

**Final Report**

**The Study for  
Development of  
the Greater Jakarta Metropolitan Ports  
in the Republic of Indonesia**

**Main Report Volume-3  
Master Plan**

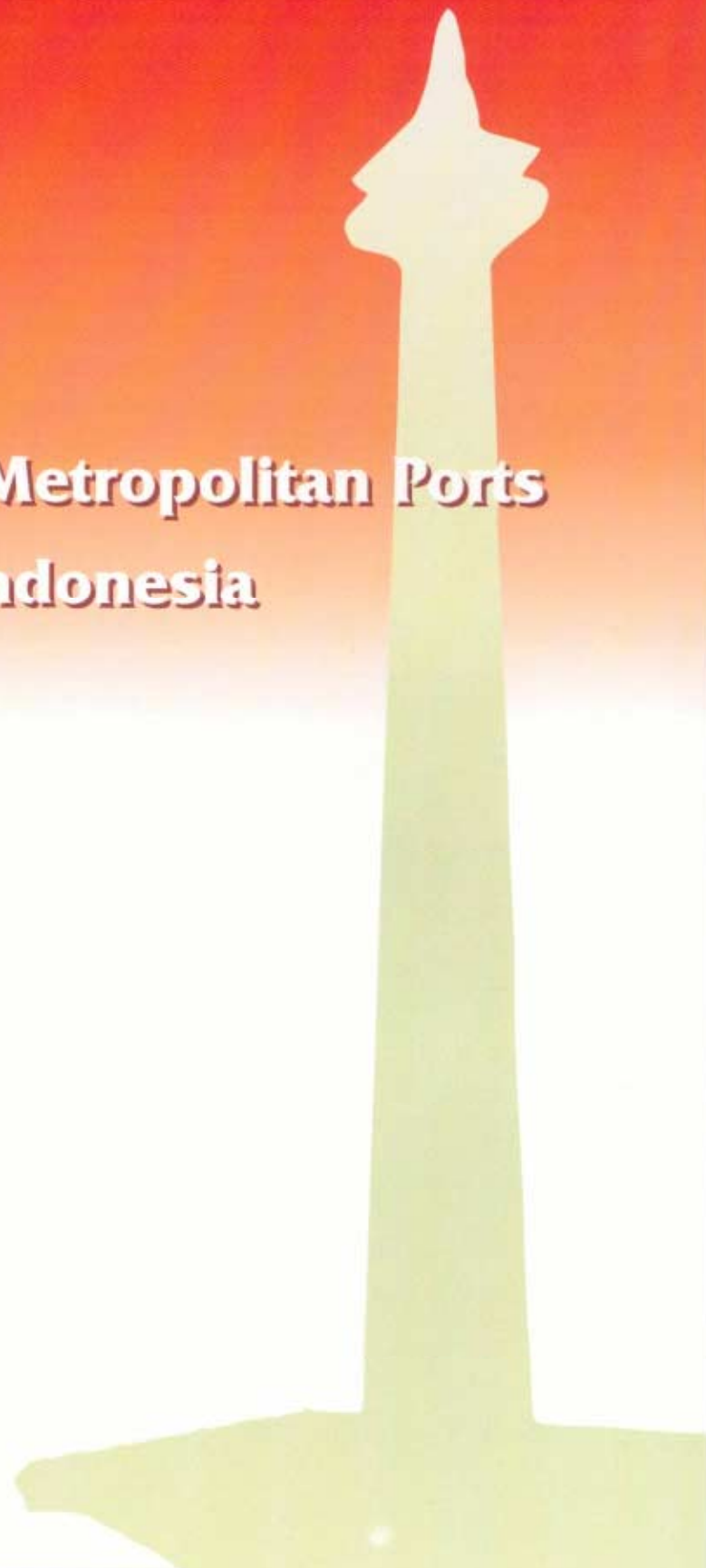
**December 2003**

The Overseas Coastal Area Development Institute of Japan (OCDI)  
Pacific Consultants International (PCI)

SSF

JR

03-151



Exchange Rate

1USDoller=8,500Rupiah=120Yen

(As June 2003)

**Japan International Cooperation Agency (JICA)**

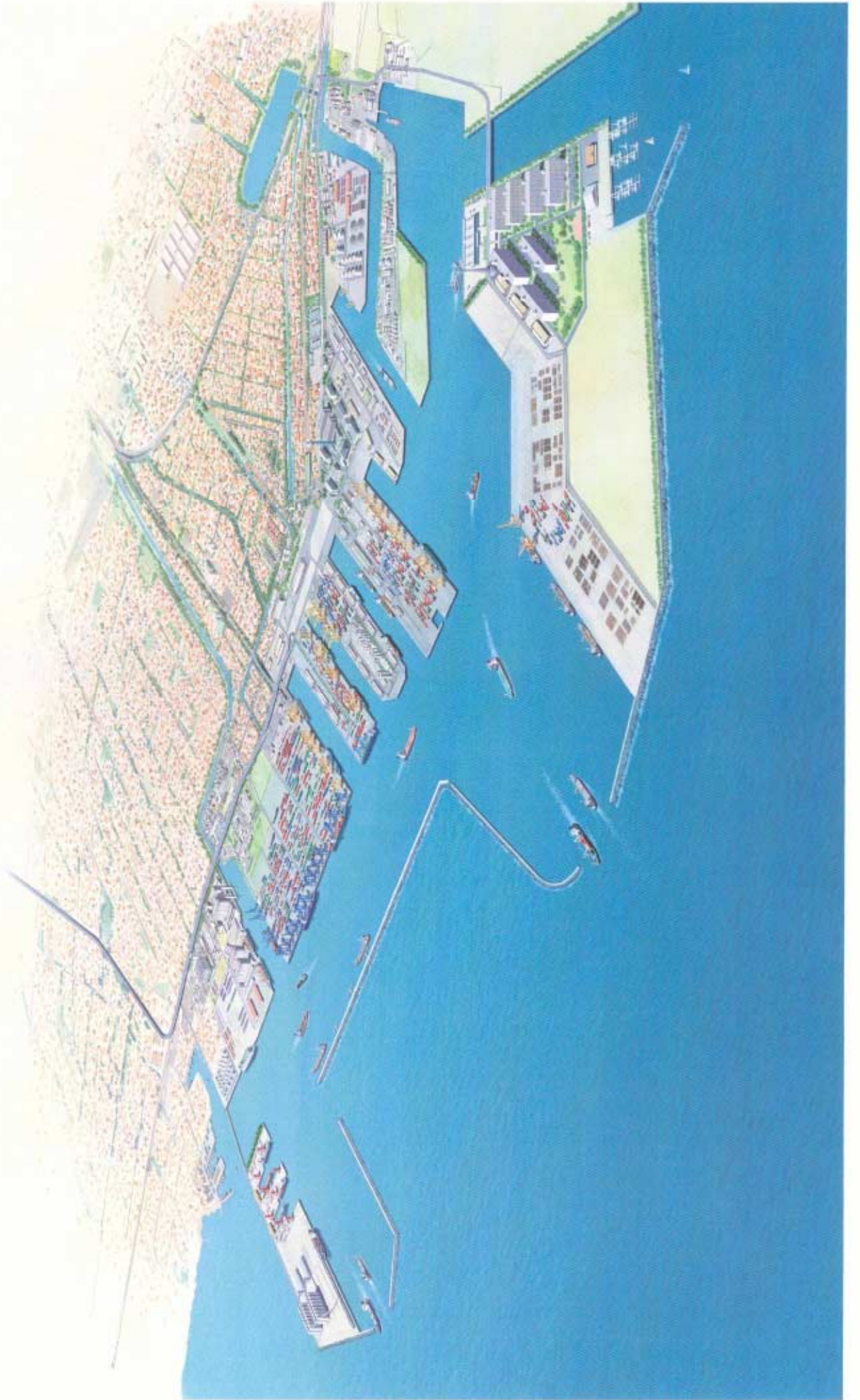
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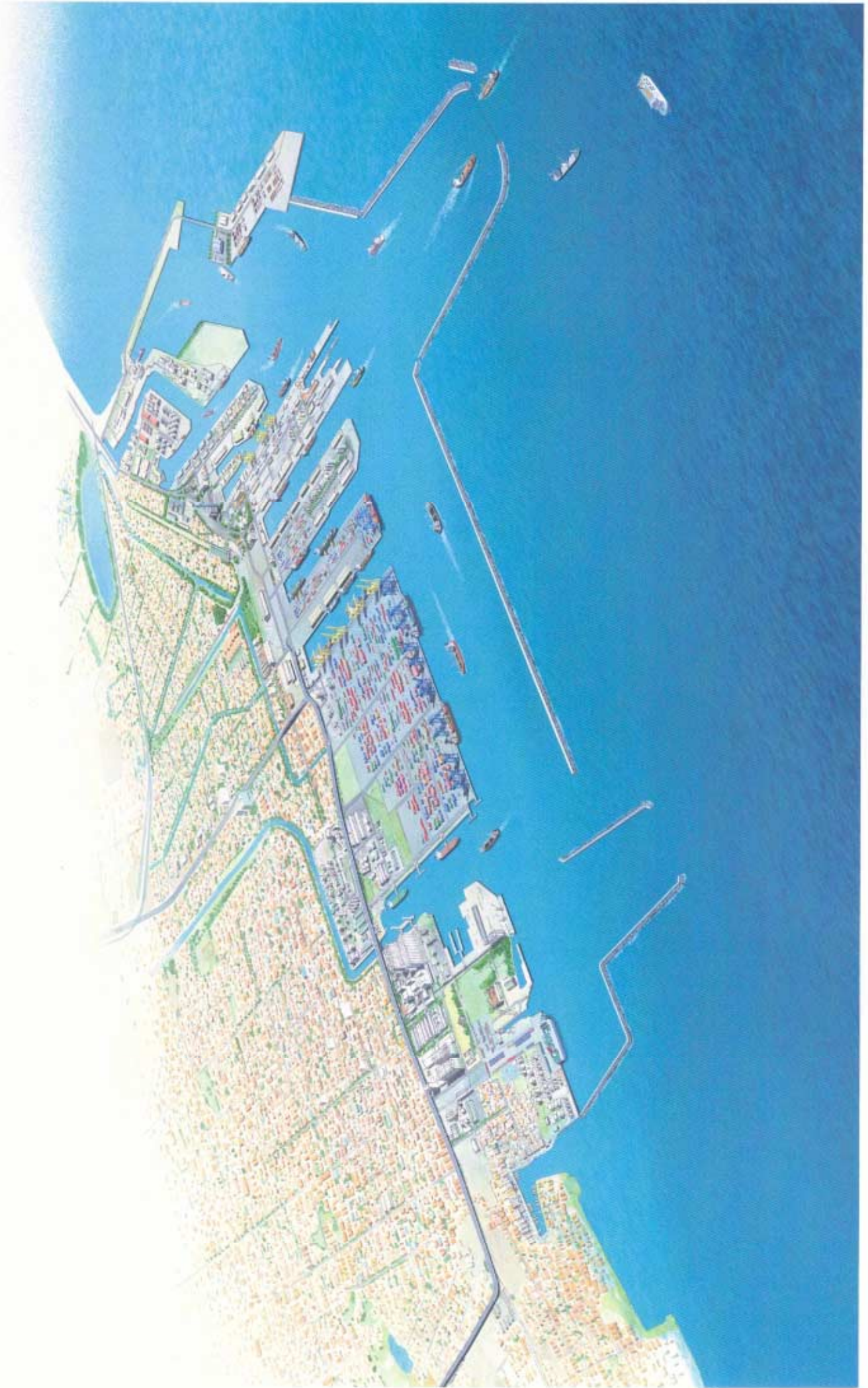
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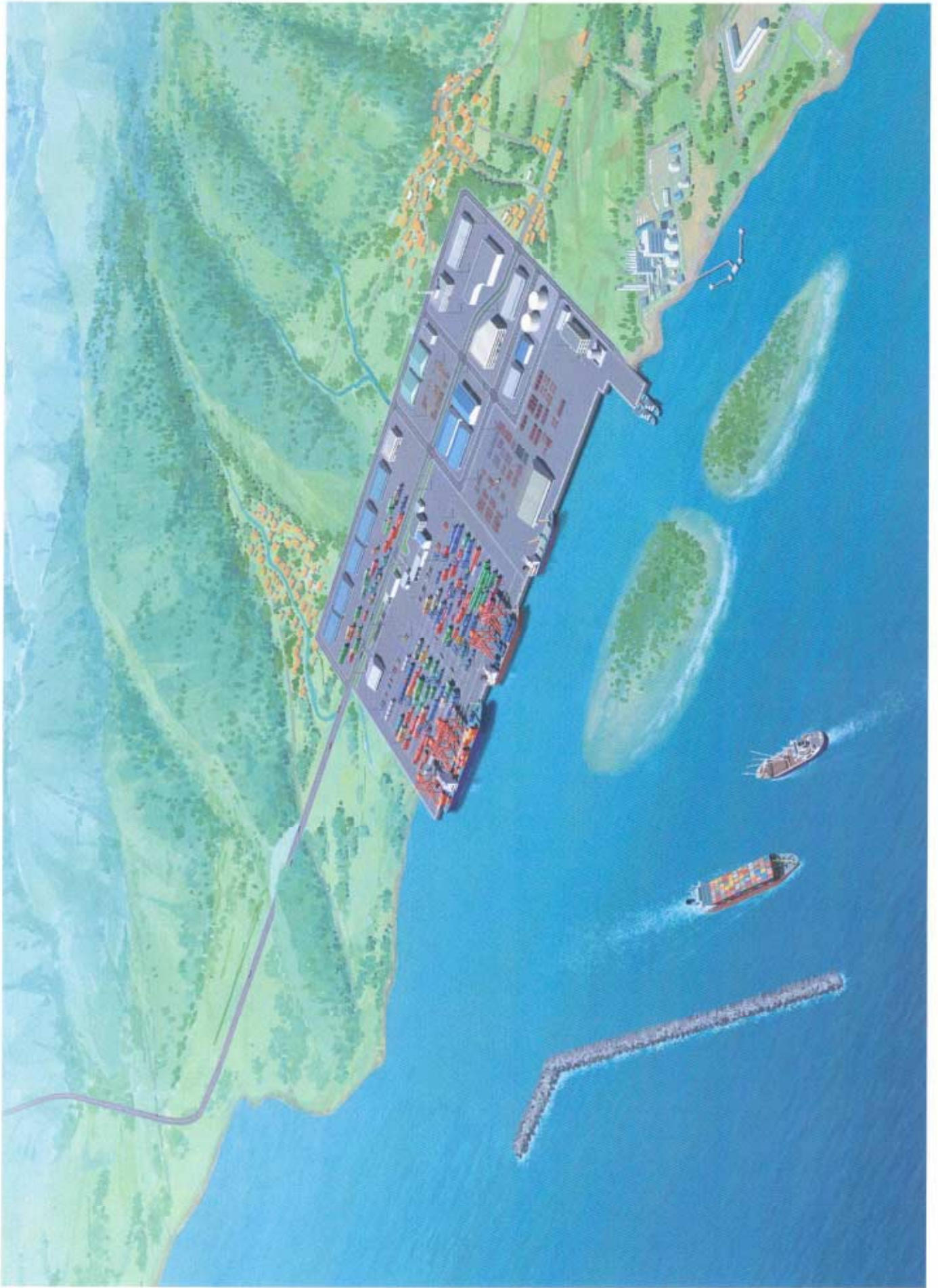
Tanjung Priok Port (2025)



Tanjung Priok Port (2012)



Bojonggara Port (2025)



Bojonegara Port (2012)

## PREFACE

In response to a request from the Government of the Republic of Indonesia (hereinafter referred to as “GOI” ), the Government of Japan decided to conduct a Study for the Greater Jakarta Metropolitan Ports in the Republic of Indonesia and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA selected and dispatched a study team to Indonesia four times between March 2002 and October 2003, which was headed by Mr. Hidehiko Kuroda of the Oversea Coastal Area Development Institute of Japan (OCDI) and was comprised of OCDI and Pacific Consultants International, Ltd (PCI).

The team held discussions with the officials concerned of the GOI and conducted the field surveys at the study area. Upon returning to Japan, the team conducted further studies and prepared this final report.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of GOI for their close cooperation extended to the team.

November 2003

Kazuhisa Matsuoka

Vice President

Japan International Cooperation Agency



## LETTER OF TRANSMITTAL

November 2003

Mr. Kazuhisa Matsuoka  
Vice President  
Japan International Cooperation Agency

Dear Mr. Matsuoka:

It is my great pleasure to submit herewith the Final Report of "The Study for Development of the Greater Jakarta Metropolitan Ports in the Republic of Indonesia".

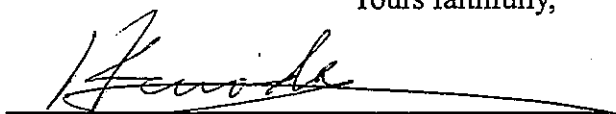
The study team comprised of the Overseas Coastal Area Development Institute of Japan (OCDI) and Pacific Consultants International (PCI) conducted surveys in the Republic of Indonesia over the period between March 2002 and October 2003 according to the contract with the Japan International Cooperation Agency (JICA).

The study team compiled this report, which proposes the future development scenario for the Greater Jakarta Metropolitan ports and Master Plans and Short-term Plan of Tanjung Priok Port and Bojonegara new port up to 2025 and 2012 respectively, together with the feasibility study on urgent project for both ports, through close consultations with officials of the Ministry of Communications of the Indonesian Government and other authorities concerned.

On behalf of the study team, I would like to express my heartfelt appreciation to the Ministry of Communications and other authorities concerned for their cooperation, assistance, and heartfelt hospitality extended to the study team.

I am also greatly grateful to the Japan International Cooperation Agency, the Ministry of Foreign Affairs, the Ministry of Land, Infrastructure, and Transport, and the Embassy of Japan in Indonesia for valuable suggestions and assistance during the course of the study.

Yours faithfully,



Hidehiko KURODA  
Team Leader

The Study for Development of the Greater Jakarta  
Metropolitan Ports in the Republic of Indonesia

## LIST OF ABBREVIATIONS

A	ADPEL	Port Administrator Office
	AFTA	ASEAN Free Trade Area
	AMDAL	Environmental Impact Assessment
	ADB	Asian Development Bank
	ASEAN	Association of South East Asian Nations
B	BAPEDAL	Environmental Impact Management Agency
	BAPEDALDA	Brunch Office of BAPEDAL
	BAPPEDA	Provincial Development and Planning Board
	BAPPENAS	National Development Planning Agency
	BCH	Box/Crane/Hour
	B/C	Benefit/Cost
	BKPM	Investment Coordination Board
	BOD	Biological Oxygen Demand
	BOR	Berth Occupancy Ratio
	BOT	Build-Operate-Transfer
	BPS	Central Bureau of Statistics
	BPPN	International Bank of Reconstruction and Development
	BT	Berthing Time
	BUMN	State Owned Company
C	CFS	Container Freight Station
	COD	Chemical Oxygen Demand
D	DGLC	Directorate General of Land Communication
	DGH	Directorate General of Highways
	DGSC	Directorate General of Sea Communication
	DO	Dissolved Oxygen
	DTV	Daily Traffic Volume
E	EDI	Electric Data Interchange
	EIA	Environmental Impact Assessment
	EIRR	Economic Internal Rate of Return
	ET	Effective Time (at Berth)
F	FCL	Full Container Load
	FTA	Free Trade Area
	FIRR	Financial Internal Rate of Return
	FDI	Foreign Direct Investment
G	GBHN	Broad Outlines of the Nation's Direction
	GDP	Gross Domestic Product
	GOI	Government of Indonesia
	GOJ	Government of Japan
	GRDP	Gross Regional Domestic Product
	GT	Gross Tonnage

H

I	IAPH	International Association of Ports and Harbors
	IBRD	International Bank of Reconstruction and Development
	IDB	Islamic Development Bank
	IEE	Initial Environmental Examination
	IMF	International Monetary Fund
	IMTN	Indonesia Medium Term Notes
	INSA	Indonesian National Ship Owner Association
	IPC	Indonesia Port Corporation

J	Jabotabek	Jakarta, Bogor, Tangerang and Bekasi area
	JBIC	Japan Bank for International Cooperation
	JICA	Japanese International Cooperation Agency
	JICT	Jakarta International Container terminal
	JKT	Jakarta
	JO	Joint Operation
	JORR	Jakarta Outer Ring Road
	JV	Joint Venture

K	KANPEL	Port Administration Office (Non-commercial Port)
	KANWIL	Provincial Office of a Central Ministry
	Keppres	Presidential Decree
	Kimpraswil	Ministry of Settlements and Regional Development
	KM	Ministerial Decree
	KSO	Kerjasama Operasi (Joint Operation)

L	LCL	Less than Container Load
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M	MENEG LH	State Ministry for Environment
	MOC	Ministry of Communication
	MOF	Ministry of Finance
	MOSOE (MOSOC)	Ministry of State-Owned Enterprises (Companies)
	M(O)SRD	Ministry of Settlements and Regional Development

N	NGOs	Non Government Organizations
	NPS	National Port System
	NPV	Net Present Value

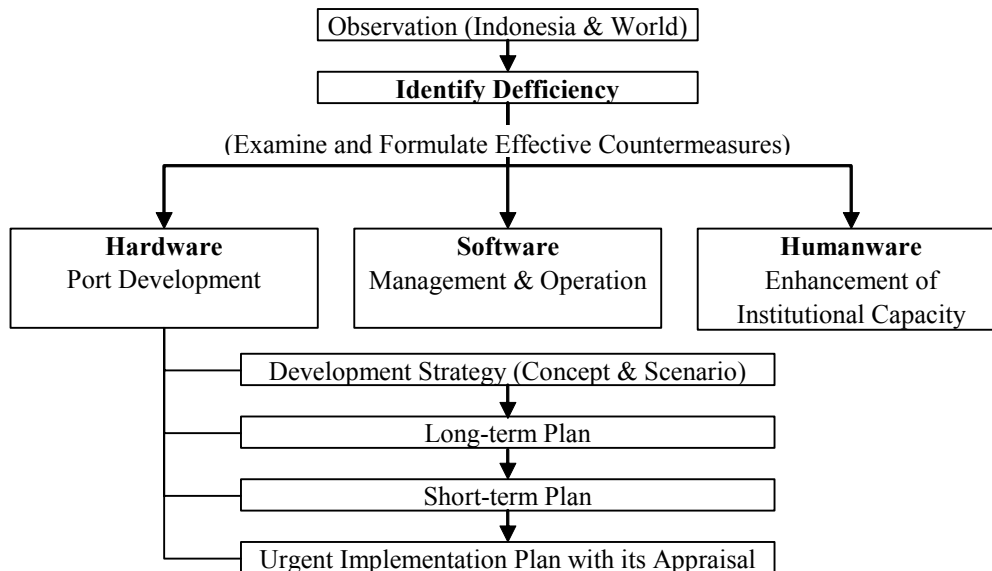
O	OD	Origin and Destination
	ODA	Official Development Assistance

P	PCC	Pure Car Carrier
	PCU	Passenger Car Unit
	PELINDO	Indonesia Port Corporation
	PELNI	Indonesian National Shipping Company
	PERSERO	State-Owned Company

	PERUM ASDP	State-Owned Inland Waterways & Ferry Company
	pH	Hydrogen ion concentration
	PIANC	Permanent International Association of Navigation Congress
	PJP	The Second Long Term Development Plan
	PM10	Particular matter less than 10 $\mu$ m
	PP	Government Regulation
	PPKB	Permintaan Pelayanan Kapal dan Barang (The Demands of Ship and Good Services)
	PPSA	One Roof Port Service Center
	PROPENAS	National Development Policy
	PRT	Port Related Traffic
	PSA	PSA Company (changed from Port of Singapore Authority)
	PSP	Private Sector Participation
	PT.	Limited Company
	PT.RUKINDO	Indonesia Dredging State Limited Company
R	REPELITA	National Five-year Development Plan
	REPELITADA	Local Five-year Development Plan
	RKL	Environmental Management Plan
	Rp.	Rupiah
	RPL	Environmental Monitoring Plan
	RTRW	Spatial Use Plan
	RTG	Rubber Tire mounted Gantry
S	SIMOPPEL	Port Operation Management Information System
	SOLAS	International Convention on Safety of Life at Sea
	SOR	Shed Occupancy Ratio
	SPM	Suspended Particle Matter
	SS	Suspended Solid
T	TEU	Twenty Foot Equivalent Unit
	THC	Terminal Handling Charge
	TGH	Ton/Gang/Hour
	TOR	Term of Reference
	TTV	Through Traffic Volume
U	UNCTAD	United Nations Conference on Trade and Development
	UU	Law
W	WB	World Bank
Y	YDT	Yard Dwelling Time
	YOR	Yard Occupancy Ratio

## **Executive Summary -Conclusion and Recommendation-**

1. The study for “Development of Greater Jakarta Metropolitan Ports”, was implemented following the procedure hereunder:



2. Conclusions and recommendations of the study are given below.

### **A. Identified Deficiencies**

3. Tanjung Priok port now functions as the largest trading port in the Western Java area. However, its physical figure is almost the same as it was in the Dutch colonial era and the port productivity has been gradually deteriorated compared to major ASEAN ports. This will let the port’s function paralyzed in near future, and which will surely depress the investment climate especially for foreign investors. As a result, global companies will likely withdraw from this area and Indonesian products will lose competitiveness in the international market, especially in the ASEAN market.

4. The critical issue now facing the existing Tanjung Priok port are as follows, which are summarized in “being unable to meet the port users’ needs”:

- Lack of speedy and credible cargo transit through the port
- Lack of safe and secure cargo handling
- Lack of available port facilities and space to accommodate the cargo demand
- Lack of fair and transparent dues and charge

5. The study team identified the causes of this unfavorable situation as follows:

- Limited capacities on ship navigation, land space and inland transport
- Low efficiency/productivity of cargo handling due to capacity constraints and disorderly land use

- Institutional defectiveness in trade facilitation such as inefficient customs clearance, inefficient and inflexible terminal operating system, ineffective EDI system etc.
6. The study team strongly proposes DGSC and IPC-II to duly and continuously follow up and monitor these problems through the collection and observation of accurate data and information.

## **B. Hardware –Development of the Ports–**

7. The study team examined cargo trends and the development potential of the ports, set the port development goal and strategy for ports in the Western Java area and formulated the master plan and the short-term development plan both for Tanjung Priok and Bojonegara. In addition, the study team selected the priority projects for urgent implementation and assessed the viability of the projects both for Tanjung Priok and Bojonegara.

### **B-1 Development Strategy**

#### ***Development Targets of Jakarta Metropolitan Ports***

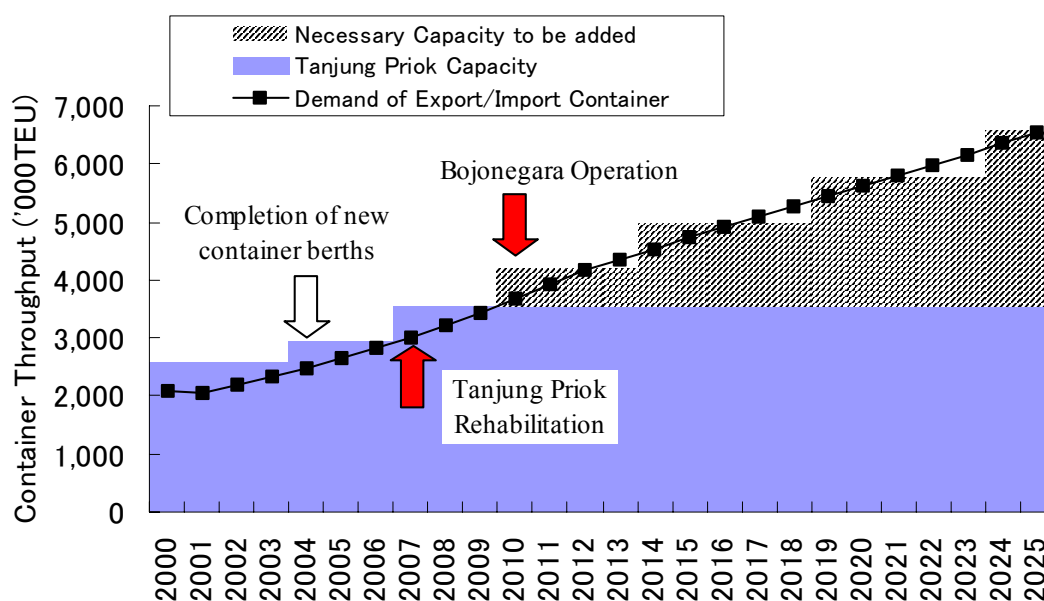
- To make the Greater Jakarta Metropolitan port function as a “**Logistic Center**” in **ASEAN regions** in order to maintain and enhance the competitiveness of Indonesian industry in the region by providing an attractive business /investment environment.
- To make the Greater Jakarta Metropolitan port function as a **Regional Hub Port**” not only attracting international trunk lines but also linking them to domestic/inter-island lines

#### ***Development Focus***

8. In order to achieve the above development targets, the following points should be focused on:
- Best use of the existing facilities
  - User friendliness of port facilities
  - Strategic port development and management
  - Environmental friendliness

#### ***Development Scenario***

9. The proposed development scenario is as follow:
- To increase the port capacity of Tanjung Priok by its urgent rehabilitation up to 2008 with maximum use of the existing port facilities, which will increase the international container handling capacity of the port up to 3.6~3.8 million TEUs against the current capacity of around 3 million TEUs
  - To develop a new container handling port in Bojonegara by 2010 as a twin port of Tanjung Priok, considering the following points:
    - Spatial constraints for new development in the existing Tanjung Priok port and huge cost for new development outside Tanjung Priok port
    - Avoiding intensive concentration of cargo traffic especially large container trailers on the roads of the metropolitan area.



**Demand and Capacity (International Container)**

**Functional Allotment**

10. Basic functions of Tanjung Priok port and Bojonegara new port are set as follows, based on the development target and their potentials:

- Tanjung Priok
  - Principal international gate-way port supporting industrial development in Western Java area
- Bojonegara
  - Complementary gate-way port of Tanjung Priok
  - Basic and strategic logistic infrastructure for regional development of Banten

11. Functional allotment among the Ports in the Western Java Area is summarized as follows:

**Summary of Functional Allotment among the Ports in the Western Java Area**

	Tanjung Priok	Bojonegara	Ciwandan	Merakmas	Merak	Cirebon
Export/Import Container	+++	+++	+	+	-	+
Domestic Container	+++	+	-	-	-	-
Transshipment Container	++	++	-	-	-	-
Conventional Cargo	+++	+++	+++	+	-	+++
Passenger	+++	-	-	-	+++	-
Ro-Ro Cargo	++	++	-	-	+++	-
Car Cargo	+++	+	-	-	-	-

+++ : indicates principal ports

++ : indicates ports which may become principal ports in future

+ : indicates ports which may handle a small portion of cargo in future

- : indicates that cargo will not be handled

**B-2 Master Plan and Short Term Development Plan***Development Concepts*

12. Recognizing the strength and the weakness of each port, the study team sets the following development targets and project concepts.

	<i>Development Concepts</i>	<i>Project Concepts</i>
<b>Tanjung Priok</b>	<ul style="list-style-type: none"> <li>✓ To increase the port capacity/productivity</li> <li>✓ To ensure safety and security of the port</li> <li>✓ To meet the port users' needs and to provide appropriate services</li> <li>✓ To consider environment-friendly development</li> </ul>	<ul style="list-style-type: none"> <li>✓ Navigational Condition Improvement (in terms of Capacity &amp; Safety)</li> <li>✓ Automobile Terminal Development</li> <li>✓ Re-organizing Land-use of the Existing Port</li> <li>✓ Development of new port area to accommodate functional relocation from the existing port as well as future demand</li> <li>✓ Road Improvement/development in/around the port</li> <li>✓ Ecological Area Development</li> </ul>
<b>Bojonegara</b>	<ul style="list-style-type: none"> <li>✓ To establish high grade, world standard international container terminal</li> <li>✓ To attract cargo by providing competitive services</li> <li>✓ To consider environment-friendly development</li> </ul>	<ul style="list-style-type: none"> <li>✓ Development of new Container Terminal with Related Port Facilities</li> <li>✓ To provide good access to/from the port</li> <li>✓ To enhance regional industrial development and ensure sufficient coordination with new port development</li> <li>✓ To minimize the impact of port development on the surrounding environment</li> </ul>

*Project Components*

13. The following project components are recommended to be implemented toward 2025, while projects indicated by bold type are proposed to be developed in the short-term toward 2012.





# Long-term Plan (toward 2025)



**Tanjung Priok**

<b>Project Concepts</b>	<b>Contents</b>	<b>Remarks</b>
Navigational condition improvement (to increase the capacity together with maintaining navigational safety)	- Widening main channel (300m) & turning basin	Short-term
	- Widening the channel & basin to the Nusantara area together with military relocation	Short-term
	- Opening the east channel to accommodate larger vessels	
Automobile terminal development (1 berth in the short term, 2 berth in the long term)		Short-term
Re-organizing land-use of the existing port		
Streamlined cargo handling zone	- Inter-island container handling (Pier III reorganization and MTI expansion)	Short-term
	- Bulk cargo handling (CPO, sand, cement etc.)	Short-term
	- Passenger terminal relocation	Short-term
	- Pertamina berths relocation together with consolidation of international container terminal	
Providing suitable and sufficient space for better port management	- Yard Development	Short-term
	- Reclamation of a part of Nusantara basin	Short-term
	- Consolidation of ship building yard	
	- Relocation of military base	Short-term
Land-use re-development in the urban area adjacent to the port	- Re-development around the Tanjung Priok railway station	Short-term (Urban side)
	- Re-development of the residential area to the south of JICT container terminal	Short-term (Urban side)
Development of new port area		
Ancol Development	- New Passenger Terminal	Short-term
	- Multi Purpose Terminal	Short-term
	- Access road	Short-term
Kalibaru Off-shore Development	- Consolidation of ship building yard	
	- Development of special cargo handling zone	
	- Access road	
	- Development of Kalibaru new port	
Environmental Improvement	- Improvement of water change through the port entrance by re-alignment of breakwater	Short-term
	- Ecological waterfront development with mangrove planting	
	- Development of amenity facilities such as observation tower	
Road development /improvement in/around the existing port	- Port Inner Road Improvement	Short-term
	- Eastern Port Access Highway to link with JORR	Short-term (Road sector)
	- Improvement of the existing urban road including western port access road and access road to/from JIUT	Short-term (Road sector)

**Bojonegara**

Project Concepts	Contents	Remarks
Basic Infrastructure Development	- Breakwater, channel, basin and necessary port service facilities	Short-term
Development of new Container Terminal (2 berths (600m) in the short term, 8 berths (2,400m) in the long term)		Short-term
Unitized and other cargo handling facilities development	- Multi purpose terminal	Short-term
	- General cargo berth	
	- Ro-Ro terminal	Short-term
	- Special cargo handling	
To provide good access to/from the port	- High-standard access road connecting the existing Jakarta-Merak toll road	Short-term (Road sector)
	- Railway service connected with an inland container distribution center/terminal	
	(In addition to the above access road, JORR (Jakarta Outer Ring Road) is indispensable for the new port operation.)	

**B-3 Urgent Plan**

14. Among the projects in the master plan and the short-term development plan, the following projects are proposed to be implemented urgently. The study team assessed viability of the projects from economic, financial and environmental view points.

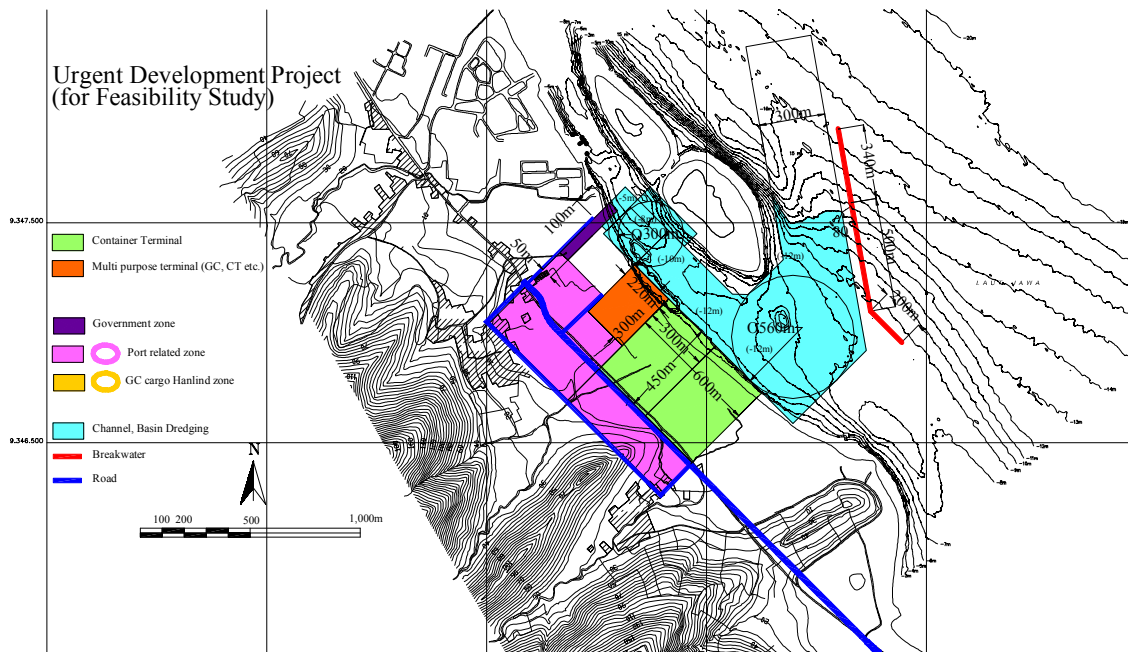
**Urgent Rehabilitation Plan of Tanjung Priok**

- Widening the Main Channel and expanding turning basin (should be partly realized by 2006)
- Automobile Terminal Development (should be realized by 2006)
- Inter-island Container Handling Improvement in Pier-III (Step by step redevelopment together with Ancol development; should be partly realized by 2008)
- Ancol Development including New Passenger Terminal, Multi Purpose Terminal and Access Road (Initial development should be realized by 2010)
- Port Inner Road Improvement (should be realized by 2006)
- Eastern Port Access Highway Development Linking with JORR - This project is urgent but should be implemented by Kimpraswil because road itself is outside of the port and will be a part of the urban road network.)

**(Feasibility)**

- Economic evaluation: EIRR (Port project, excluding Ancol) = 33.0%  
EIRR (Port project, including Ancol) = 18.2%  
EIRR (Access road project) = 25.1%
- Financial evaluation: FIRR (Public sector, excluding Ancol)= 10.7%  
FIRR (Public sector, including Ancol) = 4.3%  
FIRR (Automobile terminal operator) = 16.0%
- Not serious impacts on environment, however, it is desirable to be implemented in accordance with a proper environmental management plan and a monitoring plan.





#### **B-4 Recommendations**

15. Based on the above results and conclusions, the study team recommends that the following matters be followed up by DGSC and IPC-II.

*To implement the proposed urgent project at the earliest possible time*

16. DGSC and IPC-II should make their best efforts to implement and realize the proposed urgent projects for Tanjung Priok rehabilitation as well as for Bojongegara new port development by the combination of soft loan and private fund.

*To improve the port access road condition*

17. Road sector, i.e. Kimpraswil and/or Jasa Marga should improve the condition of port access roads in good cooperation with port sector, i.e. DGSC and IPC-II. JORR completion is also indispensable for Bojongegara development because the port hinterland will be dependent on the toll road network including JORR.

*To formalize master plans as well as land-use plans by government regulation*

18. DGSC and IPC-II should follow up the study results and stipulate master plans as well as land-use plans of the Jakarta Metropolitan port by government regulation at the earliest possible time to avoid disorderly development of the port and hinterland.

*To take prompt actions for re-organizing the existing port area*

19. DGSC and IPC-II should take a prompt action for re-organizing the existing port area, especially on the following matters:

- Military relocation
- Keeping inactivated and/or unutilized land in the port area under the port administration control to prevent disorderly and unchecked development

***To follow up environmental matters***

20. DGSC and IPC-II should duly consider environmental affairs in carrying out port activities and/or new development. In particular, the following issues should be addressed:

- Countermeasures to deal with drainage and waste material from the city to the port
- Improvement of water quality in/around the port by relocation of breakwater making use of ecological waterfront such as mangrove plantation etc.

**C. Software –Management and Operation of the Ports–**

21. For better management and operation of the port, the following measures should be taken by DGSC in collaboration with IPC-II:

**C-1 Status of Jakarta Metropolitan Port**

22. Tanjung Priok and Bojonegara, important infrastructure supporting industrial activities in Western Java area, should be given the status of International Hub Port, and should be properly managed as twin ports of Jakarta Metropolitan port.

**C-2 Terminal Operation*****To establish an appropriate operation scheme for the automobile terminal***

23. A full fledged loading/unloading operation of automobile products requires special skills. Therefore, IPC-II should establish an appropriate operation scheme for the automobile terminal immediately. The study team recommends the following:

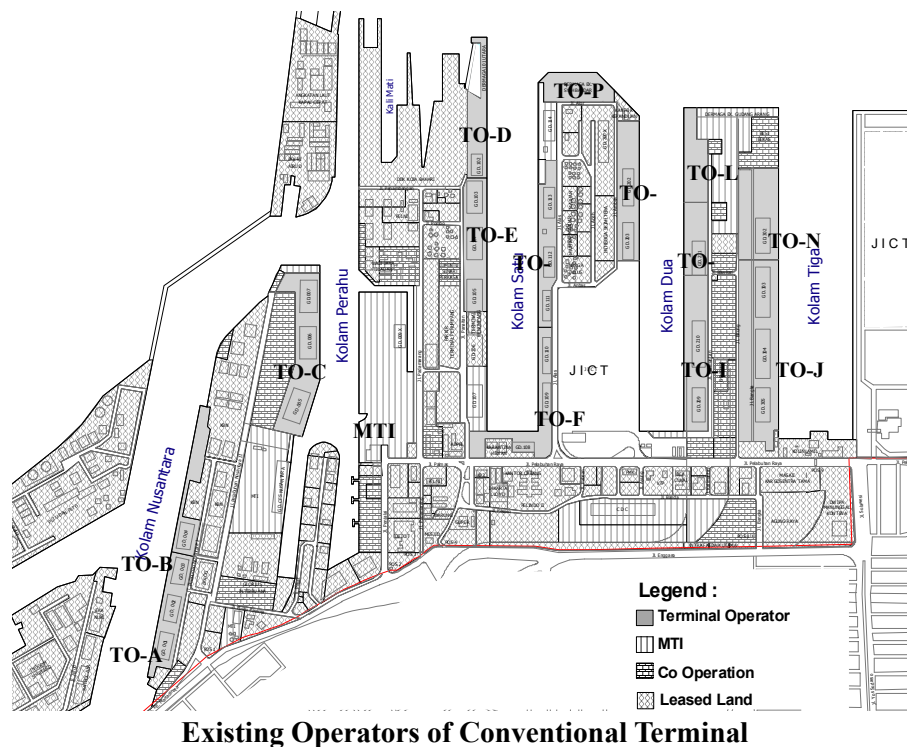
- Terminal operation itself should be left to the expertise of automobile transport/handling companies
- Reasonable handling tariff should be set after examining the examples of other terminal as well as taking the port users' opinions into consideration (Based on the financial analysis, the study team proposes around US\$13/unit.)
- The terminal should be operated under common use principle for various automotive manufacturing companies

***To improve operational performance of terminals***

- To monitor operational performance of terminals properly through the following actions:
  - Clearer performance indicators should be introduced to supervise the performance of operators
  - Performance target should be incorporated in the concession agreement or management agreement
- Consolidation of the operators of conventional terminal considering the following points: (From the theoretical point of view, excessive numbers of operator decreases the scale merit in terms of number of available berths for common carriers and this situation causes unnecessary waiting for carriers.)
  - The existing operators of conventional terminal should be grouped into smaller numbers to operate reasonable number of berths jointly to pursue the scale merit.

It is suitable that 5 to 10 berths are available for each terminal operator centering on terminal operators and/or stevedoring with good performance.

- Selection of terminal operators should be carried out by open-tender.
- To reduce berthing time by changing berthing fee system from day charge to time charge
- To establish an effective land traffic management system in/around the port as well as improvement of roads in/around the port.
- To reduce direct delivery ratio to/from the ports with appropriate regulations. To promote the use of yard/transit shed with some incentive is also necessary.
- To properly maintain port facilities and equipment



***To create appropriate concession scheme for Bojonegara container terminal development***

24. In introducing the concession scheme to Bojonegara container terminal development, the following points should be taken into consideration:

- Open tender system to secure fairness and transparency should be adopted.
- Assessment of business viability from view points of both IPCII/Government and concessionaire through risk analysis and identifying proper risk sharing scheme between IPCII/Government and concessionaire should be conducted as early as possible after the feasibility study.
- Performance target should be incorporated in the concession agreement and management agreement. Corporate articles together with clear accounting system should be more clearly defined when a joint stock company is a concessionaire candidate. DGSC should play a role of regulator.



**C-3 Port Management*****To provide reasonable and competitive tariff/charge and maintain transparency of price setting***

- Leadership of DGSC should re-examine the existing tariff/charge system comparing with other cases in neighboring ports.
- Based on the above examination, DGSC should formulate the revised concept/system of tariff and port charge and open it to the public.
- IPC-II should show the maximum level of tariff/charge and give terminal operators and/or stevedoring companies a free hand to set actual tariff/charge within the maximum.

(Based on the financial analysis, handling charge at the container terminal in Bojonegara could be reduced to 60~70% of its current level. The team also proposes a rate of about US\$13/unit for the automobile terminal in Tanjung Priok.)

***To achieve efficient customs clearance***

- Three customs offices in the port area should be integrated into one customs office together in order to achieve a single window procedure

***To improve EDI system***

25. EDI system expedites documentation procedures in ports including customs clearance. EDI system has already been established in Tanjung Priok, however, it is not fully utilized and optimized yet. The study team recommends the following actions:

- To integrate the existing EDI system with close coordination and cooperation of customs office
- IPC-II should utilize an EDI service provider as a means of getting information on port activities to analyze berth performance

***To enhance port security***

- To set up a security committee composed of related organizations in order to prevent such incident as pilferage in the port. The committee will meet regularly to discuss problems reported from related offices as well as port users, measures and recommendations to improve the situation.
- To introduce sufficient hardware for port security such as fence and ITV which can be monitored from a central office, together with a constant surveillance system in actual site.

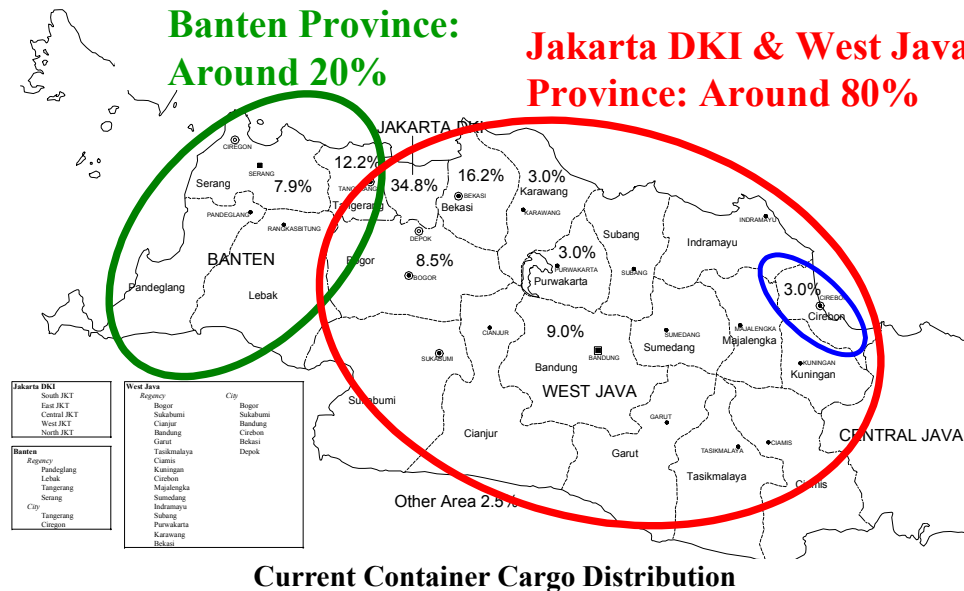
***To control land-use of the port area***

- Keeping inactivated and/or unutilized land in the port area under the port administration control to prevent disorderly and unchecked development

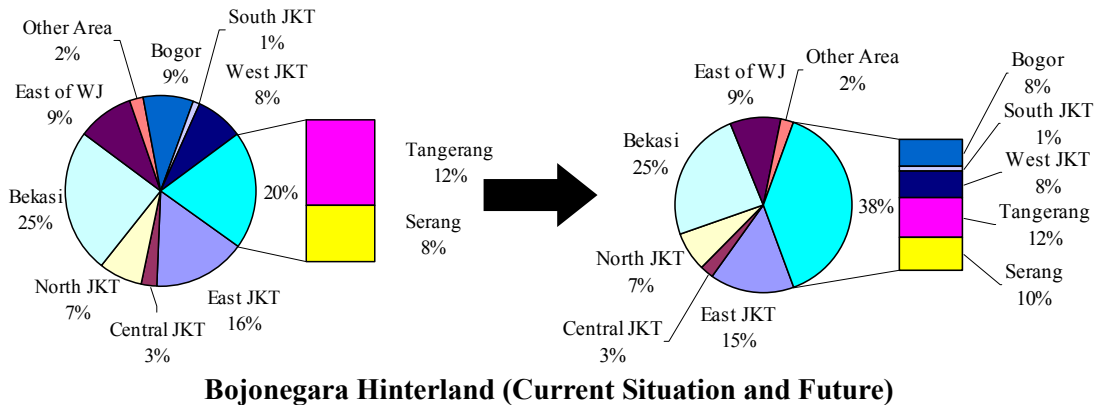
***To activate promotion of the port***

- IPC-II should hold meetings with related parties such as shipping companies, shippers and consignees to exchange necessary information and viewpoints, to obtain precise information on the shipping market, and to grasp the needs of users.
- To clarify the sales points of the port and to reinforce port sales promotion activity to potential users

- To develop the hinterland and attract more cargo, especially for Bojonegara new port
- It is important to coordinate port development with regional development, especially industrial location. Special economic zone should be developed adjacent to the ports, especially for Bojonegara new port



Current Container Cargo Distribution



**C-4. Finance**

*To optimize soft loans to realize substantial port development of the Greater Jakarta Metropolitan ports*

26. To realize the development plans of the Greater Jakarta Metropolitan ports, IPC2 will have to prepare sufficient funds. As the financial situation of IPC-2 will have been tough for the time being, the proposed urgent projects both for Tanjung Priok port and Bojonegara new port should be implemented optimizing soft loans which have advantages of low interest as well as long grace period.

**To formulate proper financial scheme for development, operation and maintenance of the ports**

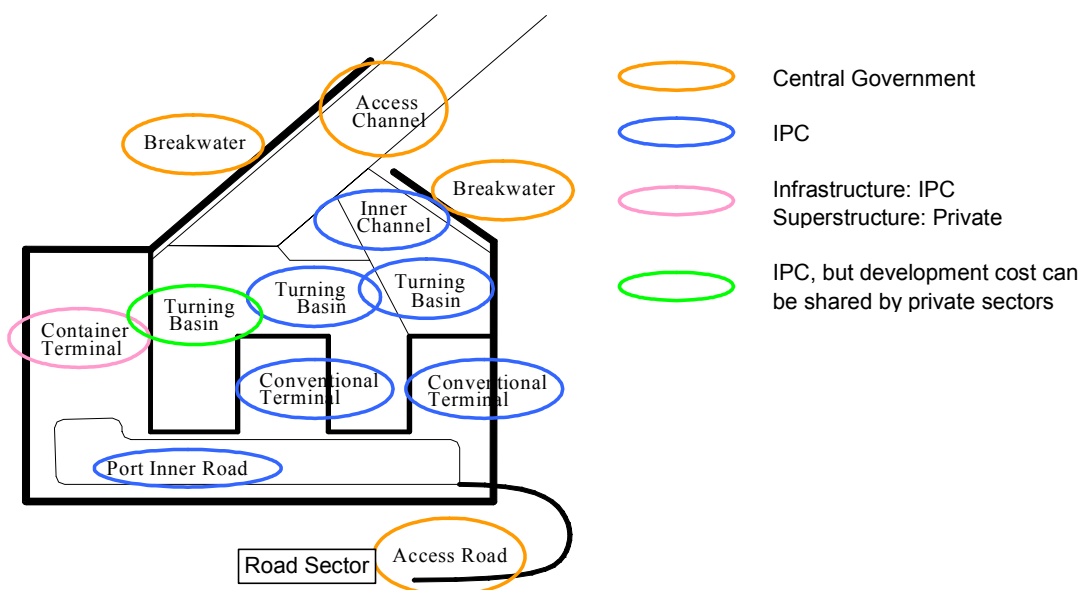
27. In order to implement port development projects smoothly, it is crucial to formulate proper financial scheme for development, operation and maintenance of the ports, and the Ministerial Decree on National Port System should be amended incorporating financial aspects of port investment and operation. The study team proposes the following framework for the proposed urgent projects of Tanjung Priok and Bojonegara:

	Development	Management/ Operation	Remarks
Breakwater, Access Channel	CG	CG / IPC-2*1	
Inner Channel and Basin	IPC-2	IPC-2	
Terminal (Profitable)			Container terminal etc.
Infrastructure	IPC-2 / CG*2	Private	Quay wall, front basin etc.
Superstructure	Private		Handling equipment, pavement etc.
Terminal (Less profitable)	IPC-2 / CG*2	Private / IPC-2	Conventional terminal etc.
Port Inner Road	IPC-2	IPC-2	
Access Road	Road Sector*3	Road Sector*3	

\*1 : When an integrated management by IPC-2 needed

\*2 : In case that project risk will be considered to be high, it should be examined whether the CG will bear the cost.

\*3 : CG or Local Government



28. It is also essential that the financial burden of IPC-2 should be lowered to keep good port management and operation, and in this connection, private funds should be utilized properly and effectively. In case that beneficiaries by the port development are able to be specified in such case as development of turning basin in front of specific terminal, they should pay for a part of the project cost in accordance with the extent of their benefit. And when the project risk is considered to be relatively low, e.g. in case of expanding container terminal, there will be a possibility to introduce complete BOT scheme for infrastructure development. For access road development, local government as well as related public sector should be involved.

**D. Humanware –Enhancement of Institutional Capacity–****D-1 Establishment of effective training system**

- To provide good training system for port workers/gangs
- To activate port related organization by introducing such system as Quality Control (QC) circle
- To enhance the function of the Port Training Center (PTC)

**D-2 Setting up the information unit together with the development of effective database system**

- To develop appropriate statistical system and to establish the integrated database system
- To enhance the capability of planning as well as port performance evaluation utilizing the above database system

29. To achieve afore-mentioned improvements of soft-ware issues, it is recommended that “Administrative & Management Skill Enhancement Program” should be implemented by DGSC and IPC2 with the support of external experts. The said program can provide various tools that are necessary to resolve the wide-ranging problems.

30. DGSC and IPCs should commence the following actions with the assistance of the proposed Administrative & Management (A & M) Skill Enhancement program.

- To modify port statistics system
- To conduct training for the enhancement of the capability of assessing/evaluating performance of the private sector
- To modify the institutional framework for responding “Decentralization” and “Privatization”

31. Major activities of the program are as follows:

- Establishment of “Port Affairs Information Unit (provisional name)”
- Recipient of external expert team for technology transfer
- Inspection/examination of detailed administrative system
- Training of staff of the Port Affairs Information Unit
- Establishment of the “Port Affairs Information System (provisional name)”
- Provision of guidelines regarding port administrative procedures
- Formulation of training program

32. Outcome of the program are as follows

- Establishment of a new organization that is able to control and analyze all port affairs information,
- Establishment of a new information system that enables comprehensive evaluation of port activities due to its standardized format and integrated contents
- Fostering of administrative officials who have the skill to evaluate/asses basic

data/information

- Establishment of a technology transfer scheme from the central government (a new unit) into IPCs, local governments, etc.

## Main Report

### Volume-III: Master Plan

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## CHAPTER-10. MASTER PLAN FOR TANJUNG PRIOK AND BOJONEGARA NEW PORT IN 2025

### 10-A. DEVELOPMENT CONCEPT OF THE PORTS

1. In accordance with the development targets as well as proposed development scenario in Chapter-9, the basic functions of the ports can be set as follows:

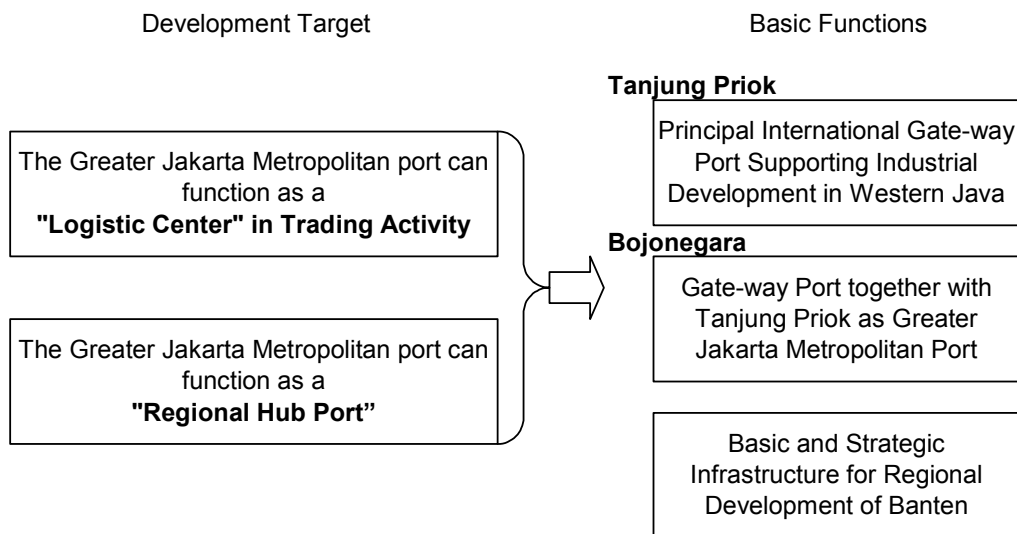


Figure 10-A-1 Basic Function of the Ports

2. In order for Tanjung Priok port to function as a principal international gate-way port supporting industrial development especially trading industry in Western Java, as well as for Bojonegara port to function as a complementary port of Tanjung Priok and as basic and strategic infrastructure for regional development of Banten, the study team formulates development concepts for Tanjung Priok and Bojonegara as follows:

#### **Tanjung Priok**

- To increase the port capacity/productivity in a comprehensive manner
- To ensure safety and security of the port
- To meet the port users' needs and to provide appropriate services
- To consider environment-friendly development

#### **Bojonegara**

- To establish high grade, world standard international container terminal
- To attract cargo strategically by providing competitive services
- To consider environment-friendly development

3. Based on the above development concepts, core projects can be formulated as shown in Figure 10-A-2.

Figure 10-A-2 Development Concept and Core Projects

**10-B. PLANNING CONDITION****10-B-1 Cargo Demand**

4. Based on the demand analysis for the long term including the above commodity-wise analysis and the functional allotment among the ports in Western Java area, the expected cargo volume of Tanjung Priok and Bojonegara toward 2012 are summarized in Table 10-B-1.

**Table 10-B-1 Cargo Tonnage by Package Type****Tanjung Priok**

	Container ('000TEU)										
	Total			International					Domestic		
	Total	Laden	Empty	Sub Total	Laden			Empty	Sub Total	Laden	Empty
					Sub Total	Ex	Im				
2012	4,346	3,445	900	3,631	2,983	1,706	1,276	648	715	462	252
2025	5,321	4,487	834	3,776	3,499	1,775	1,724	277	1,545	989	557

	GC ('000 ton)	Bag ('000 ton)	Dry-B ('000ton)			Liquid-B ('000ton)		
			Total	Public	Special	Total	Public	Special
2012	11,971	4,274	11,004	6,563	4,441	2,386	9,258	11,644
2025	15,025	5,365	20,129	10,720	9,409	3,480	10,566	14,046

**Bojonegara**

	Container ('000TEU)										
	Total			International					Domestic		
	Total	Laden	Empty	Sub Total	Laden			Empty	Sub Total	Laden	Empty
					Sub Total	Ex	Im				
2012	563	456	107	525	431	247	184	94	39	25	14
2025	2,745	2,497	249	2,581	2,392	1,213	1,179	189	164	105	59

	GC ('000 ton)	Bag ('000 ton)	Dry-B ('000ton)			Liquid-B ('000ton)		
			Total	Public	Special	Total	Public	Special
2012	679	74	---	---	---	---	---	---
2025	1,444	157	---	---	---	---	---	---

**10-B-2 Target Ship Size****1) Container Vessels for Ocean Going****a) Ship Size Distribution**

5. Distribution of container vessel size in the world is shown in below. Ships under the class of 50,000GT accounts for almost 90% of the total. This tendency is same when including ordered vessels. On the other hand, the current ship size distribution in Tanjung Priok is shown in Table 10-B-3, all of which are under 50,000GT and less than -13m of draft.

**Table 10-B-2 Ship Size Distribution in the World (GT-Draft)**

**Delivered**

Gt	<7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	>15	Total	
0-4999	378	9	2								389	13.8%
5000-9999	117	195	164	5			1				482	30.8%
10000-14999	4	2	123	107	33		2				271	40.4%
15000-19999	1	8	41	201	149	4					404	54.7%
20000-24999			3	31	79	81		1	1		196	61.6%
25000-29999				11	31	130	10				182	68.1%
30000-34999		3		4	28	53	65	1			154	73.5%
35000-39999					20	100	57			1	178	79.8%
40000-44999					5	46	47	11	1		110	83.7%
45000-49999				1		21	49	13			84	86.7%
50000-54999						4	35	114	5		158	92.3%
55000-59999						7	3	5	1		16	92.9%
60000-64999						2	10	10	9		31	93.9%
65000-69999							25	4	73	1	103	97.6%
70000-74999							3		19		22	98.4%
75000-79999								3	10		13	98.8%
80000-84999								2	12		14	99.3%
85000-89999									2		2	99.4%
90000-94999							1		16		17	100.0%
<b>Total</b>	<b>500</b>	<b>217</b>	<b>333</b>	<b>360</b>	<b>345</b>	<b>448</b>	<b>308</b>	<b>164</b>	<b>149</b>	<b>2</b>	<b>2,826</b>	
	17.7%	25.4%	37.2%	49.9%	62.1%	78.0%	88.9%	94.7%	100%	100%		

Source: Fairplay October 2002

**On Order**

Gt	<7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	>15	Total	
0-4999	2				1						3	3.4%
5000-9999	4	4	7	2							17	22.7%
10000-14999			1	4							5	28.4%
15000-19999				7	2						9	38.6%
20000-24999					5						5	44.3%
25000-29999					9	9					18	64.8%
30000-34999						4					4	69.3%
35000-39999							5				5	75.0%
40000-44999						2	3				5	80.7%
45000-49999							2				2	83.0%
50000-54999								6			6	89.8%
55000-59999											0	89.8%
60000-64999											0	89.8%
65000-69999							1				1	90.9%
70000-74999											0	90.9%
75000-79999								6			6	97.7%
80000-84999											0	97.7%
85000-89999									1		1	98.9%
90000-94999									1		1	100.0%
<b>Total</b>	<b>6</b>	<b>4</b>	<b>8</b>	<b>13</b>	<b>17</b>	<b>15</b>	<b>11</b>	<b>12</b>	<b>2</b>	<b>0</b>	<b>88</b>	
	6.8%	11.4%	20.5%	35.2%	54.5%	71.6%	84.1%	97.7%	100%	100%		

Source: Fairplay October 2002



**Delivered + On Order**

Gt	<7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	>15	Total	
0-4999	380	9	2		1						392	13.5%
5000-9999	121	199	171	7			1				499	30.6%
10000-14999	4	2	124	111	33		2				276	40.0%
15000-19999	1	8	41	208	151	4					413	54.2%
20000-24999			3	31	84	81		1	1		201	61.1%
25000-29999				11	40	139	10				200	68.0%
30000-34999		3		4	28	57	65	1			158	73.4%
35000-39999					20	100	62			1	183	79.7%
40000-44999					5	48	50	11	1		115	83.6%
45000-49999				1		21	51	13			86	86.6%
50000-54999						4	35	120	5		164	92.2%
55000-59999						7	3	5	1		16	92.8%
60000-64999						2	10	10	9		31	93.8%
65000-69999							26	4	73	1	104	97.4%
70000-74999							3		19		22	98.1%
75000-79999								9	10		19	98.8%
80000-84999								2	12		14	99.3%
85000-89999									3		3	99.4%
90000-94999							1		17		18	100.0%
<b>Total</b>	<b>506</b>	<b>221</b>	<b>341</b>	<b>373</b>	<b>362</b>	<b>463</b>	<b>319</b>	<b>176</b>	<b>151</b>	<b>2</b>	<b>2,914</b>	
	17.4%	24.9%	36.7%	49.5%	61.9%	77.8%	88.7%	94.7%	99.9%	100%		

Source: Fairplay October 2002

**Table 10-B-3 Ship Size Distribution at Tanjung Priok (Liner; Mar.01, Sep.02 & Mar.02)**

Gt	Draft									Total	
	~6	~7	~8	~9	~10	~11	~12	~13			
0-4999	67	7	3	2	1					80	12.6%
5000-9999	43	43	48	5						139	34.6%
10000-14999	3	13	36	30	7					89	48.7%
15000-19999	2	19	77	151	29	1				279	92.7%
20000-24999					6	1				7	93.8%
25000-29999				1		10	1	1		13	95.9%
30000-34999			1	6						7	97.0%
35000-39999			2	1						3	97.5%
40000-44999				7	2	4	1			14	99.7%
45000-49999					2					2	100.0%
<b>Total</b>	<b>115</b>	<b>82</b>	<b>167</b>	<b>203</b>	<b>47</b>	<b>16</b>	<b>2</b>	<b>1</b>		<b>633</b>	
	18.2%	31.1%	57.5%	89.6%	97.0%	99.5%	99.8%	100.0%			

**b) Target Maximum Ship Size and Dimension**

6. Based on this ship size analysis, the target maximum ship size in the study is set at **50,000GT class**. Dimension of the target ship such as draft, length (LOA) and beam are set as their average plus sample standard deviation for the class of 40,000 ~ 50,000GT as shown below. In terms of draft, according to Table 10-B-2, ships with a draft of less than -13m account for around 90%. For reference, ship length and beam distribution are shown in Table 10-B-5 and Table 10-B-6.

**Table 10-B-4 Target Ship Size and Dimension**

**Target Ship Size = 50,000GT class (40,000~50,000GT)**

	Average	Sample	
		Standard Deviation	Setting
Draft (m)	12.1	0.6	12.7
Length (m)	264.4	14.9	279.3
Beam (m)	32.2	0.5	32.7

Source: Fairplay October 2002

**Table 10-B-5 Ship Length Distribution**

**Delivered + On Order**

Gt	<180	180-	190-	200-	210-	220-	230-	240-	250-	260-	270-	280-	290-	>300	Total
0-4999	391			1											392
5000-9999	497	2													499
10000-14999	272	3		1											276
15000-19999	243	123	30	13	4										413
20000-24999	32	95	26	26	17	5									201
25000-29999	5	1	64	85	37	4	1	3							200
30000-34999		4	3	50	60	15	9	5	12						158
35000-39999				2	6	6	61	84	19	5					183
40000-44999							3	41	37	26	6	2			115
45000-49999								1	1	19	45	9	11		86
50000-54999									10	8	13	30	103		164
55000-59999										1	2	10	3		16
60000-64999											25		6		31
65000-69999											66	38			104
70000-74999													10	12	22
75000-79999													19		19
80000-84999													8	6	14
85000-89999														3	3
90000-94999														18	18
Total	1,440	228	123	178	124	30	74	134	79	59	157	89	160	39	2,914
	49%	57%	61%	68%	72%	73%	75%	80%	83%	85%	90%	93%	99%	100%	

**Table 10-B-6 Ship Beam Distribution**

**Delivered + On Order**

Gt	<25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	37-38	39-40	>40	Total
0-4999	391					1								392
5000-9999	495	4												499
10000-14999	133	118	7	16	2									276
15000-19999	34	74	28	197	80									413
20000-24999	5	9	9	28	69	17	55	9						201
25000-29999			5	1		72	72	2	48					200
30000-34999				3		1	21	9	124					158
35000-39999							4		177	2				183
40000-44999							1		113		1			115
45000-49999				1					85					86
50000-54999									150		13	1		164
55000-59999									10		6			16
60000-64999									1		5	24	1	31
65000-69999												86	18	104
70000-74999												15	7	22
75000-79999												15	4	19
80000-84999	1												13	14
85000-89999													3	3
90000-94999													18	18
Total	1,059	205	49	246	151	91	153	20	708	2	25	141	64	2,914
	36%	43%	45%	54%	59%	62%	67%	68%	92%	92%	93%	98%	100%	

Source: Fairplay October 2002

**c) Evaluation of Existing Plan**

7. According to the existing plan of Bojonegara new port, dredging of the approach channel and basins will be implemented up to the depth of -15 meters. While some ports in the world already have approach channel and quays with the draught of -15 meters or more, it is still an important question whether a facility like this is really needed by user-shipping lines. Even in New York, according to the Port Authority of NY & NJ, an average draught of many container terminal quays and approach channel is -12 meters, although the Port Authority has guaranteed one of the major user-shipping lines that it will dredge up to -16~18 meters if it becomes really necessary.

8. Even in the days of large container ships, -15 meter draught is more than sufficient. Recently, the trend of building larger container ships has been slowing down because of the excessive unbalance of demand and supply of space. Major shipping lines are also beginning to realize the un-economical effects of keeping giant ships. It is widely believed that the optimum size of container ships deployed in East-West trunk lines is around 4,500 to 6,000 TEU.

9. The trade and shipping world will settle upon the optimum ship size in a few years from now, but it is most likely that the largest ship which will be deployed in the routes to/from Indonesia will be 4,500 TEU. Accordingly, The draught of -14 meters is sufficient. For reference, Table 10-B-7 shows the real necessary draught by newly built large container ships at some Japanese and world ports.

**d) Actual Draft Sample of New Build Vessels**

10. Table 10-B-7 through Table 10-B-9 show the recent actual draft figures of the container ships with capacity of 3,700 TEU and 6,200 TEU, as typical examples of draught on departure from each port. It is now almost standard when developing to dig for a draft 15-16 meters. As a trend, every port wants to become a “Hub”. As is shown in these Tables, 3,700 TEU ship which is a typical runner in Trans-Pacific Service is easily received by a port with 11-12 meter draught. Even a 6,200 TEU ship can call easily a port with 13 meter draft as is shown in Table 10-B-9. There is no necessity for all ports to prepare 15-16 meter draught wharves.

**Table 10-B-7 Actual Draft of a Container Ship (3,700 TEU; Trans Pacific Service)**

Calling Port	Fore	Aft
<b>Inter Asia Portion</b>		
Shanghai	07m-80cm	08m-70cm
Quindao	08m-72cm	09m-02cm
Kobe	08m-22cm	09m-28cm
Nagoya	09m-40cm	09m-66cm
Tokyo	10m-35	10m-70cm
Sendai	10-70cm	11m-08cm
<b>Trans Pacific Portion</b>		
Los Angeles	10m-13cm	10m-13cm
Oakland	11m-17cm	11m-17cm
Tokyo	09m-24cm	09m-85cm
Nagoya	08m-04cm	08m-60cm

Source: OCDI \* Maximum Departure Draft: 13m-75cm

**Table 10-B-8 Actual Draft of a Container Ship (3,700 TEU; Far East/Europe Service)**

Calling Ports	Fore	Aft
Shekou	08m-95cm	09m-39cm
Hong Kong	09m-90cm	10m-50cm
Singapore	10m-90cm	11m-15cm
Colombo	11m-00cm	11m-50cm
Jedda	11m-20cm	11m-75cm
Rotterdam	11m-70cm	11m-82cm
Hamburg	N/A	N/A
Southampton	11m-80cm	12m-05cm
Malta	11m-45cm	11m-90cm
Jedda	10m-55cm	10m-80cm
Jubel Ali	08m-90cm	09m-15cm
Singapore	06m-25cm	09m-26cm

Source: OCDI \* Maximum Departure Draft: 13m-75cm

**Table 10-B-9 Actual Draft of a Container Ship (6,200 TEU Ship; Far East/Europe Service)**

Calling Port	Fore	Aft
Tokyo	10m-43cm	10m-75cm
Shimizu	11m-05cm	12m-08cm
Singapore	11m-90cm	12m-08cm
Southampton	11m-70cm	11m-95cm
Rotterdam	11m-72cm	12m-04cm
Hamburg	11m-75cm	12m-14cm
Le Habre	11m-99cm	12m-95cm
Singapore	11m-32cm	11m-42cm
Kobe	10m-87cm	10m-95cm
Nagoya	10m-98cm	11m-08cm

Source: OCDI

2) *Container Vessels for Inter-island (Domestic) Transport*

a) *Ship Size Distribution*

11. Distribution of inter-island container vessel size at Tanjung Priok is shown in Table 10-B-10. Based on the table, the target maximum ship size for domestic container is set as 10,000GT class.

**Table 10-B-10 Ship Size Distribution at Tanjung Priok (Inter-Island; Mar.01, Sep.02 & Mar.02)**

Draft of Ship								
Gt	~2	~3	~4	~5	~6	~7	~8	Total
0-4999	9	48	71	132	118	16	2	396
5000-9999			1	24	32	14	12	83
Total	9	48	72	156	150	30	14	479
	1.9%	11.9%	26.9%	59.5%	90.8%	97.1%	100.0%	

82.7%  
100.0%

Length of Ship								
Gt	~100	~110	~120	~130	~140	~150	~160	Total
0-4999	282	78	36					396
5000-9999		19	17	11	21	12	3	83
Total	282	97	53	11	21	12	3	479
	58.9%	79.1%	90.2%	92.5%	96.9%	99.4%	100.0%	

82.7%  
100.0%

**b) Target Maximum Ship Size and Dimension**

12. Dimension of the target ship such as draft, length (LOA) and beam are set as their average plus sample standard deviation for the class of 5,000 ~ 10,000GT as shown below.

**Table 10-B-11 Target Ship Size and Dimension**

<b>Target Ship Size = 10,000GT class (5,000~10,000GT)</b>			
	Average	Sample Standard Deviation	Setting
Draft (m)	7.6	0.8	8.4
Length (m)	132.3	11.5	143.7
Beam (m)	20.8	1.8	22.6

Source: Fairplay October 2002

**3) Pure Car Carrier**

**a) Ship Size Distribution**

13. Distribution of pure car carrier (PCC) vessel size in the world is shown in Table 10-B-12. Ships under the class of 50,000GT account for around 80% of the total. On the other hand, the maximum PCC size recently was 45,000GT with the capacity of 3,500 car units, LOA of 200m, draft of 8.7m and beam of 29m according to Mitsui OSK Lines Indonesia which carried out the first trial of PCC handling in 2002.

**Table 10-B-12 Ship Size Distribution in the World (GT-Capacity)**

Gt	Capacity (Number of cars)							Total	
	0-999	1000-	2000-	3000-	4000-	5000-	6000-		
0-4999	52	2			1			55	10.1%
5000-9999	52	8						60	21.1%
10000-14999	1	11		1	2	1		16	24.0%
15000-19999	1	15	3	1		1	1	22	28.1%
20000-24999	3	8	18	3		2		34	34.3%
25000-29999			15	27				42	42.0%
30000-34999			2	31	1			34	48.3%
35000-39999			1	15	24	1		41	55.8%
40000-44999				3	49	8		60	66.8%
45000-49999				1	27	45	3	76	80.7%
50000-54999			3		16	24	5	48	89.5%
55000-59999	2			3	1	22	28	56	99.8%
60000-64999							1	1	100.0%
<b>Total</b>	<b>111</b>	<b>44</b>	<b>42</b>	<b>85</b>	<b>121</b>	<b>104</b>	<b>38</b>	<b>545</b>	
	20.4%	28.4%	36.1%	51.7%	73.9%	93.0%	100.0%		

Source: Fairplay October 2002

**b) Target Maximum Ship Size and Dimension**

14. Based on this ship size analysis and considering flexible deployment of PCC in the future, the target maximum ship size in the study is set at **50,000GT class**. Dimension of the target ship such as draft, length (LOA) and beam are set as their average plus sample standard deviation for the class of 40,000 ~ 50,000GT as shown below. For reference, ship draft, length and beam distribution are shown in Table 10-B-5 ~Table 10-B-16.

**Table 10-B-13 Target Ship Size and Dimension**

**Target Maximum Ship Size = 50,000GT class (40,000~50,000G**

	Average	Sample	
		Standard Deviation	Setting
Draft (m)	9.1	0.6	9.7
Length (m)	187.1	7.0	194.0
Beam (m)	31.6	1.0	32.6

Source: Fairplay October 2002

**Table 10-B-14 Ship Draft Distribution**

Gt	Draft							Total
	<7	7-8	8-9	9-10	10-11	11-12	12-13	
0-4999	54	1						55
5000-9999	55	4	1					60
10000-14999	8	4	2	2				16
15000-19999	9	9	3	1				22
20000-24999	5	13	12			2	2	34
25000-29999		9	32	1				42
30000-34999		4	26	4				34
35000-39999		2	25	14				41
40000-44999			24	34			2	60
45000-49999			29	41	4	2		76
50000-54999			5	29	7	7		48
55000-59999			1	20	30	5		56
60000-64999				1				1
<b>Total</b>	<b>131</b>	<b>46</b>	<b>160</b>	<b>147</b>	<b>41</b>	<b>16</b>	<b>4</b>	<b>545</b>
	24.0%	32.5%	61.8%	88.8%	96.3%	99.3%	100.0%	

Source: Fairplay October 2002

**Table 10-B-15 Ship Length Distribution**

Gt	Length								Total
	<150	150-160	160-170	170-180	180-190	190-200	200-210	210-220	
0-4999	55								55
5000-9999	58	2							60
10000-14999	10	2		2	1	1			16
15000-19999	12	4	3	1		2			22
20000-24999	5	11	11	2	2	1		2	34
25000-29999		9	21	9	3				42
30000-34999			8	13	10	3			34
35000-39999				24	8	8		1	41
40000-44999				8	30	22			60
45000-49999				19	26	30		1	76
50000-54999				10	10	20	7	1	48
55000-59999						46	5	5	56
60000-64999								1	1
<b>Total</b>	<b>140</b>	<b>28</b>	<b>43</b>	<b>88</b>	<b>90</b>	<b>133</b>	<b>12</b>	<b>11</b>	<b>545</b>
	25.7%	30.8%	38.7%	54.9%	55.2%	79.3%	81.5%	83.5%	

Source: Fairplay October 2002

**Table 10-B-16 Ship Beam Distribution**

Gt	Beam									Total
	<25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	
0-4999	55									55
5000-9999	60									60
10000-14999	12			1			1		2	16
15000-19999	14	5	1						2	22
20000-24999	13	3	6	10					2	34
25000-29999	3	1	13	18	7					42
30000-34999			2	4	14	11	1		2	34
35000-39999					5	17	9	8	2	41
40000-44999					6	3	21		30	60
45000-49999						1		8	67	76
50000-54999							3		45	48
55000-59999									56	56
60000-64999									1	1
<b>Total</b>	<b>157</b>	<b>9</b>	<b>22</b>	<b>33</b>	<b>32</b>	<b>32</b>	<b>35</b>	<b>16</b>	<b>209</b>	<b>545</b>
	28.8%	30.5%	34.5%	40.6%	36.3%	40.4%	47.0%	49.9%	88.3%	

Source: Fairplay October 2002

**4) Vessels for Conventional Cargo****a) Ship Size Distribution****i) Public Wharf in Tanjung Priok**

15. Ship size distribution at public wharf in Tanjung Priok is shown as in Table 10-B-17 for major conventional cargo.

**Table 10-B-17 Ship Size Distribution at Public Wharf in Tanjung Priok –General Cargo****Ocean-going - Unloading/loading**

GRT	Draft									Total	
	<5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13		
0-4999	29	1	6	1						37	20.1%
5000-9999	1	6	30	22	3	1				63	54.3%
10000-14999			10	5	7	4				26	68.5%
15000-19999		1	3	3	8	4	1			20	79.3%
20000-24999			1	2	2	1	3			9	84.2%
25000-29999				3	1	1	5	1	1	12	90.8%
30000-34999				3	4					7	94.6%
35000-39999				2		1	1			4	96.7%
40000-44999					4					4	98.9%
45000-49999					2					2	100.0%
<b>Total</b>	<b>30</b>	<b>8</b>	<b>50</b>	<b>41</b>	<b>31</b>	<b>12</b>	<b>10</b>	<b>1</b>	<b>1</b>	<b>184</b>	
	16.3%	20.7%	47.8%	70.1%	87.0%	93.5%	98.9%	99.5%	100.0%		

Source: PPKB (Request of ship and cargo service) data of Mar.01, Sep.01 and Mar.02

Note) Aggregating ship record data which are identified for handling GC.

**Inter-island - Unloading/loading**

GRT	Draft					Total	
	<5	5-6	6-7	7-8	8-9		
0-4999	389	58	20			467	94.3%
5000-9999	11	8	4	2		25	99.4%
10000-14999	1			1	1	3	100.0%
<b>Total</b>	<b>401</b>	<b>66</b>	<b>24</b>	<b>3</b>	<b>1</b>	<b>495</b>	
	81.0%	94.3%	99.2%	99.8%	100.0%		

Source: PPKB (Request of ship and cargo service) data of Mar.01, Sep.01 and Mar.02

Note) Aggregating ship record data which are identified for handling GC.

**Table 10-B-18 Ship Size Distribution at Public Wharf in Tanjung Priok –Sand & Clay**

GRT	Draft						Total	
	0-1	1-2	2-3	3-4	4-5	5-6		
0-999	1	15	99	17			132	40.4%
1000-1999		8	110	64		2	184	96.6%
2000-2999				6	2		8	99.1%
3000-3999				1	2		3	100.0%
<b>Total</b>	<b>1</b>	<b>23</b>	<b>209</b>	<b>88</b>	<b>4</b>	<b>2</b>	<b>327</b>	
	0.3%	7.3%	71.3%	98.2%	99.4%	100.0%		

Source: PPKB (Request of ship and cargo service) data of Mar.01, Sep.01 and Mar.02

Note) Aggregating ship record data which are identified for handling Sand and Clay.

**Table 10-B-19 Ship Size Distribution at Public Wharf in Tanjung Priok –Cement & Clinker**

GRT	Draft										Total	
	<3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11			
0-4999	29	24	4	2	1						60	56.6%
5000-9999	1	3	2						1		7	63.2%
10000-14999			2	2				1		1	6	68.9%
15000-19999			5	6		2	4				17	84.9%
20000-24999			2	5	2	2					11	95.3%
25000-29999				1	4						5	100.0%
<b>Total</b>	<b>30</b>	<b>27</b>	<b>15</b>	<b>16</b>	<b>7</b>	<b>4</b>	<b>5</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>106</b>	
	28.3%	53.8%	67.9%	83.0%	89.6%	93.4%	98.1%	99.1%	100.0%			

Source: PPKB (Request of ship and cargo service) data of Mar.01, Sep.01 and Mar.02

Note) Aggregating ship record data which are identified for handling Cement and Clinker.

**Table 10-B-20 Ship Size Distribution at Public Wharf in Tanjung Priok –CPO**

GRT	Draft						Total	
	1-2	2-3	3-4	4-5	5-6	6-7		
0-999	1	33	38	29	4		105	59.0%
1000-1999	1	8	37	11	2	1	60	92.7%
2000-2999			9	1	1	2	13	100.0%
<b>Total</b>	<b>2</b>	<b>41</b>	<b>84</b>	<b>41</b>	<b>7</b>	<b>3</b>	<b>178</b>	
	1.1%	24.2%	71.3%	94.4%	98.3%	100.0%		

Source: PPKB (Request of ship and cargo service) data of Mar.01, Sep.01 and Mar.02

**Table 10-B-21 Ship Size Distribution at Public Wharf in Tanjung Priok –Scrap Iron**

GRT	Draft						Total	
	3-4	4-5	6-7	7-8	8-9	10-11		
0-4999	4	4	1	2	1		12	75.0%
5000-9999			1	1			2	87.5%
20000-24999						1	1	93.8%
25000-29999						1	1	100.0%
<b>Total</b>	<b>4</b>	<b>4</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>16</b>	
	25.0%	50.0%	62.5%	81.3%	87.5%	100.0%		

Source: PPKB (Request of ship and cargo service) data of Mar.01, Sep.01 and Mar.02

Note) Aggregating ship record data which are identified for handling Scrap Iron.

ii) *Special Wharf in Tanjung Priok*

16. Ship size distribution at special wharf in Tanjung Priok is shown as in Table 10-B-17.



**Table 10-B-22 Ship Size Distribution at Special Wharf in Tanjung Priok –PMB**

Unloading/loading

GRT	Draft									Total	
	0-1	3-4	4-5	5-6	6-7	7-8	8-9	9-10			
0-4999		1	10	43	6	1				61	38.9%
5000-9999				1	2		1	1		5	42.0%
10000-14999	1		1	10	6	8	1			27	59.2%
15000-19999						1	1	5		7	63.7%
20000-24999						1	16	36		53	97.5%
25000-29999							1	2		3	99.4%
30000-34999								1		1	100.0%
<b>Total</b>	<b>1</b>	<b>1</b>	<b>11</b>	<b>54</b>	<b>14</b>	<b>11</b>	<b>20</b>	<b>45</b>		<b>157</b>	
	0.6%	1.3%	8.3%	42.7%	51.6%	58.6%	71.3%	100.0%			

Source: PPKB (Request of ship and cargo service) data of Mar.01, Sep.01 and Mar.02

**Table 10-B-23 Ship Size Distribution at Special Wharf in Tanjung Priok –SAR/BOG**

Unloading/loading

GRT	Draft										Total	
	1-2	3-4	4-5	6-7	9-10	10-11	11-12	12-13	13-14			
0-4999	2	1									3	11.5%
5000-9999			1								1	15.4%
10000-14999					1						1	19.2%
15000-19999				1	1						2	26.9%
20000-24999					5	2					7	53.8%
25000-29999						3					3	65.4%
35000-39999								4			4	80.8%
40000-44999							1	1		1	3	92.3%
45000-49999										1	1	96.2%
55000-59999									1		1	100.0%
<b>Total</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>7</b>	<b>5</b>	<b>1</b>	<b>6</b>	<b>2</b>		<b>26</b>	
	7.7%	11.5%	15.4%	19.2%	46.2%	65.4%	69.2%	92.3%	100.0%			

Source: PPKB (Request of ship and cargo service) data of Mar.01, Sep.01 and Mar.02

**Table 10-B-24 Ship Size Distribution at Special Wharf in Tanjung Priok –BOG**

Unloading/loading

GRT	Draft					Total	
	2-3	4-5	6-7	7-8	8-9		
0-4999	1					1	8.3%
5000-9999		3				3	33.3%
10000-14999		3	1			4	66.7%
20000-24999				1	2	3	91.7%
25000-29999					1	1	100.0%
<b>Total</b>	<b>1</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>12</b>	
	8.3%	58.3%	66.7%	75.0%	100.0%		

Source: PPKB (Request of ship and cargo service) data of Mar.01, Sep.01 and Mar.02

**Table 10-B-25 Ship Size Distribution at Special Wharf in Tanjung Priok –DKP**

Unloading/loading

GRT	Draft							Total	
	3-4	4-5	5-6	6-7	7-8	8-9			
0-4999	2	8	17	7	4			38	52.1%
5000-9999			2	11	12	7		32	95.9%
10000-14999					1	1		2	98.6%
25000-29999						1		1	100.0%
<b>Total</b>	<b>2</b>	<b>8</b>	<b>19</b>	<b>18</b>	<b>17</b>	<b>9</b>		<b>73</b>	
	2.7%	13.7%	39.7%	64.4%	87.7%	100.0%			

Source: PPKB (Request of ship and cargo service) data of Mar.01, Sep.01 and Mar.02

iii) Ship Size Distribution in the World

17. Ship size distribution in the world for major type of vessels is shown in below.

**Table 10-B-26 Ship Size Distribution in the World –General Cargo**

Gt	Draft										Total	
	<5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13			
0-4999	2,064	757	407	110	15		1				3,354	80.1%
5000-9999	4	6	43	268	203	104				1	629	95.2%
10000-14999				4	17	94	11				126	98.2%
15000-19999					1	3	16				20	98.7%
20000-24999									1		1	98.7%
25000-29999								3	23	14	40	99.6%
30000-34999								2		3	5	99.8%
35000-39999										7	7	99.9%
40000-44999										3	3	100.0%
<b>Total</b>	<b>2,068</b>	<b>763</b>	<b>450</b>	<b>382</b>	<b>236</b>	<b>201</b>	<b>33</b>	<b>24</b>	<b>28</b>	<b>28</b>	<b>4,185</b>	
	49.4%	67.6%	78.4%	87.5%	93.2%	98.0%	98.8%	99.3%	100.0%			

Source: Fairplay October 2002

**Table 10-B-27 Ship Size Distribution in the World –Bulk**

Gt	Draft										Total	
	<5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	>12			
0-4999	926	488	624	147	3	1			1	1	2,191	44.4%
5000-9999			23	194	136	49					402	52.6%
10000-14999			2	3	84	472	71	1		1	634	65.4%
15000-19999	1		1	3		395	366	14		3	783	81.3%
20000-24999	1					16	123	138		8	286	87.1%
25000-29999					1	13	52	377	21		464	96.5%
30000-34999							2	21	21		44	97.4%
35000-39999						1	1	3	77		82	99.0%
40000-44999									17		17	99.4%
45000-50000										2	2	99.4%
>50000									2	26	28	100.0%
<b>Total</b>	<b>928</b>	<b>488</b>	<b>650</b>	<b>347</b>	<b>224</b>	<b>947</b>	<b>615</b>	<b>557</b>	<b>177</b>	<b>177</b>	<b>4,933</b>	
	18.8%	28.7%	41.9%	48.9%	53.5%	72.7%	85.1%	96.4%	100.0%			

Source: Fairplay October 2002

**Table 10-B-28 Ship Size Distribution in the World –Bulk Cement Carrier**

Gt	Draft										Total	
	<5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	>12			
0-4999	65	40	93	30							228	71.5%
5000-9999			5	38	9	1					53	88.1%
10000-14999					8	14					22	95.0%
15000-19999						1	7				8	97.5%
20000-24999						1		4	1		6	99.4%
25000-29999								2			2	100.0%
<b>Total</b>	<b>65</b>	<b>40</b>	<b>98</b>	<b>68</b>	<b>17</b>	<b>17</b>	<b>7</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>319</b>	
	20.4%	32.9%	63.6%	85.0%	90.3%	95.6%	97.8%	99.7%	100.0%			

Source: Fairplay October 2002

**Table 10-B-29 Ship Size Distribution in the World –Chemical Tanker**

Gt	Draft									Total	
	<5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	>12		
0-4999	195	162	214	89	2					662	62.5%
5000-9999		1	8	61	87	18				175	79.0%
10000-14999				2	22	24	15			63	84.9%
15000-19999						17	35	23		75	92.0%
20000-24999						5	26	30		61	97.7%
25000-29999							1	6	14	21	99.7%
30000-34999									1	1	99.8%
40000-44999									1	1	99.9%
55000-59999									1	1	100.0%
<b>Total</b>	<b>195</b>	<b>163</b>	<b>222</b>	<b>152</b>	<b>111</b>	<b>64</b>	<b>77</b>	<b>59</b>	<b>17</b>	<b>1,060</b>	
	18.4%	33.8%	54.7%	69.1%	79.5%	85.6%	92.8%	98.4%	100.0%		

Source: Fairplay October 2002

**Table 10-B-30 Ship Size Distribution in the World –Product Tanker**

Gt	Draft									Total	
	<6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	>13		
0-4999	329	130	19	1	1					480	28.1%
5000-9999	10	24	49	31	11	1				126	35.5%
10000-14999		6	40	28	74	12	1			161	44.9%
15000-19999				2	21	109	123	3		258	60.0%
20000-24999				2	21	51	124	30	2	230	73.4%
25000-29999					5	32	64	141	7	249	88.0%
30000-34999							8	32	4	44	90.6%
35000-39999							3	35	18	56	93.9%
40000-44999							3	7	29	39	96.1%
45000-50000								1	1	2	96.3%
>50000					1			26	37	64	100.0%
<b>Total</b>	<b>339</b>	<b>160</b>	<b>108</b>	<b>64</b>	<b>134</b>	<b>205</b>	<b>326</b>	<b>275</b>	<b>98</b>	<b>1,709</b>	
	19.8%	29.2%	35.5%	39.3%	47.1%	59.1%	78.2%	94.3%	100.0%		

Source: Fairplay October 2002

**b) Target Maximum Ship Size and Dimension**

18. Based on the above ship size analysis in Tanjung Priok and ship size distribution in the world, the target ship size for conventional cargo at special wharf is set as in Table 10-B-31.

Table 10-B-31 Target Ship Size and Dimension

Type of Vessel	Target Ship Size	Dimension	Average	Sample Standard Deviation	Setting	Remarks
General Cargo	20,000GT	Draft (m)	10.1	0.5	10.6	International GC & Scrap Iron (15,000~19,999G)
		Length (m)	172.5	8.6	181.1	
		Beam (m)	24.2	2.1	26.3	
General Cargo	10,000GT	Draft (m)	8.0	0.9	8.9	Domestic GC (5,000~9,999GT)
		Length (m)	126.0	18.9	144.9	
		Beam (m)	19.1	1.4	20.5	
Bulkier	40,000GT	Draft (m)	12.9	1.1	14.0	SAR/BOG (30,000~39,999G T)
		Length (m)	213.6	15.8	229.4	
		Beam (m)	32.1	0.4	32.5	
Bulkier	25,000GT	Draft (m)	11.0	0.8	11.8	BOG (20,000~24,999G T)
		Length (m)	186.8	10.6	197.4	
		Beam (m)	27.8	2.0	29.8	
Bulkier	3,000GT	Draft (m)	5.0	1.3	6.3	For sand etc. (2,000~2,999GT)
		Length (m)	100.5	12.1	112.6	
		Beam (m)	14.1	1.2	15.4	
Bulk Cement Carrier	20,000GT	Draft (m)	10.2	0.2	10.4	For Cement (15,000~19,999G T)
		Length (m)	176.0	12.0	188.0	
		Beam (m)	24.6	1.6	26.2	
Product Tanker	25,000GT	Draft (m)	11.0	0.8	11.8	PMB (20,000~24,999G T)
		Length (m)	182.1	9.6	191.7	
		Beam (m)	29.2	2.1	31.3	
Chemical Tanker	10,000GT	Draft (m)	8.2	0.7	8.9	DKP (5,000~9,999GT)
		Length (m)	125.6	10.8	136.4	
		Beam (m)	19.4	1.4	20.8	
Chemical Tanker	3,000GT	Draft (m)	5.7	0.7	6.4	For CPO (2,000~2,999GT)
		Length (m)	91.6	6.0	97.6	
		Beam (m)	13.9	1.0	14.9	

Source: Fairplay October 2002

5) *Passenger Vessels*a) *Ship Size Distribution*

19. Considering the following current number of unloading/loading passengers and ship size distribution, the target maximum ship size is set as **15,000GRT** with 150m of LOA, -6.5m of draft and 25m of beam. Current vessels are listed as in Table 10-B-33. Maximum draft is -6.7m.

Table 10-B-32 Ship Size Distribution at Tanjung Priok –Passenger Vessels

	GRT				Total	Unit: Pax
	~4999	~9999	~14999			
106	20	89	119	228	87.7%	
107	27	2	2	31	11.9%	
109		1		1	0.4%	
Total	47	92	121	260	100.0%	
	18.1%	35.4%	46.5%	100.0%		
Average Loading/Unloading Pax	244	756	2,360			
Average Berthing Time (hr)	7.0	6.8	6.2	6.6		

Source: 3 months PPKB data (Mar.01, Sep.01 &amp; Mar.02)

DRF													
GRT	0-0.5	1-1.5	1.5-2	2-2.5	3-3.5	3.5-4	4-4.5	4.5-5	5-5.5	5.5-6	6-6.5	6.5-7	Total
0-4999		6	27	1	7	1		4		1			47
5000-9999	1						9	38	22	1	21		92
10000-14999									2	117	1	1	121
総計	1	6	27	1	7	10	38	26	3	139	1	1	260
	0%	2%	10%	0%	3%	4%	15%	10%	1%	53%	0%	0%	100%

Source: 3 months' data (Mar.01, Sep.01 &amp; Mar.02)

LOA									
GRT	30-39	40-49	70-79	90-99	100-109	120-129	130-139	140-149	Total
0-4999	19	14	9	5					47
5000-9999				14	53	1	20	4	92
10000-14999								121	121
総計	19	14	9	19	53	1	20	125	260
	7%	5%	3%	7%	20%	0%	8%	48%	100%

Source: 3 months' data (Mar.01, Sep.01 &amp; Mar.02)

**Table 10-B-33 List of Vessels (as of Mar.01, Sep.01 & Mar.02)**

Name of Vessel	GRT	Max Dft	Min Dft	LOA
AGOAMAS	9,350	5.6	5.6	130
BUKIT RAYA	6,400	4.8	4.0	100
BUKIT SIGUNTANG	14,649	5.7	5.6	146
CIREMAI	14,581	5.6	5.6	144
CONTSHP AUCKLAND	14,501	5.6	5.6	144
DOBONSOLO	14,581	5.6	5.6	146
DOROLONDA	14,739	5.7	5.7	146
GANDA DEWATA	9,607	5.7	0.2	130
KAMBUNA	14,501	5.6	5.6	144
KELIMUTU	5,685	4.2	4.2	100
KELUD	14,665	5.8	5.6	146
KERINCI	14,501	5.6	5.6	144
LAMBELU	14,649	6.7	5.6	146
LAWIT	6,022	4.5	4.0	100
LEUSER	6,400	4.7	4.0	100
MABUHAY NUSANTARA	5,035	4.6	3.5	97
MADANI NUSANTARA	4,300	5.5	4.6	97
MANDIRI NUSANTARA	8,257	5.7	4.6	145
NGGAPULU	14,739	5.7	5.6	147
PANGRANGO	2,650	3.6	3.0	74
SAMUDERA JAYA	287	1.9	1.4	45
SANGIANG	1,853	3.4	2.0	74
SINABUNG	14,716	5.8	5.0	146
SIRIMAU	6,022	4.5	4.0	100
SONG OF FLOWER	8,400	5.0	5.0	125
TELAGA EXPRESS	326	1.6	1.4	39
TILONGKABILA	6,022	4.5	4.0	100
UMSINI	14,501	5.6	5.6	144

b) *Target Maximum Ship Size and Dimension***Table 10-B-34 Target Ship Size and Dimension**

Target Maximum Ship Size = 15,000GT class

Setting	
Draft (m)	6.5
Length (m)	150.0
Beam (m)	25.0

Note) Based on the current maximum ship size.

6) *Ro-Ro Vessels*a) *Ship Size Distribution***Table 10-B-35 Ship Size Distribution in the World (GT-Draft)**

Delivered											
Gt	<5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	>12	Total	
0-4999	241	51	26							318	35.0%
5000-9999	36	70	110	36	4	2				258	63.4%
10000-14999	2	15	56	26	7	10	2			118	76.3%
15000-19999		6	23	12	16	5	9	3		74	84.5%
20000-24999			10	19	28	11	2	1		71	92.3%
25000-29999			7			3	1	1		12	93.6%
30000-34999			2		3	12				17	95.5%
35000-39999						2	8	3		13	96.9%
40000-44999								7	1	8	97.8%
45000-50000						1				1	97.9%
>50000							9	10		19	100.0%
Total	279	142	234	93	58	46	31	25	1	909	
	30.7%	46.3%	72.1%	82.3%	88.7%	93.7%	97.1%	99.9%	100%		

Source: Fairplay October 2002

b) *Target Maximum Ship Size and Dimension***Table 10-B-36 Target Ship Size and Dimension**

Target Ship Size	Dimension	Average	Sample Standard Deviation	Setting	Remarks
15,000GT	Draft (m)	7.2	1.4	8.7	12,500~14,999GT
	Length (m)	163.6	23.2	186.8	For Large Ro-Ro vessel
	Beam (m)	23.5	2.7	26.3	
10,000GT	Draft (m)	6.4	0.9	7.3	7,500~9,999GT
	Length (m)	131.5	13.0	144.5	For existing Ro-Ro vessel
	Beam (m)	20.0	1.6	21.6	

Source: Fairplay October 2002

**10-B-3 Planning Standard for Channel and Basin**1) *Width of Channel*

20. Based on Japanese and UNCTAD standards, the widths of channel for one-way /two-way traffic are calculated as follows:

**Table 10-B-37 Widths of Main Channel**

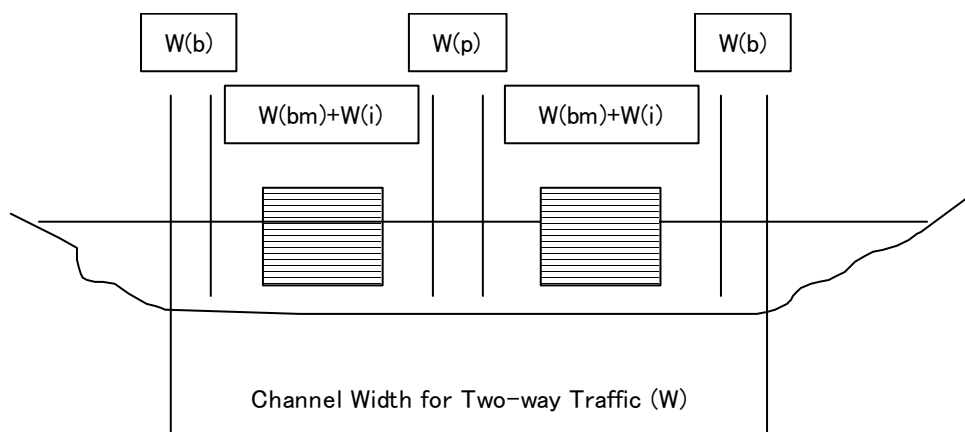
		Concept	Container ship	Car Carrier
Two-way	UNCTAD	8B ~ 10B	264~330m (B=33m)	264~330m (B=33m)
	Japanese	1.5 L: In case that the length of the navigation channel is relatively long, or the target vessels frequently pass in both ways through the channel. 2.0 L: In case that the target vessels frequently pass in both ways through the channel and the length of the channel is relatively long. 1.0 L: Except the above cases	420m	291m
One-way	UNCTAD	5B	165m	165m
	Japanese	>0.5 L	>140m	>97m

\* L : Ship length, B: Width of Beam (Distribution of beam is as follow.)

21. On the other hand, width of channel has been examined applying the international standard stipulated by PIANC and IAPH “*Approach Channel – A Guide for Design*”. The details of calculation are described in the Main Report and the results are summarized as below. In this study, the figures below are adopted as planning figures because minimum width should be set in effective and reasonable manner.

		Outer Channel		Inner Channel	
		One-way	Two-way	One-way	Two-way
Tanjung Priok	Existing Port	150m	300m	150m	300m
	Ancol	-	-	120m	250m
Bojonegara		150m	300m	-	-

**Table 10-B-38 Calculation of Width of Channel (PIANC and IAPH Standard)**



	Outer Channel		Inner Channel	
<b>Container Vessel (50,000GT)</b>				
Beam	32.7 m		32.7 m	
W(bm)	1.5 B	49 m	1.5 B	49 m
Sum W(i)	1.5 B	49 m	1.8 B	59 m
W(p)	1.8 B	59 m	1.2 B	39 m
W(b)	0.5 B	16 m	0.5 B	16 m
	5.3 B	173 m	5.0 B	164 m
<b>Bulk Carrier (50,000GT)</b>				
Beam	35.8 m		35.8 m	
W(bm)	1.5 B	54 m	1.5 B	54 m
Sum W(i)	1.5 B	54 m	1.8 B	64 m
W(p)	1.8 B	64 m	1.2 B	43 m
W(b)	0.5 B	18 m	0.5 B	18 m
	5.3 B	190 m	5.0 B	179 m
<b>Product Tanker (30,000GT)</b>				
Beam	32.4 m		32.4 m	
W(bm)	1.5 B	49 m	1.5 B	49 m
Sum W(i)	2.0 B	65 m	2.3 B	75 m
W(p)	1.8 B	58 m	1.2 B	39 m
W(b)	0.5 B	16 m	0.5 B	16 m
	5.8 B	188 m	5.5 B	178 m
<b>Car Carrier (50,000GT)</b>				
Beam	32.6 m		32.6 m	
W(bm)	1.5 B	49 m	1.5 B	49 m
Sum W(i)	1.5 B	49 m	1.8 B	59 m
W(p)	1.8 B	59 m	1.2 B	39 m
W(b)	0.5 B	16 m	0.5 B	16 m
	5.3 B	173 m	5.0 B	163 m

**Total Width for Two-way**

CT-CT	288 m	288 m
CT-BC	301 m	301 m
CT-PT	303 m	303 m
CT-CC	287 m	287 m
	→ 300 m	→ 300 m

**Total Width for One-way**

CT	131 m	141 m
BC	143 m	154 m
PT	146 m	156 m
CC	130 m	140 m
	→ 150 m	→ 150 m

2) **Turning Basin**

22. According to UNCTAD and Japanese standard, the diameter of turning basin should be equal to or greater than 2 L (= Ship length) of the largest ship in case of towing by tugboat. For a container ship for ocean going, the diameter of turning basin is calculated as 560m (2 x 280m) based on the target ship size of Table 10-B-4.

3) **Calmness of Basin alongside Quays**

23. Based on the standard, excessive probability beyond 0.5m wave height in front of quay should be under 2.5% throughout the year.