14-B. REQUIREMENTS

14-B-1 Navigational Condition Improvement

12. To increase the port capacity, improvement of navigational condition is crucial, which increase the capacity of ship calls as well as enhance the safety. The components are:

- Widening the main channel with 300m width to secure two-way traffic
- Widening the turning basin with maximum 560m diameter to accommodate larger vessels

1) Channel

13. Width of two-way channel was examined applying the international standard stipulated by PIANC and IAPH regulation, i.e. "*Approach Channel – A Guide for Design*", and set as 300m for outer channel as well as inner channel.

2) Turning Basin

14. According to UNCTAD and Japanese standard, the diameter of turning basin should be equal to or greater than 2*L (Ship length) of the largest ship in case of towing by tugboat. Consequently, to secure enough turning basin to accommodate larger container vessels, the diameter of the maximum turning basin in front of the international container terminal is set as 560m (2 *280m).

3) Breakwaters

15. In accordance with the improvement of channel and turning basin, the existing breakwater should be relocated considering the calmness of the basin.

4) VTMS (Vessel Traffic Management System)

16. In order to support the increase of navigational capacity as well as the safety of navigation, the study team proposes that VTMS (Vessel Traffic Management System) be introduced and/or the existing VTIS (Vessel Traffic Information System) be improved. VTIS is only available now for VHS communication and not designed for vessels with AIS system which many vessels have or will introduce to comply with the amended SOLAS convention.

14-B-2 Automobile Terminal

1) Berth Facility

17. Berth facility of the automobile terminal is as shown in Table 14-B-1 according to the Master Plan.

Table 14-B-1 Berth Facility of the Automobile Terminal

Berth Dimension		Number of Berths
Depth	Length	
-10m	250m	1

18. According to the demand forecast, around 210,000 cars will be handled in 2012. In the case of exporting cars from Japan to Asia, typically around 300 ~ 1,500 cars are loaded at one time. In this study, assuming that 500 cars will be loaded and the same number of cars will be unloaded per ship, annual number of ship calls is estimated 210 in 2012.

19. Using handling productivity in Japan as an example, 75 cars loaded per gang per hour and 500 cars per gang per day on condition of daytime handling from 08:30 ~ 16:30 including 1.5 hours for break. In case of exporting cars from Japan to Europe, a maximum of 5 gangs will be introduced in order to load cars within 2 days. Here, assuming 300 cars/gang/day for loading/unloading and 3 gangs per ship for handling productivity, berthing days per ship is calculated as follows:

- Berthing time per ship: 500 * 2 (export/import) / 300 / 3 gangs = 1.1 days/ship

20. This means that around 4 weekly services are available for one berth considering berth occupancy of around 60~70%. Therefore, number of berth required is calculated as below:

- Number of berth required (2012): 210 calls / (4 * 52 weeks) = 1.01 1 berth

2) Terminal Area

21. Concerning a car handling yard, in order to secure the space for weekly handling volume, assuming 4 weekly services and 500 units are loaded and unloaded per ship, necessary terminal area is planned as follow:

- Necessary area per one car = around 12m2 (based on experience in Japan)
- Number of ships per week per berth: 4 weekly services
- Necessary car handling yard = 500 * 2 (export/import) x 4 x 12 = 48,000m2.
- Necessary car terminal area = 48,000m2 / 70% = around 70,000m2 (including other facilities such as road, receiving area, office, gate etc.) + Apron (250m x 60m) = 85,000m2

3) Other Facilities

22. Other major facilities are planned as follows:

Items	Quantity (Ground Space)	Description	Remarks
Terminal Office	900m2	30m*30m	2 floors (900m2*2)
Work Shop	1,500m2	50m*30m	Installation of small option to exporting CBU
Power Station	1 set		
Fuel Station	1 set		
Washing Station	1 set		
Lighting Tower	1 set		
Fence and ITV	1 set		For security

4) Terminal Layout

23. Based on the above terminal area,, an automobile terminal are planned as follows utilizing inactive DKB-IV's space:

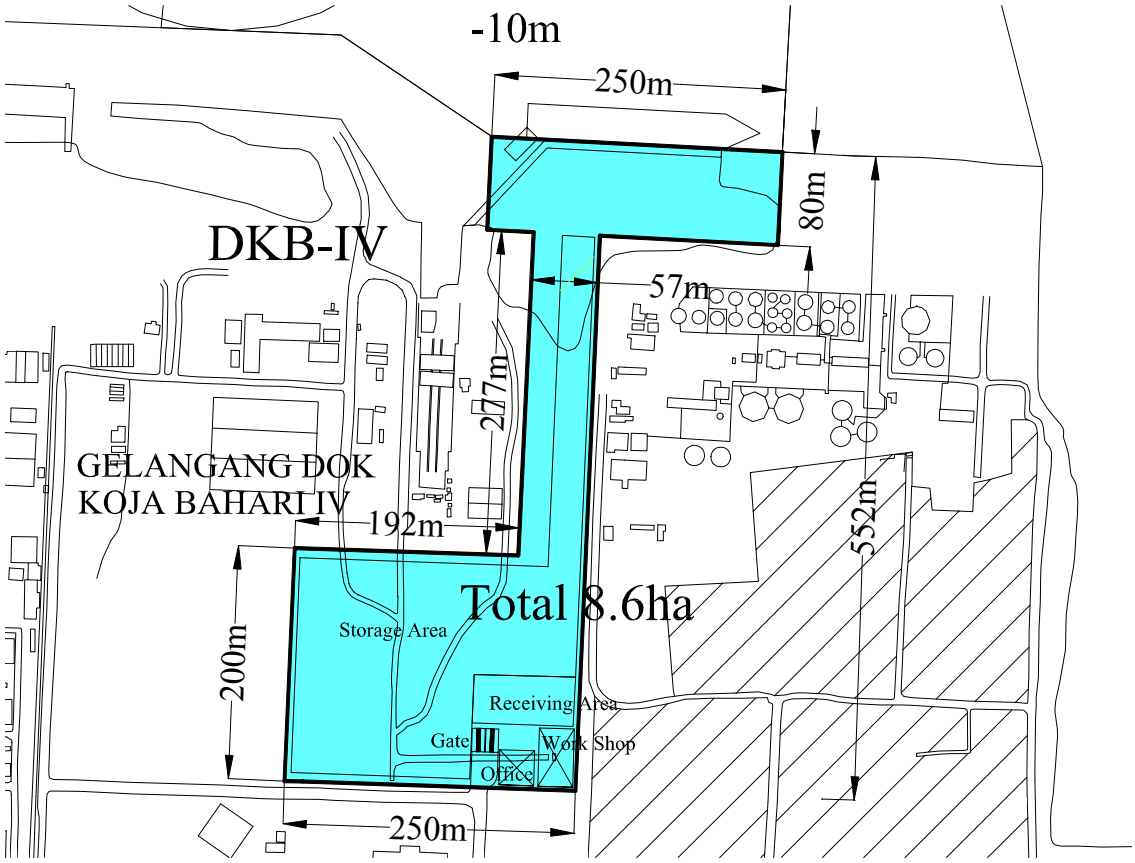


Figure 14-B-1 Layout of Automobile Terminal

Figure 14-B-2 Aerial View of the Site

14-B-3 Inter-island Container Terminal in Pier-III

24. According to the Master Plan, the quay from 208 berth to TBB berth will be for dedicated use of container handling. Some warehouses behind the proposed container berths should be demolished in order to use this area as a container yard.

1) Berth Facility

25. The berth facilities in 2012 are as shown in Table 14-B-2 according to the Master Plan.

Table 14-B-2 Inter-island Container Terminal Berth Facility in 2012

Berth Dimension		Number of Berths	Remarks
Draft	Length		
-9m	1,020m	7	Current berth 208 to 213
-12m	300m	2	Current berth 214/300
-12m	195m	1	Current berth TBB

2) Handling Facilities

26. For the feasibility study, handling facilities for inter-island container terminal in Pier-III has been planned as shown in bellow based on the capacity set in the Master Plan.

a) Handling System

27. As for handling system deployed in Pier-III, mobile cranes at quay side (except the existing gantry cranes at 214/300 berth) as well as forklift/reach stacker and/or straddle carrier in the yard seem to be a suitable system in the short term considering relatively narrow space of the yard. In case of introducing gantry cranes, the productivity of yard side and that of quay side would be unbalanced, and in addition to that, drastic improvement of the existing quay wall would be necessitated.

b) Handling Equipment

i) Quay Side Crane

28. Except 214/300 berth, mobile cranes will be introduced Based on the expected maximum annual throughput, the required number of quay side mobile cranes is calculated as shown bellow. The productivity of a mobile crane is assumed 12 boxes per hour.

Formula

Nqc = A / (Tw * Pqc)
Where:
A: Expected Maximum Annual Throughput (box)
Tw: Working Hours (365*24*Operation Ratio (95%)*BOR (60%))
Pqc: Crane Productivity (Box/Crane/Hour (Net))

Calculation

A	428,000	Capacity of berths (except 214/300 berth) (box)
Tw	4,993	
Pqc	12	
Nqc	7.1	

29. However, considering some troubles of cranes, it is preferable that additional cranes will be set. Furthermore, the available number of cranes for a vessel is a governing factor in determining the turn-around time (TRT) of container vessels at the port. In case of handling

around 400 box/ship for unloading/loading (this is an average figure in Tanjung Priok for 10,000GT class of inter-island container vessel), it is desirable 2 cranes are deployed at least in order to keep the turn-around time within one day. Considering these points, it is set that one (1) mobile crane per 100m will be deployed. Thus, 9 cranes for the current berth 208 to 213 and 2 cranes for the current TBB berth. (Total 11 mobile cranes) As for berth 214/300, the existing 2 gantry cranes will continue to be used as they are.

ii) Forklift/Reach Stacker and/or Straddle Carrier

30. The required number of forklifts and/or straddle carriers installed at the marshalling yard is set as one (1) for a mobile crane and two (2) for a gantry crane. Total number of forklifts/reach stacker and/or straddle carriers amounts to 15 units (11+2*2), however, 20 units should be deployed considering the allowance for their maintenance. Some straddle carriers can be deployed from other ports such as Ciwandan port where straddle carries had been provided but not utilized so far.

iii) Summary of Handling Equipment

Item	Number
Quay Side Crane	Gantry crane2 units mobile crane11 units
Forklift /Reach Stacker /Straddle Carrier	around 20 units

c) Marshalling Yard

31. The necessary ground slots is calculated as follows based on the handling system using forklift/reach stacker and/or straddle carrier:

Expected Maximum Throughput (Capacity)	864,000
Average Transit Time (days)	6.0
Working Days Ratio	100%
Peak Ratio (1/Yard Operation Ratio)	1.3
Stacking Height	3.0
Ground Slots (TEUs)	**6,155**

32. However, examining actual site in Pier-III, around 3,900 ground slots (TEU) can be assigned as follows. Thus, the capacity of the inter-island container terminal in Pier-III will be set as follows:

Ground Slots (TEUs)	3,900
Stacking Height	3.0
Peak Ratio (1/Yard Operation Ratio)	1.3
Average Transit Time (days)	6
Working Days Ratio	100%
Annual Capacity	**547,500**

3) Terminal Layout

33. Based on the above examination, an idea of the terminal layout are drafted as shown in Figure 14-B-5.

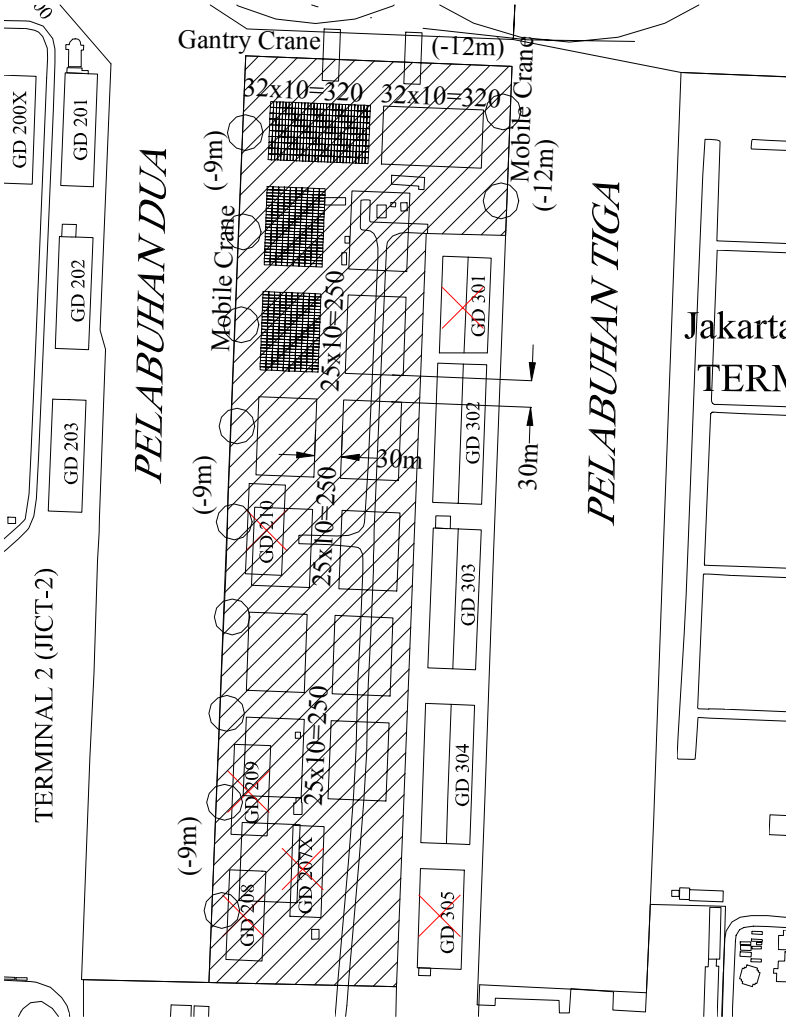


Figure 14-B-3 Layout of Inter-island Container Terminal in Pier-III

14-B-4 Ancol Development

1) Passenger Terminal

34. As stated in the Master Plan, the passenger terminal should be relocated to the new port area of East-Ancol. The relocation would alleviate traffic concentration on Jl. Panaitan, Jl. Pelabuhan Raya and their intersection mixed with cargo traffic, and provide re-development space in the port. Park and amenity zone for passengers as well as visitors should also be developed around the terminal as a buffer to the cargo handling zone. Quay length is around 350m with a water depth of -7.5m. The size of the passenger terminal with 2 berths is set as follow:

a) Berth Facility

35. The passenger berth facilities in 2012 are as shown in Table 14-B-3 according to the Master Plan and Short-term Development plan.

Table 14-B-3 Passenger Berth Facility in 2012

Depth	Length
-7.5m	350m

b) Terminal Area

36. The required area for the passenger terminal and car parking area per berth is calculated as follows:

Required area per person (m2) (A)	1.2	
Required area per car (m2) (B)	20.0	
Car utilization ratio per person (C)	0.25	
Peak Ratio (D)	1.8	
Loading/unloading passengers per ship (E)	2,360	
Required Terminal Building Area (m2)	5,098	=E*A*D
Required Parking Area (m2)	21,240	=E*C*B*D
Total Area (m2)	26,338	

37. The size of the passenger terminal with 2 berths are set as follow:

Item	Dimension	Remarks
Apron	350*20=7,000m2	Apron width=20m
Passenger Terminal Building Area	10,000m2	2 floors (10,000m2 + office space)
Parking	43,000m2	
Others	10,000m2	
Total Terminal Size=70,000m2=350m x 200m		

2) Multi Purpose Terminal in Ancol

38. Even if the existing area will be re-organized and utilized effectively, it is expected that port facilities in the existing port will reach the limit of their capacity for the future cargo demand centering on general (and bag) cargo. In order to meet the future demand of general and bag cargo as well as unitized cargo such as inter-island container and Ro-Ro cargo, multi purpose terminal is planned to be developed in East-Ancol area. Total quay length is around 800m with the depth of -10m.

a) Berth Facility

39. The multi purpose berth facilities in 2012 are as shown in Figure 14-A-2 according to the Master Plan and Short-term Development plan. As it is assumed that the multi purpose berth will be used sequentially, not number of berths but necessary berth length will be set.

Table 14-B-4 Multi Purpose Berth Facility in 2012

Depth	Length
-10m	790m

b) Yard/ Transit Shed

40. Necessary area for open yard and transit shed for general cargoes is calculated as follows:

Formula

Ay = Hg*P*Ty / (R*r*w) As = Hg*P*Ts / (R*r*w)

Where:

Ay: Necessary area of open yard (m2)
As: Necessary area of transit shed (m2)
Hg: Annual Handling Volume (ton)
P: Peak Ratio - 1.3
Ty: Passege Ratio through Open yard - 50%
Ts: Passege Ratio through Transit shed - 20%
R: Turn of Cargo (50 times/year)
r: Cargo Stacking Area Ratio in the yard - 60%
w: Average Stacking Weight (ton/m2) - 1.0

Calculation

Open yard			Transit shed		
A	138,970		A	18,529	
Hg	3,207,000	Capacity	Hg	3,207,000	Capacity
P	1.3		P	1.3	
R	25		R	25	
r	60%		r	60%	
w	1.0		w	1.5	
Ty	50%		Ts	10%	
Total	157,499				

3) Port Related Zone

41. The following functions/facilities will be planned in Ancol area in order to support the activity of the new port area:

- Logistic center such as truck terminal, cargo distribution center with some processing facilities etc.
- Welfare facilities for port workers and seamen
- Port related companies' offices such as shipping agency, stevedoring etc.
- Amenity such as port park, observation tower etc.

42. Although another study will be necessary to examine the details dimension of these facilities, the space of around 11ha of the port area will be allocated to these function/facilities as a port related zone.

4) Terminal Layout

43. Based on the above examination, the terminal layout in Ancol area are drafted as shown in Figure 14-B-4.

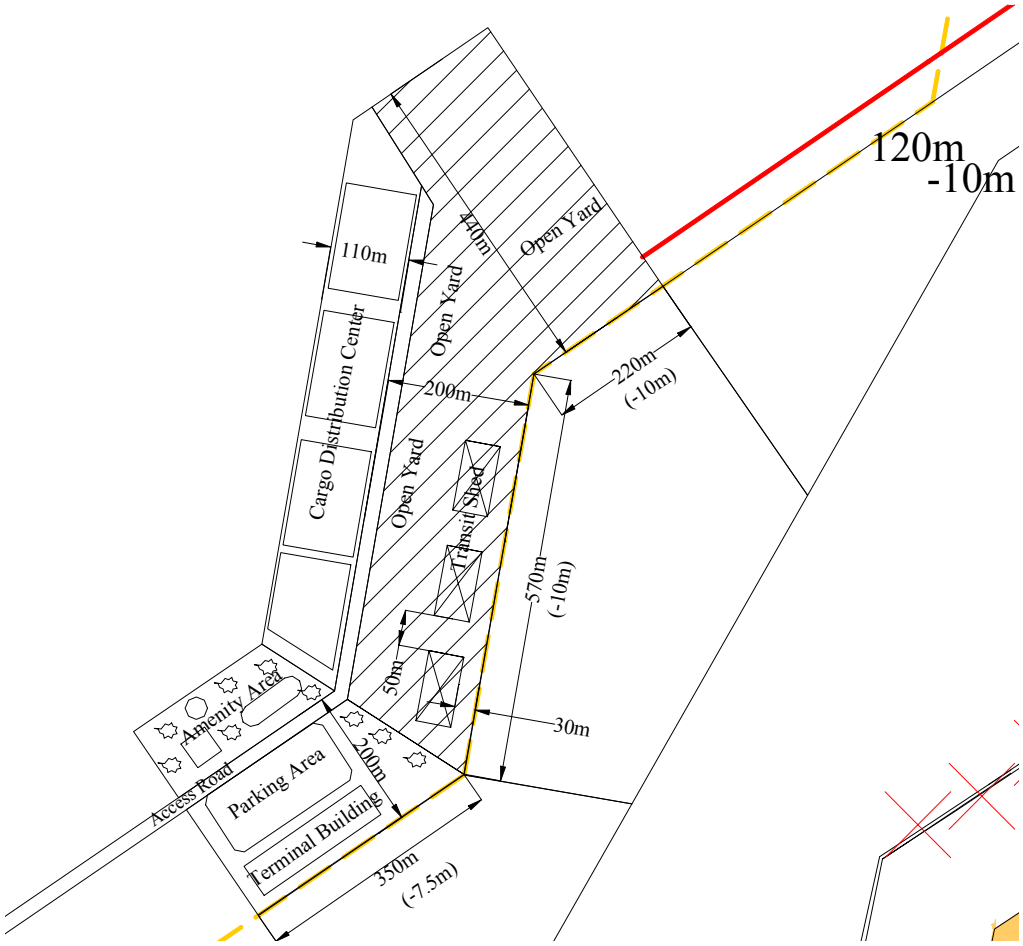


Figure 14-B-4 Terminal Layout in Ancol Area

5) Breakwater, Channel and Basin

44. According to the Master Plan, breakwater as well as access channel should be developed cost-effectively in accordance with development phases. Initial development cost should be minimized by shortening the breakwater as well as minimizing the width of the access channel. The width of the channel was examined by applying the international standard stipulated by PIANC and IAPH regulation, i.e. "*Approach Channel – A Guide for Design*", and set as 120m.

45. In accordance with the development of the multi purpose terminal and passenger terminal, a breakwater with the length of around 1,000m should be developed to secure the calmness of the basin as well as to prevent sedimentation of the channel and basin.

46. The diameter of turning basin is set as 400m with the depth of -10m in front of the multi purpose terminal, while set as 300m with the depth of -7.5m in front of passenger terminal, in accordance with UNCTAD and Japanese standards.

14-B-5 Port Inner Road Improvement

1) Finding and Analysis of the Survey

a) Traffic Volume

47. The traffic counting surveys were carried out at 26 locations. The port inner roads are defined as the arterial road. The traffic capacity of 1 lane inner port road is calculated to be 1,153 PCU according to the formula established by Indonesia Highway Manual (IHM). The required lane numbers of each survey points were calculated by dividing the traffic volume as counted with the capacity.

48. The calculation of the required lane number for the current traffic volume at all survey points were shown in Figure 14-B-5. The traffic volume of port inner roads is forecasted for target year of 2020 with the assumption of the growth rate of vehicles traffic at 7% annually, (this growth ratio is taken from the study by Research Department, University of Indonesia).

Figure 14-B-5 Inside Port Required Lane Number

49. According to the table, the required lane number for the current traffic volume at the survey points are indicating less than 1.0, except the following locations:

- G-4: Gate No.9 area
- C-11: Jl. Pelabuhan Raya at the entrance to the passenger terminal
- C-17 ~ C-18: Jl. Pasoso and Jl. Jampea
- C-21 ~ C-22: Jl. Sulawesi.

b) Inside Port O-D Survey

50. The O-D Survey by the vehicle type was carried out. The heavy traffic volume had been recorded at the following locations as listed in the order of large volume.

- 1st At Gate 9 – All the vehicle types are recorded largest traffic volume among 14 locations, specially tractor, contain truck volume are the largest volume among all survey points.
- 2nd at Gate-1 – Sedan, pick up truck are larger volume
- 3rd at the Jl. Pelabuhan Raya, entrance to JICT II.
- 4th at the intersection of Jl. Bitung and Jl. Pelabuhan Raya.

51. The results indicates that the gate-9 is the major entrance of containers. Gate-1 is the second major entrance for other port related traffic.

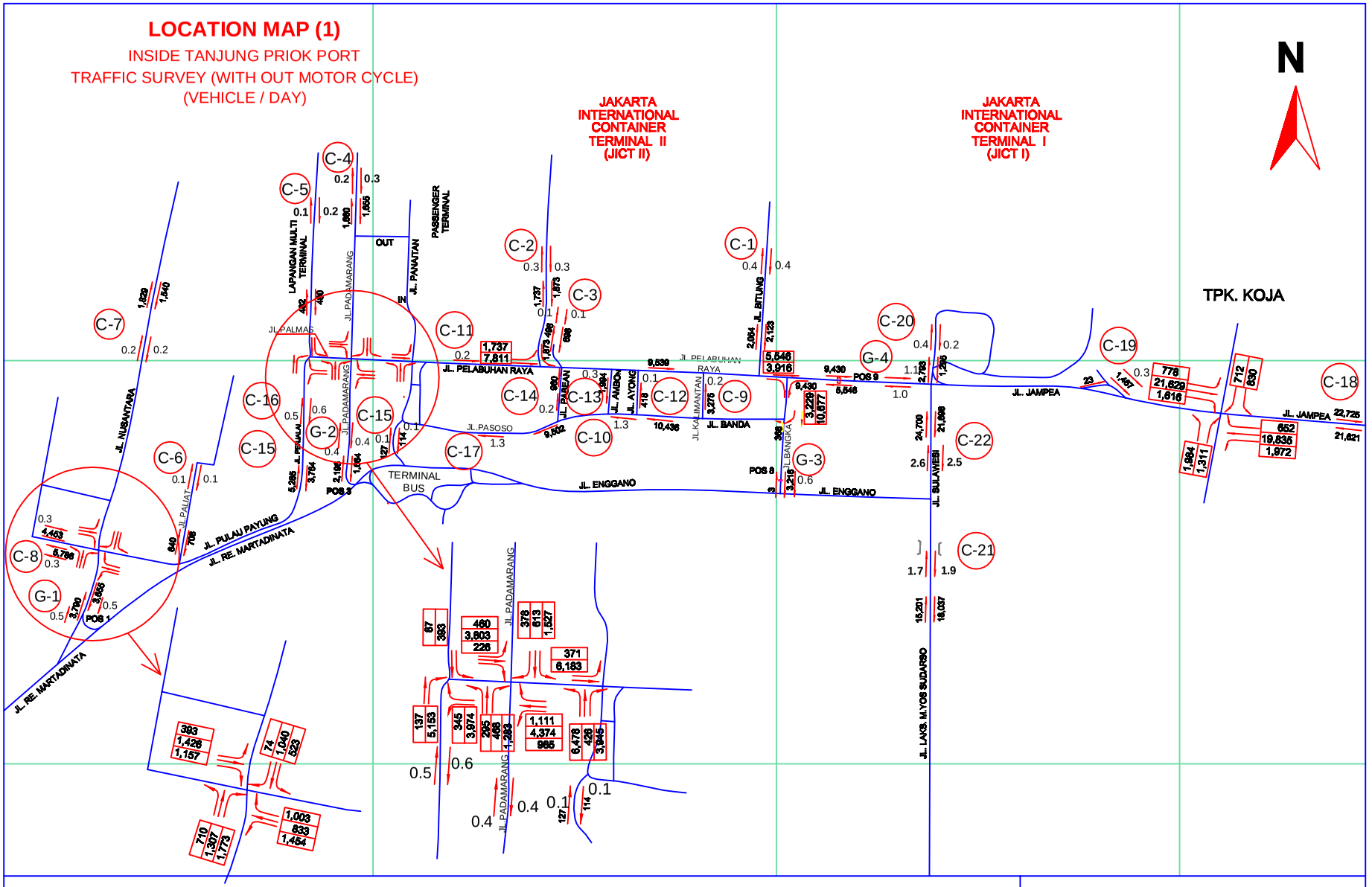
c) Car Parking Survey

52. The car parking survey was carried out at 14 locations to count hourly number of car parking at respective parking area from 6 o'clock in the morning to 22 o'clock in the evening.

53. The parking space capacity of each parking area is estimated by actual measuring the dimension at site, and shown in Figure 14-B-6.

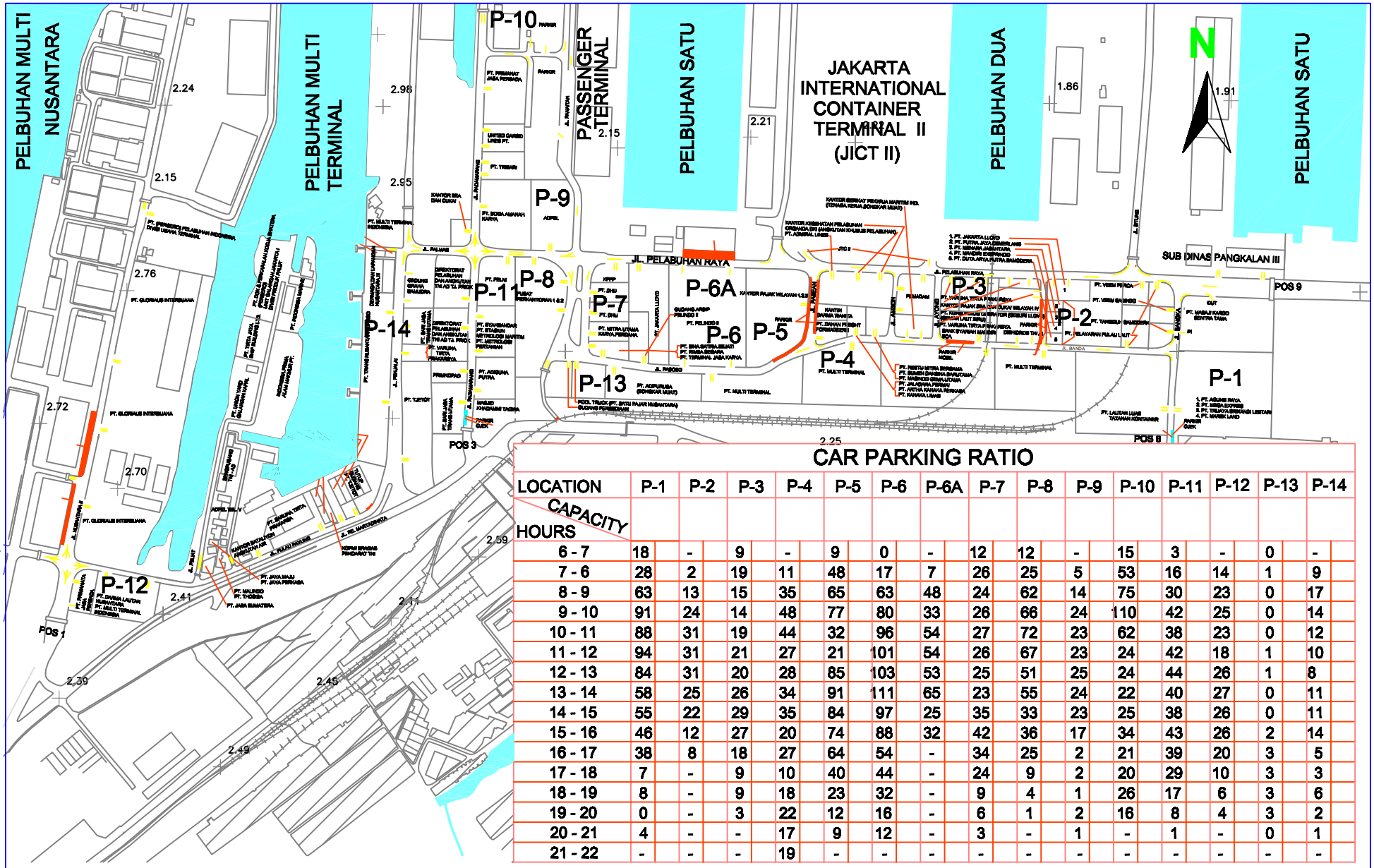
54. The parking capacity of all the parking area available in the port have enough space to accommodate daily parking volume except parking area of P-8, locating at the entrance of passenger terminal, in which parking volume is nearly full capacity at the midday time.

Figure 14-B-6 Car Parking Survey



THE STUDY FOR DEVELOPMENT OF THE GREATER JAKARTA METROPOLITAN PORTS IN THE REPUBLIC OF INDONESIA

INSIDE PORT REQUIRED LANE NUMBER



CAR PARKING RATIO

LOCATION / CAPACITY / HOURS	P-1	P-2	P-3	P-4	P-5	P-6	P-6A	P-7	P-8	P-9	P-10	P-11	P-12	P-13	P-14
6 - 7	18	-	9	-	9	0	-	12	12	-	15	3	-	0	-
7 - 6	28	2	19	11	48	17	7	26	25	5	53	16	14	1	9
8 - 9	63	13	15	35	65	63	48	24	62	14	75	30	23	0	17
9 - 10	91	24	14	48	77	80	33	26	66	24	110	42	25	0	14
10 - 11	88	31	19	44	32	96	54	27	72	23	62	38	23	0	12
11 - 12	94	31	21	27	21	101	54	26	67	23	24	42	18	1	10
12 - 13	84	31	20	28	85	103	53	25	51	25	24	44	26	1	8
13 - 14	58	25	26	34	91	111	65	23	55	24	22	40	27	0	11
14 - 15	55	22	29	35	84	97	25	35	33	23	25	38	26	0	11
15 - 16	46	12	27	20	74	88	32	42	36	17	34	43	26	2	14
16 - 17	38	8	18	27	64	54	-	34	25	2	21	39	20	3	5
17 - 18	7	-	9	10	40	44	-	24	9	2	20	29	10	3	3
18 - 19	8	-	9	18	23	32	-	9	4	1	26	17	6	3	6
19 - 20	0	-	3	22	12	16	-	6	1	2	16	8	4	3	2
20 - 21	4	-	-	17	9	12	-	3	-	1	-	1	-	0	1
21 - 22	-	-	-	19	-	-	-	-	-	-	-	-	-	-	-

THE STUDY FOR DEVELOPMENT OF THE GREATER JAKARTA METROPOLITAN PORTS IN THE REPUBLIC OF INDONESIA

CAR PARKING SURVEY