.6	Fittings	Fenders and Mooring Fittings	m	450		2		
7	West Barge Operation Main Quay								
	7.1	Dredging and Disposal	700*10	m3	7000		1		
	7.2	Quaywall	Gravity wall type: -4.5m	m	700	200	3.5		
	7.3	Apron Pavement	20m wide, Concrete: 25cm	m2	14000	3500	4		
	7.4	Utilities	Lighting, Water supply	m	700		2		
	7.5	Drainage		m	700		2		
	7.6	Fittings	Fenders and Mooring Fittings	m	700		2		
8	Improvement of West Access Road								
	8.1	Pavement, Overlay	Asphalt, 3,000m*12m	m2	36000	9000	4		
	8.2	Lighting		m	3000	1000	3		
9	North Barge Stand-by Dolphins								
	9.1	Dredging and Disposal	1020*10	m3	10200	2000	5.1		
	9.2	Improvement of Existing Dolphins	Gravity wall type: -4.5m	Unit	18	6	3		
	9.3	Apron Pavement	20m wide, Concrete: 25cm	m2	24400	8000	4		
	9.4	Utilities	Lighting, Water supply	Unit	0				
	9.5	Drainage		Unit	0				
	9.6	Improvement of Existing Fittings	Fenders and Mooring Fittings	Unit	18		2		
10	North Barge Preparation Quays								
	10.1	Dredging and Disposal	600*10	m3	6000	2000	3		
	10.2	Quay	Gravity wall type: -4.5m	m	600	150	4		
	10.3	Apron Pavement	20m wide, Concrete: 25cm	m2	12000	4000	3		
	10.4	Utilities	Lighting, Water supply	m	0				
	10.5	Improvement of Existing Fittings	Fenders and Mooring Fittings	m	0				
	10.6	Improvement of Existing Mole	Grading and Pavement	m2	6000	2000	3		
11	South Barge Stand-by Dolphins								
	11.1	Dredging and Disposal	700*10	m3	7000	2000	3.5		
	11.2	Dolphins	Gravity wall type: -4.5m	Unit	11	3	3.7		
	11.3	Apron Pavement	20m wide, Concrete: 25cm	m2	7000	2000	3.5		
	11.4	Utilities	Lighting, Water supply	Unit	0				
	11.5	Improvement of Existing Fittings	Fenders and Mooring Fittings	Unit	11		2		
12	South Barge Preparation Quays								
	12.1	Dredging and Disposal	500*10	m3	5000	2000	3.5		
	12.2	Quay	Gravity wall type: -4.5m	m	500	150	4.8		
	12.3	Apron Pavement	20m wide, Concrete: 25cm	m2	10000	4000	2.5		
	12.4	Utilities	Lighting, Water supply	m	0				
	12.6	Improvement of Existing Facilities	Fenders/Fittings/ Grading	m	0				

Chapter 9 Preliminary Cost Estimation

9.1 General Description

9.1.1 Scope of Cost Estimation

This chapter deals with the cost estimation of required facilities for the Short Term Development Plan for 2010, based on the Master Plan of Constantza Port for 2020 provided in the PART II "MASTER PLAN 2020 ".

The construction costs (or initial investment cost) cover civil and building works, utilities, cargo handling equipment, and facilities necessary for environmental protection.

The major terminals and facilities that have been included in this cost estimation are the following:

Group "First Priority"

F1) Grain Terminal

F2) Barge Terminal

Group "Secondary Priority"

S1) Inland Transport Facilities, Gate 5 Access

9.1.2 Costing Criteria

The basic conditions and assumptions that have been applied for the cost estimates are the following:

(a) The cost estimations are based on market prices prevailing in September 1999, for construction materials, labor rates and construction equipment rates in Constantza and other regions inside the country.

(b) The following average exchange rate is used for this cost estimation:
December 2000: US$ 1.00 = 110 Yen = 26,000 lei

(c) The physical contingency is 10%.

(d) The cost is divided into Foreign Cost and Local Cost for obtaining the local and foreign currency ratio.

(e) Currency unit for the estimation is US dollars.

9.1.3 Application of Taxes and Duties for Financial Costs

The following taxes and duties are considered for financial costs.

(a) Value added tax (VAT) of 19%.

(b) A duty of 20% over CIF cost is imposed on imported materials for permanent works (Ordinance No. 673/1991). In the estimate of civil works, 20% of foreign cost is assumed on imported materials. For the estimate of equipment works, 80% of foreign cost is assumed on imported materials.

9.2 Capital Cost Estimation Summary

Capital costs include the required cost of civil works, equipment procurement, engineering service fees and contingency; however, tax is excluded for the economic analysis.

The summary of the total capital cost by groups calculated for the Short Term Development Project Components is shown in the Table 9.1.

Table 9.1 Total Capital Costs of the Short Term Development Projects

First Priority Projects Group	**US$ 107.7 Million**	**90.1%**
Second Priority Projects Group	**US$ 11.8 Million**	**9.9%**
Total	**US$ 119.5 Million**	**100.0%**

Note. Figures are rounded thus total amount is not always equal to the mathematical total.

According to the summary of capital costs, the total capital cost needed for the Short Term Development Project Components is US$ 119.5 million, of which 90.1% is the First Priority Project cost.
The summary of the capital cost for the First Priority Projects is shown in Table 9.2.

Table 9.2 Total Capital Costs of the First Priority Projects

Grain Terminal	**US$ 81.0 Million**	**75.2%**
Barge Terminal	**US$ 26.7 Million**	**24.8%**
Total	**US$107.7 Million**	**100.0%**

As shown above, the required total cost for the First Priority Projects is US$ 107.7 million of which US$ 81.0 millions for constructing the Grain Terminal and US $26.7 million for the Barge Terminal

The first cost item covers the grain terminal and related facilities which are directly related to future grain cargo demand. However, the facilities for the Barge Terminal are required for not only for the cargo demand buy also improvement and integration of a better and more efficient port operation for river transport barges.

The summary of the capital cost for the Second Priority Projects is shown in the Table 9.3.

Table 9.3 Total Capital Costs of the Second Priority Projects

Inland Transport Facilities	**US$ 11.8Million**	**100.0%**
Total	**US$ 11.8 Million**	**100.0%**

The Second Priority Project Group covers the Inland Transport facilities, the required cost of it is US$ 11.8 million.

Tables 9.4 and 9.5 present the capital cost composition in terms of cost item and currency requirement of the local and foreign components.

In the Table 9.4, the cost components and local/foreign currency balance of the First Priority Projects are provided.

Table 9.4 Cost Components of the First Priority Projects

1.	**Civil Construction Works**	**US$ 53.9 million**	**50.0%**
2.	**Cargo Handling Equipment**	**US$ 38.9 million**	**36.1%**
3.	**Physical Contingency**	**US$ 7.3 million**	**6.8%**
4.	**Engineering Services**	**US$ 7.5 million**	**7.0%**
	Total	**US$ 107.7 million**	**100.0%**
1.	**Local Currency Component**	**US$ 46.2 million**	**42.9%**
2.	**Foreign Currency Component**	**US$ 61.5 million**	**57.1%**
	Total	**US$ 107.7 million**	**100.0%**

Note. Figures are rounded thus total amount is not always equal to the mathematical total.

In the above table, Civil Works require 50.0% of the investment and Cargo Handling Equipment 36.1%. Physical contingency and the required costs for engineering service fees totals US$ 14.8 million, or 13.8% of the investment.

The ratio of the foreign currency required is 57.1%, indicating a high use of foreign currency because of the high investment in foreign cargo handling equipment.

The Table 9.5 presents the cost components and local/foreign currency balance of the Second Priority Project.

Table 9.5 Cost Components of the Second Priority Projects

1.	**Civil Construction Works**	**US$**	**10.0 million**	**84.7%**
2.	**Cargo Handling Equipment**	**US$**	**0.0 million**	**0.0%**
3.	**Physical Contingency**	**US$**	**1.0 million**	**8.5%**
4.	**Engineering Services**	**US$**	**0.8 million**	**6.8%**
	Total	**US$**	**11.8 million**	**100.0%**
1.	**Local Currency Component**	**US$**	**5.1 million**	**43.2%**
2.	**Foreign Currency Component**	**US$**	**6.7 million**	**56.8%**
	Total	**US$**	**11.8 million**	**100.0%**

Note. Figures are rounded thus total amount is not always equal to the mathematical total.

In the above table for Second Priority Projects, Civil Works are about 84.7%; no Cargo Handling Equipment is required. Physical contingency and the required cost of the engineering service fees total US$ 1.8 million, 15.3%.

The foreign currency ratio requirement is 56.8%, attributed to the high ratio of civil work components which can mostly be implemented by foreign resources.

Chapter 10 Economic Analysis of F/S Projects

10.1 Basic Methodology

The economic evaluation is carried out for the priority projects for the Feasibility Study in the Short-Term Development Plans for the following two plans.

① The Grain Terminal Plan for the Alternatgive-1a : S3 Pier
② The Barge Terminal Plan

10.1.1 Cost Benefit Analysis

The cost benefit analysis is the standard method for the economic evaluation for Feasibility Study Projects of the Short-Term Development Plans**.** Basic method employed herewith is the same one used in the preliminary evaluation for the Master Plan Projects. However detailed analysis was provided as required to meet the purpose of feasibility study.

(1) Cost

The financial project cost at market prices is converted into the economic price by deduction of transfer items such as VAT for the local currency portion, and the customs and duties for the foreign currency portion. The local currency portion is divided into materials and labor costs. The cost for labor is broken down into the cost of skilled labor and unskilled labor. The cost for materials is priced by adopting the standard conversion factor (SCF) as 0.986 to exclude the distorted market prices of the project cost. The cost for unskilled labor is converted into the economic cost by adopting the shadow price as 0.7.

(2) Benefits

The benefits are estimated by comparison of "with-the-project" and "without-the-project" cases. The following major benefits are quantifiable for cargoes and vessels at the Port of Constantza.

- Savings of the time value of the cargoes generated from savings of waiting times of vessels.
- Savings of ship lease cost for saved waitng time of vessel.
- Savings of ship lease cost for navigationby ship size scales of economy
- Savings of the time value of the cargoes generated from savings of moving times especially of barges and pusher
- Savings of ship lease cost for saved moving time especially of barges and pusher

The un-quantified benefits already mentioned in the preliminary econoimic analysis carried out in Master Plan are not taken into consideration as benefits in this Study.

10.1.2 Assumptions

(1) Period of Evaluation in the economic analysis is 30 years after the implementation works of the projects.

(2) The exchange rate adopted for this analysis is US $ 1.00 = 26,000. Lei =110 Yen.

(3) The share of Romanian shipping companies in Romania's total sea transport is still comparatively low. Thus, most of the benefits will accrue to foreign shipping companies. However, in the end, Romanian producers and consumers will have to pay for longer waiting times at the Port of Constantza. Furthermore, after Romania is accepted for EU membership, Romania will be socially and economically more closely related to other EU member countries and the attributability of the benefits to the Romanian economy will be strengthened. Thus, in this Study, a hundred percent of the benefits are attributed to the benefits of the projects in this Study.

(4) The Criteria of Project Evaluation consist of: (i) NPV (Net Present Value), (ii) EIRR (Economic Internal Rate of Return) and (iii) B/C ratio (Benefit Cost ratio)

(5) The opportunity cost of capital is adopted for the discount rate for cost and benefits to evaluate in the present value and functions such as the cut-off-ratio to judge the feasibility/viability of projects. In this Study, the opportunity cost of capital is in the range of 12% to 15%.

10.2 Economic Evaluation

The economic evaluation is conducted by preparing the cashflow streams of economic cost and benefit during the evaluation period for the Feasibility Projects in the Short-Term Development Plan with regard to the high growth scenario of traffic demand forecast (Case-1).

10.2.1 Grain Terminal Plan for Alternative-1a; Renovative Plan, At S3 Pier

The benefits of the Grain Terminal Plan for the Alternative-1a were reviewed in detail for the traffic demand forecast and the handling capacity for with- and without-project cases.

The EIRR and B/C ratio of Case-1 are 18.9% and 1.27 respectively where the discount rate is 15%.

The value of EIRR is higher than the maximum cut-off ratio, 15%, which is the criteria of project feasibility. This high level EIRR is mainly due to the implementation of a more effective cargo handling capacity for the new grain terminal than the existing capacity.

Consequently the Grain Terminal Plan, as the first priority project in the Short Term Development, is approved to have significantly high economic viability.

Sensitivity analysis is conducted with regard to the EIRR, to check on the feasibility of the project by increasing the level of project cost and decreasing project benefit. The following table shows the results of sensitivity analysis. EIRR values range from 13.6% in the worst case (20% decrease of benefit and 20% increase of cost) to 16.7% in the best case (10% decrease of benefit and 10% increase of cost). Also all EIRR values are over the minimum level cut-off ratio, 12%. Thus, it is concluded that the Grain Terminal Plan has high credibility with regard to its feasibility.

10.2.2 Barge Terminal Plan

The benefits of the Barge Terminal Development Plan were also reviewed by site inspection to the existing barge basin in the Port of Constantza and interviews with shipping companies such as NAVROM. EIRR and B/C ratio values for Case-1 are 23.9% and 1.64% respectively.

EIRR is considerably higher than the cut-off-ratio, 15%, that is the maximum needed for judging the project's feasibility.

This high viability is considered to be generated mainly by the integrated and accelerated improvement of efficiency of barge behavior (which could be as well called a "Synergy Effect") in the area of the existing and the new barge basin due to well organized and systematic management of barge movement. Thus the Barge Terminal Plan, as the first priority project in the Short Term Development, is approved to be significant economically and viable.

Sensitivity analysis was also conducted for EIRR to check on the credibility of the project feasibility by increasing project cost and decreasing project benefit. The following table shows the results of the sensitivity analysis. EIRR values range from 16.4%, in the worst case, (20% decrease of benefit and 20% increase of cost) to 19.9% in the best case (10% decrease of benefit and 10% increase of cost). All values of EIRR are well over the 15% cut-off-ratio. In this context, it is confirmed that the Barge Terminal Plan has significantly high credibility with regard to its feasibility. .

The results of economic evaluation for two Priority Projects are summarized as follow.

Table 10.1 Summary of Economic Evaluation for the F/S Projects

No.	Names of F/S Projects	Traffic Demand Forecast Case No.	EIRR (%)	B/C	NPV (million US$)
1	Grain Terminal Plan	1: High	18.9	1.27	16,015
2	Barge Terminal Plan	1: High	23.9	1.64	10,847

Note: The discount rate of 15% is applied to calculation of the present value for the cost and benefit.

10.2.3 Conclusion

Both the Grain Terminal Plan and the Barge Terminal Plan as F/S Projects are satisfactorily feasible projects with credibility to be the Short-Term Development Plans for the Port of Constantza.

History tells us that agriculture has been a basic and fundamental industry of the world. Romania is no the exception.

Both projects directly assist the Romanian leading engines, the Agriculture Industries, which may shear a high portion until it becomes an industrialized country. Barge terminal will help to reduce the transport cost of export bulk grain cargo generating from the deep inland areas where are far from the Black Sea. New grain terminal will provide an excellent bulk grain export opportunities by two sets of 800 tons/hr large ship loaders and storage capability by 100 tons silo bins.

Silo will provide chances not only quality control and reduce the berthing time of ocean-going vessel by high speed loading of bulk grain. All these contribute to increase the quality and to reduce the unit price of bulk grain and keeping the bargaining power, in the agri-products exports.

Thus if both projects are implemented simultaneously, its effect will enlarge by so-called Multiplier Effect and give a great inertia to be the real market mechanism in the agriculture sector.

It is strongly recommended that the Romanian Government of its representative agency should take a clear initiative to achieve these vital projects to implement as soon as possible,

Chapter 11 Financial Analysis of F/S Projects

11.1 Scope of the Financial Analysis

It is assumed that the CMPA will construct the infrastructure of the new Grain terminal and Barge Terminal. Regarding the Grain Terminal the CMPA will lease it to private terminal operators. They will operate and manage the terminal and pay the CMPA a lease fee. On the other hand the Barge Terminal will be operated by CMPA.

Therefore, the investment by CMPA will be confined to the following:

(1) All the infrastructure construction work of the new Grain and Barge Terminal

(2) Dredging and reclamation for both terminals

(3) Operation of the Barge Terminal

The scope of this financial analysis is the same.

11.2 Project Lifetime

Project lifetime is of 34 years from the beginning of the project. It includes one year of detailed design and two years of the construction works of the above mentioned port facilities.

11.3 Base Year

All cost, expenditure and revenues are indicated in prices as of 2001, when the price survey was conducted.

11.4 Fund Raising

Fund raising is divided into two kinds: two types of foreign funds. In this project, JBIC's yen loan is considered to be applied as a foreign fund. Conditions of loans are as follows:

(1) Foreign Funds

Covered range: 75% of the initial investment costs of the project

Loan period: 25 years including a grace period of 7 years

Interest rate: 2.2% per year

Repayment: Fixed amount repayment of principal

(2) Other foreign funds

Covered range: 25% of the initial investment costs of the project

Loan period: 15 years including a grace period of 4 years

Interest rate: 5.77% per year

Repayment: Fixed amount repayment of principal

(2) Weighted Average Interest Rate

3.09% (2.2%×0.75+5.77%×0.25)

11.5 Revenue and expenditure

(1) Grain Terminal

1) Revenue

The public sector (CMPA) will develop the fundamental infrastructure of the new Grain Terminal (Quay, Terminal Site), while a private sector operates and manages the facility. Therefore CMPA receives a lease charge for infrastructure (lands) from the private sector .

a. Land lease charge of the new Grain Terminal

b. Port access charge and Quay charge for entering vessel by CMPA Tariff

2) Expenditure

Investment

Initial investments cost for the infrastructure including a detailed design developed by the public sector are calculated. Since service lives of these infrastructure facilities are longer than the project life, reinvestment costs for these facilities are left out of consideration in the analysis.

Maintenance cost

Annual maintenance cost for infrastructure facilities is calculated as 0.3% of the initial construction cost.

Depreciation cost

Annual depreciation costs for the facilities are calculated by the straight line method, based on their service lifetimes. Residual value after all depreciation is estimated as being zero.

Tax

Cooperation Income tax is charged on the net income at a rate of 25%.

(2) Barge Terminal

1) Revenue

Port access charge for Entering vessel(barge and pusher) by CMPA Tariff

Basin charge by CMPA Tariff

2) Expenditure

Investment

Initial investment cost for the infrastructure (Barge Quay, Dolphins) developed by the public sector are calculated.

Maintenance cost

Annual maintenance cost for infrastructure facilities calculated is as 0.3% of the initial construction cost.

Depreciation cost

Annual depreciation costs for the facilities are calculated by the straight line method, based on their service lifetimes. Residual value after all depreciation is estimated as being zero.

Tax

Cooperation Income tax is charged on the net income at a rate of 25%.

Administration cost of CMPA

11.6 Appraisal of the Project

11.6.1 Viability of the Project

The results of FIRR tentative calculation are summarized in Table 11.6.1.

Table 11. 6.1

	Original	Revenue 10 % down	Cost 10% up	Rev. 10% down Cos. 10% up	Weighted average. Interest rate
Grain Terminal	6.65	5.87	5.97	5.19	3.09
Barge Terminal	7.93	7.02	7.22	6.35	3.09

Since the FIRR exceeds the weighted averaged interest rate in all cases of both projects, these projects are deemed to be financially viable.

11.6.2 Financial Soundness of the Port Management Body

In 2013-2017, the indicators of Cash Balance in this period are not satisfied, but the Cash - Flow (Cash Ending) has no problems due to appropriate accumulated earnings.

(1) Profitability

The rate of return on net fixed assets exceeds the weighted average interest rate of the funds from 2008.

(2) Loan Repayment Capacity

The debt service coverage ratio exceeds 1.0 except for 2013-2015.

(3) Operational Efficiency

The operating ratio keeps below 60% from 2008.
And working ratio keeps below 50% from 2008.
This means that the operation will be efficient.

As mentioned above, the financial condition of CMPA will be satisfactory regarding F/S project.

But especially the operator of the new Grain Terminal should make continuous efforts to secure forecast cargo volume to improve cargo handling efficiency and reduce operating expenses.

Chapter 12 Summary of Environmental Impact Assessment (EIA) of F/S Projects

12.1 Introduction

Law No.137/1995 on Environmental Protection defines and stipulates the requirement of environmental impact assessment (EIA) and the environmental authorisation process of Romania. As per this law, all transportation infrastructure projects like roads, rails, ports and airports are subject to the conduct of mandatory EIA. Accordingly EIA study for the feasibility study project components (short-term development plan) of this master plan was performed.

IPTANA was the prime contractor in association with INCDM (The National Institute for Marine Research and Development, Constantza) and Ovidius University conducted the EIA study. It is noted that IPTANA and INCDM are licensed institutions to undertake EIA studies as per the Romanian regulations.

12.2 Project Components of EIA Study

The project components of the feasibility study (F/S) on port development until the year 2010 were targeted for this EIA study. The projects are as follows:

1. Provision of a new modern grain terminal with capacity of 2 million tons per annum at Pier S3 in the South Port as the most significant project component of F/S. It is noted that the modern terminal will use closed belt conveyor system (namely chain conveyor) to mitigate fugitive emission of grain dust.
2. Improvement of existing barge terminal located in the river-maritime basin area. This aims at improving the physical facilities to provide barges with systematic utilization of limited wet basin. However it is not for the cargo handling works at all.
3. Improvement of port road access of Gate No.5 is for to improve the physical alignment of existing road to provide the access with more safety and smooth traffic condition.

The first two parts are for the feasibility study.

12.3 Contents of the EIA Report

The EIA Report was organised in two volumes: Main Report and Annex. The Main Report contains 6 Chapters listed below, while the Annex contains detailed data, analytical methods and curriculum vitae of experts conducting the EIA study.

1. Introduction (Chapter 1)
2. Policy, legal and administrative framework concerning coastal water/marine/port environmental protection (Chapter 2)
3. Description of the baseline environment (Chapter3)
4. Description of proposed projects in the Feasibility Study (F/S) (Chapter 4)
5. Consideration regarding environmental impact (Chapter 5)
6. Recommendations for mitigating actions monitoring plan (Chapter 6)

12.4 Findings of the EIA study

1. Overall, the implementation of the project facilities will lead to long-term environmental and social benefits.
   Even the potential short-term adverse environmental effects inherent to the construction activities are identified as not significant and manageable. In this respect, the results of water quality simulation on the extent of increased turbidity, still a temporary adverse effect, consequent to the reclamation works for the creation of Pier S3, is also found to be not that significant.

   Addition to above, simulation study on the fugitive emission of grain dust against seawater was carried out in order to evaluate the efficiency of proposed environmentally friendly equipment. It is concluded that the proposed grain terminal is acceptable in teams of fugitive emission of grain dust.

2. Construction works for the development of the South Port, the location of the most significant project of these F/S, the new grain terminal at Pier S3, has been on-going for a long time. Moreover, it is expected to continue for a long time even after the provision of the new Pier S3 by the F/S. However, the current transport road of construction materials in the south port area passes adjacent to the sand dune reservation area (Borcea Reservation Area) in Agigia. The possibility of re-routing this road, so that it is not located adjacent to this reservation area, is recommended to be investigated by the concerned agencies of CPA and EPA of Constantza.

12.5 Conclusion and Recommendations

12.5.1 Conclusion

The port of Constantza is a large operational port, in fact the largest Black Sea Port, spanning over 18 km of coast line and a large number of operational berths. In this respect, the planned projects by this feasibility study (F/S) are of rather small scale in comparison to the total available operational terminals and existing facilities of the port.

Based on this aspect alone, potential adverse environmental effects and impacts due to the provision of the new and improved facilities by this F/S projects are not that significant and are manageable. This can be easily happen, if the proper and just normal considerations are undertaken in plan /design of facilities to preserve the present environmental condition.

12.5.2 Recommendations

1. There remain a variety of environmental issues concerned to the present operational status of the port to be addressed.

   In this respect the prompt implementation of the planned waste management improvement projects is strongly recommended.

   Moreover, improvement of dry-bulk handling (iron ore, coal and others) in the port to mitigate fugitive emission is recommended.

2. The port lacks adequate green area within its property. Still, there remain vast barren lands in the central area of the port from the area of Gate 6 to the south up to the Danube Canal (Gate 9). This area is also located behind the terminal areas that handle most of the dry-bulk cargo.

Accordingly as a means of ecological enhancement of this barren area and also to mitigate to the extent possible potential dispersion of dust during dry bulk handling to the city area, development of a linear forestation (linear green-belt) in this barren area is recommended. Such a forestation would also help in protecting the city area from a potential snowstorm.

Chapter 13 Summary of the Feasibility Study Projects

The summary of the Feasibility Study Projects is presented in Table 13.1. In assessing the results, some issues should be paid a special attention to.

Table 13.1 Outline of the Feasibility Study Projects

	Grain Terminal	Barge Terminal
Project Location in the Port	South Port Pier S-3	River Maritime Basin & Central Island
Capacity of the Plant (Ton/Year)	2,000,000	17,000,000
Outline of the Facility	Main Quay Wall: 550 m Water Depth: 14m Railway: 2,800 m Unloader: 400T/H x 2 Unit Ship Loader:800T/H x 2 Receiving and Delivery Line 5000T Silos: 20 Unit	Barge Preparation Quay: 1,100m Barge Stand-by Dolphin: 1,400m Barge Operation Quay: 700m Quay for Pushers: 450m
Project Cost (Total) (1000USD)	97,732	32,169
Project Cost (Infrastructure) (1000USD)	34,086	32,169
Completion of Construction	2007	2007
EIRR (%)	18.9	23.9
FIRR (%)	6.6	7.9

13.1 Grain Terminal Development Plan

(1) Business entity to invest in grain terminals

The usual investments made by private companies when operating grain terminals are those in superstructures. As for this case, CMPA will only invest in infrastructures and concede them to private companies that possess superstructures. This business style was also the basis of the feasibility study conducted by the World Bank during previous investigations (Grain Market and Export Project, Preparation Study for Maritime and River Infrastructure Component; 1998). Furthermore, in case the private companies invest in superstructures, the cost-bearing strength and investment criteria are significantly different, depending on whether the investors are traders or operators (stevedoring companies). In implementing this plan it is therefore necessary to clarify who will invest in superstructures and subsequently assess investments in infrastructures.

(2) Demand forecast

Within the present feasibility study, the results of the Master Plan study are reviewed and revised for the cereal traffic in 2010 and 2020. The forecast methodology adopted for the

particular case of the transit cargoes is similar to the one used in the World Bank's investigation. As a result, forecast cargo volumes in this review are not significantly different from those in the World Bank Study. Present traffic forecast relies on the assumptions that 1) the Danube blockage will soon be removed and 2) the yield ratio per farm area unit is substantially increased by a) modernization of the agricultural industry, b) adoption of land reforms, mainly in terms of land ownership and farm size optimization and c) structural change of the regional agricultural economy so as to facilitate agro-services, especially financial and marketing services etc, in Romania and Eastern and Western European countries. In implementing the plan it is therefore necessary to examine the above-mentioned pre-requisites at date.

13.2 Barge Terminal Development Plan

The advantage of the Port of Constanta against its neighboring competing ports is that it can provide thrifty transportation services by water transport on the Danube to the landlocked Eastern and Central European countries in the hinterland by making the most of its huge facility range, capacities and big water depths.

Transit cargoes transported by barge are transshipped at the port of Constanta and exported or imported by oceangoing vessels. Both the transshipment to the oceangoing vessels with large draft and the use of the water transport on the Danube are services for which the potentials of the Port of Constanta can be fully made use of. In particular, when transit cargoes from hinterland are to be attracted, the river transport on the Danube will play an important role. It is therefore important to set the development vector of the Port of Constanta towards making full use of this significant advantage. In this respect, it is important to consider that the development of the barge terminal is a strategic ahead-time investment with a view at an increase of the barge traffic demand in the Port of Constanta in the future.