Chapter 3 Selection of Ferry Routes for the Long-term Development Plan

3.1 Traffic Demand Forecast for the Long-term Development Plan

1. "Less than 1,000km or sailing time of 20 hours" is proposed as the maximum ferry route length. New long distance ferry routes are selected under this condition.

2. The ferry passenger demand on Category-1 and -2 ferry route is estimated using the passenger 2019 OD and considering the hinterlands of the routes.

3. The ferry passenger demand on Category-3 ferry routes which are in Maluku and Irian Jaya is directly estimated based on the following relation between passenger demand and socio-econmic indices (population and GRDP/capita).

$$P_{xyi} = a \{ (PA_{xi} \times PA_{yi})^{0.5} \times (GC_{xi} + GC_{yi})^{0.75} \} + b$$

P_{xyi} : Ferry passenger between areas x and y in the year i
PA_{xi} : Population of area x in the year i
PA_{yi} : Population of area y in the year i
GC_{xi} : GRDP/capita of area x in the year i
GC_{yi} : GRDP/capita of area y in the year i
a, b : Constants

4. Demands of ferry cargo, four-wheel vehicle and two-wheel vehicle are forecasted by the same method as is used for the nationwide ferry network.

5. Composition of four-wheel vehicles are assumed as follows.

Table 3.1.1 Composition of Four-wheel Vehicles

	Truck	Bus	Sedan & Pick up
Long distance route	55%	15%	30%
Middle and short distance route	55%	10%	35%

6. It is assumed that large vehicles occupy sixty-five (65) percent of total trucks and buses.

7. The future two-wheel vehicle demand of each route is forecasted using the following formula.

$$V2 = (\frac{a}{D} + b) \times P$$

$V2$: Number of two-wheel vehicle

D : Ferry route distance

P : Passenger

a, b : Constant

3.2 Selection of Ferry Routes for the Long-term Development Plan

8. The following items are studied as the conditions to select ferry routes for the long-term development plan.

1) Classification of ferry routes
2) Route distance
3) National Development policy and other policies
4) Population of the hinterland where ferry port is located
5) Existing roads and railways connecting ferry port
6) Demand forecast at the target year (2019)
7) Present situation of ferry port facilities
   (mooring facilities, loading facilities, possibility of extension)
8) Possibility of privatization

9. The evaluation of candidate ferry routes is shown in Table 3.2.1.

10. Under the condition that there be eight(8), nine(9) or ten(10) routes in the long-term development plan, the long distance routes and the middle and short distance routes are evaluated separately.

11. Concerning the long distance ferry routes, the four routes whose ferry passenger demands are more than three hundred thousand (300,000) in 2019 in Table 3.2.1 and the Ambon - Sorong route whose ferry passenger demand is biggest in Maluku and Irian Jaya are proposed.

a) Surabaya - Banjarmasin
b) Jakarta - Pontianak
c) Surabaya - Ujung Pandang
d) Kendari - Ambon
e) Ambon - Sorong

Table 3.2.1 Evaluation of Candidate Ferry Route

Route		Population in 1995		Route Distance	PELNI Existing Route	Part of Trunk Line	Passenger Demand in 2019	Consideration
(unit)		(thousand)		(NM)			(thousand)	
Long Distance								
Jakarta	Pontianak	9,160	873	414	O	O	755	
Belawan	Batam	1,910	478	425	X		233	
Surabaya	Banjarmasin	2,701	2,900	256	O	O	1,857	
Surabaya	Ug Pandang	2,701	1,092	445	O	O	578	
Kendari	Ambon	606	270	362	X	O	503	
Ambon	Sorong	270	200	337	O	O	251	Maluku, Irian Jaya
Ambon	Fak-Fak	270	107	323	O	△	28	Maluku, Irian Jaya
Ambon	Ternate	270	59	348	O	O	193	Maluku
Ambon	Tual	270	74	353	O	O	120	Maluku
Dobo	Timika	57	53	210	O	△	56	Maluku, Irian Jaya
Middle and Short Distance								
Selayar	L. Bajo	100	56	135	X	O	313	
Waingapu	L. Bajo	82	56	88	X		124	
Air Buaya	Sanana	174	48	90	X		144	Maluku
Patani	Sorong	49	200	173	X	△	218	Maluku, Irian Jaya
Wahai	Babang	209	59	178	X	△	222	Maluku
Manokwari	Biak	156	86	144	O	O	255	Irian Jaya

12. With regard to the middle and short distance routes, the routes whose passenger demands are more than one hundred and fifty thousand (150,000) in 2019 are proposed, that is, one in Nusa Tenggara and the remaining three in Maluku and Irian Jaya.

a) Selayar - Labuhan Bajo
b) Manokwari - Biak
c) Wahai - Babang
d) Patani - Sorong

13. The ferry routes for long-term development plan are shown in Figure 3.2.1.

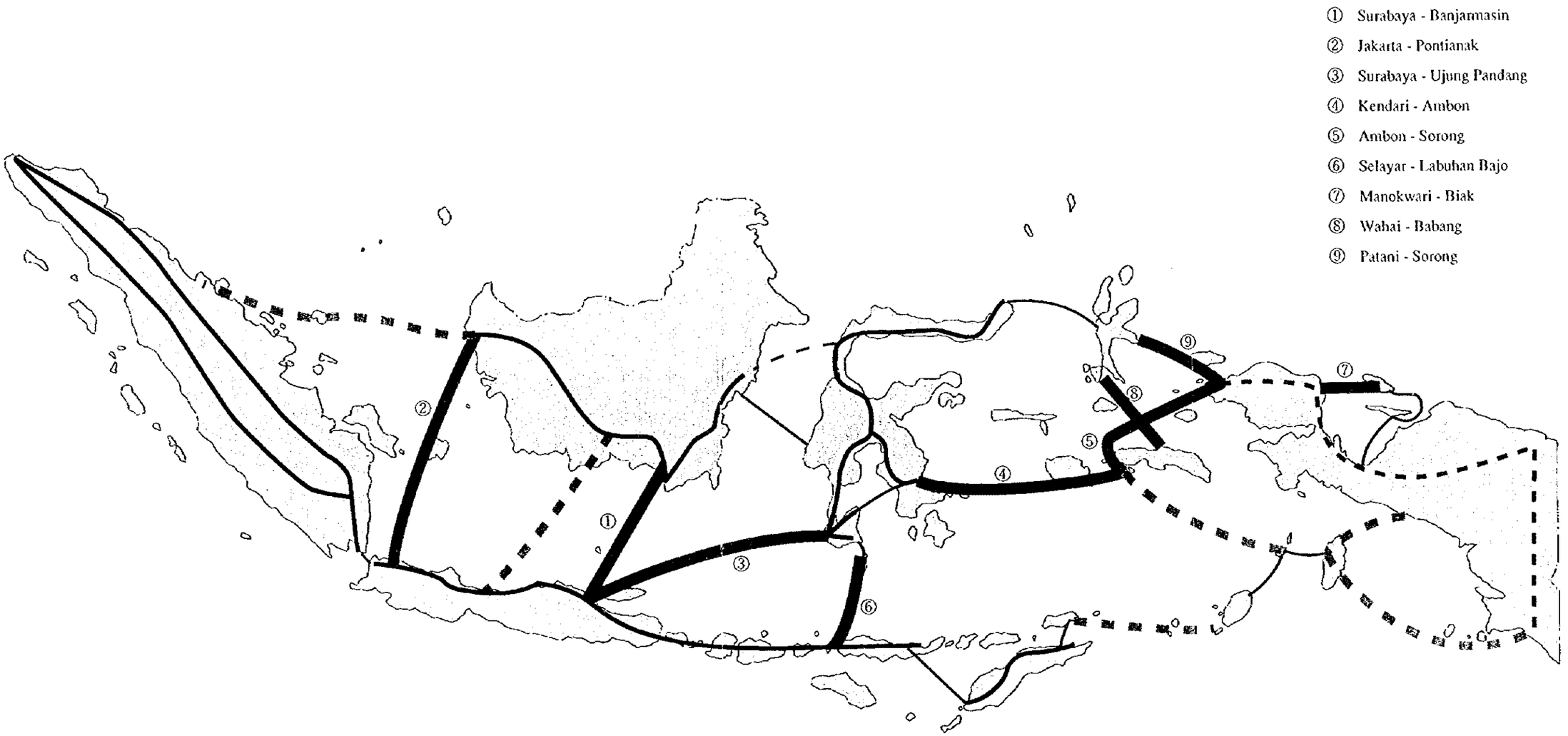


Figure 3.2.1 Ferry Routes for the Long-term Development Plan

3.3 Characteristics of Ferry Routes

3.3.1 Surabaya - Banjarmasin

14. Surabaya - Banjarmasin route connects Surabaya, the capital of East Java, which is second to Jakarta in size and economic activities and Banjarmasin, the capital of South Kalimantan.

15. It is anticipated that passengers and cargoes from neighboring provinces will come to Banjarmasin by vehicle for the purpose of using ferry transport.

16. This ferry routes will be the most important North - South trunk line in Indonesia and will be indispensable to the transport network. Passenger demand including East Kalimantan is forecast to exceed 1.8 million in 2019.

3.3.2 Jakarta - Pontianak

17. Jakarta - Pontianak route connects Jakarta, the capital of Indonesia, and Pontianak, the capital of West Kalimantan.

18. Sea transportation accounted for only about one fourth of all transport in 1993. It is necessary to increase sea transportation capacity because it is thought that the potential demand for sea transportation is fairly large.

19. This route will be the second most important North-South trunk route in the future transport network.

3.3.3 Surabaya - Ujung Pandang

20. Surabaya - Ujung Pandang route connects Surabaya, the capital of East Java and Ujung Pandang, the capital of South Surawesi, and is one of the important routes on the East - West trunk line at present.

21. PT. PELNI offers many vessels on this line and carries a lot of passengers including transit passengers. The importance of PT. PELNI on this route will not change. But fast and punctual transportation service on a fixed schedule will be required more than at present.

3.3.4 Kendari - Ambon

22. Kendari - Ambon route connects Kendari, the capital of Southeast Sulawesi and Ambon, the capital of Maluku.

23. Kendari - Ambon route will be a part of the East - South trunk line in the Indonesian transport network. This route has short-cut effect because PT. PELNI vessels have to go by a roundabout route from Ujung Pandang to Ambon.

3.3.5 Ambon - Sorong

24. Ambon - Sorong route connects Ambon, the capital of Maluku and Sorong, the main gate to Irian Jaya.

25. This route is a part of the East - West central trunk line and is used by many transit passengers. About sixty percent of the total passengers from Maluku to Irian Jaya used this route in 1993.

26. The improvement of this route is required to promote industries and to assist in the development of this area.

3.3.6 Selayar - Labuhan Bajo

27. Selayar - Labuhan Bajo route connects the new port planned in Selayar Island and Labuhan Bajo located at the western tip of Flores Island.

28. People and cargoes can come and go more smoothly from South Sulawesi to East Nusa Tenggara and West Nusa Tenggara through this route.

29. People in Flores Island have historically had close relations with people in South Sulawesi. There is a strong demand for ferry service.

3.3.7 Manokwari - Biak

30. Manokwari - Biak route connects Manokwari, the capital of Kabupaten Manokwari in Irian Jaya and Biak in Biak Island of Irian Jaya. This route is on the way from Sorong to Jaya Pura, the capital of Irian Jaya.

31. Biak plays an important role as the center of air and sea transportation in upper Irian Jaya. And Biak is designated as one of the thirteen (13) priority areas to be developed in the Eastern Indonesian Regional Development Plan.

32. But it is inconvenient for people living in Manokwari to go to other places in upper Irian Jaya because there are only a small number of flights and ships. Therefore it is important to start service on this route and then people in Manokwari can visit other places via Biak more smoothly.

3.3.8 Wahai - Babang

33. Wahai - Babang route connects Wahai located on the north coast of Seram Island, the second largest island in Maluku province, and Babang on the east coast of Bacan Island.

34. Seram Island is designated as one of the thirteen (13) priority areas to be developed in the Eastern Indonesian Regional Development Plan. And Wahai is the main town on the north coast of the island.

35. This route will play an important role as a part of the North-South trunk line connecting Ambon with Ternate in the future.

3.3.9 Patani - Sorong

36. Patani - Sorong route connects Patani, situated at the eastern tip of Halmahera Island and Sorong, the main gate to Irian Jaya.

37. This route will be an important part of the northern East-West trunk line from Bitung to Jaya Pura because it has a short-cut effect compared with the present PT. PELNI route between Ternate and Sorong.

38. The road condition is very poor in the central part of Halmahera Island at present. Therefore the success of this route depends on the improvement of the present road.

Chapter 4 Natural Conditions of Ferry Terminal Sites and Sea Conditions of Ferry Routes

1. Outline of natural conditions, oceanographic and topographic features, sea, wave and current conditions concerning the ferry terminal development sites are described in this chapter based on the descriptions of the latest edition of INDONESIA PILOT (published by the Navy, UK) and SAILING DIRECTIONS - Southeast Asia; 4th Edition (published by the United States Government). The following ferry routes and their sites of terminal are discussed in this part.

Route No.	1.	Surabaya	-	Banjarmasin
	2.	Jakarta	-	Pontianak
	3.	Surabaya	-	Ujung Pandang
	4.	Kendari	-	Ambon
	5.	Ambon	-	Sorong
	6.	Selayar	-	Labuhan Bajo
	7.	Manokwari	-	Biak
	8.	Wahai	-	Babang
	9.	Patani	-	Sorong

2. One of the predominant features of weather and sea conditions in those area is the monsoon climate. From the coast of Java Sea to the Flores Islands, the SE monsoon prevails from April until November. During the SE monsoon season the weather is good with much sunshine and clear skies. While, the NW monsoon, in progress by December, gives N- NW winds until February, and the strongest winds occur in January.

3. In the open sea the direction of the predominant surface current generally sets in the same direction to which the monsoon wind is blowing. The horizontal movement of the water in Java Sea, Flores Sea and Banda Sea area is mainly caused by the wind, and is, therefore, monsoon current; the maximum rate of which is about 1 m/s.

4. In this sea area the tides are predominantly diurnal, and the range is mostly between 1.0 and 1.5m. On the coast of west Java and south and west coasts of Kalimantan, the range of the tide seldom exceeds 1.0m.

5. The height of sea waves are frequently less than 1m throughout the year. During the transitional months between the SE and NW monsoons (April and late October to November), moderate or higher seas are reported on less than 3% of occasions. In January moderate or higher swells are reported on around 10 to 14% of occasions in the extreme north and southeast of the Java Sea, and about 4 to 8% in central areas.

Chapter 5 Ferry Operation Planning

1. For the operation planning several planning factors as follows are studied.

1) As the demand of ferry service is fluctuated by season, "Planning Peak-day Demand" should be estimated by each route as the basic transportation volume for operation planning. Annual forecast demand is broken down into "Planning Peak-day Demand" by multiplying peak-day concentration ratio.
2) The target load factors should be set appropriately to achieve convenient and comfortable public transportation.
3) The capacity by boat size should be set as a standard.

2. The basic planning factors are arranged as shown on Table 5.1.1 considering the present conditions and characteristics of ferry transportation in Indonesia.

Table 5.1.1 Planning Factors

		Passenger	Car
Peak-day Concentration Ratio		1/280	1/330
Target load factor		70%	80%
Capacity by Boat Size (GRT)			
	5,000 class	800	76
	3,000 class	600	61
	1,000 class	500	42

3. Operation program of ferry service includes selection of boat size, frequency of service per day, necessary time for one trip, required number of boats for operation. Especially it is important to set the optimum boat size to each route considering the demand forecast, boat capacity, performance, route distance, sea conditions and port conditions. Table 5.1.2 shows the operation program of each route.

4. According to the operation programs of each route, the required berth at each terminal site are estimated as shown on Table 5.1.3 including existing relative route which may share the same berth. The standard berthing time are set as 3 hours for 3,000-5,000GRT class boats for one trip, and 2 hours for 1,000GRT class boats.

Table 5.1.2 Operation Program of Each Route in 2019

Route	Distance (NM)	Peak-day Demand		Boat (GRT)	Fre-quency	Trip Hour	No. of Boat
		Pax	Car				
Surabaya-Banjarmasin	256	6,630	710	5,000	6/day	12.0h	8
Jakarta - Pontianak	417	2,700	290	5,000	3/day	19.5h	6
Surabaya-UjungPandang	445	2,070	220	5,000	2/day	21.0h	4
Kendari - Ambon	362	1,800	195	3,000	2/day	17.0h	4
Ambon - Sorong	337	900	95	1,000	2/day	20.5h	4
Selayar - Labuhan Bajo	135	1,120	105	1,000	2/day	10.0h	2
Manokwari - Biak	144	910	85	1,000	2/day	10.0h	2
Wahai - Babang	178	800	75	1,000	1/day	13.0h	2
Patani - Sorong	173	780	70	1,000	1/day	13.0h	2

Table 5.1.3 Required Ferry Berth at Each Site in 2019

Terminal Site	Destination	Required Ferry berth		
		Size:GRT	No.	Note
Surabaya	- Banjarmasin	5,000	2	*3 berths in total
	- U.Pandang	5,000	1	
Banjarmasin	- Surabaya	5,000	2	
Jakarta	- Pontianak	5,000	1	
Pontianak	- Jakarta	5,000	1	
Ujung Pandang	- Surabaya	5,000	1	
Kendari	- Ambon	3,000	1	*A new berth should be shared with Wowoni route.
	- Wawoni	300		
Ambon	- Kendari	3,000		*combined use is possible
	- Sorong	1,000	1	*2 berths will be necessary for existing route.
	- Waiprit	500	2	
Sorong	- Ambon	1,000		*A new berth should be shared with 3 routes.
	- Patani	1,000		
	- Fakfak	500	1	
Selayar	- L.Bajo	1,000	1	
Labuhan Bajo	- Selayar	1,000	1	*The extended berth should be shared with Sape route.
	- Sape	500	1	
Manokwari	- Biak	1,000	1	
Biak	- Manokwari	1,000	1	*A new berth should be shared with Serui routes.
	- Serui	300	1	
Wahai	- Babang	1,000	1	
Babang	- Wahai	1,000	1	
Patani	- Sorong	1,000	1	

Chapter 6 Ferry System Management

1. Currently, PT. ASDP and PT. PELNI conduct similar transportation service on the same routes, although these two public companies obtain licenses from different organizations. This peculiar situation is due to the licensing system. It will not be until demarcation between transportation service under control of DGLT and that of DGSC becomes clearly defined that this problem can be solved.

2. As far as the subsidy system continues, it is recommended that the Government should not only require reports from PT. ASDP but establish a strict investigation system into the financial and accounting system of its branch offices, and also supervise shipping operations by PT. ASDP in order for them to work in harmony with governmental policy on shipping management and operation, and to safeguard the national interests of the Republic of Indonesia.

3. As for the shipping tariff system in the future, it is recommended that special tariff be prepared and a season commuter pass be given to people who use a specific route as a lifeline. In the future, shipping tariff, which is determined by the Government at this stage should be freely set up by ferry operating companies according to their own management policy.

4. When a ferry network service covers a number of islands in the future, the system may require a computer network on a real-time basis to ensure that up-to-date information is always available.

5. In order to realize more effective terminal management in the long-term stage, a system that allows a private company to participate in the terminal management and operation regardless of cooperation with public sectors should be introduced.

6. In order for the terminal management to be profitable, efficient placement of staff should be conducted, since the personnel cost at most public terminals forms more than 40% of its annual expense.

7. As jurisdiction between ferry transportation service and that of passenger might be taken away in the future, it is recommended that PT. PELNI be granted management right on the profitable or potentially profitable terminals to realize a balance with PT. ASDP.

Chapter 7 Ferry Terminal Development Plan

7.1 Factors Concerned with Ferry Terminal Planning

1. Factors Concerned with Ferry Terminal Planning are dimension and capacity of ferry boats, and length and water depth of berth and required scale for ferry terminal.

7.2 Ferry Terminal Development at Each Site

2. In selecting a ferry terminal development site, the ferry terminal development sites are evaluated from the viewpoints of convenience, safety, economy, flexibility of the plan and environmental protection

3. In this section, the ferry terminal development site on each route will be selected according to the results of the field survey based on the basic premises and the ferry terminal development plan at the selected site will be proposed.

(1) Surabaya - Banjarmasin

1) Surabaya

4. The existing Ujung ferry terminal has no room for expansion either on water or land. The ferry terminal development at Lamong Bay site was consented to by PELINDO III. The mooring facility to accommodate 5,000GRT ferry boat and onshore facility are planned to be connected with access bridge.

2) Banjarmasin

5. In comparing the three sites, the area near Banjarmasin port site seems to be the best candidate as a site for ferry terminal development. The mooring facility is planned as an extension of the berth line of the future development of the Banjarmasin Port as much as possible.

(2) Jakarta - Pontianak

1) Jakarta

6. PELINDO II has a port redevelopment plan in the reclamation area including the ferry terminal, the construction plan of the ferry terminal has been consented to by PELINDO II . One berth for ferry boat of 5,000GRT is planned consecutively without the access bridge.

2) Pontianak

7. The existing Pontianak port has no expansion area for the future ferry terminal develpoment. The Bundaran Jeruju site is located about 5km from the Pontiank port and is being examined as a candidate site of the ferry terminal in Pontianak. The mooring facility is planned as an extension of the berth line of the rakyat berth as much as possible.

(3) Surabaya - Ujung Pandang

8. The candidate site for the ferry terminal in Surabaya is mentioned above.

1) Ujung Pandang

9. The ferry terminal plan will be incorporated in the Ujung Pandang port long-term development plan as a part of a comprehensive plan for Ujung Pandang port. The plan has been consented to by PELINDOIV. The ferry terminal layout plan is planned for one berth of 5,000GRT ferry boat.

(4) Kendari - Ambom

1) Kendari

10. Kendari ferry terminal site is located about 100m west of the commercial port in Kendari Bay, near the city, and has good road access. Compared with Lapuko site, the existing Kendari ferry terminal site is superior on all counts. One berth is planned to accommodate 3,000GRT ferry boat.

2) Ambon

11. The existing Hunimua ferry terminal site is recommended over Torehu port area because it has a mooring dolphin of 500GRT capacity and will be able to accommodate 3,000GRT ferry boats for the existing and new routes. One berth will be constructed to accommodate 3,000GRT ferry boat.

(5) Ambon - Sorong

12. The candidate site for the ferry terminal in Ambon is mentioned above.

1) Sorong

13. There is a ferry terminal linking with Jefman Island Airport in Sorong area. In the future development of the ferry terminal, the existing wooden pier will be demolished,

A new berth will be constructed that can accommodate 1,000GRT ferry boats for the existing and new routes.

(6) Selayar - Labuhan Bajo

1) Selayar

14. Patumbukan site is a small scale bay and is located at the south east end of Selayar Island. One berth of 1,000GRT ferry boat is constructed and the land area for development will be secured by land reclamation.

2) Labuhan Bajo

15. The existing Labuhan Bajo ferry terminal site is selected as the ferry terminal site for the existing and new routes from the viewpoint of comprehensive management and operation with the existing ferry terminal. The existing dolphin berth is improved for 1,000GRT ferry boat.

(7) Manokwari - Biak

1) Manokwari

16. South Sowi site is located about 5km south west from Manokwari city, however, this site seems to have sufficient offshore and onshore area for ferry terminal development. Layout plan for ferry terminal is planned for one berth of 1,000GRT ferry boat.

2) Biak

17. The existing Mokmer ferry terminal recommended by the previous study, which is currently being constructed with local government funds. Therefore, Mokmer ferry terminal site is selected as the ferry terminal for the existing and new routes. One new berth is constructed for 1,000GRT ferry boat for the existing and new routes.

(8) Wahai - Babang

1) Wahai

18. Wahai is the biggest city on the north side of Seram Island. East, west and south sides of the bay are shaded. Therefore, the new ferry terminal site is selected near the existing pier in the inner part of the bay. One berth for 1,000GRT ferry boat will be constructed in front of this area.

2) Babang

19. Babang site is located in Babang Bay and about 16km east from the biggest city of Labuha in Bacan Island. There is a pier managed by KANWIL and a oil pier of PERTAMINA and an abandoned revetment under reclamation by a private company in the bay. One berth for 1,000GRT ferry boat will be constructed in front of this area.

(9) Patani - Sorong

1) Patani

20. Sif site was used by a lumbering company for the transport of lumber until 1983. The depth of the old jetty is -5.0m and the diameter of turning basin is about 200m. Sif site is selected for the development of a ferry terminal in Patani area. One berth for 1,000GRT ferry boat will be constructed with dredging and reclamation.

21. The candidate site for the ferry terminal in Sorong is mentioned above.

22. The general ferry terminal layout plans by each ferry boat size are shown from Figure 7.2.1 to 7.2.4.

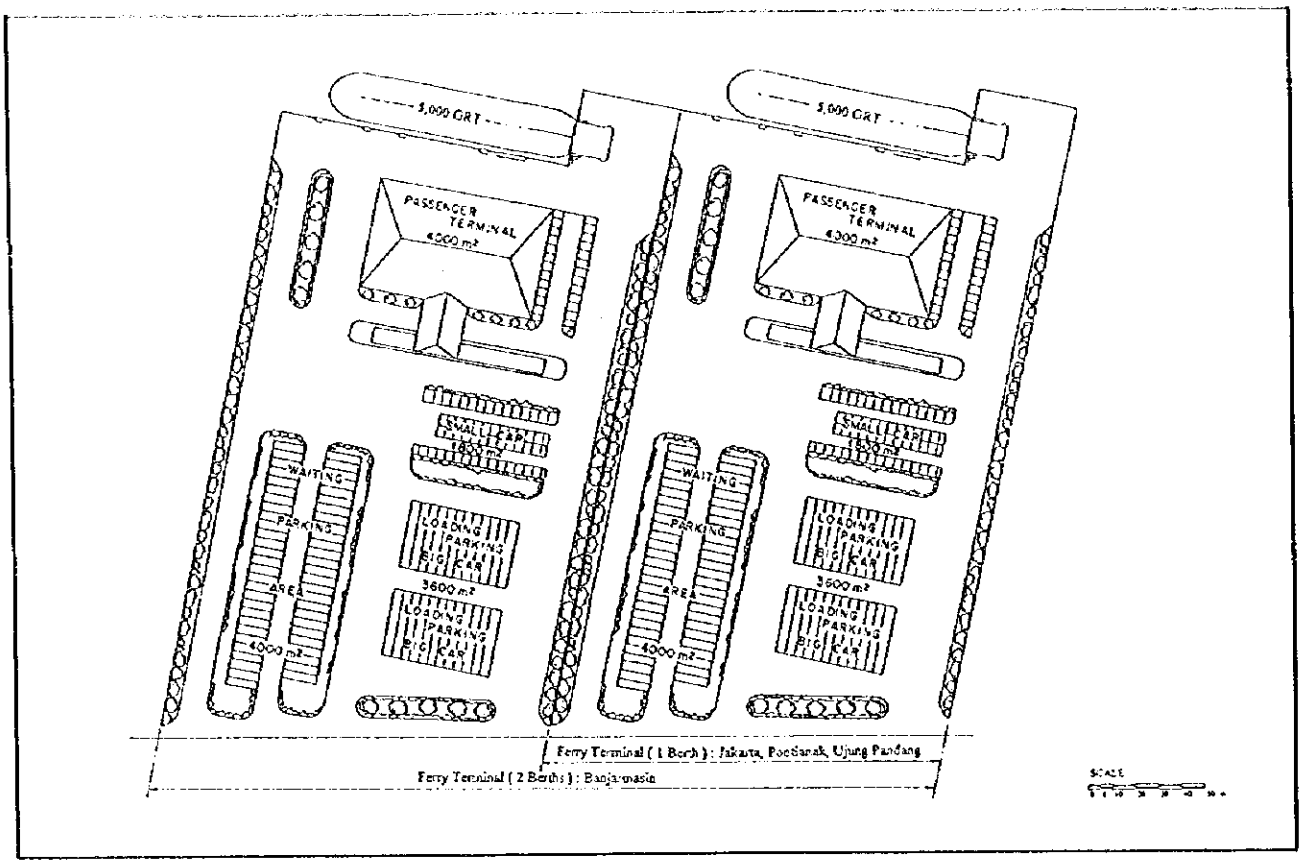


Figure 7.2.1 General Layout Plan of Ferry Terminal (5,000 GRT)

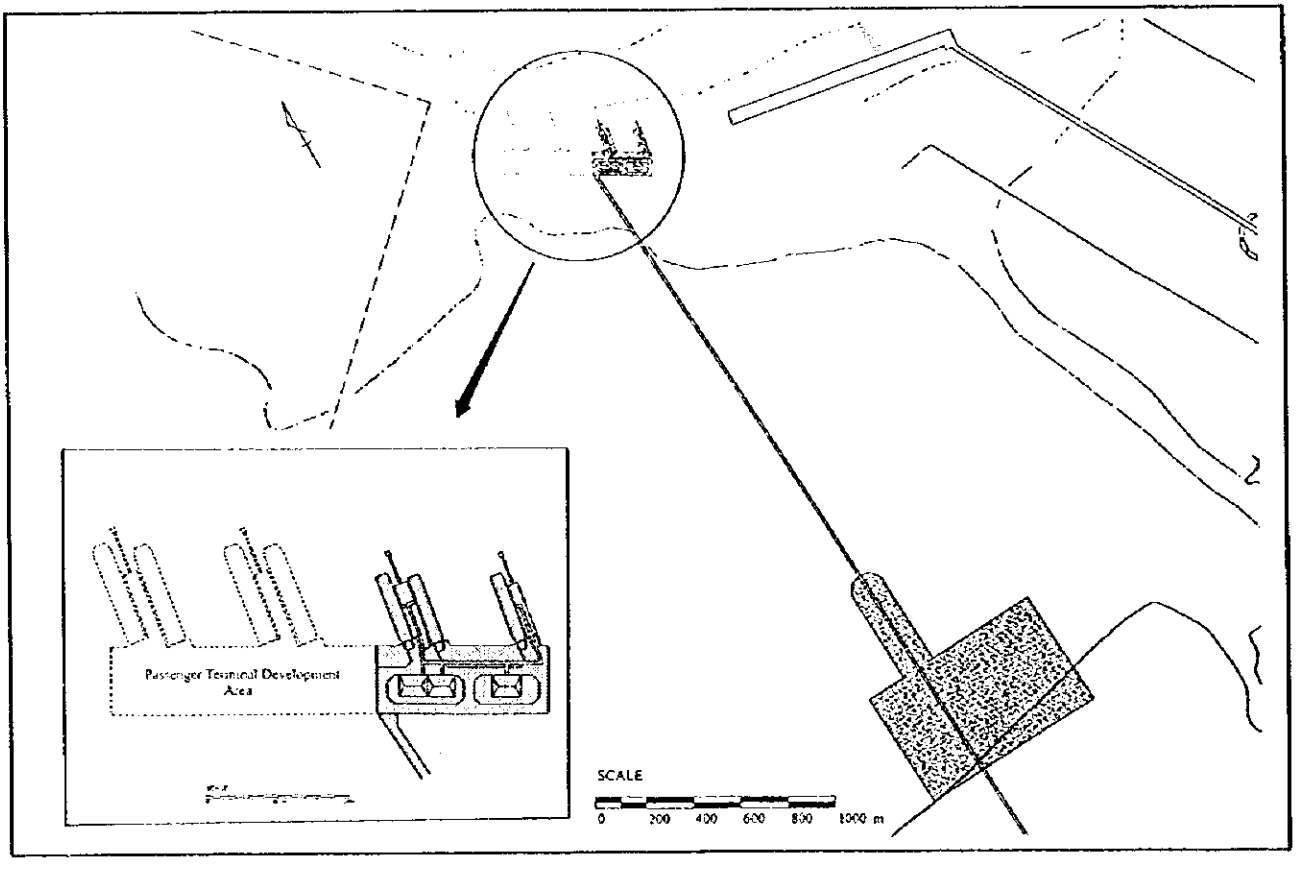


Figure 7.2.2 General Layout Plan of Ferry Terminal (5,000 GRT, at Surabaya site)

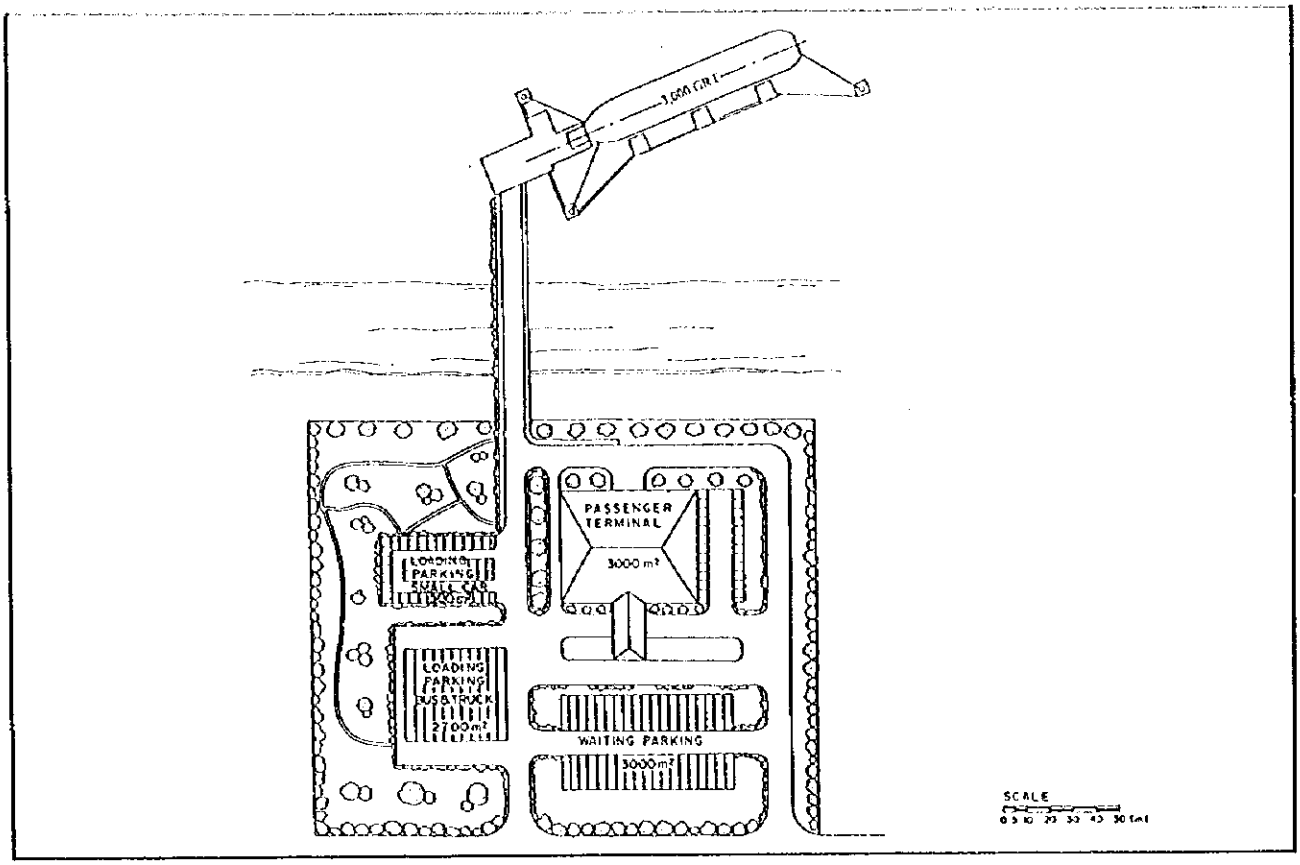


Figure 7.2.3 General Layout Plan of Ferry Terminal (3,000 GRT)

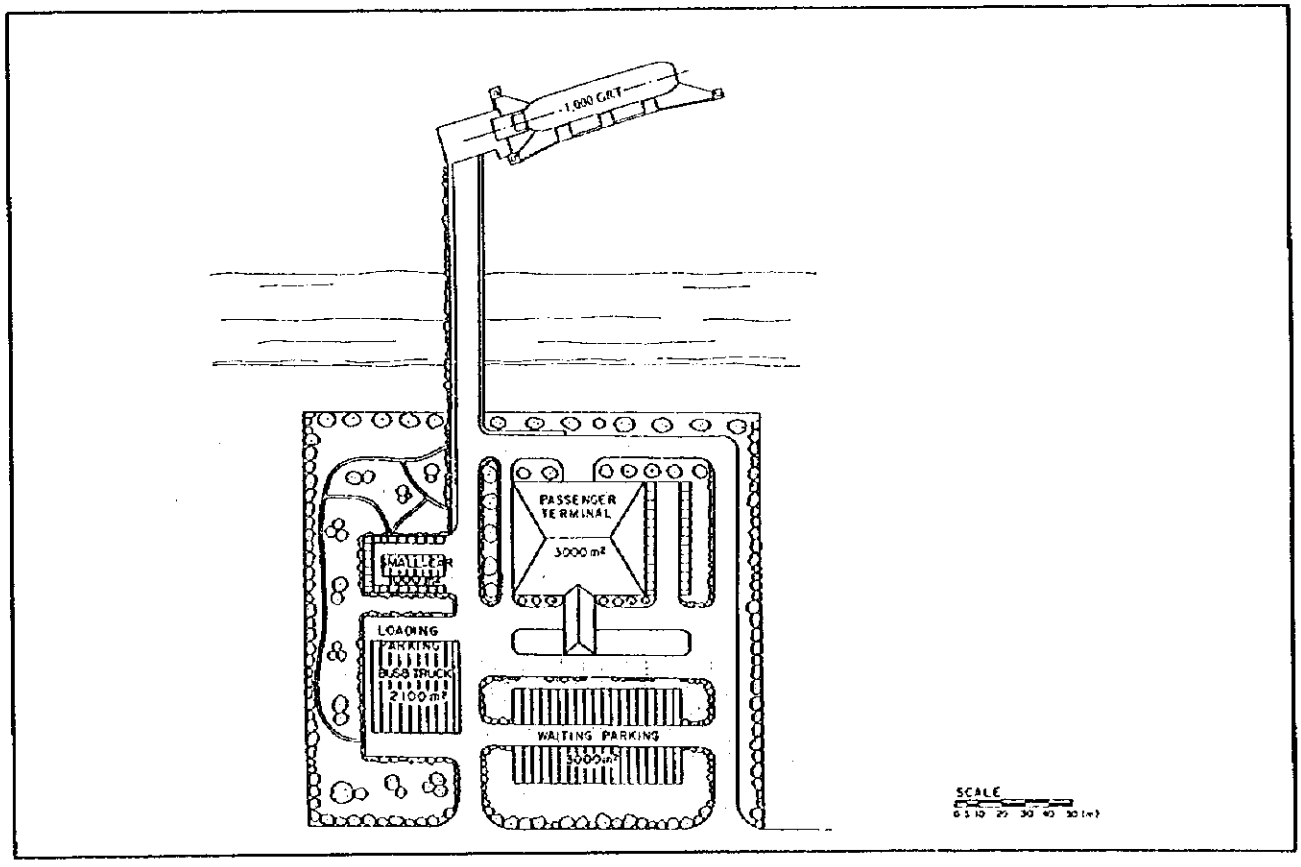


Figure 7.2.4 General Layout Plan of Ferry Terminal (1,000 GRT)

Chapter 8 Preliminary Design and Cost Estimates

1. Preliminary design of port facilities and ferry terminals, and estimation of construction cost are conducted in this chapter based on the preliminarily set design conditions of each terminal and the considerable sizes of ferry boats on each route.

2. Conditions of design, standard dimensions of ferry boats, tidal level in each terminal site, subsoil conditions and elevation of bearing strata, and dimensions of ferry terminal and on-land facilities are assumed from the conditions applied for the marine structure/port facilities near the candidate ferry terminal area.

3. For estimation of construction cost in each terminal, typical sections of breasting dolphin, mooring dolphin and dimensions of movable bridge are prepared. The basic facilities for ferry terminals such as mooring facilities, loading decks, trestle and causeway are considered in preliminary plans.

4. The basic cost of the works and unit prices for provinces was surveyed and the differences are compared between the provinces concerning availability of materials, labour, construction equipment and accessibility to the sites where the proposed ferry terminals are to be developed. The capacity of local contractors were also checked with respect to their experiences of marine construction works considering the magnitude of planned ferry terminal facilities.

5. The basic costs of the construction works are obtained by accumulating labour cost, material cost, equipment cost and indirect cost such as general temporary works, overheads profit and so on. Particularly, the works such as dredging work, building works and demolition work are hindcast on the basis of the empirical prices collected from the major contractors in each region.

6. Price of maritime facilities such as fender system, bollard and navigation aids are based on the market prices in Jakarta and adjusted considering some transportation cost to the construction site. Unit cost of Movable Bridge for ferry terminal includes costs of design, manufacturing in Jakarta area, workshop test, delivery and installation, based on the CIF Jakarta prices and adjusted accessibility of the each region.

7. The construction cost is estimated on the basis of the quantity of construction works for the planned facilities and the basic cost of the works including utilities. The construction cost for the ferry terminal is summarized in the Table 8.1.1.

Table 8.1.1 Cost of Construction Works for Each Terminal

(prices in 1,000 Rupiah)

FACILITIES	ITEM / SITE	Jakarta	Pontianak	Surabaya	Banjarmasin	Ujung Pandang	Kendari	Ambon	Sorong
Mobilization and Demobilization		1,563,945	685,636	4,443,092	1,163,063	1,054,118	678,747	992,334	724,298
Site Clearance and Grading		-	135,000	-	-	-	-	261,300	-
Dredging and Reclamation		4,800,000	-	-	288,000	9,776,000	1,228,500	-	-
Access Road and Bridge		33,285,000	-	-	-	-	-	-	-
Waterfront Facilities	Quay and Loading Deck	6,406,636	2,105,280	27,738,600	10,139,045	5,232,820	1,630,746	2,776,860	954,980
	Breasting Dolphin	-	1,650,660	6,931,890	-	-	2,123,355	3,862,502	1,365,360
	Mooring Dolphin	-	642,126	2,642,616	-	-	736,835	1,291,388	453,270
	Catwalk	-	108,000	270,000	-	-	140,400	232,375	74,100
	Movable Bridge	1,230,000	1,230,000	6,600,000	3,460,000	1,230,000	2,483,000	3,952,000	1,460,000
	Trestle	-	-	90,680,000	-	12,062,400	-	-	-
	Causeway	-	-	734,310	-	-	-	981,383	440,690
Terminal Facilities	Revetment and Slope Protection	1,924,315	2,532,450	-	955,470	2,371,890	329,472	-	-
	Terminal Building and Gate House	2,725,000	3,407,000	9,165,000	6,036,000	2,707,000	3,519,100	4,066,400	2,648,000
	Pavement	758,100	812,250	1,240,200	1,190,200	707,350	674,960	964,600	672,600
	Landscaping and Fence	610,200	629,650	655,950	629,250	636,550	381,225	1,015,560	527,000
	Utilities	392,250	460,300	1,394,500	563,300	413,250	327,340	442,320	457,720
Navigation Aids		-	-	50,000	-	-	-	-	-
Total		53,695,446	14,398,352	152,546,158	24,424,328	36,191,378	14,253,679	20,839,021	9,778,018

(prices in 1,000 Rupiah)

FACILITIES	ITEM / SITE	Selayar	Labuhan Bajo	Manokwari	Biak	Wahai	Babang	Patani
Mobilization and Demobilization		773,356	620,745	658,932	741,540	731,872	577,529	728,513
Site Clearance and Grading		-	-	86,400	-	-	-	86,400
Dredging and Reclamation		845,000	990,000	-	672,000	1,452,000	-	1,142,000
Waterfront Facilities	Quay and Loading Deck	808,470	912,210	1,007,110	1,948,960	1,824,420	1,175,840	1,173,920
	Breasting Dolphin	1,184,190	1,315,470	1,435,545	1,380,360	1,315,470	1,365,165	1,364,295
	Mooring Dolphin	386,505	433,840	477,265	461,920	433,840	453,455	452,740
	Catwalk	57,000	62,700	79,800	61,750	62,700	74,100	74,100
	Movable Bridge	1,460,000	1,420,000	1,520,000	1,020,000	1,520,000	1,060,000	1,130,000
	Trestle	1,119,420	-	697,230	-	-	-	1,320,660
	Causeway	185,280	197,360	226,160	179,930	246,700	-	110,450
Terminal Facilities	Revetment and Slope Protection	420,630	424,900	-	347,130	498,310	277,000	415,760
	Terminal Building and Gate House	2,048,000	2,048,000	2,219,000	2,048,000	1,688,000	1,688,000	1,688,000
	Pavement	415,800	564,300	786,600	646,800	535,800	498,200	564,300
	Landscaping and Fence	413,750	235,200	557,100	235,800	571,800	347,000	528,500
	Utilities	260,400	263,800	407,500	266,600	306,280	280,350	304,200
Navigation Aids		62,500	-	-	-	-	-	52,000
Total		10,440,301	9,488,525	10,158,642	10,010,790	11,187,192	7,796,639	11,135,838

Chapter 9 Initial Environment Examination

1. The amendment to the government law for the Environmental Impact Assessment (EIA) was promulgated in 1993. However, as there is no Initial Environment Examination (IEE) system in Indonesia at present, the study team conducted an IEE based on JICA's guideline to grasp the environmental impact of the project.

2. The purpose of this IEE is to examine the potential impact of the total 15 ferry ports. The environmental impact is one of the major items for selecting the location of ferry terminals in the development plan. It is necessary to carry out initial environmental study and examination.

3. Based on the above background and aims, IEE on the 15 terminals has been conducted. The environmental impact of each item which could potentially cause impact to the environment was studied and evaluated.

4. The results of these studies and examinations are shown in Table 9.1.1.

5. The items graded as A, B or C require a more detailed study and survey on the environmental impact regarding the ferry terminal development plan in future.

Table 9.1.1 Result of IEE

No.	ELEMENT OF ENVIRONMENTAL IMPACT	Banjarmasin	Surabaya	Ujung Pandang	Selayar	Kendari	Ambon	Wahai	Patani	Babang	Biak	Manokwari	Sorong	Labuhan Bajo	Jakarta	Pontianak
1	Resettlement of inhabitants	B	C	D	B	D	D	C	B	C	D	B	B	D	C	C
2	Economic activities	C	D	C	C	D	C	C	C	C	C	C	C	C	C	C
3	Traffic and life facilities	B	C	B	C	B	C	C	C	D	D	D	C	D	B	B
4	Division of regional area	C	D	D	D	C	D	D	D	D	D	D	D	D	D	C
5	Historical and cultural heritage	D	D	D	D	D	D	D	D	D	D	C	D	D	D	D
6	Water right and common right	D	C	D	C	D	D	D	C	C	D	D	D	D	C	C
7	Hygiene and health	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
8	Waste and garbage	D	C	D	D	D	D	D	D	C	C	C	C	C	D	D
9	Risks and hazards	C	D	C	D	C	C	D	D	D	D	D	D	D	C	C
10	Topography and geology	C	C	C	C	D	D	C	D	D	D	C	D	D	C	C
11	Soil erosion	D	D	D	D	D	D	C	D	D	D	C	D	D	D	C
12	Underground water	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
13	Hydrological regime for river and lake	C	B	D	D	D	D	D	D	D	D	C	D	D	D	C
14	Coastal zone	D	D	C	D	C	C	C	D	C	C	C	C	D	C	D
15	Ecology, fauna, flora	C	B	C	B	C	C	C	B	C	C	C	D	B	C	C
16	Meteorology	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
17	Landscape	D	C	D	D	D	D	D	D	D	D	D	D	D	D	D
18	Air Pollution	D	D	B	D	C	D	D	D	D	D	D	D	D	D	D
19	Water pollution	C	C	B	C	B	B	B	C	B	B	B	C	B	C	C
20	Soil contamination	D	D	D	D	D	D	D	D	D	D	D	D	D	C	D
21	Noise and vibration	C	D	C	D	C	D	D	D	D	D	D	D	D	C	C
22	Land subsidence	D	C	C	C	C	C	C	D	D	C	C	D	D	D	D
23	Offensive odor	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D

A : High magnitude of impact is expected

B : Low magnitude of impact is expected

C : Unknown (Need study, provide consideration that it will become clear after the site investigation and survey)

D : No effect is expected, and does not require consideration for the items of EIA.

PART 3

SHORT-TERM DEVELOPMENT PLAN

Chapter 1 Selection of Ferry Routes for the Short-term Development Plan

1.1 Traffic Demand Forecast for the Short-term Development Plan

1. Traffic demand for the short-term development plan is forecasted in the same way as the traffic demand forecast for the long-term development plan.

2. The target year of the short-term development plan is 2004. In addition, the traffic demands in the years of 2008 and 2013 are forecasted as the midterm numerical values.

3. The forecasts in the year of 2008 and 2013 are calculated based on the assumption that the demands increase every year from 2004 to 2019 at the same increase rate.

4. The projection of ferry passengers, cargoes, four-wheel vehicles and two-wheel vehicles for selection of the short-term development plan is shown in Table 1.1.1.

1.2 Evaluation of Ferry Routes for the Short-term Development Plan

5. The following items are selected for easy comparison and evaluation among the selected nine routes.

1) Ferry transport demand
   - Passenger, four-wheel vehicle, cargo volumes in 2004 and 2019
     Four-wheel vehicle volume are subdivided into truck, bus and sedan & pickup
2) Construction cost for ferry terminal including offshore and on shore facilities on each route in 2019
3) Ferry boats operation cost for each route in 2004 and 2019
   - Procurement cost and operation costs of new or used ferry boats to be engaged on the routes
4) Demand efficiency
   - Tariff income potential of ferry transportation; total person-miles, vehicle numbers -miles, tons-miles
   - Ratio of ferry terminal construction cost per one passenger, vehicle and ton
   - Ratio of ferry boats operation cost per one passenger, vehicle and ton
5) Urgency of ferry route development

Table 1.1.1 Demand Forecast for the Short-term Development Plan

		PASSENGER				CARGO				4 WHEEL-VEHICLE				2 WHEEL-VEHICLE			
		2004	2008	2013	2019	2004	2008	2013	2019	2004	2008	2013	2019	2004	2008	2013	2019
									unit : ton								
Long Distance Route																	
Surabaya	Banjarmasin	559,800	770,700	1,149,300	1,856,500	166,300	250,500	414,900	750,000	63,550	90,460	140,110	234,960	5,740	7,910	11,790	19,040
Jakarta	Pontianak	254,000	339,600	488,200	754,700	75,400	110,400	176,200	304,900	28,830	39,870	59,500	95,520	2,530	3,380	4,860	7,520
Surabaya	U Pandan	168,500	234,100	353,200	578,500	50,000	76,100	127,500	233,700	19,110	27,480	43,060	73,210	1,670	2,320	3,510	5,740
Kendari	Ambon	126,000	182,200	289,100	502,900	37,400	59,200	104,400	203,200	14,300	21,380	35,250	63,660	1,260	1,830	2,900	5,040
Ambon	Sorong	74,800	103,300	154,700	251,200	22,200	33,600	55,800	101,500	8,490	12,130	18,840	31,800	750	1,040	1,560	2,530
Middle and Short Distance Route																	
Selayar	L Bajo	84,500	119,800	185,400	313,000	16,700	26,700	47,100	91,100	9,550	13,360	20,390	33,950	930	1,310	2,030	3,430
Manokwari	Biak	72,600	101,500	154,300	255,200	14,400	22,600	39,200	74,300	8,230	11,310	16,970	27,670	790	1,100	1,680	2,770
Wahai	Babang	47,700	71,900	120,000	222,100	9,400	16,000	30,500	64,600	5,370	8,010	13,200	24,090	510	760	1,270	2,350
Patani	Sorong	44,600	68,100	115,400	217,500	8,800	15,200	29,300	63,300	5,030	7,610	12,680	23,590	470	720	1,230	2,310

		TRUCK				BUS				SEDAN,PICKUP				LARGE TRUCK AND BUS			
		2004	2008	2013	2019	2004	2008	2013	2019	2004	2008	2013	2019	2004	2008	2013	2019
Long Distance Route																	
Surabaya	Banjarmasin	34,970	49,750	77,060	1,298,230	9,540	13,570	21,020	35,240	19,070	27,140	42,030	70,490	28,930	41,160	63,750	106,910
Jakarta	Pontianak	15,860	21,930	32,720	52,530	4,320	5,980	8,930	14,330	8,650	11,960	17,850	28,660	13,120	18,140	27,070	43,460
Surabaya	U Pandan	10,510	15,120	23,680	40,270	2,870	4,120	6,460	10,980	5,740	8,240	12,920	21,960	8,700	12,500	19,590	33,310
Kendari	Ambon	7,860	11,760	19,380	35,010	2,150	3,210	5,290	9,550	4,290	6,410	10,580	19,100	6,510	9,730	16,040	28,970
Ambon	Sorong	4,670	6,670	10,360	17,490	1,270	1,820	2,830	4,770	2,550	3,640	5,650	9,540	3,860	5,520	8,570	14,470
Middle and Short Distance Route																	
Selayar	L Bajo	5,250	7,340	11,210	18,670	960	1,340	2,040	3,400	3,340	4,680	7,140	11,880	4,030	5,640	8,610	14,340
Manokwari	Biak	4,530	6,220	9,330	15,230	820	1,130	1,700	2,770	2,880	3,960	5,940	9,690	3,480	4,780	7,170	11,700
Wahai	Babang	2,950	4,410	6,970	13,240	540	800	1,320	2,410	1,880	2,800	4,620	8,420	2,270	3,380	5,580	10,170
Patani	Sorong	2,770	4,190	6,980	12,970	500	760	1,270	2,360	1,760	2,660	4,440	8,260	2,130	3,220	5,360	9,970

Source : Study Team

- Necessity of urgent ferry route development considering the Indonesian Government's eastern region development plan

1.3 Selection of Ferry Routes for the Short-term Development Plan

1.3.1 Selection of Ferry Routes

6. Five long distance and four middle and short distance routes are evaluated separately for selecting ferry routes for the short-term development plan.

7. Regarding the selection of the long distance routes, Surabaya - Banjarmasin route is most superior among the five routes from the point of view of the development efficiency.

8. Concerning the middle and short distance routes, Selayar - Labuhan Bajo route is most superior among the four routes from the point of view of the development efficiency, while, Patani - Sorong route is clearly inferior to the Manokwari - Biak and Wahai - Babang routes.

9. Comparing the routes of Manokwari - Biak and Wahai - Babang, both routes are evaluated highly, especially in the terms of ratio of ferry terminal construction cost.

10. Table1.3.1 shows the selection of ferry routes for the short-term development plan.

1.3.2 Proposed Routes for the Short-term Development Plan

11. According to the above mentioned evaluation items and evaluation, the proposed routes for the short-term development plan are as follows.

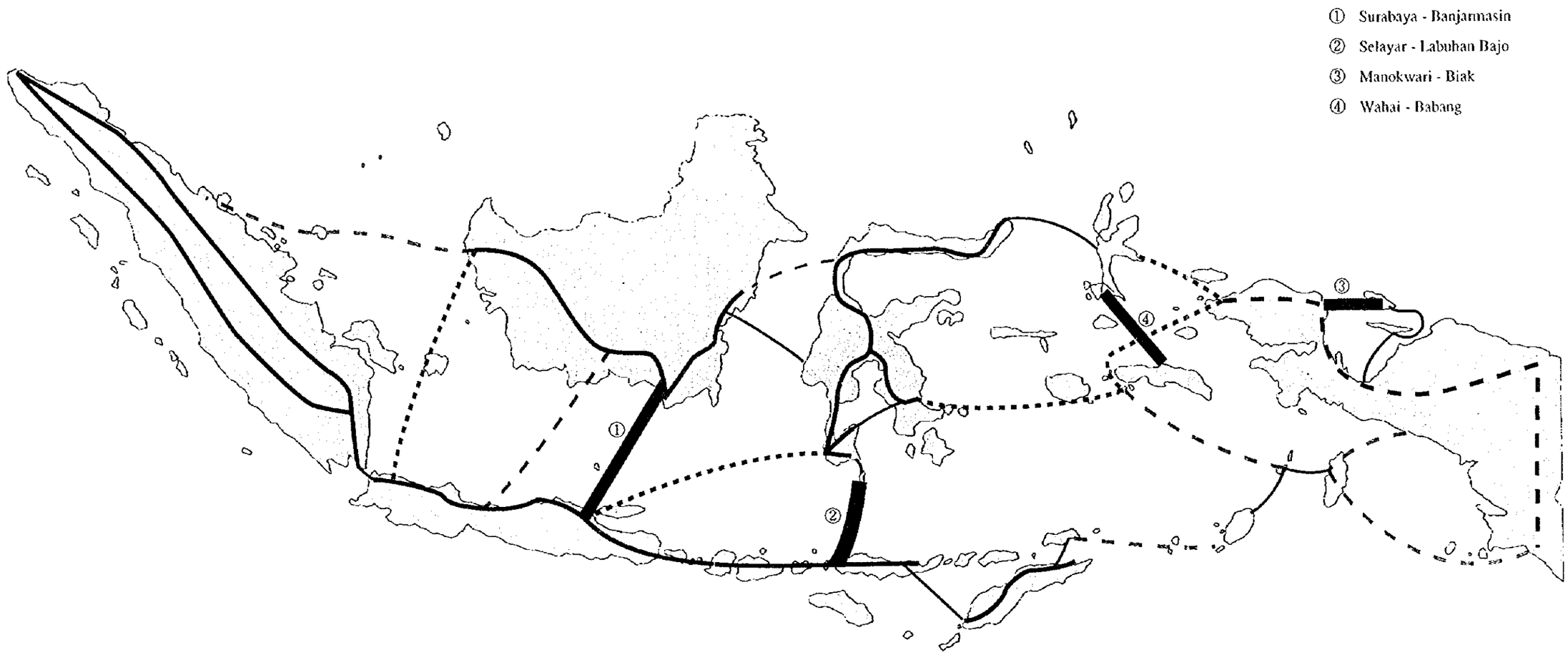
Long distance route:	Surabaya - Banjarmasin
Middle and short distance route:	Selayar - Labuhan Bajo
	Manokwari - Biak
	Wahai - Babang

12. The ferry routes for the short-term development plan are shown in Figure 1.3.1.

Table 1.3.1 Selection of Ferry Routes for the Short-term Development Plan

		Demand Volume						Distance	Cost (Million Rp.)			Evaluation Items and Evaluation																Route Selection for Short-term Development Plan	
												Development Efficiency															Urgency of Ferry Development		
		2004			2019							Tariff Income Potential ('000,000)						Ratio of Terminal ('000 Rp.)			Ratio of Ferry boats ('000 Rp.)								
												2004			2019						2004			2019					
		Passenger	Vehicle	Cargo	Passenger	Vehicle	Cargo	(NM)	Terminal Construction	Ferry boats Operation 2004	Ferry boats Operation 2019	Passeng.	Vehicle	Cargo	Passeng.	Vehicle	Cargo	/Pers.	/Car	/Ton	/Pers.	/Car	/Ton	/Pers.	/Car	/Ton		Steering Committee	Study Team
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(1)*(7)	(2)*(7)	(3)*(7)	(4)*(7)	(5)*(7)	(6)*(7)	(8)/(4)	(8)/(5)	(8)/(6)	(9)/(1)	(9)/(2)	(9)/(3)	(10)/(4)	(10)/(5)	(10)/(6)			
Long Distant Routes																													
Route A																													
Surabaya	Banjarmasin	559,800	63,550	166,300	1,856,500	234,860	750,000	256	167,868	21,075	55,602	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	○	◎	◎	◎	◎		◎	◎
Route B																													
Jakarta	Pontianak	254,000	28,830	75,400	754,700	95,480	304,900	417	90,633	14,979	44,284	◎	○	○	○	○	◎	○	○	◎	△	△	○	△	△	○			
Route C																													
Surabaya	Ujung Pandang	168,500	19,110	50,000	578,500	73,190	233,700	445	115,850	10,905	29,913	○	△	○	○	○	◎	△	△	△	△	△	△	△	○	○			
Route D																													
Kendari	Ambon	126,000	14,290	37,400	502,900	63,620	203,200	362	46,708	5,325	20,473	△	△	△	△	△	○	◎	◎	◎	○	○	◎	○	○	○			
Route E																													
Ambon	Sorong	74,800	8,490	22,200	251,200	31,780	101,500	337	40,751	2,592	9,821	△	△	△	△	△	△	△	△	△	◎	◎	◎	◎	◎	◎			
Middle and Short Distant Routes																													
Route a																													
Selayar	Labuhan Bajo	84,500	9,550	16,700	313,000	33,950	91,100	135	26,525	2,032	3,959	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎		◎	◎
Route b																													
Manokwari	Biak	72,600	8,230	14,400	255,200	27,670	74,300	144	26,846	2,060	3,997	◎	○	◎	○	○	○	○	○	○	◎	◎	◎	○	○	○	◎	◎	◎
Route c																													
Wahai	Babang	47,700	5,370	9,400	222,100	24,090	64,600	178	25,267	2,154	2,676	○	△	○	○	○	○	○	△	○	○	○	△	◎	◎	◎	◎	◎	◎
Route d																													
Patani	Sorong	44,600	5,030	8,800	217,500	23,580	63,300	173	27,836	2,145	2,657	△	△	○	○	○	○	○	△	△	○	△	△	◎	◎	◎			

Note : ◎ First priority, ○ Second priority, △ Third priority



Legend

- Proposed Ferry Routes for the Short-term Development Plan
- Proposed Ferry Routes for the Long-term Development Plan
- Ferry Routes in Future
- Existing Ferry Routes
- Ferry Routes under construction

Figure 1.3.1 Ferry Routes for the Short-term Development Plan

Chapter 2 Natural Conditions

1. A series of topographic/hydrographic survey, tide observation, current observation and soil investigations was carried out at the location of terminal site (except Biak – Mokmer site that was surveyed in the previous study) from January to March 1998.

2. Surabaya: The site is located in the Lamong Bay between Surabaya City and Gresik City. The slope of seabed is extremely gentle and six rivers flow into this bay area. The proposed project site is actually on alluvial tidal flat with mud bottom and the water area of depth over 5m below LWS is obtained around 2 – 3km offshore.

3. Banjarmasin: The site is located on the left bank of the Barito River approximately 30km upstream from the river mouth and belongs to tidal compartment of the river. The tidal range is observed about 2.8m at the site. The site is separated from the public port of Banjarmasin by a small creek.

4. Labuhan Bajo: The site is to develop by expanding the existing ferry facilities for 500GRT ferry berthing jetty and movable bridge, which was constructed in 1995/96. The water depth at the end of the jetty is observed about DL-6 m. The topography of the land in the vicinity of the port is rather flat and the existing port area is surrounded by several islands which are considered to be protected from offshore high waves that would pose problems on ferry operation.

5. Selayar (Patumbukan): The site is located at the head of an inlet on the southeast coast of Selayar Island. The land topography is rather uneven, while seaside is characterized by mangrove in relatively shallow water. The inlet is approximately 120 m in width and 700m in length and both sides of this inlet are steep slopes of the mountainous terrain. The influence of waves from the Flores Sea is negligibly small all through the year.

6. Wahai: The site is situated on the seashore in a hidden bay and is located about 250m south of the Wahai Public Port. The seaside of the proposed area is covered by bush, coconut trees and mangrove. It is considered that there are no wave that will pose any problem on ferry services.

7. Babang: The site is located on the East Coast of the Bacan Island and is about 400m northwest from the Babang Public Port, which is 16km from Labuha Town, the major port town of the island. The proposed site is an empty reclaimed area and covered by grass presently. The land side topography is flat, while sea side topography is rather

steep and the contour of DL-5m is from only 10 - 20m from shoreline.

8. Manokwari (Sowi): The site is located on the bayside approximately 5km southwest of Manokwari Town and the conditions of access road is rather good. The vicinity of the proposed site is flat and is presently empty and covered by bush. Seaside topography is relatively steep and the contour of DL-5m has a distance of about 75m from shoreline.

9. Biak (Mokmer): The site is the ferry terminal now being constructed by DGLT and is located approximately 20 minutes from Biak Town by vehicle. The size of the ferry terminal area still under construction is approximately 100m x 60m and located at the center of Mokmer village. The water depth at the end of the jetty is estimated to be approximately 5m below LWS. The site is open to SW waves. The maximum height of waves is assumed to be about two meters. The difference between HWS and LWS is about 1.6m.

10. Tide observations were carried out for continuous 15 nights and days at each terminal site from January to February 1998. The significant tide levels in each terminal site are as follows.

Table 2.1.1 Tide Elevations in Each Terminal Site

(DL+, m)

Terminal	HHWS (m)	MSL (m)	LLWS (m)	Remarks
Surabaya (Lamong Bay)	2.74	1.37	0.00	Existing Data
Banjarmasin (Port Site)	2.97	1.48	0.00	
Selayar (Patumbukan)	2.39	1.19	0.00	
Labuhan Bajo	2.70	1.35	0.00	
Wahai	1.92	0.96	0.00	
Babang	1.35	0.67	0.00	
Manokwari (Sowi)	2.22	1.11	0.00	
Biak (Mokmer)	1.55	0.92	0.00	Phase I Report

11. Observations of the current were executed at each terminal site. The maximum speeds of the observed current at each terminal site range 0.2 – 0.3m/sec (0.6 – 0.8m/s in the Barito River in Banjarmasin). The results of observations verify that maneuverability of vessels at all the terminal sites is not adversely affected by the current.

12. The ferry operation in the three sites, Selayar, Babang and Manokwari, was considered to be affected by waves, but there was no observed wave data available for each terminal site. Therefore wave hindcast in those sites was conducted by the latest

wind data over a period of more than five years, and offshore waves were calculated. The frequency of occurrence of wind and wave for each three terminal sites show the relatively calm characteristics of waves at the three terminal sites.

13. Patumbukan: The directions of wave incidence to the entrance of inlet at Patumbukan (Selayar Island) site are limited to the range between NE – E – SE and the days with calm wave conditions (with wave height less than 0.3 meters) show more than 95% of frequency. The frequency of occurrence of the waves with height 0.3 – 0.9 meters occupies 4.7% and the probability of the days with wave height greater than 1 meter is calculated as 0.7 days in a year (around once in 1.5 years).

14. Babang: The days with calm wave conditions (with wave height less than 0.3 meters) show more than 90% of frequency. The frequency of occurrence of the waves with height 0.3 – 0.9 meters occupies 9.7% and the probability of the days with wave height greater than 1 meter is calculated as 0.17 days in a year (around once in 6 years).

15. Manokwari: The directions of wave incidence to the Manokwari range between N – E – S. The days with calm wave conditions (with wave height less than 0.3 meters) show more than 92.5% of frequency. The frequency of occurrence of the waves with height 0.3 – 0.9 meters occupies 7.1%, and the probability of the days with wave height greater than 1 meter is calculated as 1.2 days in a year (around once in 0.8 years).

16. In order to verify the subsoil conditions of proposed terminal sites, one boring for the onland area and another boring for the offshore facility area were executed at each terminal site. Following table shows the summary of Soil Investigation result.

Table 2.1.2 Summary of Soil Investigation

No.	Site Location	Boring	Depth (DL, m)	Average N	Cohesive Soil	Non-cohesive Soil
1	Surabaya	BM. I	0 - 4	0	Soft	-
			4 - 60	33	Hard	-
		BM. II	0 - 11	1	Soft	-
			11 - 12	5	Medium	-
			12 - 60	35	Hard	-
2	Banjarmasin	BM. I	0 - 19	1	Soft	-
			19 - 22	14	Hard	-
			22 - 30	12	-	Medium
		BM. II	0 - 16	1	Soft	-
			16 - 19	5	Medium	-
			19 - 20	14	Hard	-
		BM. III	0 - 14	2	Soft	-
			14 - 24	7	Medium	-
			24 - 32	19	-	Medium
3	Selayar (Patumbukan)	BM. I	0 - 3	3	Soft	-
			3 - 12	6	-	Soft
			12 - 20	18	-	Medium
			20 - 22	60	-	Hard
		BM. II	0 - 6	3	-	Soft
			6 - 20	0	Soft	-
			20 - 27	5	Medium	-
			27 - 29	10	Hard	-
			29 - 30	50	-	Hard
4	Labuhan Bajo	BM. I	0 - 7	3	-	Soft
			7 - 19	12	-	Medium
			19 - 30	57	-	Hard
		BM. II	0 - 5	4	-	Soft
			5 - 11	16	-	Medium
			11 - 30	57	-	Hard
5	Wahai	BM. I	0 - 10	6	-	Soft
			10 - 14	12	-	Medium
			14 - 18	8	-	Soft
			18 - 20	31	-	Hard
			20 - 27	5	-	Soft
			27 - 30	50	-	Hard
		BM. II	0 - 6	4	-	Soft
			6 - 30	5	Medium	-
6	Babang	BM. I	0 - 3	60	-	Hard
			3 - 11	13	-	Medium
			11 - 14	12	Hard	-
			14 - 19	16	-	Medium
			19 - 22	56	-	Hard
		BM. II	0 - 7	6	-	Soft
			7 - 13	12	Hard	-
			13 - 27	18	-	Medium
			27 - 30	38	-	Hard
		BM. III	0 - 5	6	-	Soft
			5 - 14	21	-	Medium
			14 - 20	55	-	Hard
7	Manokwari	BM. I	0 - 7	30	-	Medium
			7 - 18	50	-	Hard
		BM. II	0 - 16	50	-	Hard
			6 - 14	35	-	Medium
			14 - 20	50	-	Hard

Notes	Cohesive Soil	Noncohesive Soil	Remarks
N value	0 - 4	0 - 10	Soft
	4 - 8	10 - 30	Medium
	N > 8	N > 30	Hard

Chapter 3 Ferry Terminal Development Plan

3.1 Factors Concerned with Ferry Terminal Planning

1. The required ferry terminal facilities at each site in the short-term development plan are determined according to the requirement of number of berths, length and water depth of berth, passenger terminal and parking area and others.

3.2 Ferry Terminal Development Plan at Each Site

2. Basic premises for the ferry terminal development plan at each site in the short-term development plan should consider the following matters.

1) Continuity to long-term development plan,
2) Flexibility in land utilization and
3) Efficient layout of terminal.

3. A ferry terminal short-term development plan at each site is proposed according to the requirement of ferry terminal facilities, the basic premises and the results of the natural and environmental conditions survey as follows;

(1) Surabaya (Lamong Bay) - Banjarmasin

1) Surabaya (Lamong Bay)

4. The proposed site is located at Lamong Bay in the Surabaya port area and situated between the existing container berth and the future container terminal and other development complex, which includes the passenger vessel terminal (See Figure 3.2.1).

5. The berth for a 5,000GRT ferry boat (15,000m^2) is planned offshore about 3km from the onshore ferry terminal including the second passenger terminal (2,400m^2) and parking area (3,200m^2). The ferry terminal area (38,000m^2) at the onshore side with a causeway (800m) is connected to the berth by the trestle (about 2.0km). Other facilities include the first passenger terminal (4,000m^2), a shuttle bus terminal (3,300m^2) and a parking area (9,000m^2).

6. In the implementation of this project, it is necessary for the Indonesian government to coordinate with PELINDO III's passenger terminal development plan including joint management of the trestle and to consider the land acquisition for the access road between the ferry terminal and the regional road.

2) Banjarmasin

7. The proposed site is situated in a future port development area of Banjarmasin port. This area, however, is owned by the army and is now being leased to a private company. Layout of this terminal is planned for berthing of 5,000GRT ferry boat (See Figure 3.2.2); total onshore area is about 30,000m^2 including a passenger terminal (two stories: 4,000m^2) and parking area (9,000m^2).

8. At the implementation of this project, it is necessary for the Indonesian government to confirm the future port development plan and to consider the land acquisition for the ferry terminal.

(2) Selayar (Patumbukan) - Labuhan Bajo

1) Selayar (Patumbukan)

9. The proposed site is a small scale bay. In the ferry terminal layout plan, dredging is necessary to secure the offshore facilities including the area of a new dolphin berth for 1,000GRT ferry boat, turning basin and access channel. The ferry terminal area (19,500m^2) including a passenger terminal (2,000m^2) and a parking area (5,000m^2) is secured by land reclamation (See Figure 3.2.3).

10. The turning basin and access channel will be compensated for by installing navigation aids. And the 4km access road between the site and the main road has not been paved, therefore, the road construction works are planned in this project.

2) Labuhan Bajo

11. The proposed site has been equipped with a dolphin berth for 500GRT for the existing route, however, according to the ferry operation planning, one ferry berth to accommodate 1,000GRT ferry boat is planned for both the existing and the new route. The existing dolphin berth is improved to accommodate 1,000GRT ferry boat. The ferry terminal area (20,000m^2) is obtained by reclamation of both east and west side including two passenger terminals (2,200m^2) and a parking area (5,000m^2) as shown in Figure 3.2.4.

12. In the implementation of this project, it is necessary to ensure that existing ferry terminal operation is not obstructed during the improvement works. The Indonesian government must be considered the land acquisition for the expansion of ferry terminal.

(3) Manokwari (Sowi) - Biak (Mokmer)

1) Manokwari (Sowi)

13. The topography of the proposed site is flat and empty, and a water depth of -5m is obtained 75m from shoreline. The ferry terminal layout plan includes one dolphin berth to accommodate 1,000GRT ferry boat. The ferry terminal area (19,500m^2) with a causeway (50m) including a passenger terminal (2,000m^2) and a parking area (5,000m^2) is secured by land reclamation (See Figure 3.2.5).

2) Biak (Mokmer)

14. A dolphin berth to accommodate 300GRT ferry boat was planned at the proposed site by a previous study. However, after finishing the land reclamation work, terminal construction was stopped due to lack of funds. One ferry berth to accommodate 1,000GRT ferry boat is planned for both the existing and the new route. The ferry terminal area (19,500m^2) is obtained by reclamation including a passenger terminal (2,000m^2) and a parking area (5,000m^2) as shown in Figure 3.2.6.

(4) Wahai - Babang

1) Wahai

15. The topography of the proposed site is flat and a water depth of -5m is obtained 100m from shoreline. One dolphin berth capable of accommodating 1,000GRT ferry boat is planned in the ferry terminal layout plan. The ferry terminal area (17,000m^2) with a causeway (115m) including a passenger terminal (1,500m^2) and a parking area (4,000m^2) is secured by land reclamation (See Figure 3.2.7).

2) Babang

16. The proposed site is owned by a timber company, however, the area including a office and a factory is not being used at present. One dolphin berth to accommodate 1,000GRT ferry boat is planned. The ferry terminal area (15,000m^2) including a passenger terminal (1,500m^2) and a parking area (4,000m^2) will be secured by leveling the ground (See Figure 3.2.8).

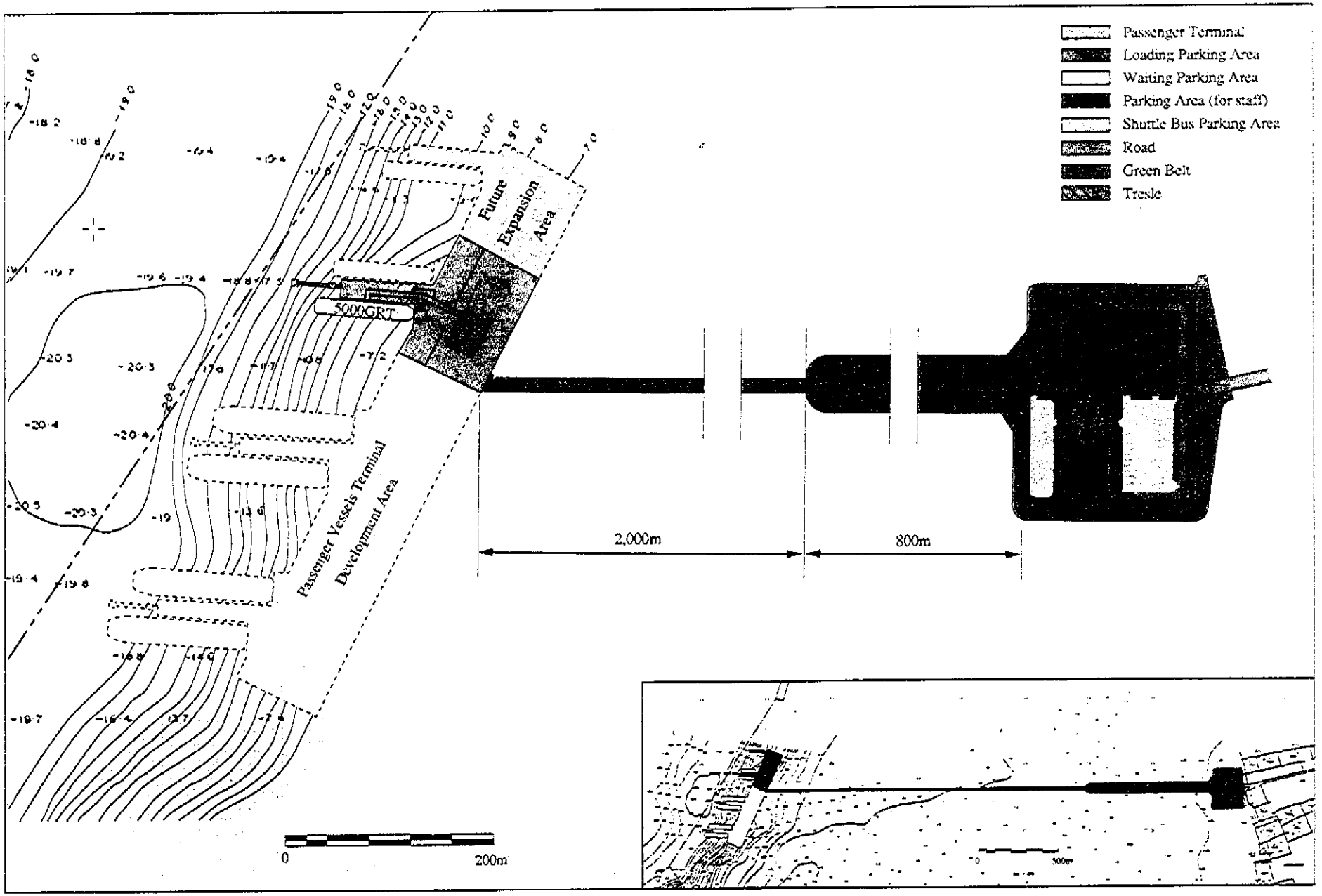


Figure 3.2.1 Layout Plan of Surabaya Ferry Terminal

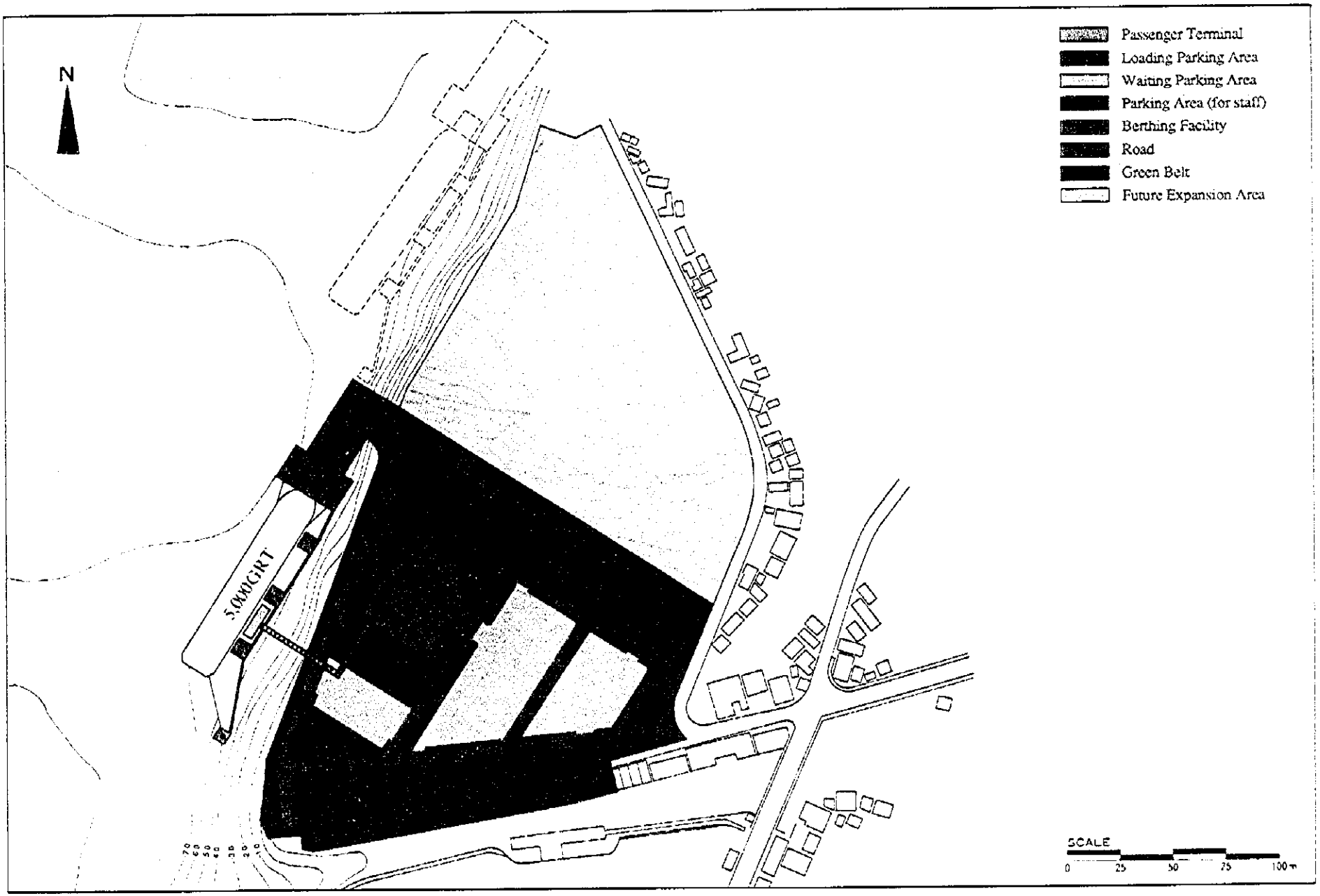


Figure 3.2.2 Layout Plan of Banjarmasin Ferry Terminal

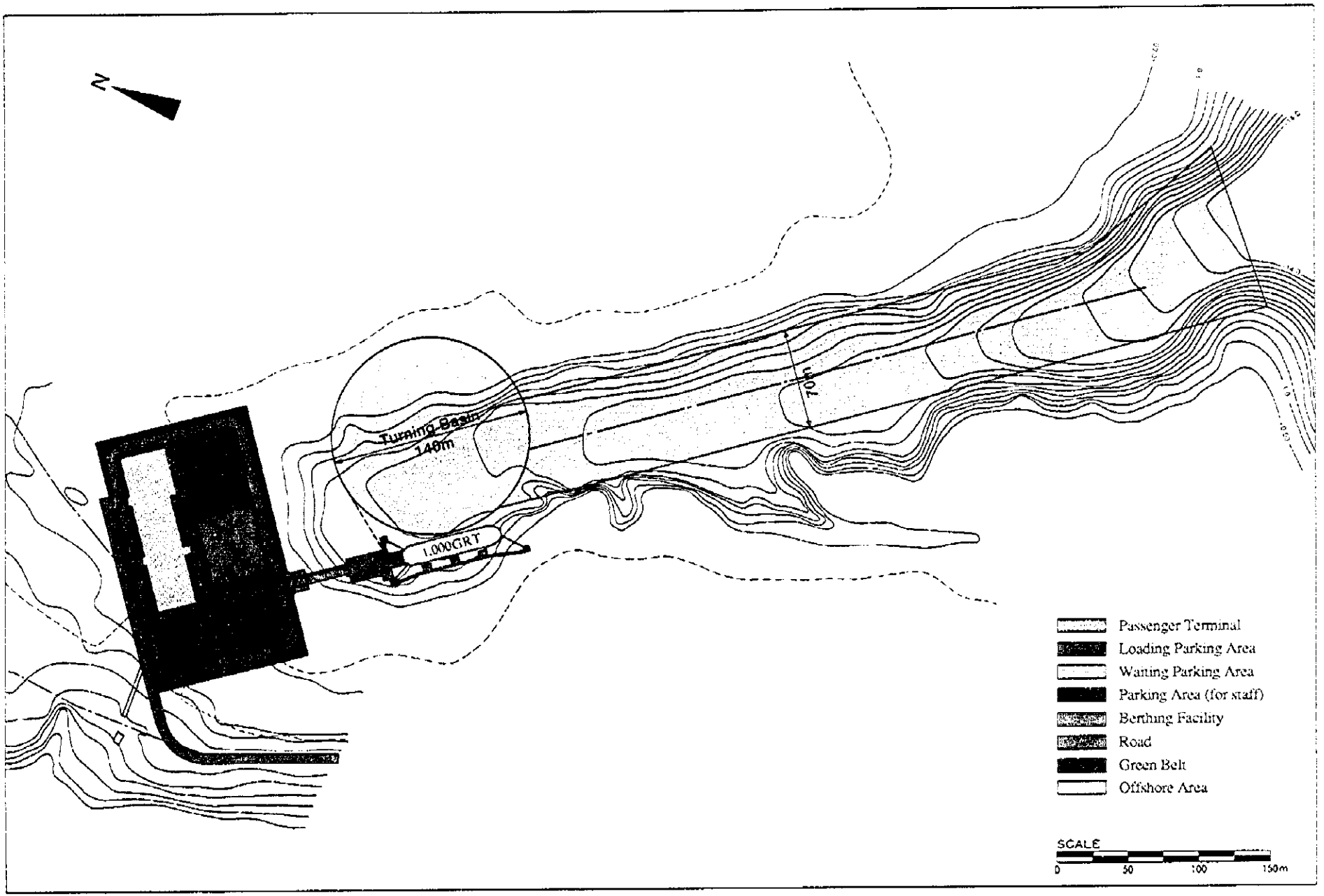


Figure 3.2.3 Layout Plan of Selayar Ferry Terminal

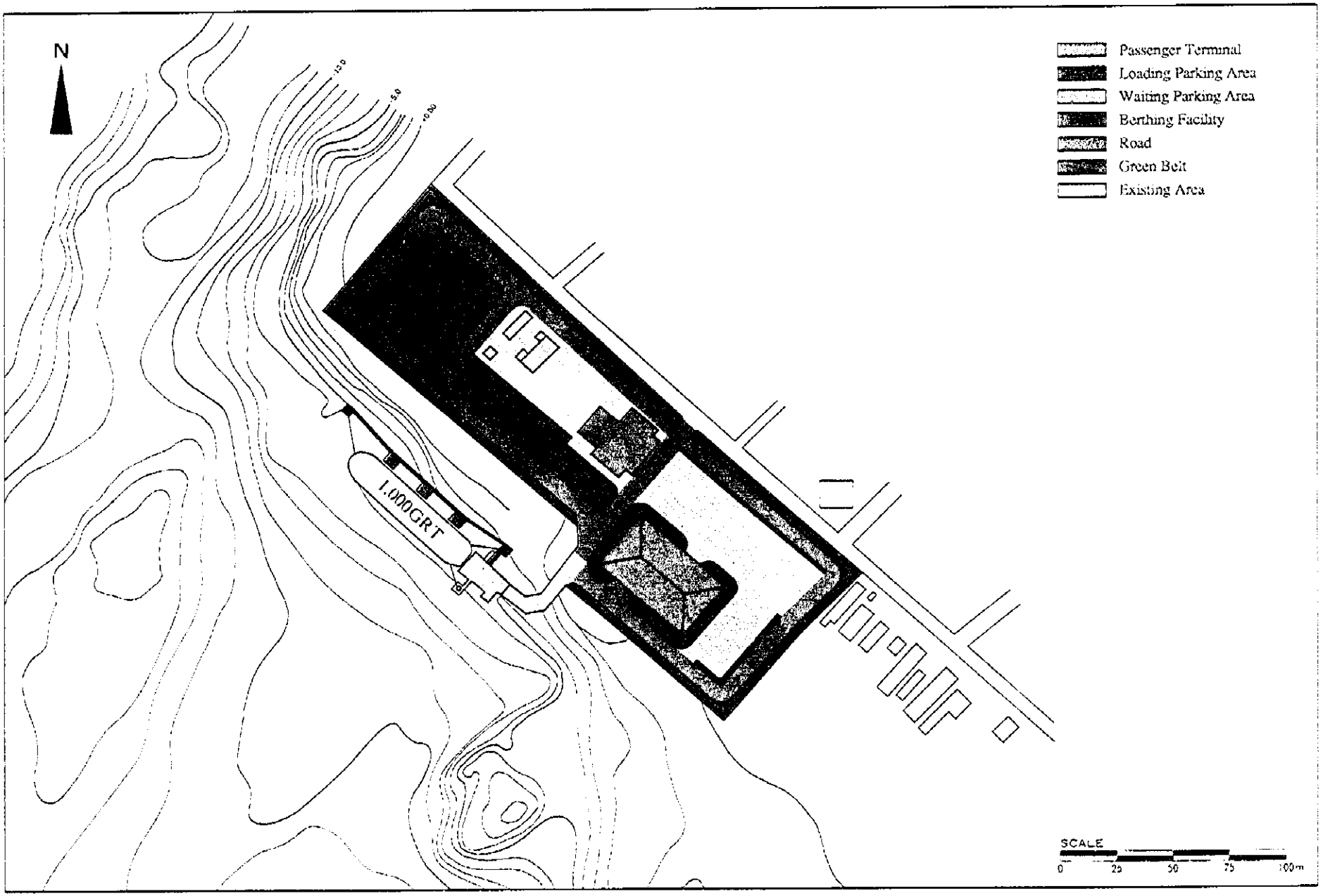


Figure 3.2.4 Layout Plan of Labuhan Bajo Ferry Terminal

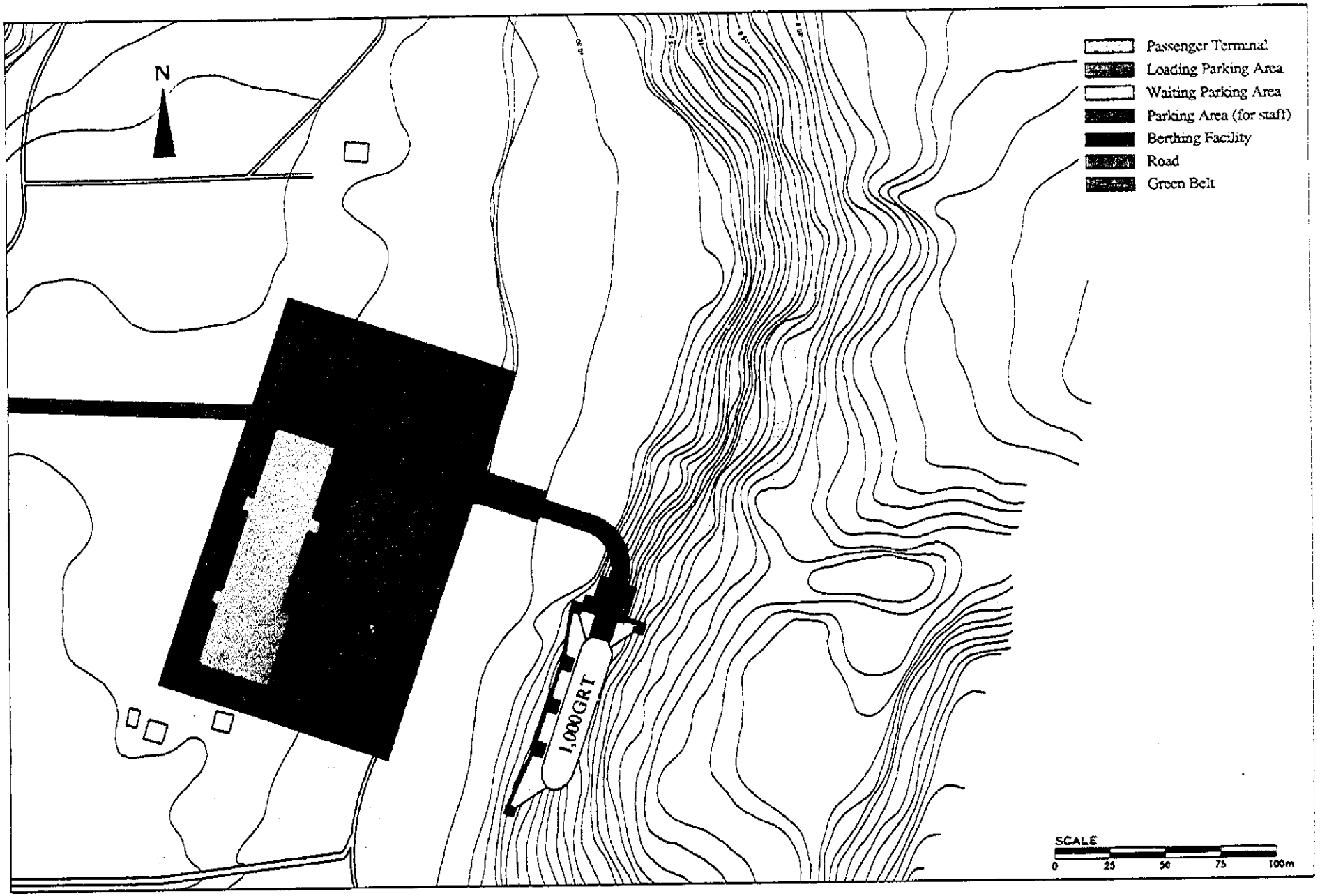


Figure 3.2.5 Layout Plan of Manokwari Ferry Terminal

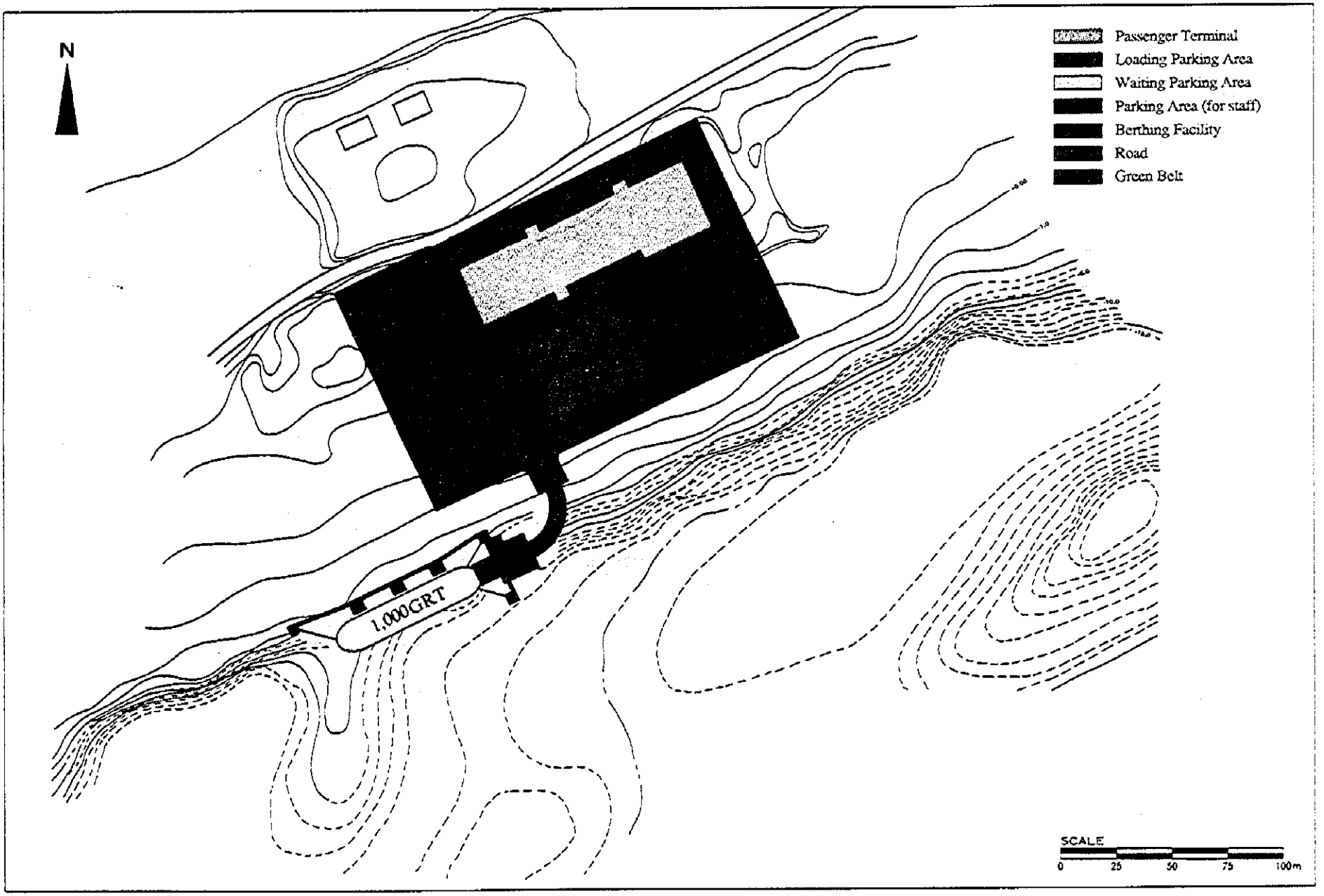


Figure 3.2.6 Layout Plan of Biak Ferry Terminal

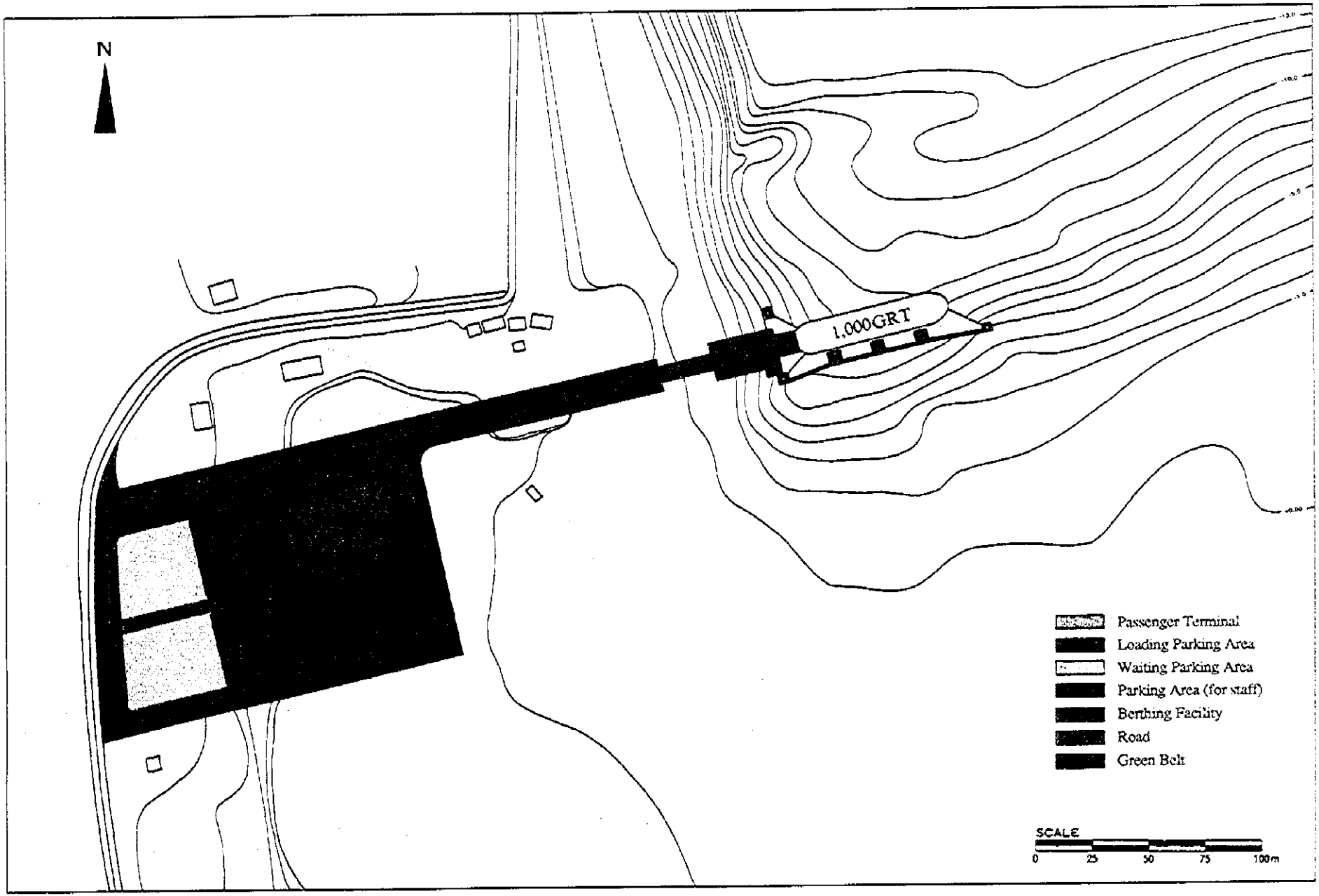


Figure 3.2.7 Layout Plan of Wahai Ferry Terminal

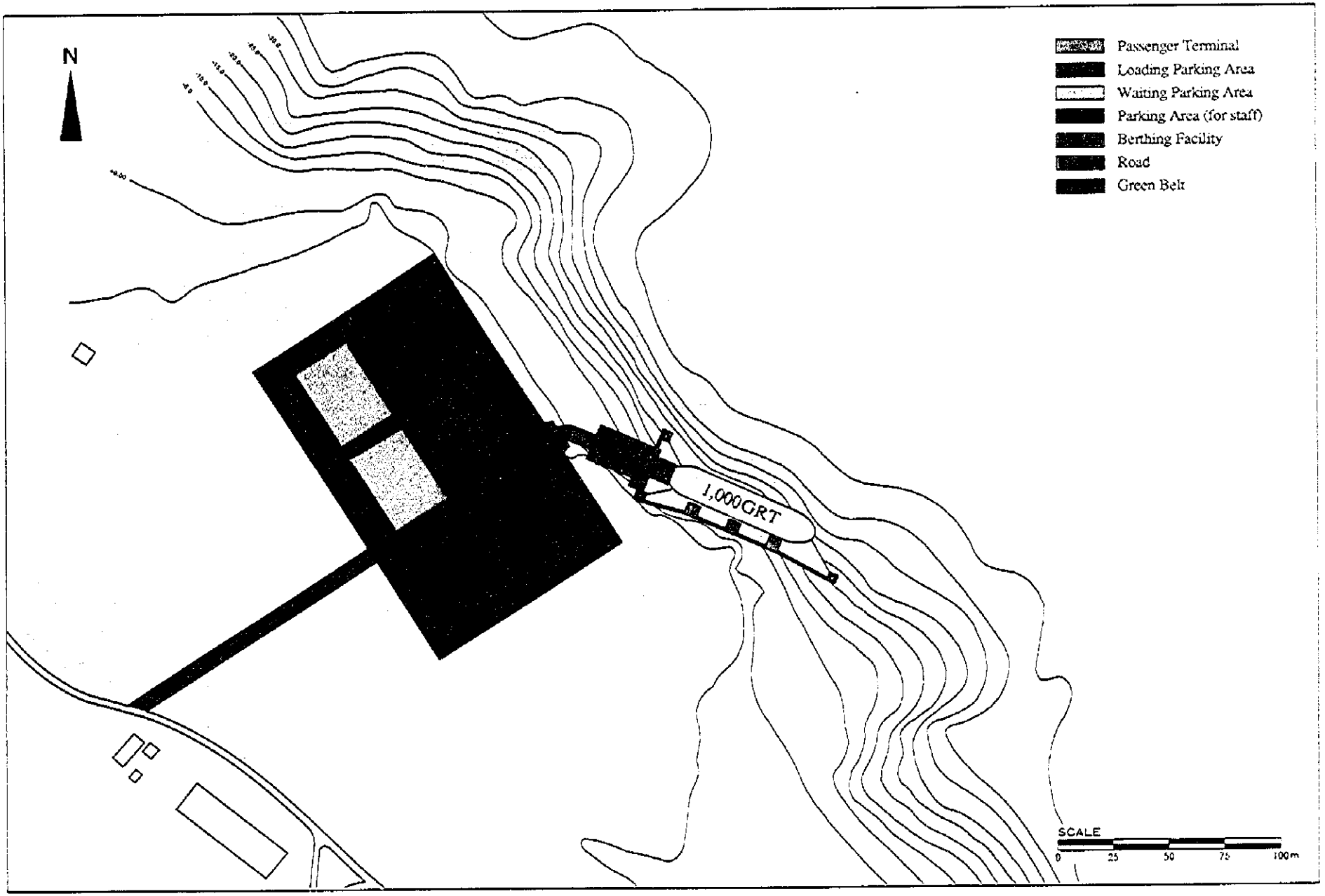


Figure 3.2.8 Layout Plan of Babang Ferry Terminal

Chapter 4 Preliminary Design, Cost Estimation and Construction Schedule

4.1 Preliminary Design

(1) Surabaya -- Banjarmasin route

1. Soil conditions of Surabaya and Banjarmasin are soft clayey silt (N<10) in the deeper depth of some - 30.0m at the construction site of mooring facilities. The pile foundation for the mooring facilities are recommended at each terminal.

2. The berthing facilities for 5,000GRT are constructed by detached pier at off shore of depth of -12.0m about 2,800m away from the land. The access way combined with the trestle by pre-stressed concrete beams for 2,000m long and causeway for 800m long are provided based on the soil data assumed bearing layer.

3. The onshore terminal area of Surabaya is developed by the reclamation. A detached platform of 140m x 90m at offshore for convenience of immediate on-board of vehicles and passengers is constructed by concrete slabs on the pile foundation. The surface layer of soft soil (the base course of the causeway of the Surabaya terminal) is to be dredged in depth of 5m and 50m width for 800m long from the shoreline due to its soft clay, which dredged volume is estimated about 230,000m^3.

4. The Banjarmasin terminal is developed by utilizing the existing land. The retaining wall by sheet piles in the distance of 180m are provided behind the mooring dolphins to protect the reclaimed land at the Banjarmasin area. The armour stones are placed for score/leakage protection of reclaimed sand between the area of retaining wall and existing land.

(2) Selayar - Labuhan Bajo route

5. The Selayar (Patumbukan) terminal is developed inside the bay which is well protected from offshore high wave of 2.27m from east direction and strong current. The necessary depth of -4.5m at turning basin and access channel are obtained by dredging, which will be executed by cutter suction dredger.

6. The land area of Labuhan Bajo terminal is to be developed by additional reclamation of 20,000m^3 from the existing land area. The existing breasting and mooring dolphins for short distance of ferry service by 500GRT are replaced by new dolphins with

up-graded fender quality to absorb the berthing energy of 7.56 t·m by 1,000GRT. The new breasting dolphins and mooring dolphins are placed at new positions to accommodate 500GRT and 1,000GRT vessels. The existing movable bridge, trestle, terminal building and parking area will be used.

(3) Wahai - Babang Route

7. The sub soil conditions of Babang is soft clay (N<10) at the upper layer above -15m depth and encountered hard coral shell fragment layer there from where is the sea bed of mooring and breasting dolphins to be constructed. Because of the relatively steep slope of sea bed by 5m difference in 20m distance at the planned site the sub soil conditions below sea bed is observed to be changed. The steel pipe piles are recommended for the mooring facilities foundation to maintain the stability by flexible adjustment to the change of sub soil conditions to be encountered during the construction stage.

8. The sub soil condition of Wahai site is soft clay in the deeper depth above -30m. The longer steel pipe piles are recommended for the foundation of mooring facilities in the aspect of economic cost and convenience of construction works.

(4) Manokwari – Biak route

9. The existing reclaimed land at the Mokmer site is recommended to be expanded gradually to meet the traffic growth of passengers and vehicles to be generated by the regional ferry service routes of the new ferry of 1,000GRT connecting vertically and horizontally in the Cendrawasih Bay.

10. During 90% of the year the Sowi bay area receives less than 30cm of the wave height. Under such wave conditions, the planned ferry terminal at Sowi will be able to be made available for operation for more than 90% of the year. Therefore a breakwater thereof is not constructed. On the contrary the planned site of Mokmer terminal is exporsed to three directions in the Yapen Strait where has still possibility to receive high wave during September to December. It is recommended to collect wave and wind data continuously for some years to justify the necessity of construction of the breakwater.

11. The volume of works of the main facilities of each terminal are summarized in the Table 4.1.1 attached hereinafter.

Table 4.1.1 The Volume of Works of Main Facilities of Planned Ferry Terminals

Main Facilities	Surabaya		Banjarmasin	Selayar	Labuhan Bajo	Wahai	Babang	Manokwari	Biak
On Land Facilities	On land	Off Shore							
- Land Area [m^2]	38,000	0	30,000	19,500	20,000	17,000	15,000	19,500	19,500
- Reclamation Volume [m^3]	95,000	0	45,000	55,000	20,000	25,500	7,500	19,000	36,500
- Passenger Terminal Building [m^2]	4,000	2,400	4,000	2,000	2,200*	1,500	1,500	2,000	2,000
- Loading Parking Lot [m^2]	5,000	0	5,000	2,500	2,500	2,000	2,000	2,500	2,500
- Waiting Parking Lot [m^2]	4,000	3,200	4,000	2,500	2,500	2,000	2,000	2,500	2,500
- Shuttle Bus Parking Lot [m^2]	3,300	0	0	0	0	0	0	0	0
Off Shore Facilities									
- Mooring Facility									
Objective Ferry Boat [GRT]	5,000		5,000	1,000	1,000	1,000	1,000	1,000	1,000
Design Water Depth [m]	- 6.0		- 6.0	- 4.5	- 4.5	- 4.5	- 4.5	- 4.5	- 4.5
Type of Marin Structure	Steel Pile Dolphins and Pier		Steel Pile Dolphin	Steel Pile Dolphin	Steel Pile Dolphin	Steel Pile Dolphin	Steel Pile Dolphin	Steel Pile Dolphin	Steel Pile Dolphin
- Landing System for vehicles	Movable Bridge		Movable Bridge	Movable Bridge	Movable Bridge	Movable Bridge	Movable Bridge	Movable Bridge	Movable Bridge
for passengers	Passengers Access and Boarding Bridge		No	No	No	No	No	No	No
- Access way Treslte [m]	1,960		10.0	42.5	41.8**	36.0	10.0	55.0	35.0
Causeway [m]	800		0	17.5	31.5**	115.0	0	30.0	0.0
- Detached Pier [m]	120		120	0	0	0	0	0	0
Platform [m^2]	12,600		1,800	0	0	480.0	480.0	0	0
- Retaining wall [m]	0		180	0	0	0	0	0	0
- Dredging Works [m^3]	230,000		15,000	99,200	0	0	0	0	0

Note; * The existing passenger terminal building of 700 m^2 are included and additional terminal building of 1,500 m^2 is developed separately.

** The distance indicated is the existing access way of Labuhan Bajo.

4.2 Cost Estimation and Construction Schedule

12. The construction cost of each planned ferry terminal site was surveyed by re-visiting the main construction companies of the concerning regions in February 1998. The prices of construction materials, equipment, labours and construction-related commodities soared in high rates influenced by the devaluation of Rupiah since middle of 1997 to 1998.

13. Unit price of each element such as labour, major material and major equipment were determined on the basis of the regional unit prices collected in the field survey in February – March 1998.

14. Table 4.2.1 shows the estimated construction cost of major work items and their changes between August 1997 and February 1998.

15. Price of imported products such as major parts of PC structures, fender system and navigation aids are based on the CIF Jakarta price and adjusted considering import tax and some mobilization fee to the construction site. The basic costs of imported products are converted to Indonesian Rupiah for the estimation of project cost based on the exchange rate of foreign currency as follows; US$1.00 = 9,600Rupiah = ¥128 (the average rate in the period from January to March 1998).

16. Based on the preliminary design of the proposed facilities at each terminal site, the quantities of works of designed facilities of the respective terminal sites are estimated. The construction costs of all the works and facilities are worked out by multiplying quantities by unit prices of works for the respective proposed sites and divided into local currency portion and foreign currency portion depending on the components of works.

17. The construction costs of the main items of waterfront facilities and onland facilities with the respective quantities are estimated along the planned construction schedule. The total construction cost for development of the proposed terminal site for the feasibility study is summarized as shown in Table 4.2.2.

18. The construction schedule, arrangement and methods of works of each terminal have been determined in accordance with the planned scope and type of works required for development and construction of the ferry terminal. The construction period of each terminal is estimated about two years except for Surabaya - Banjarmasin route which requires the peiod of two and half yaers.

Table 4.2.1 Combined Construction Cost and Their Changes between August 1997 and February 1998

Work Items	Banjarmasin			Surabaya			Labuhan Bajo			Selayar		
(unit: 1,000 Rupiah)	Aug '97	Feb '98	Inflation	Aug '97	Feb '98	Inflation	Aug '97	Feb '98	Inflation	Aug '97	Feb '98	Inflation
Steel Pipe Piling (D=600 mm)	543	1,119	106%	530	1,208	128%	717	1,701	137%	593	1,165	96%
(D=800 mm)	687	1,436	109%	674	1,556	131%	912	2,165	137%	751	1,482	97%
(D=1000 mm)	831	1,752	111%	818	1,905	133%	1,106	2,628	138%	910	1,799	98%
Concrete Work Wharf, Dolphin	1,215	2,145	77%	1,035	1,739	68%	1,374	3,134	128%	1,262	2,164	71%
Revetment, Wall	641	1,154	80%	575	951	65%	750	1,614	115%	672	1,245	85%
Sheet Piling (type II)	207	290	40%	-	-	-	-	-	-	-	-	-
Tie-rod & Block Concrete	1,068	2,549	139%	-	-	-	-	-	-	-	-	-
Asphalt Concrete Pavement	65	120	85%	38	58	53%	169	253	50%	42	127	202%
Walkway Pavement	49	68	39%	26	37	42%	87	145	67%	33	76	130%
Mound Stone	-	-	-	-	-	-	64	105	64%	-	-	-
Dredging and Reclamation	-	-	-	-	-	-	-	-	-	27	51	89%
Filling Work	21	57	171%	24	38	58%	22	54	145%	22	41	86%
Slope Protection by Stone Work	63	84	33%	39	65	67%	86	137	59%	71	105	48%
Filter Sheet by Geotextile	9	27	200%	8	24	200%	9	27	200%	9	26	189%

Work Items	Babang			Wahai			Biak			Manokwari		
(unit: 1,000 Rupiah)	Aug '97	Feb '98	Inflation	Aug '97	Feb '98	Inflation	Aug '97	Feb '98	Inflation	Aug '97	Feb '98	Inflation
Steel Pipe Piling (D=600 mm)	741	1,212	64%	699	1,188	70%	743	1,283	73%	763	1,307	71%
(D=800 mm)	950	1,544	63%	894	1,513	69%	952	1,640	72%	979	1,671	71%
(D=1000 mm)	1,159	1,877	62%	1,088	1,838	69%	1,160	1,996	72%	1,195	2,035	70%
Concrete Work Wharf, Dolphin	1,431	2,303	61%	1,374	2,300	67%	1,508	2,519	67%	1,572	2,459	56%
Revetment, Wall	798	1,370	72%	750	1,367	82%	878	1,542	76%	921	1,486	61%
Sheet Piling	-	-	-	-	-	-	-	-	-	-	-	-
Tie-rod & Block Concrete	-	-	-	-	-	-	-	-	-	-	-	-
Asphalt Concrete Pavement	53	140	164%	57	138	142%	77	177	130%	69	145	110%
Walkway Pavement	38	87	129%	39	82	110%	50	108	116%	47	96	104%
Mound Stone	-	-	-	64	112	75%	58	333	474%	79	152	92%
Dredging and Reclamation	-	-	-	-	-	-	-	-	-	-	-	-
Filling Work	28	74	164%	22	87	295%	28	173	518%	28	60	114%
Slope Protection by Stone Work	72	168	133%	86	152	77%	87	343	294%	86	152	77%
Filter Sheet by Geotextile	9	29	222%	9	29	222%	9	32	256%	9	32	256%

19. Implementation program of the project is assumed that the financial arrangement will be started in 1999, survey and engineering study will be started in 2000, tender procedures from 2000 to 2001 and the construction period will start in 2002 (2001 as for Surabaya – Banjarmasin route) and completed at the end of 2003.

Table 4.2.2 Summary of Construction Cost

Surabaya - Banjarmasin (Unit in 1,000 Rupiah)

		Local	Foreign	Total
Construction Cost	Surabaya	189,412,166	136,113,365	325,525,531
	Banjarmasin	19,502,944	16,904,726	36,407,670
	(1) Sub-Total	208,915,110	153,018,091	361,933,201
Engineering Fee	(2)=(1) x 8%	17,372,795	11,581,861	28,954,656
Physical Contingency	(3)=[(1)+(2)] x 10%	22,628,791	16,459,995	39,088,786
VAT	(4)=[(1)+(2)+(3)] x 10%	42,997,664	-	42,997,664
Total	(1)+(2)+(3)+(4)	291,914,360	181,059,947	472,974,307

Selayar - Labuhan Bajo (Unit in 1,000 Rupiah)

		Local	Foreign	Total
Construction Cost	Labuhan Bajo	6,188,504	4,755,682	10,944,186
	Selayar	13,264,713	9,270,794	22,535,507
	(1) Sub-Total	19,453,217	14,026,476	33,479,693
Engineering Fee	(2)=(1) x 10%	2,008,781	1,339,188	3,347,969
Physical Contingency	(3)=[(1)+(2)] x 10%	2,146,200	1,536,566	3,682,766
VAT	(4)=[(1)+(2)+(3)] x 10%	4,051,043	-	4,051,043
Total	(1)+(2)+(3)+(4)	27,659,241	16,902,230	44,561,471

Manokwari - Biak (Unit in 1,000 Rupiah)

		Local	Foreign	Total
Construction Cost	Manokwari	9,350,718	6,916,568	16,267,286
	Biak	10,282,623	7,303,043	17,585,666
	(1) Sub-Total	19,633,341	14,219,611	33,852,952
Engineering Fee	(2)=(1) x 10%	2,031,177	1,354,118	3,385,295
Physical Contingency	(3)=[(1)+(2)] x 10%	2,166,452	1,557,373	3,723,825
VAT	(4)=[(1)+(2)+(3)] x 10%	4,096,207	-	4,096,207
Total	(1)+(2)+(3)+(4)	27,927,177	17,131,102	45,058,279

Wahai - Babang (Unit in 1,000 Rupiah)

		Local	Foreign	Total
Construction Cost	Wahai	9,428,874	7,431,380	16,860,254
	Babang	7,471,098	7,183,754	14,654,852
	(1) Sub-Total	16,899,972	14,615,134	31,515,106
Engineering Fee	(2)=(1) x 10%	1,890,907	1,260,604	3,151,511
Physical Contingency	(3)=[(1)+(2)] x 10%	1,879,088	1,587,574	3,466,662
VAT	(4)=[(1)+(2)+(3)] x 10%	3,813,328	-	3,813,328
Total	(1)+(2)+(3)+(4)	24,483,295	17,463,312	41,946,607

Chapter 5 Environmental Impact Assessment

5.1 General

1. The Environmental Impact Assessment (EIA) was carried out from the view point of the environmental consideration based on the result of IEE report. The environmental field survey was conducted at the following eight (8) ferry terminal sites from January to March 1998 for short-term development plan for the target year 2004. Based on the result of field survey EIA report was prepared for :

1) Surabaya – Banjarmasin
2) Selayar – Labuhan Bajo
3) Manokwari – Biak
4) Wahai – Babang

5.2 Study Method

2. The methodology applied in this study is summarized as follows:

1) Firstly the present environmental conditions were checked and confirmed through field survey and by means of literature review.

2) Identification was made of those components of the proposed project which may have an impact (negative or positive) on the environment and lead influence to the current conditions.

3) Evaluation was made on the impact of the project by using matrix forms in which project activities are set against environmental characteristics to foster cause-and-effect relationship

4) To conduct a precise evaluation and study for EIA, the following site survey, laboratory analysis and data collection were conducted in each site:

- Seawater quality survey
- Seabed quality survey
- Survey of benthic ecosystem
- Survey of fisheries
- Survey of local inhabitants

- Survey of fauna and flora
- Survey of soil conditions

5.3 Prediction and Evaluation of the Environmental Impact

3. Impact identification and prediction were carried out on the basis of analysis of the interactions between project activity components and environmental parameters/ characteristics, which are used as impact indicator. The various interactions are shown in a matrix to show the cause-and-effect relationships. The results of impact are analyzed at three stages i.e. pre-construction phase, construction phase, and operation phase.

4. The environmental impact at the above stages by the project implementation was assessed based on the Government regulations and guidelines.

5.4 Result of EIA

5. The study result of the Environmental Impact Assessment on this project are shown in Table 5.4.1. It is found that no serious significant effect on the environmental aspect is expected. The influence caused by implementation of this project is estimated to be only minor, and adverse impact may be minimized through mitigation measures, proper planning and execution of the construction activities. Therefore the implementation of this project will not foster much difficulty.

Table 5.4.1 Result of EIA

Construction phase & Envi. Components	Type of Impact	Impact agent	Surabaya	Banjarm-asin	Selayar	L. Bajo	Manokw-ari	Biak	Wahai	Babang
Pre-construction stage										
Local community	Social conflicts due to field survey	Negative perception of the project	-	-	-	-	-	-	-	-
	Social conflicts due to resettlement	Relocation program of household/land affected	-	-	-	-	-	-	-	-
Construction stage										
Local community	Employment		0	0	0	0	0	0	0	0
	Damage to roads	Over weight	1	1	1	1	-	-	1	1
	Temporary dust and noise problem	Equipment and materials mobilization and construction activities.	1	1	-	-	-	-	-	-
	Traffic jam	Equipment and materials mobilization and construction activities.	1*	1**	1	1	1	1	1	1
	Fishing activity	Construction work : Reclamation, dredging, piling, earth work, etc.	1	-	-	-	-	-	-	-
Water quality: aquatic environment	Impact to marine ecology (fish/aquatic organism)	Construction work : Reclamation, dredging, piling, earth work, etc.	1	-	1	1	1	1	1	1
Inhabitants and fishermen activity	Interference with transportation and fishing	Equipment mobilization Construction work in sea area	1	1	-	1	-	-	-	-
Coastal hydrology	Change of coastal hydrology	conditions	1	-	1	-	-	-	-	-
Ecology	Impact of coastal ecology	Design of facility and construction method	-	-	1	1	1	1	1	1
Operation stage										
Water quality : aquatic Environment	Impact to marine ecology (fish/aquatic organism)	Oil spills/leakage within port	-	-	-	-	-	-	-	-
Ecology	Impact to marine ecology (fish/aquatic organism)	Liquid waste from port facilities and boats	-	-	-	-	-	-	-	-
Local community	Air pollution and noise	Loading & unloading of traffic	1	1	-	-	-	-	-	-
	Public health and sanitation	Solid waste from ferry boats and passengers.	-	-	-	-	-	-	-	-
	Traffic jam/noise	Loading & unloading of traffic	1*	1**	-	-	-	-	-	-
	Employment		0	0	0	0	0	0	0	0
Coastal hydrology	Change of coastal hydrology	conditions	-	-	-	-	-	-	-	-
	Surface soil erosion	Soil erosion by rain water	-	-	1	-	-	-	-	-

Grade 3 : Serious negative impact, 2 : Moderate negative impact, 1 : Minor negative impact, 0 :Positive, - : No effect is expected,

Note : 1* The environmental impact to the existing traffic system will be resolved after widening plan of the existing road.

1** The environmental impact to the existing traffic system will be resolved after completion of new highway project.

Chapter 6 Ferry Operation Planning

6.1 General Conditions

1. The specification of all vessels including carrying capacity of ferry boat is confirmed by DGSC. However, the actual loading capacity of boats for ferry service is specified by DGLT. Therefore the ferry boat size and capacity on each route should be precisely determined at the operational stage with the authorization of the competent authorities according to the actual boats which will be introduced.

6.2 Operation Program

2. The operation program of the four routes is summarized as shown in Table 6.1.1.

Table 6.1.1 Operation Program of the Four Routes

	Surabaya - Banjarmasin	Selayar - Labuhan Bajo	Manokwali - Biak	Wahai - Babang
1. Annual Demand				
(a) passenger	559,800	84,500	72,600	47,700
(b) car	63,550	9,550	8,230	5,370
2. Boat Size (GRT)	5,000	1,000	1,000	1,000
Capacity: Passenger	800	500	500	500
: Car	76	42	42	42
3. Frequency (round trip)	2/ day	1/2/ day	1/2/ day	2/week
4. Route Distance (NM)	256	135	144	178
5. Cruising Speed (knot)	17	14	14	14
6. Time of Trip(hour)	15	10	10	13
7. Berthing Hour(/trip)	3	2	2	2
8. Number of boats	3	1	1	1
9. Berthing Hour(/day)	6	2h/2	2h/2	4/week
10. Required No. of Berth	1	1	1	1

Note: Planning peak day volumes are estimated as 1/280 of annual volume for passengers and 1/330 for cars.

Target load factors on the planning peak day are 70% for passengers and 80% for cars.

3. At Labuhan Bajo and Biak ports, the Labuhan Bajo - (Komodo) - Sape route and Biak - Serui route are now in operation by 500GRT class boat. So the new ferry berths at Labuhan Bajo and Biak are to be shared by the existing ferry routes.

4. To encourage constant demand for ferry transportation, it is necessary to promote reliable, convenient, comfortable and safe operation. This requires adjusting

the schedule during docking maintenance with the estimated demand fluctuation. Also, to operate efficiently with a small number of boats, it is necessary to increase cruising speed, decrease berthing/anchoring time and introduce nighttime operation.

5. Service should be reliable and punctual, with fewer cancellations and less short shipment (left-off). This entails proper frequency, fixed time arrival and departure, easy access to and from the ferry terminals, and so on. In addition, better accommodations including comfortable waiting lounge in passenger terminal and cabin with sufficient number of chairs, concessions on boats, and so on are needed.

6.3 Navigation Safety

(1) Ferry boats safety

6. The stability and strength of ships is the most important element of ship safety. Ship inspection is vital for the safety for ships. The Indonesian government has ratified the international conventions according to the classification of vessels as well as other conventions regarding ship safety. Therefore the inspection of ferry boats at shipyards should be performed in the same manner as other vessels.

7. In addition, life saving facilities, fire prevention and fire fighting equipment should be securely rigged on ferry boats in conformity to the regulations including life jackets and life boats corresponding to the maximum number of passengers.

(2) Navigational safety

8. Sea and weather conditions on the four routes are generally moderate, and few severe problems can be found from the navigational point of view. But needless to say, because the area belongs to the tropical monsoon climate region, seasonal variation of strong wind and current, squalls, sea disturbance and swell should not be made light of.

9. Concerning Selayar - Labuhan Bajo and Wahai – Babang routes, there are no existing scheduled shipping service on the routes. It is desirable to set navigational aids such as light beacon along the route as the need arises.

(3) Operation safety

10. For safe and smooth loading on and off of passengers and vehicles, a movable

bridge and an access bridge for passengers to load on and off separately from vehicles at Surabaya and Banjarmasin, a stem/stern ramp type boat for smooth loading on and off without reversing and a lighting system on berth for nighttime operation should be introduced.

11. Lighting system in the ferry terminals (berth, parking and terminal) is indispensable for nighttime operation (There is no special requirement for equipment on boats).

12. Concerning the safety ferry operation, it is recommendable to take possible certain steps as soon as possible such as the comprehensive operation supervision, the modernization of facilities concerned and the training of a capable task force including crews to ensure the highest degree of safety and create a promising ferry service.

(3) Maintenance of ferry boats

13. Maintenance of ferry boats should regularly conducted to keep boats in operational conditions, to secure the safety of passengers and vehicles and to prevent damage and trouble.

14. Operators of ferry boats should set up an annual maintenance scheme beforehand to avoid the stoppage of operation in high demand season, especially for the docking maintenance, which ordinarily takes at least one month.

Chapter 7 Ferry System Management

1. PT. ASDP is now operating ferry service in all parts of Indonesia. Three-fourths of the service routes are so called "Pioneer Routes" which are operated under a government subsidy. It is very important to improve profitability by increasing operational gains and rationalizing the management system.

2. Since the financial arrangement of state-owned companies come under the control of the Ministry of Finance (MOF) by Government Regulation No. 12 promulgated in January of 1998, PT. ASDP which is now supervised by DGLT should take this opportunity to conduct the drastic improvement of the ferry system management in accordance with the policy of the regulation.

3. Aiming at enhancement of profitability, it is necessary to set up a proper tariff for each route and terminal considering operational expense, volume of transportation demand and so on. In particular of the four ferry routes to be opened in 2004 under the Short-term Plan, PT. PELNI is conducting almost the same shipping service two routes: Surabaya - Banjarmasin and Manokwari - Biak. Based on existing tariff rates, PT. ASDP's passenger tariff would be much lower (for example, a passenger has to pay Rp.46,000 for an economy ticket on the Surabaya - Banjarmasin under PT. PELNI service, but on the other hand the tariff for PT. ASDP service on the same route would become approximately Rp.25, 600). Therefore, the Government should review carefully the tariff setting and the subsidy system to avoid situations in which there are differences in tariffs on the same route and service.

4. In 1997, the number of staff of PT. ASDP was 3,119 of which 94% belonged to the branch office. In order to secure efficient management, PT. ASDP should pay attention to its financial soundness as with any other commercial business. It is especially important to let administrative staff obtain a sense of business management as well as to rationalize the staff and organization. This includes eliminating overlapping duties and allocating multiple tasks to each staff members.

5. In order to realize profitability in terminal management as well as shipping management, it is recommended that the terminal tariff be set by each terminal in consideration of their own financial situation. Also, a new system to generate more revenues such as through collecting anchoring fee should be introduced.

6. The current ferry management system is rather complex. There are two kinds of

operators (PT. ASDP as a state-own company and complete private companies). Passenger only ships are being operated as a ferry service which is not different at all from PT. PELNI shipping service. PT. ASDP and PT. PELNI who conduct similar services are supervised by different organizations, and have different subsidy and tariff setting systems. Similar kinds of ports and terminals are established and managed by several different bodies such as MOC/KANWIL, PT. ASDP, PT. PELNI and PELINDO. Considering such a complex situation, it is advisable to review and simplify (or unify) the present administrative system and installations in order to develop an effective and financially sound ferry transportation system in Indonesia.

Chapter 8 Economic Analysis

1. The objective of the economic analysis is to appraise the economic feasibility of the four projects, i.e. Surabaya-Banjarmasin Route, Selayar-Labuhan Bajo Route, Manokwari-Biak Route and Wahai-Babang Route, from the viewpoint of the national economy.

2. The economic internal rate of return (EIRR) based on a cost-benefit analysis is used for the economic evaluation. The prerequisites assumed in the economic analysis are as follows:

1) The base year is set at 1998, the costs and benefits are calculated over 34 years; construction period of 4 years (2000-2003) and operation period of 30 years.
2) The foreign exchange rate adopted is the same rate as used in the cost estimation, i.e., 1.00US$ = 9,600Rupiah.
3) In the without project case, in order to meet the projected traffic demand, substitutional traffic means are assumed. In this study, the substitutional traffic such as existing passenger liner boats and cargo vessels or cargo-passenger liner boats in operation are assumed to be utilized.

3. The following benefit items are taken into account as the quantitative benefit generated by the implementation of these projects.

1) Reduction of cargo handling costs
2) Saving of transportation costs
3) Saving of travel time costs

4. The items that should be considered as costs of the projects are as follows:

1) Investment costs for the proposed terminal facilities
2) Operation and maintenance costs for the proposed terminal facilities
3) Procurement costs for the proposed ferry boats
4) Operation and maintenance costs for the proposed ferry boats
5) Re-investment costs for facilities and equipment

5. The calculation of EIRR is carried out for two patterns:

Pattern A : Introduction of new ferry boats

Pattern B : Introduction of used ferry boats;

(This is considered as one of the methods to reduce project cost.)

6. The following table shows a summary of the economic analysis results (EIRR) for each route.

Table 8.1.1 Summary of Economic Analysis Results (Base Case)

Route	EIRR	
	Pattern A	Pattern B
Surabaya-Banjarmasin	9.2%	14.3%
Selayar-Labuhan Bajo	11.7%	17.1%
Manokwari-Biak	7.9%	12.1%
Wahai-Babang	3.5%	7.8%

7. In the case of used boats these results indicate that implementation of the development of three projects i.e. Surabaya-Banjarmasin, Selayar-Labuhan Bajo and Manokwari-Biak is economically feasible.

8. The economic analysis result of Wahai-Babang route in term of quantified benefits is unfavorable. However, this route will be expected to play an important role as a direct trunk line connecting "Ambon economic influence area" with "Ternate economic influence area" in the future.

9. Also, with the implementation of new ferry service, additional traffic demand generation by increase of punctuality, regularity and comfort in ferry operation, promotion of activation of passenger and commodities movement among regions, promotion of social/cultural communication among regions, promotion of educational opportunities for people in the region and so on, will be expected. As a result, realization of "promotion of regional economic and industrial activity" and "improvement of regional economic disparity" will be expected. Taking the enormous unquantified effects for the related regions into consideration, we judge that these projects should be implemented to stimulate regional development.

10. In the aftermath of the Indonesian currency crisis, the currency is still unstable and the macroscopic economic prospects remain unclear. Under these circumstances, it is very difficult to assess precisely the possible influences of the recent economic situation on these projects. Therefore, by setting up a bold assumption, a sensitivity analysis is carried out.

11. Considering increased project cost due to the currency crisis and lower traffic demand forecast due to low economic growth, a sensitivity analysis is made for four alternatives. The economic analysis results (EIRR) for each route are summarized in Table 8.1.2. Also, the results of calculated EIRR by the fluctuation of the cost and the traffic demand are shown in Figure 8.1.1.

Table 8.1.2 Results of EIRR (Pattern B)

Route	Base Case	Sensitivity analysis			
		Case A	Case B	Case C	Case D
		Cost +10%	Cost +40%	Demand -30%	Demand -50%
Surabaya-Banjarmasin	14.3%	12.8%	9.1%	8.8%	4.1%
Selayar-Labuhan Bajo	17.1%	15.6%	12.2%	12.0%	7.6%
Manokwari-Biak	12.1%	10.9%	7.9%	7.6%	3.6%
Wahai-Babang	7.8%	6.7%	3.7%	3.4%	--

12. Although it is very difficult to forecast the future Indonesian economic situation, judging from the results of sensitivity analysis, the four projects can not be evaluated highly. This is largely due to the decreased traffic demand. However, when the Indonesian economy recovers to the extent that the forecasted traffic demand can be ensured, the implementation of these projects will be feasible.

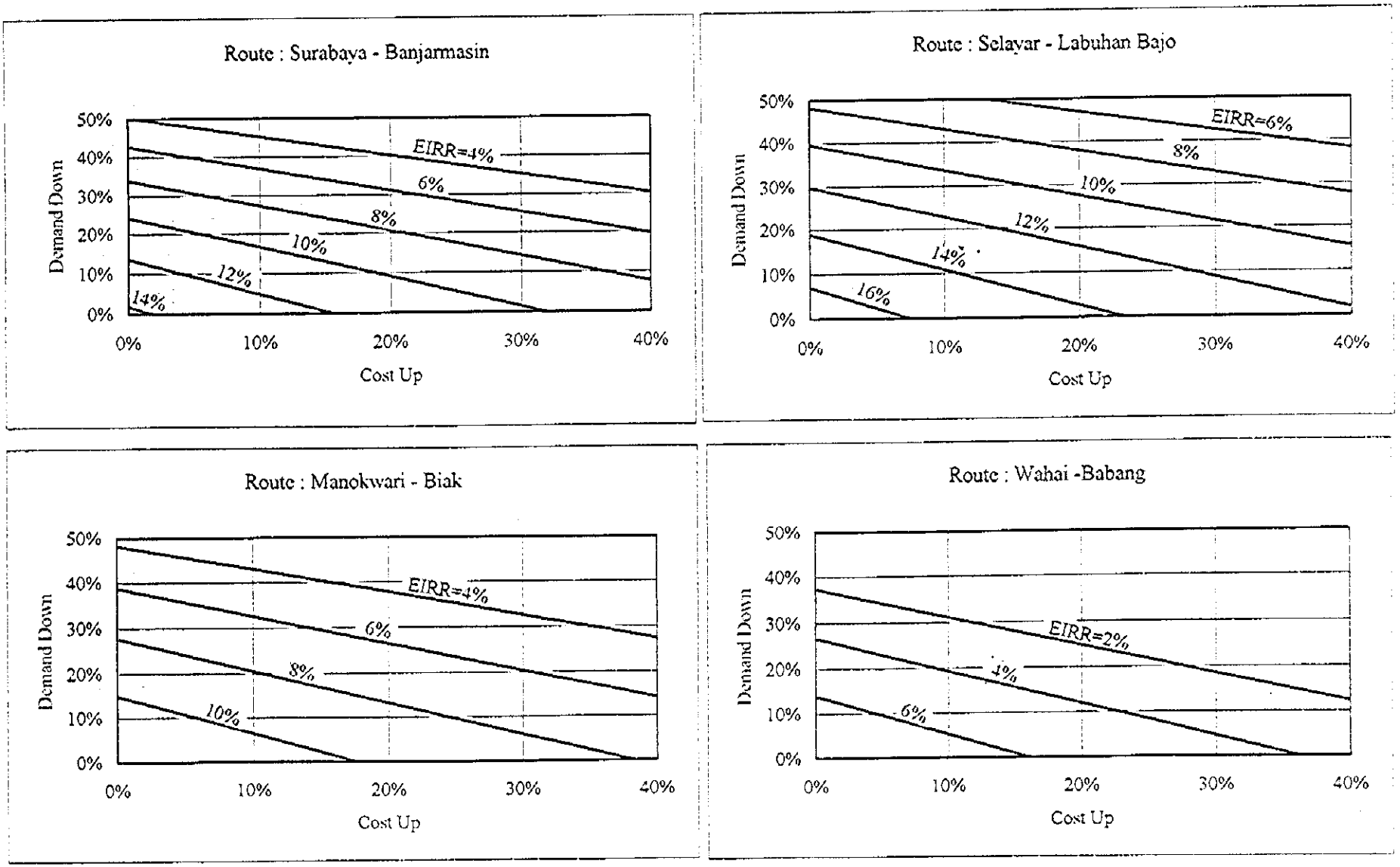


Figure 8.1.1 Results of EIRR by the Fluctuation of Cost and Demand (Pattern B)

Chapter 9 Financial Analysis

1. The port management bodies and the shipping management bodies are treated separately in the financial analysis.

(1) Financial Analysis of Port Management Bodies

2. The terminal charges now applied to PT. ASDP ferry boats are very low when compared with the equivalent charges to the national shipping line PT. PELNI under the control of DGSC. The terminal charges for the ferry boats under the Project must be raised at least to the same level now applied to PT. PELNI. This is based upon a concept that the competitive condition for both shipping lines should be equalized; at the same time, the revenue should be maximized under present circumstances in order to reduce the amount of the subsidy. At present the charges are comprised of Port dues (Rp.40/GRT) and Berth dues (Rp.32/GRT).

3. Terminal charges now applied to passengers, vehicles and other cargoes are kept at a very low level. Although this tariff is very low, this is the direct charge to the users and it is difficult to raise drastically without proper adjustment with other public charges. And a slight increase would only have a marginal effect on revenue level.

4. As with existing ferry terminals and vessels, one-hundred per-cent Government subsidy is necessary for loan repayment including interest for both terminals and vessels as well as the depreciation or reinvestment because these expenses cannot be covered by the revenues. Normal administration costs including personnel expenses and others except maintenance shall be covered by the revenue. However, all or a part of the maintenance cost must also be subsidized by the government in most cases.

5. The port management body cannot cover operating costs (personnel, administration and maintenance costs) by only its own operating revenues. As maintenance costs occupy the largest share of operating costs, the percentage of the maintenance costs which cannot be covered by operating revenues is calculated.

1) Surabaya - Banjarmasin route – The port management body cannot cover approximately 80% of the maintenance costs by the operating revenues.
2) Selayar - labuhan Bajo and Manokwari - Biak routes – The port management body cannot cover approximately 100% of the maintenance costs by the operating revenues.

3) Wahai - Babang route – The port management body cannot cover approximately 110% of maintenance costs by the operating revenues.

6. Sensitivity Analysis is conducted to examine the impact of unexpected future changes. For example, during the recent economic crisis in Indonesia, the rupiah has depreciated more than 1/5 against the US dollar in the last six months. Although the Indonesian market seems now to have recovered stability, it is very difficult to forecast the price variance exactly. Therefore a case in which revenue decreases by 50% is postulated.

7. In this case, the percentage of maintenance costs which cannot be covered by operating revenues is calculated as follows.

1) Surabaya - Banjarmasin route – The port management body cannot cover approximately 100% of the maintenance costs by the operating revenues.
2) Other three routes - The port management body cannot cover approximately 130% to 140% of maintenance costs by the operating revenues.

8. At present, the terminal charges of port management bodies are at a comparatively low level according to the government policy. To eliminate the gap between the present tariff for ferry boats and PT. PELNI and improve the financial conditions in this short-term development plan, government should set the port tariffs at the same level as applied to PT. PELNI and each terminal should try to cover operating costs using its operating revenues.

9. The operating cost including maintenance cost cannot be covered even if the terminal charge for ferry boat is raised to the same level applied by PT. PELNI. It would be necessary to raise drastically the present terminal tariffs of passengers, vehicles, cargoes and so on. In the case of Surabaya - Banjarmasin route where a high demand forecast is expected, the charge would have to be raised three times the present level for the port management body to cover all operating costs including maintenance costs by itself.

10. However, as eastern Indonesian routes are selected due to the importance of middle and short distance routes as a life line for citizens and the necessity of urgent ferry route development considering the Indonesian Government's eastern region development plan, it is acceptable for the routes to be subsidized by the government. All or a part of the maintenance cost must also be subsidized by the government or be covered by raising the

tariff.

(2) Financial Analysis of Shipping Management Bodies

11. As presuppositions of the financial analysis, two alternative fund raising cases are considered for the procurement of ships.

1) Case of Long-term Loans: The funds for the boat purchase are assumed to be raised by the long-term loans locally. Loan period: 20 years (no grace period), Interest rate: 9.0% per annum (local loans) and Repayment: fixed amount repayment of principal
2) Case of Government Grant: The ships are procured by the government and supplied to the operator free of charge. Shipping management body is not burdened with repayment of loan or interest.

12. Financial soundness of the shipping management body is evaluated as follows: For cases in which new or used ferry boats are procured with long-term loans, financial soundness cannot be ensured on any of the four routes. For cases in which new or used ferry boats are procured by government grant, all four routes are viable.

13. Due to the great degree of uncertainty in terms of price variance, for the sensitivity analysis of shipping management bodies, procurement costs of ferry boat are assumed to increase by 80%.

14. Financial soundness based on the sensitivity analysis is evaluated as follows: For cases in which new or used ferry boats are procured with long-term loans, financial soundness cannot be ensured on any of the four routes. For cases in which new or used ferry boats are procured by government grant, Surabaya - Banjarmasin route is viable but the other three routes are not.

15. Judging from the above analysis, the project can be regarded as financially viable if government grant is used to procure the ferry boats. But with the exception of Surabaya–Banjarmasin route, it will be difficult for the routes to be financially viable if price variance such as in the recent economic crisis occurs again.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions and Recommendations

Conclusions

- Long-term Ferry Development Plan -

(Relation between Present Economic Situation and Study)

1. In March 1997 when this Study began, the Indonesian economy was growing smoothly and the Second Twenty-five Years Development Plan estimated GRDP in 2019 at 2,036 billion Rupiah (1993 constant price). However, the problem of economic situation surfaced after currency crisis in December 1997 left the Indonesian economy in a state of confusion. It is very difficult to assess precisely the possible influence of the recent economic situation on this Study.

(Traffic Demand in Future)

2. The forecast (target year of 2019) was based on the Origin Destination data composed of twenty-seven provinces. The 1990 OD was modified so that the total volume of OD would be the same as the 1988 data.

3. Passenger volume was forecasted using the formula (Fratar Method) obtained from the relation between passenger and GRDP/capita excluding oil and gas. Cargo volume was forecasted using the formula obtained from the relation between cargo and GRDP including oil and gas.

4. The total passenger volume in Indonesia is forecasted as 409.8 million. This value is equal to 5.84 times the passenger volume in 1995 (70.23 million). On the other hand, the total cargo volume in Indonesia in 2019 is estimated at 1.094 billion tons. This value is equal to 6.94 times the cargo volume in 1995 (158 million tons).

(Future Nationwide Ferry Service Network)

5. The nationwide ferry service network in the target year should be developed according to the following requirements; 1) Distance of ferry routes is within 550NM (1,000km) or sailing time of 20 hours, 2) Passenger demands are more than 300,000 a year, 3) Both ports connected by the ferry route are not linked by road and 4) Ferry routes in Maluku and Irian Jaya should be given high priority. The following routes are selected as the nationwide ferry service routes network in 2019.

DKI (Jakarta) - West Kalimantan

East Java - South, Central and East Kalimantan

East Java - South Sulawesi
NTT & NTB - South Sulawesi
South Sulawesi - Maluku (through Southeast Sulawesi)
Maluku - Irian Jaya

6. In addition to the routes proposed as mentioned above, the following routes are also proposed from the viewpoint of completing the nationwide ferry service network after 2019.

Riau and Jambi - West Kalimantan
East Kalimantan - Central Sulawesi
East Timor - Maluku

(Selection of Ferry Routes for the Long-term Development Plan)

7. Under the condition that there be eight(8), nine(9) or ten(10) routes in the long-term development plan, the long distance routes and the middle and short distance routes are evaluated separately.

8. Concerning the long distance ferry routes, the four routes whose ferry passenger demands exceeded three hundred thousand (300,000) in 2019 and the Ambon - Sorong route whose ferry passenger demand was the largest in Maluku and Irian Jaya are proposed.

a) Surabaya - Banjarmasin
b) Jakarta - Pontianak
c) Surabaya – Ujung Pandang
d) Kendari - Ambon
e) Ambon - Sorong

9. With regard to the middle and short distance routes, the routes whose passenger demands are more than one hundred and fifty thousand (150,000) in 2019 are proposed, that is, one in Nusa Tenggara and the remaining three in Maluku and Irian Jaya.

a) Selayar - Labuhan Bajo
b) Manokwari - Biak
c) Wahai - Babang
d) Patani - Sorong

(Ferry Terminal Development Plan at Each Site)

10. The main items of evaluation for the terminal site selection are oceanographic and topographic conditions, accessibility from/to main city and road and land use

condition. The ferry development plan at the selected site is proposed according to the field survey based on the basic premises.

(Ferry Operation)

11. The Study Team set up three model types of ferry boat in the proposed routes, 1,000GRT, 3,000GRT and 5,000GRT according to the traffic demand in 2019. The principle dimensions and characteristics such as length over all, breadth and model speed were determined according to the existing ferry boats.

(Preliminary Design and Cost Estimates)

12. Conditions of design, standard dimensions of ferry boats, tidal level in each terminal site, subsoil conditions and elevation of bearing strata, and dimensions of ferry terminal and onshore facilities are assumed from the conditions applied to the offshore structures in the vicinity of the selected ferry terminal.

13. The basic facilities for ferry terminals such as mooring facilities, loading decks, trestle and causeway are considered in preliminary plans. The construction cost is estimated on the basis of the quantity of construction works for the planned facilities and the basic cost of the works including utilities.

- Feasibility Study -

(Selection of Ferry Routes for the Feasibility Study)

14. Five long distance and four middle and short distance routes are evaluated separately for selecting ferry routes for the short-term development plan. The proposed routes for the short-term development plan are as follows.

Long distance route:	Surabaya - Banjarmasin
Middle and short distance route:	Selayar - Labuhan Bajo
	Manokwari - Biak
	Wahai - Babang

(Natural Conditions)

15. The topographic and hydrographic survey was carried out for each terminal site (except Biak - Mokmer site which was surveyed in the previous study) from January to March 1998. The results of observations verify that maneuverability of vessels at all the terminal sites are not adversely affected by the current. In order to verify the subsoil conditions of proposed terminal sites, one boring for the onshore area and another boring for the offshore facility area were executed at each terminal site.

(Preliminary Design and Cost Estimate)

16. A large volume of reclamation works is required to secure the onshore area of the ferry terminals; Surabaya ferry terminal requires 95,000m^3, 45,000m^3 for Banjarmasin, 55,000m^3 for Selayar(Patunbukan), 25,500m^3 for Wahai, 7,500m^3 for Babang, 36,000m^3 for Biak(Mokmer) and 19,000m^3 for Manokwari.

17. Dredging of 99,200m3 is required for the turning basin and access channel area to obtain the designed depth of -4.5m for the Selayar (Patumbukan) ferry terminal.

18. The mooring facilities of the Surabaya ferry terminal which are constructed some 2,800m away from the coastal line are designed by steel pipe pile foundation to minimize the impacts by currents flows. The access way to connect the onshore facilities and offshore detached platform is designed with rock mound cause way of 800m in length from the land and thereafter 20m span each of pre-stress concrete beam type trestle for the remaining 2,000m. Required dredging volume is estimated at about 230,000m^3.

19. Unit price of each element was determined on the basis of the regional unit prices collected in the field survey in February - March 1998, which reflects to some extent price changes due to the currency crisis.

20. Price of imported products are based on the CIF Jakarta price and adjusted considering import tax and some mobilization fee to the construction site. The basic costs of imported products are converted to Indonesian Rupiah for the estimation of project cost based on the exchange rate of foreign currency as 1US$ = Rp.9,600 = ¥128.

21. The total construction cost for development of the proposed terminal site for the feasibility study is as follows,

(Unit in Billion Rupiah)

Route	Construction Cost
Surabaya – Banjarmasin	472.974
Selayar - Labuhan Bajo	44.561
Manokwari – Biak	41.946
Wahai - Babang	45.058

22. The period of survey, engineering study and tender procedure is estimated to be about two years. The construction period of each terminal is estimated to be about two years except for Surabaya - Banjarmasin route which requires a period of two and half

years.

(Environmental Impact Assessment)

23. After conducting the Environmental Impact Assessment, no significant effect on the environmental aspect is expected. Therefore, the implementation of this project includes no difficulty.

(Economic Analysis)

24. The economic benefits are dirided from the implementation of the development of ferry terminals and ferry operation plans including the introduction of the proposed ferry boats. In this economic analysis, reduction of travel time costs, cargo handling costs and saving of transportation costs for the ferry users are treated as the quantified economic benefits.

25. The following table shows a summary of the economic analysis results (EIRR) for each route.

Route	EIRR	
	Pattern A (Procurement new ferry boats)	Pattern B (Procurement used ferry boats)
Surabaya-Banjarmasin	9.2%	14.3%
Selayar-Labuhan Bajo	11.7%	17.1%
Manokwari-Biak	7.9%	12.1%
Wahai-Babang	3.5%	7.8%

26. In the case of used boats (Pattern B) these results indicate that implementation of the three projects i.e. Surabaya-Banjarmasin, Selayar-Labuhan Bajo and Manokwari-Biak is economically feasible.

27. The economic analysis result of Wahai-Babang route in term of quantified benefits is unfavorable. However, this route will be expected to play an important role as a direct trunk line connecting "Ambon economic influence area" with "Ternate economic influence area" in the future.

28. Also, with the implementation of new ferry service, additional traffic demand generation by increase of punctuality, regularity and comfort in ferry operation, promotion of activation of passenger and commodities movement among regions, promotion of social/cultural communication among regions, promotion of educational

opportunities for people in the region and so on, will be expected. As a result, realization of "promotion of regional economic and industrial activity" and "improvement of regional economic disparity" will be expected. Taking the enormous unquantified effects for the related regions into consideration, we judge that these projects should be implemented to stimulate regional development.

29. Since the Indonesian economic situation is still unstable and the macroscopic economic prospects remain unclear, it is very difficult to assess precisely the possible influences of the recent economic situation on these projects. Therefore, a sensitivity analysis with broader range is carried out.

30. In the low case scenario, the four projects can not be evaluated highly. This is largely due to the decreased traffic demand. However, when the Indonesian economy recovers to the extent that the forecasted traffic demand can be ensured, the implementation of these projects will be feasible.

(Financial Analysis)

31. The port management bodies and the shipping management bodies are treated separately in the financial analysis. The port management body cannot cover operating costs (personnel, administration and maintenance costs) by only its own operating revenues. As maintenance costs occupy the largest share of operating costs, the percentage of the maintenance costs which cannot be covered by operating revenues is calculated.

1) Surabaya - Banjarmasin route: The port management body cannot cover about 80% of the maintenance costs by the operating revenues.
2) Selayar - labuhan rajo and Manokwari - Biak routes: The port management body cannot cover about 100% of the maintenance costs by the operating revenues.
3) Wahai - Babang route: The port management body cannot cover about 110% of maintenance costs by the operating revenues.

32. The financial soundness of shipping management body on any of the four routes can not be ensured if new ferry boats are procured with long-term loans. With used ferry boats by government grant, all four routes are viable.

33. Judging from the above analysis, the project can be regarded as financially viable if government grant is used to procure the ferryboats. But it is difficult for three

routes except Surabaya - Banjarmasin route to be financially viable if price variance such as in the recent economic crisis occurs again.

Recommendations

(Relation between Present Economic Situation and Study)

34. Given the current state of economic confusion, it is unlikely that development of all the four routes should be made immediately from 1999. Considering the possible influence of the recent economic situation, the target year of the short-term development plan would inevitably be delayed for few years. Nevertheless, routes which are expected to generate a relatively larger demand such as Surabaya - Banjarmasin and Selayar - Labuhan Bajo may be developed at earlier time.

(Ferry Terminal Development Plan)

35. In the implementation of the Surabaya terminal, it is necessary for the Indonesian government to coordinate with PELINDO III 's passenger terminal development plan including joint management of the trestle. For the Banjarmasin terminal, the Indonesian government must confirm the future port development plan and consider the land acquisition for the ferry terminal.

(Preliminary Design)

36. At the Surabaya ferry terminal, the access way is constructed by using the 20 m span of the pre-stress concrete beam type for some 2,000m. However, the sub soil conditions under the sea bed around this area are considered undulated and complicated. It is therefore recommended to conduct more detailed soil of the proposed ferry terminal areas to facilitate detailed design of such facilities.

(Environmental Monitoring and Management)

37. To effectiveness of environmental monitoring, it is advisable to have an responsible institution for environmental monitoring and management. This institution will coordinate for the implementation of the environmental monitoring and management.

(Ferry Operation Planning)

38. The specification of all vessels including carrying capacity of ferry boat is confirmed by DGSC. However, the actual loading capacity of boats for ferry service is specified by DGLT. Therefore the ferry boat size and capacity on each route should be precisely determined at the operational stage with the authorization of the competent

authorities according to the actual boats which will be introduced.

39. To encourage constant demand for ferry transportation, it is necessary to promote reliable, convenient, comfortable and safe operation. This requires adjusting the schedule during docking maintenance with the estimated demand fluctuation. Also, to operate efficiently with a small number of boats, it is necessary to increase cruising speed, decrease berthing/anchoring time and introduce nighttime operation.

40. Service should be reliable and punctual, with fewer cancellations and less short shipment (left-off). This entails proper frequency, fixed time arrival and departure, easy access to and from the ferry terminals, and so on. In addition, better accommodations including comfortable waiting lounge in passenger terminal and cabin with sufficient number of chairs, concessions on boats, and so on are needed.

41. The stability and strength of ships is the most important element of ship safety. Ship inspection is vital for the safety for ships. The Indonesian government has ratified the international conventions according to the classification of vessels as well as other conventions regarding ship safety. Therefore the inspection of ferry boats at shipyards should be performed in the same manner as other vessels.

42. In addition, life saving facilities, fire prevention and fire fighting equipment should be securely rigged on ferry boats in conformity to the regulations including life jackets and life boats corresponding to the maximum number of passengers.

43. Navigational aids which indicate the location near the entrance of ports (except Surabaya, Banjarmasin and Labhan Bajo) and en route navigational aids should be installed as the need arises.

44. For safe and smooth loading on and off of passengers and vehicles, a movable bridge and an access bridge for passengers to load on and off separately from vehicles at Surabaya and Banjarmasin, a stem/stern ramp type boat for smooth loading on and off without reversing and a lighting system on berth for nighttime operation should be introduced.

45. Concerning the safety ferry operation, it is recommendable to take possible certain steps as soon as possible such as the comprehensive operation supervision, the modernization of facilities concerned and the training of a capable task force including crews to ensure the highest degree of safety and create a promising ferry service.

46. Maintenance of ferry boats should be regularly conducted to keep boats in operational condition, to secure the safety of passengers and vehicles and to prevent damage and trouble. Operators of ferry boats should set up an annual maintenance scheme beforehand to avoid the stoppage of operation in high demand season, especially for the docking maintenance, which ordinarily takes at least one month.

(Ferry Management System)

47. As far as the subsidy system continues, it is recommended that the Government should not only require reports from PT. ASDP but establish a strict investigation system into the financial and accounting system of its branch offices.

48. As for the shipping tariff system in the future, it is recommended that a special tariff be prepared and a season commuter pass be given to people who use a specific route as a lifeline. In the future, shipping tariff, which is determined by the Government at this stage should be freely set up by ferry operating companies according to their own management policy

49. When a ferry network service covers a number of islands in the future, the system may require a computer network on a real-time basis to ensure that up-to-date information is always available.

50. In order for the terminal management to be profitable, efficient placement of staff should be conducted, since the personnel cost at most public terminals forms more than 40% of the annual expense.

51. Aiming at enhancement of profitability, it is necessary to set up a proper tariff of each route and terminal considering operational expense, volume of transportation demand and so on instead of uniform tariff setting. Also, for terminal management, a new system to generate more revenues such as collection of anchoring fee should be introduced.

52. In order to secure efficient management, PT. ASDP should pay attention to its financial soundness as with any other commercial business. It is especially important to let administrative staff obtain a sense of business management as well as to rationalize the staff and organization. This includes elimination of overlapping duties and allocation of multiple tasks to each staff member.

53. The current port and ferry terminal management system are rather complex.

Passenger only ships are being operated as a ferry service which is not different at all from PT. PELNI shipping service. Similar finds of ports and terminals are established and managed by several different bodies such as MOC/KANWIL, PT. ASDP, PT. PELNI, and PELINDO. Considering such a complex situation, it is advisable to review and simplify (or unify) the present administration system and installations in order to develop an effective and financially sound ferry transportation system in Indonesia.

(Financial Analysis)

54. At present, the terminal charges of port management bodies are at a comparatively low level according to the government policy. To eliminate the gap between the present tariff for ferry boats and PT. PELNI and improve the financial conditions in this short-term development plan, government should set the port tariffs at the same level as applied to PT. PELNI and each terminal should try to cover operating costs using operating revenues.

55. The operating cost including maintenance cost cannot be covered even if the terminal charge for ferry boat is raised to the same level applied by PT. PELNI. It would be necessary to raise drastically the present terminal tariffs of passengers, vehicles, cargoes and so on. In the case of Surabaya - Banjarmasin route where a high demand forecast is expected, the charge would have to be raised three times the present level for the port management body to cover all operating costs including maintenance costs by itself.

56. However, as eastern Indonesian routes are selected due to the importance of middle and short distance routes as a life line for citizens and the necessity of urgent ferry route development considering the Indonesian Government's eastern region development plan, it is acceptable for the routes to be subsidized by the government. All or a part of the maintenance cost must also be subsidized by the government or be covered by raising the tariff.

JICA