Table 2-6-3 Required Number of Berths
(High Economic Growth (I) Case) at Manila

International Container Berth	7 Berths (Depth: -13.0m)
Domestic Container Berth	10 Berths (Depth: -10.0m)
Domestic RO/RO Berth	3 Berths (Depth: - 9.0m)

Table 2-6-4 Required Number of Berths
(High Economic Growth Case) at Batangas

International Container Berth	1 Berth (Depth: -10.0m)
International General Cargo Berth	1 Berth (Depth: -10.0m)
Domestic Container Berth	1 Berth (Depth: -10.0m)
Domestic General Cargo Berth	1 Berth (Depth: - 5.5m)

2.6.2 Evaluation and Selection of Port Development Site

Evaluation and selection of port development site for the Port of Manila and Batangas are carried out by means of overall comparison of possible alternative sites for the projected number of berths in the target year 2010.

(1) Evaluation and Selection of International Container Terminal Development Site at the Port of Manila

There are five (5) alternative port development sites for an international container terminal at the Port of Manila. Each alternative has been appraised from the following six (6) evaluation points, namely 1) Reliability, 2) Construction cost, 3) Space utilization, 4) Water area utilization, 5) Accessibility, and 5) Effect on existing port function. As a result of overall evaluation, the proposed reclamation area along the north breakwater of the North Harbor (Site E) has been selected as the best development site for an international container terminal in case of the medium economic growth scenario. And the proposed reclamation areas along the north breakwater of the North Harbor (Site E) and also along the south breakwater of the South Harbor (Site B) have been selected as

the best development sites in case of the high economic growth (I) scenario. The result of overall evaluation is summarized in Table 2-6-5.

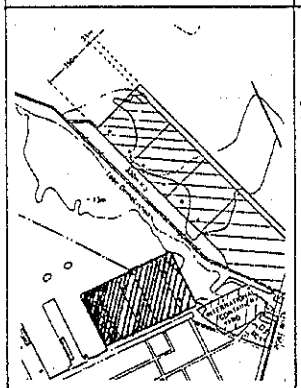
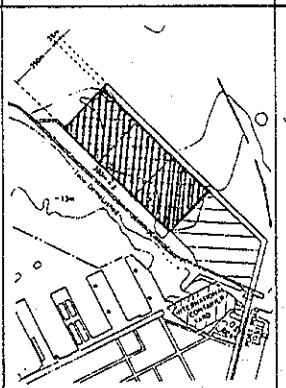
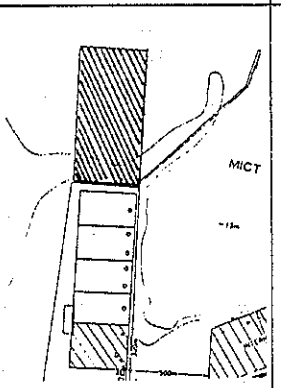
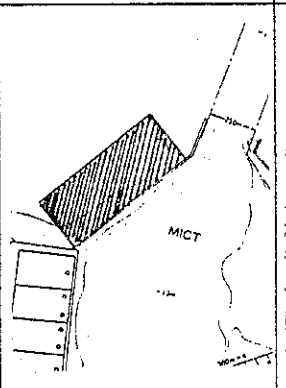
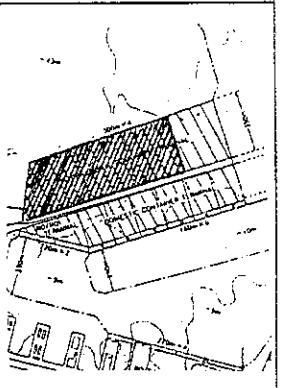
(2) Evaluation and Selection of Domestic Container Terminal Development Site at the Port of Manila

There are four (4) alternative port development sites for a domestic container terminal at the Pot of Manila. Each alternative has been appraised from the following seven (7) evaluation points, namely 1) Reliability, 2) Construction cost, 3) Space utilization, 4) Water area utilization, 5) Accessibility, 6) Effect on existing port function, and 7) Land acquisition. As a result of overall evaluation, the proposed reclamation area along the north breakwater at the North Harbor (Site B) has been selected as the best development site for a domestic container terminal in case of the medium economic growth scenario. And the proposed reclamation area along the north breakwater at the North Harbor (Site B) and the Smokey Mountain development and reclamation project area (Site D) have been selected as the best development sites in case of the high economic growth (I~III) scenario. The result of overall evaluation is summarized in Table 2-6-6.

(3) Evaluation and Selection of Domestic Container Terminal Development Site for the Port of Batangas

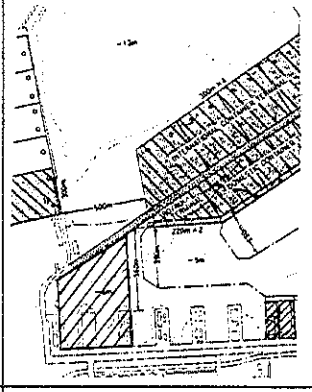
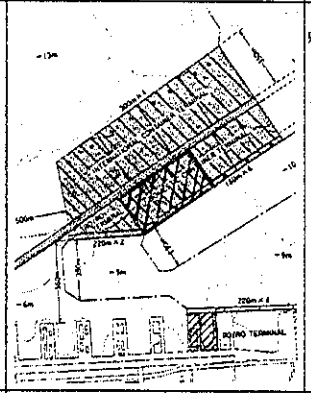
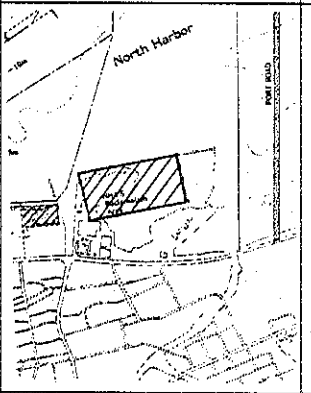
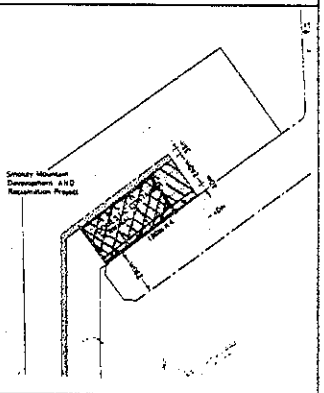
There are three (3) alternative port development sites for a domestic container terminal at the Port of Batangas. Each alternative has been appraised from the following six (6) evaluation points, namely 1) Reliability, 2) Construction cost, 3) Space utilization, 4) Water area utilization, 5) Accessibility, and 6) Effect on existing port function. As a result of overall evaluation, the proposed reclamation area located 300 meters away from the west end of the Phase-I project site (Site A), has been selected as the best development site for a domestic container terminal. The result of overall evaluation is summarized in Table 2-6-7.

Table 2-6-5 Evaluation and Selection of International Container Terminal Development Site at the Port of Manila

		ALTERNATIVES				
		Site A	Site B	Site C	Site D	Site E
Locataion						
EVALUATION	Reliability	5	5	3	4	5
	Construction Cost	5 (2)	3	2	4	4
	Space Utilization	3	5	5	3	5
	Water Area Utilization	3	4	5	4	4
	Accessibility	5	4	5	5	4
	Effect on Existing Function	3	5	5	5	5
Overall		24 (21)	26	25	25	27
Priority		5	2	3	3	1

Note: 1) Evaluation Point; 5 (Very Good), 4 (Good), 3 (Average), 2 (Less than Average) and 1 (Poor)
2) Construction cost of Site A goes up further, if relocation cost of general cargo berths is taken into account. In that case, lower evaluation is realized, namely, only 2 points.
3) The above evaluation is valid only in case of construction of at most four (4) international container terminals. Overall evaluation always depends on how large a project is.

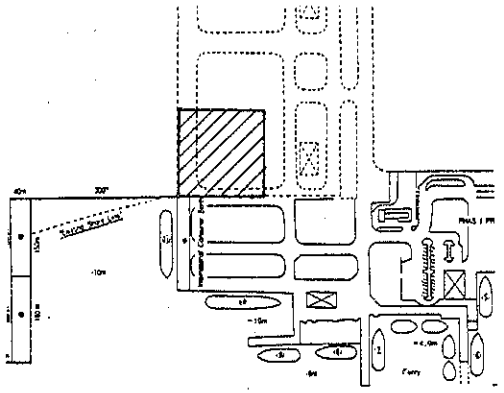
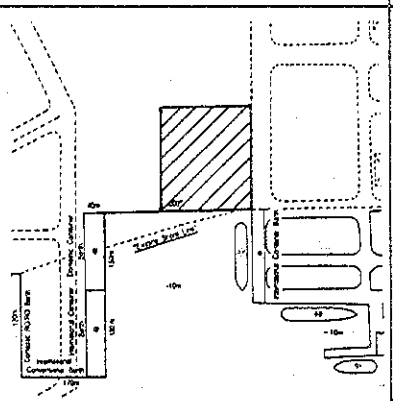
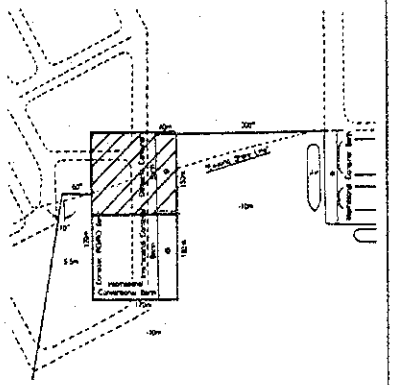
Table 2-6-6 Evaluation and Selection of Domestic Container Terminal Development Site at the Port of Manila

		ALTERNATIVES			
Locataion		Site A	Site B	Site C	Site D
					
EVALRATION	Reliability	5	5	3	4
	Construction Cost	5	3	4	4
	Space Utilization	3	5	4	5
	Water Area Utilization	3	4	5	4
	Accessibility	5	3	5	3
	Effect on Existing Function	2	5	4	5
	Land Acquisition	5	5	3	4
Overall		28	30	28	29
Priority		3	1	3	2

Note: 1) Evaluation Point; 5 (Very Good), 4 (Good), 3 (Average), 2 (Less than Average) and 1 (Poor)

2) The above evaluation is valid only in case of construction of 5 at 6 domestic container terminals. Overall evaluation always depends on how large a project is.

Table 2-6-7 Evaluation and Selection of Domestic Container Terminal Development Site at the Port of Batangas

		ALTERNATIVES		
		Site A	Site B	Site C
Locataion Map				
EVALUATION	Reliability	5	4	4
	Construction Cost	3	4	5
	Space Utilization	4	3	5
	Water Area Utilization	4	5	5
	Accessibility	5	5	4
	Effect on Existing Function	5	5	5
Overall Evaluation		26	26	28
Priority		2	2	1

Note: 1) Evaluation Point; 5 (Very Good), 4 (Good), 3 (Average), 2 (Less than Average) and 1 (Poor)

2) The above evaluation is valid only in case of construction of 5 at 6 domestic container terminals. Overall evaluation always depends on how large a project is.

2.6.3 Port Master Plan

After careful examination and consideration of alternative construction sites for port development and possible impact on the urban transportation system as well as environment itself, the port master plan for the Port of Manila, Batangas, Sangley Point and Naic/Cavite was formulated from the comprehensive point of view, corresponding to the low, medium and high economic growth scenarios. The result of master plan formulation is summarized in Table 2-6-8, and the map of the port master plan is shown in Figure 2-6-1 to 2-6-6. The giant map of the master plan for the Port of Manila is also attached to the end of this volume.

Table 2-6-8 Result of Master Plan Formulation for Major Ports in GCR (1)

Port	Project	Low Economic Growth Case (GDP 4%)		Medium Economic Growth Case (GDP 5.5 %)		High Economic Growth (I) Case (GDP 7~7.5%)		High Economic Growth (II) Case (GDP 7~7.5%)		High Economic Growth (III) Case (GDP 7~7.5%)		Assumptions of Scenario
		Cargo Through put	Requirement	Cargo Though put	Requirement	Cargo Through put	Requirement	Cargo Through put	Requirement	Cargo Through put	Requirement	
MANILA	South Harbor Int'l Container Terminal	4,210 (Thousand Tons)	<Facility> Int'l container yard: 7.5 ha	4,440 (Thousand Tons)	<Facility> Int'l container yard: 7.5 ha	10,430 (Thousand Tons)	<Facility> Int'l container terminal: 3 berths (Depth -13 m; Length 300 m) and container yard: 35.4 ha Int'l container yard: 7.5 ha Dredging for access channel and turning basin: 5.3 Mil m^3 Port access road: 1,850 m <Equipment> Container Crane: 6 Nos. Transfer Crane: 15 Nos.	4,200 (Thousand Tons)	<Facility> Int'l container yard: 7.5 ha	4,200 (Thousand Tons)	<Facility> Int'l container yard: 7.5 ha	· All Surface and elevated highway projects are timely implemented according to DPWH's Highway Development Program.
	Manila Int'l Container Terminal (MICT)	12,090 (Thousand Tons)	<Facility> Int'l container Terminal: 1 berth (Depth -13 m; Length 300 m) Int'l container yard: 10 ha Dredging for access channel and turning basin: 1.98 Mil m^3 <Equipment> Container Crane: 2 Nos. Transfer Crane: 5 Nos.	17,800 (Thousand Tons)	<Facility> Int'l container Terminal: 3 berths (Depth -13 m; Length: 300 m) Int'l Container yard: 30.2 ha Dredging for access channel and turning basin: 3.48 Mil m^3 <Equipment> Container Crane: 6 Nos. Transfer Crane: 15 Nos.	20,570 (Thousand Tons)	<Facility> Int'l container Terminal: 4 berths (Depth -13 m; Length 300 m) Int'l container yard: 39.5 ha Breakwater extension: 400 m Dredging for access channel and turning basin: 5.02 Mil m^3 <Equipment> Container Crane: 8 Nos. Transfer Crane: 20 Nos.	20,570 (Thousand Tons)	<Facility> Int'l container Terminal: 4 berth (Depth -13 m; Length 300 m) Int'l container yard: 39.5 ha Breakwater extension: 400 m Dredging for access channel and turning basin: 5.02 Mil m^3 <Equipment> Container Crane: 8 Nos. Transfer Crane: 20 Nos.	20,570 (Thousand Tons)	<Facility> Int'l container Terminal: 4 berths (Depth -13 m; Length 300 m) Int'l container yard: 39.5 ha Breakwater extension : 400 m Dredging for access channel and turning basin: 5.02 Mil m^3 <Equipment> Container Crane: 8 Nos. Transfer Crane: 20 Nos.	· MICT's NO.5 int'l container terminal project will have been completed by the year 2000. · MICT's rail-served inland container depot project will have been compled without delay.
	North Harbor Dom'c Container Terminal	10,140 (Thousand Tons)	<Facility> Dom'c container terminal: 5 berths (Depth -10 m; Length 180 m) Dom'c container yard: 21 ha Dredging for access channel and turning basin: 3.7 Mil m^3 Port access road: 1,340 m Port bridge: 6 lanes <Equipment> Container crane: 5 Nos. Straddle carrier: 15 Nos.	13,750 (Thousand Tons)	<Facility> Dom'c container terminal: 6 berths (Depth -10 m; Length 180 m) Dom'c container yard: 26 ha Dredging for access channel and turning basin: 3.96 Mil m^3 Port access road: 1,520 m Port bridge: 6 lanes <Equipment> Container crane: 6 Nos. Straddle carrier: 18 Nos.	13,000 (Thousand Tons)	<Facility> Dom'c container terminal: 6 berth (Depth -10 m; Length 180 m) Dom'c container yard: 26 ha Dredging for access channel and turning basin: 3.96 Mil ^{3} Port access road: 1,520 m Port bridge: 6 lanes <Equipment> Container crane: 6 Nos. Straddle carrier: 18 Nos.	13,000 (Thousand Tons)	<Facility> Dom'c container terminal: 6 berths (Depth -10 m ; Length 180 m) Dom'c container yard: 26 ha Dredging for access channel and turning basin; 3.96 Mil m^3 Port access road: 1,520 m Port bridge: 6 lanes <Equipment> Container crane: 6 Nos. Straddle carrier: 18 Nos.	13,000 (Thousand Tons)	<Facility> Dom'c container terminal: 6 berths (Depth -10 m; Length 180 m) Dom'c container yard: 26 ha Dredging for access channel and turning basin; 3.96 Mil m^3 Port access road: 1,520 m Port bridge: 6 lanes <Equipment> Container crane: 6 Nos. Straddle carrier: 18 Nos.	· NHA's reclamation project is for mixed use, not for port facility only.
	Smokey Mount'n Dom'c Container Terminal					8,440 (Thousand Tons)	<Facility> Dom'c container terminal: 4 berths (Depth -10; Length -180 m) Dom'c container yard: 17 ha Dredging for access channel and turning basin: 4.2 Mil m^3 Port access road: 3,500 m <Equipment> Container crane: 4 Nos. Straddle carrier: 12 Nos.	8,440 (Thousand Tons)	<Facility> Dom'c container terminal: 4 berths (Depth -10 m; Length -180 m) Dom'c container yard: 17 ha Dredging for access channel and turning basin: 4.2 Mil m^3 Port access road: 3,500 m <Equipment> Container crane: 4 Nos. Straddle carrier: 12 Nos.	8,440 (Thousand Tons)	<Facility> Dom'c container terminal: 4 berths (Depth -10 m; Length -180 m) Dom'c container yard: 17 ha Dredging for access channel and turning basin: 4.2 Mil m^3 Port access road: 3,500 m <Equipment> Container crane: 4 Nos. Straddle carrier: 12 Nos.	· Smokey Mount'n Development and Reclamation Project will have been completed by the year 2010.
	North Harbor Dom'c RO/RO Terminal	9,160 (Thousand Tons)	<Facility> Dom'c RO/RO terminal: 1 berth (Depth -9 m ; Length 220 m) Dom'c RO/RO yard: 14.6 ha Dredging for access channel and turning basin: 0.04 Mil m^3	12,400 (Thousand Tons)	<Facility> Dom'c RO/RO terminal: 2 berths (Depth -9 m; Length 220 m) Dom'c RO/RO yard: 14.6 ha Dredging for access channel and turning basin: 0.24 Mil m^3	15,040 (Thousand Tons)	<Facility> Dom'c RO/RO terminal: 3 berths (Depth -9 m; Length 220 m) Dom'c RO/RO yard; 14.6 ha Dredging for access channel and turning basin: 0.47 Mil m^3	15,040 (Thousand Tons)	<Facility> Dom'c RO/RO terminal: 3 berths (Depth -9 m ; Length 220 m) Dom'c RO/RO yard: 14.6 ha Dredging for access channel and turning basin: 0.47 Mil m^3	15,040 (Thousand Tons)	<Facility> Dom'c RO/RO terminal: 3 berths (Depth -9 m; Length 220 m) Dom'c RO/RO yard: 14.6 ha Dredging for access channel and turning basin: 0.47 Mil m^3	· NO.1 and NO.2 dom'c RO/RO terminals (both are on-going projects) will have been constructed by the year 1995. · NO.3 dom'c RO/RO terminal project will have been completed by the year 1997.

Table 2-6-8 Result of Master Plan Formulation for Major Ports in GCR (2)

Port	Project	Low Economic Growth Case (GDP 4%)		Medium Economic Growth Case (GDP 5.5 %)		High Economic Growth (I) Case (GDP 7~7.5%)		High Economic Growth (II) Case (GDP 7~7.5%)		High Economic Growth (III) Case (GDP 7~7.5%)		Assumptions of Scenario
		Cargo Through put	Requirement	Cargo Though put	Requirement	Cargo Through put	Requirement	Cargo Through put	Requirement	Cargo Through put	Requirement	
SANGLEY POINT	Int'l Container Terminal									6,230 (Thousand Tons)	<Facility> Int'l container terminal: 3 berths (Depth -13 m; Length 300 m) Int'l container yard: 27.9 ha Dredging for access channel and turning basin: 8.5 Mil m^3 Port access road: 4,300 m <Equipment> Container crane: 6 Nos. Transfer crane: 15 Nos.	· Cost for the Naval Base relocation is not borne by the port sector. · Manila-Cavite highway project will have been completed by the year 2010
NAIC/ CAVITE	Int'l Container Terminal							6,230 (Thousand Tons)	<Facility> Int'l container terminal: 3 berths (Depth -13 m; Length 300 m) Int'l container yard: 27.9 ha Breakwater : 2,020 m Dredging for access channel and turning basin: 5.65 Mil m^3 Port access road: 3,800 m <Equipment> Container crane: 6 Nos. Transfer crane: 15 Nos.			· Both DPWH's urban highway development projects and MICT's rail-served inland container depot project will not have been completed by the year 2010. · Relocation of the Naval Base at Sangley Point will not have been achieved.
BATANGAS	Int'l Terminal					1,200 (Thousand Tons)	<Facility> Int'l container terminal: 1 berth (Depth -10 m; Length 180 m) Int'l container yard: 2 ha Dredging for access channel and turning basin: 0.35 Mil m^3 Port access road 490m <Equipment> Container crane: 1 No. Straddle carrier: 3 Nos.	1,200 (Thousand Tons)	<Facility> Int'l container terminal: 1 berth (Depth -10 m; Length 180) Int'l container yard: 2 ha Dredging for access channel and turning basin: 0.35 Mil m^3 Port access read 490 m <Equipment> Container crane: 1 No. Straddle carrier: 3 Nos.	1,200 (Thousand Tons)	<Facility> Int'l container terminal: 1 berth (Depth -10 m; Length 180 m) Int'l container yard: 2 ha Dredging for access channel and turning basin: 0.35 Mil m^3 Port access road: 490 m <Equipment> Container crane: 1 No. Straddle carrier: 3 Nos.	· Phase-I project will have been completed without delay. · South Super Expressway's extension to Batangas will have been implemented by the year 2000.
						400 (Thousand Tons)	<Facility> Int'l conventional terminal: 1 berth (Depth -10 m; Length 170 m)	400 (Thousand Tons)	<Facility> Int'l conventional terminal: 1 berth (Depth -10 m; Length 170 m)	400 (Thousand Tons)	<Facility> Int'l conventional terminal: 1 berth (Depth -10 m; Length 170 m)	
	Dom'c Terminal	1,300 (Thousand Tons)	<Facility> Dom'c container terminal: 1 berth (Depth -10 m; Length 150 m) Dom'c container yard: 2.6 ha Dredging for access channel and turning basin: 0.4 Mil m^3 <Equipment> Container Crane: 1 No. Straddle Carrier: 3 Nos.	2,170 (Thousand Tons)	<Facility> Dom'c container terminal: 1 berth (Depth -10 m; Length 150 m) Dom'c container yard: 2.6 ha Dredging for access channel and turning basin: 0.4 Mil m^3 <Equipment> Container crane: 1 No. Straddle carrier: 3 Nos.	3,300 (Thousand Tons)	<Facility> Dom'c container terminal: 1 berth (Depth -10 m; Length 150 m) Dom'c container yard: 2.6 ha Dredging for access channel and turning basin: 0.4 Mil m^3 <Equipment> Container crane: 1 No. Straddle carrier: 3 Nos.	3,300 (Thousand Tons)	<Facility> Dom'c container terminal: 1 berth (Depth -10 m; Length 150 m) Dom'c container yard: 2.6 ha Dredging for access channel and turning basin: 0.4 Mil m^3 <Equipment> Container crane: 1 No. Straddle carrier: 3 Nos.	· Phase-I project will have been completed without delay. · South Super Expressway's extension to Batangas will have will have been implemented by the year 2000.
						2,400 (Thousand Tons)	Dom's RO/RO terminal: 1 berth (Depth -5.5 m; Length 120 m) Dredging for access channel and turning basin: 0.05 Mil m^3	2,400 (Thousand Tons)	Dom'c RO/RO terminal: 1 berth (Depth -5.5 m; Length 120 m) Dredging for access channel and turning basin: 0.05 Mil m^3	2,400 (Thousand Tons)	Dom'c RO/RO terminal: 1 berth (Depth -5.5 m; Length 120 m) Dredging for access channel and turning basin: 0.05 Mil m^3	

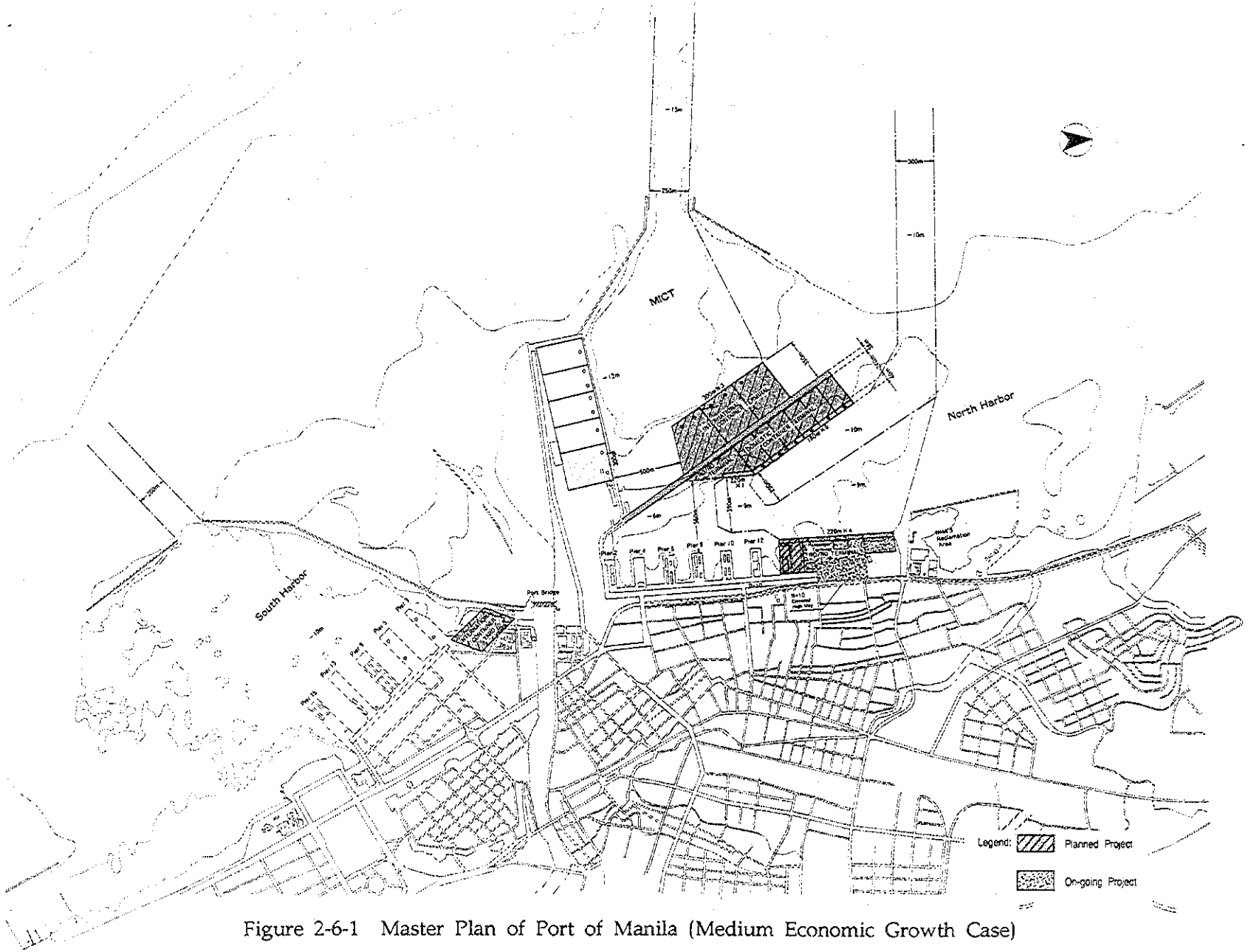


Figure 2-6-1 Master Plan of Port of Manila (Medium Economic Growth Case)

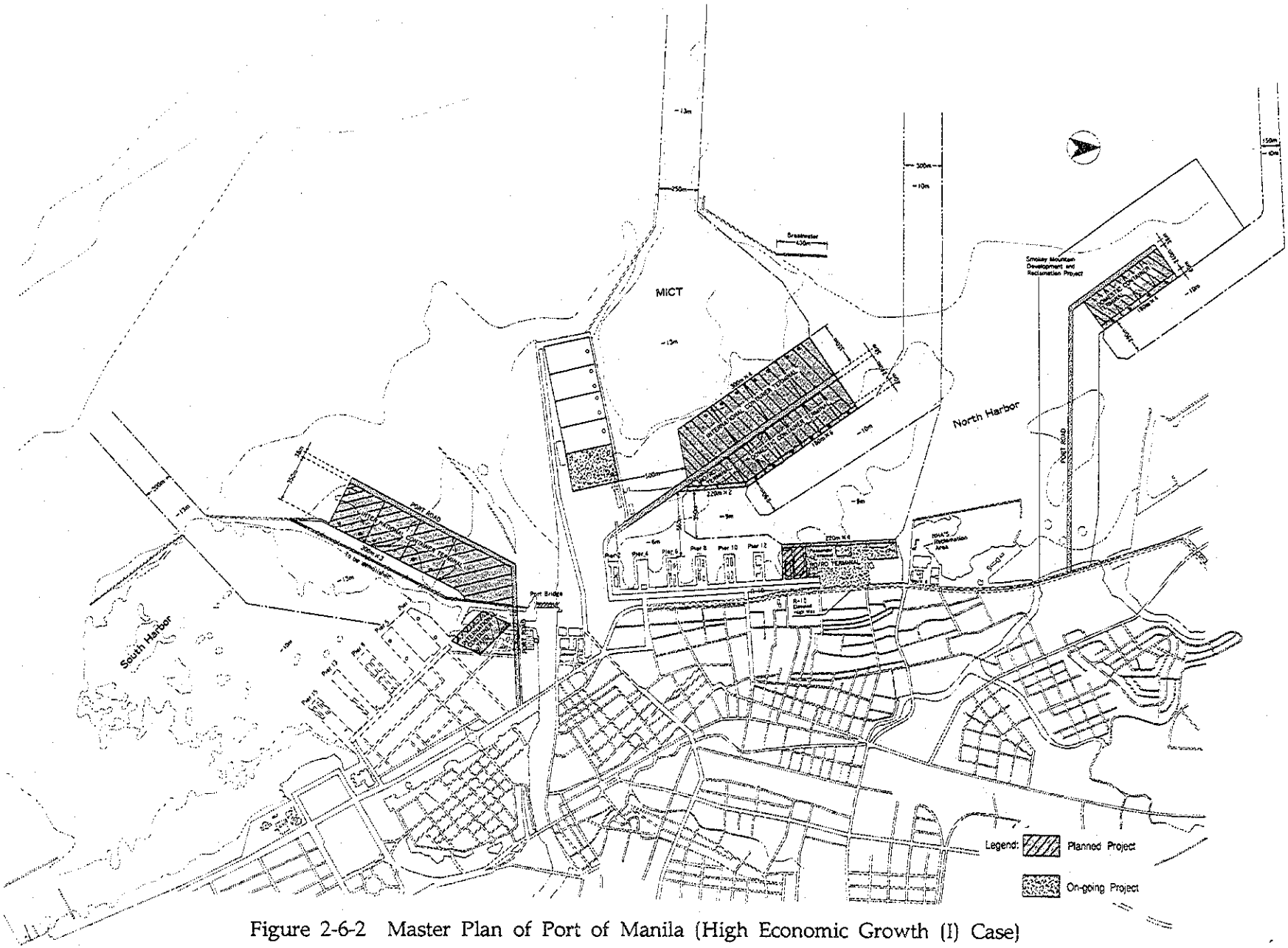


Figure 2-6-2 Master Plan of Port of Manila (High Economic Growth (I) Case)

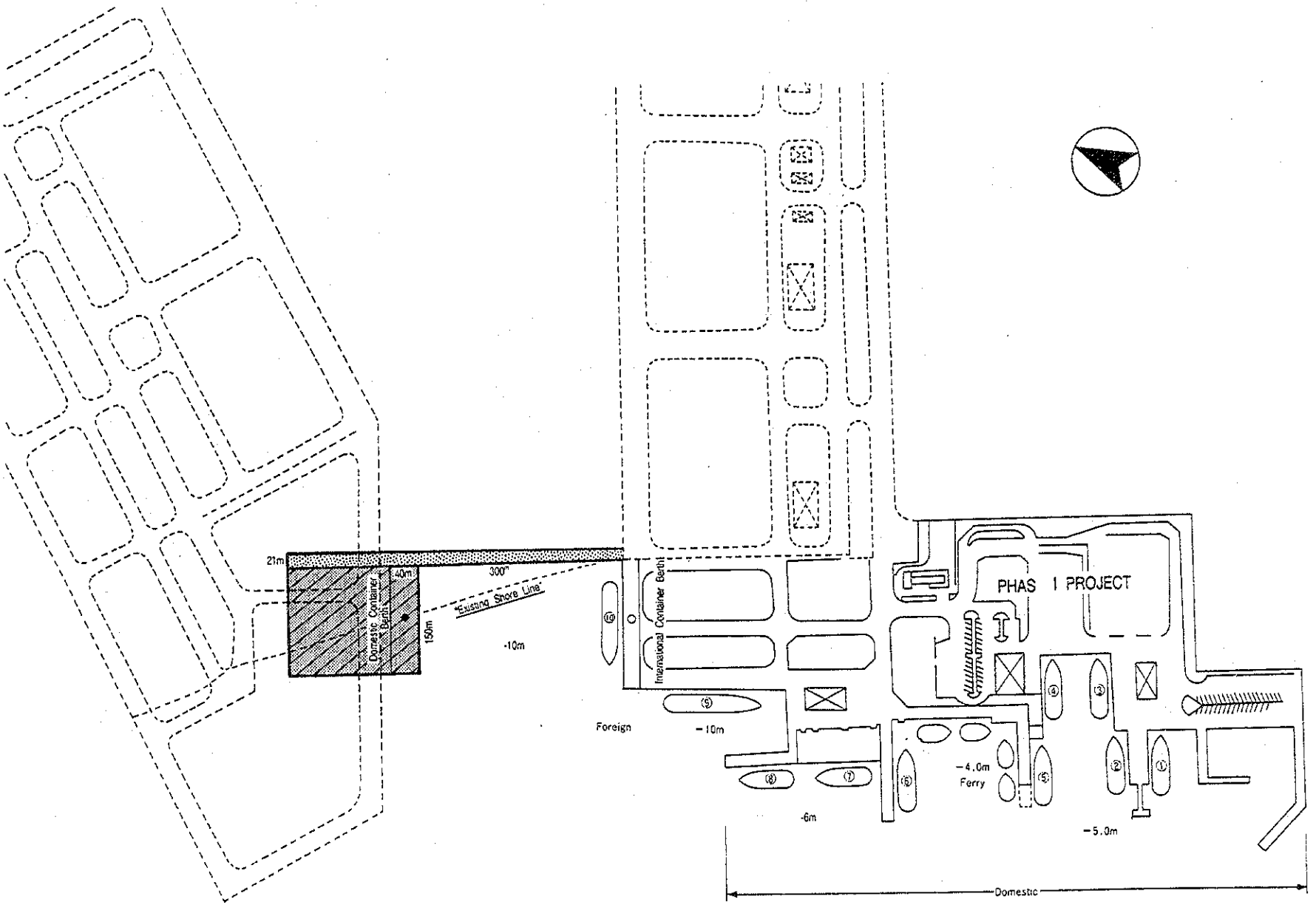


Figure 2-6-3 Master Plan of Port of Batangas (Medium Economic Growth Case)

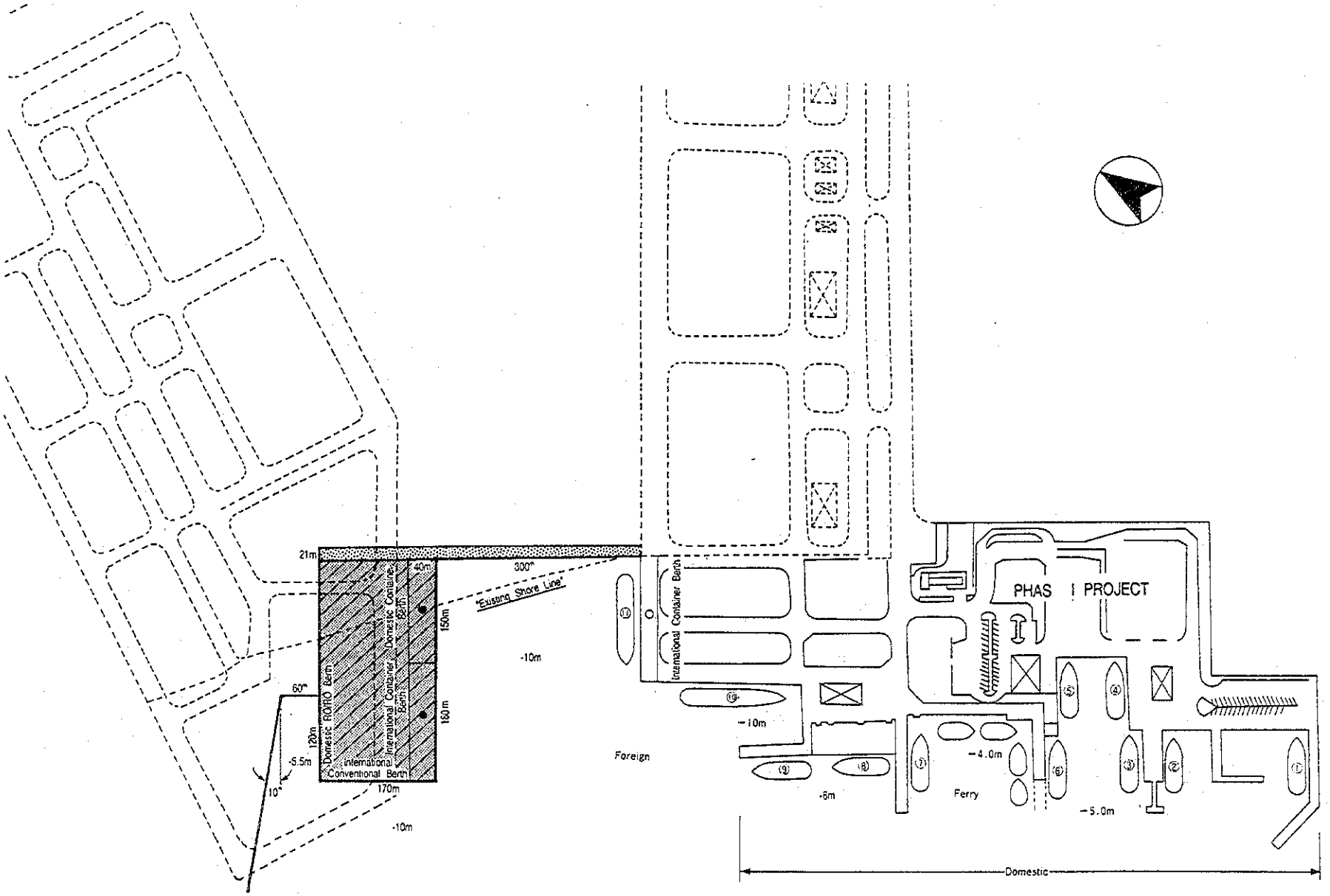


Figure 2-6-4 Master Plan of Port of Batangas (High Economic Growth (I~III) Case)

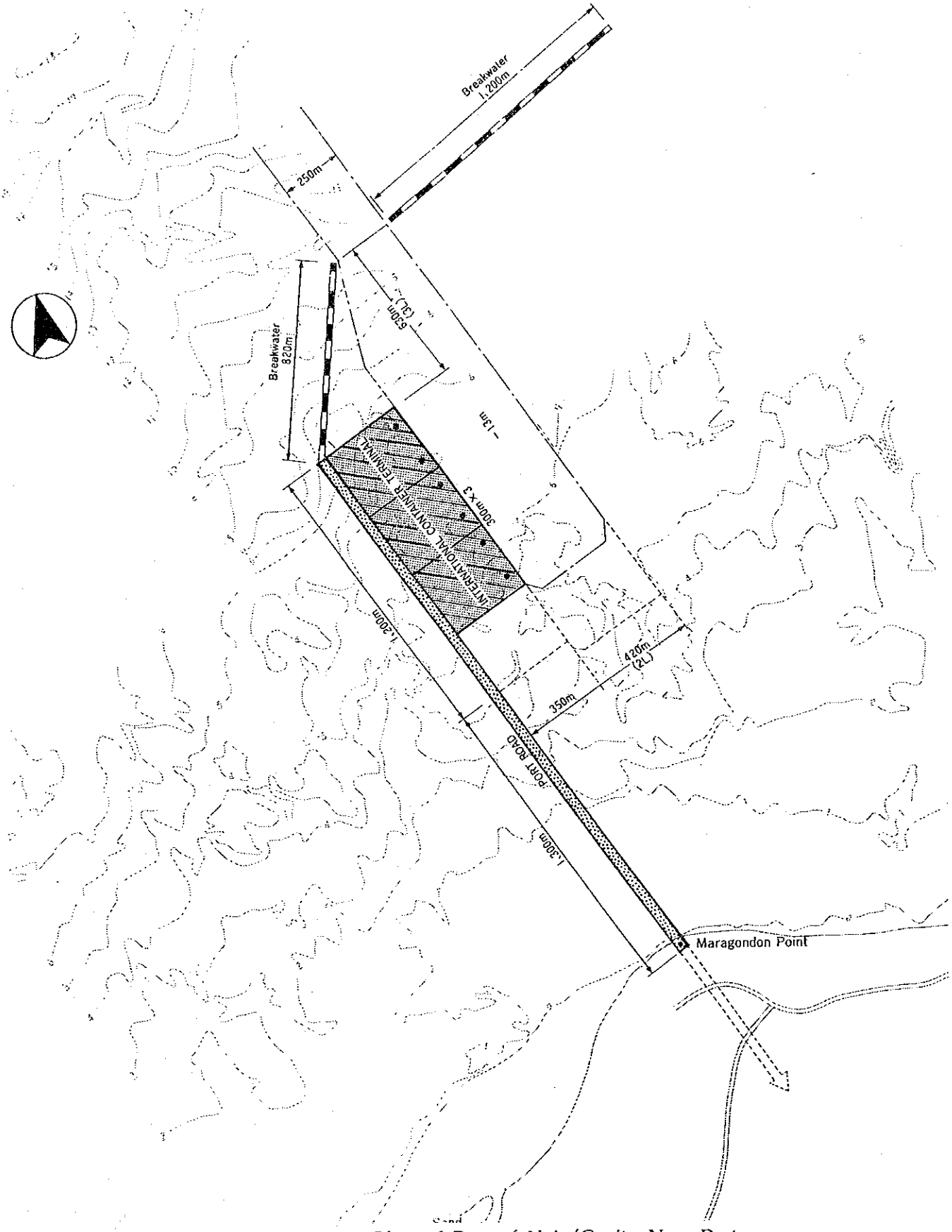


Figure 2-6-5 Master Plan of Port of Naic/Cavite New Port
(High Economic Growth (II) Case)

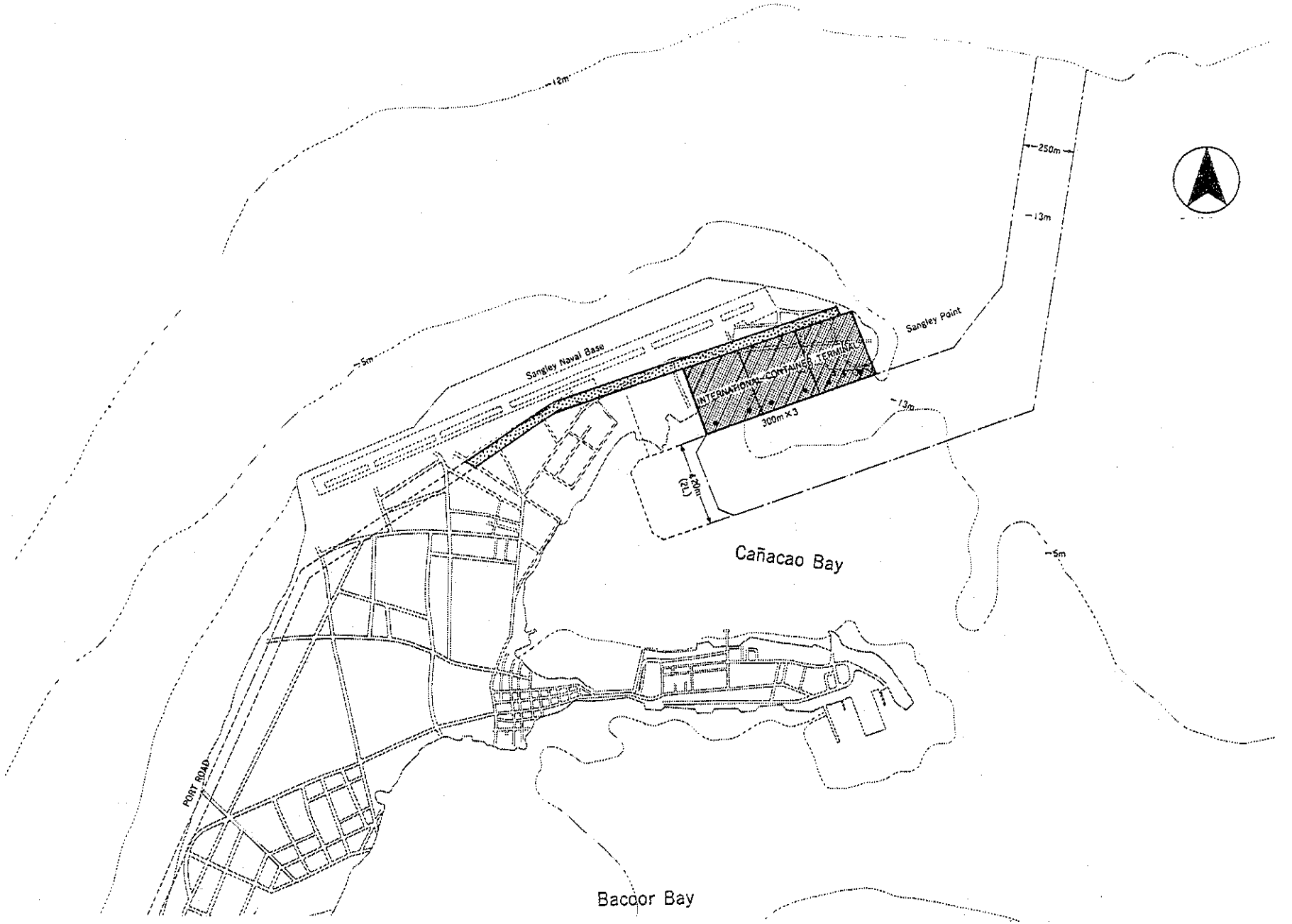


Figure 2-6-6 Master Plan of Port of Sangley Point (High Economic Growth (III) Case)

2.7 Preliminary Facility Design

2.7.1 Design Criteria

Design Criteria

	Port of Manila	Port of Batangas	Sangley Point Naic/Cavite
1. Tides			
H.W.L	+1.26	+1.41	+1.26
M.T.L	+0.49	+0.52	+0.49
M.L.L.W	±0.00	±0.00	±0.00
D.L.T	-0.35	-0.40	-0.35
2. Waves			
Height (1/3) 50-Years	2.69m	3.24m	2.69m
3. Seismic Force			
Coefficient (kh)	0.15	0.15	0.15
S.F	0.21	0.18	0.18
4. Surcharge Load			
Ordinary	2.5t/sq.m	2.5t/sq.m	2.5t/sq.m
Extraordinary	1.25	1.25	1.25
5. Berthing Velocity			
Berthing velocity	0.1m/sec	0.1m/sec	0.1m/sec
6. Objective Ship Size			
Container Ship (DWT)	30,000	-	30,000
Ditto (DWT)	13,000	13,000	-
Ro/Ro Ship (GRT)	13,000	2,000	-
7. Crown Height			
Crown height	+4.00m	+3.20m	+4.00m
8. Wind			
Wind velocity (kph)	175	175	175

2.7.2 Selection of Quay Structure

Quay structure will be selected for each port based on the result of natural condition survey, construction cost and working period.

(1) Manila South Harbor
Gravity Type Concrete Caisson Quay.
Soil improvement will be conducted up to -25m by sand compaction piles.
(Refer to Fig. 2-7-1)

(2) Manila North Harbor
Open Type Prestressed Concrete Pile Quay.
(Refer to Fig. 2-7-2)

(3) MICT
Open Type Steel Pipe Pile Quay.
Soil improvement will be conducted up to -15m by rubble stone replacement.
(Refer to Fig. 2-7-3)

(4) Btangas Port
Closed Type Steel Sheet Pile Quay.
(Refer to Fig. 2-7-4)

(5) Naic/Cavite New Port
Gravity Type Concrete Caisson Quay.
(Refer to Fig. 2-7-5)

(6) Sangley Point
Open Type Steel Pipe Pile Quay.
(Refer to Fig. 2-7-6)

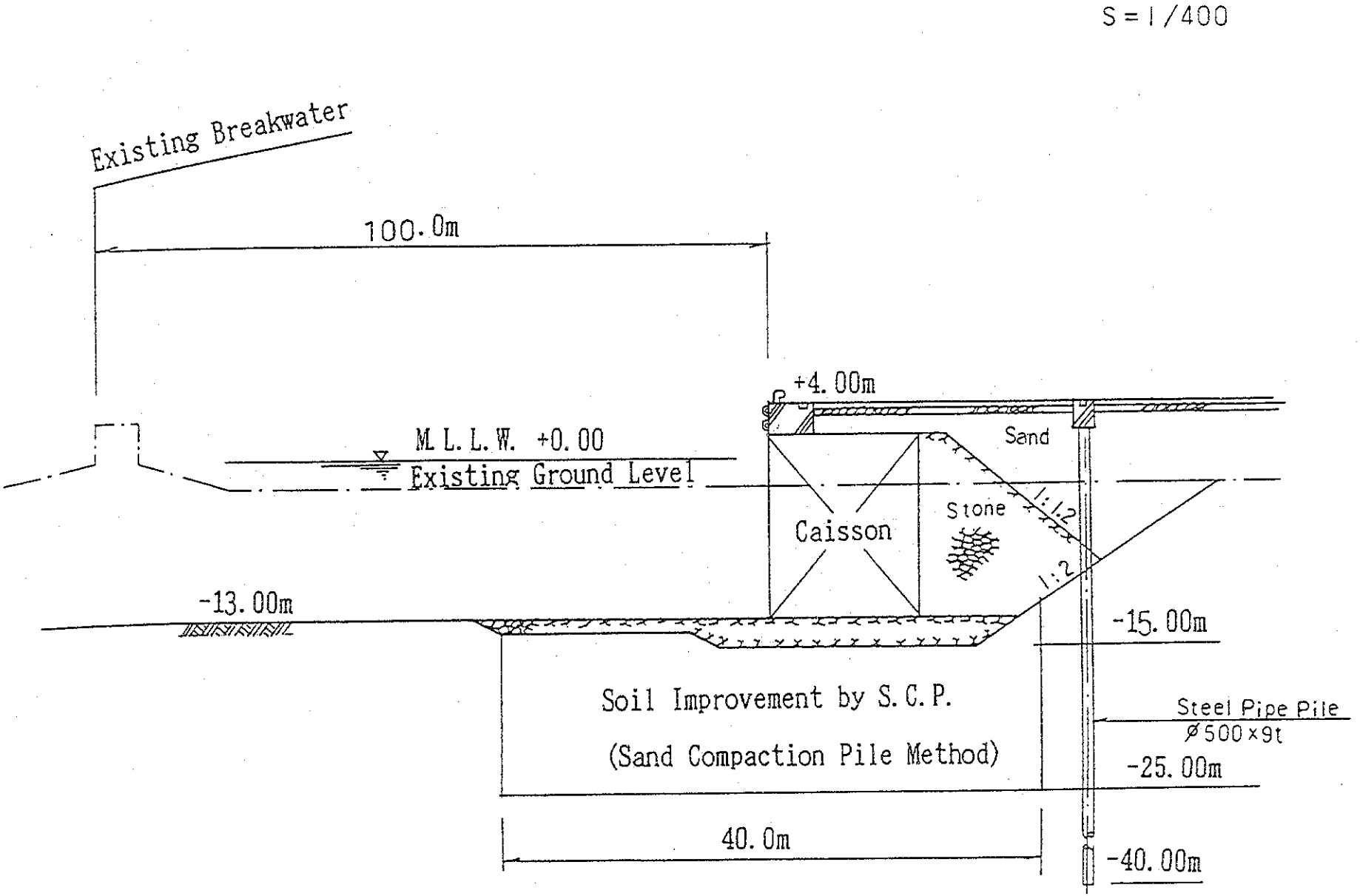


Figure 2-7-1 Typical Cross Section of -13m Container Berth at Manila South Harbor

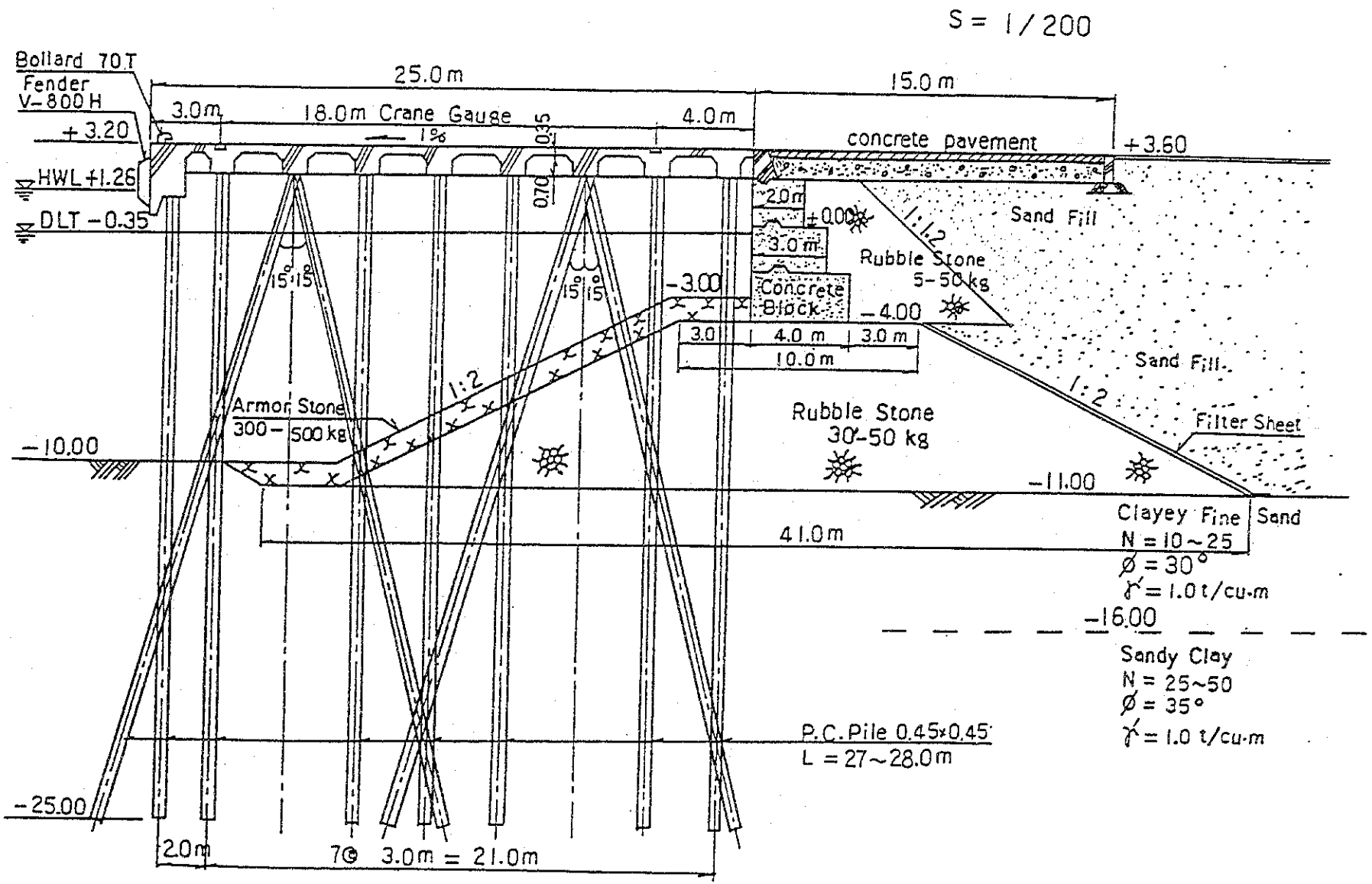


Figure 2-7-2 Typical Cross Section of -10m Container Berth at Manila North Harbor

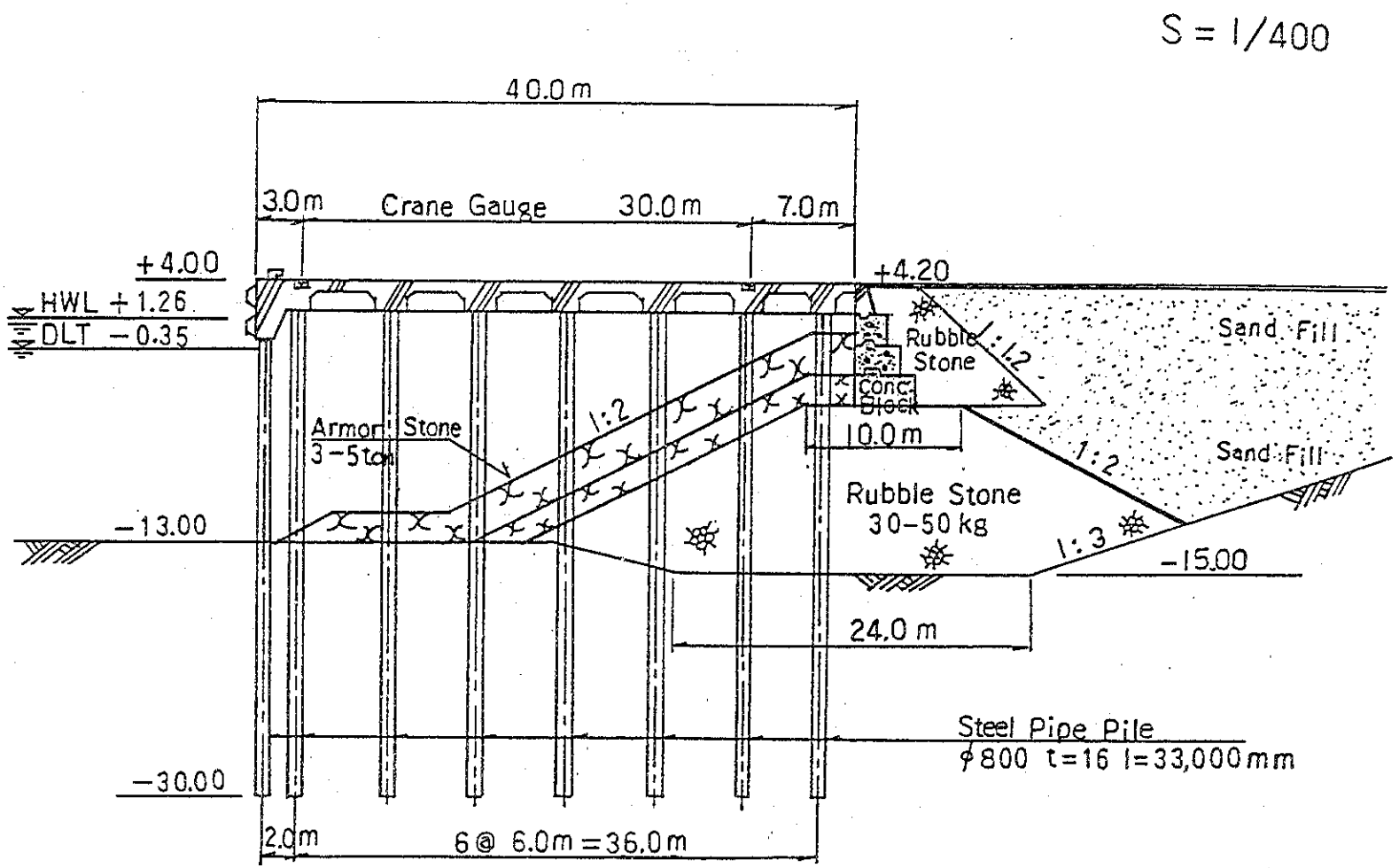


Figure 2-7-3 Typical Cross Section of -13m Container Berth at MICT

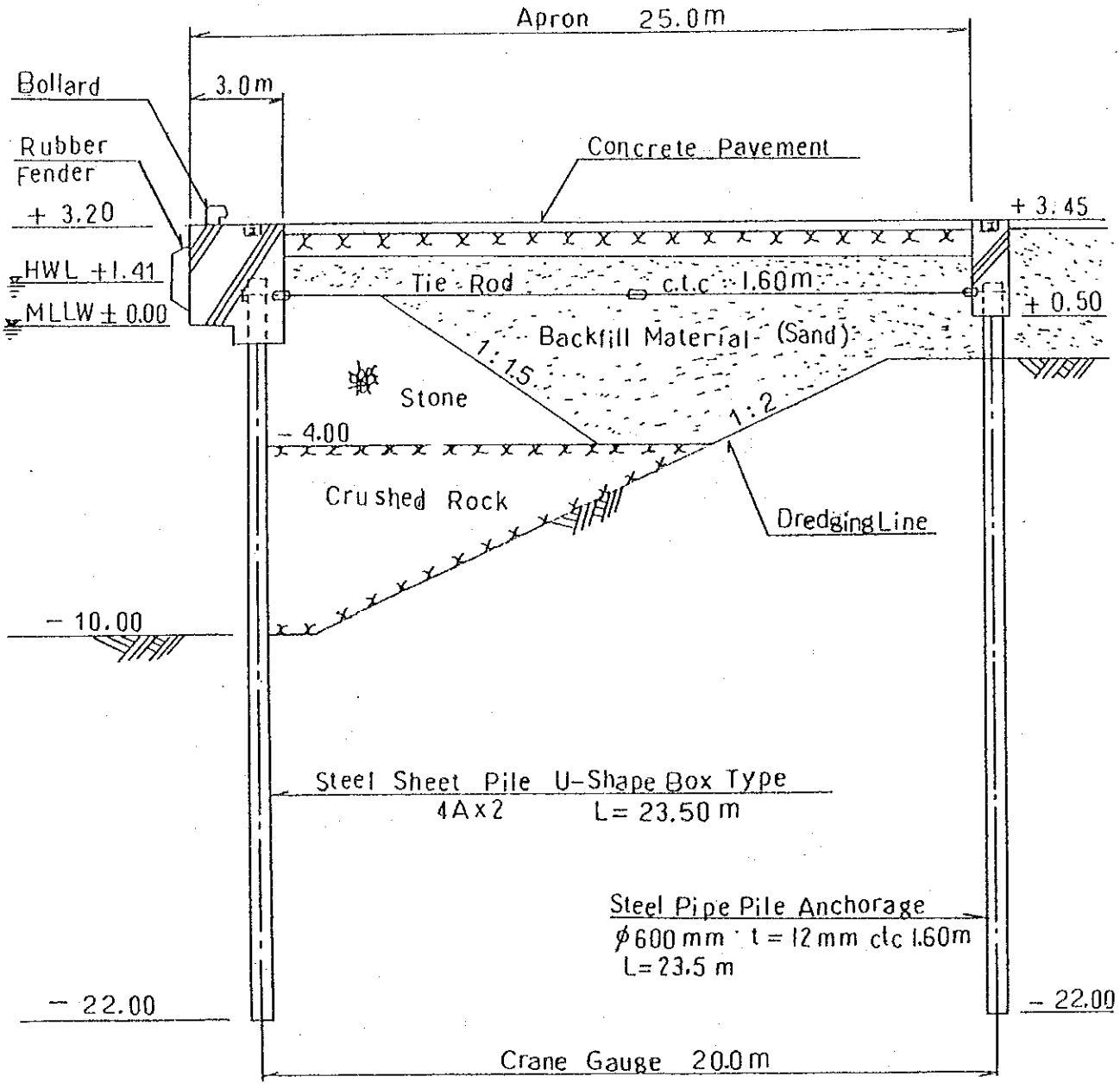


Figure 2-7-4 Typical Cross Section of -10m Container Berth at Batangas Port

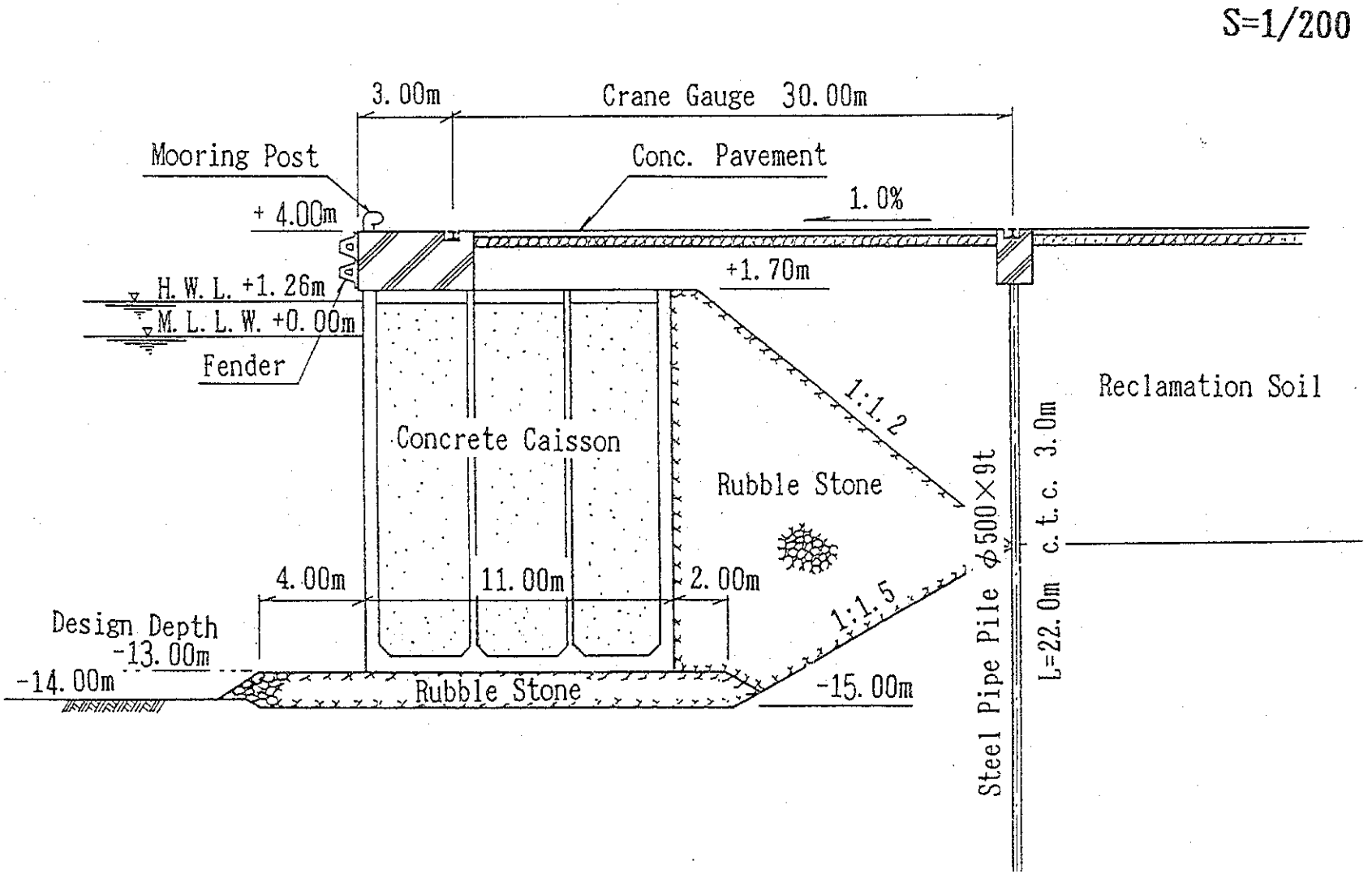


Figure 2-7-5 Typical Cross Section of -13m Container Berth at Naic/Cavite New Port

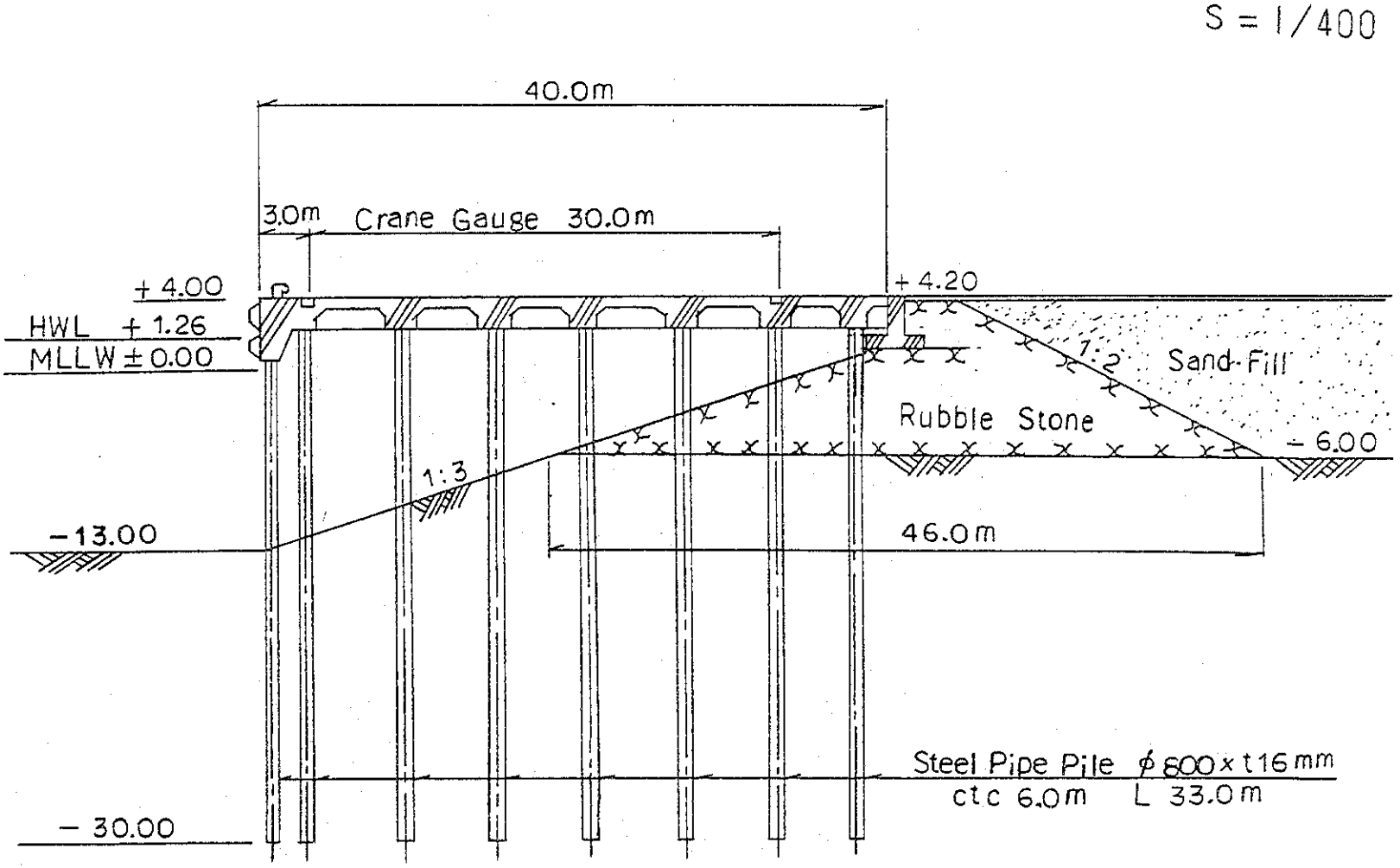


Figure 2-7-6 Typical Cross Section of -10m Container Berth at Sangley Point

2.8 Preliminary Project Cost

The project cost of the Master Plan under the medium economic growth case is approximately 20.9 billion pesos: 19.8 billion pesos for the Manila Port and 1.0 billion pesos for Batangas.

The project cost under the high economic growth case is approximately 43.3 billion pesos: 41 billion pesos at the Manila Port and 2.3 billion pesos for Batangas.

The project cost is based on facility layout plan and the preliminary design of the objective port facilities in the master plan and it is estimated under the precondition of the price as of December, 1993 year. The project cost includes physical contingency, but excludes price contingency. Table 2-8-1 shows the project cost in the medium economic growth case, and Table 2-8-2 shows the project cost in the high economic growth case.

In order to decide most suitable site to construct 3 additional berths of the foreign container terminal, the project cost at the Manila South Harbor, Naic/Cavite New Port and Sangley Point is estimated and the Manila South Harbor is selected. Table 2-8-3 shows the comparison list for the project cost.

In addition, long-term construction schedule in the medium economic growth case is shown in Figure 2-8-1.

Table 2-8-1 Preliminary Project Cost in Medium Economic Growth Case

Unit : Million Peso

Cost Item \ Port	Manila South	MICT	Manila North	Batangas	TOTAL
Port Facilities	353	4,783	4,687	461	10,284
Dredging / Filling	176	942	1,056	52	2,226
Wharf Construction	0	2,403	1,329	91	3,823
Road / Pavement of yard	120	722	861	58	1,761
Building Works	0	300	651	10	961
Utilities / Electricity	47	186	245	43	521
Other Works	10	230	545	207	992
Equipment	768	2,890	2,130	355	6,143
Indirect Cost	303	2,075	1,844	221	4,443
Total Cost	1,424	9,748	8,661	1,037	20,870

Table 2-8-2 Preliminary Project Cost in High Economic Growth Case

Unit : Million Peso

Cost Item \ PORT	Manila South	MICT	Manila North	Batangas	Total
1 Port Facility	5,120	6,458	7,429	954	19,961
1) General Expenses	149	188	216	29	582
2) Dredging(Million cu.m)	(5.30)	(5.02)	(8.63)	(0.79)	(19.74)
	705	670	1,166	87	2,628
3) Filling (Million cu.m)	(2.52)	(3.16)	(2.62)	(0.31)	(8.61)
	480	600	498	51	1,629
4) Container Berth(l.m)	(900m)	(1200m)	(1800m)	(330m)	(4230m)
	1,944	3,204	1,800	201	7,149
5) RO/RO, Conventional	(0)	(0)	(660m)	(290m)	(950m)
Berth (l.m)	0	0	397	156	553
6) Other Marine Works	489	176	200	188	1,053
7) Road/Pavement of yard	805	950	1,224	108	3,087
8) Building Works	300	400	1,084	20	1,804
9) Utility/Other Civil Works	248	270	844	114	1,476
2 Equipment	3,658	3,720	3,850	885	12,113
3 Connection Road	73	0	0	0	73
4 Land Acquisition Cost	240	0	2,170	0	2,410
5 Relocation Cost	80	0	0	0	80
6 Contingency/D/D/VAT	2,374	2,753	3,051	497	8,675
Project Cost	**11,545**	**12,931**	**16,500**	**2,336**	**43,312**

Table 2-8-3 Comparison List for Project Cost of -13.0 m, 900 m long Container Terminal at Each Candidate Site

Unit : Million Peso

Cost Item \ Port	Alternate I South har.	Alternate II Naic/Cavite	Alternate III Sangley Po.	Reference MICT
1 Port Facilities	**4,767**	**4,747**	**4,754**	**4,761**
1) General Expenses	139	138	138	136
2) Dredging/Filling	(5.3/1.6)	(5.65/3.7)	(8.5/0.5)	(3.5/2.5)
(Dredge/Fill M.cu.m)	1,009	773	956	940
3) Container Berth 900m	1,944	817	2,268	2,403
4) Breakwater (km)	(D 1.1)	(C 2.02)	(0)	(0)
Construct/Demolish	48	548	0	0
5) Other Marine Works	441	521	67	79
6) Building, Civil Works	1,186	1,950	1,324	1,203
2 Equipment	2,890	3,040	3,040	2,890
3 Indirect Cost	2,071	2,102	2,105	2,070
4 Connection Road to	(0.8)	(14.0)	(8.5)	(0)
Highway (km)	73	1,400	1,700	0
5 Land Acquisition	(4)	(60)	(45)	(0)
Cost (ha)	240	2	27	0
6 Relocation Cost	80	60	4,200	0
Total Project Cost	**10,121**	**11,351**	**15,825**	**9,721**

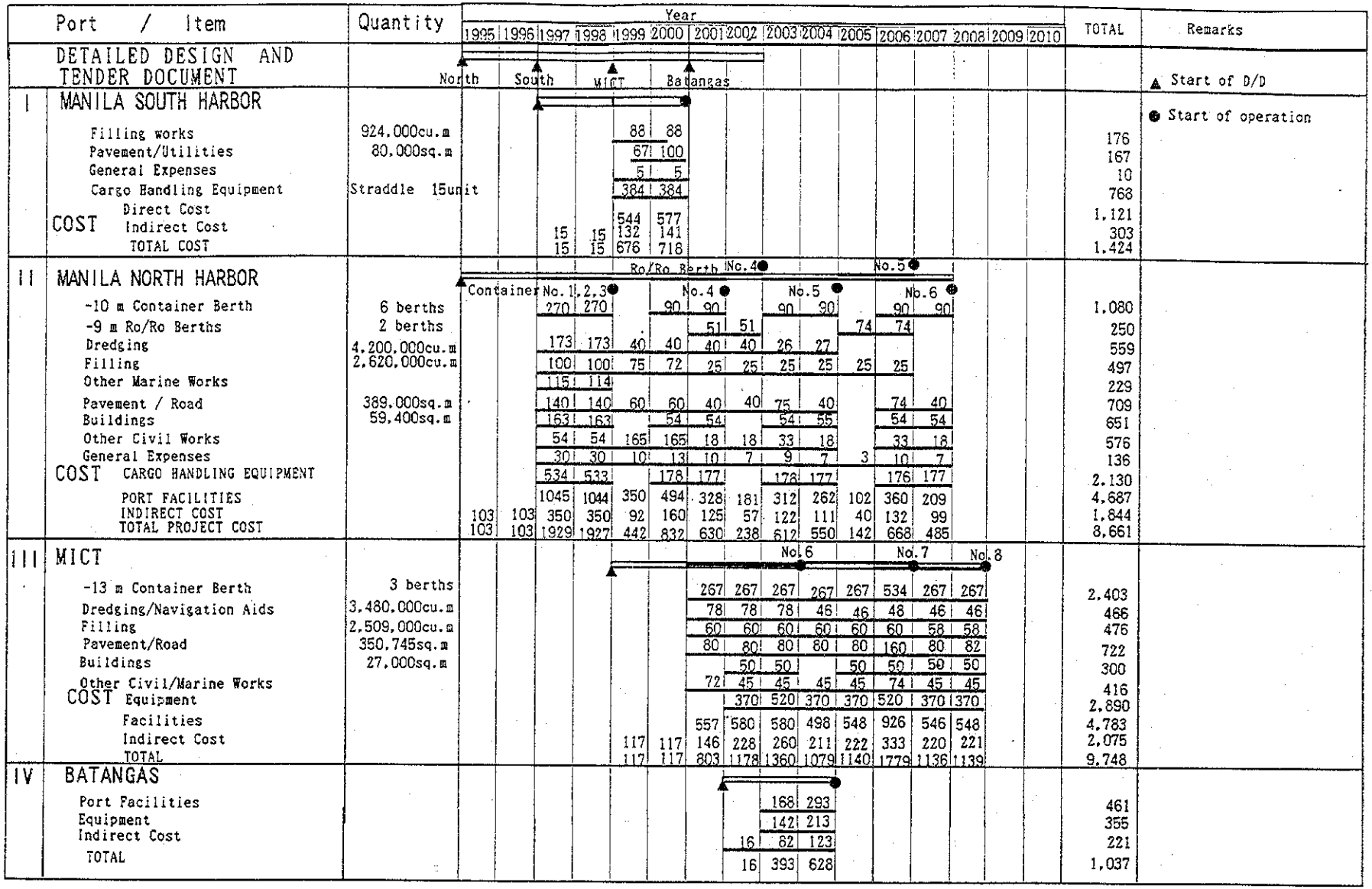


Figure 2-8-1 Long-term Construction Schedule

2.9 Initial Environmental Examination (IEE)

2.9.1 Rules and Regulations

The Environmental Impact Assessment(EIS) system in the Philippines began in 1978 under Presidential Decree 1586. In the year 1992, the Environmental Law in the Philippines was published by the University of the Philippines Law Center and the above system was established by DENR Administrative Order No.21 in the same year. That Administrative Order also describes in detail the procedure and items for EIS and so on.

In addition, the standards of each item for water quality is regulated by the DENR Administrative Order No.34, 35 in 1990.

2.9.2 Present Environmental Conditions

In the proposed project site, there is no special environment which must be preserved because these port sites have already been developed over a long period of time except the alternative Naic/Cavite New Port in the high case scenario.

The present environmental conditions in the proposed project sites are as follows:

(1) Port of Manila

The foreign and domestic container terminal and the domestic RO/RO terminal are planned along the existing breakwater where many people live.

The present BOD and PH levels satisfy the water quality criteria.

(2) Port of Batangas

The new port facilities after completion of the Phase I Project are planned at the west side of the Phase I Project area.

There are a few settlers in this area.

(3) Naic/Cavite New Port

The water area is used by only a small number of fishermen with small boats. In the inland area, there are several fish ponds. There is also a beach about one kilometer from the bottom of the planned access-road.

The present BOD and PH levels satisfy the water quality criteria.

(4) Sangley Point

The Naval Base occupies this area. The water area is globally used for the farming of oysters.

2.9.3 Result of IEE

The result of IEE at each stage in the Master Plan is summarized as follows:

(1) Planning Stage

1) Resettlement --- Port of Manila

As one of the countermeasures for the resettlement, the place where settlers are relocated should be incorporated with the on-going Smokey Mountain Development and Relocation Project.

2) Tidal Current --- Naic/Cavite New Port

When the detailed design is examined, the degree of erosion and accretion must be ascertained by means of a current simulation program and so on.

(2) Construction Stage

1) Water and Air Quality, Noise and Vibration
--- Port of Manila, Port of Batangas, Naic/Cavite New Port and Sangley Point

There is no significant impacts on the above items by means of the selection of suitable construction machines and the countermeasures of pollution control.

(3) Operation Stage

1) Water and Air Quality, Noise and Vibration
--- Port of Manila, Port of Batangas, Naic/Cavite New Port and Sangley Point

Impact on the environment from port activity is small.

2) Employment

--- Port of Manila, Port of Batangas, Naic/Cavite New Port and Sangley Point

Remarkable effect is expected.

Before the selected project is implemented, it is necessary that the detail Environmental Impact Assessment (EIA) should be examined at the early stage of the project.

2.10 Management and Operation

2.10.1 Modernization for Port Management and Operation

Second Manila Port Project is now under way to improve port efficiency. It is important for the Ports in GCR to modernize port management and operation for further development of the ports in GCR. World-wide development of containerization dictates that port management and operation be modernized rapidly. Through this wave of containerization, major shippers, consignees and agents are urging port authorities to modernize their port facilities.

2.10.2 Recommendation on Management and Operation for Containerization

In order to cope with containerization, key points for terminal operation are the following;

(1) Establishment of adequate set-up and operational procedures for container terminal
(2) Build-up of container information system
(3) Improvement of container handling fee and mechanical repair and maintenance skill

First of all, cargo storage procedures of a port administrative body including billing and cargo delivery in a port area have to be simplified as much as possible.

In November 1993, the adoption of six International Maritime Organization (IMO) FAS Forms which are the minimum documentary requirement on foreign ships were

approved. From the above mentioned point of view, these series of improvements are highly appreciated.

When the volume of container cargoes increases, it is indispensable for a terminal to introduce a computer system in order to improve the efficiency of planning, management and documentation.

2.10.3 Organization of Port Administrative Body

Generally speaking, inner organization of executive department (Head Office) should be simplified and streamlined.

And it is necessary to establish objective and clear criteria for promotion of the staff. The following points need to be considered in order to activate the organization.

(1) Training middle-ranked staff for positions of authority
(2) Establishment of objective and clear criteria for promotion of regular staff.
(3) Sharing information for strengthening organization
(4) Necessity of incentives for workers
(5) Establishment of task force for improving organization consisting of efficiency specialists

2.10.4 Management and Operation of Ports in GCR in the Target Year

In the large context of containerization, management and operation of Ports in GCR should be considered as follows;

(1) Port of Manila

Promotion of Privatization by MICT Scheme and Land Acquisition Aided by the Government

(2) Port of Batangas

Early solution to the Problem of relocation and Introduction of Privatizing Scheme

(3) Newly planned commercial port of Naic / Cavite New Port and Sangley Point

CHAPTER 3

PRELIMINARY EVALUATION OF MASTER PLAN COMPONENTS

CHAPTER 3 PRELIMINARY EVALUATION OF MASTER PLAN COMPONENTS

3.1 Short-term Demand Forecast

For the purpose of the short-term development plan, cargo volume is estimated in 2000 and 2005 respectively. Table 3-1-1 shows total volumes in these years.

Table 3-1-1 Cargo Volumes in 1991, 2000, 2005 and 2010
(Medium Case) (Unit:Thousand Tons)

Type	Year	in GCR	Manila	Batangas
Total	1991	18,173	17,173	1,000
	2000	32,954	31,060	1,894
	2005	42,902	39,584	3,318
	2010	56,715	52,015	4,700
Domestic	1991	11,464	10,520	944
	2000	17,691	16,127	1,564
	2005	23,239	20,751	2,488
	2010	30,707	27,019	3,688
Foreign	1991	6,710	6,654	56
	2000	15,263	14,933	331
	2005	19,662	18,831	831
	2010	26,008	24,996	1,012

3.2 Short-term Berth Requirements

Figures 3-2-1 to 3-2-3 show the relation of container cargo demand and berth requirement up to the year 2010 at the port of Manila. Each figure also shows the time by which each berth of the foreign container, domestic container and RO/RO terminal must be completed.

In addition, at the Port of Batangas, it is necessary to construct one(1) additional domestic container terminal by the year 2005 after phase I of the project is completed.

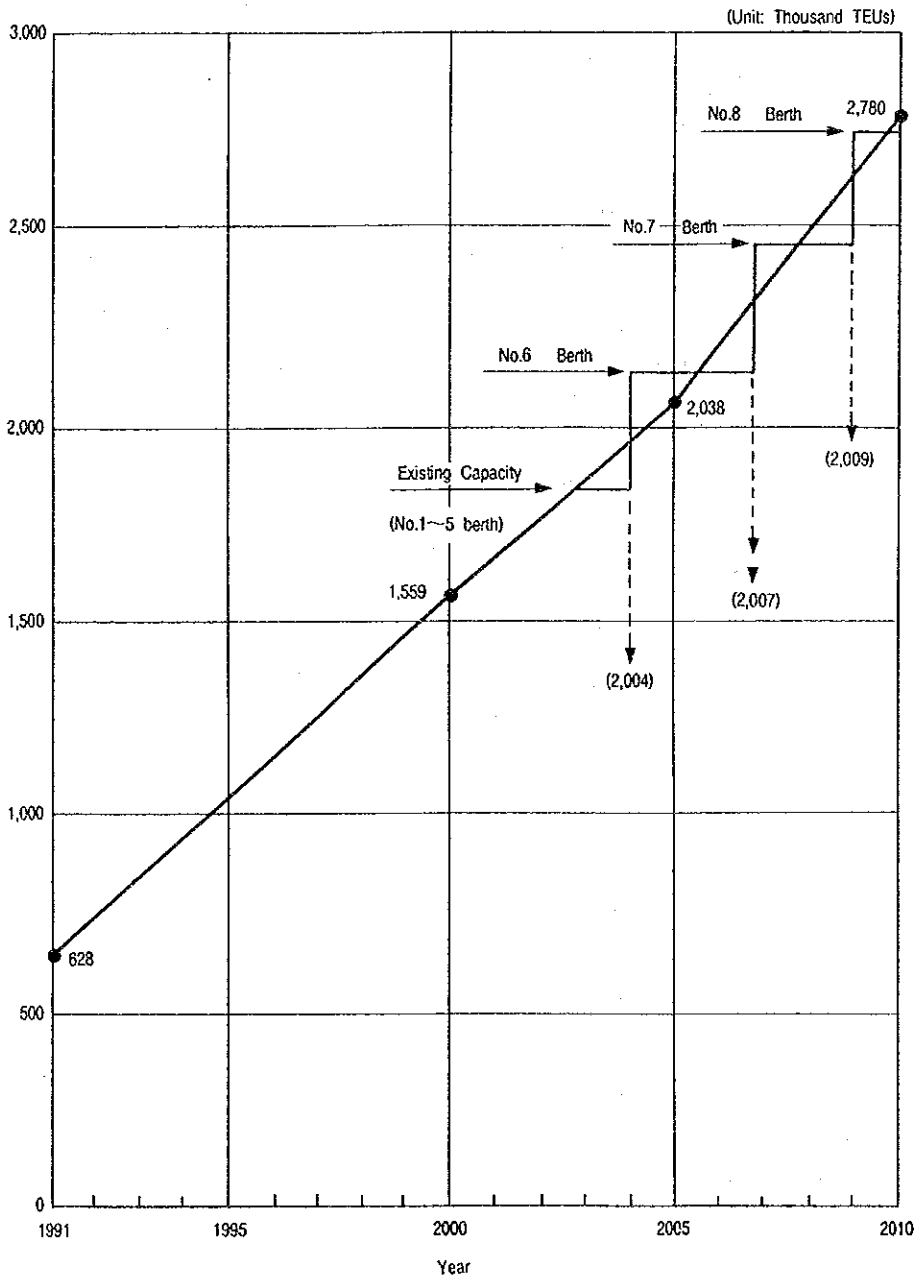


Figure 3-2-1 International Container Terminal at Port of Manila

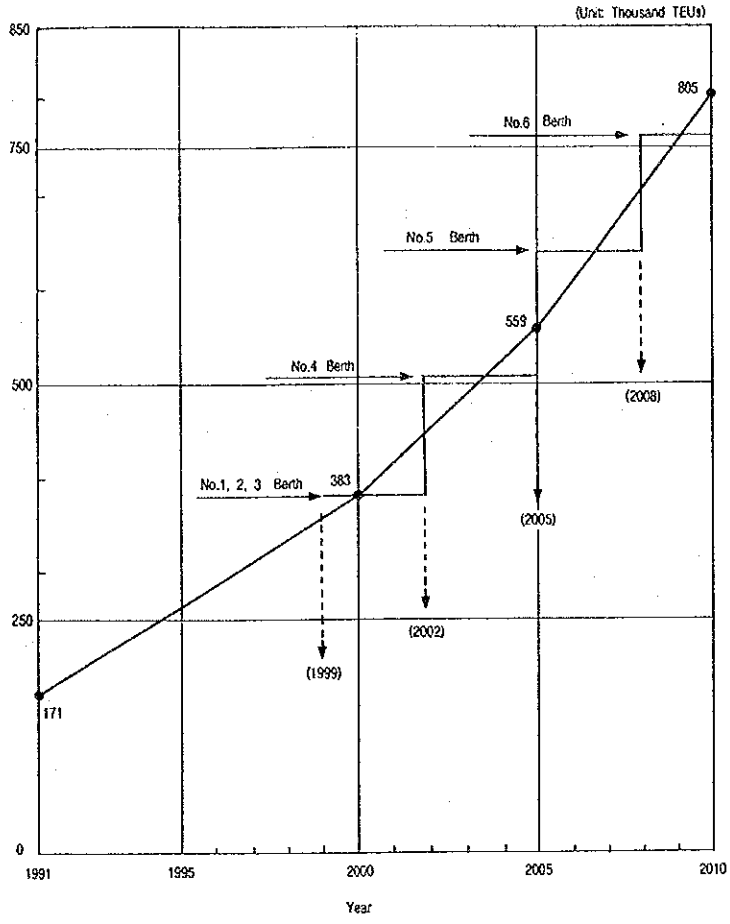


Figure 3-2-2 Domestic Container Terminal at Port of Manila

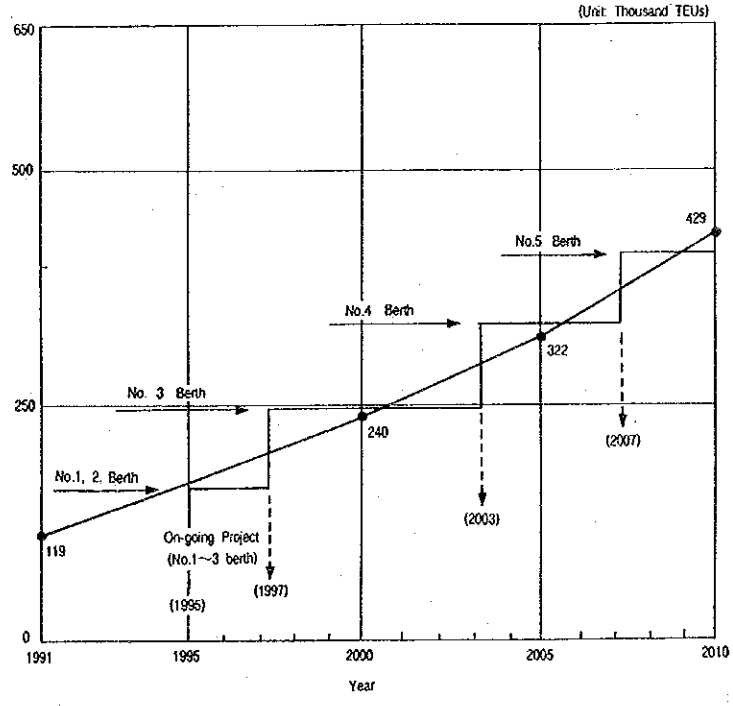


Figure 3-2-3 Domestic RO/RO Terminal at Port of Manila

3.3 Project Prioritization and Implementation Program

It is hoped that the new berths completed by the target year 2010 are able to timely cope with the port cargo and passenger demand. In view of this point, recommended implementation schedule in case of medium case scenario at the port of Manila and Batangas is shown in Figure 3-3-1 and 3-3-2 respectively.

According to this table, there are three(3) domestic container terminals, No1, No2 and No3, which must be completed and in full operation by 1999.

In addition, it is hoped that the other new berths completed after the year 2000 will be able to handle the port cargo and passenger demand.

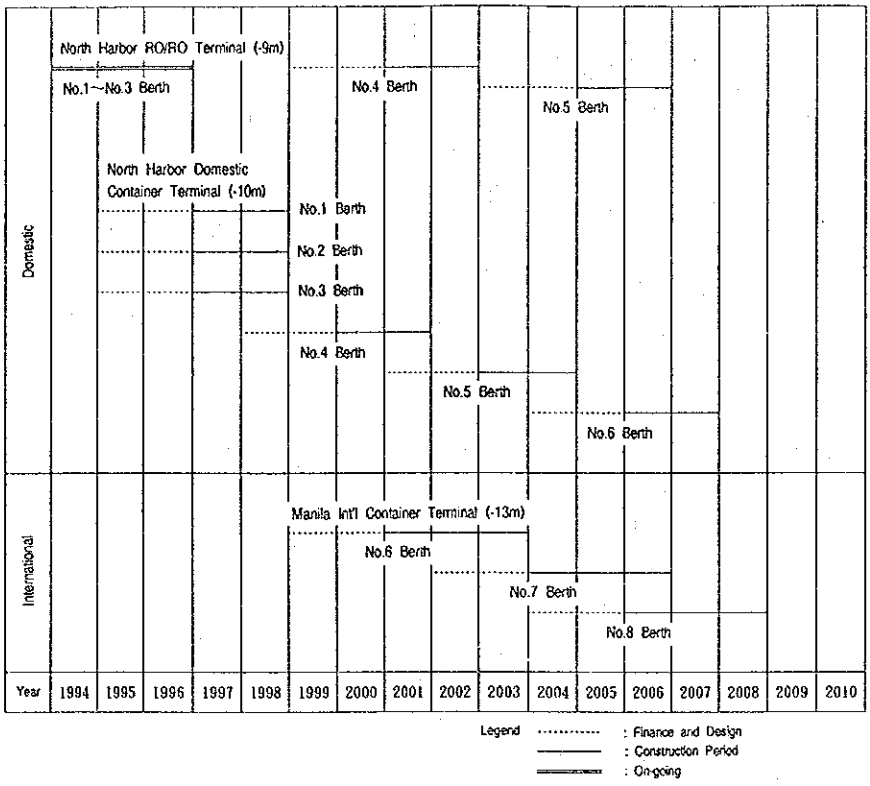


Figure 3-3-1 Project Implementation Schedule at Port of Manila (Medium Economic Growth Case)

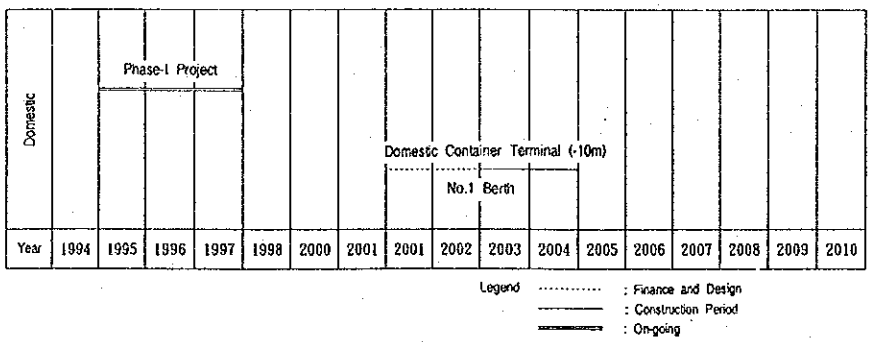


Figure 3-3-2 Project Implementation Schedule at Port of Batangas (Medium Economic Growth Case)

3.4 Project Cost

3.4.1 Preconditions of Cost Estimation

Project cost based on facility layout plan and the preliminary design of the objective ports in the master plan is estimated under the following preconditions.

(1) The price of cost estimation is as of December, 1993 and exchange rate of currency is :
US$ 1 = Peso 28.0 = ¥ 112 (Peso 1 = ¥ 4.0)
(2) Physical contingency is estimated at 10 %
(3) Engineering service is estimated at 5 %
(4) Value Added Tax is estimated at 10 %
(5) Inflation factor is excluded from the cost estimation
(6) Land acquisition cost : The price of 6000 peso/sq.m is applied at Manila Port Area. The estimated cost at Naic/Cavite New Port and Sangley Point is based on the latest price list obtained from Cavite State Government.
(7) Procurement such as cargo handling equipment and tug boat is assumed to be procured in Japan, and their import tax is exempted.
(8) Import and reexport taxes of construction plant & equipment procured from abroad used for the construction works of the project are exempted under the conditions of reexport.

3.4.2 Construction Plan

(1) Dredging : Dredging material at Manila Ports shall be disposed to offshore since the material which consists of silty or clayey soil is unsuitable for reclamation fill. Disposal area shall be at a place deeper than 20 meters below chart datum and about 20 km far from the Manila Port; disposed materials will not cause a siltation problem at the channels and basins of the Manila Port.
(2) Reclamation : Filling sand material for reclamation shall be obtained from coastal area of Cavite/Ternate offshore since a huge amount will be used for the reclamation of foreign container terminal at MICT and domestic container terminal at the North Harbor.

3.4.3 Project Cost

(1) Manila North Harbor

According to the short-term development plan of port facilities, three(3) domestic container berths at the North Harbor will be required for the short-term development project by the year 1998. Project cost of the North Harbor by the year 2010 for Master Plan is 86.61 billion pesos as shown in Table 2-8-1 of Chapter 2. Table 3-4-1 shows project cost of short-term development plan.

Table 3-4-1 Project Cost of Manila North Harbor

(Short-term Plan)

Description	Unit	Quantity	Unit Price (Peso)	Amount ('000 Peso)
1. CONSTRUCTION WORKS				**1,909,853**
(1). Marine Works	-	-	-	**1,139,207**
1). Dredging	cu.m	2,600,000	133	345,800
2). Filling	cu.m	1,050,000	190	199,500
3). -10m container berth	m	540	1,000,000	540,000
4). -9m new ro/ro berth	m	0	670,000	0
5). -9m existing ro/ro berth	m	0	568,000	0
6). Revetment	m	0	128,750	0
7). Access road offshore	m	1,020	52,850	53,907
(2). Civil Works	-	-	-	**712,500**
1). Pavement of yard	sq.m	129,600	1,600	207,360
2). Access road on land	m	950	91,100	52,250
3). Container freight station	sq.m	22,500	9,50	213,750
4). Meintenance shop	sq.m	2,400	12,500	30,000
5). Administration ofice	sq.m	4,800	17,000	81,600
4). Truck scale	unit	3	5,180,000	15,540
5). Utilities/Other civil works	Ha	16	7,000,000	112,000
6). Bridge at Pasig River	m	0	1,500,000	0
(3). General Expenses	sum	1		**58,146**
2. EQUIPMENT	-	-	-	**1,067,250**
1). Container crane	unit	3	180,000,000	540,000
2). Straddle Carrier	unit	11	26,000,000	286,000
3). Forklift 40 ton	unit	1	22,000,000	22,000
4). Forklift 25 ton	unit	2	11,000,000	22,000
5). Forklift 7.5 ton	unit	0	2,750,000	0
6). Forklift 5 ton	unit	12	1,750,000	21,000
7). Tractor Trailer	unit	30	3,250,000	97,500
8). Chassis	unit	45	1,750,000	78,750
3. INDIRECT COST	-	-	-	**805,306**
1). Physical Contingency	sum	1	-	297,710
2). Engineering Services Fee	sum	1	-	163,741
3). Value Added Tax	sum	1	-	343,855
TOTAL OF PROJECT COST				**3,782,409**

The construction schedule of the Manila North Harbor for short term development plan is shown in Figure 3-4-1. It is estimated to take 2 years (1995, 1996) for the detailed design and tender documents of the Project after the feasibility study. The construction of 3 berths, which all the main works, will take 2 years.

Amount : Million Peso

Description	Quantity	Amount	1995	1996	1997	1998
1. Port Facilities		1,910			952	958
1). General Expenses	1 sum	58			28	30
2). Dredging	2,600,000 cu.m	346			173	173
3). Filling	1,050,000 cu.m	200			100	100
4). -10m contaier berth	3B. 540 m	540			270	270
5). Access road	1,970 m	106			52	54
6). Pavement	129,600 sq.m	207			103	104
7). Buildings	29,700 sq.m	325			162	163
8). Utilities/Other works	1 sum	128			64	64
2. Equipment	-	1,067	-	-	534	533
1). Container crane	3 unit	540			350	190
2). Straddle carrier	11 unit	286			184	102
3). Forklift/Tractor etc,.	90 unit	241			-	241
3. Indirect Cost		805	45	45	357	358
TOTAL COST		3,782	45	45	1,843	1,849

Figure 3-4-1 Short-term Implementation Schedule at North Harbor Project

(2) Batangas Port

Table 3-4-2 shows project cost of the Batangas port for short-term development plan.

Table 3-4-2 Project Cost of Batangas Port

Amount : Million Peso

Description	Unit	Quantity	Unit Price	Amount
1. Port Facilities	-	-	-	461.3
(1). General Expenses	sum	1	-	13.4
(2). Marine Works	-	-	-	346.8
1). Dredging	cu.m	365,000	110	40.2
2). Reclamation	cu.m	74,000	164	12.1
3). -10 m container berth	m	150	609,000	91.4
4). -10 m seawall	m	300	549,000	164.7
5). Revetment seaside	m	200	90,000	18.0
6). Revetment sidewall	m	85	60,000	5.1
7). Artificial concrete block	cu.m	3,600	4,250	15.3
(3). Civil Works	-	-	-	101.1
1). Pavement of yard	sq.m	27,380	1,600	43.8
2). Port road W=22 m	sq.m	13,200	1,075	14.2
3). Outdoor lighting	berth	1	15,750,000	15.8
4). Utilities	sum	1	-	14.7
5). Other civil works	sum	1	-	2.6
6). Warehouse	sq.m	800	12,500	10.0
2. Equipment	-	-	-	355.0
1). Container crane	unit	1	180,000,000	180.0
2). Straddle carrier	unit	4	26,000,000	104.0
3). Forklift 40 ton	unit	1	22,000,000	22.0
4). Forklift 5 ton	unit	4	1,750,000	7.0
5). Tractor	unit	7	3,250,000	22.8
6). Chassis	unit	11	1,750,000	19.2
3. Indirect Cost				220.8
TOTAL COST				1,037.1

Figure 3-4-2 shows the implementation schedule of the Batangas Port. Construction shall be completed by the end of year 2004.

Amount : Million Peso

Item	Quantity		Amount	2002	2003	2004
1. Port Facility			461.3		168.4	292.9
(Marine Works)						
1). Dredging	365,000	cu.m	40.2		40.2	
2). Reclamation	74,000	cu.m	12.1			12.1
3). -10 m seawall	300	m	164.7		82.3	82.4
4). -10 m container berth	150	m	91.4		30.4	61.0
5). Revetment	285	m	38.4			38.4
(Civil Works)						
6). Pavement of yard	27,380	sq.m	43.8			43.8
7). Port road	13,200	sq.m	14.2			14.2
8). Warehouse	800	s	10.0			10.0
(Common Works)						
2. Equipment			355.0		142.0	213.0
1). Container crane	1	unit	180.0		90.0	90.0
2). Straddle carrier	4	unit	104.0		52.0	52.0
3). Forklift/tractor, etc	23	unit	71.0			71.0
3. Indirect Cost			220.8	16.5	81.6	122.7
1). Engineering Services			44.9	15.0	14.9	15.0
2). Physical Contingency			81.6	0.0	31.0	50.6
3). Value Added TAx			94.3	1.5	35.7	57.1
TOTAL COST			1,037.1	16.5	392.0	628.6

Figure 3-4-2 Implementation Schedule at Batangas Port

3.5 Technical Evaluation

Technical evaluation is as follows.

Port	Wave Calmness	Tidal Current	Soil Condition
Manila South	mostly calm	mostly allowable	less sustainable
Manila North	mostly calm	mostly allowable	sustainable
MICT	mostly calm	mostly allowable	Partially less sustainable
Batangas	normally calm	allowable	sustainable

3.5.1 Manila South Harbor

The waves and tidal current conditions are not severe inside the breakwater.
Existing water depth in basin is about - 11 m.
For the future expansion, following points shall be considered carefully.

(1) The space of basin is not sufficient for ocean-going ship.
(2) Soil condition is soft up to around - 30 m.
(3) The circular slip will occur near existing breakwater in case of surcharge 2 tf/sq.m, therefore, soil improvement method will be required for construction of new container berth.
(4) Construction cost for new berth will increase due to soil improvement method.
For the soil improvement method ; Sand Compaction Pile method will be recommended up to - 25 m.

3.5.2 Manila North Harbor

The waves and tidal current conditions are not severe inside the breakwater.
Existing water depth in basin is from - 6 m to - 8 m.
For the future expansion, following points shall be considered carefully.

(1) The inner part of the harbor is narrow and shallow.
(2) Soil condition is soft up to around - 15 m.
(3) Dredged material cannot be used for reclamation due to soft silty clay.

3.5.3 MICT

The waves and tidal current conditions are not severe inside the breakwater.

For the future expansion, following points shall be considered carefully.

(1) Water depth in front of existing container berth is deep (around - 12 m) but the water depth near existing north breakwater is shallow (around - 2 m).

(2) Dredging work will be required in front of proposed container berth and approach channel.

(3) Dredged material cannot be used for reclamation.
Offshore dumping will be required.

3.5.4 Batangas port

The port is well protected from waves by Mindro Island and the water depth of the bay is very deep.

The proposed development site of Phase-II is adjacent to ongoing development site of Phase-1.

Most of data for natural condition of Phase-I can be used for proposed port facilities.

The soil condition of proposed site is assumed to be sandy layer.

The Steel Sheet Pile type berth structure will be selected for container and RO/RO berths.

3.6 Preliminary Economic Evaluation

(1) Outline

A master plan study is the main theme of this study, and a feasibility study shall be conducted as preliminary evaluation study for the ports of Manila and Batangas. For instance, preliminary evaluations of the long-term development plan and the short-term development plan were carried out from the national economic point of view. Those development plans include short-term plan of domestic container terminal(3 berths), long-term plans of domestic container terminal(3 berths) and domestic Ro-Ro terminal(2 berths) and foreign container terminal(3 berths) at the Port of Manila, and also a domestic container terminal at the Port of Batangas.

Benefits gained from the implementation of projects are savings in waiting cost of vessels, savings in ocean transport costs by means of improvements of ship operation schedule, savings in time cost of cargoes and savings in additional cargo handling equipment costs.

The Economic Internal Rate of Return(EIRR) of all components of this project exceeds 15%, which is the opportunity cost of capital in the Philippines.

(2) Benefits

Benefits were calculated as a balance between "with case" and "without case". The type of vessel and type and volume of cargo are the same in both cases.

1) Savings in vessel waiting cost.

Existing terminal will be operated in "without case", and waiting of vessels will be introduced through severe congestion. Savings in waiting cost of vessels are calculated as a benefit.

2) Savings in ocean transport costs by means of improvements of ship operation schedule.

Sizes of domestic container vessel and Ro-Ro vessel are enlarged, and depths of berths are planned to be dredged deeper. In "without case", vessel calls with 75% loading instead of full loading. The worsening of turnaround time due to lack of capacity of water transportation increases the cost of water transportation. Savings in

ocean transport costs by enlargement of vessel and so on are calculated as a benefit.

3) Savings in time cost of cargoes

Cargo owner gets the capital gain as early return of invested capital from shortened waiting time and handling time. Savings in time cost of cargoes are calculated as a benefit.

4) Savings in additional cargo handling equipment costs

Existing container terminal for domestic cargo has no gantry crane. Handling works for the increasing container cargoes require transfer equipment. Savings of cost in cargo handling are calculated as a benefit.

(3) Cost

The items that should be calculated as costs of the projects are construction costs, maintenance costs and renewal investment costs. Personnel cost is considered the same in both with and without cases.

Table 3-6-1 Cost and Benefit

PROJECT	COST	BENEFIT
MANILA INTERNATIONAL CONTAINER TERMINAL	· CONSTRUCTION 3 BERTHS · MAINTENANCE, RENEWAL	· VESSEL WAITING · TIME COST OF CARGO
MANILA DOMESTIC CONTAINER TERMINAL	· CONSTRUCTION 3 BERTHS · MAINTENANCE, RENEWAL	· VESSEL WAITING · OCEAN TRANSPORT COSTS · TIME COST OF CARGO · CARGO HANDLING
MANILA DOMESTIC CONTAINER TERMINAL RO/RO TERMINAL	· CONSTRUCTION CONTAINER 3 BERTHS RO/RO 2 BERTHS · MAINTENANCE, RENEWAL	· VESSEL WAITING · OCEAN TRANSPORT COSTS · TIME COST OF CARGO
BATANGAS DOMESTIC CONTAINER TERMINAL	· CONSTRUCTION 1 BERTH · MAINTENANCE, RENEWAL	· VESSEL WAITING · TIME COST OF CARGO

(4) Economic Internal Rate of Return(EIRR)

Economic evaluation of a project is carried out by calculating EIRR. Minimum value of EIRR is 17% reported in Table 3-6-2. This exceeds 15% which is the opportunity cost in the Philippines, and so this project is evaluated feasible from the viewpoint of the national economy.

Table 3-6-2 Economic Internal Rate of Return

Project	Cost (billion pesos)	Benefit (billion pesos)	EIRR (%)
Manila International Container Terminal	15.7	76.6	20
Manila Domestic Container Terminal	6.1	28.2	18
Manila Domestic Container Terminal RO/RO Terminal	7.0	34.5	17
Batangas Domestic Container Terminal	1.8	17.2	28

3.7 Environmental Consideration

In the short-term project, three domestic container terminals at the North Harbor are planned along the existing breakwater.

3.7.1 Present Conditions of Port of Manila

DO and PH levels satisfy the water quality criteria at the Port of Manila. However, the water quality of Pasig River which flows into the Port of Manila, especially water turbidity, seems to be quite bad based on the field observation.

One of the reasons is that sewage from houses and factories which contributes to water pollution directly flows into the Pasig River because of the lack of a sewage disposal plant and so on.

Furthermore, an offensive odor emanating from a waste disposal site near the North Harbor affects not only settlers around Smoky Mountain but also a part of the port area.

3.7.2 Environmental Consideration in the Port Sector

(1) Resettlement

Along the existing breakwater where the domestic container terminals is planned, many settlers live. In order to realize this project successfully, first of all, it is necessary that these settlers are moved to another area, but it is also necessary to have their agreement for the resettlement. As one of the countermeasures for the resettlement, the place to where they are relocated should be incorporated with the on-going Smokey Mountain Development and Reclamation Project. In this way, settlers will be more willing to agree to resettlement.

(2) Environmental Consideration around the Port Area

This proposed project site has already been developed as port facilities over a long period of time. The works for the extension of the existing breakwater is under construction. Dredging works to deepen/maintain the channel or the turning basin are regularly conducted.

Considering the above conditions, impact on environment from the construction of new port facilities and the port activities is judged to be small.

But, in order to keep the port and the area around the port in good condition, it is also necessary to continuously conduct monitoring, expand regulations on the environment and introduce suitable countermeasures for preservation of the environment.

(3) Mitigation of Traffic Congestion

According to the result of the OD survey which was conducted last year by the Study Team, the impact from the port activities on urban traffic in Metro Manila is very small. However, there is serious traffic congestion at the intersection of the port access road.

Therefore, in order to mitigate the traffic congestion behind the port area and to keep the future port cargo stably and smoothly transported to consumers related to the development of the port of Manila, it is necessary to timely construct the road net-work behind the port area and the Inland Container Depot(ICD) Project.

3.8 Privatization of the Objective Ports

3.8.1 Privatization of the Public Ports in the GCR

(1) There is marked trend torwards privatization in ports throughout the world, and yet it is very difficult to define and evaluate this so-called "privatization" because of peculiarities among individual ports and countries. The privatization scheme to be adopted depends upon the degree of remaining duties in the public sector.

If the privatized area is confined to cargo handling, it can be said that Philippine public ports have been privatized from the beginning. Therefore 'Privatization' in the Philippines means the promotion of private sector participation in the public port operations in consideration of the following:

1) Lightening the burden of government capital expenditure for newly constructed terminals and/or expansion of existing berths
2) Rapid decision making of the private sector
3) Eliminating bureaucratic system and promoting efficiency
4) Easy fund acquisition and no budget restraints

The problem confronting a public port's management and operation from the short-term prospective is how to decide priorities on the adoption of privatized schemes that harmonize with a long-term economic target.

An additional problem is how the PPA, which is the entity not only as a regulator of the Philippines but also as an owner of the public ports and an operator, would be placed in relation to the development of privatization.

(2) The PPA is a public trust and a business enterprise simultaneously. The Board of PPA adopted a privatization strategy in 1987.

The privatization of small and medium sized public ports of the PPA which are not suitable for comprehensive privatization will be confined to the cargo handling as at the present. But comprehensive privatization of the main ports of the PPA should be promoted though the public interests must be maintained.

Therefore, privatization of the main ports in the GCR such as the Port of Manila and the Port of Batangas should be promoted aggressively considering the urgent needs of modernization and the cargo demand forecast.

A container terminal can be run most efficiently when operated entirely by one shipping company. In the GCR, there is a low number of container berths at present. Therefore these berths should be used openly.

However preferential usage and/or exclusive usage should be considered in order to raise efficiency when the newly planned container terminals are completed.

The PPA has to organize their construction and should be the owner. Then the PPA can switch to the above mentioned usage giving priority to public use.

MICT was the pilot project privatized under the 'Lease & Concession scheme'. It is thought best that these terminals be managed and operated through this scheme.

(3) PPA Privatizing Scheme

The PPA has the following four privatizing schemes including MICT scheme.

(SCHEME)	(PLACE)	(CONTENTS)
MICT SCHEME	MICT	- Public bidding in 1988 - Vested rights to manage, operate and develop the port for 25 years - Facilities revert to the PPA in case of the expiration of the lease or canceling the contract - Investment for port facilities and equipment by the contractor - Requisitions to keep the most suitable and efficient operations, management and maintenance - levying port charge for consideration of services - Payment for fixed fee and variable fee based on the revenue
MANAGEMENT CONTRACT SCHEME	SOUTH HARBOR	- The contract not involving infrastructure development but involving only the management and operation of cargo handling services and the provision of all necessary cargo handling equipment

BOT SCHEME	GRAIN	- Awarded through public bidding
	BULK	- A given infrastructure is built by a contractor
	TERMINAL	- The infrastructure is operated for a specified period of time and its ownership transferred to the government
PORT ESTATE PROJECT SCHEME	NORTH HARBOR	- Conceptualized by PPA in 1987 - Areas leased to the shipping companies - The shipping companies are responsible for the provision of cargo handling and other supplementary services - Rent is paid to PPA on a monthly basis

(4) Primary Tasks in Privatization of GCR Public Ports

1) Functional allotment among the container terminals (MICT, South Harbor and newly-planned container terminals)

Generally speaking, usage of a terminal can be divided into two types, 'general use' and 'exclusive use'. The former can be also divided into 'open use' and 'preferential use'. The adopted form will often make differences of a scale of the terminal or cargo handling capacity.

Therefore each container terminal of the GCR should be classified based on their functional allotments and their usage style should be decided, namely 'open use', 'preferential use' or 'exclusive use'.

2) Profitability of Grain Bulk Terminal privatized under BOT Scheme

Whether the private sector can recover the initial investment for the specified period of time is the main problem. The key for the success of a project under the BOT scheme depends on the investment conditions which are provided by the government.

3) The government should give priority to the privatization of the public ports in the GCR and establish criteria for privatizing and evaluating. In order to do so, further cooperation and adjustments between the authorities concerned (DOTC, PPA, NEDA, DTI etc.) will be needed.

3.8.2 PPA Organization

The PPA formed a Management Audit Task Force in September, 1992 and has been re-examining privatized-options for the ports.

On the above mentioned back-ground, the PPA is not only faced with reexamining its organization, but reconsidering the PPA Charter in addition to the decentralization of authority.

When it comes to the application of 'Early Retirement System, which aims at streamlining the organization, the brain drain of excellent staff from the PPA must be prevented. At the same time, the supernumeraries coming from the streamlining of the organization must be coped with deliberately and be adjusted on the whole. In order to do so, it is important for the PPA to enrich the staff training and upgrade job specifications.

3.8.3 PPA Finance from the Short-term Perspective

The financial indicators of the PPA from 1988 to 1993 are shown in Part I. Both the operating ratio and the working ratio reach the preferable level. On the other hand, the rate of return on net fixed assets does not reach the preferable level.

A two-step increase of the tariff was approved in March, 1994. The last time the PPA increased its port charges was in 1983. Since then, prices have increased an average of 230%. The increase at this time is considered necessary.

In addition, the PPA's financial position has taken a turn for the better owing to Executive Order 159 dated February 23, 1994, directing all agencies of government to revise their fees & charges at just and reasonable rates sufficient to recover at least the full cost of services rendered.

The problem is that although the PPA controls currently more than a hundred of the public ports in the Philippines, most of them are not independent financially. Consequently, the main ports of PPA in the GCR support the others.

3.8.4 Conclusion and Recommendations in Management and Operation

(1) Monopolistic cargo handling services should be abolished in the GCR public ports and their services should be procured by public bidding.

(2) When the promotion of privatization, the role between the public sector and the private sector should be clarified. And the PPA's assets must be made use of effectively in order to maximize the economic benefits and introduce the private sector's investment aggressively.

(3) The first urgent task for promoting privatization is to make a Terms of Reference of public bidding for safeguarding public interests. The next is to make the criteria for evaluation of each privatization scheme. A related task is to prepare and clarify the claim procedures from a company or consortium which can not be awarded the bidding.

(4) Accurate, prompt and reliable data for vessels, cargoes, their demand forecast and so on are indispensable in the contract between the public sector and the private sector. Computerized network system is very effective for that. A network system which links the bodies concerned should be considered from the beginning.

(5) Container terminal demands efficiency of transportation. From the viewpoint of efficiency, preferential usage or exclusive usage is desirable. However it must be deliberately considered to maintain public interests by the contract when their forms are adopted while not dampening the private sector's incentive.

(6) The following functions must be retained by the public sector to maintain public interests and safety.

1) Dredging of channels
2) Navigational aids
3) Navigational regulations
4) Ownership of land in a terminal including infrastructure

(7) The public sector should participate in the project implementation, trying to introduce the soft loan for that preparation, while clarifying the role between the public and private sectors.

3.9 Overall Evaluation

Overall evaluation shows that the port master plan at the Port of Manila and Batangas (Medium Economic Growth Case, GDP 5.5%) is feasible from the view point of (1) engineering soundness, (2) economic feasibility, (3) port traffic impact on urban road system in Metro Manila, and (4) environmental impact. The result of overall evaluation is summarized in Table 3-9-1.

Table 3-9-1 Result of Overall Evaluation

Item	Result	Remarks
Engineering Soundness	Good	Existing major structures are technically sound. There is soft clay foundation at the project sites, but introduction of oil improvement technique can accomplish technically feasible port construction.
Economic Feasibility	Good	Project greatly contributes to the national economy of the Philippines.
Port Traffic Impact on Urban Road System	Good	Project has no significant impact on urban road system. However, it is recommended to introduce truck-ban and rail-served container transport to/from the hinterland in order to alleviate the road congestion expected in future.
Environmental Impact	Good	Project has no significant environmental impact, but continuous monitoring of environment quality is recommendable.

CHAPTER 4

CONCLUSIONS AND RECOMMENDATIONS

CHAPTER 4 CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

4.1.1 Port Development Strategies

In order to catch up with the rapidly increasing seaborne cargo and passenger demand, together with the remarkable tendency in enlargement of calling vessels, it is urgently needed to accelerate port development at major ports in the Greater Capital Region.

Based on plural scenarios of future economic growth and land transportation network development in the hinterland and economic impact of infrastructure investment and environmental consideration, port development strategies for the Port of Manila, Batangas, Sangley Point, Naic/Cavite, Subic, Lucena/Pagbilao and Infanta/Real have been formulated. The essence of port development strategies is summarized as shown in Table 4-1-1.

Table 4-1-1 Port Development Strategies in the Greater Capital Region

Port	Present Situation	Port Development Strategy
Subic	· Broad calm water area. Former US Naval Base. · American President Lines (APL) has already started international container service but frequency is low, thus a small amount of container cargo is handled at the port. · Industrialization at Subic has been realized by Taiwan group at first. · Free port project has been announced and port authority has begun duty-free sale on a small scale. · Possible project for marine recreation development. Beach is now open for public. · Distant location from Metro Manila, especially poor road link between San Fernando and Olongapo. · Cargo handling system is not modernized, in addition further improvement of port facilities is still needed for efficient cargo handling operation.	· Base port whose hinterland covers the North-west Luzon Island. · In order to develop the Port, road investment connecting with major commercial or industrial centers should have the first priority. · From the very long-term point of view, international container transshipment port is possible. · Industrial port in accordance with industrial development in backward area is also possible. · The Port should play a role as free trade zone, shelter port during storm and other urgent use until the port and road links are fully developed.
Manila	· The busiest port in the Philippines. · Super-hub port connecting with all major islands. · Increasing seaborne cargo recently, in particular container and roll on/roll off cargo. · Obvious trend of vessel-size enlargement · Successful privatization at the Manila International Container Terminal (MICT) · Rail-served Inland Container Depot Project by MICT · Definite limitation of land space for port extension. · Possible impact of port traffic upon urban highway system in Metro Manila without any countermeasure in future.	· The Port of Manila remains unshakable as super-hub port of the Philippines · In accordance with de-centralization of Metro Manila's urban function together with highway improvement extension in surrounding areas, diversion of the port role and function at Manila will be promoted. · The provision of further port facilities for rapidly increasing domestic container and roll on/roll off cargo is very urgent. Countermeasure for vessel-size enlargement is also needed. · Regarding international container cargo, Mict'S NO.5 container terminal and Rail-served Inland Container Depot (both are now projected), can catch up with increasing container demand up to the year 2000. After that, offshore port extension for new container terminals is required. · Further port improvement (Port facilities and cargo handling system) for coping with growing international container cargo, especially in high economic case scenario, at the South Harbor should be accelerated. · In order to decrease the impact of port traffic on urban highway system, a port bridge across the Pasig River is needed. In addition, R-10 elevated highway project should be implemented.
Sangley Point	· Broad calm water area. Close to the South Channel in the Manila Bay. · Located in the neighborhood of Cavite Export Processing Zone (EPZ) and Metro Manila as well. · Relocation of the Naval Base is difficult. · Capacity of the access road to the proposed port site is not enough, in addition, widening of the road is infeasible due to fully developed urban district.	· Conversion plan of the Naval Base into an international commercial port is possible if relocation of the Base is achieved. · Wide discussion about the Naval Vase relocation is recommendable, from the national economic point of view. · From the long-term point of view, a construction plan of an international container port surrounding Sangley Point will mature, in spite of unsuccessful relocation of the Naval Base. · Further development of Cavite's EPZ and highway extension to Rosario will accelerate a new port construction.
Naic/ Cavite	· Natural sand beach, very shallow water area. · Small scale fishing activity, and seasonal beach recreation. · Sandy solid foundation at sea bottom. (Good natural condition for port construction) · Poor access road link to the port to cope with heavy container cargo transport. · Distance from commercial or industrial centers in GCR is also in question (Super highway construction is needed)	· High potential to construct a large scale commercial port along the Naic coast according to natural and social conditions. · The port construction plan of a few number of container berths is not recommendable for economic reasons. · Countermeasure for strong wave attack from the north direction should be carefully taken into account, during project implementation. · Countermeasure for drift sand into a port should be also taken into account.
Batangas	· Base port for trade with the Mindoro Island. · Roll on/roll off vessel's cargo and passenger are rapidly increasing. · A deep-sea port is possible without breakwaters. · Super-highway between the Port and the South Super Expressway is necessary. · Increasing demand of port cargo related to progress of the CALABARZON Regional Development Project.	· Base port for trade with the Mindoro Island is strengthened. · Provision of further port facilities for growing container cargo is accelerated after the completion of Phase-I project. Further port extension is not urgent until the target year 2010. · Improvement of cargo handling system to cope with modern container and roll on/roll off vessel arrival at the port. · The most promising port to assist the CALABARZON Regional Development Project.
Lucena/ Pagbilao	· Location is 13~15 km away from the city of Lucena. · 2 x 350 MW power plant project is on-going in the Pagbilao Grande Island. · There is a development plan of a large scale commercial port by using loading/unloading facilities at the power plant. · Trunk road from Metro Manila has been implemented, accordingly a short road to Pagbilao remains undeveloped. · Broad undeveloped areas in terms of water and land.	· High potential to construct a large scale commercial port at Pagbilao from the viewpoint port at Pagbilao from the viewpoint of land acquisition and provision of broad calm water area. · Sea water is shallow, -5 m more or less. Dredging volume for access channel and turning basin will be on a large scale. · A large scale port bridge must be constructed toward the Pagbilao Grande Island. · Development Plan of a large scale commercial port will not mature for the time being, as contrasted to Phase-I project implementation at Batangas in near future. · Conservation of water resources must be carefully taken into account.
Infanta/ Real	· Small local port for trade with the Polillo Island. · Greater function as a fishing port. · Promising location near to Japan and other regions in the Pacific Ocean. · Sand beach coast and shallow sea water. · Roads to Metro Manila and Lucena have not been developed yet. Accordingly, totally isolated.	· A huge amount of road investment is needed, but priority of road development is still low at present, consequently the construction of a commercial port at Infanta/Real will not be possible from the short or medium term point of view. · Base port along the Easter Luzon coast will mature from the long-term Point of view.

4.1.2 Master Plan

Based on the above-mentioned port development strategies, the port master plans (Long-term port facility's plan and introduction of necessary cargo handling equipment) for the Port of Manila (South Harbor, Manila International Container Terminal and North Harbor), Batangas, Sangley Point and Naic/Cavite have been formulated, as shown in Table 4-1-2. The map of the port master plan for the Port of Manila and Batangas in the medium economic growth case, is also shown in Fig. 4-1-1 to Fig. 4-1-2.

Table 4-1-2 GCR Port Master Plan (1)

Port	Project	Low Economic Growth Case (GDP 4%)		Medium Economic Growth Case (GDP 5.5 %)		High Economic Growth (I) Case (GDP 7~7.5%)		High Economic Growth (II) Case (GDP 7~7.5%)		High Economic Growth (III) Case (GDP 7~7.5%)		Assumptions of Scenario
		Cargo Through put	Requirement	Cargo Though put	Requirement	Cargo Through put	Requirement	Cargo Through put	Requirement	Cargo Through put	Requirement	
MANILA	South Harbor Int'l Container Terminal	4,210 (Thousand Tons)	<Facility> Int'l container yard: 7.5 ha	4,440 (Thousand Tons)	<Facility> Int'l container yard: 7.5 ha	10,430 (Thousand Tons)	<Facility> Int'l container terminal: 3 berths (Depth -13 m; Length 300 m) *and container yard: 35.4 ha* Int'l container yard: 7.5 ha Dredging for access channel and turning basin: 5.3 Mil m^3 Port access road: 1,850 m <Equipment> Container Crane: 6 Nos. Transfer Crane: 15 Nos.	4,200 (Thousand Tons)	<Facility> Int'l container yard: 7.5 ha	4,200 (Thousand Tons)	<Facility> Int'l container yard: 7.5 ha	· All Surface and elevated highway projects are timely implemented according to DPWH's Highway Development Program.
	Manila Int'l Container Terminal (MICT)	12,090 (Thousand Tons)	<Facility> Int'l container Terminal: 1 berth (Depth -13 m; Length 300 m) Int'l container yard: 10 ha Dredging for access channel and *turning basin: 1.98 Mil m^3* <Equipment> Container Crane: 2 Nos. Transfer Crane: 5 Nos.	17,800 (Thousand Tons)	<Facility> Int'l container Terminal: 3 berths (Depth -13 m; Length: 300 m) Int'l Container yard: 30.2 ha Dredging for access channel and *turning basin: 3.48 Mil m^3* <Equipment> Container Crane: 6 Nos. Transfer Crane: 15 Nos.	20,570 (Thousand Tons)	<Facility> Int'l container Terminal: 4 berths (Depth -13 m; Length 300 m) Int'l container yard: 39.5 ha Breakwater extension: 400 m *Dredging for access channel and* turning basin: 5.02 Mil m^3 <Equipment> Container Crane: 8 Nos. Transfer Crane: 20 Nos.	20,570 (Thousand Tons)	<Facility> Int'l container Terminal: 4 berth (Depth -13 m; Length 300 m) Int'l container yard: 39.5 ha Breakwater extension: 400 m *Dredging for access channel and* turning basin: 5.02 Mil m^3 <Equipment> Container Crane: 8 Nos. Transfer Crane: 20 Nos.	20,570 (Thousand Tons)	<Facility> Int'l container Terminal: 4 berths (Depth -13 m; Length 300 m) Int'l container yard: 39.5 ha Breakwater extension : 400 m *Dredging for access channel and* turning basin: 5.02 Mil m^3 <Equipment> Container Crane: 8 Nos. Transfer Crane: 20 Nos.	· MICT's NO.3 int'l container terminal project will have been completed by the year 2000. · MICT's rail-served inland container depot project will have been compled without delay.
	North Harbor Dom'c Container Terminal	10,140 (Thousand Tons)	<Facility> Dom'c container terminal: 5 berths (Depth -10 m; Length 180 m) Dom'c container yard: 21 ha Dredging for access channel and turning basin: 3.7 Mil m^3 Port access road: 1,340 m Port bridge: 6 lanes *<Equipment>* Container crane: 5 Nos. Straddle carrier: 15 Nos.	13,750 (Thousand Tons)	<Facility> Dom'c container terminal: 6 berths (Depth -10 m; Length 180 m) Dom'c container yard: 26 ha Dredging for access channel and turning basin: 3.96 Mil m^3 Port access road: 1,520 m Port bridge: 6 lanes *<Equipment>* Container crane: 6 Nos. Straddle carrier: 18 Nos.	13,000 (Thousand Tons)	<Facility> Dom'c container terminal: 6 berth (Depth -10 m; Length 180 m) Dom'c container yard: 26 ha Dredging for access channel and turning basin: 3.96 Mil ^{3} Port access road: 1,520 m Port bridge: 6 lanes *<Equipment>* Container crane: 6 Nos. Straddle carrier: 18 Nos.	13,000 (Thousand Tons)	<Facility> Dom'c container terminal: 6 berths (Depth -10 m ; Length 180 m) Dom'c container yard: 26 ha Dredging for access channel and turning basin; 3.96 Mil m^3 Port access road: 1,520 m Port bridge: 6 lanes *<Equipment>* Container crane: 6 Nos. Straddle carrier: 18 Nos.	13,000 (Thousand Tons)	<Facility> Dom'c container terminal: 6 berths (Depth -10 m; Length 180 m) Dom'c container yard: 26 ha Dredging for access channel and turning basin; 3.96 Mil m^3 Port access road: 1,520 m Port bridge: 6 lanes <Equipment> Container crane: 6 Nos. Straddle carrier: 18 Nos.	· NHA's reclamation project is for mixed use, not for port facility only.
	Smokey Mount'n Dom'c Container Terminal					*8,440* (Thousand Tons)	<Facility> Dom'c container terminal: 4 berths (Depth -10; Length -180 m) Dom'c container yard: 17 ha Dredging for access channel and turning basin: 4.2 Mil m^3 Port access road: 3,500 m <Equipment> Container crane: 4 Nos. Straddle carrier: 12 Nos.	*8,440* (Thousand Tons)	*<Facility>* Dom'c container terminal: 4 berths (Depth -10 m; Length -180 m) Dom'c container yard: 17 ha Dredging for access channel and turning basin: 4.2 Mil m^3 Port access road: 3,500 m <Equipment> Container crane: 4 Nos. Straddle carrier: 12 Nos.	*8,440* (Thousand Tons)	*<Facility>* Dom'c container terminal: 4 berths (Depth -10 m; Length -180 m) Dom'c container yard: 17 ha Dredging for access channel and turning basin: 4.2 Mil m^3 Port access road: 3,500 m <Equipment> Container crane: 4 Nos. Straddle carrier: 12 Nos.	· *Smokey Mount'n Development and Reclamation* Project will have been completed by the year 2010.
	North Harbor Dom'c RO/RO Terminal	9,160 (Thousand Tons)	<Facility> Dom'c RO/RO terminal: 1 berth (Depth -9 m ; Length 220 m) *Dom'c RO/RO yard: 14.6 ha* Dredging for access channel and turning basin: 0.04 Mil m^3	12,400 (Thousand Tons)	<Facility> Dom'c RO/RO terminal: 2 berths (Depth -9 m; Length 220 m) *Dom'c RO/RO yard: 14.6 ha* Dredging for access channel and turning basin: 0.24 Mil m^3	15,040 (Thousand Tons)	<Facility> Dom'c RO/RO terminal: 3 berths (Depth -9 m; Length 220 m) *Dom'c RO/RO yard; 14.6 ha* Dredging for access channel and turning basin: 0.47 Mil m^3	15,040 (Thousand Tons)	<Facility> Dom'c RO/RO terminal: 3 berths (Depth -9 m ; Length 220 m) Dom'c RO/RO yard: 14.6 ha Dredging for access channel and turning basin: 0.47 Mil m^3	15,040 (Thousand Tons)	<Facility> Dom'c RO/RO terminal: 3 berths (Depth -9 m; Length 220 m) Dom'c RO/RO yard: 14.6 ha Dredging for access channel and turning basin: 0.47 Mil m^3	· NO.1 and NO.2 dom'c RO/RO terminals (both are on-going projects) will have been constructed by the year 1995. · NO.3 dom'c RO/RO terminal project will have been completed by the year 1997.

Table 4-1-2 GCR Port Master Plan (2)

Port	Project	Low Economic Growth Case (GDP 4%)		Medium Economic Growth Case (GDP 5.5 %)		High Economic Growth (I) Case (GDP 7~7.5%)		High Economic Growth (II) Case (GDP 7~7.5%)		High Economic Growth (III) Case (GDP 7~7.5%)		Assumptions of Scenario
		Cargo Through put	Requirement	Cargo Though put	Requirement	Cargo Through put	Requirement	Cargo Through put	Requirement	Cargo Through put	Requirement	
SANGLEY POINT	Int'l Container Terminal									6,230 (Thousand Tons)	<Facility> Int'l container terminal: 3 berths (Depth -13 m; Length 300 m) Int'l container yard: 27.9 ha Dredging for access channel and turning basin: 8.5 Mil m^3 Port access road: 4,300 m <Equipment> Container crane: 6 Nos. Transfer crane: 15 Nos.	· Cost for the Naval Base relocation is not borne by the port sector. · Manila-Cavite highway project will have been completed by the year 2010
NAIC/ CAVITE	Int'l Container Terminal							6,230 (Thousand Tons)	<Facility> Int'l container terminal: 3 berths (Depth -13 m; Length 300 m) Int'l container yard: 27.9 ha Breakwater : 2,020 m Dredging for access channel and turning basin: 5.65 Mil m^3 Port access road: 3,800 m <Equipment> Container crane: 6 Nos. Transfer crane: 15 Nos.			· Both DPWH's urban highway development projects and MICT's rail-served inland container depot project will not have been completed by the year 2010. · Relocation of the Naval Base at Sangley Point will not have been achieved.
BATANGAS	Int'l Terminal					1,200 (Thousand Tons)	<Facility> Int'l container terminal: 1 berth (Depth -10 m; Length 180 m) Int'l container yard: 2 ha Dredging for access channel and turning basin: 0.35 Mil m^3 Port access road 490m <Equipment> Container crane: 1 No. Straddle carrier: 3 Nos.	1,200 (Thousand Tons)	<Facility> Int'l container terminal: 1 berth (Depth -10 m; Length 180) Int'l container yard: 2 ha Dredging for access channel and turning basin: 0.35 Mil m^3 Port access road 490 m <Equipment> Container crane: 1 No. Straddle carrier: 3 Nos.	1,200 (Thousand Tons)	<Facility> Int'l container terminal: 1 berth (Depth -10 m; Length 180 m) Int'l container yard: 2 ha Dredging for access channel and turning basin: 0.35 Mil m^3 Port access road: 490 m <Equipment> Container crane: 1 No. Straddle carrier: 3 Nos.	· Phase-I project will have been completed without delay. · South Super Expressway's extension to Batangas will have been implemented by the year 2000.
						400 (Thousand Tons)	<Facility> Int'l conventional terminal: 1 berth (Depth -10 m; Length 170 m)	400 (Thousand Tons)	<Facility> Int'l conventional terminal: 1 berth (Depth -10 m; Length 170 m)	400 (Thousand Tons)	<Facility> Int'l conventional terminal: 1 berth (Depth -10 m; Length 170 m)	
	Dom'c Terminal	1,300 (Thousand Tons)	<Facility> Dom'c container terminal: 1 berth (Depth -10 m; Length 150 m) Dom'c container yard: 2.6 ha Dredging for access channel and turning basin: 0.4 Mil m^3 <Equipment> Container Crane: 1 No. Straddle Carrier: 3 Nos.	2,170 (Thousand Tons)	<Facility> Dom'c container terminal: 1 berth (Depth -10 m; Length 150 m) Dom'c container yard: 2.6 ha Dredging for access channel and turning basin: 0.4 Mil m^3 <Equipment> Container crane: 1 No. Straddle carrier: 3 Nos.	3,300 (Thousand Tons)	<Facility> Dom'c container terminal: 1 berth (Depth -10 m; Length 150 m) Dom'c container yard: 2.6 ha Dredging for access channel and turning basin: 0.4 Mil m^3 <Equipment> Container crane: 1 No. Straddle carrier: 3 Nos.	3,300 (Thousand Tons)	<Facility> Dom'c container terminal: 1 berth (Depth -10 m; Length 150 m) Dom'c container yard: 2.6 ha Dredging for access channel and turning basin: 0.4 Mil m^3 <Equipment> Container crane: 1 No. Straddle carrier: 3 Nos.	· Phase-I project will have been completed without delay. · South Super Expressway's extension to Batangas will have will have been implemented by the year 2000.
						2,400 (Thousand Tons)	Dom's RO/RO terminal: 1 berth (Depth -5.5 m; Length 120 m) Dredging for access channel and turning basin: 0.05 Mil m^3	2,400 (Thousand Tons)	Dom'c RO/RO terminal: 1 berth (Depth -5.5 m; Length 120 m) Dredging for access channel and turning basin: 0.05 Mil m^3	2,400 (Thousand Tons)	Dom'c RO/RO terminal: 1 berth (Depth -5.5 m; Length 120 m) Dredging for access channel and turning basin: 0.05 Mil m^3	

Figure 4-1-1 Master Plan of Port of Manila (Medium Economic Growth Case)

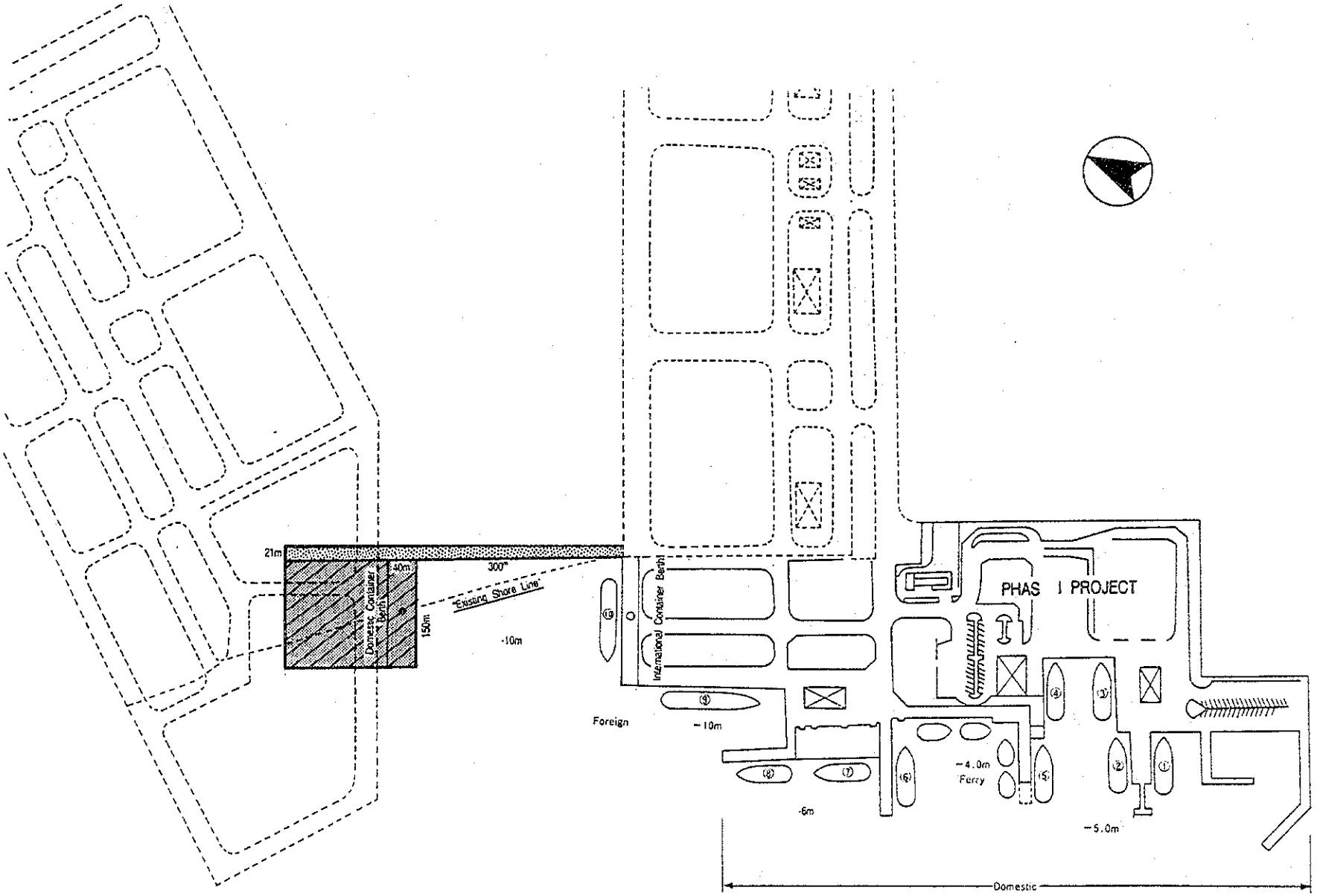


Figure 4-1-2 Master Plan of Port of Port of Batangas (Medium Economic Growth Case)

4.1.3 Staged Construction Planning

The project implementation schedule must be formulated in order not to stop or effect port activity, in addition to catching up with increasing cargo and passenger demand year after year. Fig. 4-1-3 and Fig. 4-1-4 Show the summary of the project implementation schedule resulting from master plan components of the base case scenario (Medium economic growth case).

According to Fig. 4-1-1, first three (3) domestic container terminals must be urgently implemented by the year 1999, and the remaining three (3) domestic container terminals must be constructed separately during the period between the year 2000 and 2008 to meet the cargo demand in 2010.

Fig. 4-1-1 also shows the implementation schedule of two (2) domestic roll on/roll off terminals (NO.4 and NO.5 terminal), which drops in the period between the year 2001 and 2006. Regarding the international container terminal, three (3) MICT's international container terminals (NO.6 to NO.8 terminal) must be constructed separately during the period between the year 2001 and 2008.

According to Fig. 4-1-2, the new domestic container berth (depth -10 m; Length 150 m) must be implemented by the year 2005.

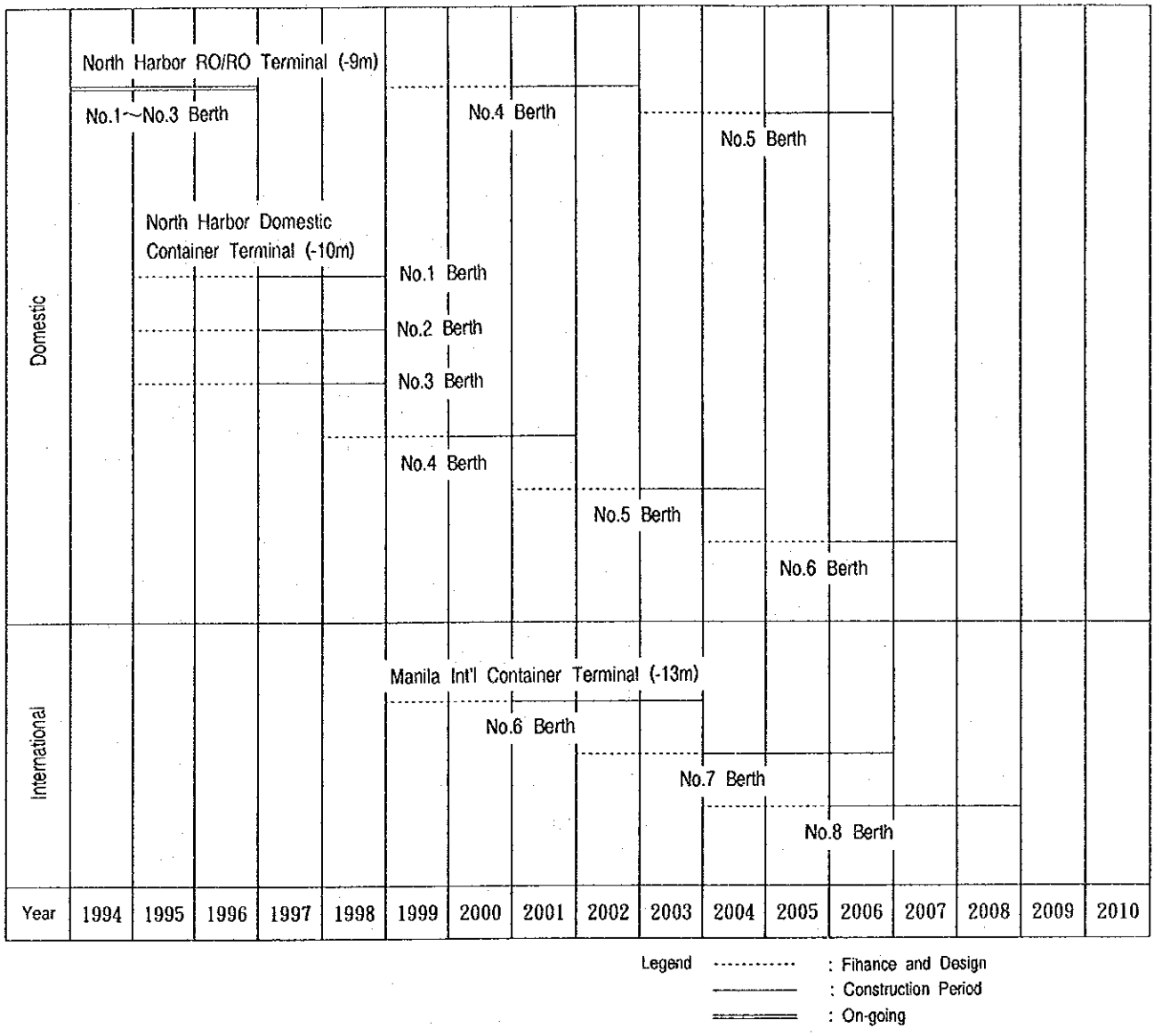


Figure 4-1-3 Project Implementation Schedule at Port of Manila
(Medium Economic Growth Case)

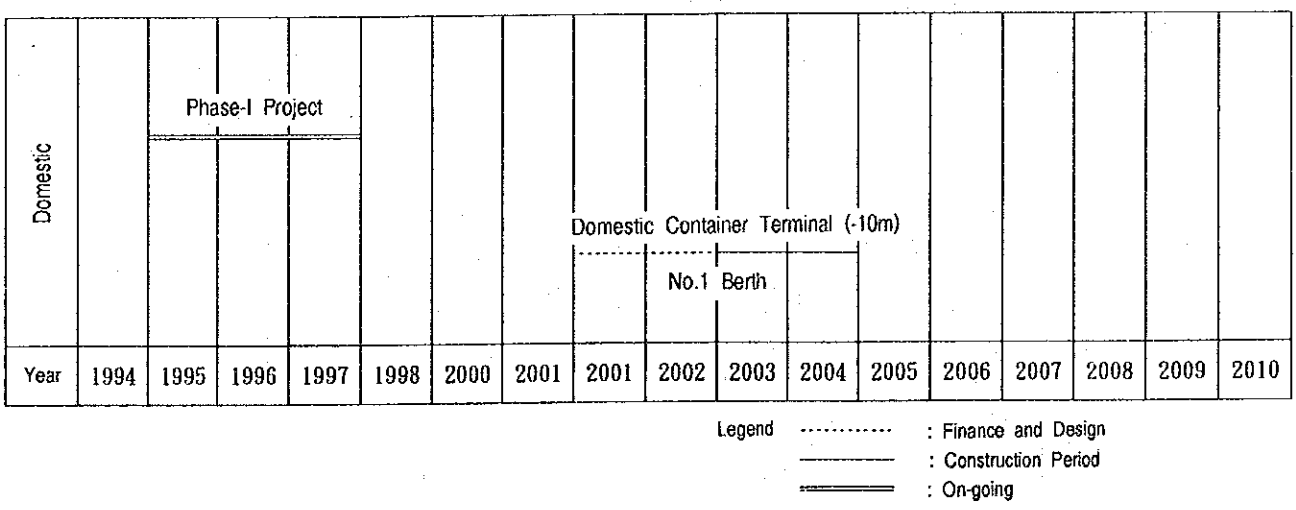


Figure 4-1-4 Project Implementation Schedule at Port of Batangas
(Medium Economic Growth Case)

4.1.4 Project Cost

The Project cost for master plan components based on each economic growth case, is shown in Table 4-1-3 to Table 4-1-6. According to Table 4-1-3, the project cost for base case master plan components at the Port of Manila and Batangas amounts to 19.8 billion pesos and 1.0 billion pesos, respectively.

Among the above master plan components based on the medium economic growth case, first three (3) domestic container terminals at the Port of Manila must be urgently constructed by the year 1999. The project cost for Manila's first three domestic container terminals amounts to 3.8 billion pesos.

On the other hand, there are three (3) kinds of project cost in accordance with the high economic growth case. The amount of the project cost for each high economic growth scenario ranges from 43.3 billion pesos to 49.0 billion pesos, as shown in Table 4-1-4 to Table 4-1-6.

Table 4-1-3 Project Cost for Master Plan Components
(Medium Economic Growth Case; GDP 5.5 %)

[Unit: Million Peso]

Port	Project	Port Facility	Cargo Handling Equipment	Design and Contingency	Total
Manila	South Harbor Int'l Container Terminal	353	768	303	1,424
	Manila Int'l Container Terminal (MICT)	4,783	2,890	2,075	9,748
	North Harbor Dom'c Container Terminal	3,998	2,130	1,658	7,786
	(Urgent project: NO.1~NO.3 Terminal)	(1,910)	(1,067)	(805)	(3,782)
	North Harbor RO/RO Terminal	689	-	186	875
	Sub total	9,823	5,788	4,222	19,833
Batangas	Dom'c Container Terminal	461	355	221	1,037
Total		10,284	6,143	4,443	20,870

Table 4-1-4 Project Cost for Master Plan Components
(High Economic Growth (I) Case; GDP 7~7.5 %)

[Unit: Million Peso]

Port	Project	Port Facility	Cargo Handling Equipment	Design, Land Acquisition and Contingency	Total
Manila	South Harbor Int'l Container Teminal	5,120	3,658	2,767	11,545
	Manila Int's Container Taerminal (MICT)	6,458	3,720	2,753	12,931
	North Harbor Dom'c Container Terminal	3,969	2,130	1,650	7,749
	(Urgent Project: NO.1~NO.3 Terminal)	(1,910)	(1,067)	(805)	(3,782)
	Smokey Mount'n Dom'c Container Terminal	2,561	1,720	3,328	7,609
	North Harbor RO/RO Terminal	899	-	242	1,141
	Sub total	19,007	11,228	10,740	40,975
Sangley Point	Int'l Container Terminal				
Naic/ Cavite	Int'l Container Taerminal				
Batangas	Int'l Terminal	417	530	256	1,203
	Dom'c Terminal	537	355	241	1,133
	Sub total	954	885	497	2,336
Total		19,961	12,113	11,237	43,311

Table 4-1-5 Project Cost for Master Plan Components
(High Economic Growth (II) Case; GDP 7~7.5 %)

[Unit: Million Peso]

Port	Project	Port Facility	Cargo Handling Equipment	Design, Land Acquisition and Contingency	Total
Manila	South Harbor Int'l Container Teminal	353	768	303	1,424
	Manila Int's Container Taerminal (MICT)	6,458	3,720	2,753	12,931
	North Harbor Dom'c Container Terminal	3,969	2,130	1,650	7,749
	(Urgent Project: NO.1~NO.3 Terminal)	(1,910)	(1,067)	(805)	(3,782)
	Smokey Mount'n Dom'c Container Terminal	2,561	1,720	3,328	7,609
	North Harbor RO/RO Terminal	899	-	242	1,141
	Sub total	14,240	8,338	8,276	30,854
Sangley Point	Int'l Container Terminal				
Naic/ Cavite	Int'l Container Taerminal	4,747	3,040	3,564	11,351
Batangas	Int'l Terminal	417	530	256	1,203
	Dom'c Terminal	537	355	241	1,133
	Sub total	954	885	497	2,336
Total		19,941	12,263	12,337	44,541

Table 4-1-6 Project Cost for Master Plan Components
(High Economic Growth (III) Case; GDP 7~7.5 %)

[Unit: Million Peso]

Port	Project	Port Facility	Cargo Handling Equipment	Design, Land Acquisition and Contingency	Total
Manila	South Harbor Int'l Container Teminal	353	768	303	1,424
	Manila Int's Container Taerminal (MICT)	6,458	3,720	2,753	12,931
	North Harbor Dom'c Container Terminal	3,969	2,130	1,650	7,749
	(Urgent Project: NO.1~NO.3 Terminal)	(1,910)	(1,067)	(805)	(3,782)
	Smokey Mount'n Dom'c Container Terminal	2,561	1,720	3,328	7,609
	North Harbor RO/RO Terminal	899	-	242	1,141
	Sub total	14,240	8,338	8,276	30,854
Sangley Point	Int'l Container Terminal	4,753	3,040	8,032	15,825
Naic/ Cavite	Int'l Container Taerminal				
Batangas	Int'l Terminal	417	530	256	1,203
	Dom'c Terminal	537	355	241	1,133
	Sub total	954	885	497	2,336
Total		19,947	12,263	16,805	49,015

4.1.5 Preliminary Evaluation

(1) Preliminary Economic Analysis

The purpose of the economic analysis is to appraise the economic feasibility of master plan components for the Port of Manila and Batangas, based on the medium economic growth case (GDP 5.5 %), from the viewpoint of the national economy of the Philippines.

The economic internal rate of return (EIRR) based on cost-benefit analysis is used in this study in order to appraise the feasibility of the projects. EIRR value is obtained from the annual economic benefit-cost value. Economic benefits are estimated through the difference between the so-called "With" case and "Without" case. In estimating costs and benefits of the projects, economic pricing is also applied.

As shown below, the calculated EIRR of each master plan component ranges from 16 % to 28 %, which exceeds the general criterion to assess whether a project is economically feasible.

1) Preliminary Economic Analysis for the Port of Manila in the Medium Economic Growth Case

Three kinds of port development projects at the Port of Manila for the period up to the year 2010 are evaluated from the view point of national economy.

(a) Additional three (3) international container berths at the Manila International Container Terminal (MICT).
(b) First three (3) additional domestic container berths at the North Harbor, which should be constructed urgently by the year 1999.
(c) Three (3) more domestic container berths and additional two (2) roll on/roll off (RO/RO) berths at the North Harbor.

As for benefits from the projects, four kinds of economic benefits are estimated through the so-called "With" and "Without" comparison.

① Savings in vessel waiting cost.
② Savings in ocean transport costs by means of improvements of ship operation schedule.

③ Savings in time cost of cargoes.

④ Savings in additional cargo handling equipment costs.

The economic internal rate of return (EIRR) of each project is calculated as 17 to 20 %. It exceeds the criterion of 15 %, which is generally adopted to assess the economic justifiability of a project in the Philippines. Accordingly, the above three project at the Port of Marila are considered economically feasible.

Table 4-1-7 Economic Internal Rate of Return (EIRR) of at the Port of Manila (Medium Economic Growth Case; GDP 5.5 %)

Project	Costs (Billion Peso)	Benefits (Billion Peso)	EIRR (%)
International Container Terminal at MICT (3 Berths)	15.7	76.6	20
Domestic Container Terminal at North Harbor (First 3 Berths)	6.1	28.2	18
Domestic Container Terminal (3 Berths) and RO/RO Terminal (2 Berths)	7.0	34.5	17

2) Preliminary Economic Analysis for the Port of Batangas in the Medium Economic Growth Case

A port development project at the Port of Batangas for the period up to the year 2010 is evaluated from the view point of national economy.

(a) Domestic container berth (Depth -10 m; Length 150 m; 1 Container crane and 3 straddle Carriers)

As for benefits from the project, two kinds of economic benefits shown below, are estimated through the so-called "With" and "Without" comparison.

① Savings in ships staying costs.

② Savings in time cost of cargoes.

The economic internal rate of return (EIRR) of the project is calculated as 28 %. This exceeds the criterion of 15 %, which is generally adopted to assess the economic justiciability of a project in the Philippines. Accordingly, the above project at the Port of Batangas is considered economically feasible.

Table 4-1-8 Economic Internal Rate of Return (EIRR) of at the Port of Batangas (Medium Economic Growth Case; GDP 5.5 %)

Project	Costs (Billion Peso)	Benefits (Billion Peso)	EIRR (%)
Domestic Container Terminal (1 Berth)	1.8	17.2	28

(2) Environmental Consideration

Project sites are located in water areas surrounded by existing breakwaters, where the extension of breakwaters, and dredging for channel deepening and maintenance are carried out throughout the year; the environment is duly considered and necessary countermeasures are taken concerning the above activities. Accordingly, construction of additional port facilities within the port will hardly make an impact the on environment surrounding the port.

How ever, the possible increase of economic activities as a result of port development may cause a general increase in the basic load on the environment system. PPA should establish an environmental conservation policy in respect to port development and take necessary measures such as careful selection of port construction machines and constant monitoring of port environment.