PART 3 SHORT-TERM DEVELOPMENT PLAN

Chapter 23 Short-term Port Development Plan up to the Target Year 2010

23.1 Maritime and Social Movements related Port Development

23.1.1 Analyses on Calling Ships in 2010

(1) Introduction

Mr. Kuroda et al of Kobe Univ. have developed models of the container marine transportation market. In this report, the possibility of large container vessel calls to the new deep port in Vietnam and the influence on the other ASEAN ports in the year 2010 are analyzed using their numerical models.

(2) Model

In this report, a route connecting with two specific ports is called a "link", and a particular link accepts only one kind of vessel size. Thus, for example, if there are two different sizes of vessel navigating on a route between two specific ports, two different links are considered corresponding to each vessel size.

(3) Premises and Assumptions

In the present report, the market is assumed as perfectly competitive, and following premises and assumptions are introduced:

+There are, in the market, many carriers that provide same quality of service and homogeneous shippers.
+No sunk cost is assumed for participating to and retiring from the market.
+The O.D. cargo volume is a prior given and is not influenced for service provided by carriers.
+Carriers have to transport all the O.D. cargo.
+Carriers can choose some classes of vessel size.
+Navigation time on a specific link is assumed as same for different vessel size. In the numerical examples of the present report, 1,000TEU, 3,000TEU and 6000TEU vessels are considered.

(4) Future Market in 2010

The model is also applied to the market in 2010, where 1000TEU, 3000TEU and 6000TEU vessel size are considered. The O.D. cargo volume in 2010 is estimated based on the data in 2000 considering the increasing ratio of GDP of each zone.

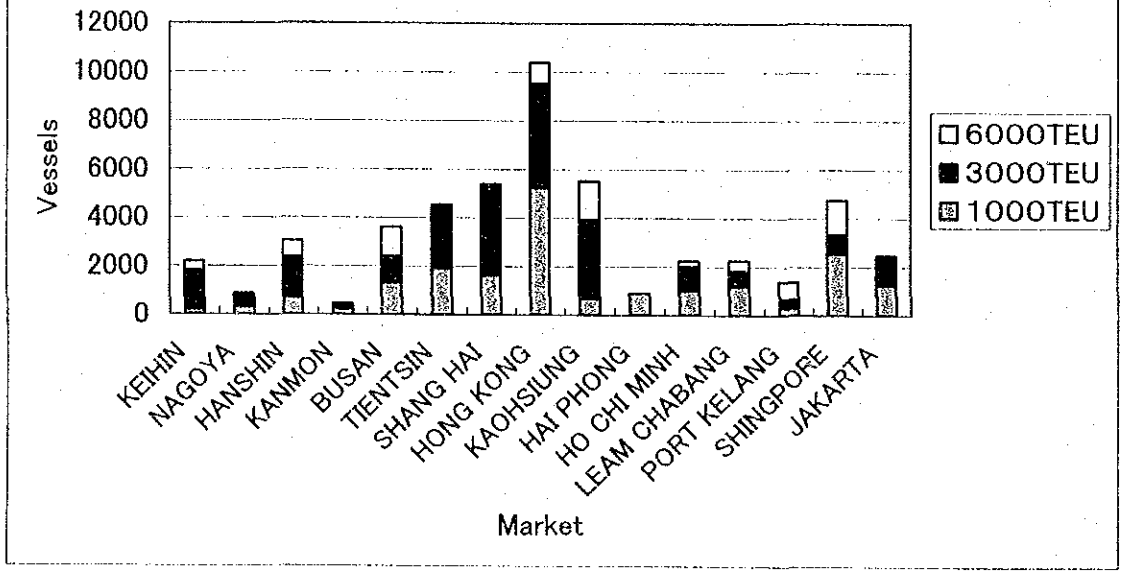
Vietnamese market consists of two areas. One is Hanoi area including Hai Phong Port and the other is the south area, i.e. SFEA including HCMC. Chinese market is divided into three areas i.e. Tensing, Shanghai, Hong Kong. Taiwan and Philippines markets are treated as one market. Port development plan of related countries are used to estimate future port facilities in the year 2010.

The present port charges are used as the future ones of each port.

(5) Vessel Calls at the new deep port in SFEA

6000 TEU container vessels are expected to call at the new deep port in SFEA to avoid the expensive port charge and congestion of Singapore port. Singapore port will act as the transshipment port for Thailand, Malaysia, and Indonesia. This international transshipment port will always be crowded. Therefore, carriers will select Vietnam's new deep port because it will not be crowded and because it can accommodate large container vessels. Almost all of the transshipment cargo for this new deep port in SFEA will come from the north of Vietnam and the transshipment of Vietnamese cargo in Singapore will decrease in the year 2010. It is important that the transshipment system on the domestic cargo from the north Vietnam should be examined at the same time. In addition to this, the transportation network by 6000 TEU vessels between the new deep port in SFEA and Leam Chabang and Kaohsiung will be actualized.

Figure 23.1 Calculated Vessel Calls in 2010



23.1.2 Social Movements related Port Development

The total cargo throughput of the ports in SFEA will increase twofold over the present volume. In particular, container cargo is expected to greatly increase. In addition, urban traffic is also expected to sharply increase. The friction between the cargo transport to and from the ports in the central district of the Ho Chi Min City and increased urban activities will become more significant in the near future. It is recommended that the existing ports in the center part of the city be relocated to a more appropriate location for port activities; the areas where those ports are now located should be developed for other purposes.

Manufacturing practices are becoming increasingly global in nature: Asian countries are now expected to comply with both WTO and AFTA regulations. Under such circumstances, it can be

safely assumed that maritime transport by container vessels will increase each year. In addition, the size of container vessels will become larger than that of today. Accordingly, the development of a deep port along the Thi Vai River is necessary.

The central part of HCMC has been expanding toward the east at quite a rapid pace. The completion of the under-water tunnel as well as the Phu My Bridge crossing over the Saigon River will accelerate this expansion further. In addition to this, the development of the highway connecting to Long Thanh would have a substantial impact on the eastern area of the city. In order to cope with such urban expansion, the ports located in the central part of the city should be relocated to the Cat Lai Area. Therefore, it is important to commence development of the Cat Lai Port.

Together with economic growth, citizens usually enjoy an increase in leisure time. As the tourism demand increases, tourist sites along the riverside as well as the seaside will be developed further following the example of other places in Asia. Therefore, it will be important to improve the urban environment, especially along the river and the seashore to this end, it is recommended to relocate some of the existing factories, which have an adverse effect on the urban environment to proper areas (such as to the Hiep Phuoc Area). In conjunction with the relocation of such factories to the Hiep Phuoc Area, the ports having an adequate scale should be developed in this area so as to handle the cargo to and from these relocated factories.

Furthermore, the improvement of both water and bottom quality of the Saigon River is necessary. The wide range of administrative organizations mandated for such environment affairs concerned to the port, river, industry, and etc. of the city or along the river should continue their efforts and cooperate with one another to improve the water as well as bottom quality of the river and ports.

Also, when developing marine leisure facilities, it is important to preserve the natural environment in the Can Gio and the Vung Tau areas to provide attractive leisure spots for weekend tourists.

23.2 Characteristics of SFEA Port Traffic in 2010

SFEA ports serve vast lands even beyond SFEA. In order to characterize the year 2010 SFEA port traffic in more detail, this section has analyzed the hinterland development, focusing on industrial estates within SFEA and freight transport corridors beyond SFEA.

23.2.1 Anticipated Hinterland Development

(1) Industrial Development within SFEA

Manufacturers are a group of big port users and particularly they are dominant within SFEA. The existing government policy encourages new industrial development in designated areas rather than in congested urban areas. It is physically translated into the SFEA development master plan during the planning period 1996-2010 prepared by MPI in collaboration with AusAID and then approved by the prime minister (No. 44/1998/QD-TTg).

Table 23.2.1 Industrial Estate Development in SFEA

Local Government	SFEA Master Plan		Actual Development
	Year 2000	Year 2010	(as of 2000)
HCM City	2 EPZ and 5 IZ 910 ha	2 EPZ and 13 IZ 3,440 ha	2 EPZ and 9 IZ 1,997 ha
Binh Duong Province	7 IZ 921 ha	10 IZ 2,471 ha	6 IZ 803 ha
Dong Nai Province	6 IZ 1,520 ha	1 EPZ and 12 IZ 4,132 ha	1 EPZ and 7 IZ 1,981 ha
Baria – Vung Tau Province	2 IZ 500 ha	6 IZ 1,810 ha	5 IZ 1,809 ha
SFEA Total	3,851 ha	11,853 ha	6,590 ha

Source: Implementation Status of SFEA Socio-economic Development Policies (by MPI, 2000) and Respective local EPZ/IZ management authorities

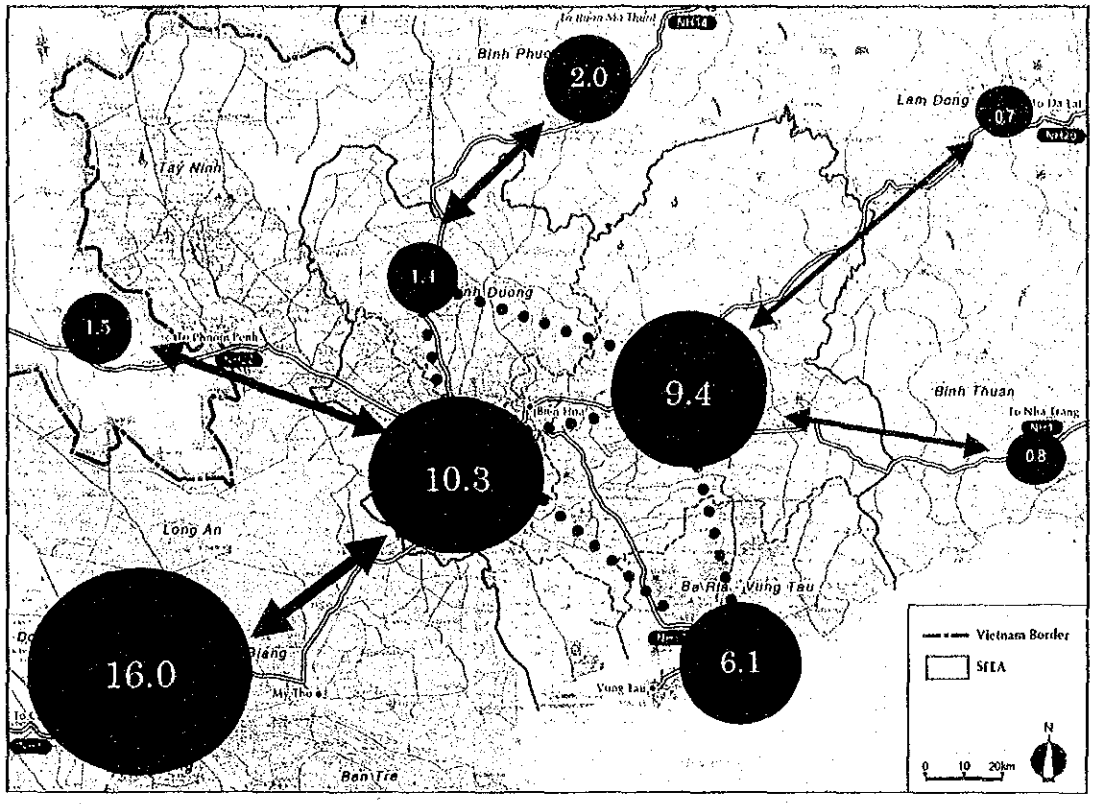
(2) Corridor-wise Development in connection with SFEA Ports

SFEA ports serve a wide hinterland connected through the following five corridors:

1) North – South Coastal Corridor
2) HCMC – Dalat Corridor
3) North – South Upland Corridor
4) HCMC – Phnom Penh Corridor
5) HCMC – Can Tho Corridor

The SFEA port traffic in 2010 can be depicted by SFEA provinces and corridors in terms of the amount of generation and attraction. The biggest demand area is the Mekong Delta region, followed by HCMC and Dong Nai Province.

Figure 23.2.1 SFEA and Its Connected Corridors



Note: Port access traffic (million tons in 2010)

23.2.2 Impact of Thi Vai – Vung Tau Ports on Access Transport

Since ports are concentrated on the HCMC side, a considerable freight flow must cross the Dong Nai River. The volume is estimated at 5.6 million tons in 2000 or equivalent to over 1,500 ten-ton trucks per day. When a Thi Vai – Vung Tau gateway port plays a significant role as planned, the traffic inflow across the Dong Nai River to HCMC central area will be substantially mitigated.

Although shippers' preference in port decision is not simple, new gateway port may reduce such river-crossing traffic to the lowest level of 1.3 million tons in 2010. Without it, the volume would have to hike up to the preposterous level of 13.6 million tons. Based on the above analysis, an SFEA gateway port located at Thi Vai – Vung Tau area would be well suited not to add heavy freight load on the HCMC urban transport system.

Table 23.2.2 Estimated River-crossing Port Access Traffic

	Without Thi Vai – Vung Tau Gateway Port	With Thi Vai – Vung Tau Gateway Port
Year 2000	5.6 million tons	- Not applicable -
Year 2010	13.6 million tons	1.3 million tons

23.3 Transportation System up to the Target Year

(1) Road Transportation

Roads and inland waterways form the main transportation network for commodity circulation in the Southern Vietnam.

To develop the northeast area of HCMC, various projects such as the East-West Highway and Phu My Bridge are set to move forward. The East-West Expressway which is planned to traverse HCMC via Thu Thiem tunnel (6 lanes) is to be completed in 2005. This expressway, which will lead to the NH 51 and a new airport in Long Thanh via Nhon Trach Industrial Zones, is expected to ease the traffic congestion in the city and to help the flow of cargoes between HCMC and ports in Thi Vai River.

HCMC-Long Thanh line, which is a part of HCMC-Vung Tau Expressway, is a key element to connect industrial zones in HCMC to the new ports along Thi Vai River and is expected to contribute not only to the mitigation of traffic congestion on NH 1 but also to regional economic development. Both provincial governments of HCMC and Dong Nai are planning to construct this expressway as a top priority project in their transport sector.

With the above situation, a port development as a gateway of the transport network to connect the development centers in SFEA and its hinterlands becomes significant and indispensable for the effective regional development including industrial and agricultural development. Moreover, if the ports and other transport infrastructures would be appropriately developed in the area, they could attract more ocean-going vessels callings and thus could develop the region in multiplication.

(2) Inland Waterway Transportation

Concerning the inland waterway improvement plans in Vietnam, the project study on Rehabilitation and Improvement of the Main Waterways in the Mekong Delta (Mekong Delta Master Plan) was conducted by World Bank/UNDP. Subsequently the proposed project was finally completed in 2001. The inland waterways of which improvement works completed are:

1) Ho Chi Minh City – Can Tho Corridor 195 km
2) Can Tho – Ca Mau Corridor 192 km
3) Can Tho – Kien Luong Corridor 173 km

Phnom Penh Port Authority has planned container cargo transportation by motive barges from ports in HCMC to Phnom Penh Port through Mekong River. According to the pilot station in Vietnamese side: ①most probably barges will go to Cambodia by way of the Tien River, which is the only possible way, ②barges of 120m in length, 5m in draft and 32m in air draft are possible to navigate, ③navigation aids on the route are not sufficient for safe navigation, ④customs clearance is easy at the border.

If the above development is carried out successfully, the new ports will have a great chance to be the gateway for Mekong Delta area and Cambodia through the inland waterway transportation.

23.4 Main Target for the Short Term Port Development

The ports should be designed to handle container cargoes and dry bulk cargoes and to accommodate vessels up to 50,000 DWT in the Thi Vai River to cope with the enlargement of vessel size.

On Dong Nai and Soai Rap Rivers, ports should be designed to handle the same type of cargoes but to accommodate up to 20,000 DWT based on the cargo demand generated to and from IZ along these rivers. The relocation on a step-by-step basis of the ports along the Saigon River is recommended.

It is recommend to relocate the existing ports located along the Saigon River to both Dong Nai River and Soai Rap River banks on a step-by-step basis as well. The port relocation and redevelopment activities should be commenced from the Tan Cang area and proceed to the Nha Rong terminal of the Sai Gon Port.

A detailed survey and examination on large-scale navigation channel development in the Soai Rap River should be implemented as the development of such a channel is considered to be a key factor in increasing the scale of Hiep Phoc Port.

23.5 Cargo Distribution by Ports

The required scale in the short-term development plan (2010) depends on the volume of cargoes handled at SFEA Ports. Summary of the cargo throughput at SFEA Ports is indicated in Table 23.5.1.

Table 23.5.1 Cargo Distribution by Ports at Year 2010

Port Name	Dry Cargo (x 1,000 ton)	Container Cargo (x 1,000 TEUs)
(HCMC Port Group)		
Sai Gon/Tan Cang/Ben Nghe/VICT	9,600	760
Other Ports in HCMC Port Group	3,000	-
Cat Lai IZ Port	400	300
Hiep Phuoc Container Port	400	110
Sub-total	13,400	1,170
(Thi Vai – Vung Tau Port Group)		
Go Dau/Baria Serece etc	3,200	-
TVG	1.100	-
LCC	-	1,100
Dong Xuyen Port	200	-
Sub total	4,500	1,100
Total	17,900	2,270

(Source: JICA Study Team)

The bases for cargo allocation to the ports are as follows:

- On 15th June 2000, the HCMC People's Committee issued Announcement No.62/TB-VP-CNN on the conclusion of the People's Committee at the meeting about investment projects in Cat Lai IZ, which said that the HCMC People's Committee agreed to assign Saigon Export Processing Zone and to formulate an investment project for the construction of a specialized port in the industrial zone with a size of 53 hectares to serve the Cat Lai IZ and the hinterland. Port construction, which is composed of 3 nos. of container berths and 2 nos. of general cargo berths, will be completed by 2010, according to the Feasibility Study on Cat Lai Industrial Zone Port by People's Committee of HCMC.
- In 1998, Sai Gon Military Port implemented the feasibility study of the 2nd phase Cat Lai Port Expansion Project to submit the authority concerned for approval under the approval of the Navigation Command and Ministry of National Defense due to the insufficient capacity of the existing port as well as the requirement of the next period to 2010.
- On 10th July 1998, the prime Minister promulgated Decision 123/1998/QD-TTg, which approved the Adjustment of the HCMC Master Plan up to 2020. According to the Master Plan, following directions were pointed out regarding transport and infrastructure planning.

①Restriction of extension and development of the existing inner city ports such as Sai Gon, Ben Nghe, Tan Thuan, Tan Cang and Bason,

②Construction of new ports in the suburban area.

③Step by step renovation of the inner city ports for on-river tourism.

23.6 Port Development Projects up to the Target Year 2010

23.6.1 Ports in HCMC Area

(1) Re-development of the Ports along Saigon River

In accordance with the urban development master plan of Ho Chi Min City, all the major ports of Ho Chi Min City such as Tan Cang and VICT are planned to be relocated to the Cat Lai and/or Hiep Phuoc Area by the year 2020. The most serious traffic congestion in the city at present occurs in a certain area to the north of the Tan Thuan Bridge. Priority should be given to the relocation and redevelopment of the port facilities in this area. The ports located in the city center but with a limited capacity will handle the cargo destined directly to the city or within the city area. The relocation of EPZ and VICT is not easy not only because of the scale but also because the lands of these huge areas have been leased out to the foreign companies operating these IZ and the port on a long-term basis.

(2) Development of Cat Lai IZ Port

The cargo transported to and from the IZ and HCMC should be handled mainly in the Cat Lai and Heip Phuoc IZ Ports. The cargo coming from the other areas should be handled at a convenient port such as Phu My Port. Accordingly, it will be imperative to adjust the capacity of port facilities.

(3) Development of Heip Phuoc IZ Port

As for the large-scale development of the Hiep Phuoc IZ Port, the relocation of the Saigon Port

group and the possibility of the large-scale development of the lower Soai Rap River Channel are the important factors. At present, it seems that the port development has progressed in line with the progress of the IZ. A container and general cargo port for 20,000 DWT vessels should be developed by the year 2010

The short cut of the bend in the channel in the upper Soai Rap would have a negative influence on the water depth. In other words, the water depth may become shallower in the front of the Hiep Phuoc Power Plant by shortcutting the bend in the upper stream. This matter should be examined very carefully in the case of channel development.

23.6.2 Ports in Thi Vai – Vung Tau Area

(1) Development of the Thi Vai International General Cargo Terminal

The Thi Vai International General Cargo Terminal supports the industrial activity of the immediate port hinterland. The vessels should navigate up to the Thi Vai more than 30 km partly through a winding section of the channel stretching from the tip of the Vung Tau Peninsula. This condition is not suitable for the navigation of container vessels which require quick operation. It is ,however, suitable for the requirement of general cargo vessels. General cargo ports for 50,000 DWT should be developed by the year 2010.

(2) Development of the Cai Mep International Container Terminal

The size of the container vessel has been increasing throughout the world. This necessitates the development of a deep port as quickly as possible in Vietnam. The container port should be operated continuously 24 hours a day. In other words, the operation of such a port should not depend on the tidal level. It is quite important for the economic development of Vietnam to secure the direct transport of container but not to remain dependent on container transport by feeder operation. As the site of the Cai Mep is close to the site of the Phu My IZ, it is possible to manage these two terminals comprehensively. Container terminals for 50,000 DWT vessels should be developed by the year 2010.

(3) Development of the Vung Tau Area

The Ben Dinh-Sao Mai site is considered as an available site for the transshipment operation of the container cargoes. However, this place is rich in fishery and tourism resources. The development of this site or area should be carefully examined from various viewpoints and on a long-term basis. It is to be noted that there is a certain limitation of the available area for IZ just behind the port area. Dong Xuyen Port should be developed by the year 2010.

Table 23.6.1(1) Number of Future Container Berths

Container Berths	Vessel Size	2010	2020	Total
Tan Cang Cat Lai	20,000 DWT	2	0	2
Cat Lai Container	20,000 DWT	2	0	2
Hiep Phuoc Container	20,000 DWT	1	2	3
Upper Cai Mep	50,000 DWT	0	2	2
Lower Cai Mep	50,000 DWT	4	0	4
Lower Cai Mep	80,000 DWT	0	2	2
Total		9	6	15

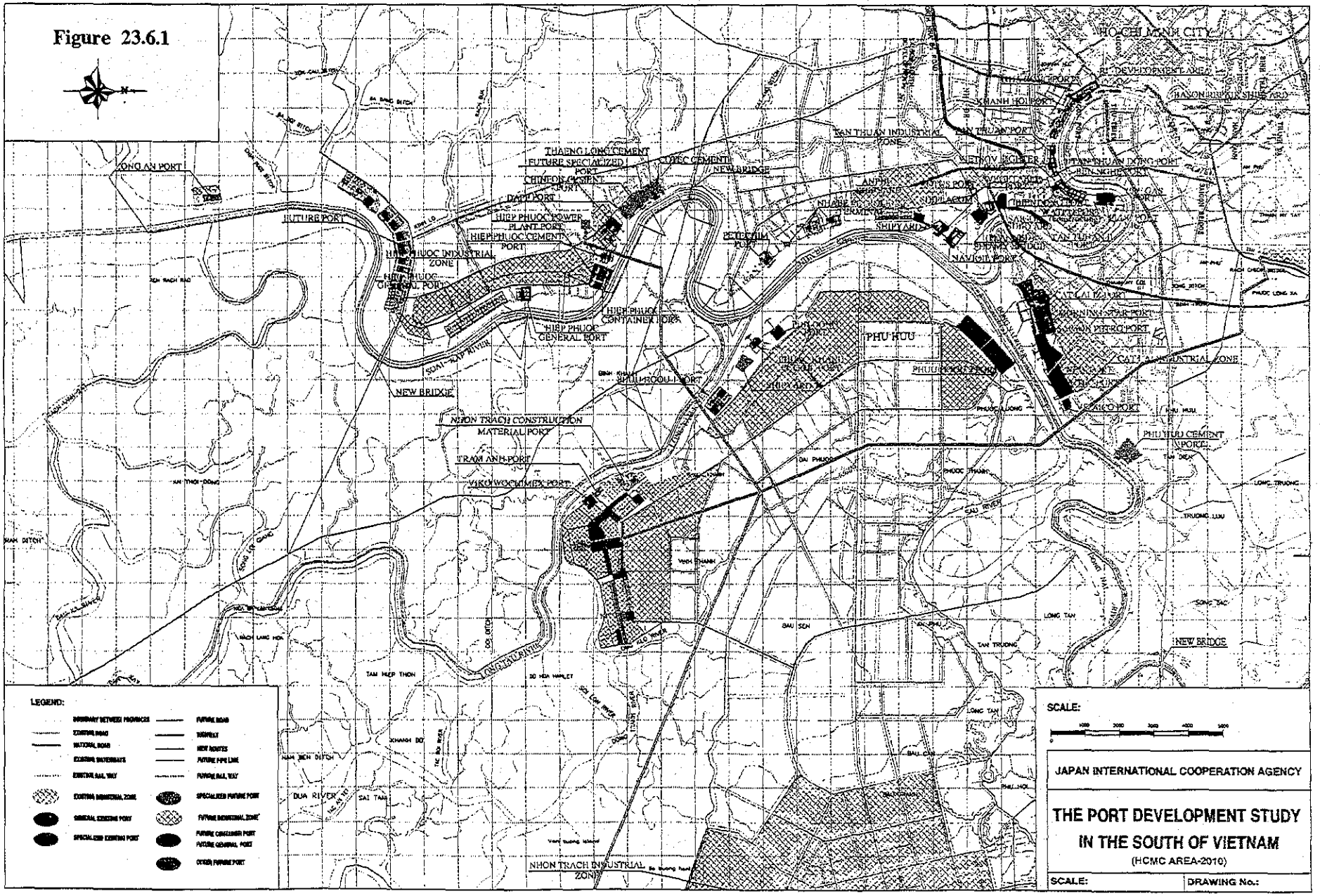
Table 23.6.1(2) Number of Future General Cargo Berths

General Cargo Berths	Vessel Size	2010	2020	Total
Cat Lai	20,000 DWT	1	0	1
Hiep Phuoc Container	20,000 DWT	1	1	2
Hiep Phuoc General	20,000 DWT	0	10	10
Thi Vai General	50,000 DWT	2	4	6
Dong Xuyen IP	20,000 DWT	1	0	1
Total		5	15	20

Table 23.6.1(3) Number of Future Passenger Berths

PassengerBberths	Vessel Size	2010	2020	Total
Sai Gon	50,000 GRT	0	1	1

Figure 23.6.1


HO CHI MINH CITY
DONG AN PORT
FUTURE PORT
THAENG LONG CEMENT FUTURE SPECIALIZED PORT
CHINFON CEMENT PORT
DAIDO PORT
HIEP PHUOC POWER PLANT PORT
HIEP PHUOC CEMENT PORT
HIEP PHUOC INDUSTRIAL ZONE
HIEP PHUOC GENERAL PORT
HIEP PHUOC CONTAINER PORT
HIEP PHUOC GENERAL PORT
NEW BRIDGE
NHON TRACH CONSTRUCTION MATERIAL PORT
TRAM ANH PORT
VIKOWOOD TIMEX PORT
NHON TRACH INDUSTRIAL ZONE
TAN THUAN INDUSTRIAL ZONE
TAN THUAN PORT
VIETNOV HOSTER PORT
TAN THUAN DONG PORT
BEN NGHE PORT
ANPHI PORT
PETROLIMEX PORT
NAVIOIL PORT
SHIPYARD
PHU HUU
PHU HUU PORT
CAT LAI PORT
CAT LAI INDUSTRIAL ZONE
CAI MEP PORT
PHU HUU CEMENT PORT
NEW BRIDGE
LEGEND:
SCALE:
JAPAN INTERNATIONAL COOPERATION AGENCY
THE PORT DEVELOPMENT STUDY IN THE SOUTH OF VIETNAM
(HCMC AREA-2010)
SCALE:
DRAWING No.:

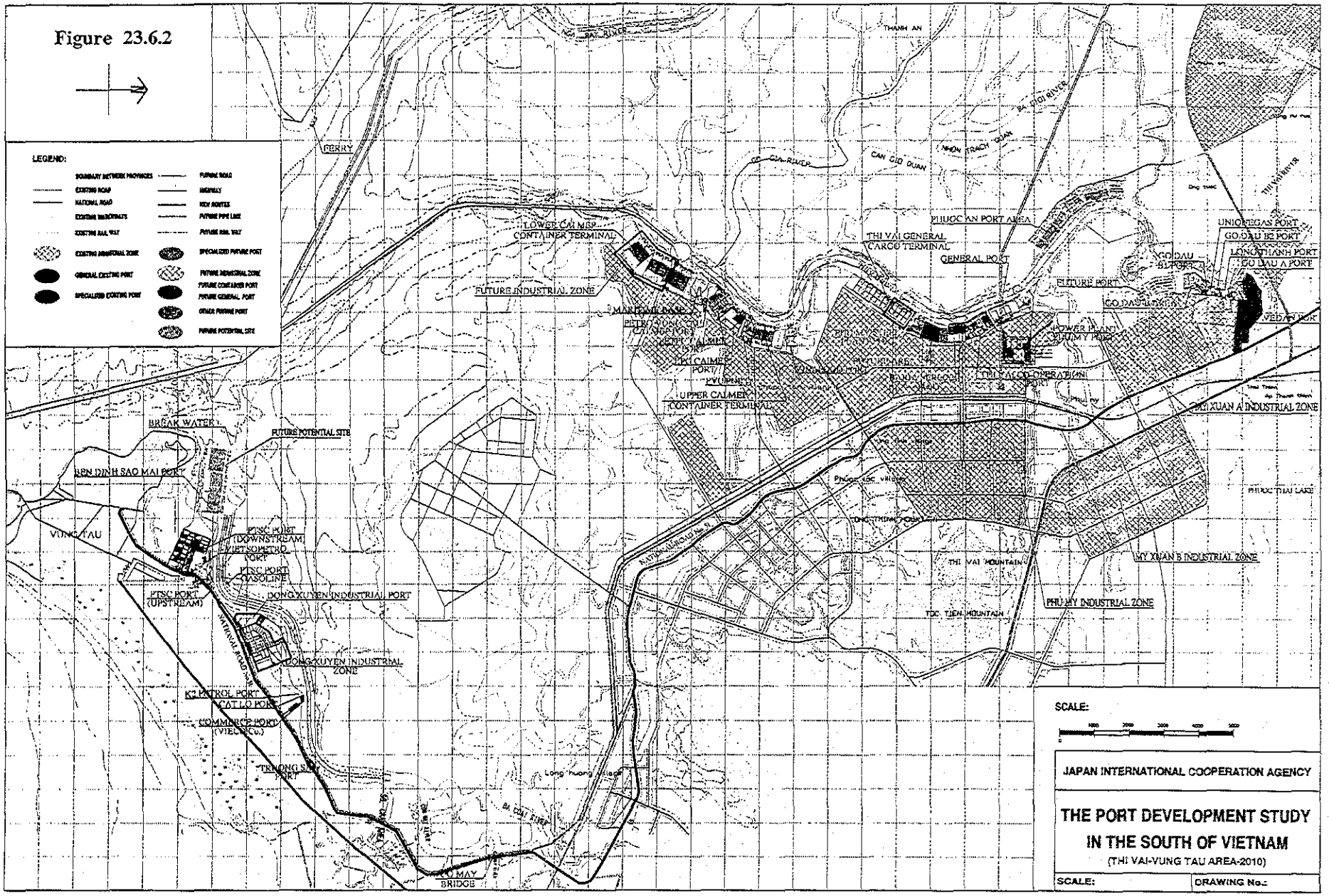


Figure 23.6.2
LEGEND:
FERRY
LOWER CAI MEP CONTAINER TERMINAL
FUTURE INDUSTRIAL ZONE
THI VAI GENERAL CARGO TERMINAL
PHUOC AN PORT AREA
GENERAL PORT
FUTURE PORT
UNICOMEGAS PORT
GO DAU B2 PORT
LONG THANH PORT
GO DAU A PORT
VEDAN PORT
THI XUAN A INDUSTRIAL ZONE
UPPER CAIMEP CONTAINER TERMINAL
BREAK WATER
FUTURE POTENTIAL SITE
BEN DINH SAO MAI PORT
VUNG TAU
PTSC PORT (DOWNSTREAM)
VIETSOVPETRO PORT
PTSC PORT GASOLINE
PTSC PORT (UPSTREAM)
DONG XUYEN INDUSTRIAL PORT
DONG XUYEN INDUSTRIAL ZONE
K2 PATROL PORT
CAT LO PORT
COMMERCIAL PORT (VIETSOVPETRO)
TRUONG SON PORT
THI VAI MOUNTAIN
TDC TIEN MOUNTAIN
PHU MY INDUSTRIAL ZONE
MY XUAN B INDUSTRIAL ZONE
PHUOC THAI LAKE
CO MAY BRIDGE
SCALE:
JAPAN INTERNATIONAL COOPERATION AGENCY
THE PORT DEVELOPMENT STUDY IN THE SOUTH OF VIETNAM
(THI VAI-VUNG TAU AREA-2010)
SCALE:
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Chapter 24 Port Administration and Management Program for the Target Year 2010

24.1 Improvement of Port Administration and Management System for Year 2010

(1) Further Improvement of Port Administration System

The Government should continuously and aggressively conduct the further improvement of port administration system. Especially, the formulation of policies/plans and the improvement of institutional framework are important subjects, which are effective for further advancement of the port administration in Vietnam.

(2) Establishment of New PMB for the New Port

In order to carry out efficiently and effectively the port management and operation of the New Port located on both Thi Vai and Cai Mep area, the New PMB should be established as soon as possible. Fundamentally, the organization form of this New PMB needs to be a form which consists of the same Port Management and Operation system as the Master Plan. The management and operation of the New Port should be conducted under an organizational framework suitable for the typical new large container port in Vietnam.

(3) Institutionalization for Formulating and Authorizing Port Master Plan

By 2010, institutionalization for formulating and authorizing the Port Master Plan of each port should be realized. The planning procedure needs to be institutionalized in close cooperation with other organizations concerned. Each PMB should formulate its own draft plan and then submit it to the central government for authorization.

(4) Improvement of Port Statistics System

By 2010, a port statistics system covering all general ports should be established. As described before, it is required to clarify at least the trend of cargo handling volume by lot and the origin/destination of each kind of commodity and cargo type, as well as number of calling vessels, number of passengers and situation of quay, basin and warehouse, etc.

(5) Promotion of Port Sales and Marketing

Port sales promotion and marketing activities are important for the future development. The new PMB should conduct these activities with the following materials:

+ Port Brochure,
+ Promotion Video and CD,
+ Internet,
+ Promotion Seminar, etc.

24.2 Organization of New PMB

The organization chart of New PMB of the New Port in 2010 is proposed as shown in Figure 24.1.

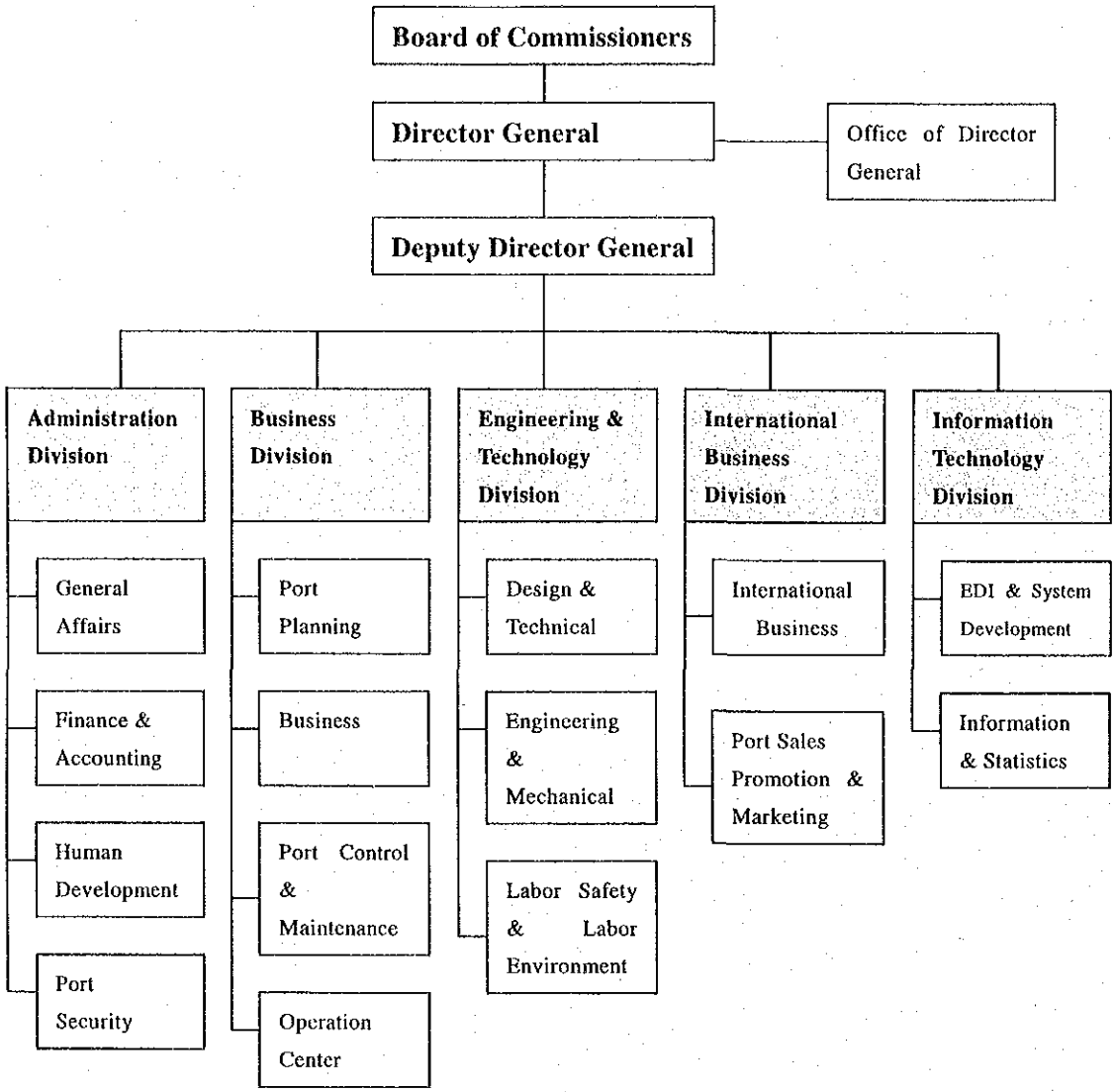


Figure 24.1 Organization Chart of Port Management Body of New Port

Moreover, assuming that the actual port service such as a stevedoring and a tugboat service shall be carried out by independent enterprises, new PMB would not hold departments responsible for such works as part of its organization.

(2) Scale of New Port Management Organization

A certain correlation can be observed between the number of staffs of PMB and the number of containers handled at its port. By using this correlation about some worlds' ports, a scale of New Port's PMB can be estimated.

As a result, it can be proposed that approximately 300 persons, as the organization scale of PMB of the New Port necessary for the management and operation, are suitable.

24.3 Promotion Program of PSP at the New Port

(1) Determination of Appropriate PSP Type for Container Terminal of the New Port

It is forecast that container traffic at the New Port will keep increasing towards the future. Especially, Cai Mep Port is full-scale and deepwater container terminal, the first of its kind in Vietnam. In order to gain the maximum benefit from this social capital, the execution of efficient management and operation at this port will be required.
Therefore, it is necessary to consider the following in determining an appropriate PSP type for this terminal.

+ The New Port is the most advanced international container port in Vietnam.
+ A public sector always needs to supervise the development and management of the New Port.
+ Land and basic infrastructures at the New Port should be owned by the public sector.
+ If MOT/VINAMARINE can obtain low interest foreign loans, PSP for a terminal operation will be successfully introduced.

Concerning the PSP type to be introduced at the New Port, it can be proposed that the Type B mentioned at Section 3 of Chapter 15, especially a Lease style, is the most suitable.

(2) Form of Container Terminal at the New Port

There are three types of terminal utilization, which are "Public use", "Commercial use" and "Private use".
Since the New Port is used not only by one shipping company, but also by plural shipping companies, high efficiency should be secured and public use should be kept. Therefore, it can be recommended that the "Commercial use" system should be adopted for the New Port.

As mentioned above, suitable development/operation scheme concerning the container terminal of the New Port can be summarized as follows:

+ Public sector provides infrastructure and, if possible, also provides the quayside gantry crane while private sector provides superstructure. Terminal management and operation is conducted by private sector. Basic berth allocation is "Commercial use" system.

PART 4 FEASIBILITY STUDY ON THE PRIORITY PROJECT IN THI VAI AREA

Chapter 25 Development Plan on the Priority Project

25.1 Port Development Plan on the Priority Project Site

The Phu My-Thi Vai area located along Thi Vai River has been assigned as an Industrial Zone (IZ) and the industrialization process here has been carried out at a rapid pace. In addition, the plan on the development of an IZ in Cai Mep is being worked out. In tandem with the operation of these IZs, expansion projects of 51 National highway or railway along Thi Vai River have been also under planning. In order to coordinate such industrial development plans and transportation infrastructure projects as well as to stimulate economic growth of the whole SFEA, it is crucial to construct new ports in Thi Vai and Cai Mep areas. Due to such conditions as waterfront, large hinterland space and other socio-economic factors, Thi Vai-Cai Mep can be regarded as the most suitable site for new port development.

Taking into account all of those above-stated issues, the development of a deep container terminal (CDL –14m) is vital to the independent growth of the Vietnamese economy. From this viewpoint, the construction of 2 berths in the lower Cai Mep site should be given priority. In tandem with this, another general terminal with berth depth of -14m in Thi Vai area where industrialization is rapidly advancing is also planned.

The simulation result shows that there will be the possibility of about 150 ship calls of post panamax size container ships at Cai Mep in the year of 2010. Cai Mep terminal will not be the final calling port. In other words, post panamax container ships will not accommodate at Cai Mep with their full drafts. Therefore in the year of 2010, it will not be necessary to develop the berths with the depth of –16m but it will be necessary to install the clans sufficient for postpanamax container ships width.

In the river, the berth construction in the upper stream should be started at first but in this case the upper stream is deeper than down stream. The Upper stream site should be reserved for the future sites of berths with depths of –16m. Therefore in the year of 2010, the construction at the middle site should be stared for the first priority project.

Among those above projects, there are 3 works items, which should be undertaken by the public sector. They are: (1) initial dredging of the navigational channel which makes the project benefit estimate difficult, (2) construction of access roads to ports and (3) construction of deep terminals (more than CDL –14m) which requires massive investment.

The use of ODA funds to finance the construction and development of all infrastructures required up to year 2010 is, on the one hand, not in conformity with the target of ODA, which is to support and stimulate the self-development of recipient countries, and on the other hand, it raises issues involving budget limitations. Consequently, it is desirable to allocate the limited funds for priority projects, which will act as a catalyst for further investment into the projects by either the target country or the private sector. In this study, the scale of priority project package is limited to the minimum size that should be done by the public sector.

25.2 Channel Plan on the Priority Project Site

25.2.1 Channel Plan

Channel plan is computed in accordance with PIANC guidelines. The computed results are presented below. Input data of the open sea is assumed for the case of Ganh Rai Bay and the closed-sea input data for Thi Vai River Mouth to the upper Cai Mep. The section from the sea to Cai Mep should be designed so as to enable two-way navigation of container vessels at any time; particularly, the water level should be sufficient for 50,000DWT container vessel draught. From Cai Mep to the upstream, it is possible to take advantage of tide and to navigate on two-way routes. However, at the S-shaped bend between Cai Mep and Thi Vai, in order to maintain navigational safety, the channel needs to be restricted to one-way traffic.

Table 25.2.1 Priority Project in 2010

(1) Terminals

Site	DWT	Cargo Type	Berths	Cargo Vol.(x1,000)
Lower Cai Mep	50,000DWT	Container	2B(LCC3-4)-14m	600 TEUs
Thi Vai	50,000DWT	General	2B(TVG1-2)-14m	1,100 tons

(2) Navigation Channel -Section 1-

Up to Cai Mep (24 hours, two-way traffic)	Depth (m)
Present	-9
Phase 1	-12
Phase 2	-14

(3) Navigation Channel -Section 2-

Cai Mep - Thi Vai (tidal, 2-way traffic)	Depth (m)
Present	-10
Phase 1	-12

Bend section (One-way traffic)

Table 25.2.2 Channel Plan in 2010

Channel section	DWT	Depth (m)	Width (m)	Operation
Ganh Rai Bay	50,000 DWT	-14	310	2 ways, 24 hours
Lower Cai Mep	50,000 DWT	-14	310	2 ways, 24 hours
"S" shaped bend	50,000 DWT	-12	200	1 way, tidal
Thi Vai	50,000 DWT	-12	310	2 ways, tidal

Table 25.2.3 Channel plan in 2020 (for reference)

Channel section	DWT	Depth (m)	Width (m)	Operation
Ganh Rai Bay	80,000 DWT	-16	420	2 ways, 24 hours
Lower Cai Mep	80,000 DWT	-16	420	2 ways, 24 hours
Upper Cai Mep	50,000 DWT	-14	310	2 ways, 24 hours
"S" shaped bend	50,000 DWT	-12	200	1 way, tidal
Thi Vai	50,000 DWT	-12	310	2 ways, tidal

Figure 25.2.1 Cai Map Site

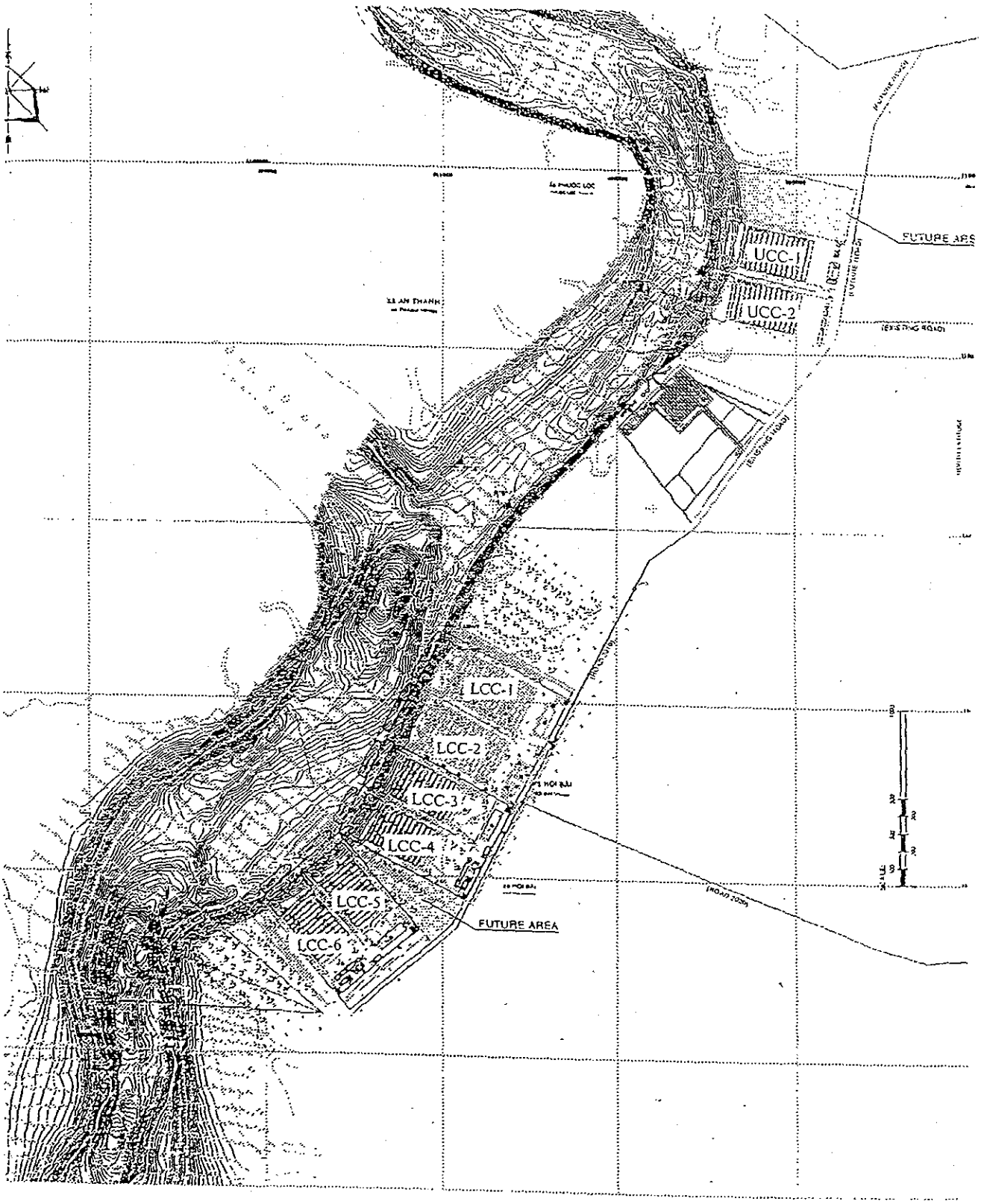


Figure 25.2.2 Thi Vai Site

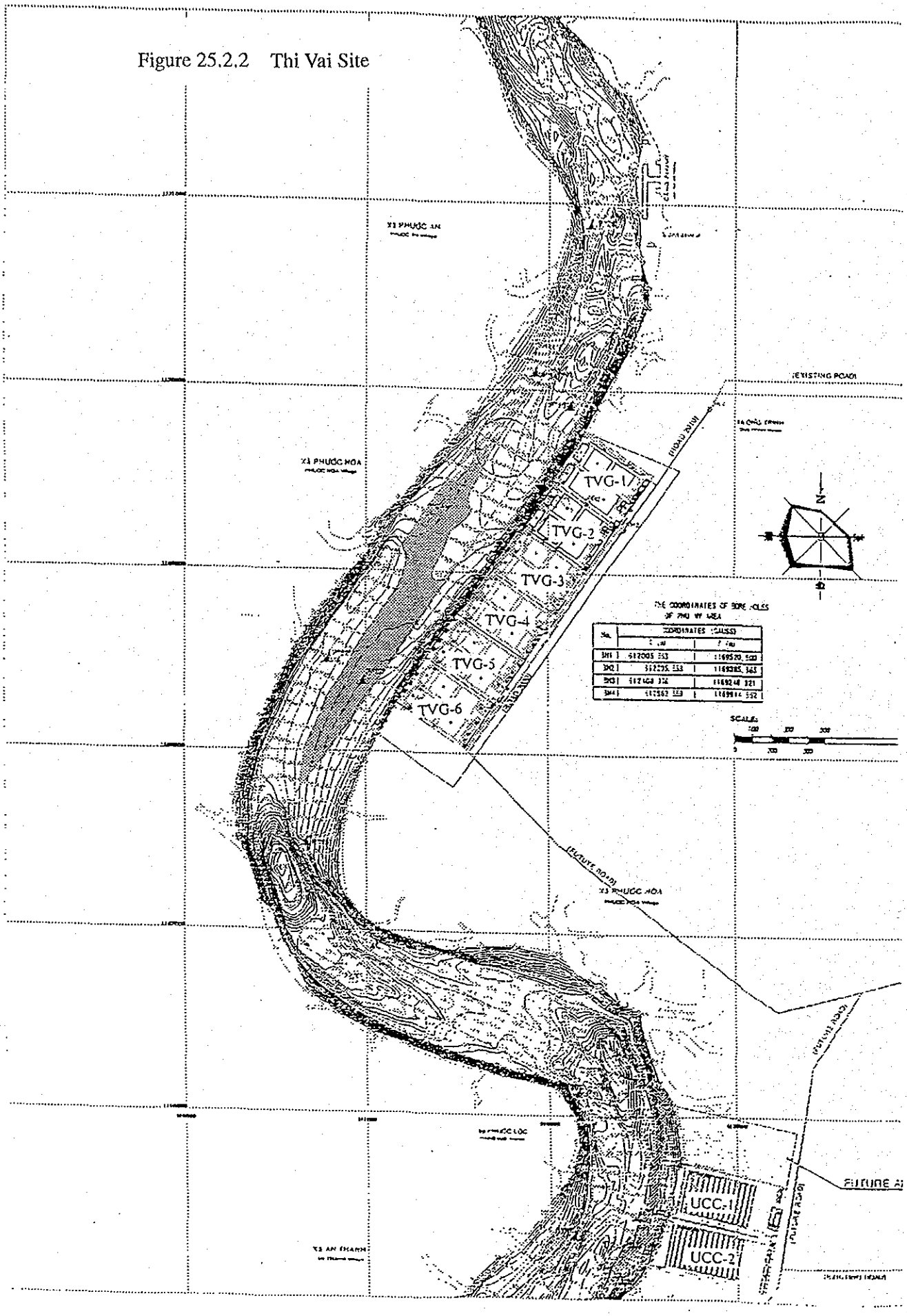
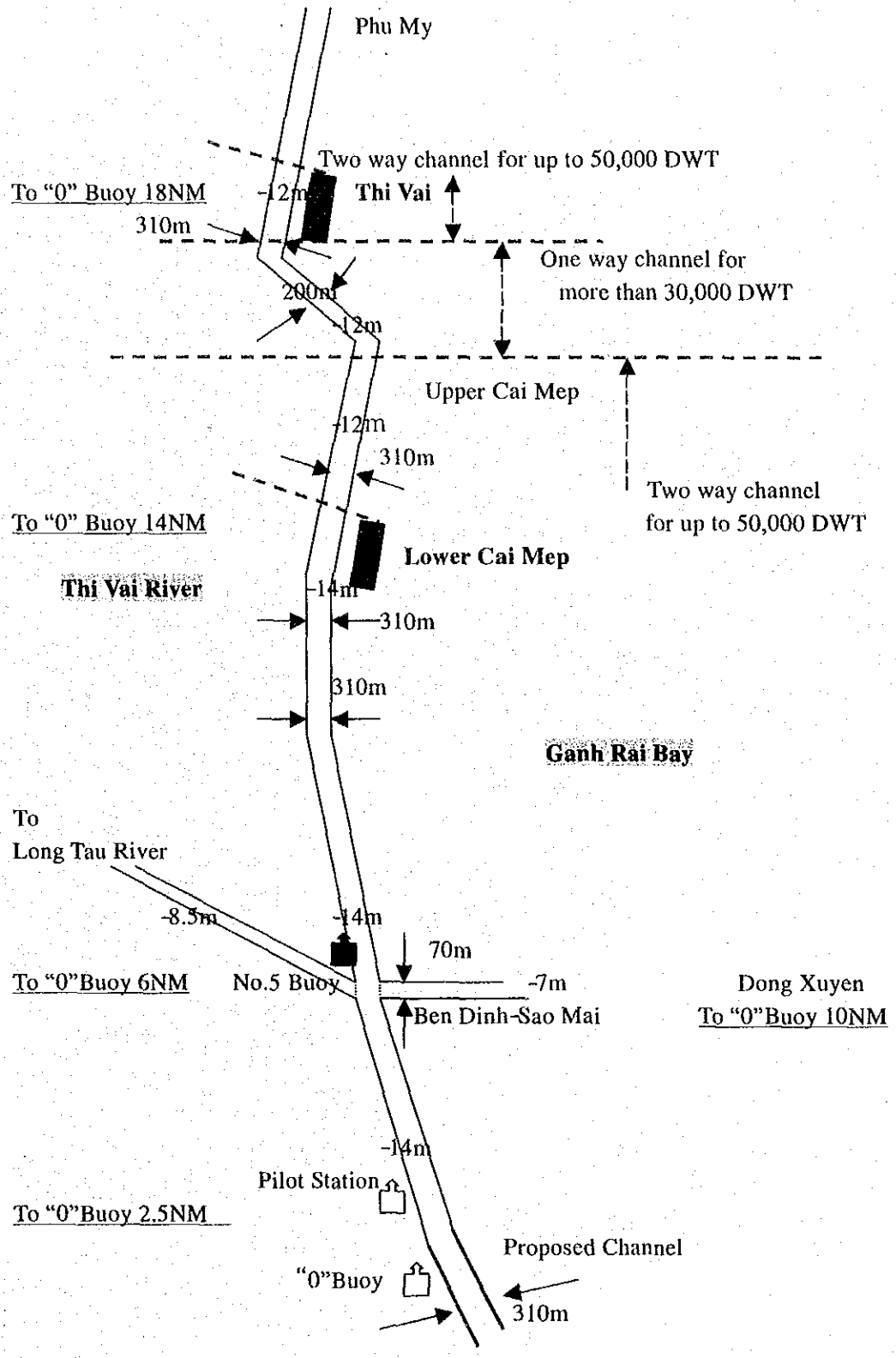


Figure 25.2.3 Planned Channel in Ganh Rai Bay and Thi Vai River (2010)



25.2.2 Channel Dredging and Maintenance

Dredging of channels is planned based on the Channel Plan, which has the straight portions of the two-way channel with a planned depth of 14m and a bottom width of 310m. The side slope is assumed to be 1/5, considering the soft bed materials and types of dredgers.

Sedimentation volume in the channel is assessed by means of numerical simulations and other technical considerations. Sedimentation is expected to occur at five areas in the channel. The accretion of sediments on the planned channel depth occurs at two areas, or at the entrance of the Vung Tau Approach Channel and around the corner of the Thi Vai River Approach Channel as shown in Figure 25.2.4. The estimated volume of annual sedimentation above the planned channel depth is 130,000 to 430,000 m^3.

Requirements for and conditions of dredging are confirmed that, in order for the dredging not to have any hindrance to ships' navigation in the channels, vertical tolerance of the excess dredging beyond the planned channel depth ("Over-dredging") should be 50 cm; and horizontal tolerance is less than 4m in consideration of deep depth of the channel, introduction of high-efficiency and large-size dredger, and performance of the past similar dredging works.

The volume of initial capital dredging is calculated to be 9.9 million m^3, including net capital dredging, an allowance of sedimentation of 50 cm deep, and an over-dredging of 50 cm deep. The volume and interval of maintenance dredging are assessed to be 0.3 million m^3 at intervals of three years at the entrance of Vung Tau Approach Channel, and 2.1 million m^3 at intervals of four years at around the corner of the Thi Vai River Approach Channel, including dredging for sedimentation and over-dredging.

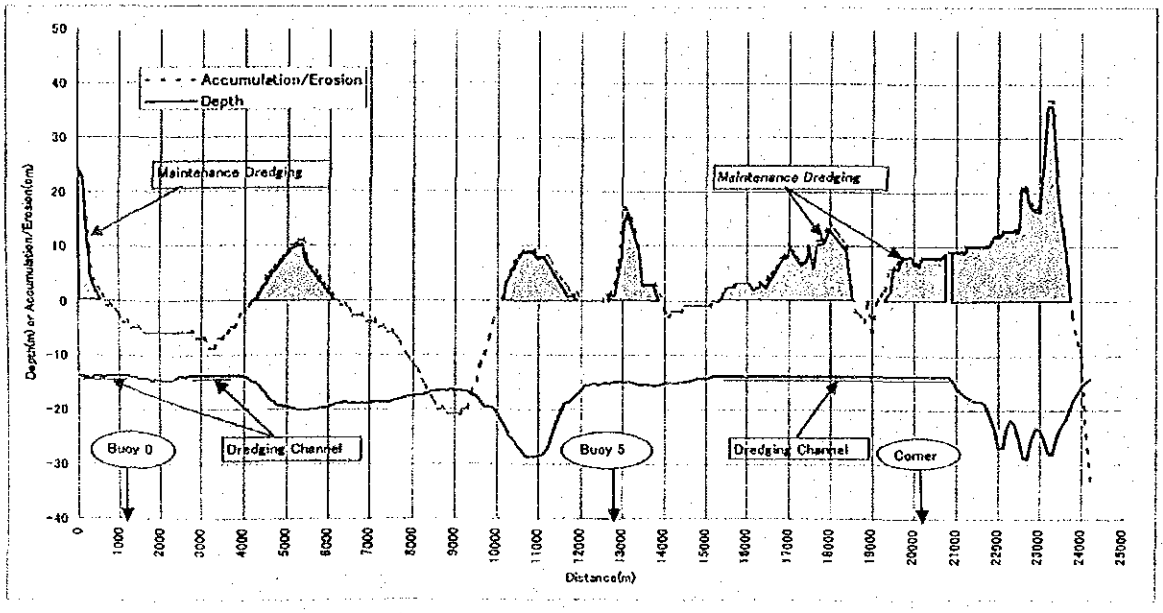


Figure 25.2.4 Longitudinal Distribution of Sedimentation

Appropriate methods of dredging in terms of equipment and operations are discussed. The most suitable dredging fleet consists of a drag suction hopper dredger and a tugboat equipped with Scraper. The dredging efficiency and capacity of existing drag suction hopper dredgers available in Vietnam and foreign countries are analyzed taking account of the conditions at site. Methods of operations discussed includes "Ordinary Dredging," "Agitation Dredging," "Side-Casting," and others. Ordinary dredging is considered as the only suitable method with supplemental operation of leveling by a scraper.

Method and location of dumping of dredged soils is studied. Offshore dumping is judged to be the most suitable method in view of past practice at other ports in Vietnam. The dumping site is selected at about 5 km offshore of the Vung Tau Cape with the water depth of more than 20 m. The impact of dumping in the sea is assessed from the viewpoints of quality of materials to be dumped, dispersion due to diffusion, accretion of dumped soils on the seabed, and biological environment. Serious impacts are not anticipated based on a theoretical analysis taking account of SS with a limit of 10 ppm, which is required by fisheries. It is recommended, however, to make monitoring surveys specifically on density of SS dispersed and accumulation of soils on the seabed.

The execution plan of dredging is discussed and proposed that the capital dredging should be done by a drag suction hopper dredger with high efficiency (pumps: 8,000 x 2 m^3/hour, speed (empty):15 knots) and large capacity (4,000 m^3), although not available in Vietnam. It takes 3 years for the capital dredging under its full operation.

The maintenance dredging can be done by a drag suction hopper dredger available in Vietnam with common efficiency (pumps: 3,500 m^3/hour, speed (empty):12 knots) and capacity (3,500 m^3). It takes 2.4 month for the dredging at the entrance under normal operation. It is assessed to take 11.5 months for dredging at the corner of the Thi Vai Approach Channel under its full operation.
Careful monitoring and surveys on eight items are recommended to plan/manage the dredging works properly.

25.3 Transportation System on the Priority Project

25.3.1 Access Road between the Port and NH 51

(1) Number of Required Traffic Lanes

Design traffic volumes in the access road up to the 2010 are estimated as follows:

Table 25.3.1 Estimated Traffic Volume of Vehicles in 2010

(Unit: cars/hour)

Name of Terminal	Traffic Volume	Note
Thi Vai International General Cargo Terminal	186	General=1,100,000 tons
Cai Mep International Container Terminal	993	Container=1,100,000TEUs

Required traffic lanes will be decided as follows: the traffic capacity is 650 per hour for two lane road and 2,400 per hour for four lane road. According to the above traffic volume, 2 lanes will be necessary for the Thi Vai General Cargo Terminal and 4 lanes for Cai Mep International Container Terminal. However the area of four lanes will be reserved for both terminals.

(2) Access Road Alignment outside the Port Area

The preliminary alignment of the access road was reviewed by the site reconnaissance survey. The alignment of the access road should be decided in a way that minimize the interference with the existing houses, factories and its related facilities. The road alignment will be planned to have a maximum gradient of 4% for safe running of 40 Ft container trucks at 80 km/hr. Traffic volume from Industrial Zones (IZ), which is planned in future, is counted after IZ will be constructed.

The length of the planned access road will be shown in Table 25.3.2.

Table 25.3.2 The Length of the Access Road

Name of Port	Length (km)	Note
Thi Vai InternationalGeneral Cargo Terminal	2	
Cai Mep International Container Terminal	3	Including one bridge

25.3.2 Road Network in the Region

The National Road 51 (NH 51) connecting Bien Hoa with Vung Tau links numerous industrial zones in the region with the ports along Thi Vai River. Major existing industrial zones located along NH 51 are Nhon Trach and Go Dau in Dong Nai province, and My Xuan and Phu My in Ba Ria-Vung Tau province. NH 51 is an axle connecting Vung Tau city to HCMC and other province. Presently, NH 51 is under improvement to plain area-Class 1 road, to be 24m broad with 6 lanes, design speed: 100-120km/h.

HCMC-Long Thanh line is a key element to connect industrial zones in HCMC to the new ports along Thi Vai River. Both provincial governments of HCMC and Dong Nai are planning to construct this expressway as a top priority project in their transport sector.

In case a deep-water port will be constructed along Thi Vai River, access road corresponding to the traffic volume between the port and NH 51 will be required in Phu My area and Cai Mep area.

Chapter 26 Terminal Layout / Operation and Channel Operation

26.1 Terminal Layout Plan and Operation

The basic terminal Layout plan up to 2020 in Thi Vai and Cai Mep sites is summarized in the table below. On the other hand, the under-mentioned terminals will be planned up to 2020 in the HCM City Port and Vung Tau Port Areas due to the partial relocation of HCM City Port Group by the development plan of Sai Gon River side and the urban development of Ba Ria-Vung Tau Province.

a) Up to 2010: two (2) Container and one (1) General Cargo Terminals in Cat Lai site, one (1) Container and (1) General Cargo Terminals in Hiep Phuoc site, and also one (1) General Cargo Terminal in Dong Xuyen Port. All terminal shall be able to accommodate 20,000DWT vessels.
b) Up to 2020: In addition to the above, one (1) Passenger Terminal for 50,000GRT vessel in Saigon Port, two (2) Container and 11 General Cargo Terminals for 20,000DWT vessels in Hiep Phuoc site

Table 26.1 Terminal Layout Plan in Thi Vai and Cai Mep sites (2010 & 2020)

Site	Kind of Terminal	Number of Berth (Name of Berth)	Size of Vessel (DWT)	Terminal		2010 **F/S	2020
				Length (m)	Depth (m)		
Thi Vai Site	General Cargo	2B(TVG-1/2)	50,000	300x2	450	**2B	
	General Cargo	2B(TVG-3/4)	50,000	300x2	450		2B
	General Cargo	2B(TVG-5/6)	50,000	300x2	450		2B
	Total	6B		1,800m	450	2B	4B
	Total Area				***	27 ha	81 ha
Upper Cai Mep Site	Container	2B(UCC-1/2)	50,000	300x2= 600m	550		2B
	Total Area				***	-	33 ha
Lower Cai Mep Site	Container	2B(LCC1/2)	80,000	350x2	650+80+60		2B
	Container	2B(LCC3/4)	50,000	300x2	*650+90+50	**2B	
	Container	2B(LCC5/6)	50,000	300x2	*650+90+50	2B	
	Total	8B		1,900m		4B	4B
	Total Area				***Exc. Pier	66 ha	125 ha

Remark: * ①650m (550m is yard depth plus 100m for future expansion), ②90m are the length of bridge between pier and yard, ③50m are the width of pier
** Feasibility Study on project, *** Total area in 2020 includes one in 2010.

In this chapter, the study is focused on the layout plan and operation of general cargo and container terminals for 50,000DWT vessels in the feasibility study on the priority project.

26.1.1 Lower Cai Mep International Container Terminal (Berth No. LCC3/4)

(1) Terminal Layout Plan and Facilities (the layout plan is shown in Chapter 26 of the main text)
1)The terminal shall be designed to be able to accommodate 80,000DWT containership

(post-Panamax) with maximum 12.5m draft, taking demand cargo forecast into account.

2) Berth face line will be bent by 22 degrees between Berth No. LCC-1/4 and LCC-5/6.

3) The facilities of the Two (2) Berth Container Terminal are as follows:

Pier (3 ha) and Terminal (33 ha), Ground Slots (5,600 TEUs), Administration Office and Amenity Block, Container Freight Station, Maintenance Shop, Container Washing Area, Power Station, Fuel Station, Water Supplying Facility, Light Tower, Gates, Equipment Yard / Truck Waiting Yard, Terminal Fence, Seamen's Club, Bond Shop, etc.

(2) Terminal Operation

1)The terminal capacity will be expected to be 600 thousand TEUs for a two (2)-berth 50,000 DWT Terminal, taking berth and yard capacities into account. However, after 2010, maximum capacity will be increased to 740 thousand TEUs.

2)Combined operation system with transfer crane (Rubber Tyred Gantry Crane (RTG)) and tractor / chassis shall be introduced.

3)The traffic circulation of yard vehicles shall be fixed for the purpose of placing containers in the yard on the same direction.

4) Control system by computer for EDI, documentation flow, yard and ship planning operation must be introduced, applying a software on the market to the appropriate one of the terminal.

5) Feeder boats and barges for domestic service shall be operated by quayside container cranes.

6) Kinds and number of required equipment are shown in Chapter 26 of the main text.

7) Maintenance System

①Fostering and training service engineers, ②Periodical Inspection of equipment, ③ Container equipment and its spare parts should be duly controlled by computer.

26.1.2 Thi Vai International General Cargo Terminal (Berth No. TVG 1/2)

(1) Terminal Layout and Facilities (the layout plan is shown in Chapter 26 of the main text)

1) The facilities of Thi Vai two (2)-berth 50,000DWT General Cargo Terminal are as follows:

①Terminal Area (27 ha), ②Administration Office, ③Amenity Block, ④ 2 Warehouses (8,000m2), ⑤ 2 Transit Sheds (8,000m2), ⑥ 8 Open Yards (115,200m2), ⑦Maintenance Shop, ⑧Others (Power Station, Fuel Station, Water Supplying Facility, Gates, Light Tower, Equipment Yard, Truck, Waiting Yard, Terminal Fence, Seamen's Club, Bond Shop, etc.)

2) After the target year, considerable general cargoes will be containerized, otherwise huge amounts of bulky cargoes shall be made in consideration of future conversion into container terminal and / or bulk terminal.

(2) Terminal Operation

1) Maximum terminal capacity will increase from 1.6 million tons in 2010 to 2 million tons in 2020 for a two (2)-berth 50,000 DWT-terminal because the number of berths will increase to six (6) and each terminal will be expected to operate efficiently in 2020.

2) The cargo handling operations will be performed by ship's gears and shore cranes together.

3) Forklift operation to carry cargo between shipside and adjacent warehouses / transit sheds directly without using yard track shall be proposed.

4) Each ground floor of warehouses and transit sheds should provide slope from seaside exit on ground level to the landside exit with one (1) meter in height above ground level. This will

facilitate forklift operation because cargo can be loaded or received directly on /from outside truck at the ramp way of landside exit.

5) To improve bulk cargo handling productivity, movable hopper and automatic belt conveyor with casters to reach to the stockyard shall be provided, in case that considerable volume of bulky cargo is discharged from ship.

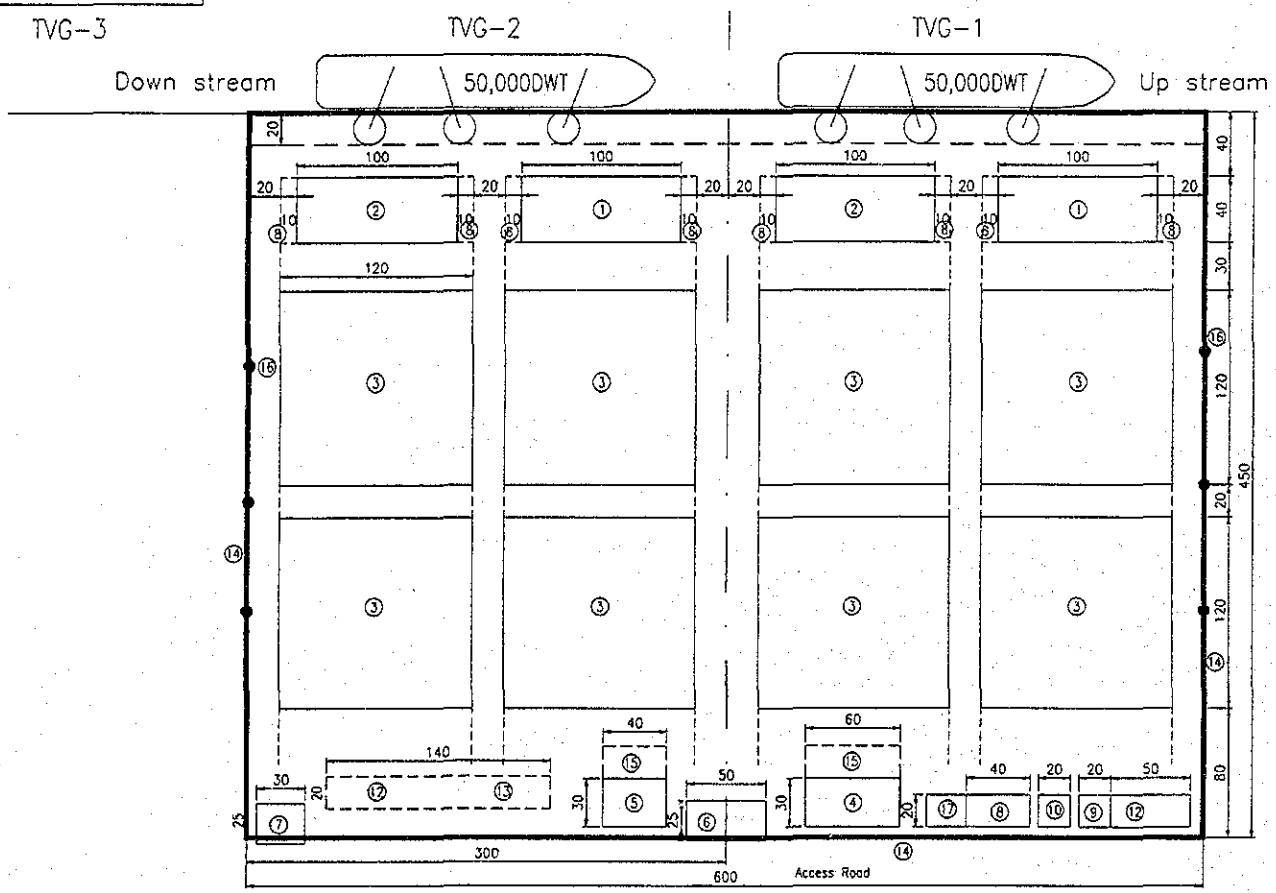
6) Various types and quantities of equipment may be introduced depending on the type of operation. Desirable kinds and number of equipment for general cargo terminal are shown in Chapter 26 of the main text.

7) Rationalization

General cargo terminal generally needs lot of workers although its cargo handling productivity will be only one-forth of that of container terminal. Therefore, to improve its productivity, number of workers engaged shall be minimized by using appropriate cargo handling equipment effectively and efficiently.

Figure 26.1

Thi Vai International Genreral Cargo Terminal (50,000DWT)



Legend

①	Warehouse
②	Transit Shed
③	Open Yard
④	Administration Office
⑤	Amenity Block
⑥	Terminal Main Gate
⑦	Terminal Sub Gate
⑧	Maintenance Shop
⑨	Fuel Station
⑩	Power Station
⑪	Truck Waiting Area
⑫	Equipment Yard
⑬	Truck Waiting Yard
⑭	Fence
⑮	Parking
⑯	Lighting Tower
⑰	Water Supplying Facility

SCALE
0 50 100 150m

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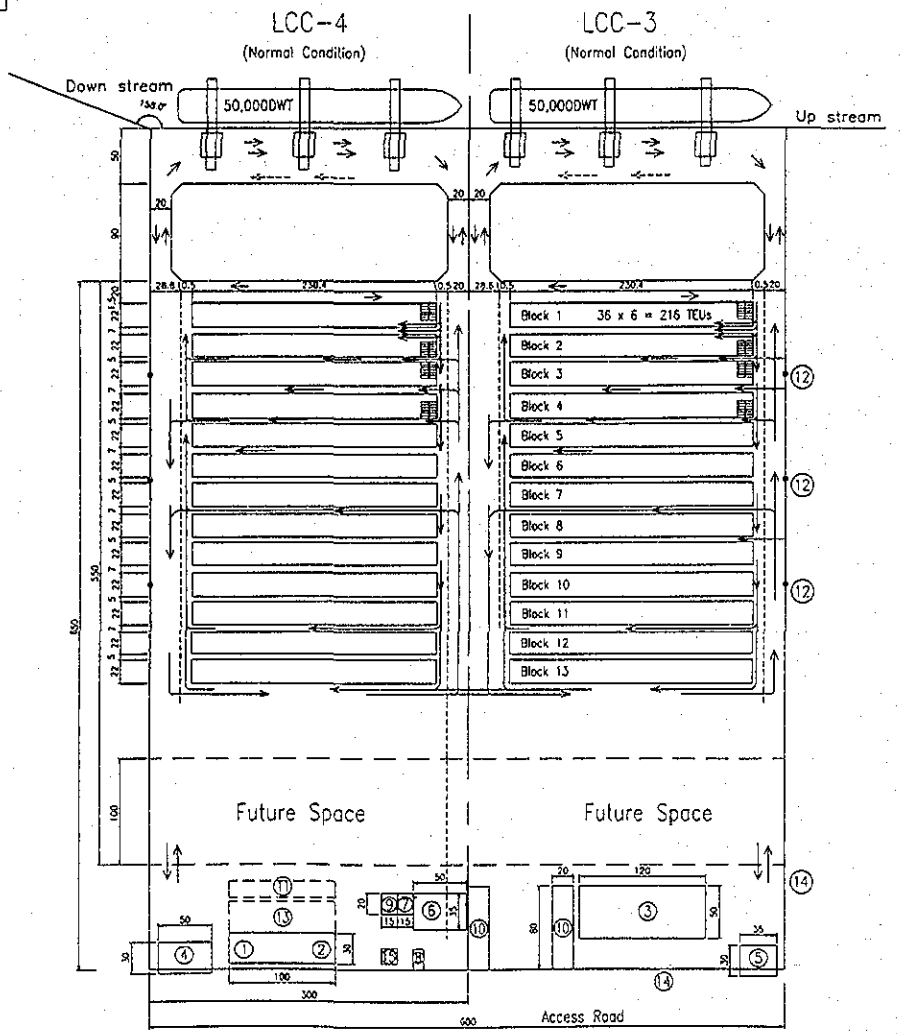
THE PORT DEVELOPMENT STUDY IN THE SOUTH OF VIETNAM
(THI VAI INTERNATIONAL GENERAL CARGO TERMINAL)

SCALE: | DRAWING No.:

Figure 26.2

Cai Mep International Container Terminal (50,000DWT)



Legend

①	Administration Office
②	Amenity Block
③	Container Freight Station
④	Main Gate (Weighbridge)
⑤	Sub Gate
⑥	Maintenance Shop
⑦	Container Washing Area
⑧	Power Station
⑨	Fuel Station
⑩	Equipment Yard
⑪	Truck Waiting Yard
⑫	Lighting Tower
⑬	Parking Area
⑭	Fence
⑮	Water Supplying Facility

SCALE
0 50 100 150m

JAPAN INTERNATIONAL COOPERATION AGENCY

THE PORT DEVELOPMENT STUDY IN THE SOUTH OF VIETNAM
(CAI MEP INTERNATIONAL CONTAINER TERMINAL)

SCALE: | DRAWING No.:

26.2 Channel Operation

(1) Number of Calling Vessels in SFEA in 2010 and 2020

According to the calculation from the anticipated cargo volume in 2010 and 2020, the number of calling vessels to SFEA waters is expected to be more than 8,000 in 2010 (an increase of 1.3 times over 2000) and 12,000 in 2020 (a twofold increase). As the calculation is made on the assumption that all cargo will be carried by more than 10,000DWT vessels, an even greater number of vessels can be expected. Vessel traffic number will be more than double that above.

(2) Channel Dimensions is shown in Chapter 26 of the main text.

(3) Studied Issues

1) Very shallow belts across the channel situated in 1,000m south from No.'0' buoy in the entrance of Ganh Rai Bay, which is minimum –9.5m in depth.

2) New channel will be proposed to be drawn 300m east from existing channel to obtain sufficient depth in the entrance of Ganh Rai Bay.

3) In the confluence among the Long Tau River, Thi Vai River channels and Dinh River to Ben Dinh Sao Mae, vessel traffic volume in SFEA will reach 17 thousand vessels in 2010 and 25 thousand in 2020. In other words, 47 vessels in 2010 and 69 in 2020 will come in and out in a day. In this regard, special attention must be paid to this confluence and a guidance shall be stipulated for the confluence traffic.

4) In 'S' shape bent channel between Upper Cai Mep and Thi Vai Site, vessels more than 30,000DWT (Vessel with LOA more than 200m) shall keep one-way navigation there.

5) Thi Vai General Cargo Berths shall be –14m in depth with 50m in width and the depth of both berth edges shall spread towards 30 degrees from the berth face line.

6) Existing lighthouses, light beacons and light buoys can be used by relocating them, when the channel is deepened and widened. But additional light beacon or light buoys shall be installed, in particular, at the extreme south in the entrance of Ganh Rai Bay due to shallow depth.

7) Number of extra class pilots who can handle vessels of more than 20,000 GRT, shall be increased. Therefore, the training system must be strengthened. It is recommended to send pilots to developed countries where ship-handling simulators are available.

(4) Vessel Traffic Service (VTS)

For vessel traffic safety, efficiency and protection of environment, VTS in SFEA will be definitely necessary as the number of calling vessels will increase year by year.

1) VTS by the Port Authority of HCM City

Port Authority of HCM City has installed VTS hardware covering waters between HCM City Port Area and Vung Tau Pilot Station. The system is divided into two (2) zones. West side is Zone 1 (under the control of HCM City Control Center) and East side is Zone 2 (under the control of Vung Tau Control Station).

2) Issues to be studied

In order to use VTS system practically in the future, the following issues shall be considered.

① Training and fostering VTS operators

② To control small boat traffic

③ To control wide water traffic by VTS
④ To stipulate common regulation to cover SFEA water (HCMC, Dong Nai and Baria Vung Tau Province)
⑤ The scope of the service rendered by VTS
    a) Information service
    b) Navigation Assistance Service
    c) Traffic Organization Service

3) VTS System in 2010

The following system would be proposed for VTS in SFEA water up to 2010, taking the above issues into account.

① VTS in this water shall be operated by one (1) organization.
② Zone 3 shall be established in addition to Zone 1 and 2.
③ Additional radar shall be installed along the Thi Vai River.
④ Additional Control Station shall be prepared to cover Zone 3.
⑤ The service shall be started from the information as mentioned in the above and then improve step by step to navigation assistance and traffic organization after the first sstage could be completely performed.
⑥ Detailed Information of Calling Vessels
Control Center and Stations shall receive the detailed information of calling vessels in advance from shipping lines or shipping agents by E-Mail and file the information in the computer of the station.
⑦ Local Navigation Regulation to cover SFEA Water
A special navigation regulation for VTS in SFEA water shall be stipulated for restriction of vessel speed, priority by kind of vessels, priority of vessels passing channel and restriction when vessel turning in the basin, restriction for large vessels in one way channel and so on.
⑧ Countermeasures against the movement of small boats
It will be most important to thoroughly teach the VTS regulation to the captains and crew of small boats by means of special measures such as lectures and brochures. Special surveillance boats such as Coast Guard Boats should also patrol water of high traffic density to ensure that regulations are followed.
⑨ Training VTS Operators
Prospective VTS operators should be trained in developed countries, which render the services for long time, and then be qualified as the operator.
⑩ Future Study other than the above Zones
After developed inland waterways among Mekong Delta, SFEA including Soai Rap River Channel and the channel to Cambodia, further study concerning VTS shall be required.

Chapter 27 Structure Design

27.1 Lower Cai Mep International Container Terminal

Based on the additional subsoil investigation result, it is confirmed that thick upper soft subsoil layer is distributed in flat, which means that settlement will occur, but significant uneven settlement may not occur as far as the surface load condition is same.

Quay of this terminal is designed for full loaded 50,000DWT container vessels and partial loaded 80,000DWT container vessels. The water depth in front of quay is decided at –14m based on the full loaded draft of 50,000DWT container vessels. The magnitudes of berthing energies of both vessels are similar and the fender system for 50,000DWT vessels is available for partial loaded 80,000DWT vessels. However, the size of quayside container crane should be determined by 80,000DWT vessels.

Comparison study for the selection of suitable structural type of quay has been conducted, and a coupled steel pipe pile type quay structure is adopted as the most suitable to the site conditions.

From the topographic and hydrographic condition around the site, the face line of quay is allocated at 140m off from riverbank and quay structure and terminal yard at riverside are connected by trestles (access bridges) of 90m long. This type of structural arrangement can avoid reclamation in the river, which will cause hydraulic and morphological change at the mouth of Thi Vai River. In addition, the reclamation behind the quay is not preferable in terms of treatment of settlement, construction time and cost. On the other hand, the cycle time of container loading/unloading of 12.0 minutes will be increased by about 0.5 minutes due to the existence of trestles. This time loss can be recovered easily by increasing one tractor-trailer for each berth.

The terminal yard should be reclaimed by sand up to CDL+5.0m and the soft subsoil layer of about 30m thick shall be improved by Vertical Plastic Board Drains with Pre-load.

Containers are stacked on concrete sleepers and runways of RTG is made of pre-stressed concrete, and Interlocking Concrete Blocks are adopted for the pavement of other terminal area, since it is flexible for settlement, construction cost is cheap, construction works are easy, maintenance work is also easy.

Buildings, such as terminal office, CFS and maintenance shop, will be supported by reinforced concrete foundation piles to cope with the insufficient bearing capacity and residual settlement of subsoil layers in future.

From the new container terminal to the existing road, an access road of about 3km long with asphalt paved 4 lanes should be constructed on the improved sub-graded. The entire route passes through flood plain covered by mangrove and the route is mostly free from any adjacent housings or agricultural or aquaculture activities but there is one creek of about 150m wide. To keep barge

transportation through the creek, one bridge having an above water clearance of 8.5m for 500DWT barges will be constructed.

27.2 Thi Vai International General Cargo Terminal

Upper soft subsoil layer is distributed up to around CDL–30m under the riverbed in front of the riverbank. However, its thickness is less than 15m in the land behind riverbank. This means that the subsoil improvement is easier and requires shorter construction period compared with the Cai Mep site.

In the port planning study, the depth of approach channel to the port is maintained to CDL-12m and the full loaded design vessel, 50,000DWT cargo vessel, should enter to the port using tide margin but the water depth in front of the quay is provided more than CDL-14m in order that the object vessels can stay at berth during any tidal level.

Considering the topographic and hydrographical conditions around the site, the face line of the quay is allocated at the riverbank just in front of terminal yard, namely, the quay is constructed as a marginal wharf. And based on the comparison study, coupled steel pipe pile type quay structure and steel sheet pile wall type revetments are adopted as the most suitable to the site conditions.

In the port planning study, this port will mainly handle non-container cargoes. However, some container handling for semi-container ships will be inevitable. Therefore, installation of 40ton capacity multi purpose quayside cranes is considered in the design of quay structure.

The terminal yard is reclaimed by sand up to CDL+5.0m, and the soft subsoil layer of about 15m thick shall be improved by Vertical Plastic Board Drains with Pre-load.

The yards are mainly paved by asphalt concrete, and buildings such as terminal office, transit sheds, warehouses and maintenance shop will be supported by reinforced concrete foundation piles to cope with the insufficient bearing capacity and residual settlement of subsoil layers in future.

From the new general cargo terminal to the existing road, an access road of about 2km long with asphalt paved 4 lanes should be constructed on the improved sub-graded. The entire route passes through flood plain covered by mangrove and the route is completely free from any adjacent housings or agricultural activities.

Chapter 28 Construction Plan and Cost Estimate

28.1 Construction Plan

According to estimated quantities of works for the Project, existing capacity of local construction companies, equipments necessary to the Project and materials to be supplied have been investigated. As the result comprehensive companies' capability of marine works is judged to be enough for the Project except some items. As for construction material supply, steel pipe piles or sheet piles and large-scale rubber fenders should be imported from foreign countries. In case of equipments pile drivers for vertical plastic board drain works to improve soft foundation or large steel pipe pile driving-vessels are necessary to procure from foreign countries. After a trial calculation on cycle time of a trailing (drag) suction hopper dredger, it becomes clear that we must procure a few large-capacity trailing (drag) suction hopper dredgers when they will be needed. As a whole there is no problem to carry out the construction works of the Project.

After reviewing workable days and considering speed of each work, several alternative construction schedules are discussed, including plans of construction periods of five and four years. The proposed construction schedule is shown in Figure 28.1.1(1), which has a construction period of five years. Consolidation of foundation soils takes time; in this case, about two years. An additional cost of about 800 million yen is required for shortening the consolidation period to about 1.5 years as four-year construction period plan, which is shown in Figure 28.1.1 (2).

Still the proposed schedule in general should be understood to be rather tight; so that, in order to complete the works in the end of 2009, various procedures including financial arrangement, selection of the consultant and contractors should be done smoothly and quickly. It is imperative to carry out critical works such as soil improvement and sand filling/removing works for reclamation, and pile driving work for the piers, skillfully in time.

28.2 Cost Estimate

Cost estimate has been carried out based on the layout plans for the Project discussed in Chapter 26 and the preliminary structural designs prepared in Chapter 27. The results are shown in Table 28.2.1. The cost includes value added tax, survey cost and consultant fee (engineering) and contingency.

Table 28.2.1 Construction Cost Estimate for the Priority Project

Port	Description.	No.	Cargo	Length (m)	Depth (m)	Billion VND	Million USD	Million Yen
LCC3&4								
1.Container Wharf	50,000DWT	2	Container	300×2=600m	-14.0m	1,543.5	102.90	12,348
2.Access Road	W=20m	1		3,000m		87.0	5.80	696
3.Basin	600m × 50m				-14.0m	1.4	0.09	11
4.Channel	9.9 Mill. m^3			9,500m		351.3	23.42	2,810
T.V. Channel	8.1 Mill. m^3			5,600m	-14.0m	315.4	21.03	2,523
V.T. Channel	1.8 Mill. m^3			3,900m	-14.0m	35.9	2.40	287
5.Value Added Tax	(1+2+3+4) × 5%	1				99.2	6.61	793
6.Engineering	(1 to 4) × 5%+Survey	1				109.2	7.28	873
7.Contingency	(1+2+3+4) × 10%	1				198.3	13.22	1,587
Total						**2,389.8**	**159.32**	**19,118**
TVG1&2								
1.General Wharf	50,000DWT	2	General	300×2=600m	-14.0m	926.7	61.78	7,413
2.Access Road	W=20m			2,000m		42.3	2.82	339
3.Basin	600m × 50m				-14.0m	1.2	0.08	10
4.Channel	0.7 Mill. m^3			4,700m	-12.0m	33.8	2.26	271
5. Value Added Tax	(1+2+3+4) × 5%	1				50.2	3.35	402
6.Engineering	(1to 4) × 5%+Survey	1				60.2	4.01	482
7.Contingency	(1+2+3+4) × 10%	1				100.4	6.69	803
Total						**1,214.9**	**81.00**	**9,719**
Grand Total						**3,604.7**	**240.31**	**28,837**

Note: 1. Exchange rate: VND 15,000=USD 1= JY120. 2. Excludes maintenance dredging

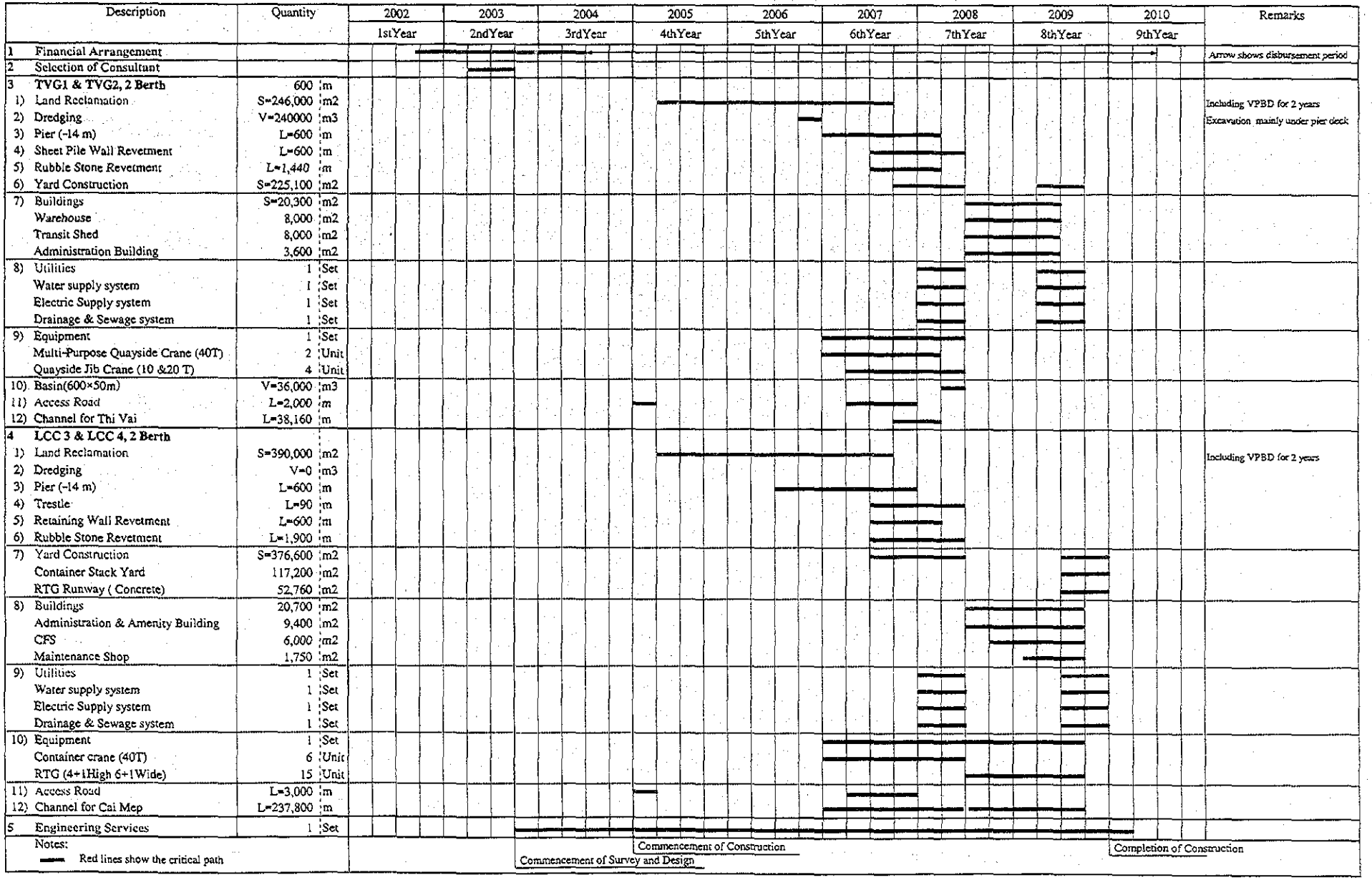


Figure 28.1.1(1) Proposed Construction Schedule

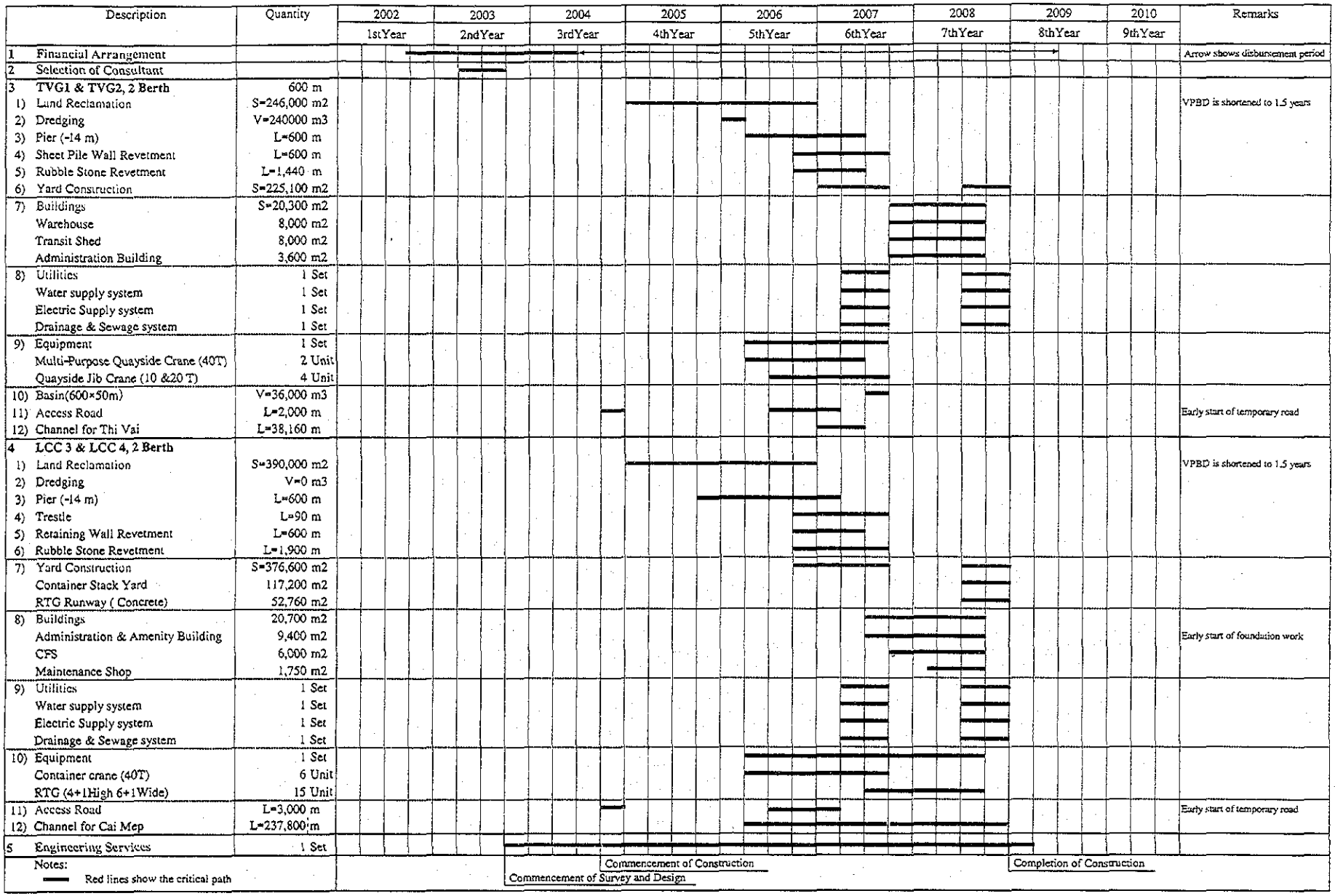


Figure 28.1.1 (2) Alternative Construction Schedule

Chapter 29 Investment Plan

29.1 Stage-wise Development

From the short-term development plan components; the Study Team and the MOT and VINAMARINE selected certain projects in order of necessity. Two container berths in Cai Mep and two general cargo berths in Thi Vai were selected for a priority project package in the year 2010.

Stage-wise development plan of Cai Mep - Thi Vai International Port is shown in Figure29.1, in which the construction works start from the berth LCC-3 in Lower Cai Mep International Container Terminal. The construction works for the other three berths (LCC-4, TVG-1, and TVG-2) also start consecutively. Dredging of channel up to the berth LCC-3 will be carried out up to –12m and be deepened to –14m at the next stage. The channel between the berth LCC-3 and TVG-1 will be dredged t o –12m.

29.2 Investment Plans

The investment plans for the Cai Mep-Thi Vai International Port are as follows

(1) Cai Mep International Container Terminal

After evaluating various development and management systems, a lease system is recommended for the development of the new container terminal. VINAMARINE will invest in infrastructure and quay gantry cranes. Investment in superstructure, such as cargo handling equipment and buildings, should be done by the private sector.

(2) Thi Vai International General Cargo Terminal

Multi purpose berth is public infrastructure for various users and should be constructed by VINAMARINE. It should be examined whether it is feasible to construct two general cargo terminals by 2010 from the aspect of the available loan scale and the results of the financial analysis

Figure 29.1 Investment Plan

Area	Vessel	Terminal		-2010			-2020
Cai Mep	50,000DWT	LCC3	LCC4	160			
	50,000DWT	LCC5	LCC6		130		
	50,000DWT	UCC2	UCC1			130	
	80,000DWT	LCC2	LCC1				200
Thi Vai	50,000DWT	TVG1	TVG2	80			
	50,000DWT	TVG3	TVG4		40	40	
	50,000DWT	TVG5	TVG6				80
Total				240	170	170	280

Mill. USD

Chapter 30 Economic Analyses

30.1 Outline of the Project

(1) Physical Outline

The brief composition of the Project is tabulated in Table 30.1 below.

Table 30.1 Outline of the Project

Project Name	Cargo	Maximum Size of Vessel per Berth	Number of Berth	Reference Number	Development Schedule
Lower Cai Mep	Container	50,000 DWT	2 berths	LCC-3, 4	2006-10
Thi Vai International	General	50,000 DWT	2 berths	TVG-1, 2	2006-10

(2) Operational Outline

Although the project ports are scheduled to commence operation tentatively in 2006 for limited cargo volume, it is assumed that the port will be completed in a complete form as designed in 2010 to handle full volume of cargo projected for respective ports. The cargo demand forecast for the SFEA area in total and the cargo volume projected by cargo type for each project port is assumed as shown in Table 30.2:

Table 30.2 Cargo Volume

Type of Cargo	Year 2010	Year 2020
Container Cargo for Thi Vai – Vung Tau Area	11.0 million tons	33.0 million tons
Non-container Cargo for Thi Vai – Vung Tau Area	4.5 million tons	10.0 million tons
Total Cargo Volume for Thi Vai – Vung Tau Area	15.5 million tons	43.0 million tons
Container Cargo for LCC Project Port	6.0 million tons	7.4 million tons
Non-container Cargo for TVG Project Port	1.1 million tons	1.9 million tons
Total Cargo Volume for Project Port	7.1 million tons	9.3 million tons

30.2 Economic Cost

(1) Project Cost in Economic Price

The initial capital investment amount estimated in market price was adjusted for the economic analysis by a conversion of financial price into economic price as well as by a distribution of the total cost of capital dredging for the preparation of channel leading to the project ports in proportion to a direct use by respective port. Table 30.3 summarizes the capital investment amount.

(2) Annual Operation Cost

The average cargo handling and port operation cost per metric ton of general cargo handled is

determined at US$ 1.60 per ton in economic price. The average cargo handling and port operation cost per metric ton of container cargo is determined at US$ 3.60 per ton (or US$ 36 per TEU) in economic price based on prevailing tariff in market price.

Table 30.3 Project Cost for Economic Analysis

(Unit: US$ Million)

Project Port	In Financial Price	In Economic Price	Remarks
A. Lower Cai Mep Container Terminal (Priority Package)			
Sub-total (A)	131.8	112.1	2 x 50000 DWT
B. Thi Vai General Cargo Terminal (Priority Package)			
Sub-total (B)	78.5	66.7	2 x 50000 DWT
C. Channel Dredging			
Sub-total (C)	3.5	2.9	
Grand Total	213.8	181.9	

Note: See details Chapter 29 of main text.

(3) Annual Maintenance Cost

1) Berth and Equipment

The annual maintenance cost of the different project components is assumed to be a percentage of relevant capital investment cost as shown in Table 30.4. The percentage of maintenance cost of berth and equipment is based on standard rates commonly applied in evaluating similar projects.

Table 30.4 Annual Maintenance Cost for Berth and Equipment

Component	Percentage in Total Capital Investment Amount
Berth	1 %
Equipment	4 %

Source: JICA Study Team

2) Maintenance Dredging

The annual cost of maintenance dredging is based on the detailed analysis of the design and cost estimate for the channel as discussed in Chapter 28 of the main text of the report as summarized in Table 30.5.

Table 30.5 Annual Maintenance Cost for Channel

Terminal	Name of Channel	Share	Cost (US$ Million)
LCC	Thi Vai River Approach Channel	6.4 %	0.930
TVG	Thi Vai Channel	4.0 %	0.639
LCC+TVG	Combination of both channel	5.9 %	0.969

(3) Economic Benefit

1) Economic Benefit per Ton of Cargo

The Project's economic benefits are analyzed and obtained per ton of cargo as shown in Table 30.6 so as to facilitate the economic analysis of specific port development plan within Thi Vai and Vung Tau area. The items used to arrive at the Project's economic benefit per ton are as follows:

- Elimination of Vessel's Waiting Time
- Saving from Reduction of Ship Time for Channel Navigation
- Average Annual Damage of Maritime Accident
- Projection of VOC Cost for Trucking after year 2010

Table 30.6 Economic Benefit per Ton of Cargo

Year	Combined Benefit (US$/ton)		
	Container	Non-cont.	Combined
2010	4.58	9.18	13.76
2015	8.46	11.84	20.29
2020	11.51	13.16	24.67

Source: JICA Study Team

30.3 Result of Economic Analysis

(1) Economic Viability Indicators

The economic viability evaluation of the Project was carried out for each project port, namely Lower Cai Mep International Container Terminal (LCC) and Thi Vai International General Cargo Terminal (TVG), using the economic benefit per ton as mentioned in the previous section, separately and in combination as shown below in Table 30.7.

Table 30.7 Economic Analysis Indicators

	LCC+TVG	LCC Alone	TVG Alone
EIRR	16.1 %	17.1 %	12.4 %
NPV at 10 % D.R. (US$ Million)	155.7	123.1	19.9
B/C at 10 % D.R.	1.48	1.48	1.25

Source: JICA Study Team

(1) Conclusion

As shown in the above table, both cases of a combination with LCC and TVG or independent developments of respective terminal clearly exceeds the minimum EIRR rate of 10% and B/C rate of 1.0. Therefore, the project of the Lower Cai Mep International Container Terminal combined with the Thi Vai International General Cargo Terminal is considered competitive and feasible from the national economic viewpoint.

Chapter 31 Financial Analysis

31.1 Objective and Methodology of Financial Analysis

(1) Objective

The purpose of the financial analysis is to evaluate the financial feasibility of the project (The project means the priority project at Cai Mep-Thi Vai in this chapter). When evaluating the financial viability of the project, financial soundness of the executing agency, which is a New Port Management Body (PMB), is also assessed.

(2) Methodology

The viability of the project is analyzed using the Discount Cash Flow Method and appraised by the Financial Internal Rate of Return (FIRR). The FIRR is the discount rate that makes the discounted costs and revenues over the project life equal. The financial soundness of the executing agency of the project is also appraised based on its projected financial statements.

31.2 Assumption for Financial Analysis

Table 31.2.1 Preconditions of Financial Analysis

Base Year	Year 2001
Project Life	30years after a project completion
Revenue	Calculation based on the latest port tariff and forecast cargo volume
Expenditure	
+Investment	Initial investment cost include tax.
+Re-investment	Container crane:15years, Forklift and tractors: 5 years each.
+Maintenance and repair	Infrastructure : 1 % of original construction cost. Equipment : 5 % of original purchasing cost.
+Personnel and administration	Calculation based on personnel plan and the existing scale of payment
+Depreciation	Calculation by means of the straight line method.
Fund Raising	
+Foreign loan	Loan period: 30 years Interest rate: 1.8 % Grace period: 10 years Proportion: 85 % of total investment cost
+Domestic loan	Loan period: 10 years Interest rate: 15 % Proportion: 15% of total investment cost

31.3 Evaluation of Project

(1) Evaluation of 5 Year Construction Project

1) Viability

The result of FIRR calculation is shown in Table 31.3.1. FIRR for the New Port Management Body is 5.7%, which is exceeding the weighted average interest rate of loan (3.78 %). FIRR for the terminal operator is 23.8%, which is also exceeding the assumed private bank's interest rate (15.0%).

Table 31.3.1 Result of FIRR Calculation

	New Port Management Body (PMB)	Private Sector
FIRR	5.7 %	23.8 %

The result of FIRR calculation under the condition that the revenue share of cargo handling charge at the Cai Mep-Thi Vai International Port is variable between 10 % and 25 %, is shown in Table 31.3.2. Judging from the following result of FIRR calculation, 20 % variable share of cargo handling charge is financially viable to both the New Port Management Body (PMB) and a private sector.

Table 31.3.2 Result of FIRR Calculation assuming the Variable Revenue Share of the Terminal

Variable Share of Cargo Handling Charge (%) for PMB	FIRR of New Port Management Body (PMB)	FIRR of Private Sector
10 %	3.9 %	33.0 %
15 %	4.8 %	28.5 %
20 %	5.7 %	23.8 %
25 %	6.5 %	18.8 %

2) Sensitivity Analysis

Sensitivity analysis is carried out to examine the impact of unexpected future changes such as cargo volume, construction cost, inflation or exchange rate. The following cases are envisioned.

- Case 1 : Investment costs increase by 10 %.
- Case 2 : Revenues decrease by 10 %.
- Case 3 : Investment costs increase by 10 %, and revenues decrease by 10 %.

The result of the sensitivity analysis is shown in Table 31.3.3. In all cases, FIRR exceeds, or is almost the same as the target interest rate of loan (3.78% per annum for PMB and 15.0% per annum for a private sector).

Table 31.3.3 Results of Sensitivity Analysis

Case	New Port Management Body (PMB)	Private Sector
Original Case	5.7 %	23.8 %
Case 1	4.8 %	21.1 %
Case 2	4.3 %	15.6 %
Case 3	3.5 %	13.2 %

(2) Evaluation of 4 Year Construction Project

1) Viability

The result of FIRR calculation is shown in Table 31.3.4. FIRR for the New Port Management Body is 5.8%, which is exceeding the weighted average interest rate of loan (3.78 %). FIRR for the terminal operator is 22.5%, which is also exceeding the assumed private bank's interest rate (15.0%).

Table 31.3.4 Result of FIRR Calculation

	New Port Management Body (PMB)	Private Sector
FIRR	5.8 %	22.5 %

2) Sensitivity Analysis

Sensitivity analysis is carried out to examine the impact of unexpected future changes such as cargo volume, construction cost, inflation or exchange rate. The following cases are envisioned.

- Case 1 : Investment costs increase by 10 %.
- Case 2 : Revenues decrease by 10 %.
- Case 3 : Investment costs increase by 10 %, and revenues decrease by 10 %.

The result of the sensitivity analysis is shown in Table 31.3.5. In case 1 and case 2, FIRR for the project exceeds, or is almost the same as the target interest rate of loan (3.78 % per annum for PMB and 15.0 % per annum for a private sector.). However, in case 3 (investment costs increase by 10 % and revenue decreases by 10 %), FIRR for the New PMB and a terminal operator does not exceed the target interest rate. Therefore, if there were a drastic change in the financial environment, this project would not be feasible.

Table 31.3.5 Results of Sensitivity Analysis

Case	New Port Management Body (PMB)	Private Sector
Original Case	5.8 %	22.5 %
Case 1	4.8 %	20.1 %
Case 2	4.4 %	14.8 %
Case 3	3.4 %	12.7 %

31.4 Conclusion

Judging from the above analysis, the project is regarded as financially feasible. However, the project should be reviewed and reevaluated from time to time, in particular when the financial environment is expected to change. It is also recommendable that the New Port Management Body (PMB) and a terminal operator should make continuous efforts to heighten the quality of the service, to improve cargo handling efficiency, to secure the predicted cargo volume, and to seduce operating expenses.

Chapter 32 Preliminary Environmental Impact Assessment (Pre-EIA)

Based on the available information and the results of Initial Environmental Examination (IEE), the short- and long-term as well as direct and indirect negative impacts, which are likely to be caused by the implementation of the priority projects, are predicted and assessed objectively.

For each potential negative impact thus predicted and assessed, mitigation measures are proposed as summarized in Table 32.1:

Table 32.1 Summary of Potential Negative Impacts and Mitigation Measures

Factors	Potential Negative Impacts	Mitigation Measures
Construction Phase		
-Dredging		
Increase of turbidity[1)] Change in water current characteristics Oil spillage from equipment	Degradation of water and aquatic products quality. Change in shape of riverbank and coastline. (erosion or accumulation)	Appropriate alignment of navigation channel. Appropriate selection of dredging method, equipment and location of dumping site. Usage of enough capacity and well maintained equipment.
-Reclamation		
Increase of turbidity Hindrance of water exchange	Degradation of local bio-diversity.	Due consideration on local water exchange system in estuary. Layout of surrounding revetment and flyover (permeable) structure.
-Structural work		
Change in water current characteristics	Erosion of riverbank.	Selection of pier and slope (low reflection) structure.
Solid waste disposal	Heavy metal contamination.	Designation of dedicated disposal area.
-Others		
Increase of construction traffic Processing construction material	Hindrance of local traffic. Adverse effect on human health. (dust, noise, etc.)	Selection of appropriate route for material transportation and concrete and asphalt plants. Covering and watering on dusty transporting materials. (sand, stone, etc.)
Placing worker's camp	Waste discharge. Communicable trouble.	Utilization of local manpower. Preparation of adequate sanitary facilities in camp.
Operation Phase		
-Port operation		
Increase of port related traffic	Hindrance of local traffic Adverse effect on human health. (accident, dust, noise, etc.) Erosion of Mangrove forest.	Comprehensive restriction on vehicle operation speed, over-loaded transportation and usage of obsolete vehicles. Keeping distance between mangrove forest and navigation channel. Slowing down of ship speed.
Dust discharge	Degradation of air quality.	Covering and watering on bulky or dusty stock.
Oil spillage	Degradation of water and aquatic products quality.	Layout of oil trap trench and fence surrounding oil-handling facilities.

Note: [1)] In the study, it was revealed that dumping work of dredged soil at the site (20m depths and 5km off Vung Tau Cape) has no significant effect on marine environment.

Chapter 33 Port management / Operation Plans

33.1 Required Port Management / Operation System

(1) Organization of New Port Management Body

In order to administrate and manage the Cai Mep-Thi Vai International Port, a new port management body must be established before the new port is operational in 2010. The organizational form of the new port management body should be a form which consists of the same port management system as described in Chapter 16, from the viewpoint of cargo handling efficiency and unification of port management system. The Study Team proposes the organization of the new port management body, which is shown in Figure 33.1.1.

In order to accelerate private sector participation in the field of cargo handling operation, the Study Team also proposes the leasing system at a container and general cargo terminal. After port infrastructure with quay side container crane is constructed by a new port management body, a container and general cargo terminal is leased to a private operator. This private operator will play a role to stevedore and to store cargo at the terminal. Therefore, the new port management body does not hold stevedoring departments which are responsible for cargo handling operation and storage at terminal within its own organization.
It is also pointed out that pilot service, tugboat service and other marine service are exempted from the responsibility of the new port management body, because those services should be carried out by the existing maritime organizations and enterprises.

(2) Board of Commissioners

Top management of a port is executed by a board of commissioners. Under the leadership of the board of commissioners, a director general is responsible for port management and operation as a whole, which are normally taken care of on " day by day" basis. A deputy director general assists a director general in managing and operation a port. And there are an appropriate number of departments which are responsible for the specific field within the tasks of port management and operation at the port. Therefore, a board of commissioners is the most important section of a port. In other words, a board of commissioners is the supreme decision making body at a port management body.

Take the Port of Laem Chabang, Thailand, for an example. The board consists of 15 commissioners, whose professions are central government leader, and custom services. (Table 33.1.1). The board of commissioners at the Laem Chabang Port is thought to be one of the model organizational structures in the South East Asia. The Study Team recommends that the board of commissioners at a new port management body should consists of men of central government career, men of VINAMARINE career, men of municipal government career, maritime business leaders, city planners and developers in SFEA. The central government should also play a key role to establish the board of commissioners at the Cai Mep-Thi Vai International Port.

Under the strong leadership of the board of commissioners, a director general, deputy director general, and each manager of a department can play their own role to carry on day by day port

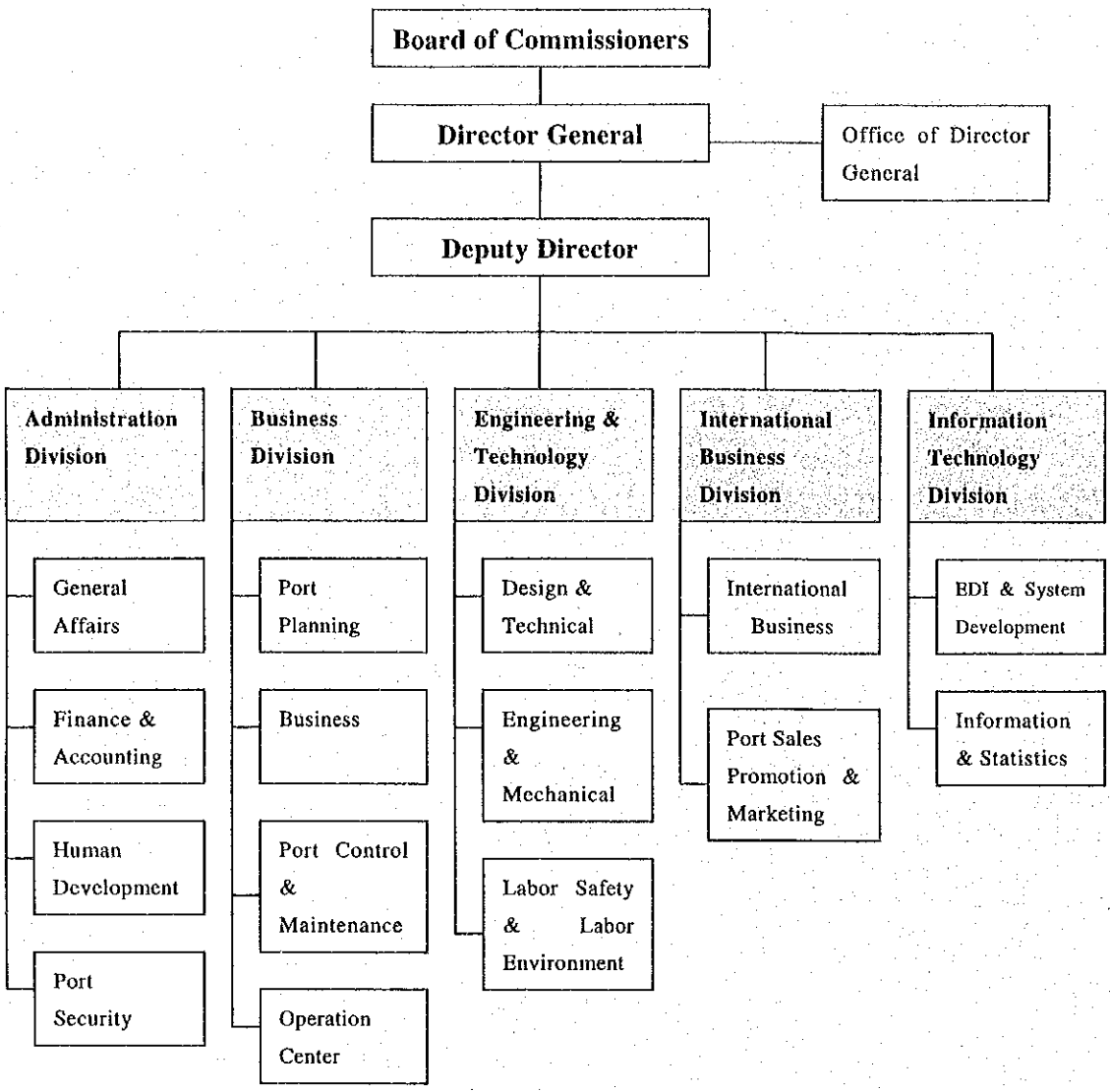


Figure 33.1.1 Organization Chart of PMB at the New Port

management and operation. Therefore, the selection of board members is one of the most important tasks when a new port management body is organized. The Study Team recommends that MOT and VINAMARINE should take a strong initiative to establish an efficient port management body in Vietnam for the purpose of port management, operation and development at the Cai Mep-Thi Vai International Port.
important tasks when a new port management body is organized. The Study Team recommends that MOT and VINAMARINE should take a strong initiative to establish the new port management body in Vietnam for the purpose of port management , operation and development at Cai Mep-Thi Vai International Port.

Table 33.1.1 Board of Commissioners of Laem Chabang, Thailand

Responsibility of Board	Personal Background
Chairman	Director General, Harbor Department, Ministry of Communications and Transport
Commissioner	Permanent Secretary, Ministry of Commerce
Commissioner	Deputy Director General, Custom Department, Ministry of Finance
Commissioner	Director General, Port Authority of Thailand
Other Commissioners(Up to 11 commissioners)	Relevant Central Government Organizations

(3) Organizational Scale of New Port Management Body

The Study Team proposes the necessary and sufficient number of staffs of a new port management body, based on the correlation analysis between the number of staffs and container cargo throughput at typical container ports in the world. Taking account of the predicted amount of container cargo at the new port in the year 2010, approximately 300 staffs can be proposed as the appropriate organizational scale of the new port management body. The new port management body manages not only a container terminal at Cai Mep, but also a general cargo terminal at Thi Vai. Therefore, the organizational scale of the new port must be larger than that of a container terminal only. All these being taken into account, the Study Team proposes the organizational structure and the number of staffs in 2010 as shown in Table 33.1.2.

(4) Organizational Scale of Cargo Handling Operator

The Study Team proposes the necessary and sufficient number of employees of a terminal operator, based on the estimation described in Chapter 26. At Cai Mep Container Terminal, it is assumed that the terminal is operated by 6 units and 3 shifts for quayside container crane, 15 units and 3 shifts for transfer crane, 36 units and 3 shifts for tractor. At Thi Vai General Cargo Terminal, it is assumed that the terminal is operated by 6 units and 3 shifts for crane, 10 units and 3shifts for tractor, 5 units and 3 shifts for forklift. All these being taken into account, the Study Team proposes the organizational structure and the number of employees in 2010 should be approximately 500 at the Cai Mep International Container Terminal, and approximately 900 at the Thi Vai International General Cargo Terminal.

Table 33.1.2 Organizational Structure and Number of Staffs at New Port Management Body in 2010

Board of Commissioners (7)				
Director General (1)			Office of Director General (3)	
Deputy Director General (4)				
Manager in charge of Port Administration (1)	Manager in charge of Port Business (1)	Manager in charge of Engineering and Technology (1)	Manager in charge of International Business (1)	Manager in charge of Information and Technology (1)
+General Affairs Section	+Port Planning Section	+Design and Technical Section	+International Business Section	+EDI and System Development Section
+Finance and Accounting Section	+Business Section	+Engineering and Mechanical Section	+Port Sales Promotion and Marketing Section	+Information and Statistics section
+Human Development Section	+Port Control and Maintenance Section	+Labor Safety and Labor Environment Section		
+Port Security Section	+Operation Center for Container Terminal			
	+Operation Center for General Cargo Terminal			
Section Total : 90	Section Total : 90	Section Total : 40	Section Total : 30	Section Total : 30

(5) Organization of Construction Management Team

To initiate port construction works at the Project site, organization of construction management must be identified and set up at first. Without this organization at site, port construction will not make any progress. Therefore, a supervisory team for these duties must be organized before the initiation of the construction.

The supervisory team consists of several tens of engineers and staffs at the early stage of the construction. However, the number of the team members will increase and reach to some hundreds as the construction works proceed. It is self-evident and desirable that the supervisory team be developed and transferred to an administrative division, and engineering and technology division within the future port management body at Cai Mep-Thi Vai International Port, when the planned port is newly operational in 2010.

33.2 Scheme of Private Sector Participation (PSP)

(1) Introduction of Private Sector Participation (PSP) to New Port

The leasing system in which infrastructure is constructed by the public sector has been already

recommended in Chapter 24. Public sector's investment should include not only wharves, yard, navigation channel and access road, but also quay side crane, because a large amount of investment may make private sector bear greater risk for the project. On the other hand, a new port management body can take advantage of foreign soft loan with lower interest rate to finance the initial investment. Superstructure and facilities, such as cargo handling equipment and buildings, should be invested by private sector. Private sector aims at high productivity based on its long cargo handling experience and know-how. Private sector also has flexibility in responding to the changing economic situation in the international container cargo market.

The leasing system of general cargo berths must be also carefully considered. The Study Team recommends that general cargo berths should be leased to the same private sector as a container terminal operator. The reason is described below.

1) Reducing the private sector's financial risk
Since cargo handling volume is not likely to be large at multi-purpose general cargo berths, port revenues generated from those berths also tends to become insufficient. When general cargo berths alone are leased to a private sector, the lessee's financial risk will become larger. In order to get rid of this kind of risk, both general cargo and container berths should be leased to the same private sector.

2) Public usage of general cargo berths
Major customers at multi-purpose general cargo berths are usually a large number of small shipping companies. General cargo berths should not be exclusively used for specific shipping companies, but should be always open to those small port customers. Otherwise, those small shipping companies will completely lose the business chance at this new port. When a new port authority enters a contract with the private sector to lease the general cargo terminal, a provision to ensure the public usage at the terminal should be contained in the contract.

3) Common usage of berths between container and general cargo terminal.
Vessel calls to a port can sometimes be irregular. When a large number of vessels call at the same time, appropriate berth allocation must be made in order to achieve efficient cargo handling at the port. In this sense, when container berths at Cai Mep are occupied by plenty of vessels, those calling vessels should be allowed to call at the Thi Vai International General Cargo Port to load / unload container cargo. However, general cargo vessels should not be allowed to call at the Cai Mep International Container Terminal because container terminals cannot accept slow general cargo handling operation all the time. The Study Team proposes that the common usage of general cargo berths between container and general cargo terminal should be introduced to the port to provide port users with maximum cargo handling capacity.

(2) Type of New International Terminal Utilization

In general, there are three types of terminal utilization, which are "Public Use", "Commercial Use", and "Private Use". Since the New International Port is constructed by public sector, even in case of PSP (Private Sector Participation), the public sector should always supervise the development and management of the new port in order to gain the maximum transport benefit from the port facilities. From the viewpoint of the most efficient berth utilization, commercial use should be

introduced to the port as a basic PSP scheme.

In conclusion, public sector provides infrastructure and quay side container crane, while private sector provides superstructure and necessary facilities. Terminal management and operation is conducted by the private sector. The public sector supervises port management and operation. Basic terminal utilization should be the "commercial use" system.