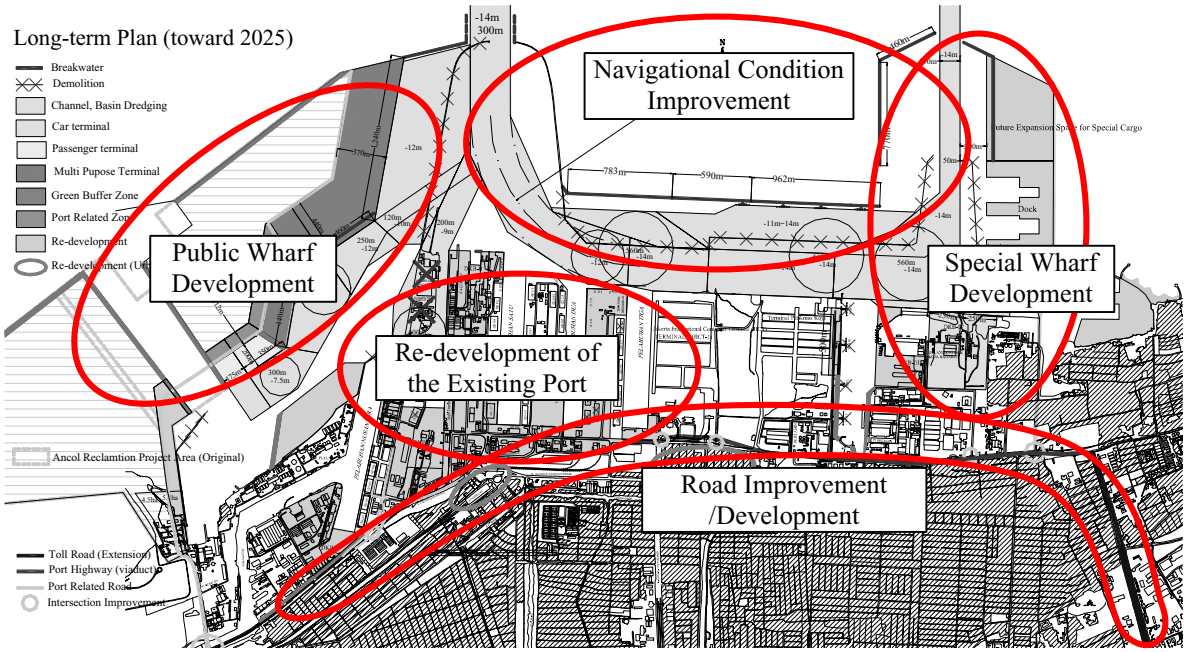
10-C-8 Layout of Port Facilities and Land-use Plan

302. Proposed layout of port facilities and the land-use plan for Tanjung Priok port toward 2025 are shown in. Figure 10-C-10 and Figure 10-C-11.

Figure 10-C-10 Layout of Port Facilities in Tanjung Priok (Toward 2025)

Figure 10-C-11 Land-use Plan of Tanjung Priok (Toward 2025)

303. The concept of the layout plan is shown below.

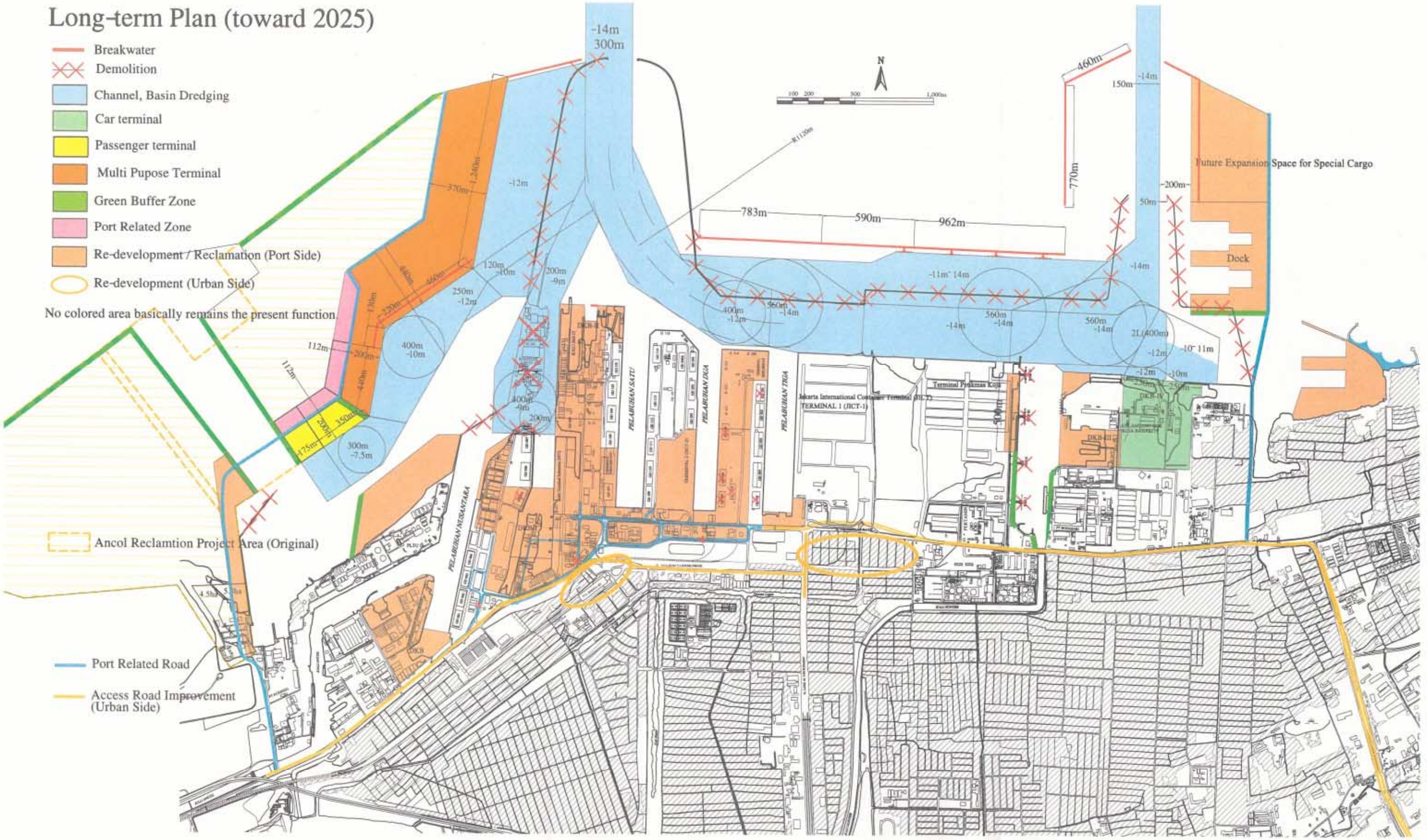


Long-term Plan (toward 2025)

- Breakwater
- Demolition
- Channel, Basin Dredging
- Car terminal
- Passenger terminal
- Multi Pupose Terminal
- Green Buffer Zone
- Port Related Zone
- Re-development / Reclamation (Port Side)
- Re-development (Urban Side)

No colored area basically remains the present function.

- Ancol Reclamtion Project Area (Original)
- Port Related Road
- Access Road Improvement (Urban Side)

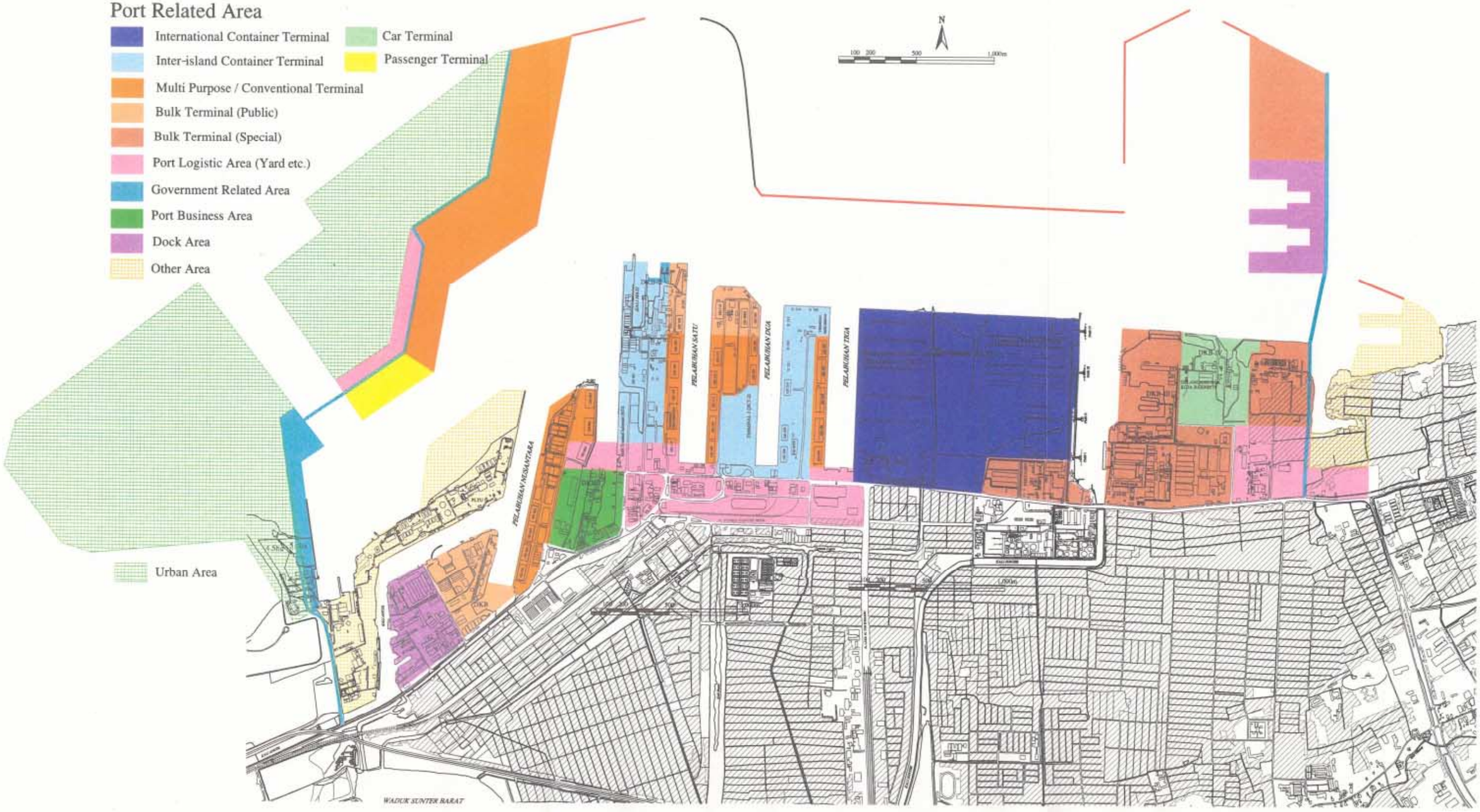


Land Use Plan (toward 2025)

Port Related Area

- International Container Terminal
- Inter-island Container Terminal
- Multi Purpose / Conventional Terminal
- Bulk Terminal (Public)
- Bulk Terminal (Special)
- Port Logistic Area (Yard etc.)
- Government Related Area
- Port Business Area
- Dock Area
- Other Area
- Car Terminal
- Passenger Terminal

Urban Area



10-D. PROJECT COMPONENTS FOR BOJONEGARA

304. In accordance with development concept for Bojonegara new port, the Study team has selected the following projects in 2025: Basic port facilities development, Container terminal development, Unitized and other cargo handling facilities development and Port access development.

10-D-1 Container Terminal Development

Concept

- ✓ *Establishment of high grade, world standard international container terminal to meet the rapid increase of import/export container demand in Western Java area as well as to function as a complementary port of Tanjung Priok*

305. Required number of berths in each year is calculated as follows based on the demand

Table 10-D-1 Berth Planning (Container Terminal)

	No. of Berths	L (m)	Ship Calls			T'put ('000TEU)	'000TEU /berth	No. of Cranes	Newly Developed Quays
			Int'l	Dom	Total				
2010	2	600	153	32	185	162	81	3	CT1,CT2(-12m, 600m)
2011	2	600	326	74	400	349	175	3	
2012	2	600	522	125	647	563	282	5	
2013	2	600	727	183	909	790	395	5	
2014	4	1200	844	253	1,097	1,035	259	10	CT3, CT4 (-14m, 600m)
2019	6	1800	1,474	372	1,846	1,811	302	15	CT5, CT6 (-14m, 600m)
2024	8	2400	2,089	500	2,589	2,589	324	20	CT7, CT8 (-14m, 600m)
2025	8	2400	2,210	526	2,735	2,745	343	20	

10-D-2 Multi Purpose Terminal and General Cargo Berth Development

Concept

- ✓ *Establishment of multi purpose berths to meet the cargo demand generated from regional development*

306. Required number of berths in each year is calculated as follows based on the demand

Table 10-D-2 Berth Planning (Multi Purpose Terminal, General Cargo Berth)

	No. of Berths	Length of Berth (m)	T'put (ton)	Ship Calls	Newly Developed Quays
2008	1	220	92000	41	MPT1 (-10m, 220m)
2012	1	220	753,000	336	
2013	2	430	818,000	365	Q1 (-10m, 210m)
2020	3	640	1,275,000	569	Q2 (-10m, 210m)
2025	3	640	1,601,000	715	

10-D-3 Breakwater, Channel and Basin

307. There are two small islands offshore in the Bojonegara new port site, however, appropriate breakwater will be necessary because the protected water area with these islands is

too narrow to develop several berths along the coast line. The standard of calmness for berth operation is set at 97.5% according to the Japanese standard, which means that number of days with less than or equal to 0.5m wave height in front of quays covers more than or equal to 97.5% of 365 days. Alignment of breakwater should be set to satisfy this standard of calmness.

308. As for breakwater alignment, the Study team examined the following two alternatives.

- Alternative-A: Set the access channel toward to the north (N10W) direction
- Alternative-B: Set the access channel toward to the South-east (S45E) direction)

309. Based on the evaluation on the alternatives shown in Table 10-D-3, the Study team proposes **Alternative-A** considering phased development. Tranquility analysis is described in the "Supporting Report of Engineering Study".

310. Breakwater alignment should be examined from the viewpoint of securing calmness of the basin inside the port. According to the computer simulation, it was confirmed that the proposed alignment of breakwater satisfied the standard which stimulates that excessive probability beyond 0.5m wave height in front of quay should be under 2.5% throughout the year. Detailed simulation results are shown in the "Supporting Report of Engineering Study".

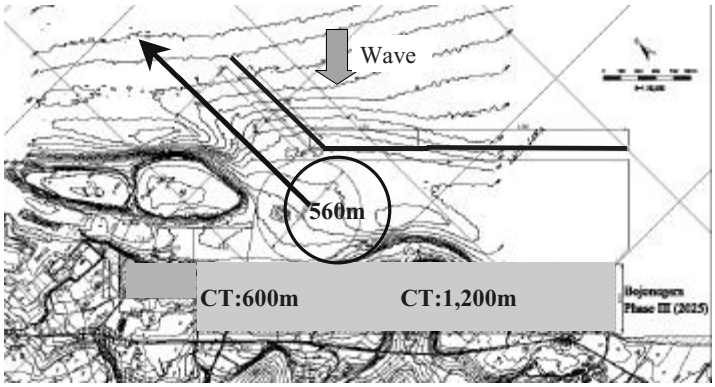


Figure 10-D-1 Alternatives for Breakwater Alignment (Alternative-A)

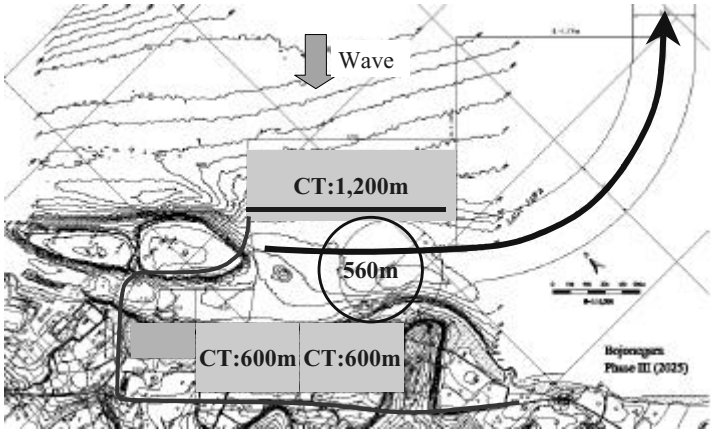


Figure 10-D-2 Alternatives for Breakwater Alignment (Alternative-B)

Table 10-D-3 Evaluation on the Alternatives of Breakwater Alignment

	Alternative-A	Alternative-B
Calmness	Satisfies criteria (Number of days with less than 0.5m wave height in front of quays is 97.5% or more.)	Same as in the left.
Navigation	Easy access from the north direction.	Access channel should be curved sharply at the entrance of the port.
Project Cost	Almost same in the initial stage. Cost is lower than Alternative-B in the long term.	Almost same in the initial stage, however, the total cost of container terminal development is expected to be higher than Alternative-A in the long term.
Easiness of the phased development	Easy (Additional berths can be developed sequentially along the coast line according to the demand and no need to modify the access channel alignment. Construction work will be separated from the port operation.)	Not easy (Need to develop offshore terminals in the long term or need to modify the channel alignment according to the expansion work along the coast line. Furthermore, the port operation would be interfered by construction work.)

10-D-4 Port Access Development

Access Road Development

311. Completion of a high standard access road by the time of port operation is an essential condition for Bojonegara operation. The Study team proposes a new highway road should be developed linking the existing toll road with the port. Furthermore, completion of JORR (Jakarta Outer Ring Road) is also a must to attract container cargo to Bojonegara because the road network situation around Jakarta DKI has a great influence on the hinterland. The detailed road improvement projects/programs are described in Chapter-11.

Railway Development

312. To upgrade the container handling services as well as to attract container cargo, the possibility of introducing a railway system should be also examined. In this case, new railway linking with the existing Merak-Jakarta line is necessary. In addition, a new inland container distribution center (inland container deposit terminal) alongside of the railway should be established at a suitable place somewhere around Jakarta DKI in order to prevent traffic congestion inside the city. Serpong is thought be one of the alternative sites.

10-D-5 Summary of Project Components

313. Long-term project components are summarized in Table 10-D-4 including road components.

Table 10-D-4 Long-term Project Components for Bojonegara

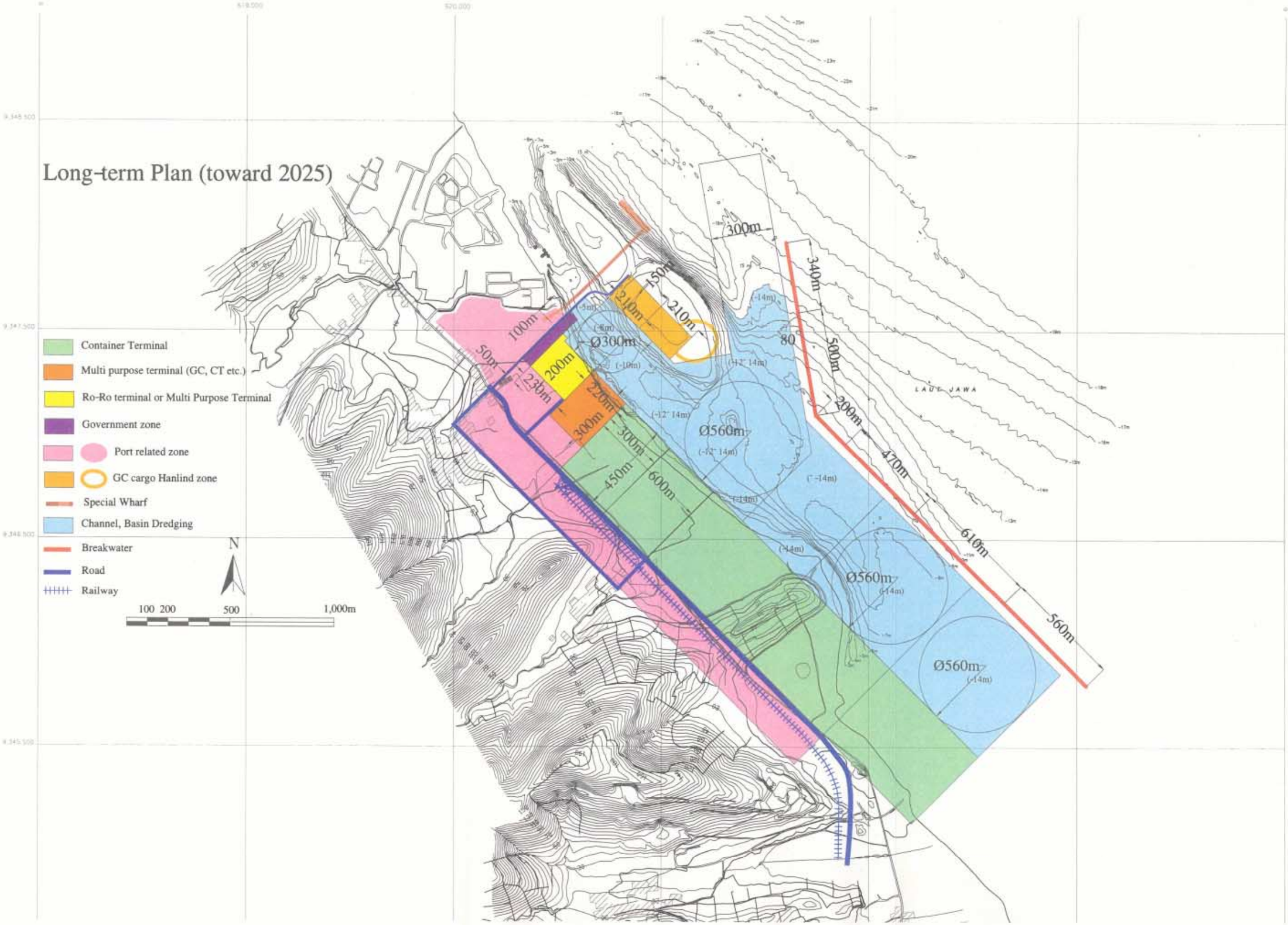
Project	Contents
Basic port facilities development	- Breakwater, access channel, basin and necessary port service facilities
Container terminal development (2 berths (600m) in the short term, 8 berths (2,400m) in the long term)	
Unitized and other cargo handling facilities development	- Multi purpose terminal - General cargo berth - Ro-Ro terminal - Special cargo handling
Port access development	- High-standard access road connecting the existing Jakarta-Merak toll road - Railway service linking 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.)

10-D-6 Layout of Port Facilities

314. Proposed layout plan of Bojonegara for 2025 is shown in Figure 10-D-3.

Figure 10-D-3 Layout Plan of Bojonegara for 2025

Long-term Plan (toward 2025)



10-E. PRELIMINARY IMPLEMENTATION SCHEDULE

315. From the urgency and phased planning/construction points of view, priority should be put on the following points in examining the implementation schedule of the proposed projects:

- To expedite development of an automobile terminal in order to accommodate urgent need of export/import automobiles in AFTA, which should be realized by around 2006
- To expedite improvement of navigational conditions at Tanjung Priok in order to increase the port capacity as well as port safety
- To alleviate traffic congestion in/around the port in order to secure smooth cargo distribution
- To reorganize disorderly land-use of the port making use of Ancol new port area in order to improve the port productivity and capacity
- To commence the operation of a new container terminal in Bojonegara by around 2010 in order to reduce heavy burden on Tanjung Priok and to encourage industrial location/investment in Banten area

316. Based on the above points, the project period of each phase development at the Tanjung Priok and Bojonegara New Port is planned as follows.

Phased Development	Tanjung Priok Port	Bojonegara New Port
Urgent Rehabilitation	Total length: 5 years including project preparation and 30 months of construction works. The car terminal facility should be operational in 2006. The other facility should be operational in 2008.	Total length: 5 years including project preparation and 30 months of construction. The port facility should be operational in 2008. Container terminal should be operational by 2010.
Short Term Development	The length: 5 years including project preparation, construction 36 months. The facility should be operational by 2012.	Total length: 5 years including project preparation, construction of 36 months. The facility should be operational by 2012.
Long Term Development	The length: 8years including project preparation, 48 months of construction. The facility should be operational in 2025.	Total length: 8 years including project preparation, 48 months of construction. The facility should be operational in 2025.

10-F. PRELIMINARY ENGINEERING DESIGN AND COST ESTIMATE

10-F-1 Preliminary Design Concept of Port Facilities

1) Preliminary Design of Basic Port Facilities of the Tanjung Priok port

Berth Structure for Car Terminal, Passenger Terminal and Multipurpose Berth

317. For the planned new multipurpose berths, passenger terminal berth and car terminal berth, considering respective site, topographic, hydrographic and soil conditions at the planned area the steel pipe pile of 1,000 mm dia. foundation is considered suitable in terms of cost, construction method and work period. The pile should be driven up to around -30m of the sandy

layer. This type of foundation of the berth is adopted to the adjacent berth structures in the Tanjung Priok port.

Design of New Breakwater by Re-Construction

318. The new breakwater is constructed on the replaced fine sandy material of the existing clay layer at a depth of -5.0m. This clay material on the surface of the sea bed is planned to be replaced with fine sandy material as soil improvement. The new breakwater structure will be constructed with rubble stones piled up and armour stones to be covered thereon. The concrete blocks (3 ton type) will be placed on the slope of the off-shore side and layer of armor stones (250 to 500 kg) will be placed on the slope of harbor side.

319. The existing concrete blocks (around 1 ton size) and rubble stones used in the breakwater are recycled for construction of the new breakwater. For identifying the durability of the existing material for recycling, it is recommended to conduct a detailed investigation of the vertical profile of the existing breakwater structure.

2) Navigation Channel Widening and Deepening of Tanjung Priok

Capital Dredging Volume

320. The total dredging volume for widening and deepening of the channel and basin of Tanjung Priok Port in each phase is shown in the following tables. (The extra dredging of 0.5 m in depth is considered in order to achieve the design depth of the channel and basin.)

Table 10-F-1 Dredging Volume for Channel and Basin Improvement (Tanjung Priok)

Item	Volume (m3)	Remarks
~2008	8,757,950	
Access Channel (-14 m, 300 m)	2,430,000	
North Channel (-14 m, 300 m)	3,875,000	
Basin (-10 m)	502,950	Car Terminal
Basin (-14 m, 560 m)	1,950,000	
~2012	4,513,750	
Basin (-14 m) Dredging	300,000	
Access Channel (-10 m, 120 m)	1,205,380	Ancol
New Basin (-10 m, 400 m)	1,270,920	Ancol
New Basin (-7.5 m, 300 m)	494,160	Ancol
Channel Dredging (-9 m, 200m)	1,243,290	MTI Terminal
~2025	14,302,420	
Outer Access Channel (-14 m, 150 m)	2,114,100	
Inner Access Channel (-14 m, 150 m)	2,133,670	
Widening of Channel (-14 m)	4,493,150	
Deepening of Basin (-14 m)	1,157,000	
Deepening of Basin (-12 m)	187,500	
Deepening of Channel (-12 m)	1,925,000	Ancol
Deepening of Basin (-12 m)	2,292,000	Ancol
Total	27,574,120	

Dredging fleet arrangement

321. Cutter Suction Dredger 1,200 m3/hr and 2 hopper barges of 2,000 m3 capacity are employed in the channel dredging works of the urgent rehabilitation project. For the short term and long term development projects, the combination of similar dredging equipment and hopper barges to transport dredging material is considered.

Disposal Area

322. The disposal area as approved by ADPEL for the dredged material from Tanjung Priok Port is located in the area called Muara Gembong. The water depth of this disposal ranges from 7 to 10 meters.

3) Preliminary Design of Basic Port Facilities of Bojonegara New Port

Container Berth and Multipurpose Berth

323. The caisson type structure is considered the most suitable for the container berth and multipurpose berth foundation.

Ro-Ro Terminal Berth and Bulk Cargo Handling Facility

324. The berth structure of Ro-Ro ships and bulk cargo berth are designed with pile support trestle and dolphin type. A car parking area of about 6-8 ha is required for Ro-Ro ferry ship, which is planned on land in parallel to the pile support trestle and dolphin type berthing facilities. The passenger waiting hall is planned inside the car parking area.

325. In case an inbound bulk cargo handling terminal might be required in Bojonegara, the area of berthing facilities for 30,000 DWT bulk carriers should be provided outside of the Kai Island. Design depth should be -12m or deeper. The berthing facilities and on land storage facilities would be connected by belt conveyor with cover. Suction type cargo handling equipment would be installed on the berth to unload the estimated about 500,000 tons of bulk cargo per year.

Breakwater

326. The breakwater will be extended in line with the expansion of the container terminal in phases and is constructed on the sea bed at the depth of around -10 to -12m, with piling up gravel and rubble stones thereon. The large concrete blocks (around 4 tons each) are placed on the slope of the sea side and top of the gravel stone mounded as amour stone for protection.

Channel Dredging of the bed rock hard soil

327. The existing sea bed depth of the planned berthing area and entrance channel and basin is –6.0m to –10.0 m, thus dredging is required to achieve the designed water depth of – 8 to –14 m. Considering the characteristic of soil conditions, it is planned to carry out the dredging works by grab dredger(s) and transport dredged material with hopper barges.

Table 10-F-2 Capital Dredging Volume (Bojonegara)

	Soil Conditions	Dredging Volume (m3)
Up to 2010	Alluvium Component	2,904,000 m^3
	Weathered Rock Component	638,000 m^3
	Total	3,542,000 m^3
Up to 2025	Alluvium Component	4,820,000 m^3
	Weathered Rock Component	1,518,325 m^3
	Total	6,338,325 m^3

Note) Dredging volume includes extra dredging of about 10% of the designed dredging volume. This volume is included in the short term project portion.

Dredging fleet arrangement

328. Dredger fleet for the dredging work at the Bojonegara site will consist of grab dredgers with hopper barge. Considering that a similar type and volume of dredging works will be required for the long term development project, the combination of the same type of dredging equipment and hopper barges will be used to transport dredged material.

Disposal Area

329. As for the disposal area of the dredged material, two locations were recommended in previously and both locations have been already approved by ADPEL (as of 30 May 1997). The location of the disposal area is shown in the "Supporting Report of Engineering Study"

10-F-2 Calmness of Channel and Basin of Tanjung Priok and Bojonegara Port

Tanjung Priok Port

330. Based on the calmness study, the breakwater planned for the long term development will provide a cover ratio of over 99 % under the target wave height 0.5 m at all points in Tanjung Priok Port.

Target Wave Height: H≦0.5m

Location	Urgent Development (2008)		Short Term (2012)		Long Term (2025)	
	Occurrence	Cover Ratio	Occurrence	Cover Ratio	Occurrence	Cover Ratio
Fairway and Inner channel	0.8	99.2	0.8	99.2	0.7	99.3
JICT 1	0.0	100	0.0	100	0.0	100
Car Terminal	0.0	100	0.0	100	0.6	99.4
Multipurpose			0.0	100	0.0	100
Passenger berth					0.2	99.8

Bojonegara New Port

331. Based on the calmness study, the planned alignment and construction program of breakwaters at different development stages will provide the required cover ratio of more than 97.5 % under the target wave height 0.5 m at the container berths in Bojonegara New Port.

Target Wave Height: H≦0.5m

Location	Phase II Short Term (2012)		Phase III Long Term (2025)	
	Occurrence	Cover Ratio	Occurrence	Cover Ratio
Multi Berth	0.4	99.6	0.2	99.8
Multi Berth	0.6	99.4	0.2	99.8
Container CT1	1.1	98.9	0.2	99.8
CT2	2.0	98.0	0.5	99.5
CT3	6.2	93.8	2.2	97.8
CT4			1.7	98.3
CT5			1.5	98.5
CT6			1.5	98.5
CT7			2.5	97.5
	With B/W of 1,040 m length		With B/W of 2440 m length (With B/W of around 2,700m cover ratio will be over 97.5% in front of CT8.)	

10-F-3 Estimate of Project Cost

Basic Price and Exchange Rate

332. The basic prices are as of December 2002 and the following foreign exchange rate is applied for estimating the project cost considering the current trend in the market as of June 2003.

- 1 USD = 8,500 Rupiah = 120 Yen (1 Yen = 70.83 Rupiah)

Project Cost Estimate of Tanjung Priok Port up to 2025

333. The total project cost estimate is summarized at around 11,000 billion Rp as follows: (It should be noted that these figures include access road and other urban-side development project costs and exclude handling equipment such as gantry crane.)

Table 10-F-3 Summary of Capital Cost (Million Rp) of Tanjung Priok Port up to 2025

(million Rp)

Description		Local	Foreign	Total
Port Development Projects				
	Urgent Plan (~2008)	315,444	483,514	798,958
	Short Term Plan (~2012)	1,375,779	836,494	2,212,273
	Long Term Plan (~2025)	2,940,228	1,732,775	4,673,003
	小計	4,631,451	3,052,783	7,684,234
	Contingency	463,145	305,278	768,423
	Engineering Service	370,318	242,441	612,759
	VAT (10 %)	546,491	360,050	906,542
	Administration Expenses	121,842		121,842
Total		6,133,248	3,960,552	10,093,800
Related Projects				0
	Urgent Plan (~2008)	326,246	102,222	428,468
	Short Term Plan (~2012)	0	0	0
	Long Term Plan (~2025)	201,911	111,298	313,209
	小計	528,156	213,521	741,677
	Contingency	52,816	21,352	74,168
	Engineering Service	42,253	17,082	59,334
	VAT (10 %)	62,322	25,195	87,518
	Administration Expenses	7,417		7,417
Total		692,964	277,150	970,114
Grand Total		6,826,212	4,237,702	11,063,914

Note-1) "Port Development Projects" includes port inner road improvement (including gate improvement) and procurement of cargo handling equipment.
Note-2) "Port Development Project" includes investment of an Ancol developer (private sector).
Note-3) "Administration Expenses" includes compensation.
Note-4) Related Projects are development of Eastern and Western Port Access Highway and redevelopment around the Tanjung Priok eailway station.

Project Cost Estimate of Bojonegara New Port up to 2025

334. The total project cost estimate is summarized at around 5,000 billion Rp as follows: (It should be noted that these figures include access road and other urban-side development project costs and exclude handling equipment such as gantry crane.)

Table 10-F-4 Summary of Capital Cost of Bojonegara New Port up to 2025 (mil Rp)

(million Rp)

Description		Local	Foreign	Total
Port Development Projects				
	Urgent Plan (~2010)	492,272	554,439	1,046,710
	Short Term Plan (~2012)	39,243	26,572	65,814
	Long Term Plan (~2025)	1,141,936	1,133,039	2,274,975
	Sub Total	1,673,451	1,714,049	3,387,500
	Physical Contingency	167,345	171,405	338,750
	Engineering Service	133,678	135,342	269,020
	VAT (10%)	197,447	202,080	399,527
	Administration Expenses	61,811		61,811
Total		2,233,732	2,222,876	4,456,607
Related Projects				0
	Urgent Plan (~2010)	52,508	122,519	175,027
	Short Term Plan (~2012)	0	0	0
	Long Term Plan (~2025)	14,130	127,170	141,300
	Sub Total	66,638	249,689	316,327
	Physical Contingency	6,664	24,969	31,633
	Engineering Service	5,331	19,975	25,306
	VAT (10%)	7,863	29,463	37,327
	Administration Expenses	29,778		29,778
Total		116,274	324,096	440,370
Procurement of Cargo Handling Equipment				0
	Urgent Plan (~2010)	37,047	333,422	370,468
	Short Term Plan (~2012)	0	0	0
	Long Term Plan (~2025)	108,039	972,347	1,080,385
	Sub Total	145,085	1,305,768	1,450,854
	Physical Contingency	14,509	130,577	145,085
	Engineering Service	5,078	45,702	50,780
	VAT (10%)	16,467	148,205	164,672
	Administration Expenses	14,509		14,509
Total		195,648	1,630,252	1,825,900
Grand Total		2,545,654	4,177,223	6,722,877

Note-1) "Port Development Projects" includes superstructure except cargo handling equipment.
Note-2) "Port Development Projects" of Short Term Plan is development of Ro-Ro terminal.
Note-3) "Administration Expenses" includes compensation.
Note-4) "Related Projects" of urgent plan is access road development, while that of long term plan is railway (infrastructure) development.

10-G. PRELIMINARY ECONOMIC ANALYSIS

Prerequisites of Analysis

335. The purpose of the preliminary economic analysis is to appraise the economic feasibility of the benefits in the master plan through a comparison of project costs from the view point of the national economy. The container, general cargo and vehicle in the prerequisites will be increased in spite of limited port capacity. The economic internal rate of return (EIRR) based on a cost-benefit analysis is used to appraise the feasibility of the project by extracting benefits of increasing cargo.

- The period of calculation (project life) in the economic analysis is assumed to be 34 years from the beginning of the project.
- The cost of installation of gantry cranes up to 2005 in Tanjung Priok port is budgeted in the previous project and not counted in this project.

Benefit

336. As benefits brought about by the master plans, the following items are identified. In this study the monetary benefits among them are calculated.

- Savings in ship staying cost for cargo handling
- Savings in sea transportation cost
- Savings in handling cost by Midstream Operation for the excess cargoes
- Savings in land transportation cost
- Reduction of cargo damage and accident at the port
- Promotion of regional economic development
- Increase in employment opportunities and income
- Reduction of the traffic congestion in the port area

Costs of the Projects

337. The items that should be considered as costs of the projects are construction cost, maintenance and administration costs.

Evaluation of the Projects

338. Based on the results, the EIRRs of the master plans are calculated as 16.6 % (it is generally accepted that infrastructure projects are economically feasible if the EIRR exceeds 15%). Therefore, these development projects of the master plans are viable from the viewpoint of the national economy.

Table 10-G-1 EIRRs of Master Plans

Project	Cost (IRR=15%)	Benefit (IRR=15%)	B/C (IRR=15%)	EIRR
Tanjung Priok	1,971 billion Rp.	2,186 billion Rp.	1.11	16.6%
Bojonegara	1,481 billion Rp.	1,685 billion Rp.	1.14	16.6%

10-H. INITIAL ENVIRONMENTAL EVALUATION (IEE)

339. Initial Environmental Examination (IEE) was carried out for the Master Plan toward 2025 with the following objectives: To identify the environmental impact of the development project in the Master Plan; To give information in evaluating methods in the next step, i.e. Environmental Impact Assessment.

10-H-1 IEE for the Master Plan of Tanjung Priok

340. The result of IEE is summarized in the following Table.

Table 10-H-1 Results of IEE (Tanjung Priok)

Type of major Activities / Environmental Factors		Overall Evaluation	Construction Phase		Operation Phase		
			Reclamation /Spatial Occupancy	Operation of Construction Equipment	Spatial Occupancy	Operation of Vehicles /Ships	Operation of Port Facilities
1. Social Environment							
1	Resettlement	-B		?			
2	Economic Activities	+-B		?		?	
3	Traffic and Public Facilities	+-B		?		?	
4	Split of Communities	D					
5	Cultural Property	D					
6	Water Rights and Rights of Common	D					
7	Public Health Condition	-C		?		?	?
8	Waste and garbage	-C	?				?
9	Hazards (Risk)	-C		?		?	?
2. Natural Environment							
10	Topography and Geology	D					
11	Soil Erosion	D					
12	Groundwater	D					
13	Hydrological Situation	D					
14	Coastal Zone	-C			?		
15	Fauna and Flora	-C	?		?		
16	Meteorology	D					
17	Landscape	D					
3. Pollution							
18	Air Pollution	-B		?		?	
19	Water Pollution	-B	?		?	?	?
20	Soil Contamination	-B	?		?		
21	Noise and Vibration	-B		?		?	
22	Land Subsidence	D					
23	Offensive Odor	D					

Note:
A: Serious impact B: Medium impact C: Small impact D: No impact
+: Positive impact – : Negative impact

Social Environment

341. The port activities provide job opportunities and residents expect to see an increase in job opportunities and business chances as a result of port development.

342. Population density of the project site is extremely high. Road rehabilitation will temporarily affect the residential/business zones i.e., service industries along the existing roadside may have to be temporarily relocated.

343. During the construction phase, traffic congestion may occur, however, road rehabilitation and construction can improve traffic control, for example, port related traffic does not need to use the existing local road.

344. Although there are enough public health facilities such as hospital or health unit (*Pos Kesehatan*), the increasing population will place greater demands on these facilities, and thus it will be required to improve health management.

345. The capacity of the drainage system is insufficient. As a result, flood problems occasionally occur in rainy season. Port facilities have sewage treatment system such as septic tank; however, some of these septic tanks are poorly managed. As a result, sewage water overflows into the port water area in rainy season or high tide.

346. Activation of port activities will increase sea/road traffic volume, however, widening channel/basin and road rehabilitation will mitigate traffic congestion. Traffic accidents can be controlled by a proper management program for traffic control.

Natural Environment

347. Small sand beach exists in the west of the project site. Development of East-Ancol area may change coastal landform.

348. Dominant species of terrestrial fauna and flora are domestic and plantation. Concerning aquatic biota, though land reclamation and dredging decrease habitat for the benthos, however, these are mainly common species.

Pollution

349. Serious air pollution and noise disturbance around the port is caused by the heavy traffic volume.

350. Current water quality at the project site is still poor. In particular, high concentrations of organic pollution such as COD and Nutrients were recorded. This pollutant is mainly dependent on domestic sewage. Widening the channel and basin will improve the water flow.

351. Dominant causes of water pollution, air pollution and noise disturbance may be influenced on the traffic activity, industrial activity and human activity in the hinterland like DKI Jakarta, so that it is essential to implement not only port improvement but also comprehensive improvement of pollution control in DKI Jakarta in cooperation with national/local government.

10-H-2 IEE for the Master Plan of Bojonegara

352. The result of IEE is summarized in the following Table.

Table 10-H-2 Results of IEE (Bojonegara)

Type of major Activities / Environmental Factors		Overall Evaluation	Construction Phase		Operation Phase		
			Reclamation /Spatial Occupancy	Operation of Construction Equipment	Spatial Occupancy	Operation of Vehicles/ Ships	Operation of Port Facilities
1. Social Environment							
1	Resettlement	-A	?				
2	Economic Activities	+B		?			?
3	Traffic and Public Facilities	-C		?		?	
4	Split of Communities	-C					?
5	Cultural Property	D					
6	Water Rights and Rights of Common	-C	?		?		
7	Public Health Condition	D					
8	Waste and garbage	-C	?				?
9	Hazards (Risk)	-C		?		?	?
2. Natural Environment							
10	Topography and Geology	D					
11	Soil Erosion	D					
12	Groundwater	D					
13	Hydrological Situation	D					
14	Coastal Zone	-C	?		?		
15	Fauna and Flora	-B	?		?		
16	Meteorology	D					
17	Landscape	D					
3. Pollution							
18	Air Pollution	-C		?		?	?
19	Water Pollution	-C	?		?		?
20	Soil Contamination	D					
21	Noise and Vibration	-C		?		?	?
22	Land Subsidence	D					
23	Offensive Odor	D					

Note:
A: Serious impact B: Medium impact C: Small impact D: No impact
+: Positive impact – : Negative impact

Social Environment

353. Basically, local residents agree with the port development project, however they complain of the proposed relocation area because it is far from the Port Area. And some of them complain about land prices which have risen since the economic crisis.

354. Local residents expect to see an increase in job opportunities and business chances as a result of port development.

355. Existing road from/to the project site is in poor condition and cannot be used to transport a sufficient number of cargo and passengers. It is required to improve the port access road.

356. The project site is close to *Desa* Puloampel, Sumuranja and Margasari. Residents around the project site will be relocated to the proposed area connected with pathway from the existing road. Furthermore, the access road may split communities.

357. For the most part, waste and garbage is individually disposed of by each household. This system cannot control increasing waste materials. Increasing wastewater from residential and port areas will seriously affect the water quality.

358. The number of ship accidents is likely to increase as traffic increases. In addition, oil spills affect not only ecosystem but also human activities. It is necessary to create the safety manual for construction/operation phase.

Natural Environment

359. Small mangrove forest and coral reef exist around the project site. Port facilities were designed not to touch those around the island of P. Kali. To establish an environmental friendly port, the remaining mangrove forest and coral reef should be preserved.

Pollution

360. Currently, air quality and noise level are satisfactory. Increasing road traffic may aggravate air quality and noise disturbance close to the roadside.

361. Current condition of water quality is still good; concentrations of water quality were below the standard. Dredging activity will temporarily generate water pollution by turbid water, however, the proposed breakwater will not disturb seawater exchange.

CHAPTER-11. ROAD NETWORK IMPROVEMENT PROJECTS/PROGRAMS

11-A. ACCESS ROAD FOR TANJUNG PRIOK

11-A-1 Forecast of Future Traffic

362. The traffic volumes using the arterial roads and the tollway connections are forecasted as shown in Table 11-A-1.

Table 11-A-1 Traffic Volume Each Direction and Roads (PCU/day)

				(PCU/day)
Direction	**Road**	**2002**	**2012**	**2025**
From East	Jl .Jampea	29,307	41,815	60,766
	JORR Toll Road	50,887	78,405	123,373
	Total	80,195	120,220	184,138
From West	Jl. Martadinata	76,556	114,766	175,784
From South	Jl. Yos Sudarso	27,210	38,823	56,418
	JIUT Connecter	47,247	72,795	114,546
	Total	74,457	111,619	170,963
Total		231,208	346,604	530,885

363. Road network around Tanjung Priok is shown in Figure 8-B-2 (Chapter-8), and tollway location map is shown in Figure 11-A-1.

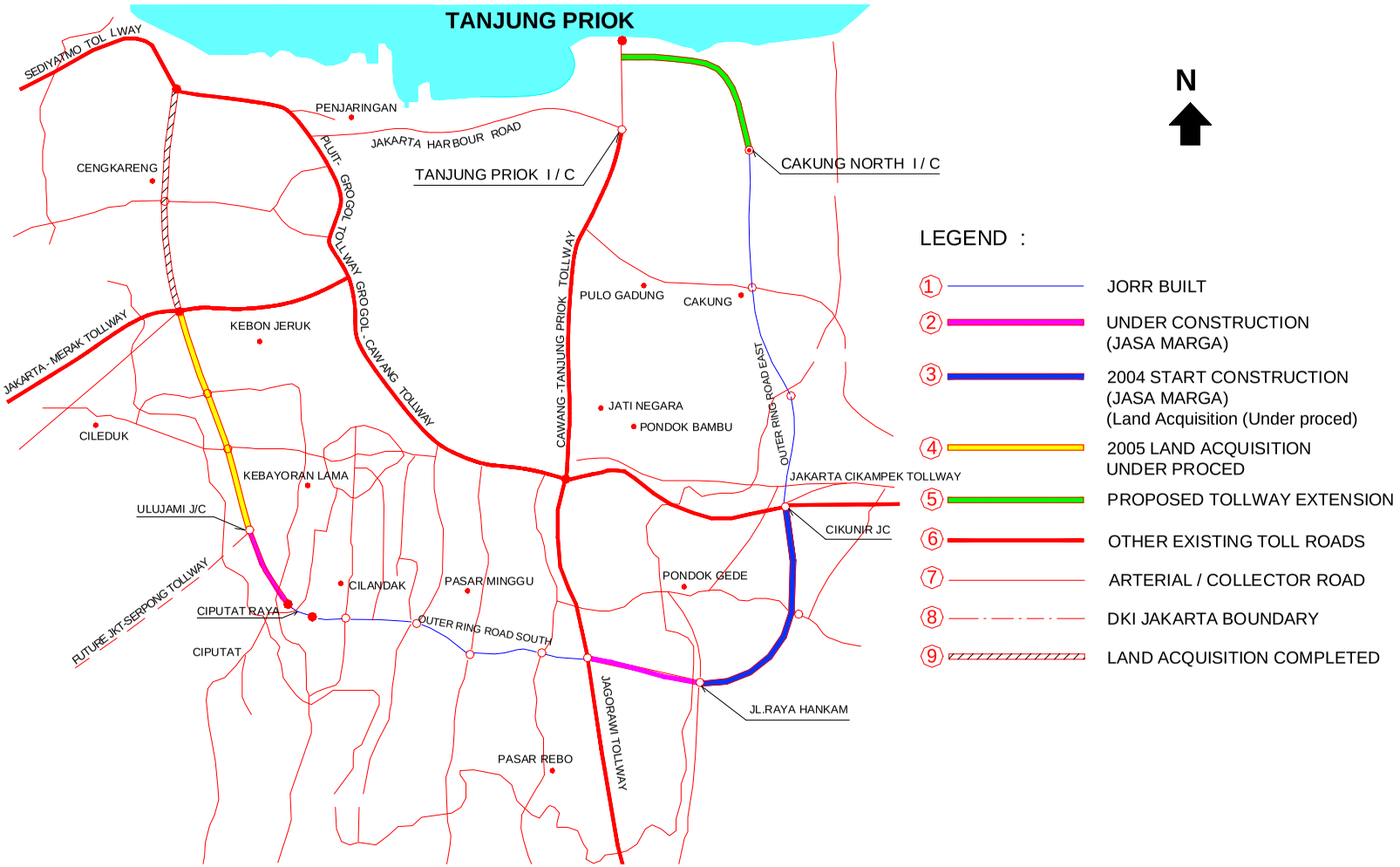


Figure 11-A-1 Tollway Location Map

364. The lane capacity or design service flow rate represents the maximum hourly flow rate that a highway can accommodate without congestion falling below a prescribed level. The lane capacities for the arterial roads were determined in accordance with IHCM in Table 8-B-8 of Chapter-8.

365. The traffic capacity for new sections of tollway is calculated in a manner similar to the arterial roads and is shown in Table 11-A-2.

Table 11-A-2 Capacity of Tollway

Type of Road		Unit	Comments
4-lane divided	Motorway		
Base Capacity	2,300	Pcu/hr/lane	Flat terrain
Fcw	1.00		3.5 lane width
Fcsp	1.00		divided road
Capacity	2,300	pcu/hr/lane	-
Practical capacity	1,840	pcu/hr/lane	80% capacity

Source: IHCM – Motorways

11-A-2 Proposed Improvement of Access Road to Tanjung Priok

366. Based on the traffic counting survey data and traffic forecasts of vehicles around the Tanjung Priok port area, the improvement of access to the Tanjung Priok port is studied for the 3 directions to the port, i.e. from East (Jl. Laks. R.E. Martadinata), from West (Jl. Jampea Cilincing), and from South (Jl. Laks. Yos Sudarso and Jl. Sulawesi).

367. The number of lane requirements of the access roads according to the traffic demands of 2012 and 2025 is determined for each segment of road as follows:

Table 11-A-3 Summary of Traffic Lane Requirement at Target Years

Road	Traffic Volume (PCU/day)		Number of Lanes Required		
	2012	2025	pcu/hr/lane	2012	2025
East ; Jl Jampea	41,815	60,766	1,355	4	6
East ; JORR Toll Road	78,405	123,373	2,300	4	6
West ; Jl Martadinata	114,766	175,784	1,398	10	14
South ; Jl. Yos Sudarso	38,823	56,418	1,496	4	4
South ; JIUT Connecter (Toll)	72,795	114,546	2,300	4	6

11-A-3 Development Concept of Jakarta Outer Ring Road and Access Road to the Port

Concept of Jakarta Outer Ring Road (JORR)

368. The Jakarta – West Java tollway system has been implemented in the following sequences since 1979.

- Jagorawi toll Road has been open to the public since 1979
- The Jakarta – Merak Toll Road since 1984
- The Cengkareng Access since 1985
- The Jakarta – Cikampek Toll Road since 1988

369. As an integral part of the Jakarta – West Java Tollway System, Jakarta Outer Ring Road is expected to play the following important roles :

- Alleviation of serious traffic congestion;
- Supplementing the function of the radial tollways and the Cengkareng Access; and
- Improvement of land use in DKI Jakarta, Tangerang and Bekasi.

370. Jakarta Outer Ring Road is planned near the fringe of the future urbanized area of DKI Jakarta and JABOTABEK Metropolitan region. Jakarta Outer Ring Road will become a vital portion of the Jakarta – West Java Tollway System together with the inner ring road and will distribute traffic in urbanized areas. (See Figure 11-A-1.)

Necessity of JORR Northern Extension

371. The existing road access capacity to the Tanjung Priok Port is totally inadequate to accommodate the current traffic volume. The traffic counting survey conducted in 2002 verified that the main arterial roads approaching the port from west (Jl. Martadinata), south (Jl. Laks. M. Yos Sudarso) and east (Jl. Jampea/Cilincing) are heavily congested with a mix of heavy trucks and public city traffic destined to the ports.

372. The construction of JORR Northern Extension Tollway (between Tanjung Priok and Cakung I/C) and JIUT connector (between Tanjung Priok Port and Tanjung Priok I/C) is required to separate port related traffic and public through traffic and to relieve the traffic congestion around the port considering the following circumstances :

- The land acquisition of the originally planned routes of JORR between Tanjung Priok I/C and Cakung I/C has been very difficult since it was proclaimed as a restricted area by the Governor of the DKI Jakarta Metropolitan. Alternatively the northern extension of JORR is proposed.
- While the JORR development project had been suspended since the economic crisis of 1997, the traffic volume through the Tanjung Priok, particularly containers volume have been increased steadily together with the recovering process of the Indonesian economy.
- The implementation program of the remaining parts of JORR in the south and west area had been set by PT. Jasa Marga (Road Development Cooperation) in 2002.

373. At the design stage of JIUT in 1988-1990, the JIUT connector (Jakarta Intra Urban Tollway), which includes the Harbour Road from the West, was intended to be the access route to Tanjung Priok port.

374. However, since then, the Bekasi Industrial area and Marunda New Port have remarkably developed. JORR Northern Extension becomes inevitable as alternative route to access the Tanjung Priok Port rather than the originally planned route of JORR.

Aim of JORR / JORR Northern Extension

375. JIUT (Jakarta Intra Urban Tollway) including the Jakarta Harbour Road was completed in 1995/96 and since then increase in traffic volume has been remarkable through this tollway. Traffic congestion on the tollway occurs daily particularly at four interchanges in the JIUT, namely Cawang, Tomang, Pluit and Tanjung Priok. The heavy congestion at these interchanges is due to the minimum geometric design standard for construction of each interchange, as it was very difficult to acquire land. The ramp from the tollway to the public city road thereof is in very poor condition, that is, the radius of ramp is small, longitudinal slope is steep, and the width of ramps is narrow, etc.

376. Under such a geometric design, heavy vehicles are forced to slow down at the ramp, while on the ramp which subsequently results in congestion since the following vehicles on the adjacent city roads must also slow down. This also lowers the lane capacity.

377. Accordingly, large/heavy trucks especially trailer trucks to/from the port are recommended to use the Outer Ring Road instead of the JIUT through the city for shorter access to the industrial estates in the eastern region (Karawang, Bekasi, Cikarang).

378. In case the traffic goes to the west through the harbour road, the existing arterial road of Jl. Martadinata should be improved and an elevated road should be developed to connect the harbour road due to the limited land for widening on both sides of the road.

11-A-4 Development Plan of JORR Northern Extension for Access Road

379. The previous section Traffic Analysis substantiated the urgent need for the development of the JORR northern extension to connect between the gate of port to Cakung I/C for improved access to the port and the provision of grade-separated structures at major intersections to alleviate existing congestion.

380. The proposed improvement access to Tanjung Priok port from the three directions are summarized below:

- Eastern access: Construction of a new elevated road to provide direct access from the east, i.e., between JORR and the port; and widening Jl Jampea.
- Western access: Widening of Jl. Laks. RE Martadinata to provide improved access to the port from the west.
- Southern access: Construction of flyover along with Jl. Sulawesi at the intersection of Jl. Enggano in order to secure smooth access from the south including JIUT.

Eastern Access Port Highway

381. Eastern Access Port Highway is 3 km long viaduct to connect the Gate-9 at the port and intersection of Jl. Cilincing which is formed as parts of JORR Northern Extension, and generally follow the alignment of Jl. Jampea and Jl. Cakung.

382. Due to the narrow ROW (Right of Way), it will be built as an elevated structure along Jl. Jampea. Plan, and profile drawings are attached in Figure 11-A-2.

383. This highway viaduct starts near the Gate-9 of port entrance and slightly bends to north-side and follows the existing alignment of Jl. Jampea.

384. The exclusive on-off ramps will be developed to connect JICT I/ Koja Container Terminal with this viaduct highway.

JORR Northern Extension

385. This section of tollway will be the extension from the eastern Access Port Highway.

386. JORR Northern Extension is 3.5 km in length and generally follows the alignment of Jl. Jampea and Jl. Cakung. Due to the narrow ROW it will be built as an elevated structure along Jl. Jampea.

387. In Jl. Cakung, the ROW is wider and the tollway can be accommodated at grade within the existing median. A flyover will be required to provide grade separation with Jl. Tugu Raya and the Cakung River. Plan and profile are attached in Figure 11-A-3.

Western Access Port Highway

388. Widening of Jl. Laks. RE Martadinata from a 4-lane to 6-lane arterial road can take place within the existing right of way from the port to where it passes under the Harbour Toll Road. Thereafter, in the Ancol area there is no room for widening within the existing ROW and the extra lanes will have to be provided either by building a second level or by constructing 3 eastbound lanes on the north side of Kali Ancol and using the existing road for westbound traffic. The latter option would be considerably cheaper than a costly overhead structure required for an elevated road.

389. The only practical way to a construct the Harbour Toll Connector would be to utilize the Jl. Laks. RE Martadinata corridor because the existing railway tracks and station congested housing areas and the port itself are major constraints. A proposed alignment is shown in Figure 11-A-4.

390. Western Access Port Highway crosses the railway and a flyover is proposed because in Jakarta, provision of flyover is requested at any railway crossing. Gate-3 of the port is schedule to close. Accordingly, traffic congestion will be reduced, while staff and labor to/from the port will still be allowed to use this gate because the bus terminal still remains.

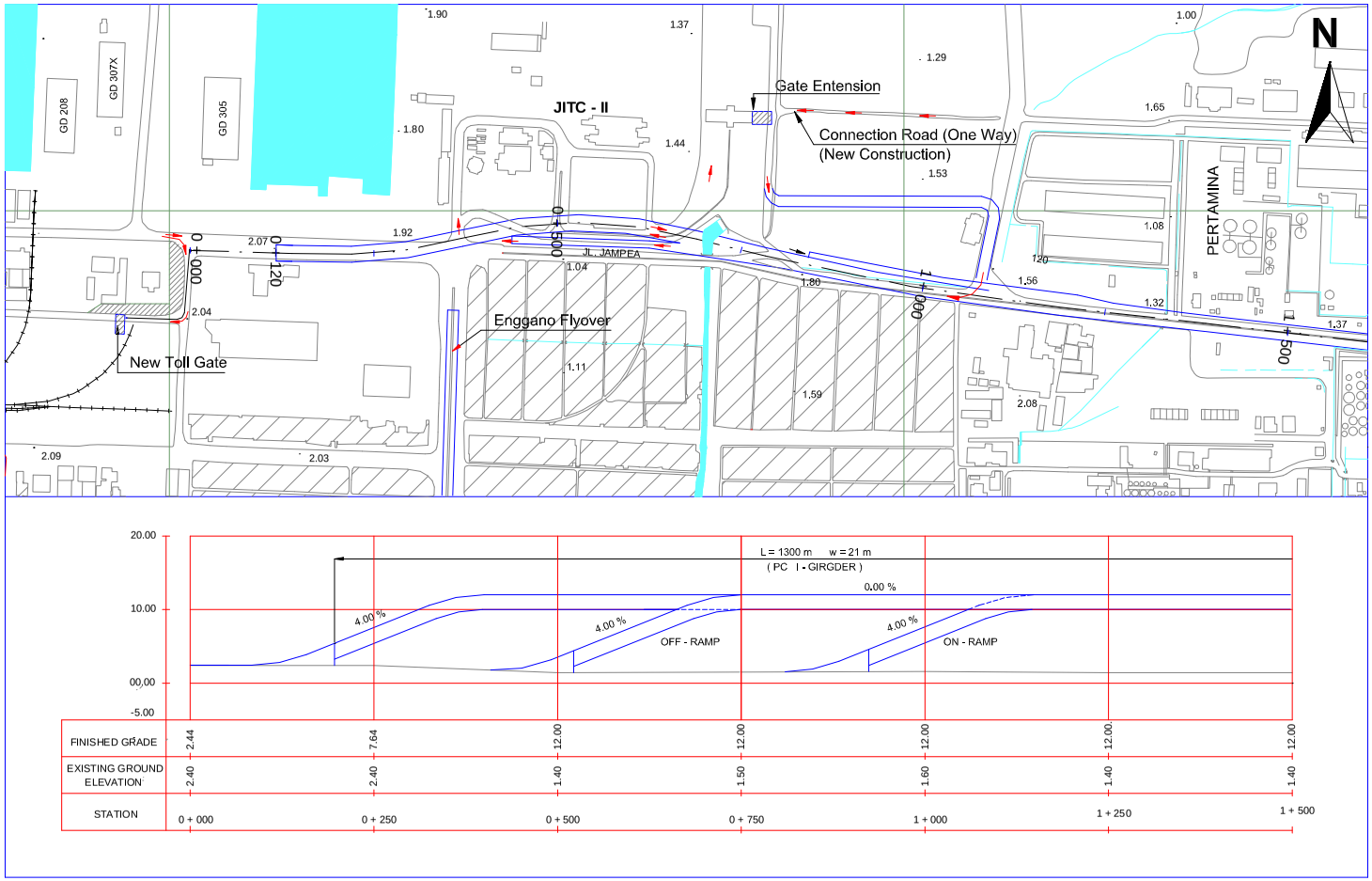


Figure 11-A-2 Eastern Access Port Highway Plan and Profile

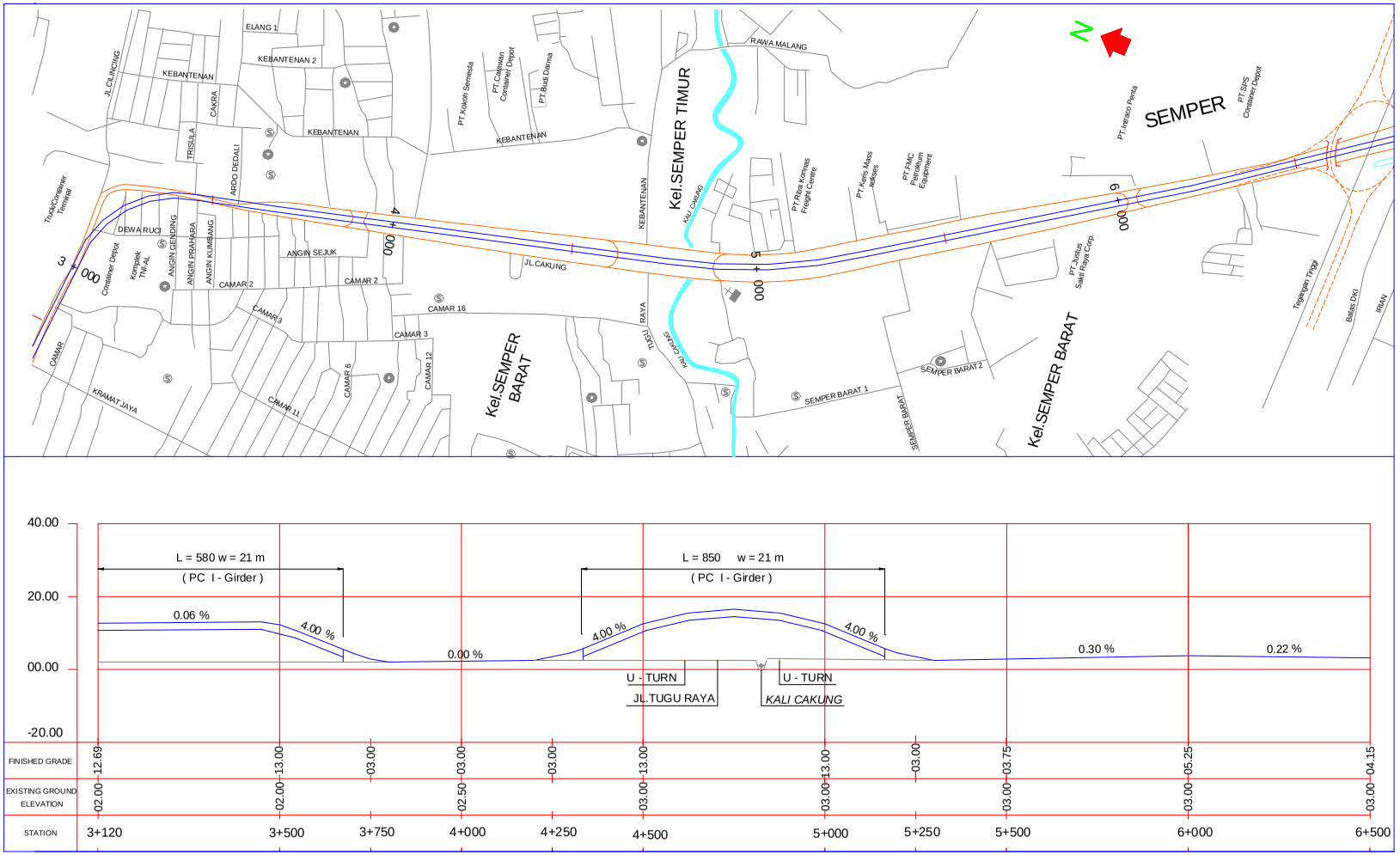


Figure 11-A-3 JORR Northern Extension Plan and Profile

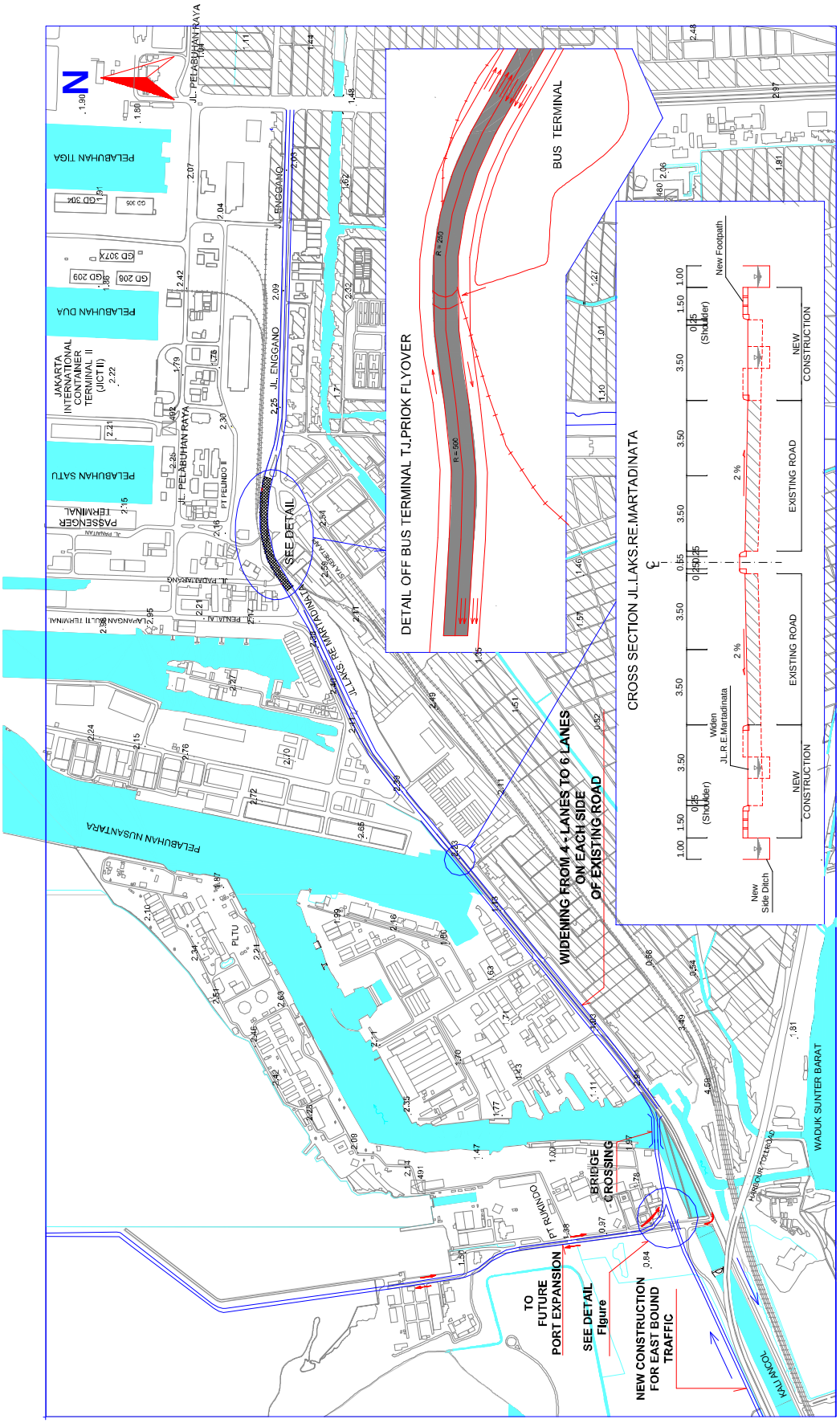


Figure 11-A-4 Western Access Port Highway Plan and Profile

11-B. PROPOSED RE-DEVELOPMENT PLAN OF THE TANJUNG PRIOK BUS TERMINAL

11-B-1 Background and purpose

391. Conditions for the study on re-development of the Tanjung Priok bus terminal have been changed as shown in table below. The study here has focused on the bus terminal improvement according to the improvement of Western Access Port Highway (Jl. Larks. Re. Martadinata and Jl. Stasiun) and the railway-crossing flyover.

Table 11-B-1 Background and purpose: reviewed conditions for the study

Items	Original conditions	Reviewed conditions
a) Railway station	• Railway service was expected to attract passengers.	• Little possibility for bringing back railway passenger. (Passenger trains have not been operated in recent two years except cargo trains.)
b) Port inner road improvement	• Jl. Padamarang and Gate 3 would be improved according to the plan of port inner roads. The location of the Gate 3 could be changed in the plan.	• Gate 3 for vehicles is planned to close.
c) New access road development	• A new access road would connect to Gate 3 in the station plaza area.	• New access road development is unlikely. • The plan to close Gate 3 will improve the traffic congestion around the bus terminal.
d) Bus terminal	• Tanjung Priok bus terminal is operated in the station plaza.	• Tanjung Priok bus terminal is operated in the station plaza but has limited relations with the port.
e) Function of the area	• The station area functions as a traffic nodal point in front of the port.	• Only a bus terminal function remains around the station area.

Source: JICA Study Team

11-B-2 Existing conditions, issues and improvement policies of the bus terminal

392. Table 11-B-2 shows the existing conditions, issues and improvement policies. In addition, there was an idea for relocation of the existing bus terminal in the Jakarta Utara municipality. The relocation sites were conferred among the municipality, PT. KAI and IPC, however, the site has not been decided yet. Thus, in this study, the improvement of the bus terminal at the existing location has been examined, while a partial relocation of it would be still worthwhile to consider.

Table 11-B-2 Existing conditions and issues of the bus terminal

Items	Conditions	Issues	Policies
a) Traffic volume	• The traffic volume around the terminal was counted at around 30,000 vehicles including motorcycles passing through the area.	• The vehicles on the route pass through a winding narrow street in front of the Tanjung Priok station. • Motorcycles dominate on the street at around 70%.	*Traffic separation* • The through traffic will pass the newly developed flyover crossing the railway. • The buses and domestic vehicles utilize the existing circulation.
b) Passengers	• The passengers tend to get on/off the buses anywhere around the terminal. • Very few passengers not enter the terminal for boarding.	• It is very difficult to count boarding/alighting passengers at the bus terminal. • It is unlikely that the bus passengers will increase because of uncertainty of future urban plan.	*Use the peak bus demands* • The numbers of buses at peak hours are used for the study.
c) Terminal area	• The Tanjung Priok bus terminal was planned for inner city transport. • A part of the railway station, a historical building, interferes with the existing bus terminal area.	• Additional inter city transport makes the management of the bus terminal difficult. • There is constraint on the space and shape of the bus terminal by the railway station.	*Area preparation* • The park area needs to be included in the terminal. *Partial relocation* • The terminal needs more space.
d) Bus operations	• The bus drivers tend to wait at the terminal for an excessively long time to get as many passengers as possible.	• This operational situation results in chronic terminal congestion.	*Strict time management and provision of facilities* • More strict time management is required through providing appropriate facilities (berths/pools)
e) Circulation	• Many buses make the circulation system around the terminal very complicated and confused. • Limited area and unique shape of the bus terminal site are also factors of confused circulation. • Some buses should cross the railway at a level.	• Confusing and crossing bus circulations • Crossing traffic is shown not only among vehicles but also with railway.	*Simple circulations* • The routes east and west are separated in the circulations. *Avoidance of crossing railway* • The buses bound for the west need to avoid crossing the railway.

Source: JICA Study Team

11-B-3 Bus terminal improvement plan

Alternative study

393. Three alternatives are proposed for the bus terminal improvement plans as follows.

- Alternative-1 (the existing site improvement): In compliance with the existing bus operations.
- Alternative-2 (partial relocation): Relocation of the west routes terminal to avoid passing the railway.
- Alternative-3 (all relocation): Relocation of the bus terminal to the container yard. The existing site could be re-developed as a park. The close proximity of the historical Tanjung Priok railway station could make this area popular among residents and tourists.

394. There is an external factor in alternative-2 and -3, i.e., utilizing the container yard owned by PT KAI for the bus terminal area. Implementations would take longer time than alternative-1. These two alternatives would be realized after expiration of the existing land use contract or by negotiation for the cancellation of it, in addition to the consensus to use the yard. However, alternative-2 would be more negotiable than alternative-3 because the required land for alternative 2 would be less than that of alternative-3.

395. Another important issue is to avoid passing the railway. Buses do not pass the railway in alternative-2. In alternative-3, buses could pass on the flyover over the railway, however, this deprives alternative-3 of the biggest advantage of the flyover: separation of the bus traffic and through traffic on Jl. Stasiun.

396. Moreover, the western exit in alternative-3 would be designed close to Gate 1 of Tanjung Priok port. This could lead to congestion among the buses and port related vehicles. Meanwhile, the container yard has an elongated shape along Jl. Martadinata. It is difficult to adjust the eastern exit with the location of the flyover edge. The bus circulation of the east side should be designed below the flyover to prevent congestion with the through traffic on the flyover.

397. A comparison of the three alternatives is shown in Table 11-B-3. Giving weight to two factors, the ease of implementation and the effectiveness of the flyover construction, alternative-1 and -2 can be evaluated highly. In terms of avoiding crossing the railway, alternative-2 is the most suitable idea. But this latter issue would not be very important unless the cargo trains are operated in daytime.

398. A double deck bus terminal is another idea to avoid passing the railway and prepare more space for at the existing site. However, it is very difficult to provide the bus circulation (slopes to approach an upper deck) in the existing site. An approach from the flyover is not desirable in terms of separation of the bus traffic from the through traffic.

399. Following a comparison of the alternatives, alternative-2 is recommended for the following reasons:

- Ease of implementation
- Effectiveness of the flyover construction,
- Avoidance of crossing the rail way (for the buses of west routes),
- Avoidance of congestion with the local traffic (mainly motorcycles) for the buses of routes west,
- Project implementation in parallel with the bus operation
- Preparation of more space (additional space could be negotiated with PT. KAI after expiration of the contract with a private company in the container yard), and
- Preparation of site for the stall vendors (on the access way of terminal west and east).

Table 11-B-3 Comparison of the Alternatives

Items	Alternative-1	Alternative-2	Alternative-3
a) Space	x Limited space	• More space could be provided	• Most space could be provided x But the linear shape of container yard would not be suitable for the terminal improvement
b) Circulation	• Separation of the bus and through traffic x The buses of western routes pass the railway	• Separation of the bus and through traffic • The buses of western routes do not pass the railway	• The buses of eastern routes do not pass the railway x But the bus traffic is mixed with the through traffic on the flyover x The exit of western route buses would be close to the gate 1 of port
c) Passenger transfer	• Easy to transfer	x Some difficulty in transferring between the west and east routes	• Easy to transfer
d) Terminal building	• One building	x Need the terminal building separation	• One building
e) Management	• Integrated management ? Strict time management is required in the terminal	x Separate management of the west and east terminals is required.	• Integrated management
f) Project implementation	• Insufficient coordination with other agencies x Difficult to find an alternate site of the bus operations while the project is implemented	? Negotiation with PT KAI is necessary to partially use the container yard ? It is expected to take a long time before the project commences (after expiration of the contract to use container yard) ? Difficult to find an alternate site of the bus operations while the project is implemented	x Negotiation with PT KAI is necessary to use most area of the container yard x Expecting long time to commence the project (after expiration of the contract to use container yard) • Possible bus operations at the existing site with the project implementation
g) Cost	• Lowest	? Middle (due to rental fee for partial use of the container yard)	x Highest (due to rental fee for use of the container yard)
h) Others		• Possible to prepare the space for street venders	• Possible to re-develop the existing site as a historical railway park with the renovation of the station Tanjung Priok • Consistency with the plan of municipality • Possible to prepare the space for street venders

Source: JICA Study Team

Note: ● advantageous, ? rather disadvantageous, x disadvantageous/issues

Layout plan

Policies of the layout plan

400. Major policies of the layout plan are related to bus circulations and spatial use. (See Table 11-B-4.)

Table 11-B-4 Major Policies of the Layout Plan

Items	Issues	Policies
Circulation	• Traffic congestion at the gates (the east and west routes), and • Crossing east routes and west routes each other	• The area of west routes west is to be separated from the area of east routes.
Spatial use	• The park limits the terminal area, • Kiosks occupy considerable space, • Most space is mainly used for bus pools, • No boarding/alighting berths are provided, and • No platforms for passengers are provided.	• The access way over the west and east areas is provided with space for stall venders, • The park is used for the terminal, • Kiosks are included in the terminal buildings, • Bus pools are provided with strict time management, • Boarding/alighting berths are provided, and • Platforms for passengers are provided.

Source: JICA Study Team

Layout plan

401. Figure 11-B-1 shows a proposed layout plan. The plan could contribute for the waiting buses with strict management of waiting time. On the layout, the facilities of bus berths for boarding/alighting and bus pools are combined functionally. As the site cannot provide enough space for the peak demand of buses, the facilities cannot be designed for each. The allocation of the western area in the edge of container yard can provide more space and rather longer waiting time for the buses. The circulation of buses for the routes west needs not pass over the railway on the plan.

402. The numbers of bus berths/pools required on the plan are studied by the peak bus demands. The demands are based on the traffic count survey in the study. The waiting times of buses are assumed from the time to be required for the boarding/alighting and driving time in the terminal. The information is back upped by the results of bus count survey in August 2002 (another JICA study, the Study on Integrated Transportation Master Plan for JABODETABEK Phase 2). Some figures of the peak demands were adjusted by temporary observation.

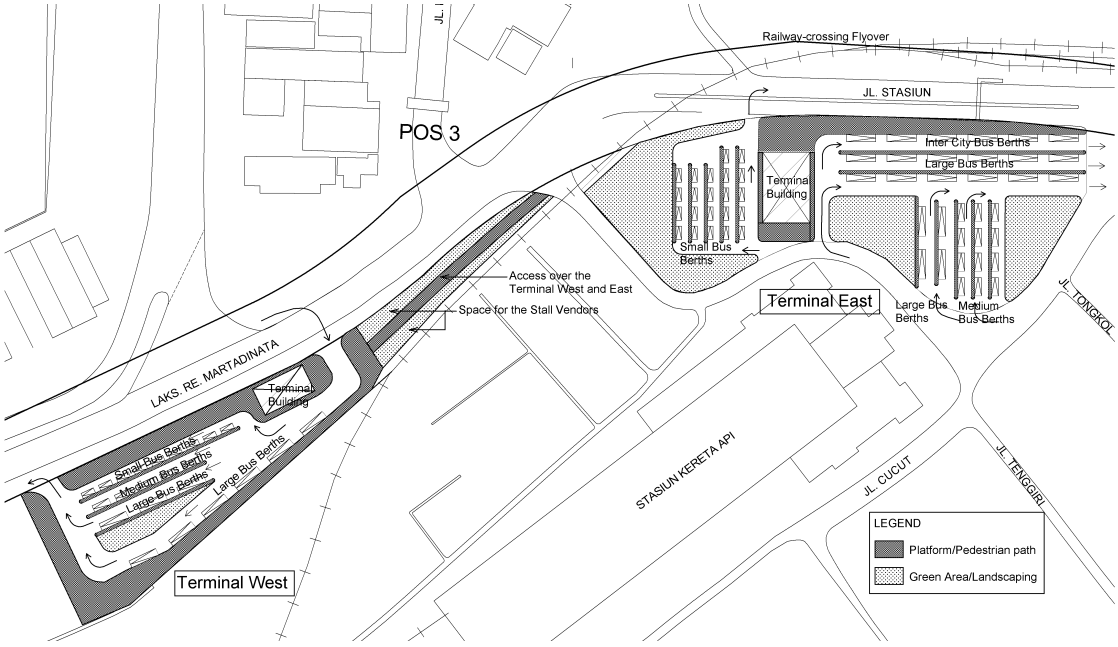


Figure 11-B-1 Proposed Layout Plan

Cost estimation

403. The total project cost for the improvement of bus terminal (the alternative-2) is estimated at about 35,000 million Rupiah excluding VAT. The cost includes indirect construction cost, project related expense and administration cost. However, the land compensation cost is not included in the estimation because this cost has to be negotiated with PT. KAI.

Implementation schedule

404. The target year of the project is 2012 in the study. The project should be completed with the construction of railway-passing flyover on Jl. Martadinata and Jl. Stasiun. The improvement of the west terminal should be implemented at first. After the relocation of the west routes, improvement works at the existing site can commence. Temporal use of the container yard can is another option.

Implementation bodies

405. Jakarta Utara municipality would play a key role in the implementation of the project. Prior to implementation, the municipality would carry out a detailed design of the bus terminal based on technical advice from the Ministry of Settlement and Regional Infrastructure (Ministry of Public Works) and UPT Terminal. Following implementation, the Suku Dinas Perhubungan Wilayah Kota Jakarta Utara under the Dinas Perhubungan DKI would be in charge of the operation/management of the terminal. Another possible land provider is PT. KAI (although this requires negotiation for lease of the container yard).

11-C. ACCESS ROAD FOR BOJONEGARA NEW PORT

11-C-1 Forecast of Future Traffic

406. Future traffic is forecasted as shown in Table 11-C-1.

Table 11-C-1 Traffic Forecast by the Bojonegara Port Development

Vehicle Type	2002	2012		2025	
	Local Traffic	Local Traffic	Port Related Traffic	Local Traffic	Port Related Traffic
Motor Cycle	2,143	3,217	0	5,397	0
Car	2,597	3,900	773	6,543	1,449
Medium Bus	722	1,129	4	2,132	8
Medium Truck	180	270	215	594	459
Large Bus	143	223	12	422	21
Large Truck	1,648	2,455	1,185	4,483	2,108
Sub Total	7,433	11,194	2,189	19,570	4,045
Total (pcu/day)	7,433	13,383		23,615	
PCU/Hr (Peak hour)	721	1,298		2,291	

11-C-2 Development Plan for Access Road

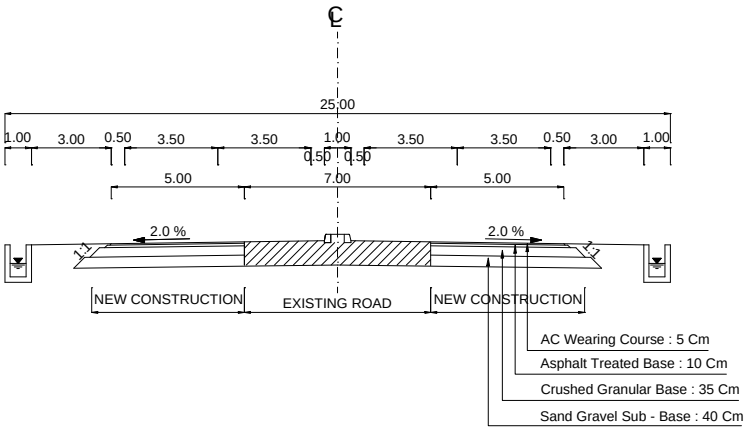
407. At present, the existing road is the provincial road. The provincial government of Banten proposed to the central government that the existing arterial road be upgraded to a national road. A new alignment of the access road should be studied by widening the existing access road and by minimizing the round-about way of the residential and factory areas. The

access road will be developed by improving the existing arterial road as follows: A 2-lane upgraded arterial road would be adequate for the local and port traffic until 2016. After 2016, widening to 4 lanes would be required.

408. The new port and proposed access road should be constructed simultaneously. Extensive improvement of the existing arterial road is required to accommodate heavy loaded trucks, including the construction of new road sections to by-pass congested areas.

409. A typical cross-section of the planned access road is shown in Figure 11-C-1. A 2-lane access road will be provided in the short term development plan. In order to facilitate future widening a 50m ROW (Right of Way) is required. Such widening would utilize the median. The outside shoulder would be wide enough to accommodate immobilized vehicles without blocking the traffic lanes.

Figure 11-C-1 Bojonegara Access Road Typical Cross Section



410. Based on the design criteria, typical cross-section and site reconnaissance survey, alignment of the access road was proposed. (Figure 11-C-2).

Figure 11-C-2 Bojonegara National Road Plan and Profile

Figure 11-C-2 Bojonegara National Road Plan and Profile

Figure 11-C-2 Bojonegara National Road Plan and Profile