(5) Phased Implementation Plans of North Kalibaru New Container Terminal of Option-1

In each alternative plan, the Master Plan of North Kalibaru Terminal with the target volume of international containers of 9.4 million TEUs in 2030 has been divided into the three phased implementation plans as shown in Table 4.7-10 (see Figure 4.7-13).

Table 4.7-10 Balance of Capacity and Demand in Container-Handling at Tanjung Priok

Unit: '000TEUs per annum

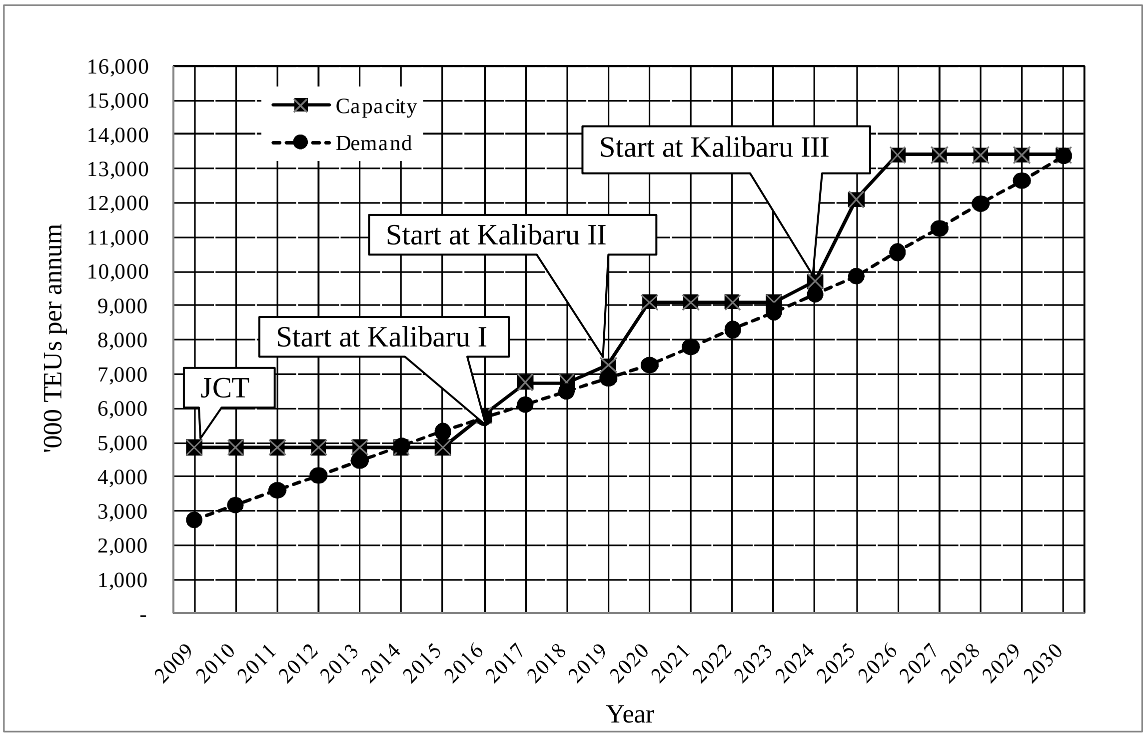
Year	International									Domestic		
	Container-Handling Capacity						Demand (B)	Balance (A)-(B)		Cargo Handling Capacity (C)	Demand (D)	Balance (C)-(D)
	JCT	North Kalibaru Phased Plans				Total (A)						
		I	II	III	sub-total							
2009	4,850					4,850	2,736	2,114		2,130	1,068	1,062
2010	4,850					4,850	3,167	1,683		2,130	1,144	986
2011	4,850					4,850	3,598	1,252		2,130	1,220	910
2012	4,850					4,850	4,029	821		2,130	1,295	835
2013	4,850					4,850	4,460	390		2,130	1,371	759
2014	4,850					4,850	4,890	-40		2,130	1,447	683
2015	4,850				0	4,850	5,321	-471		2,130	1,523	607
2016	4,850	950			950	5,800	5,708	92		2,130	1,675	455
2017	4,850	1,900			1,900	6,750	6,095	655		2,130	1,827	303
2018	4,850	1,900			1,900	6,750	6,482	268		2,130	1,979	151
2019	4,850	1,900	500		2,400	7,250	6,869	381		2,130	2,130	0
2020	4,000	1,900	3,200		5,100	9,100	7,255	1,845		3,980	2,284	1,696
2021	4,000	1,900	3,200		5,100	9,100	7,777	1,323		3,980	2,463	1,517
2022	4,000	1,900	3,200		5,100	9,100	8,299	801		3,980	2,643	1,337
2023	4,000	1,900	3,200		5,100	9,100	8,821	279		3,980	2,822	1,158
2024	4,000	1,900	3,200	600	5,700	9,700	9,343	357		3,980	3,002	978
2025	4,000	1,900	3,200	3,000	8,100	12,100	9,865	2,235		3,980	3,181	799
2026	4,000	1,900	3,200	4,300	9,400	13,400	10,563	2,837		3,980	3,421	559
2027	4,000	1,900	3,200	4,300	9,400	13,400	11,261	2,139		3,980	3,662	318
2028	4,000	1,900	3,200	4,300	9,400	13,400	11,960	1,440		3,980	3,902	78
2029	4,000	1,900	3,200	4,300	9,400	13,400	12,658	742		3,980	4,142	(162)
2030	4,000	1,900	3,200	4,300	9,400	13,400	13,356	44		3,980	4,382	(402)

Note 1) Jakarta Container Terminal containing JICT KOJA and MAL at Tanjung Priok Terminal
Note 2) MTI and JICT II currently used for international container terminals have been assumed to be converted into the terminals for domestic containers in 2020 corresponding to the completion of the redevelopment of the existing conventional berths for domestic container-handling
Source: Estimated by the Study Team

As mentioned in Section 4.3 "Estimate of Cargo-Handling Capacity of Tanjung Priok" Terminal in terms of containers, the container-handling capacities of the existing facilities have been estimated as 4.9 million TEUs per annum in international containers and 2.1 million TEUs per annum in domestic containers, respectively.

Domestic container-handling and conventional cargo-handling are forecast to be saturated in 2019, and to cope with the saturation, the existing conventional wharves where domestic containers and conventional cargoes are handled in mixture need to be separated and converted into terminals specialized in containers and conventional cargoes through redevelopment in 2020.

Together with the development of the existing conventional wharves, the two terminals, viz. MTI and JICT II have been assumed to be converted into domestic container terminals from the current international container terminals. Due to these conversions, the capacity of JCT decreases in 2020. By contrast, that of domestic container terminals increases as shown in the above table.



Source: Made by the Study Team

Figure 4.7-13 Demand and Total Capacity in International Container-Handling at Tanjung Priok Terminal

Phase I plan off North Kalibaru with a capacity of 1.9 million TEUs per annum has been made to narrow the gap of the demand and the capacity in international container handling. Operations are scheduled to commence in the beginning of 2016.

Phase II plan off North Kalibaru with a capacity of 3.2 million TEUs per annum has also been made and operations are scheduled to begin in the middle of 2019.

Furthermore, Phase III off North Kalibaru with a capacity of 4.3 million TEUs per will be ready for operations in the middle of 2024.

Phases I~III plans off Kalibaru complete the Option-1 as the Master Plan of international container handling with the target year of 2030 and a total accumulated capacity of 9.4 million TEUs per annum in total.

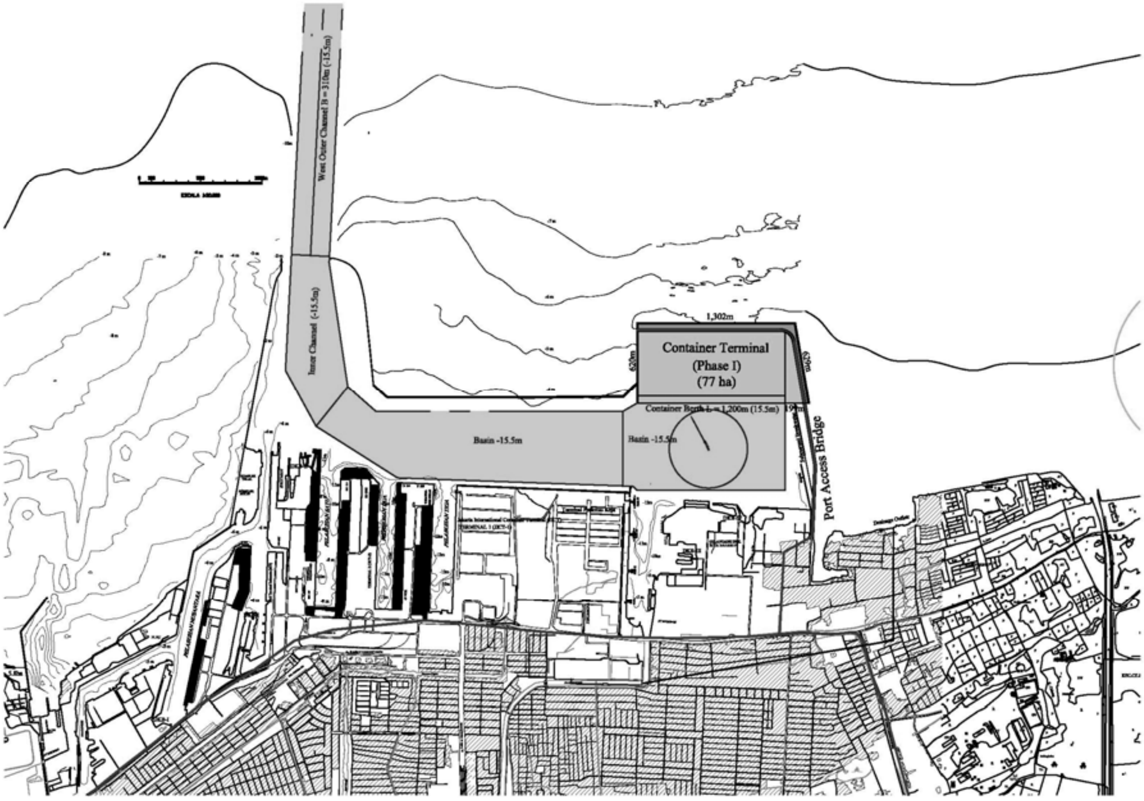
4.7.2 Development Split to off North Kalibaru and Cilamaya (Option-2)

Option-2 with the two terminals has been planned so as to compare with other options including Option-1 mentioned in the previous section, Section 4.7.1 and select the optimum development plan for international container handling in the Jakarta Metropolitan Area (see Section 4.6.4).

One terminal has been planned off North Kalibaru and another terminal at Cilamaya. The former terminal coincides with North Kalibaru Phase I Plan 1 as a part of the entire Option-1 plan described in the previous section, Section 4.7.1.

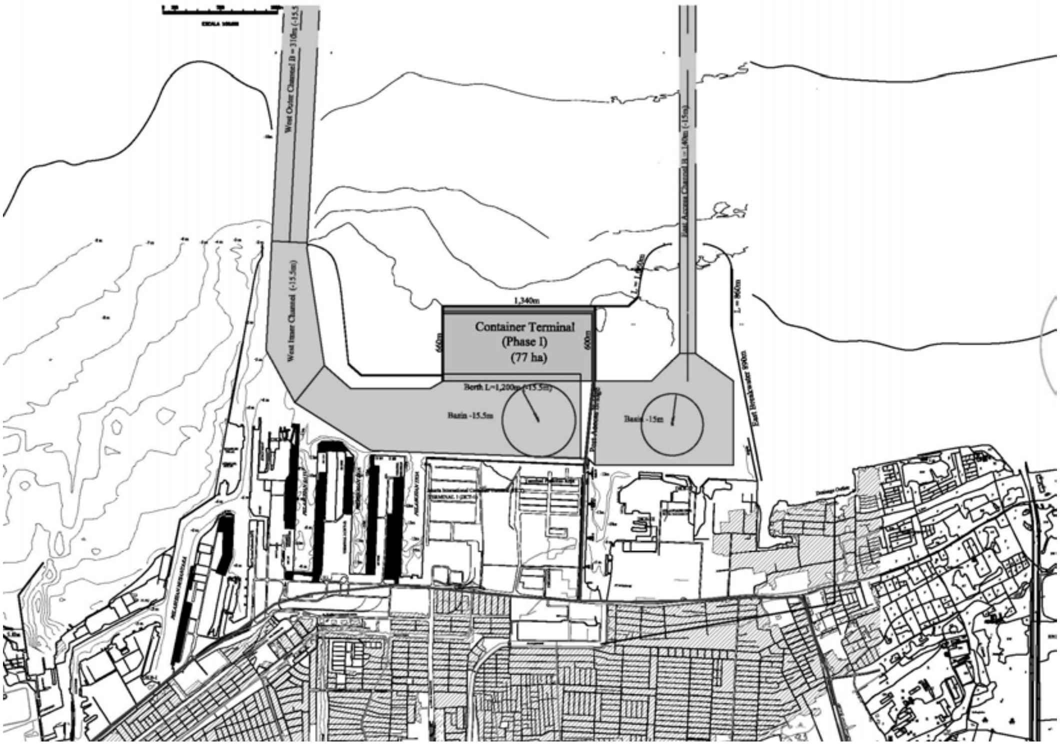
(1) North Kalibaru Phase I Terminal of Option-2

North Kalibaru Phase I Terminal Plan has three alternatives, viz. Alternative-1, Alternative-2 and Alternative-3 by partly succeeding Option-1 plan. Facility layout plans are shown in Figure 4.7-14 ~ Figure 4.7-16.



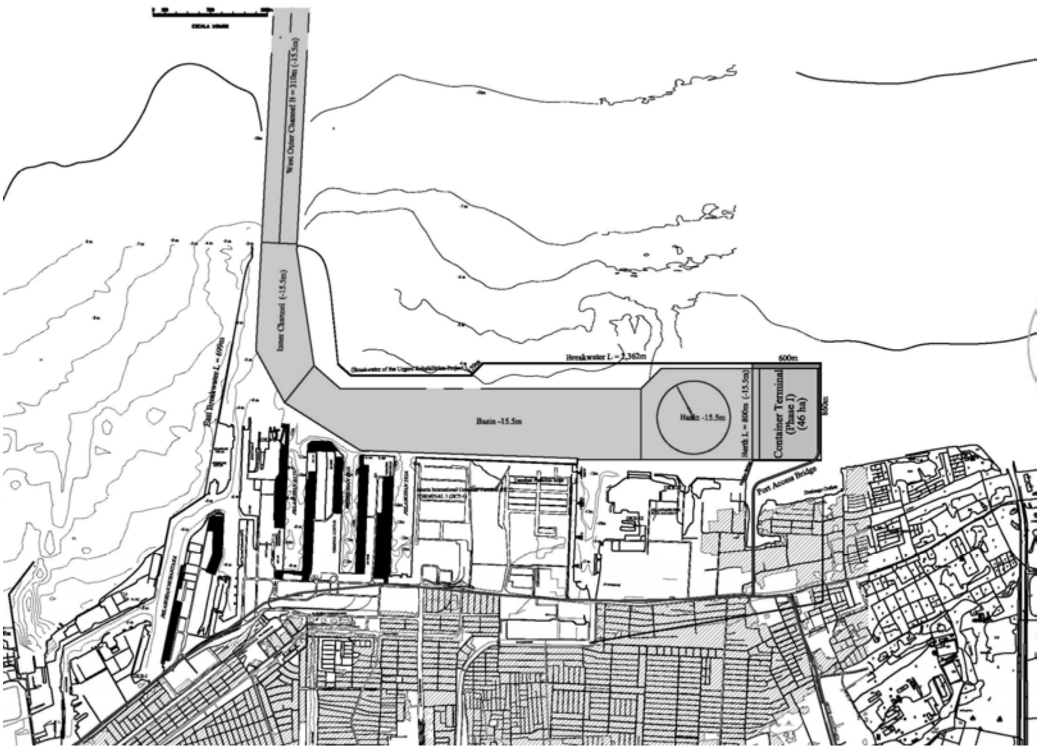
Source: Made by the Study Team

Figure 4.7-14 Facility Layout Plan of North Kalibaru Expansion in Phase I (Alternative-1)



Source: Made by the Study Team

Figure 4.7-15 Facility Layout Plan of North Kalibaru Expansion in Phase I (Alternative-2)



Source: Made by the Study Team

Figure 4.7-16 Facility Layout Plan of North Kalibaru Expansion in Phase I (Alternative-3)

(2) Cilamaya Terminal

1) Required Access Channel Dimensions

Cilamaya Terminal has been planned so as to correspond to Kalibaru II and Kalibaru III as a part of the entire Option-1 plan. Thus, the same dimensions of the access channel as those applied in the planning of the entire Option-1 have been used. The design vessel size of ordinary Post-Panamax container ships with a capacity of around 6,000 TEUs has been applied in the planning of Cilamaya Terminal as a part of Option-2 as shown below.

- DWT: 88,000 tons
- TEU Capacity: 5,600 TEUs
- LOA: 320 m
- Beam: 40 m
- Summer draft: 14 m

By using the design vessel size mentioned in the above clause "1)", the same access channel dimensions as Option-1 have been determined (see in Table 4.7-11).

Table 4.7-11 Dimensions of Planned New Navigational Channel in the New Terminal

Maximum design vessel: Post-Panamax

<table>
<tr><th rowspan="4">Number of Lanes</th><th colspan="3">PIANC Guideline</th><th colspan="3">Deviation Angle Method</th></tr>
<tr><th rowspan="3">Channel Width (D) m</th><th>Beam (B) m</th><th>LOA (A) m</th><th rowspan="3">Channel Width (D)</th><th>Beam (B) m</th><th>LOA (A) m</th></tr>
<tr><th>40.06</th><th>318</th><th>40.06</th><th>318</th></tr>
<tr><th>D/B</th><th>D/L</th><th>D/B</th><th>D/L</th></tr>
<tr><td>One-way</td><td>150</td><td>3.8</td><td>0.5</td><td>160</td><td>4.0</td><td>0.5</td></tr>
<tr><td>Two-way</td><td>310</td><td>7.8</td><td>1.0</td><td>320</td><td>8.0</td><td>1.0</td></tr>
</table>

Source: Made by the Study Team

2) Required Berth Dimensions:

Although Post-Panamax container ship has been selected as the maximum sized ship for the access channel planning, she is not the only ship to call the new terminal. In other words, various ship sizes need to be considered to make an economical plan. Various ship types and the corresponding berth dimensions accommodating them are shown in Table 4.7-12.

Table 4.7-12 Vessel Sizes Used for Berth Allocation Plan

Type	DWT	TEUs	LOA	Beam (m)	Draft (m)	Depth (m)	Length (m)
Small size	18,300	1,270	169	27.30	8.4	9.0	200
Midium size	33,750	2,550	207	29.84	11.4	12.5	240
Panamax	59,283	4,230	292	32.23	13.0	14.5	320
Post-Panamax	87,545	5,648	318	40.06	14.0	15.5	360

Source: The Study Team

3) Berth Allocation Plan at Cilamaya Terminal

Target Container Volume for the New Cilamaya Terminal

As shown in Table 4.7.16, the required capacity at Kalibaru Phases II~III has been estimated as 7.5 million TEUs in total in the stage of the Master Plan with the target year of 2030. The same target volume has been applied for Cilamaya Terminal.

Allocation of Containers by Ship Type

Containers to be handled at the new terminal in 2030 have been allocated as indicated in Table 4.7-13.

Table 4.7-13 Allocation of Containers by Ship Type at Cilamaya Terminal in 2030

Unit: ‘000TEUs/year

Direct/Transshipment		Total	Allocation			
			Small size	Medium size	Panamax	Post-Panamax
Eastbound Direct	60%	4,500		2,250	2,250	
Westbound Direct	10%	750				750
Transshipment	30%	2,250	1,125	1,125		
Total	100%	7,500	1,125	3,375	2,250	750

Source: Estimated by the Study Team

Berth Allocation Plan

The allocation of container ships by type shown in Table 4.5.20 has been converted into an economical berth allocation plan composed of the three types of berths with different water depths and lengths as shown in Table 4.7-14.

Table 4.7-14 Berth Composition of Cilamaya Terminal in 2030

Quay No.	Berth composition (m)				Sub-total (m)	Berth No.	Water depth (m)
No.1	360	360			720	2	15.5
No.2	240	240	240	240	960	4	12.5
No.3	240	240			480	2	12.5
No.4	360	360			720	2	15.5
No.5	240	240	240	240	960	4	12.5
No.6	240	240			480	2	12.5
No.7	200	200	200		600	3	9
Total (m)					4,920	19	

Source: The Study Team

4) Facility Components and a Layout Plan of Cilamaya Terminal

Main components and a facility layout plan of Phases II~III of Cilamaya Terminal are summarized in Table 4.7-15 (see Figure 4.7-17 and Figure 4.7-18). An access channel to the new terminal at Cilamaya is shown in Figure 4.9.5. An access road to the new terminal at Cilamaya is shown in Figure 4.7-19

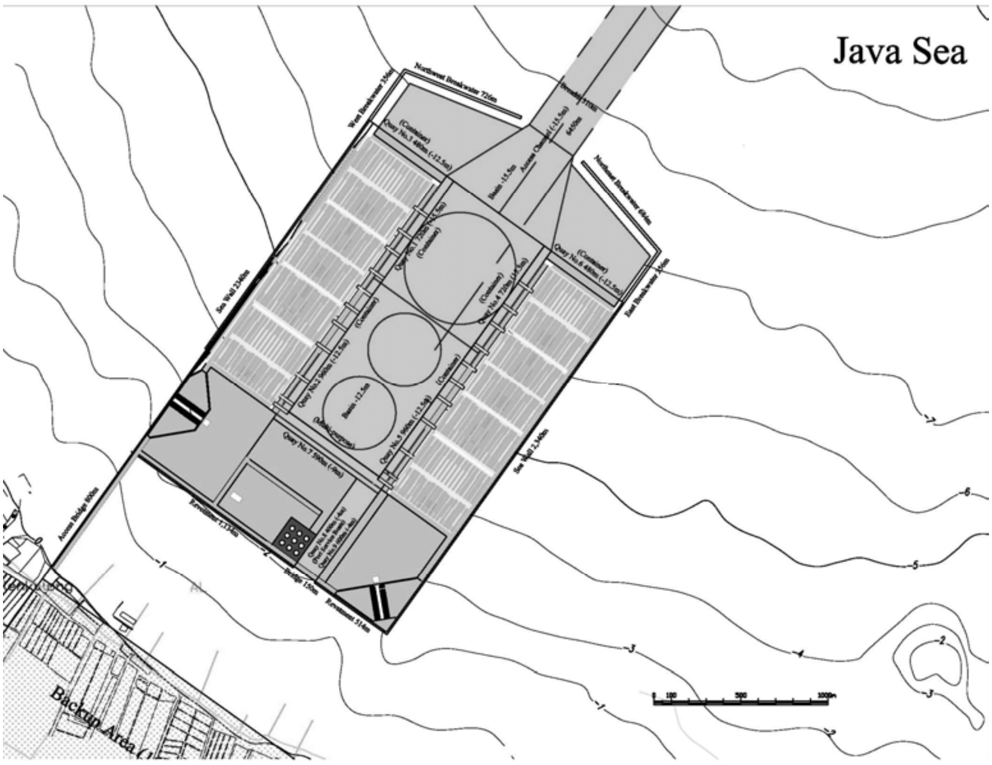
Table 4.7-15 Facility Components of Option-2 (Phases II – III at Cilamaya)

Component			Amount
Access channel		Bottom width (m)	310
		Water depth (m)	15.5
Breakwaters	West	Length (m)	360
	Northwest	Length (m)	720
	Northeast	Length (m)	680
	East	Length (m)	360
Seawalls（Open Sea）		Length (m)	4,680
Revetment		Length (m)	1,630
Container Terminal	No.1 Quay	Berth number (unit)	2
		Berth length (m)	720
		Water depth (m)	15.5
		Container yard (sq. m)	360,000
	No.2 Quay	Berth number	4
		Berth length (m)	960
		Water depth (m)	12.5
		Container yard (sq. m)	480,000
	No.3 Quay	Berth number (unit)	2
		Berth length (m)	480
		Water depth (m)	12.5
		Apron (sq. m)	24,000
	No.4 Quay	Berth number (unit)	2
		Berth length (m)	720
		Water depth (m)	15.5
		Container yard (sq. m)	360,000
	No.5 Quay	Berth number	4
		Berth length (m)	960
		Water depth (m)	12.5
		Container yard (sq. m)	480,000
	No.6 Quay	Berth number (unit)	2
		Berth length (m)	480
		Water depth (m)	12.5
		Apron (sq. m)	24,000
Multi- purpose Terminal	No.7 Quay	Berth number (unit)	3
		Berth length (m)	590
		Water depth (m)	9
		Open yard (sq. m)	147,500
Port service boats basin	No.8 Quay	Berth length (m)	1,000
		Water depth (m)	4
Land use area (ha)		Terminal area total	290
Access Road	North-South Bridge	Length (m)	800
	East-West Bridge	Length (m)	150
	Land road	Length (m)	30,600

Source: Made by the Study Team

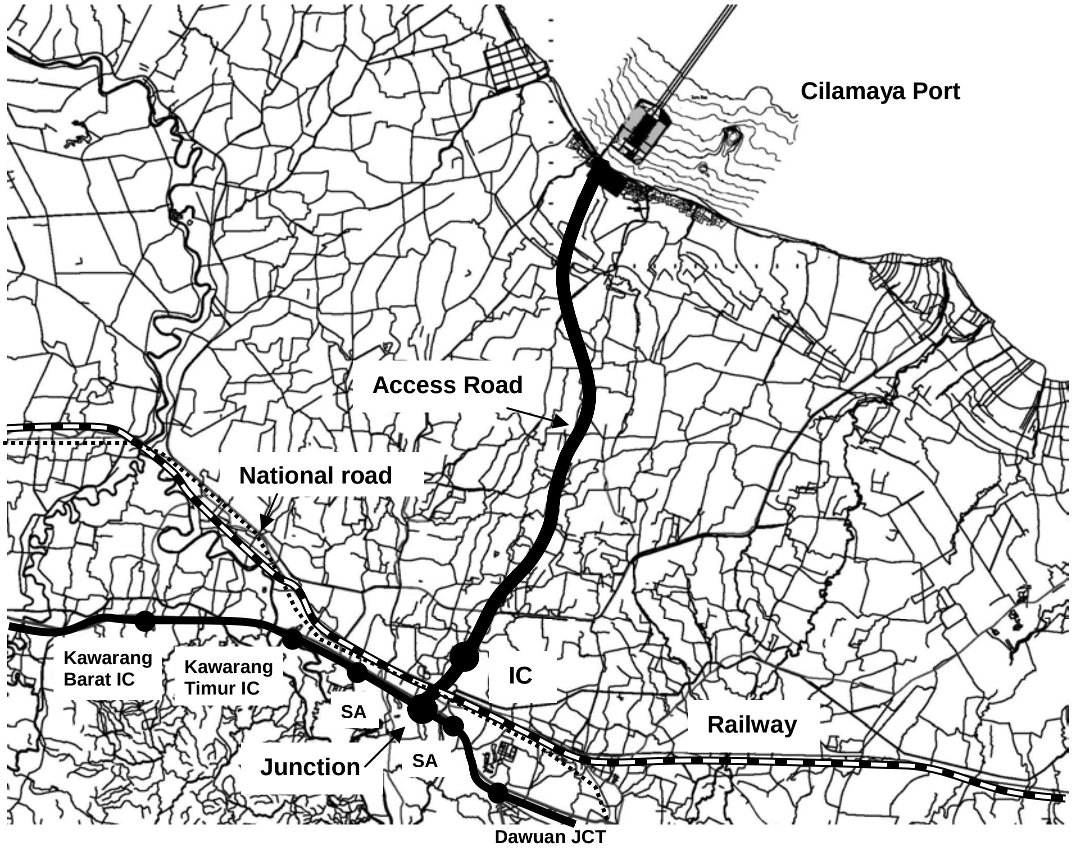
Source: Made by the Study Team

Figure 4.7-17 Location of a New Cilamaya Terminal in Phase II and III (2030)



Source: Made by the Study Team

Figure 4.7-18 Facility Layout Plan of a New Cilamaya Terminal in Phases II and III (2030)



Source: Made by the Study Team

Figure 4.7-19 Access Road to a New Cilamaya Terminal

(3) Phased Implementation Plans of Option-2

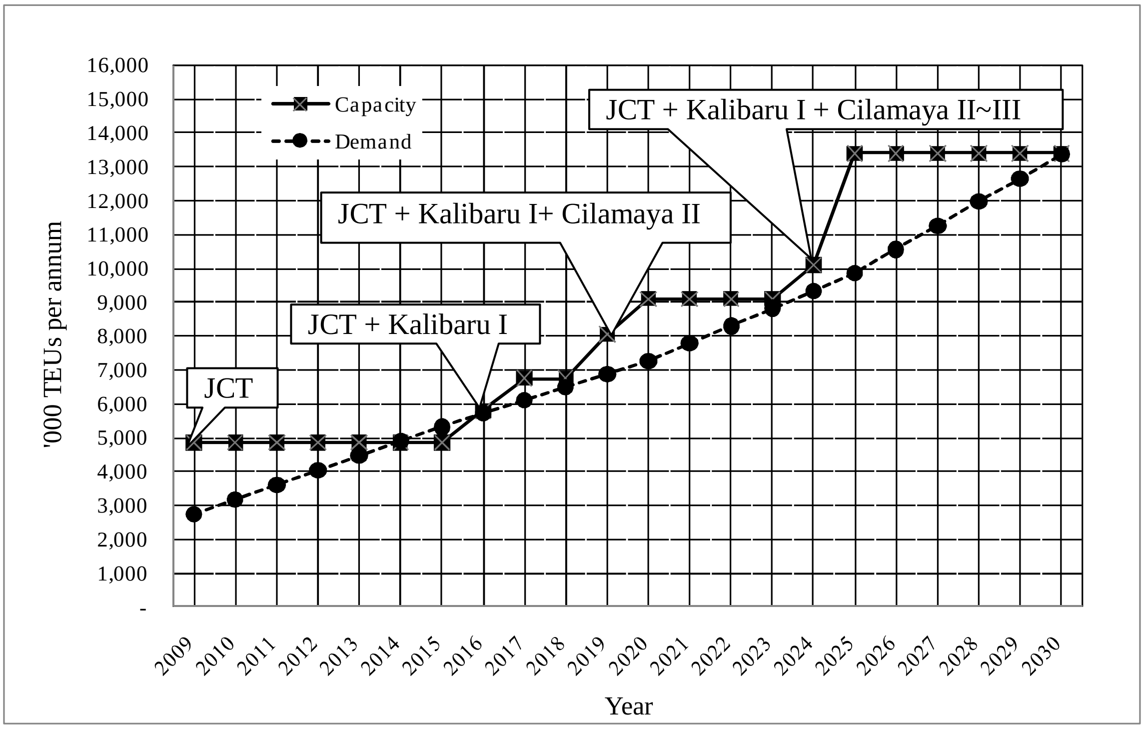
Option-2 being composed of the two terminals, viz. North Kalibaru Phase I Terminal and the Cilamaya Terminal with the target volume of international containers of 9.4 million TEUs in 2030 has been divided into the three phased implementation plans as shown in Table 4.7-16 (see Figure 4.7-20 and Figure 4.7-21):

Table 4.7-16 Balance of Capacity and Demand in Container Handling in Option-2

Unit: '000TEUs per annum

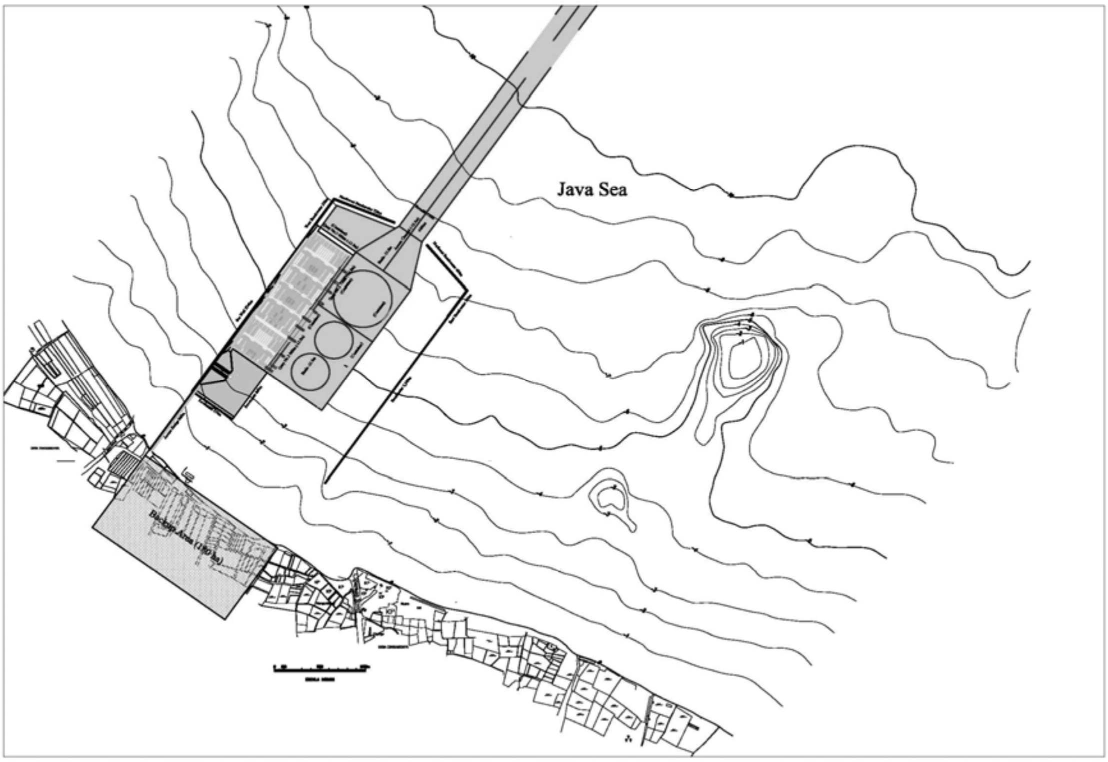
Year	International							
	Container-Handling Capacity						Demand (B)	Balance (A)-(B)
	JCT	North Kalibaru Phase I	Cilamaya		sub-total	Total (A)		
			II	III				
2009	4,850					4,850	2,736	2,114
2010	4,850					4,850	3,167	1,683
2011	4,850					4,850	3,598	1,252
2012	4,850					4,850	4,029	821
2013	4,850					4,850	4,460	390
2014	4,850					4,850	4,890	(40)
2015	4,850				-	4,850	5,321	(471)
2016	4,850	950			950	5,800	5,708	92
2017	4,850	1,900			1,900	6,750	6,095	655
2018	4,850	1,900			1,900	6,750	6,482	268
2019	4,850	1,900	1,300		3,200	8,050	6,869	1,181
2020	4,000	1,900	3,200		5,100	9,100	7,255	1,845
2021	4,000	1,900	3,200		5,100	9,100	7,777	1,323
2022	4,000	1,900	3,200		5,100	9,100	8,299	801
2023	4,000	1,900	3,200		5,100	9,100	8,821	279
2024	4,000	1,900	3,200	1,000	6,100	10,100	9,343	757
2025	4,000	1,900	3,200	4,300	9,400	13,400	9,865	3,535
2026	4,000	1,900	3,200	4,300	9,400	13,400	10,563	2,837
2027	4,000	1,900	3,200	4,300	9,400	13,400	11,261	2,139
2028	4,000	1,900	3,200	4,300	9,400	13,400	11,960	1,440
2029	4,000	1,900	3,200	4,300	9,400	13,400	12,658	742
2030	4,000	1,900	3,200	4,300	9,400	13,400	13,356	44

Note 1) Jakarta Container Terminal containing JICT KOJA and MAL at Tanjung Priok Terminal
Note 2) MTI and JICT II currently used for international container terminals have been assumed to be converted into the terminals for domestic containers in 2020 corresponding to the completion of the redevelopment of the existing conventional berths for domestic container-handling
Source: Estimated by the Study Team



Source: Made by the Study Team

Figure 4.7-20 Capacity and Demand in International Container-Handling at Tanjung Priok Terminal and Cilamaya Terminal



Source: Made by the Study Team

Figure 4.7-21 Facility Layout Plan of a New Cilamaya Terminal in Phases II (2020)

4.7.3 Development Split to off North Kalibaru and Tangerang (Option-3)

Option-3 with the two terminals has been planned so as to compare with other two options, viz. Option-1 and Option-2 mentioned in the previous sections, Sections 4.7.1 and 4.7.2, and select the optimum development plan for international container handling in the Jakarta Metropolitan Area (see Section 4.6.4). One terminal has been planned off North Kalibaru and the other terminal at Tangerang.

(1) North Kalibaru Terminal

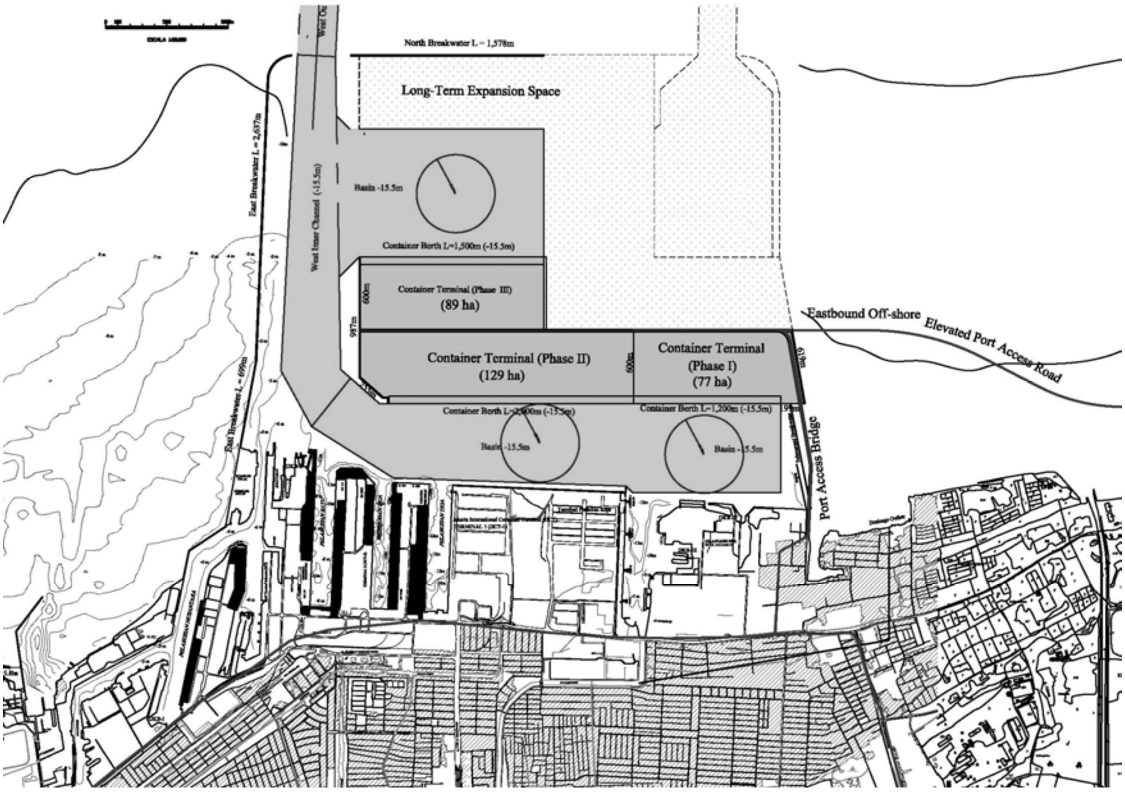
The North Kalibaru Terminal of Option-3 is composed of the three phased plans, viz. Phases I, II and III. Phases I and II of Option-3 are the same as those of Option-1. Phase III of Option-1 has been curtailed by 2 million TEUs in terms of container-handling capacity per annum. Then the curtailed portion has been allocated to Tangerang Terminal so as to keep the same capacity of 9.4 million TEUs per annum in Option-3 in total (see Table 4.7-17).

The Kalibaru Terminal plan of Option-3 has the three alternatives, viz. Alternative-1, Alternative-2 and Alternative-3 by partly succeeding Option-1 plan. The main components of each alternative are shown in Table 4.7.24. The respective facility layout plans are shown in Figure 4.7-22 ~ Figure 4.7-24.

Table 4.7-17 Facility Components of Alternative Plans at North Kalibaru (Option-3)

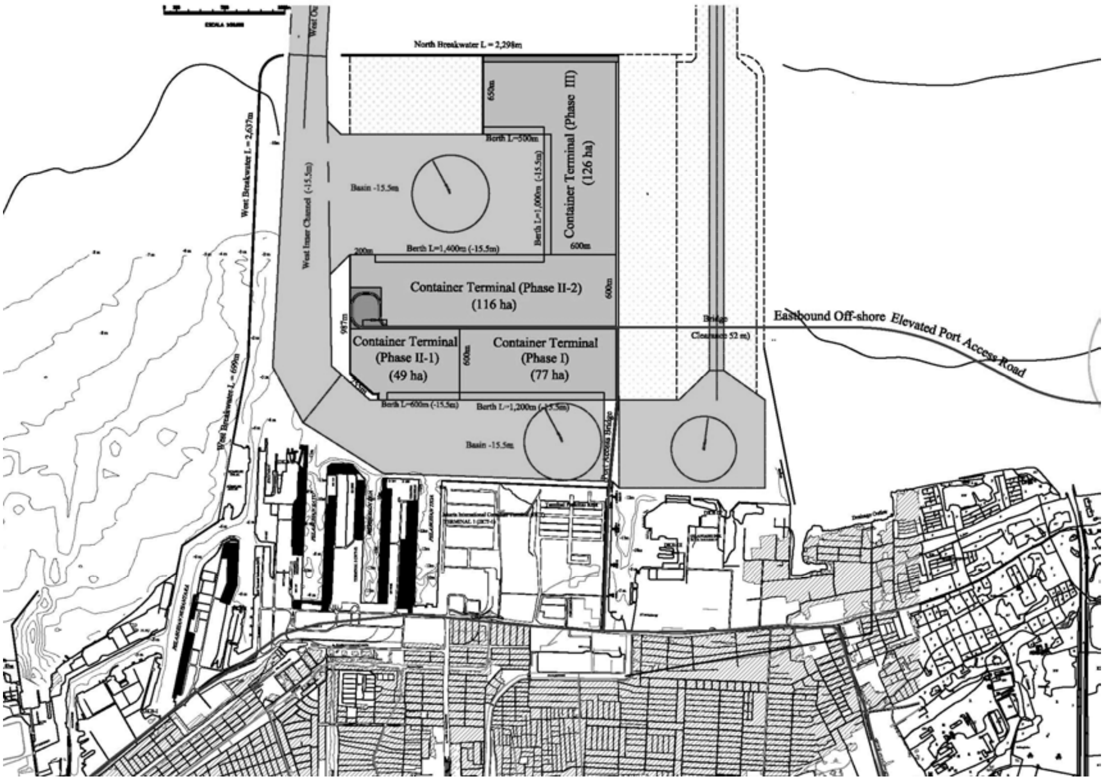
Component			Alternative - 1	Alternative - 2	Alternative - 3
Access Channels	West	Bottom width (m)	310	310	310
		Water depth (m)	15.5	15.5	15.5
Basins	Northwest	Water depth (m)	15.5	15.5	15.5
	South	Water depth (m)	15.5	15.5	15.5
New Breakwaters	West	Length (m)	2,640	2,640	2,640
	North	Length (m)	1,580	1,170	580
Seawalls (Open Sea)		Length (m)	620	1,130	1,420
Revetment		Length (m)	1,440	4,280	2,040
Container Terminal	Phase I	Berth length (m)	1,200	1,200	800
		Water depth (m)	15.5	15.5	15.5
		Container yard (ha)	80	80	50
	Phase II	Berth length (m)	2,000	2,000	2,400
		Water depth (m)	15.5	15.5	15.5
		Container yard (ha)	130	170	180
	Phase III	Berth length (m)	1,500	1,500	1,500
		Water depth (m)	15.5	15.5	15.5
		Container yard (ha)	90		110
	Master Plan (I~III)	Berth length (m)	4,700	4,700	4,700
		Water depth (m)	15.5	15.5	15.5
		Container yard (ha)	300	370	340
Land use area (ha)		Terminal area total	310	390	350
North-South Access Road	Bridge	Length (m)	1,100	670	1,090
	Land road	Length (m)	950	600	420
Eastbound Access Road	Coastal Bridge	Length (m)	10,300	11,020	9,700
	Land road	Length (m)	26,400	26,400	26,400

Source: JICA Study Team



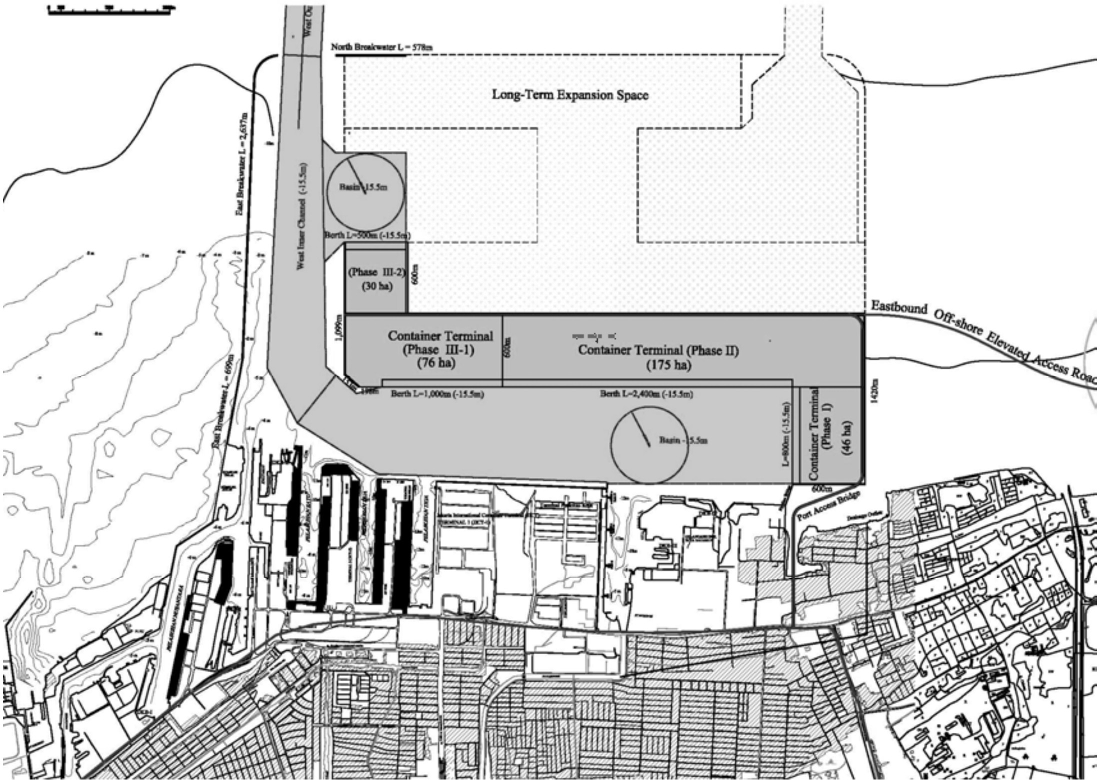
Source: Made by the Study Team

Figure 4.7-22 Facility Layout Plan of North Kalibaru Expansion in 2030 (Alternative-1)



Source: Made by the Study Team

Figure 4.7-23 Facility Layout Plan of North Kalibaru Expansion in 2030 (Alternative-2)



Source: Made by the Study Team

Figure 4.7-24 Facility Layout Plan of North Kalibaru Expansion in 2030 (Alternative-3)

(2) Tangerang Terminal

1) Required Channel Dimensions

Tangerang Terminal has been planned so as to correspond to a part of Kalibaru III of Option-1. Thus, the same dimensions of the access channel as those applied in the planning of the entire Option-1 have been used. The design vessel size of ordinary Post-Panamax container ships with a capacity of around 6,000 TEUs has also been applied as shown below.

- DWT: 88,000 tons
- TEU Capacity: 5,600 TEUs
- LOA: 320 m
- Beam: 40 m
- Summer draft: 14 m

By using the design vessel size mentioned in the above clause “1)”, the same access channel dimensions as Option-1 have been determined (see in Table 4.7-18).

Table 4.7-18 Dimensions of Planned New Navigational Channel in Tangerang Terminal

Maximum design vessel: Post-Panamax

Number of Lanes	PIANC Guideline			Deviation Angle Method		
	Channel Width (D) m	Beam (B) m	LOA (A) m	Channel Width (D)	Beam (B) m	LOA (A) m
		40.06	318		40.06	318
		D/B	D/L		D/B	D/L
One-way	150	3.8	0.5	160	4.0	0.5
Two-way	310	7.8	1.0	320	8.0	1.0

Source: Made by the Study Team

2) Required Berth Dimensions:

Various ship types corresponding to the various berth dimensions necessary for accommodating them have been considered in the same way in Option-1 and Option-2 (see Table 4.7-12)

3) Berth Allocation Plan

Target Container Volume

As mentioned in the clause "(1)" of this section, two million TEUs per annum has been allocated to Tangerang Terminal in 2030.

Allocation of Containers by Ship Type

Containers to be handled at Tangerang Terminal in 2030 have been allocated as indicated in Table 4.7-19.

Table 4.7-19 Allocation of Containers by Ship Type at Tangerang Terminal in 2030

Unit: '000TEUs/year

Direct/Transshipment		Total	Allocation			
			Small size	Medium size	Panamax	Post-Panamax
Eastbound Direct	60%	1,200		600	600	
Westbound Direct	10%	200				200
Transshipment	30%	600	300	300		
Total	100%	2,000	300	900	600	200

Source: Estimated by the Study Team

Berth Allocation Plan

The allocation of container ships by type shown in Table 4.7-19 has been converted into an economical berth allocation plan composed of the three types of berths with different water depths and lengths as shown in Table 4.7-20.

Table 4.7-20 Berth Composition of Tangerang Terminal in 2030

Quay No.	Length (m)	Berth No.	Water depth (m)
No.1	360	1	15.5
No.2	240	1	12.5
No.3	360	1	15.5
No.4	240	1	125
No.5	320	1	12.5
Total	1,520	5	

Source: The Study Team

4) Facility Components and a Layout Plan

Main components and a facility layout plan of Tangerang Terminal are summarized in Table 4.7-21 (see Figure 4.7-25). An access road to the new terminal at Tangerang is shown in Figure 4.7-26.

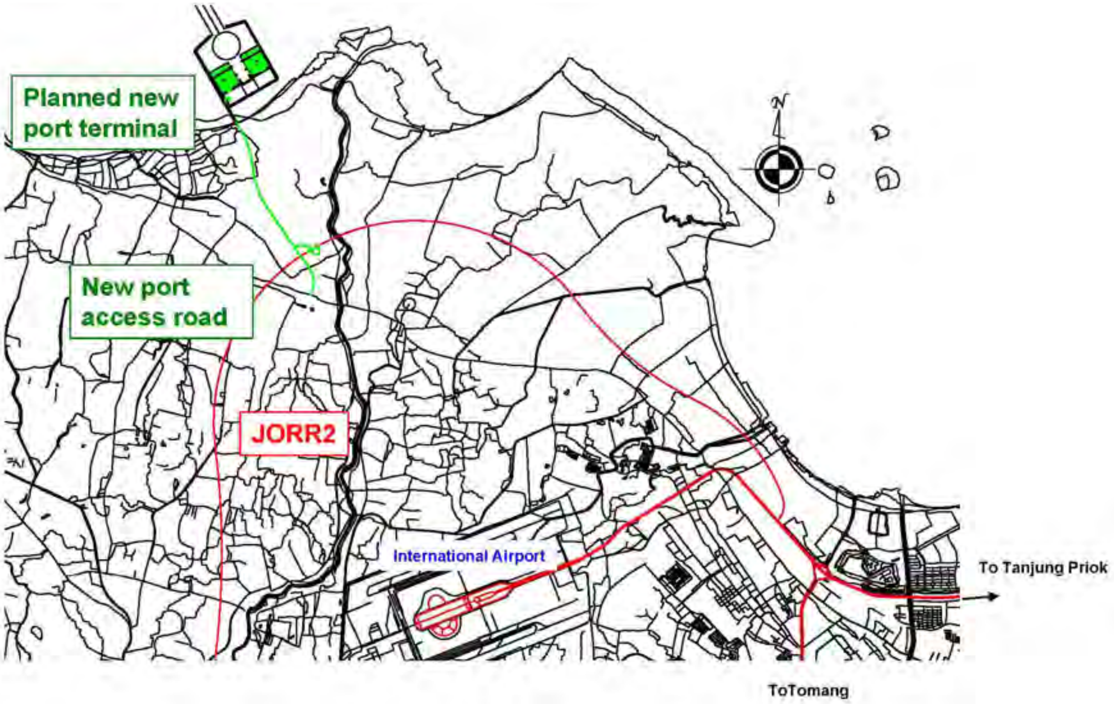
Table 4.7-21 Facility Components of Tangerang Terminal (Option-3)

Component			Amount
Access channel		Bottom width (m)	310
		Water depth (m)	15.5
Breakwaters	West	Length (m)	630
	Northwest	Length (m)	510
	Northeast	Length (m)	470
	East	Length (m)	640
Seawalls （Open Sea）		Length (m)	1,860
Revetment		Length (m)	2,460
Container Terminal	No.1 Quay	Berth number (unit)	1
		Berth length (m)	360
		Water depth (m)	15.5
		Container yard (ha)	20
	No.2 Quay	Berth number	1
		Berth length (m)	240
		Water depth (m)	12.5
		Container yard (sq. m)	10
	No.3 Quay	Berth number (unit)	1
		Berth length (m)	360
		Water depth (m)	15.5
		Container yard (ha)	20
	No.4 Quay	Berth number (unit)	1
		Berth length (m)	240
		Water depth (m)	12.5
		Container yard (ha)	10
Multi- purpose Terminal	No.5 Quay	Berth number (unit)	1
		Berth length (m)	320
		Water depth (m)	9
		Open yard (sq. m)	10
Land use area (ha)		Terminal area total	100
Access Road	North-South Bridge	Length (m)	420
	Land road	Length (m)	4,600

Source: Made by the Study jTeam

Source: Made by the Study Team

Figure 4.7-25 Facility Layout Plan of Tangerang Terminal in 2030 (Option-3)



Source: Made by the Study Team

Figure 4.7-26 Access Road to New Container Terminal at Tangerang

(3) Phased Implementation Plans of Option-3

Option-3 being composed of the two terminals, viz. North Kalibaru Phase Terminal and Tangerang Terminal with the target volume of international containers of 9.4 million TEUs in 2030 has been divided into the three phased implementation plans as shown in Table 4.7-22 (see Figure 4.7-27):

Table 4.7-22 Balance of Capacity and Demand in Container Handling in Option-3 Plan

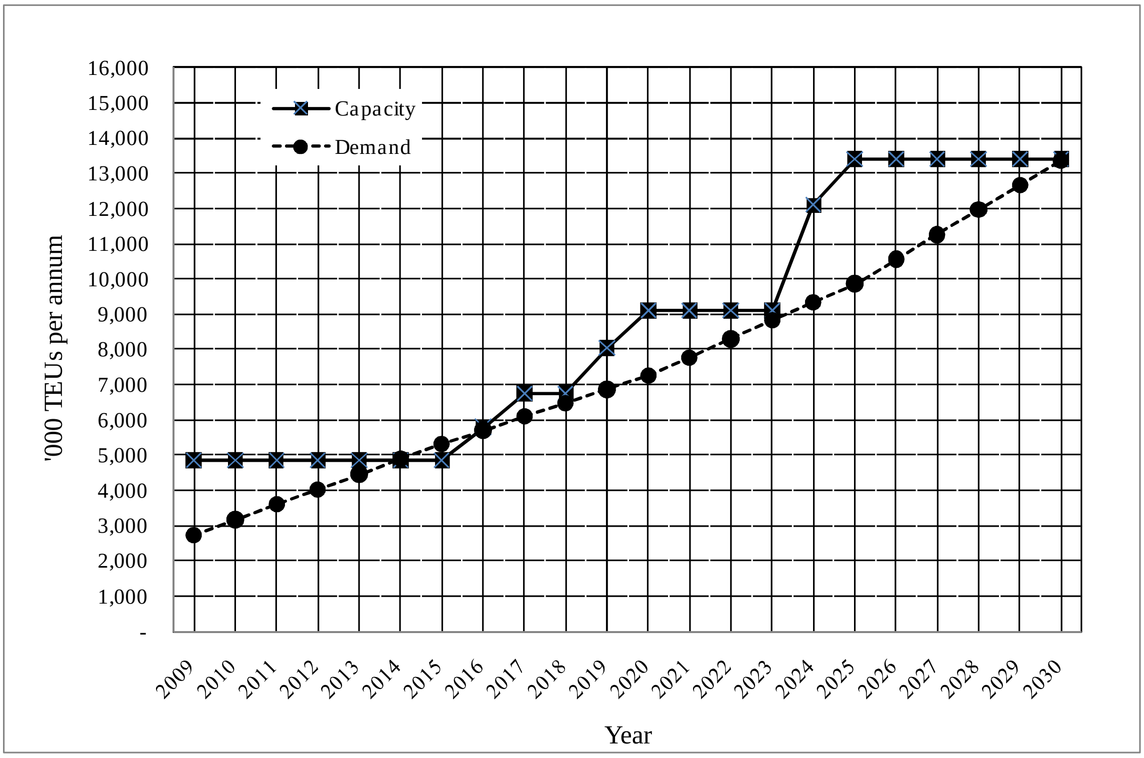
Unit: '000 TEUs per annum

Year	International								
	Container-Handling Capacity							Demand (B)	Balance (A)-(B)
	JCT	North Kalibaru			Tangerang	Sub-total	Total		
		Phase I	Phase II	Phase III					
2009	4,850						4,850	2,736	2,114
2010	4,850						4,850	3,167	1,683
2011	4,850						4,850	3,598	1,252
2012	4,850						4,850	4,029	821
2013	4,850						4,850	4,460	390
2014	4,850						4,850	4,890	(40)
2015	4,850						4,850	5,321	(471)
2016	4,850	950				950	5,800	5,708	92
2017	4,850	1,900				1,900	6,750	6,095	655
2018	4,850	1,900				1,900	6,750	6,482	268
2019	4,850	1,900	500			2,400	7,250	6,869	381
2020	4,000	1,900	3,200			5,100	9,100	7,255	1,845
2021	4,000	1,900	3,200			5,100	9,100	7,777	1,323
2022	4,000	1,900	3,200			5,100	9,100	8,299	801
2023	4,000	1,900	3,200			5,100	9,100	8,821	279
2024	4,000	1,900	3,200	1,000	2,000	8,100	12,100	9,343	2,757
2025	4,000	1,900	3,200	2,300	2,000	9,400	13,400	9,865	3,535
2026	4,000	1,900	3,200	2,300	2,000	9,400	13,400	10,563	2,837
2027	4,000	1,900	3,200	2,300	2,000	9,400	13,400	11,261	2,139
2028	4,000	1,900	3,200	2,300	2,000	9,400	13,400	11,960	1,440
2029	4,000	1,900	3,200	2,300	2,000	9,400	13,400	12,658	742
2030	4,000	1,900	3,200	2,300	2,000	9,400	13,400	13,356	44

Note 1) Jakarta Container Terminal containing JICT KOJA and MAL at Tanjung Priok Terminal

Note 2) MTI and JICT II currently used for international container terminals have been assumed to be converted into the terminals for domestic containers in 2020 corresponding to the completion of the redevelopment of the existing conventional berths for domestic container-handling

Source: Estimated by the Study Team



Source: Made by the Study Team

Figure 4.7-27 Capacity and Demand in International Container-Handling at Tanjung Priok Terminal and Tangerang Terminal (Option-3)

4.7.4 Comparison of the three Options and Selection of the Optimum Option

In this section, the above-mentioned three options, Option-1, Option-2 and Option-3 have been compared with each other from the points which have not yet been compared or have not necessarily described in detail in the stage of the above-mentioned screening.

Each option plan has three alternative plans, and hence nine plans in total have been made. In the first step of the comparison, differences between the three options have solely been taken into account rather than differences between alternatives among each option.

In the second step of the comparison, after selecting the optimum option plan out of the three options, three alternative plans of the selected option have been compared and the optimum alternative plan out of three alternatives of the optimum option plan have finally been selected.

When comparing construction costs between the three options in the first step, the least cost among three alternatives of each option has been used as a representative cost for the comparison.

Main points to evaluate the three options are as follows. Environmental points are described in Chapter 7 in detail.

(1) Rice field conservancy

In all the cases new port access roads need to be constructed together with construction of port facilities. In all options, access road constructions will be accompanied by the conversion of current land use from rice field to road to a certain extent against the governmental policy of rice field conservation.

(2) Resettlement and land use alteration

A planned access road route of Option-2 runs local residential areas as well as rice field and consequently will be accompanied resettlement to comparatively larger extent than Option-1 of which route is planned to run along the river bank and Option-3 with a shorter length of planned access road to Tangerang Terminal.

(3) Narrowing the gap of socio-economic disparity

Gross Regional Products (GRP) per capita in Kabupaten Karawan where Option-2 is planned and Kabupaten Tangerang where Option-3 is partly planned are much less than that of DKI Jakarta. The fact results the difference of the effect for narrowing the gap of regional disparity.

(4) Influence of container traffic to the new container terminal on road traffic congestion within JABODETABEK

Currently, road traffic within JABODETABEK area is being incurred by serious road congestion, getting worse year by year.

Even if the new access road is realized in Option-1 and Option-3, it is predicted that the congestion within JABODETABEK toll road will be accelerated due to further concentration of port activities to Tanjung Priok Terminal. That means a negative factor to JABODETABEK toll road congestion.

On the other hand, in the case of Option-2, an access road to Cilamaya has been planned independent from JABODETABEK road network. Thus it has been judged that Option-2 could alleviate traffic congestion in JABODETABEK due to decentralization of port activities.

(5) Natural environment

Within the coast of Kabupaten Karawan, there is some coral reef. Thus, in Option-2, port facility construction has to pay due attention not to exert any influence on their habitation. On the other hand, coral reef is not found in and around the planned project sites of other Options, Option-1 and Option-3.

(6) Impact on fishery

Option-2 and Option-3 will eliminate fishing grounds by reclamation for creating land for port facilities. In Option-1 off North Kalibaru coordination with fishing activities needs to be considered.

(7) Construction cost

Total construction costs including superstructure of Options-1 to -3 have been estimated as shown in Table 4.7-23. The estimated costs include both construction costs of port facilities and port access roads.

Table 4.7-23 Estimated Construction Costs of Options (Unit: Billion Rp.)

	Option -1	Option -2	Option -3
Marine Terminal	37,019	34,114	39,275
Access Road	12,455	3,178	12,859
Total	49,474	37,292	52,134

(8) Economic feasibility

Present Value of aggregated construction cost and transportation cost of each development option is shown in Table 4.7-24, and Option - 2 has the minimum cost. Therefore, based on the cost minimum approach Option 2 is the best choice from the economic view point.

The resulting EIRR of the Option 2 was 46.2%.

Table 4.7-24 Estimated Costs of Options

Option -1	Option -2	Option -3
25,700 Billion Rp.	20,558 Billion Rp.	26,714 Billion Rp.
125	100	130

A comparison matrix on a quantitative basis by scoring each item has been made to facilitate the comparison (see Table 4.7-25 ~ Table 4.7-27).

So as to evaluate comparison items quantitatively, the respective quantitative indices have been used as well as weights by comparison item. Then scores have been given to the respective options by comparison item. In the evaluation by item and option, scores in the range from “1” to “3” have been given. “3”, “2” and “1” mean high, medium and low. Each score has been given according to the quantitative index shown in the tables.

Then, each score has been multiplied the corresponding weight of which summation has been adjusted to be 100%. Thus, the maximum possible score should be “3”.

In putting weights, the three cases have been examined. The first one is the case in which solving the current overconcentration to the JABODETABEK area and simultaneously narrowing the socio-economic disparity between the area and its periphery areas through the regional development are given priority. The weights of the items contributing to the solution to the problems mentioned above (Economic items) have been given 70% in total, whereas the remaining items (Natural items), 30% in total as shown in Table 4.7-25. As shown in the table, Option-2 has obtained the highest score of “2.5”, followed by Option-1 with the score of “1.8” and Option-3 with the score of 1.6.

Although the Option-2 with the highest score in the former case has some negative impacts on the natural environment at its project site, it has been judged that the supposed impacts could be mitigated by adequate measures to the extent that the activities relating to the new port, and human livings and natural environment including fauna and flora peripheral to the project site could co-exist. The necessary mitigation measures, if any, will be revealed through the EIA in the feasibility study to be implemented after this.

The second one is the case in which merely preserving environment at the project site disregarding the problems of the overconcentration to the JABODETABEK area and regional disparity is given priority. The weights of the items contributing to the environmental preservation mentioned above (Natural items) have been given 70% in total, whereas the remaining items (Economic items), 30% in total as shown in Table 4.7-26. As shown in the table, Option-1 has obtained the highest score of “2.3”, followed by Option-3 with the score of “2.0” and Option-2 with the score of 1.8.”.

The third one is the case in which equal weights are put on the Natural Items and Economic Items mentioned above. (Natural items) have been given 50% in total, whereas the remaining items (Economic items), 50% in total as shown in Table 4.7-27. As shown in the table, Option-2 has obtained the highest score of "2.1", followed by Option-1 with the score of "2.0" and Option-3 with the score of 1.8.".

Through the measurement of the sensitivity of weights of the category, viz. economic items and natural items, Option-2 obtained the highest scores twice, viz. in the first case and the third case among the above three cases. In the second case, although Option-2 obtained the lowest score, it has been judged that its anticipated negative impacts on the natural environment at its project site could be mitigated by adequate measures as mentioned above. From the above, Option-2 has been selected as the optimum plan.

Table 4.7-25 Weight with Solving Overconcentration to JABODETABEK and Contributing Regional Development

Category	Comparison Item	Weight	QuantitativeIndex for comparison	Option-1	Option-2	Option-3
Economic Items (Weight: 70%)	Narrowing the gap of socio-economic disparity	23.3%	GRDP per capita ('000 Rp.)	56	15	43
			Score	1	3	2
	Influence of container traffic to the new container terminal on road traffic congestion within JABODETABEK	23.3%	Container traffic volume to/from JABODETABEK area from/to Bekasi-Karawang industrial estates in the year of 2030 (passenger car unit (pcu) per day)	13.8	4.3	13.8
			Score	1	3	1
	Construction cost	23.3%	tillion Rp.	49	37	52
			Score	2	3	1
Natural Items (Weight: 30%)	Rice field conservancy	7.5%	Area of rice field to be altered to land for road (ha)	56	72	65
			Score	3	1	2
	Resettlement and land use alteration	7.5%	Building to be removed for road construction	About 160	About 160	About 160
			Score	2	2	2
	Natural environment (coral reef)	7.5%	Distance from the nearest coral reef (km)	far	2	far
			Score	3	1	3
	Impact on fishery	7.5%	Area of fishing grounds to be disappered for port construction (sq. km)	0.3	14	6
			Score	3	1	2
Weight Total		100.0%	Total score multiplied by weight	1.8	2.5	1.6

Source: Study Team

Note) Numbers of building to be removed for road construction are excluding Phase I project at North Kalibaru.

Table 4.7-26 Weight with Preserving Environment at the Project Site

Category	Comparison Item	Weight	QuantitativeIndex for comparison	Option-1	Option-2	Option-3
Natural Items (Weight: 70%)	Rice field conservancy	17.5%	Area of rice field to be altered to land for road (ha)	56	72	65
			Score	3	1	2
	Resettlement and land use alteration	17.5%	Building to be removed for road construction	About 160	About 160	About 160
			Score	2	2	2
	Natural environment (coral reef)	17.5%	Distance from the nearest coral reef (km)	far	2	far
			Score	3	1	3
	Impact on fishery	17.5%	Area of fishing grounds to be disappered for port construction (sq. km)	0.3	14	6
			Score	3	1	2
Economic Items (Weight: 30%)	Narrowing the gap of socio-economic disparity	10.0%	GRDP per capita ('000 Rp.)	56	15	43
			Score	1	3	2
	Influence of container traffic to the new container terminal on road traffic congestion within JABODETABEK	10.0%	Container traffic volume to/from JABODETABEK area from/to Bekasi-Karawang industrial estates in the year of 2030 (passenger car unit (pcu) per day)	13.8	4.3	13.8
			Score	1	3	1
	Construction cost	10.0%	tillion Rp.	49	37	52
			Score	2	3	1
Weight Total		100%	Total score multiplied by weight	2.3	1.8	2.0

Source: Study Team

Note) Numbers of building to be removed for road construction are excluding Phase I project at North Kalibaru.

Table 4.7-27 Equal Weights on Economic Items and Natural Items

Category	Comparison Item	Weight	QuantitativeIndex for comparison	Option-1	Option-2	Option-3
Economic Items (Weight: 50%)	Narrowing the gap of socio-economic disparity	16.7%	GRDP per capita ('000 Rp.)	56	15	43
			Score	1	3	2
	Influence of container traffic to the new container terminal on road traffic congestion within JABODETABEK	16.7%	Container traffic volume to/from JABODETABEK area from/to Bekasi-Karawang industrial estates in the year of 2030 (passenger car unit (pcu) per day)	13.8	4.3	13.8
			Score	1	3	1
	Construction cost	16.7%	tillion Rp.	49	37	52
			Score	2	3	1
Natural Items (Weight: 50%)	Rice field conservancy	12.5%	Area of rice field to be altered to land for road (ha)	56	72	65
			Score	3	1	2
	Resettlement and land use alteration	12.5%	Building to be removed for road construction	About 160	About 160	About 160
			Score	2	2	2
	Natural environment (coral reef)	12.5%	Distance from the nearest coral reef (km)	far	2	far
			Score	3	1	3
	Impact on fishery	12.5%	Area of fishing grounds to be disappered for port construction (sq. km)	0.3	14	6
			Score	3	1	2
Weight Total		100.0%	Total score multiplied by weight	2.0	2.1	1.8

Source: Study Team

Note) Numbers of building to be removed for road construction are excluding Phase I project at North Kalibaru.

4.7.5 Comparison of the three Alternatives of Option-2 Selected as the Optimum Option and the Selection of the Optimum Alternative

The selected Option-2 is divided into the three phased plans, viz. Phase I planned at North Kalibaru with three alternatives and Phase II and III planned at Cilamaya without alternatives. Hence, the three alternatives of North Kalibaru Phase I of Option-2 have been compared with each other from the various points (see Table 4.7-28).

According to the table, Alternative-2 has the minimum negative factors, while Alternative-3 has a large number of negative factors. As to the project cost, Alternative-3 indicates the highest project cost, followed by Alternative-2 and then Alternative-1.

By comparing Alternative-1 and Alternative-2, although the two alternatives have their comparative advantages and disadvantages, it has been judged that there are no decisive differences affecting the selection.

Table 4.7-28 The Results of Comparison between Alternatives at North Kalibaru Phase I (Optoin-2)

Assesment Items			Alternative-1	Alternative-2	Alternative-3
Navigational Safety			In Phase I, the direction of the inner access channel is parallel to berth line and ensures safe maneuverability of a ship	In Phase I, the direction of the inner access channel is parallel to berth line and ensures safe maneuverability of a ship	In Phase I, the direction of the inner access channel is perpendicular to berth line and is not aligned to one side f the berth, and therefore it is not preferable in view of safety maneuverability of a ship.
Consistency with Urgent Rehabilitation Project			Consistent	Consistent	In the stage of Phase III, the breakwater of the project to be constructed will be removed.
Strategic Environmental Assessment	Obstacle to navigation of fishing boats		No obstacle to the existing navigation.	No obstacle to the existing navigation.	Fishing boats have to go around due to the new terminal.
	Elimination of fishing ground		Fishing ground will be secured.	Fishing ground will be secured.	A part of shallow fishing ground for shell aquaculture will be eliminated.
	Impact on water quality within the port basins		Water exchange will be secured to prevent water quality degradation.	Water exchange will be secured to prevent water quality degradation.	Water stagnation may cause degradation of water quality.
	Impact on smell within the port area		Reclamation for new terminal will not cause water quality degradation, which may cause bad smell.	Reclamation for new terminal will not cause water quality degradation, which may cause bad smell.	Water quality degradation may cause bad smell.
	Involuntary resettlement		Tens of residential houses are required to be resettled for the access road.	Resettlement is not required for utilizing the existing road.	Warehouses and tens of residential houses are required to be resettled for the access road.
	Impact on noise, vibration and safety along port access road at Kalibaru		Residents along the access road will be affected.	No residents along the planed access road	Residents along the access road will be affected.
Project cost (Billion Rp.)	Phase I	Marine Terminal	8,230	9,125	10,949
		Access Road	594	464	571
		Total	8,824	9,589	11,520

Note (1): (shaded) Negative factor

Note (2): For comparison on equal basis, berth length of Alternative-3 is adjusted to 1,200m, the same as Alternatives-1 and 2

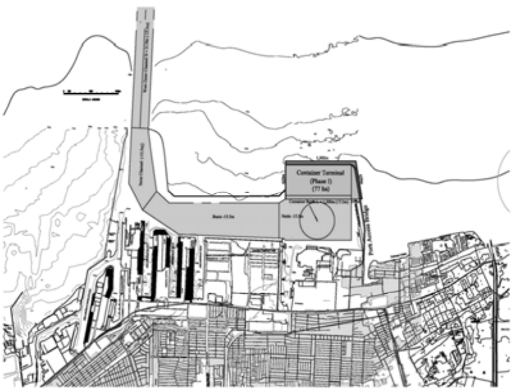
Source: Made by the Study Team

Corresponding to items in the comparison matrix on a descriptive basis, an additional comparison matrix on a quantitative basis by scoring each item has been made to facilitate the comparison (see Table 4.7-29). As shown in the table, alternative-1 has obtained the highest score of “2.5”, followed by Alternative-2 with the score of “2.4”. Thus, Alternative-1 has been selected as the optimum plan. In this regard, there are no decisive differences between Alternative 1 and Alternative 2 in scores and Alternative 2 has an advantage over Alternative 1 in Involuntary Resettlement.

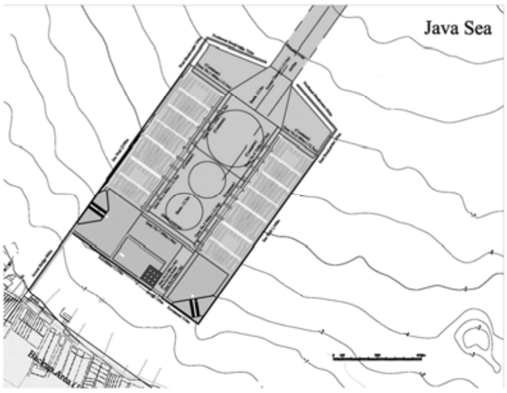
Table 4.7-29 Comparison Matrix on a Quantitative Basis by Scoring

Assessment Items		Alternative-1	Alternative-2	Alternative-3
Navigational Safety		3	1	1
Necessity of the mainenance dredging in the second channel		3	1	3
Consistency with Urgent Rehabilitation Project		3	3	1
Strategic Environmental Assessment	Obstacle to navigation of fishing boats	3	2	1
	Elimination of fishing ground	3	3	1
	Impact on water quality within the port basins	3	3	1
	Impact on smell within the port area	2	3	1
	Involuntary resettlement	1	3	1
	Impact on noise, vibration and safety along port access road at Kalibaru	1	3	1
Project cost		3	2	1
Weight Total		2.5	2.4	1.2

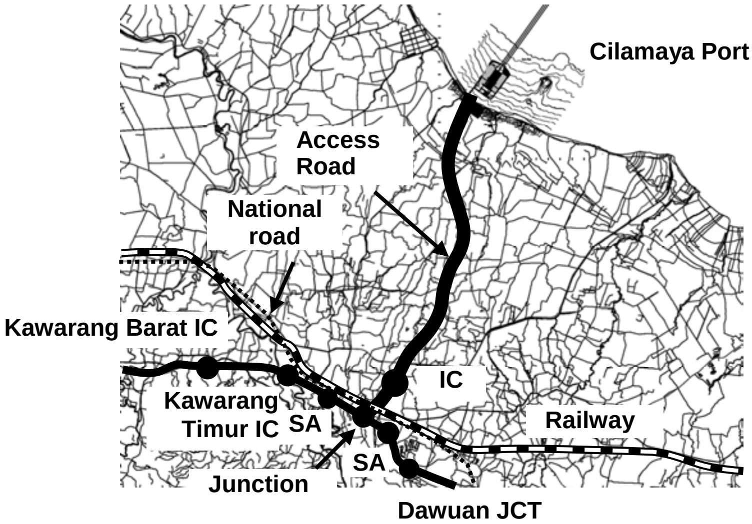
Source: Made by the Study Team



Container Terminal at North Kalibaru



Container Terminal at Cilamaya



Access Road to Cilamaya Terminal

Source: Made by the Study Team

Figure 4.7-28 Composition of Project Components of Option-2 with Alternative-1

4.8 Development of Terminals for Domestic Containers and Conventional cargoes

In this section, long-term development plan for handling domestic containers and conventional cargoes at Tanjung Priok Terminal has been studied so as to meet the increasing demand for those cargoes towards the future and also the requirement of transfer of petroleum as typical dangerous cargoes and dusty bulk cargoes such as coal, sand and clinker away from the existing terminal areas in the vicinity of urban areas.

4.8.1 Summary of the volumes of cargoes to be handled in the stage of the Master Plan in 2030

In Table 4.8-1, the volumes of all kinds of cargoes including domestic containers and conventional cargoes in 2009 are shown. In addition, in Table 4.8-2, the estimated volumes of cargoes in the stage of the Master Plan with a target year of 2030 are shown based on the demand forecast mentioned in Section 4.2.

Table 4.8-1 Handling Volume of Cargoes at Tanjung Priok Terminal in 2009

Unit: MT

Cargo Item	2009						
	Import and Domestic Unloading			Export and Domestic Loading			Total
	International	Domestic	Sub-total	International	Intra-Indonesi	Sub-total	
Containers (TEUs)	1,374,292	514,612	1,888,904	1,361,708	553,700	1,915,408	3,804,312
Vehicle	90,348	14,553	104,901	62,632	102,881	165,513	270,414
Cattle	259,593		259,593			-	259,593
Wheat	1,941,612	395	1,942,007		12,796	12,796	1,954,803
flour			-		61,242	61,242	61,242
rice	74,758	3,300	78,058			-	78,058
rice bran			-	226,300	9,000	235,300	235,300
Sand	80,961	1,774,600	1,855,561			-	1,855,561
Construction material			-	4,552		4,552	4,552
Lumber	4,017		4,017			-	4,017
Cement in bulk	2,044	770,544	772,588	469,072	554,739	1,023,811	1,796,399
Cement in bag	-	52,772	52,772	72,500	885,799	958,299	1,011,071
Clinker			-	1,357,900	1,950	1,359,850	1,359,850
Gypsum	549,586	62,541	612,127			-	612,127
Sulfur	185,115		185,115			-	185,115
Coal		3,219,781	3,219,781			-	3,219,781
Mineral	16,822	112,552	129,374			-	129,374
Quartz sand	119,500		119,500			-	119,500
Slag	47,686		47,686			-	47,686
Salt	44,100		44,100			-	44,100
Fertilizer	23,955	1,000	24,955	6,900	32,952	39,852	64,807
Maize	16,500		16,500			-	16,500
Petroleum products	2,241,925	1,959,439	4,201,364	57,130	30,109	87,239	4,288,603
LPG		786,677	786,677			-	786,677
Lubricant oil		183,262	183,262			-	183,262
High Speed Doesel	51,512		51,512		43,220		51,512
Chemical product	401,607	4,912	406,519			-	406,519
Chemical product DKP	209,811	195,087	404,898			-	404,898
Vegetable oil	5,010	1,584,302	1,589,312	35,760		35,760	1,625,072
Vegetable fats		10,402	10,402	18,251	29,950	48,201	58,603
Bo-diesel		41,097	41,097			-	41,097
Iron and steel product	2,441,264	5,759	2,447,023	225,555	143,838	369,393	2,816,416
Aluminium	42,738	65,626	108,364			-	108,364
Scrap	255,795	6,725	262,520			-	262,520
Pulp	202,410	667,560	869,970			-	869,970
GC	114,161	66,404	180,565	83,774	416,637	500,411	680,976
GC + CNT	176,468	72,610	249,078	85,692	228,318	314,010	563,088
GC + cement			-		84,126	84,126	84,126
Project material			-	2,638	12,397	15,035	15,035
Machinery and equipment	51,653	34,403	86,056	8,124	90,375	98,499	184,555
Parts and components			-	2,887	5,586	8,473	8,473
Plywood and particleboard	11,076	122,569	133,645			-	133,645
Textile			-		62,200	62,200	62,200
miscellaneous	24,082	107,347	131,429	2,200	8,861	11,061	142,490
Frozen fish	941		941			-	941
Total excluding non-MT units	9,687,049	11,926,219	21,613,268	2,721,867	2,816,976	5,538,843	27,152,111

Note: Containers: Intra-Indonesian Islands

Soure: Vessel Berting Records probided by Pelindo 2

Table 4.8-2 Forecast Volumes of Cargoes Handled at Tanjung Priok Terminal in 2030

Unit: MT

Cargo Item	2030						
	Import and Domestic Unloading			Export and Domestic Loading			Total
	International	Domestic	Sub-total	International	Intra-Indonesi	Sub-total	
Containers (TEUs)	6,678,000	2,191,000	8,869,000	6,678,000	2,191,000	8,869,000	17,738,000
Vehicle	314,000	23,933	337,933	185,000	169,195	354,195	692,128
Cattle	485,502	-	485,502	-	-	-	485,502
Wheat	3,631,290	739	3,632,029	-	23,932	23,932	3,655,960
Flour	-	-	-	-	114,538	114,538	114,538
Rice	139,816	6,172	145,988	-	-	-	145,988
Wheat bran	-	-	-	423,236	16,832	440,069	440,069
Sand	332,090	7,279,146	7,611,236	-	-	-	7,611,236
Construction material	-	-	-	18,672	-	18,672	18,672
Lumber	5,647	-	5,647	-	-	-	5,647
Cement in bulk	4,835	1,822,858	1,827,694	1,109,673	1,312,333	2,422,006	4,249,700
Cement in bag	-	124,842	124,842	171,512	2,095,515	2,267,026	2,391,868
Clinker	-	-	-	3,212,353	4,613	3,216,966	3,216,966
Gypsum	1,300,143	147,952	1,448,095	-	-	-	1,448,095
Sulfur	468,552	-	468,552	-	-	-	468,552
Coal	-	6,118,629	6,118,629	-	-	-	6,118,629
Mineral	42,579	284,885	327,464	-	-	-	327,464
Quartz sand	302,471	-	302,471	-	-	-	302,471
Slag	120,700	-	120,700	-	-	-	120,700
Salt	111,623	-	111,623	-	-	-	111,623
Fertilizer	60,633	2,531	63,165	17,465	83,406	100,871	164,036
Maize	30,859	-	30,859	-	-	-	30,859
Petroleum products	2,161,517	1,889,162	4,050,679	55,081	29,029	84,110	4,134,789
LPG	-	758,462	758,462	-	-	-	758,462
Lubricant oil	-	176,689	176,689	-	-	-	176,689
High Speed Doesel	49,664	-	49,664	-	41,670	41,670	91,334
Chemical product	387,203	4,736	391,939	-	-	-	391,939
Chemical product DKP	202,286	188,090	390,376	-	-	-	390,376
Vegetable oil	7,856	2,484,426	2,492,283	56,077	-	56,077	2,548,360
Vegetable fats	-	16,312	16,312	28,620	46,966	75,586	91,898
Bio-diesel	-	39,623	39,623	-	-	-	39,623
Iron and steel product	3,174,608	7,489	3,182,097	293,311	187,046	480,357	3,662,454
Aluminium	55,576	85,340	140,916	-	-	-	140,916
Scrap	332,635	8,745	341,380	-	-	-	341,380
Pulp	284,550	938,463	1,223,013	-	-	-	1,223,013
GC	187,746	109,206	296,952	137,772	685,188	822,960	1,119,912
GC + CNT	290,214	119,412	409,626	140,926	375,485	516,411	926,037
GC + cement	-	-	-	-	138,351	138,351	138,351
Project material	-	-	-	4,338	20,388	24,726	24,726
Machinery and equipment	84,946	56,578	141,524	13,360	148,628	161,988	303,513
Parts and components	-	-	-	4,748	9,186	13,934	13,934
Plywood and particleboard	15,571	172,309	187,880	-	-	-	187,880
Textile	-	-	-	-	102,292	102,292	102,292
Miscellaneous	39,604	176,539	216,144	3,618	14,573	18,191	234,335
Frozen fish	1,760	-	1,760	-	-	-	1,760
Total excluding non-MT units	14,626,478	23,043,269	37,669,747	5,875,763	5,619,164	11,494,927	49,164,675

Note: Containers: Intra-Indonesian Islands

Soure: Vessel Berting Records probided by Pelindo 2

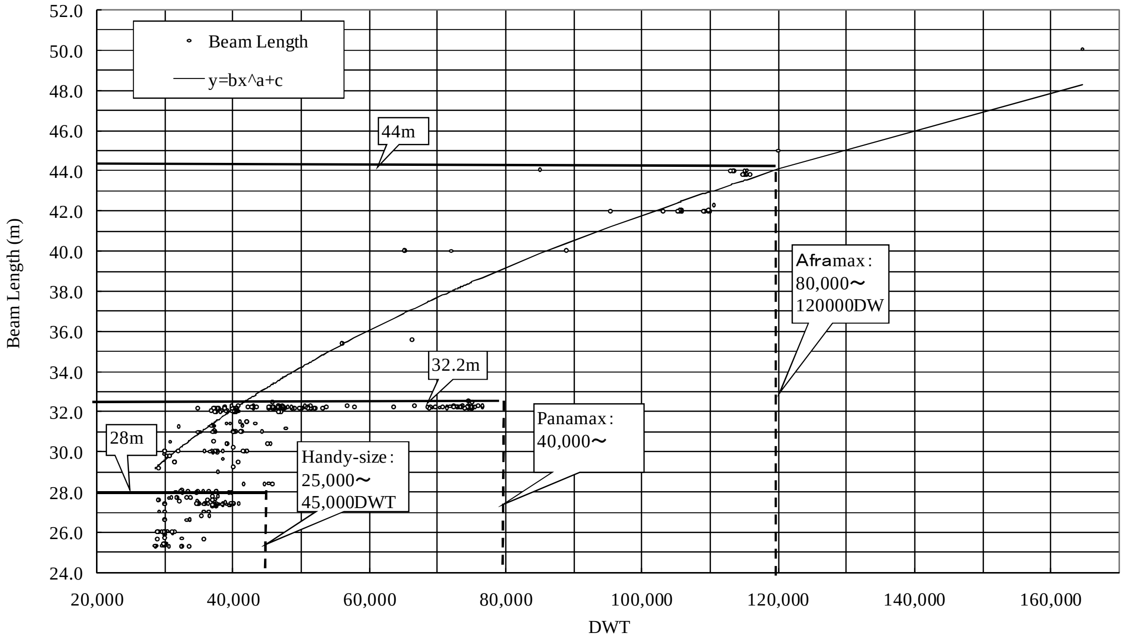
4.8.2 Required Access Channel Dimensions

The representative principal dimensions of large petroleum product tankers and bulk carriers which have a possibility of calling at new bulk berths to be developed off North Kalibaru have been considered.

Then required dimensions of an access channel for receiving the above-mentioned large products tankers or bulk carriers have been estimated as below.

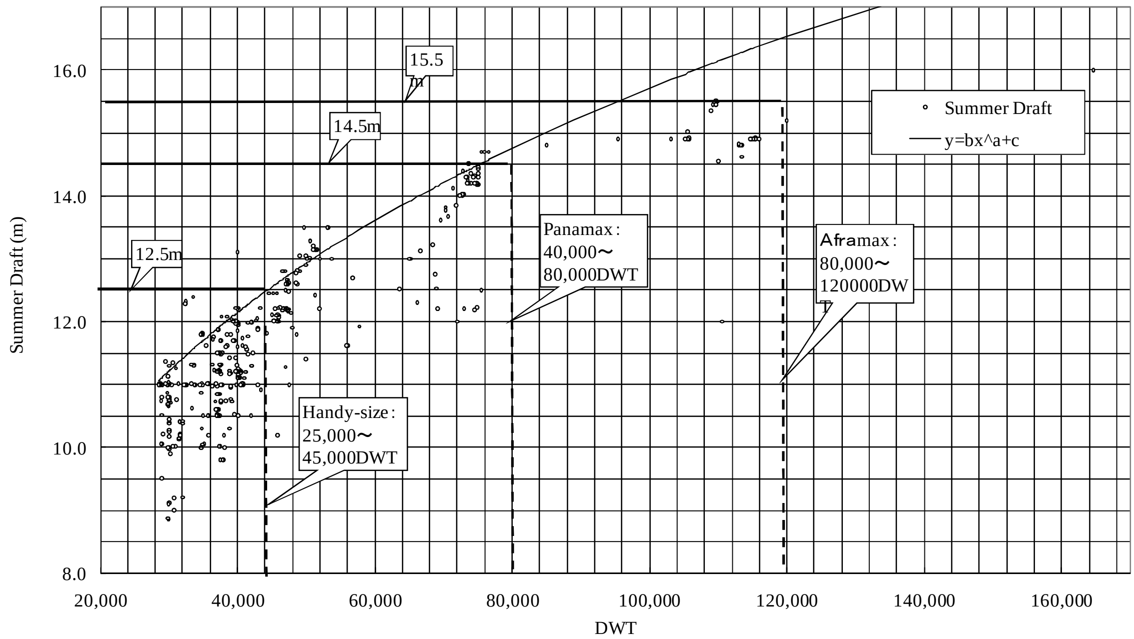
(1) Required Channel Dimensions for Petroleum Products Tankers

Correlation between DWT and principal dimensions of petroleum product tankers are shown in Figure 4.8-1 ~ Figure 4.8-3. In those figures, all the ships currently in operations worldwide are covered.



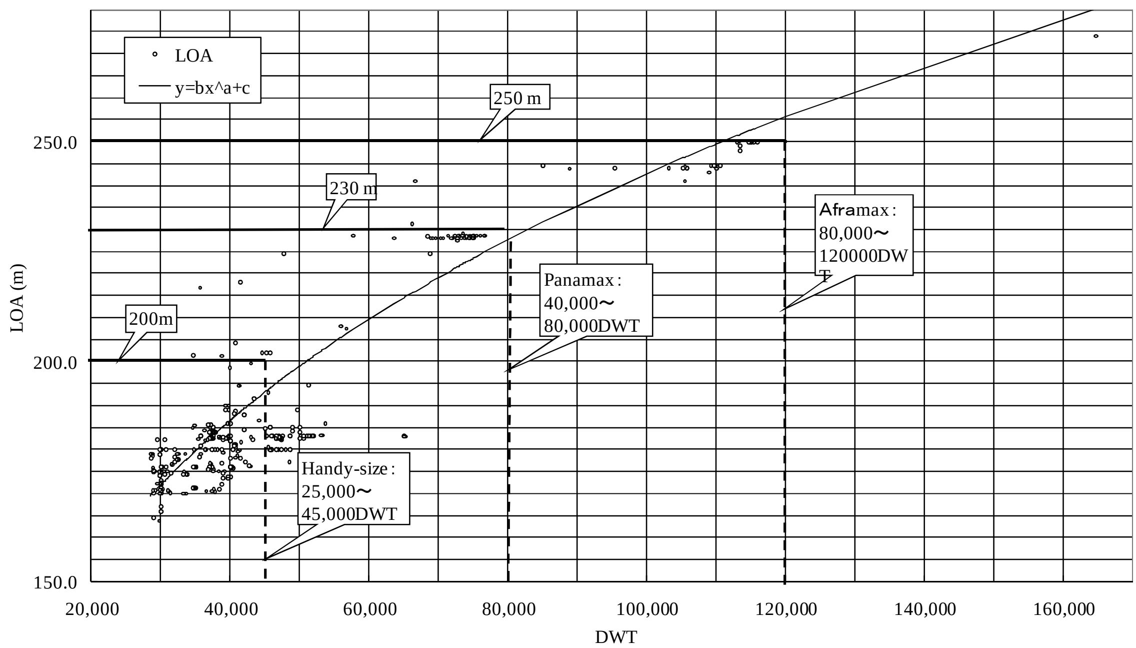
Source: Compiled by the Study Team based on the data from Fairplay

Figure 4.8-1 Correlation between DWT-Beam Length in Products Tankers



Source: Compiled by the Study Team based on the data from Fairplay

Figure 4.8-2 Correlation between DWT-Summer Draft in Products Tankers



Source: Compiled by the Study Team based on the data from Fairplay

Figure 4.8-3 Correlation between DWT-LOA in Products Tankers

As shown in Figure 4.8-1 ~ Figure 4.8-3, Aframax-type is the largest type out of petroleum products tanker followed by Panamax-type. Representative principal dimensions of Aframax-type and Panamax-type petroleum products Tankers are summarized in Table 4.8-3.

Table 4.8-3 Representative Principal Dimensions of Products Tankers

Vessel type	DWT	Draft (m)	LOA (m)	Beam (m)
Aframax-type	120,000	15.5	250	44.0
Panamax-type	80,000	14.0	230	32.2

Source: Estimated by the Study Team

Currently Panamax-type and handy-size petroleum products tankers call at the petroleum berths in Tanjung Priok Terminal. Due to the restriction of water depths under 10 m along berths of Pertamina, even medium sized Panamax-type tankers cannot enter under full-draft as shown in Table 4.8-4 in which comparatively large tankers are listed.

Table 4.8-4 Samples of Products Tankers Calling at Petroleum Berths in Tanjung Priok Terminal in 2009

Vessel type	DWT	Summer Draft (m)	Entering Draft (m)	LOA (m)	Beam (m)
Panamax-type	53,600	13.0	8.7	186	32.2
Handy-size	41,500	11.8	8.5	182	30.0

Source: Pelindo II

The purpose of setting up a new petroleum terminal is to transfer the existing petroleum terminal operations to the new terminal with a view to keeping some distance between its tank farms and densely-populated urban areas. By taking account of the fact that major consumption areas of petroleum products are considered to be the so-called JABODETABEK area, and that petroleum products are typically dangerous cargoes in terms of stevedoring operations, storage and delivery/distributing by land, off North Kalibaru has been considered to be almost the only site for the setting up of the new terminal.

As mentioned in the previous sections, “Section 4.7.5”, a part of off North Kalibaru waters area has been already occupied by the new international container terminal plan in the so-called “North Kalibaru Phase I plan”. Thus, the new petroleum terminal has been planned to the west of the North Kalibaru container terminal site on land to be created by reclamation as well as the new container terminal.

With a view to receiving Post-Panamax type container ships, a new access channel with a water depth of 15.5 m and a width of 310 m has already been proposed in Section 4.7.1 (2).

From the above, so as to save investment costs as much as possible Panamax-type has been applied for the design vessel size for the petroleum terminal. Required channel widths for Panamax-type products tankers are shown in Table 4.8-5. The required water depth for the ships has been estimated to be 15.5 meters. Thus, an additional investment in the access channel is not required for receiving petroleum tankers.

Table 4.8-5 Required Dimensions of an Access Channel for Panamax-type Tankers

Maximum design vessel: Panamax-type Products Tankers

Number of Lanes	PIANC Guideline			Deviation Angle Method		
	Channel Width (D) m	Beam (B) m	LOA (A) m	Channel Width (D)	Beam (B) m	LOA (A) m
		32.2	230		32.2	230
		D/B	D/L		D/B	D/L
One-way	120	3.8	0.5	120	3.6	0.5
Two-way	250	7.8	1.1	230	7.0	1.0

Source: Made by the Study Team

(2) Required Channel Dimensions for Bulk Carriers

Taking account of types of bulk cargoes such as clinker and gypsum which will be potentially handled at a new bulk terminal to be placed off-shore within Tanjung Priok Terminal, suitable vessel type has been considered to be Panamax-type rather than larger type of Cape-size bulk carriers. The representative principal dimensions of Panamax-type bulk carriers and corresponding dimensions of required port facilities have been summarized in Table 4.8-6.

Table 4.8-6 Representative Principal Dimensions of Panamax-type Bulk Carriers

Vessel type	DWT	Draft (m)	LOA (m)	Beam (m)
Panamax-type	80,000	13.0	240	32.2

Source: Estimated by the Study Team

The purpose of setting up a new bulk terminal is to transfer the stevedoring operations of dust cargoes such as clinker, gypsum, coal and sand at the existing conventional wharves to the new bulk terminal with a view to keeping some distance between the new terminal and densely-populated urban areas.

By taking account of the fact that major consumption areas of the said bulk cargoes are considered to be the so-called JABODETABEK area, off North Kalibaru has been considered to be a possible site for the setting up of the new bulk terminal as well as the new petroleum terminal.

As mentioned in the previous clause “1)”, a part of off North Kalibaru waters area has been already occupied by the new international container and petroleum terminals, and hence the bulk terminal has been planned on the west of the North Kalibaru container terminal site and on the east of the new petroleum terminal site.

Required channel width for Panamax-type bulk carriers is shown in Table 4.8-7. The required water depth for Panamax-type bulk carriers has been estimated to be 14.5 meters (see Table 4.8-6).

Table 4.8-7 Required Dimensions of an Access Channel for Panamax-type Bulk Carriers

Maximum design vessel: Panamax-type bulk carriers

Number of Lanes	PIANC Guideline			Deviation Angle Method		
	Channel Width (D) m	Beam (B) m	LOA (A) m	Channel Width (D)	Beam (B) m	LOA (A) m
		32.20	240		32.2	240
		D/B	D/L		D/B	D/L
One-way	120	3.8	0.5	120	3.8	0.5
Two-way	250	7.8	1.0	250	7.8	1.0

Source: Made by the Study Team

4.8.3 Required Dimensions of New off-shore Berths within Tanjung Priok Terminal

(1) Petroleum Products Tankers

To accommodate the design vessel mentioned in Table 4.8-3, the following berth dimensions are required:

- Berth length: 270 m
- Water depth: -15.5 m

(2) Bulk Carriers for Clinker and Gypsum

To accommodate the design vessel mentioned in Table 4.8-6, the following berth dimensions are required:

- Berth length: 270 m
- Water depth: -15 m

(3) Barges for Coal

To accommodate barges for coal, the following berth dimensions are required:

- Berth length: 120 m
- Water depth: -6 m

(4) Barges for Sand

To accommodate barges for sand, the following berth dimensions are required:

- Berth length: 100 m
- Water depth: -3 m