

Chapter 11 Ro/Ro Ferry Port Development Plan

A. Planned Ro/Ro Vessel Size and The Capacity

1. Empirical analysis reveals that Ro/Ro vessel sizes are related with both sailing distances and traffic volumes. Ro/Ro vessel sizes for port facility planning are proposed as shown in Table I-11-1.
2. The proposed vessel sizes coincide with the existing vessel sizes or suggest one rank higher for almost all cases. For some cases, however, the existing vessel sizes are larger than the proposed one.
3. JICA study team suggests, therefore, to compare the existing vessel size with the proposed one shown in Table I-11-1, and adopt the larger size as the planned vessel size for the port facility planning.

Table I-11-1 Proposed Standard on Ro/Ro Vessel Size

| Cargo Volume (m.t) | Distance | (GRT) | | |
|--------------------|----------|-------------------|--------------|-------------------|
| | | less than 10 n.m. | 10 - 50 n.m. | more than 50 n.m. |
| More than 100,000 | 300 | | 2,000 | 2,000 |
| 20,000 - 100,000 | | | 1,000 | |
| Less than 20,000 | | | 500 | |

4. JICA study team analyzed the shipping and cargo statistics of the first 50 vessels that called Calapan Port from Batangas Port in March 1990 to determine the net freight capacity of Ro/Ro vessels. This analysis showed that a 1,000 grt class Ro/Ro vessel currently transports about 54 tons of net cargo per voyage.

5. It is also possible to estimate the net cargo tonnage transported by a Ro/Ro vessel per voyage by assuming the following conditions; area of car deck, allocation ratio among car types, occupancy area by car type, and load factor. Planned net cargo tonnage transported by a Ro/Ro vessel under 65 % load factor is summarized as follows;

| | |
|-----------|--------|
| 300 grt | 27.3 t |
| 500 grt | 35.1 t |
| 1,000 grt | 52.0 t |
| 2,000 grt | 79.3 t |

6. Taking into consideration the information on passenger capacities of the existing Ro/Ro vessels in the Philippines and Indonesia, JICA study team assumes the passenger capacity of the Ro/Ro vessels by size in this study as follows;

| | |
|-----------|------------------|
| 300 grt | 300 passengers |
| 500 grt | 500 passengers |
| 1,000 grt | 800 passengers |
| 2,000 grt | 1,000 passengers |

B. Evaluation of the Study Links.

7. As discussed in the previous chapter, the study links are classified into three (3) groups based on the point-mark system. An issue to be discussed is whether all of the study links have high potential as Ro/Ro links.

8. An underlying assumption is that Ro/Ro ferry links of this study should offer daily service at minimum. At 60 per cent load factor based on the above-mentioned cargo tonnage, a 500 grt Ro/Ro vessel which makes a round trip a day can transport about 10,000 vehicles in a year. A 500 grt vessel is the smallest size for links with more than ten (10) n.m. links in this study.

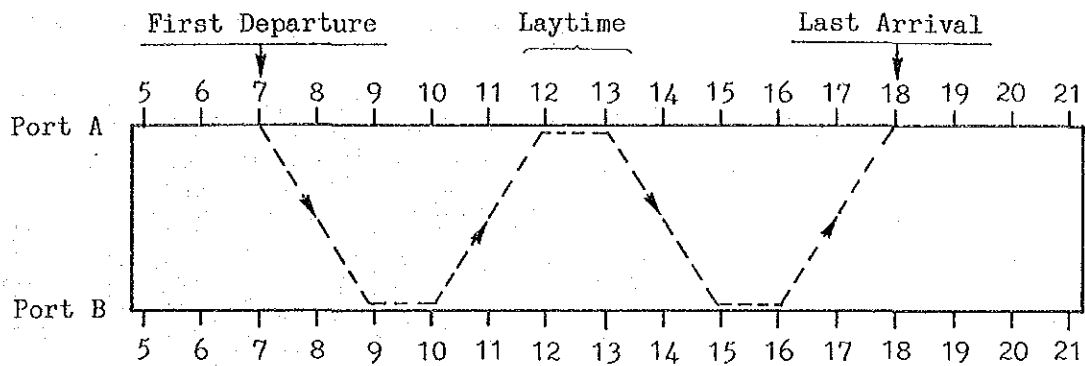
9. All of the Indonesian Ro/Ro links which have a vehicle traffic of less than 10,000 have cargo traffic of less than 40,000 tons and passenger traffic of less than 200,000 people, which coincide with the lowest class in the link prioritization criteria if one-way traffic volume can be approximated by halving these figures. Seven (7) links meet the above mentioned criteria, and all of them fall under the 3rd priority group.

10. Based on the observations and analysis, JICA study team is reluctant to propose the links of the 3rd priority group as prosperous Ro/Ro links to be developed by the year 2010. Rather, it is advisable to improve service and safety level of present shipping practices.

C. Ro/Ro Port Facility Plan

11. The details of vessel operation plan are examined containing vessel frequency, time schedule with number of vessels and births required to meet the required volume of cargo and passenger by link.

12. The sailing schedules are indicated using such diagrams for each link as shown below.



13. A port facility plan for each individual port should be carried out separately based on the latest information on socioeconomic indicators and accurate data on natural condition. Furthermore, required facilities for the development of each study port were examined based on the result of the field surveys and related studies. Summary of the existing facilities and required facilities for each study port of the first and second priority groups are shown in Table 11-2.

14. The planning guidelines presented in Table I-11-3 are to serve as standards in determining the scale and dimension of Ro/Ro facilities. The size of each facility shall be in accordance with the dimensions of vessels to be accommodated and characteristics of Ro/Ro traffic in the Philippines.

Table I-11-3 Standards for Required Ro/Ro Facilities

| Item \ Size of Vessel | | 300 | 500 | 1000 | 2000 |
|-----------------------|-------------------|--------|----------|----------|----------|
| | | | | | |
| Water depth | (m) | -3.00 | -3.50 | -4.50 | -5.50 |
| Pier | L (m) | 60.00 | 70.00 | 95.00 | 115.00 |
| | W (m) | 10.00 | 10.00 | 12.00 | 12.00 |
| Ro/Ro ramp | L (m) | 14.50 | | | |
| | W (m) | 11.05 | 11.95 | 13.05 | 14.55 |
| Terminal Building | (m ²) | 250.00 | 400.00 | 500.00 | 600.00 |
| Parking Space | (m ²) | 700.00 | 1,000.00 | 1,500.00 | 2,000.00 |
| Access way | W (m) | 7.00 | | | |

Table I-11-2 Summary of Existing Facilities and Required Facilities

| Link No. | Port Name | Existing Facilities and | | | | | | Required Facilities | | | Project cost (mil. Pesos) |
|----------|--------------|--|-----------|------|------------|----------------|---------------|---------------------|------------|--------------|---------------------------|
| | | Berth | Water Way | Ramp | Access Way | Passenger Shed | Parking Space | Access Road | Water Line | Elect-ricity | |
| 3 | Batangas | ○ | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | 1.3 |
| | Calapan | × | △ | × | ○ | △ | △ | ○ | ○ | ○ | 99.2 |
| 10 | Iloilo | × | × | × | ○ | △ | × | ○ | △ | △ | 179.7 |
| | Bacolod | × | ○ | × | △ | × | × | △ | △ | △ | 233.1 |
| 13 | Toledo | × | ○ | × | □ | × | × | △ | △ | × | 105.4 |
| | San Carlos | □ | ○ | × | ○ | × | × | △ | × | ○ | 72.7 |
| 8 | Tandayag | △ | ○ | × | × | △ | △ | × | × | ○ | 33.2 |
| | Bato | △ | △ | × | □ | × | × | △ | × | × | 37.2 |
| 38 | Cebu | □ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | 32.5 |
| | Tagbilaran | ○ | ○ | ○ | ○ | △ | × | ○ | × | ○ | 36.7 |
| 28 | Cebu | □ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | 32.5 |
| | Ormoc | □ | △ | ○ | ○ | × | × | ○ | × | × | 86.5 |
| 6 | Escalante | × | ○ | × | × | × | △ | ○ | × | ○ | 54.5 |
| | Tuburan | × | ○ | × | △ | × | × | × | △ | △ | 73.8 |
| 14 | Cebu | □ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | 27.1 |
| | Tubigon | × | ○ | × | □ | △ | × | ○ | × | ○ | 83.3 |
| 41 | Guihulngun | □ | ○ | × | ○ | × | × | △ | × | ○ | 30.3 |
| | Dumanjug | × | ○ | × | ○ | × | × | × | × | ○ | 34.1 |
| 2 | Matnog | △ | △ | × | ○ | ○ | ○ | ○ | ○ | ○ | 33.9 |
| | San Isidoro | ○ | ○ | × | ○ | ○ | △ | ○ | ○ | × | 9.5 |
| 1 | Matnog | △ | △ | × | ○ | ○ | ○ | ○ | ○ | ○ | 33.9 |
| | Allen | × | ○ | × | ○ | × | × | × | × | △ | 72.2 |
| 4 | Liloan | △ | △ | × | ○ | ○ | ○ | ○ | ○ | ○ | 20.6 |
| | Lipata | △ | △ | × | ○ | ○ | ○ | ○ | ○ | ○ | 20.6 |
| 16 | Dumaguete | □ | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | 27.7 |
| | Dapitan | □ | ○ | × | ○ | △ | ○ | △ | ○ | ○ | 34.9 |
| 17 | Jagna | △ | △ | × | □ | × | × | ○ | × | ○ | 66.6 |
| | C.de.Oro | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | 13.9 |
| 22 | Batangas | ○ | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | 0.9 |
| | Abla de Ilog | × | ○ | × | □ | × | × | ○ | ○ | × | 74.9 |
| 9 | Tubod | □ | ○ | × | ○ | × | △ | △ | × | ○ | 31.8 |
| | Tangub | × | ○ | × | △ | × | × | ○ | × | ○ | 36.2 |
| 23 | Balabacan | × | × | × | □ | × | × | ○ | × | × | 112.5 |
| | Lucena | × | ○ | × | × | × | × | ○ | × | × | 85.1 |
| 18 | Zamboanga | □ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | 20.5 |
| | Basilan | □ | ○ | × | ○ | × | × | ○ | × | ○ | 74.1 |
| 15 | Dumaguete | □ | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | 27.0 |
| | Santander | × | ○ | × | × | × | × | × | × | × | 68.9 |
| 11 | Iloilo | × | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | 38.8 |
| | Pulupandan | □ | ○ | × | ○ | × | × | ○ | ○ | ○ | 70.5 |
| 34 | Cebu | Facilities for Cebu - Ormoc Link can be utilised | | | | | | | | | 0.0 |
| | Talibon | × | ○ | × | △ | × | × | ○ | × | △ | 112.5 |
| 25 | Bulan | □ | △ | × | △ | × | × | ○ | × | × | 58.5 |
| | Masbate | □ | ○ | × | ○ | △ | × | ○ | × | ○ | 59.4 |
| 12 | Ililo | × | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | 28.1 |
| | Jordan | × | ○ | × | ○ | × | × | ○ | × | × | 36.6 |
| 19 | Zamboanga | □ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | 23.0 |
| | Jolo | △ | △ | × | ○ | ○ | ○ | × | ○ | × | 28.4 |
| 36 | Benoni | □ | ○ | × | ○ | △ | × | × | × | ○ | 31.5 |
| | Balingoan | □ | ○ | × | ○ | × | △ | × | × | × | 31.5 |
| 24 | Tabaco | □ | ○ | × | ○ | ○ | △ | ○ | × | ○ | 43.1 |
| | Virac | □ | ○ | × | ○ | × | △ | ○ | × | ○ | 41.0 |

Note; ○ shows facility exists
 □ shows facility exists but needs rehabilitation
 △ shows facility exists but need additional
 × facility (new facility needs to be provided)

D. Cost estimation and implementation schedule

15. The total construction cost of the Project is estimated at 2,721 million pesos of which 1,008 million pesos is the foreign currency portion and 1,713 million pesos is the local currency portion. Cost estimates for the Project are based on the standard facility and cost. Base estimates were prepared using the prices in July 1991. Cost estimates included a provision of 15 percent for construction cost and 5 percent for engineering work for physical contingency and excluded any contingency for price fluctuation. A summary of the project cost estimates is given in Table I-11-4.

Table I-11-4 Summary of Project Cost

(unit in Mil. Pesos)

| LINK No. | PORT NAME | CONSTRUCTION COST | | | E/S *1 | PHISICAL CONTI. | FOREIGN CURRENCY | LOCAL CURRENCY | SUB-TOTAL (by LINK) | TOTAL COST |
|----------|-----------------------|-------------------|--------------|--------|--------|-----------------|------------------|----------------|---------------------|------------|
| | | DIRECT COST | OVERHEAD etc | V.A.T. | | | | | | |
| 3 | BATANGAS CALAPAN | 0.8 | 0.1 | 0.1 | 0.2 | 0.2 | 0.4 | 0.9 | 1.3 | 2.6 |
| 10 | ILOILO BACOLOD | 52.1 | 8.3 | 6.0 | 12.7 | 10.6 | 31.7 | 58.1 | 89.8 | 275.3 |
| 13 | TOLEDO SAN CARLOS | 107.6 | 17.2 | 12.5 | 26.3 | 21.9 | 72.2 | 113.2 | 185.5 | 178.1 |
| 8 | TANDAYAG BATO | 61.1 | 9.8 | 7.1 | 14.9 | 12.4 | 39.0 | 66.4 | 105.4 | 70.4 |
| 38 | CEBU TAGBILARAN | 42.2 | 6.8 | 4.9 | 10.3 | 8.6 | 26.1 | 46.7 | 72.7 | 69.2 |
| 28 | CEBU DRMOG | 19.3 | 3.1 | 2.2 | 4.7 | 3.9 | 12.3 | 20.9 | 33.2 | 119.0 |
| | | 21.6 | 3.4 | 2.5 | 5.3 | 4.4 | 13.7 | 23.4 | 37.2 | |
| | | 18.8 | 3.0 | 2.2 | 4.6 | 3.8 | 12.7 | 19.8 | 32.5 | |
| | | 21.3 | 3.4 | 2.5 | 5.2 | 4.3 | 12.5 | 24.1 | 36.7 | |
| | | 18.8 | 3.0 | 2.2 | 4.6 | 3.8 | 12.7 | 19.8 | 32.5 | |
| | | 50.1 | 8.0 | 5.8 | 12.3 | 10.2 | 31.2 | 55.3 | 86.5 | |
| 3 | BATANGAS CALAPAN | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 97.9 |
| | | 56.8 | 9.1 | 6.6 | 13.9 | 11.6 | 34.8 | 63.1 | 97.9 | |
| 10 | ILOILO BACOLOD | 52.1 | 8.3 | 6.0 | 12.8 | 10.8 | 31.8 | 58.1 | 89.9 | 137.5 |
| | | 27.6 | 4.4 | 3.2 | 6.8 | 5.6 | 19.0 | 28.6 | 47.6 | |
| 6 | ESCALANTE TUBURAN | 31.6 | 5.1 | 3.7 | 7.7 | 6.4 | 20.1 | 34.4 | 54.5 | 128.4 |
| | | 42.8 | 6.9 | 5.0 | 10.5 | 8.7 | 27.3 | 46.5 | 73.8 | |
| 14 | CEBU TUBICON | 15.7 | 2.5 | 1.8 | 3.9 | 3.2 | 10.6 | 16.6 | 27.1 | 110.4 |
| | | 48.3 | 7.7 | 5.6 | 11.8 | 9.8 | 30.8 | 52.4 | 83.3 | |
| 41 | BUIHUKUNGUR DUMANJUG | 17.6 | 2.8 | 2.0 | 4.3 | 3.6 | 10.8 | 19.5 | 30.3 | 64.4 |
| | | 19.8 | 3.2 | 2.3 | 4.8 | 4.0 | 12.6 | 21.5 | 34.1 | |
| 2 | MATONGG SAN ISIDORO | 19.7 | 3.1 | 2.3 | 4.8 | 4.0 | 13.1 | 20.8 | 33.9 | 43.4 |
| | | 5.5 | 0.9 | 0.6 | 1.4 | 1.1 | 3.5 | 6.0 | 9.5 | |
| 1 | MATNOG ALLEN | 19.7 | 3.1 | 2.3 | 4.8 | 4.0 | 13.1 | 20.8 | 33.9 | 106.1 |
| | | 41.9 | 6.7 | 4.9 | 10.2 | 8.5 | 26.5 | 45.7 | 72.2 | |
| 4 | LILGAN LIPATA | 11.9 | 1.9 | 1.4 | 2.9 | 2.4 | 7.9 | 12.7 | 20.6 | 41.1 |
| | | 11.9 | 1.9 | 1.4 | 2.9 | 2.4 | 7.9 | 12.7 | 20.6 | |
| 16 | DUMAGUETE DAPITAN | 16.1 | 2.6 | 1.9 | 3.9 | 3.3 | 10.7 | 17.0 | 27.7 | 62.6 |
| | | 20.2 | 3.2 | 2.3 | 4.9 | 4.1 | 12.9 | 22.0 | 34.9 | |
| 17 | JAGNA C. de ORO | 38.6 | 6.2 | 4.5 | 9.4 | 7.9 | 24.5 | 42.1 | 66.6 | 80.5 |
| | | 8.0 | 1.3 | 0.9 | 2.0 | 1.6 | 5.4 | 8.5 | 13.9 | |
| 22 | BATANGAS ABLA de ILOG | 0.5 | 0.1 | 0.1 | 0.1 | 0.1 | 0.3 | 0.6 | 0.9 | 75.7 |
| | | 43.4 | 6.9 | 5.0 | 10.6 | 8.8 | 27.2 | 47.8 | 74.9 | |
| 9 | TUBOD LANGUB | 18.5 | 3.0 | 2.1 | 4.5 | 3.8 | 11.7 | 20.1 | 31.8 | 68.0 |
| | | 21.0 | 3.4 | 2.4 | 5.1 | 4.3 | 13.4 | 22.8 | 36.2 | |
| 23 | BALANACAN LUCENA | 65.3 | 10.4 | 7.6 | 16.0 | 13.3 | 40.9 | 71.7 | 112.5 | 197.6 |
| | | 49.3 | 7.9 | 5.7 | 12.1 | 10.0 | 31.3 | 53.8 | 85.1 | |
| 18 | ZAMBOANGA BASILAN | 11.9 | 1.9 | 1.4 | 2.9 | 2.4 | 8.0 | 12.5 | 20.5 | 94.6 |
| | | 42.9 | 6.9 | 5.0 | 10.5 | 8.7 | 27.0 | 47.1 | 74.1 | |
| 15 | DUMAGUETE SANTANDAR | 15.6 | 2.5 | 1.8 | 3.8 | 3.2 | 10.5 | 16.5 | 27.0 | 95.8 |
| | | 39.9 | 6.4 | 4.6 | 9.8 | 8.1 | 26.2 | 42.7 | 68.9 | |
| 11 | ILOILO PULUPANDAN | 22.5 | 3.6 | 2.6 | 5.5 | 4.6 | 15.1 | 23.7 | 38.8 | 109.3 |
| | | 40.9 | 6.5 | 4.7 | 10.0 | 8.3 | 25.6 | 45.0 | 70.5 | |
| 34 | CEBU TALIBON | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 112.5 |
| | | 65.2 | 10.4 | 7.6 | 16.0 | 13.3 | 42.1 | 70.4 | 112.5 | |
| 25 | BULAN MASBATE | 33.9 | 5.4 | 3.9 | 8.3 | 6.9 | 21.0 | 37.5 | 58.5 | 118.0 |
| | | 34.5 | 5.5 | 4.0 | 8.4 | 7.0 | 21.7 | 37.7 | 59.4 | |
| 12 | ILOILO JORDAN | 16.3 | 2.6 | 1.9 | 4.0 | 3.3 | 10.9 | 17.1 | 28.1 | 64.7 |
| | | 21.2 | 3.4 | 2.5 | 5.2 | 4.3 | 13.7 | 22.9 | 36.6 | |
| 19 | ZAMBOANGA JOLO | 13.3 | 2.1 | 1.5 | 3.3 | 2.7 | 8.9 | 14.0 | 23.0 | 51.4 |
| | | 16.5 | 2.6 | 1.9 | 4.0 | 3.4 | 10.9 | 17.5 | 28.4 | |
| 36 | BENONI BALINGOAN | 18.2 | 2.9 | 2.1 | 4.5 | 3.7 | 11.1 | 20.4 | 31.5 | 62.9 |
| | | 18.2 | 2.9 | 2.1 | 4.5 | 3.7 | 11.3 | 20.1 | 31.5 | |
| 24 | TABACO VIRAC | 25.0 | 4.0 | 2.9 | 6.1 | 5.1 | 16.5 | 26.6 | 43.1 | 84.0 |
| | | 23.8 | 3.8 | 2.8 | 5.8 | 4.8 | 14.9 | 26.1 | 41.0 | |
| | | | | | | | | | | 2721.2 |

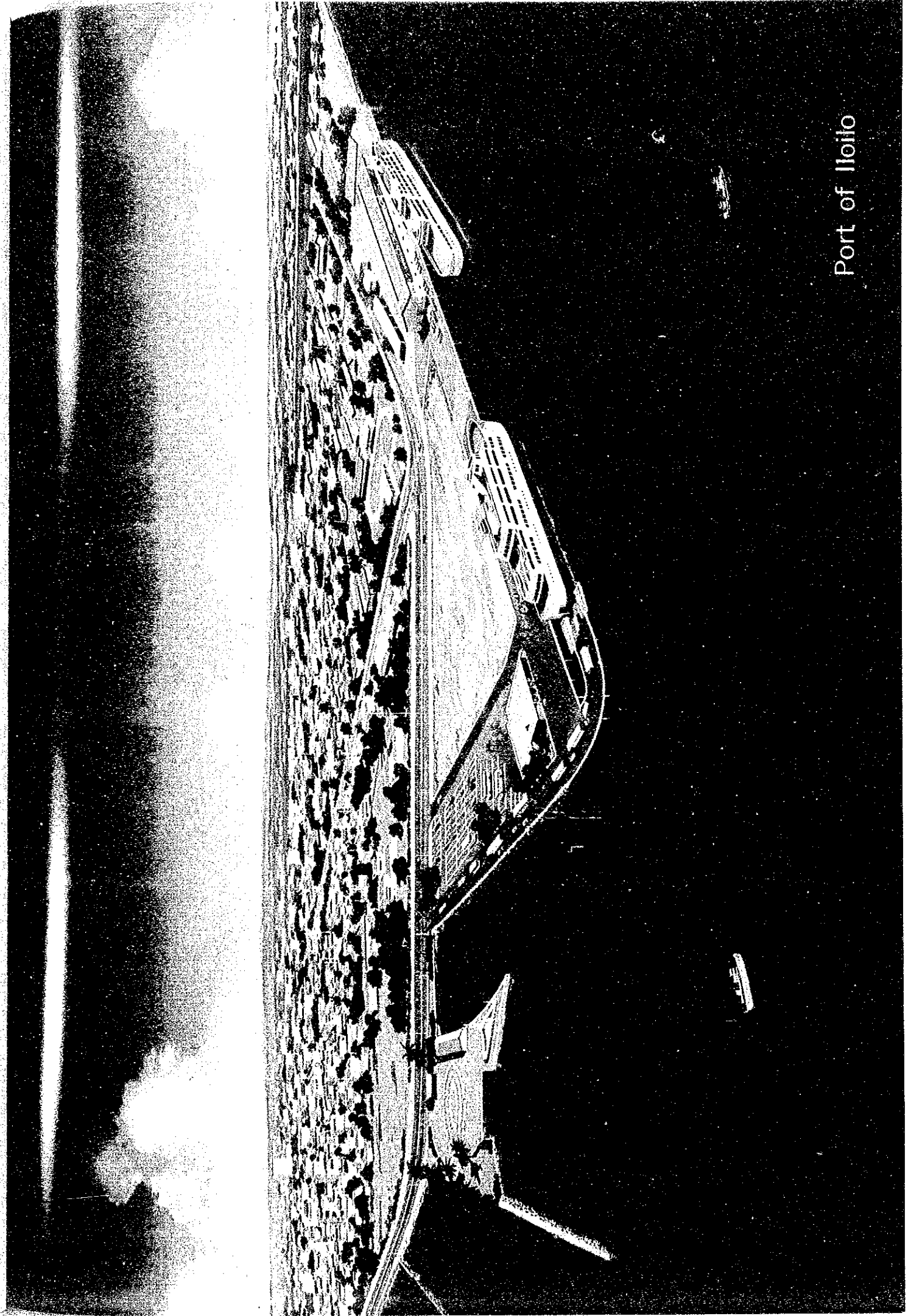
Note: Price contingency is excluded

*1: E/S denotes engineering service including detailed design and supervisory work

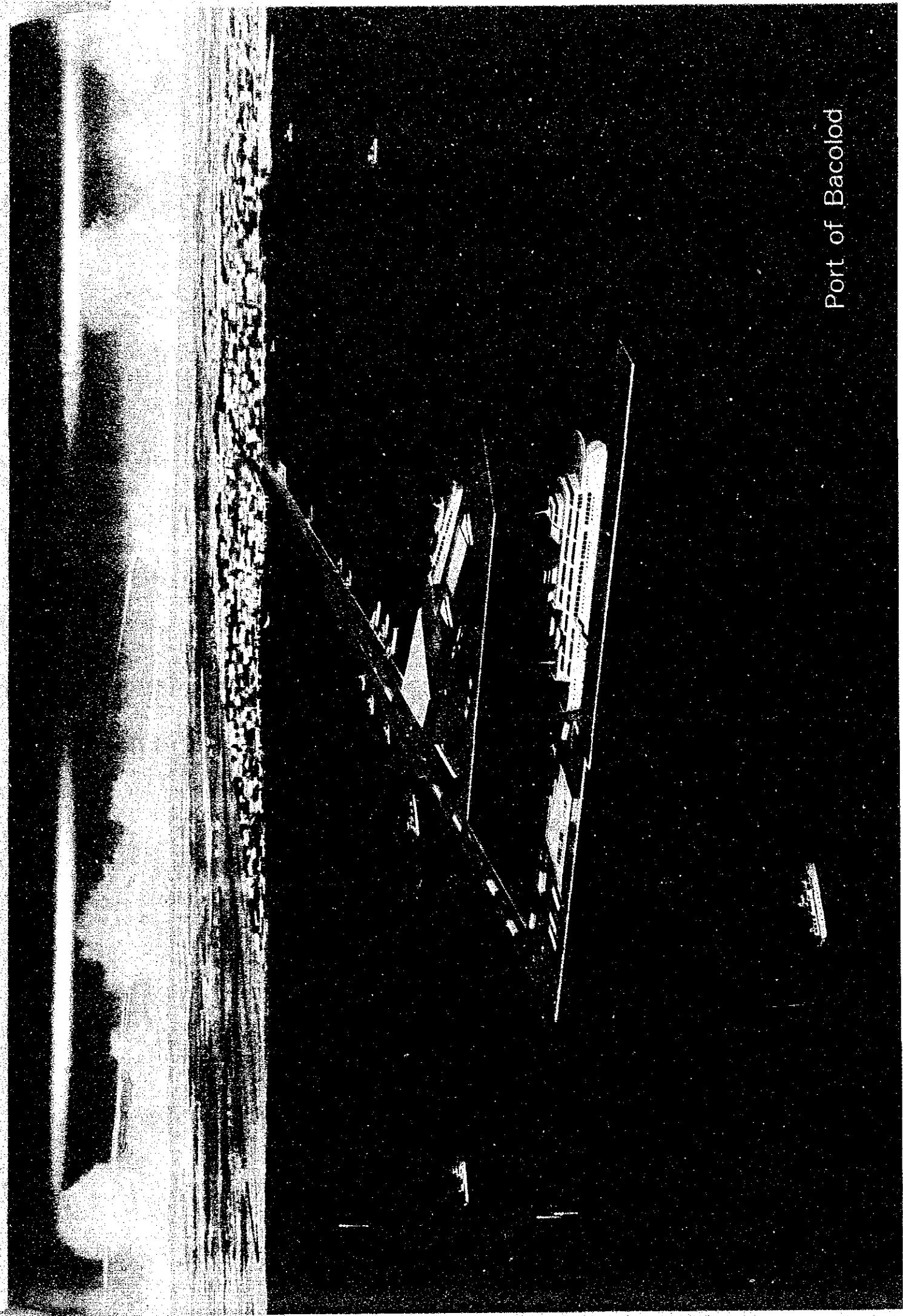
SOURCE: JICA Study Team

VOLUME II

DEVELOPMENT PLAN FEASIBILITY STUDY OF ILOILO BACOLOD LINK



Port of Iloilo



Port of Bacolod

Chapter 1 Socioeconomic Profile of Western Visayas

1. The Western Visayas region (Region VI), where the Iloilo-Bacolod Link is located, is bounded on the north by the Sibuyan Sea, on the south by the Sulu Sea, on the east by Visayan Sea, and on the west by the islands of Palawan over the Palawan Sea. This region includes the major islands such as Panay, Negros and Panubulon, of which Negros is shared with the Central Visayas region. Panay Gulf lies between these islands.

2. In the Philippines, there are four (4) types of local government units: the barangay, the municipality, the city, and the province.

In Region VI there are eight (8), 123 municipalities, and 4,042 baranguays.

3. As of the 1990 Census, the Region has a total population of 5,393,000 with a population density of 267 persons per square kilometer.

Out of the total population, 1,647,000 and 2,257,000 reside in Iloilo and Negros Occidental Province respectively. Among them, 310 and 364 thousand reside in Iloilo City and Bacolod City respectively. These two cities are designated as highly urbanized cities independent of the provinces.

4. The principal products are rice, fish, poultry, cattle and other livestock, sugarcane, corn, capiz, shells, timber, fruits and vegetables, coconut, coffee, and cotton. Mineral resources include copper, gold, silver, limestone, iron, cement, marble, clay, and asbestos.

5. The composition of GRDP (Gross Regional Domestic Product) shows that the second and tertiary industries have increased their portions of GRDP while the primary industry has gradually decreased.

6. In the last half of the 1980s, the Western Visayas was developing at a slower rate than other regions in terms of both GRDP and per capita GRDP.

Road

7. The Philippine road network system is composed of national, provincial, city, municipal and barangay roads. Progress in regional road length extends indifferently from 1986 to 1990. Of the total (14,256 km) as of 1990, earth or gravel paved barangay roads account for 57% (8,136 km); however, concrete or asphalt paved national, provincial and city roads account for only 11% (1,449 km).

Railways

8. The Panay Railways is only existing, however, no longer operational for passenger and general cargo transportation, but is utilized by the sugar industry for hauling of sugar cane.

Port

9. According to PPA and DPWH, the Western Visayas is reported to have 63 ports in total, the majority of which are private and municipal ports. Based on the PPA statistics, there is one national base port (Iloilo), three terminal ports (Culasi, Pulupandan, San Jose (Antique)), and eight other government ports (Batan, Concepción, Dumguit, E.B. Magalona, Guimaras (RC-8), New Washington, Punta Tabuc, Victorias Baranguay).

Airport

10. The Region has 6 airports viz., Antique (San Jose), Bacolod, Caticlan, Kalibo, Iloilo and Roxas. Out of them, Bacolod, Iloilo, and Roxas are designated as trunk lines, Antique, and Kalibo as secondary, and Caticlan as a feeder airport.

Chapter 2 General Description of the Study Ports

A. Present Situation of Iloilo-Bacolod Ferry Service

1. The Iloilo-Bacolod ferry service is the only regular connection by sea between the islands of Panay and Negros. Currently, this link is serviced by three vessels: M/V Don Vicente with 1,202 passenger capacity, M/V Princess of Negros with 1,187 and M/V Bacolod Express with 356. There exist five regular shipping services a day between the two islands.

B. General Description of Port of Iloilo

2. The Port of Iloilo consists of three terminals: International Commercial Port Complex (ICPC), River Port, and Old Foreign Pier as shown in Figure II-2-1.

3. ICPC was constructed using the 3rd IBRD loan to serve foreign trade. River Port with shallow a water depth of 3 m is used for bancas, barges and fishing boats. Old Foreign Pier is located near the city center and mainly used as a ferry terminal.

4. Historical development of passenger/cargo traffic and main commodities handled at the port are shown in Table II-2-1 and Table II-2-2.

C. General Description of Port of Bacolod

5. Two seaport terminals exist in Bacolod City: Banago Pier and Reclamation Area as shown in Figure II-2-2. Banago Pier is owned and managed by Negros Navigation Co., and located 3 km north of the city center. The 1.2 km-long jetty accommodates ferries from Iloilo and Manila.

6. Reclamation Area is the port owned by Bacolod Port Development and Reclamation Project Co., Inc. The existing wharf is about 600 m in length, 1.5 m in depth and used by bulk or general cargo vessels.

7. Main cargo commodities handled at the two terminals in Bacolod City are shown in Table II-2-3.

D. Present Port Management and Operation

8. While at Port Iloilo, most of the port facilities belong to PPA (PMO Iloilo), at Bacolod Port, on the other hand, all terminals belong to certain private companies. PPA grants permission of port operation to these companies. And a branch of PMO-Iloilo oversees administration of these private terminals.

Nevertheless, the PMO collects usage fees, wharfage dues, shares from the calling vessels, the stevedoring/arrastre companies and fees for cargo transported at Bacolod terminals, without giving any services.

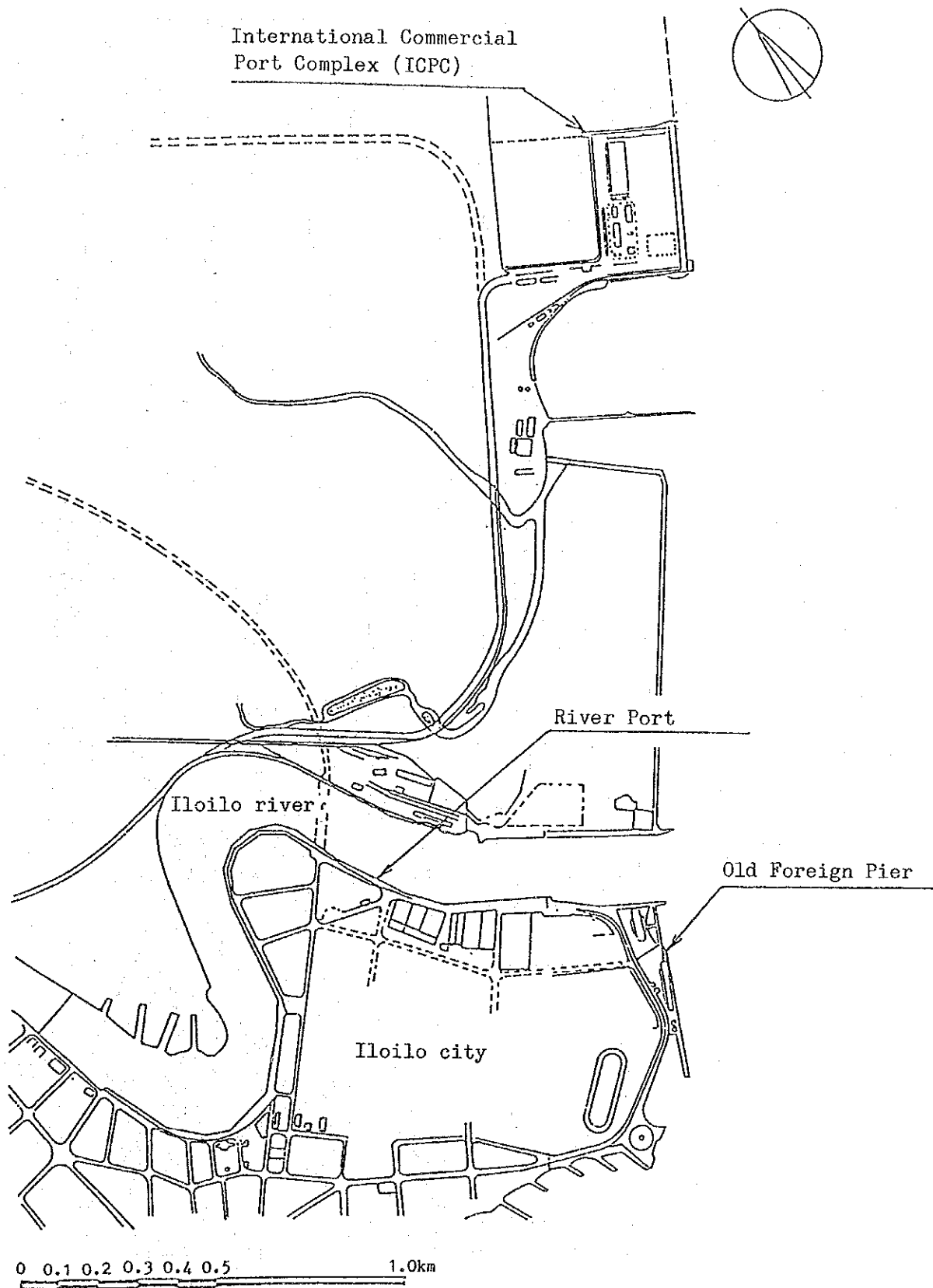


Figure II-2-1 Location of the Three Terminals of Port of Iloilo

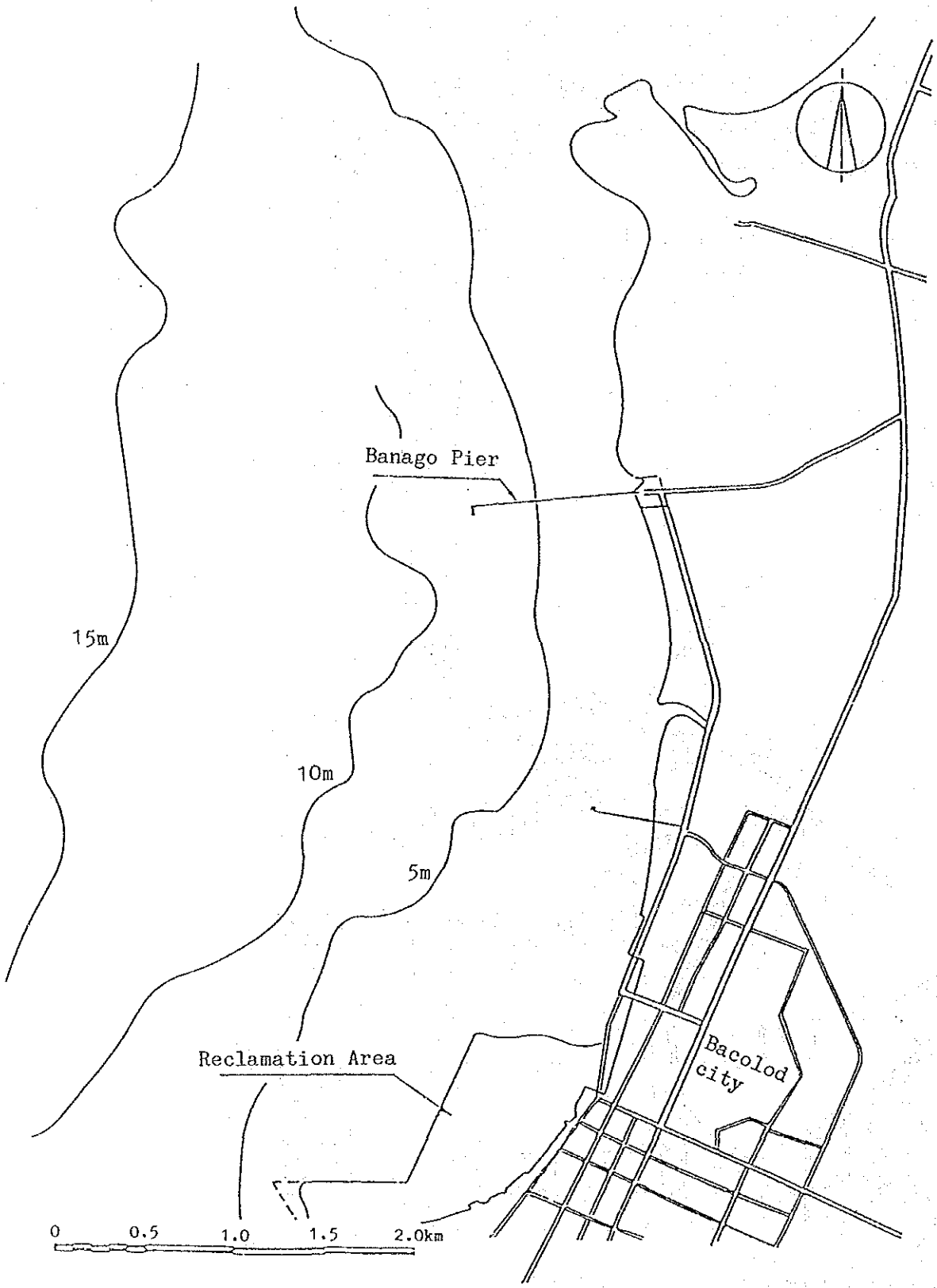


Figure II-2-2 Location of Banago Jetty and reclamation Area

Table II-2-1 Passenger & Cargo Movement at Port of Iloilo 1980 - 1990

Unit: Cargo; M ton Passenger; Person

| Year | Cargo.T | Cargo.D | Cargo.F | Passenger.T |
|------|-----------|-----------|---------|-------------|
| 1980 | 982,409 | 796,593 | 185,816 | 1,105,535 |
| 1981 | 1,124,810 | 987,704 | 137,160 | 1,324,798 |
| 1982 | 1,042,768 | 874,962 | 167,806 | 1,273,538 |
| 1983 | 1,085,631 | 943,146 | 142,485 | 1,414,453 |
| 1984 | 1,058,420 | 968,812 | 89,608 | 1,287,506 |
| 1985 | 806,593 | 703,510 | 103,083 | 1,291,518 |
| 1986 | 918,503 | 810,020 | 108,483 | 1,266,947 |
| 1987 | 1,231,117 | 1,055,539 | 175,578 | 1,521,994 |
| 1988 | 1,421,745 | 1,186,521 | 226,224 | 1,701,472 |
| 1989 | 1,572,280 | 1,378,589 | 193,701 | 2,027,642 |
| 1990 | | | | |

Source: Annual Statistical Report. PPA. 1990

Table II-2-2 Major Commodities Treated at Port of Iloilo

Unit: Metric Ton

| Commodity | Whole Port | Old Foreign Por | River Port | I.C.C |
|----------------|------------|-----------------|------------|---------|
| Bottled .C | 145,873 | 10,989 | 125,918 | 8,966 |
| Cemnt | 133,080 | 844 | 132,236 | 0 |
| Fertilizer | 154,547 | 745 | 127,549 | 26,253 |
| Palay & Rice | 130,376 | 24,580 | 91,792 | 14,004 |
| Sugar | 96,065 | 22,038 | 67,295 | 6,732 |
| Fish & F.Preop | 41,453 | 25,325 | 13,679 | 2,449 |
| Fruits & Veg. | 18,174 | 10,817 | 6,180 | 1,177 |
| Empty Bottles | 76,496 | 0 | 76,496 | 0 |
| O.G.C | 357,010 | 67,214 | 111,155 | 178,641 |
| Others | 232,622 | 41,091 | 176,730 | 14,801 |
| Total | 1,385,696 | 203,643 | 929,030 | 253,023 |

Note: I.C.C; International Commercial Complex

Source: Annual Statistical Report 1990, PPA

Table II-2-3 Major Commodities Treated at Port of Bacolod

Unit: Metric Ton

| Commodity | Whole Port | Banago | Reclam |
|----------------|------------|---------|---------|
| Bottled .C | 117,840 | 4,411 | 113,429 |
| Cemnt | 125,676 | 260 | 125,416 |
| Fertilizer | 101,250 | 1,381 | 99,869 |
| Palay & Rice | 113,077 | 66,380 | 46,697 |
| Sugar | 348,029 | 113,952 | 234,077 |
| Fish & F.Preop | 55,614 | 55,554 | 60 |
| Fruits & Veg. | 52,969 | 52,554 | 415 |
| Transport Equ. | 41,696 | 41,008 | 688 |
| Empty Bottles | 75,277 | 0 | 75,277 |
| O.G.C | 142,524 | 98,756 | 43,768 |
| Others | 118,880 | 51,122 | 67,758 |
| Total | 1,292,832 | 485,378 | 807,454 |

Source: Annual Statistical Report 1990, PPA

Chapter 3 Natural Condition

Meteorology

1. Meteorological data can be obtained from PAGASA station in Iloilo while the only wind data is available from ATO in Bacolod. The temperature, rainfall, humidity and wind are 27°C, 1959 mm, 81 % and from Northeast with 4 m/sec as an average from 1951 to 1980. Average wind in Bacolod on 1990 is from North with 4 m/sec.

Topography

2. Iloilo is located between latitude 10°40'N and 11°30'N and longitude 122°02'E and 123°10'E bounded by Iloilo strait and Guimaras strait in its south and east. Bacolod is a capital of Negros Occidental located between latitude 9°N and 10°50'N and longitude 122°20'E and 123°30'E with an area of 13,672 km². Bacolod is located in the western plain which is the most important strategic area of the island and extends about 160 km.

Oceanography

3. Hydrographic condition for Iloilo and Bacolod were surveyed in 1991 and shown in the following Figures. Tide variation in Iloilo was about 1.57 m while in Bacolod was about 2.05 m. Prevailing current surveyed both of Iloilo and Bacolod have direction from northeast to southwest with maximum speed 1.5 m/sec and 1.2 m/sec, respectively.

Geological Conditions

4. Subsoil condition for Iloilo and Bacolod were surveyed through offshore boring on 1991. Survey result are shown in Figure II-3-3. Siltation in Bacolod was estimated heavy while in Iloilo was minimal due to the conditions such as hydrographic condition, current, wave and sea bed material conditions.

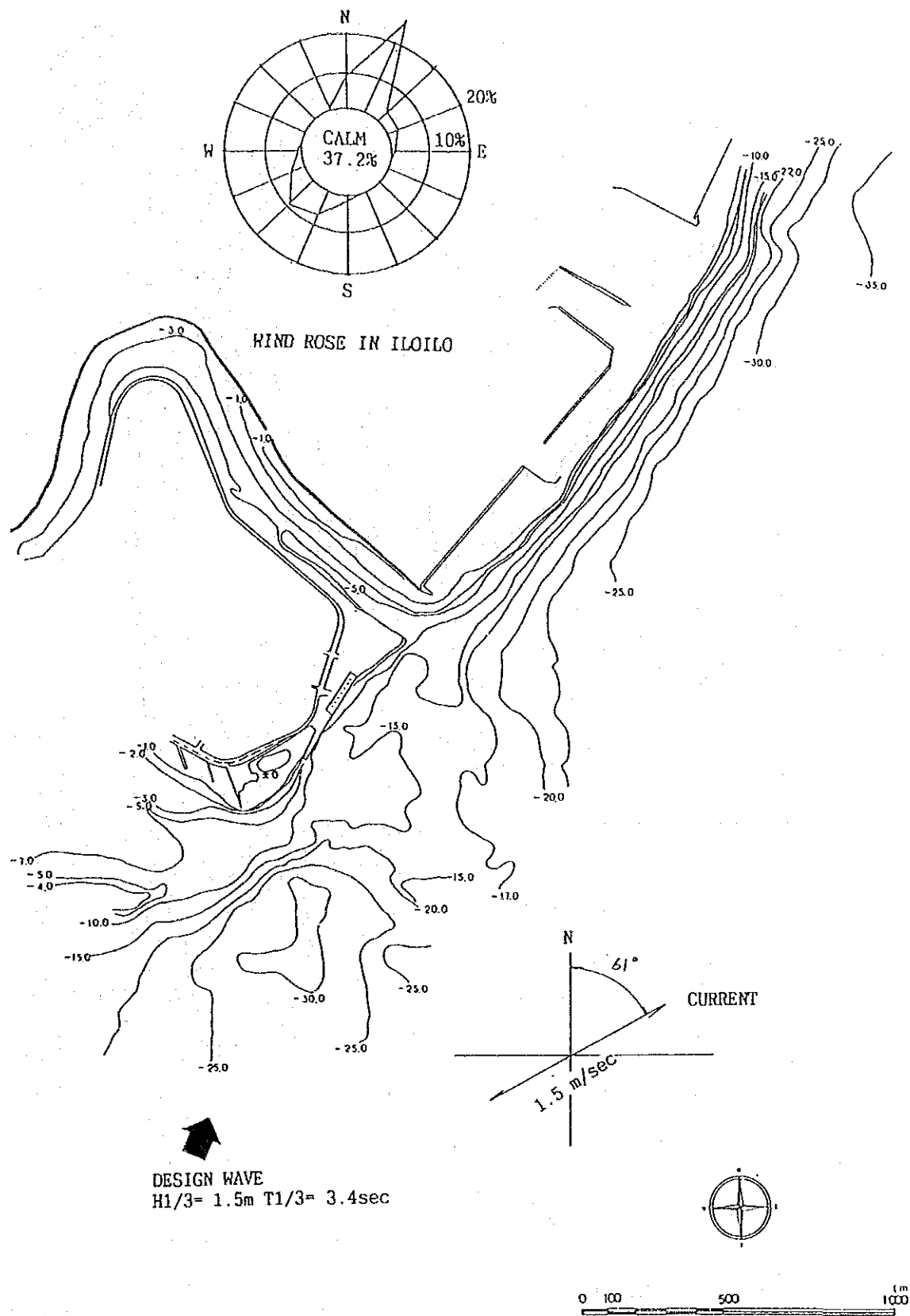


Figure II-3-1 Natural Condition in Iloilo

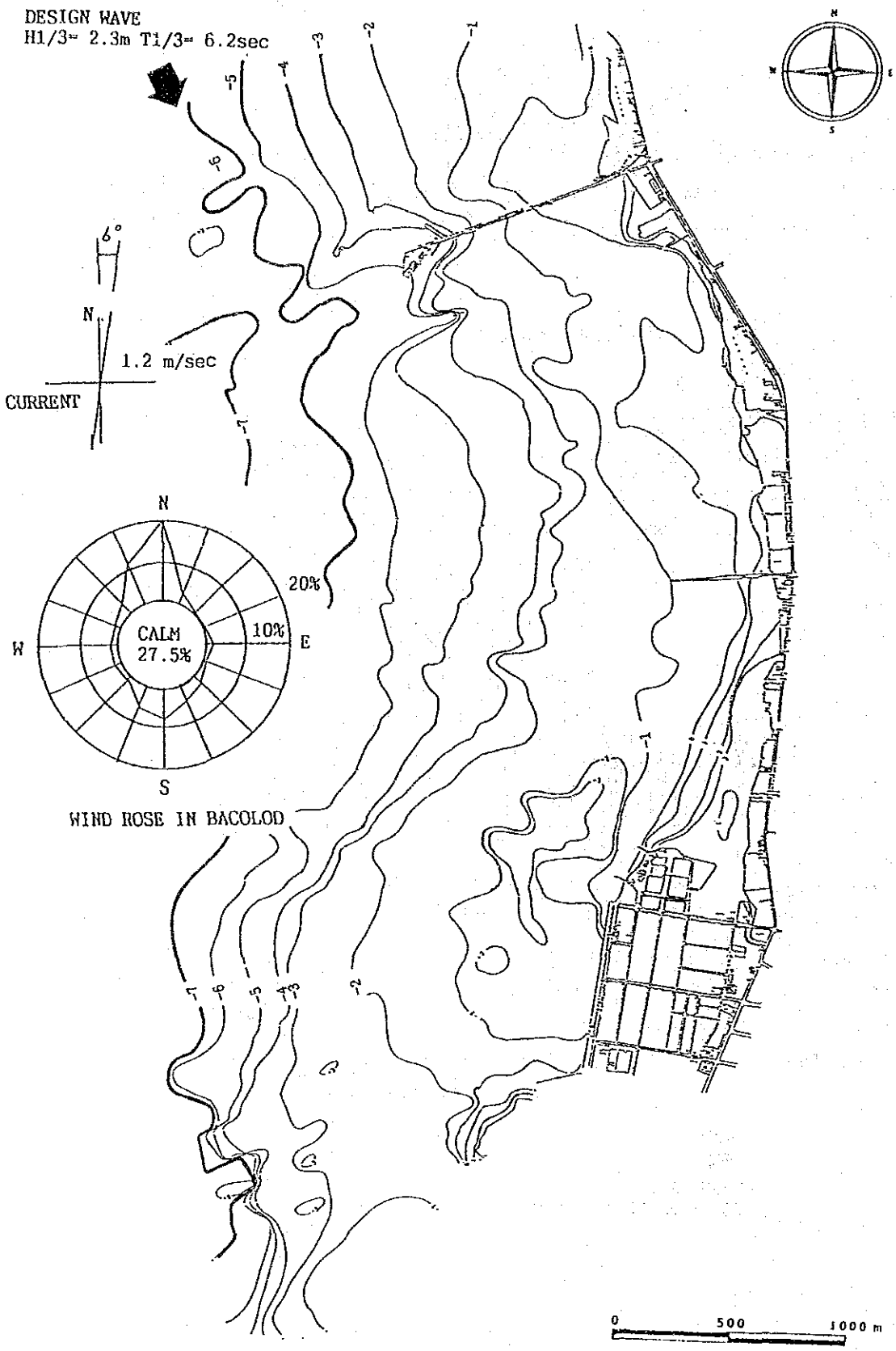
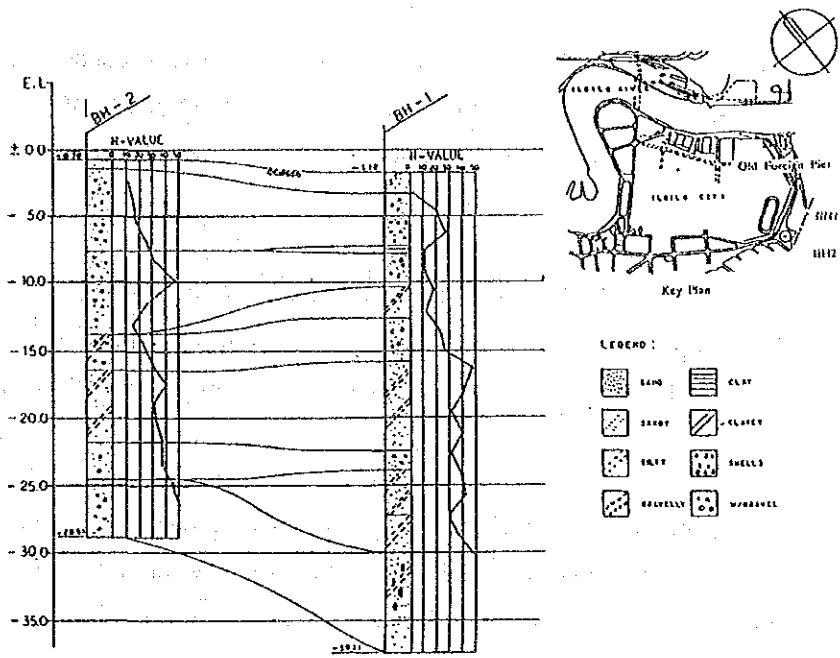


Figure II-3-2 Natural Condition in Bacoled

Subsoil Profile in Iloilo



Subsoil Profile in Bacolod

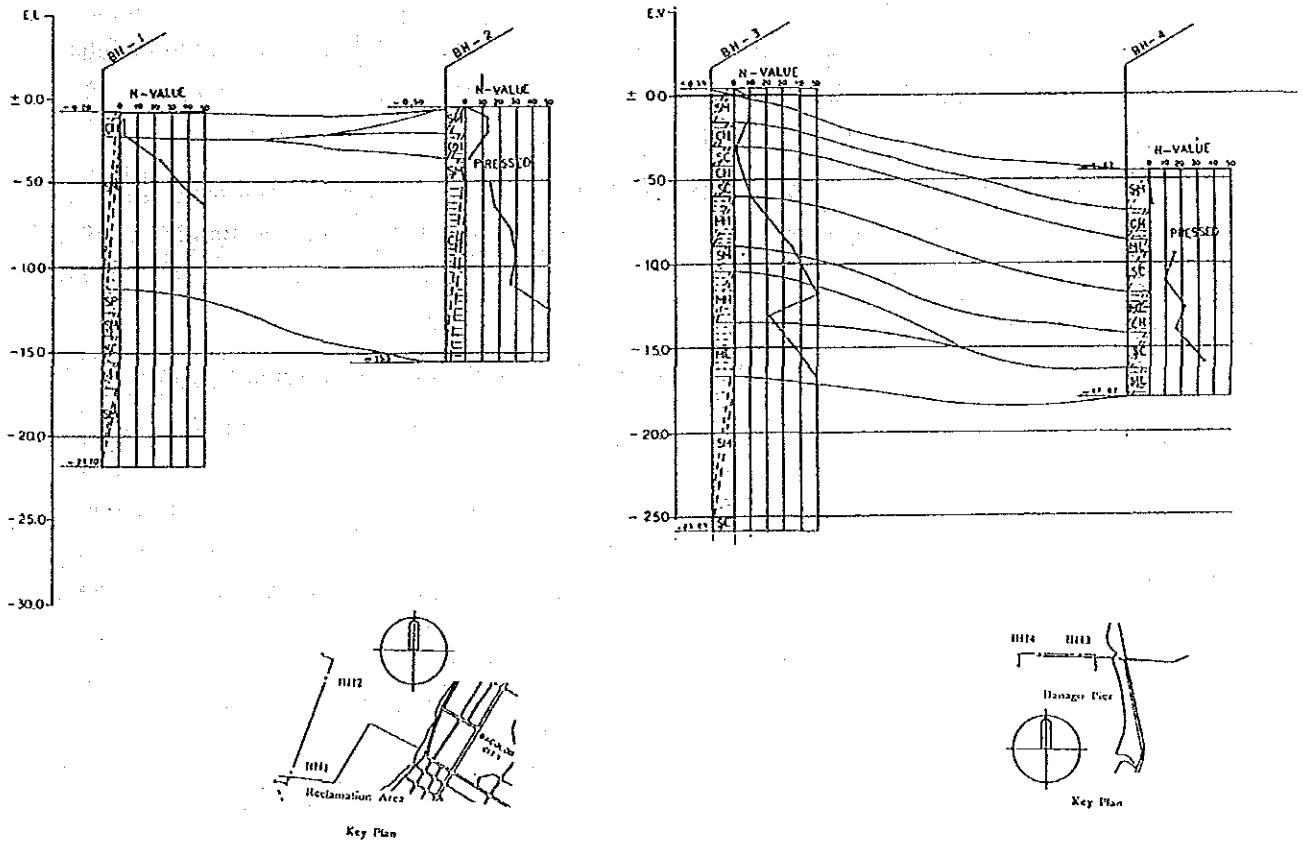


Figure II-3-3 Subsoil Profile

Chapter 4 Demand Forecast

1. According to the NSO statistics, the cargo movement between the two islands is about 150,000 – 190,000 metric ton. While the main cargo commodities from Panay to Negros are rice, fertilizer, beer & soft drink, cement and fruits & vegetables, the major commodity from Negros to Panay is sugar. The movement of other commodities are mutual.
2. As for the existing passenger traffic between the two islands, Iloilo province has a 90 % share of the total production/attraction in the Panay side. Iloilo City accounts for the biggest share in the province with 70 – 73 %. On the other hand, Negros Occidental has almost 100 % of the total production/attraction.
3. For the estimation of the passenger traffic in 1997, the annual growth rate analysis is applied. For the estimation of cargo traffic, commodity-wise demand forecast is conducted for 13 commodities. PPA statistics are utilized to get the base year link traffic as well as the historical development of throughput at the study ports.
4. The population of the target year 1997 is estimated at 3,395,000 in Panay island and 3,537,000 in Negros island.

The per capita expenditure growth rate in Region VI is assumed to be 4.5 % based on the future economic framework of the Philippines.
5. The Ro/Ro passenger traffic from Iloilo to Bacolod in 1997 is estimated at 1,236,000 while the link traffic is 1,392,000. The cargo volume transported by Ro/Ro vessels from Iloilo to Bacolod in 1997 is estimated at 165,000 ton.
6. The present and future cargo traffic between Iloilo and Bacolod is summarized in Table II-4-1.

Table II-4-1 Results of Commodity-wise Demand Forecast

Unit: M ton

| Commodity | Year = 1990 | | | | | |
|---------------------|------------------|--------|---------|------------------|--------|---------|
| | Iloilo → Bacolod | | | Bacolod → Iloilo | | |
| | Ferry | Others | Total | Ferry | Others | Total |
| Palay & Rice | 4,289 | 12,927 | 17,216 | 92 | 22 | 114 |
| Fruits & Veg. | 4,954 | 822 | 5,776 | 600 | 132 | 732 |
| Sugar | 80 | 0 | 80 | 121 | 31,658 | 31,779 |
| Fertilizer | 3 | 64,667 | 64,670 | 47 | 318 | 365 |
| Bottled Cargo | 22 | 1,422 | 1,444 | 4 | 0 | 4 |
| Other General Cargo | 12,098 | 16,967 | 29,065 | 16,360 | 6,478 | 22,838 |
| Total | 21,446 | 96,805 | 118,251 | 17,224 | 38,608 | 55,832 |
| Commodity | Year = 1997 | | | | | |
| | Iloilo → Bacolod | | | Bacolod → Iloilo | | |
| | Ro/Ro | Others | Total | Ro/Ro | Others | Total |
| Palay & Rice | 11,000 | 11,000 | 22,000 | 0 | 0 | 0 |
| Fruits & Veg. | 9,000 | 0 | 9,000 | 0 | 0 | 0 |
| Sugar | 0 | 0 | 0 | 7,000 | 32,000 | 39,000 |
| Fertilizer | 32,000 | 52,000 | 84,000 | 0 | 0 | 0 |
| Bottled Cargo | 1,000 | 2,000 | 3,000 | 0 | 12,000 | 12,000 |
| Other General Cargo | 28,000 | 19,000 | 47,000 | 20,000 | 13,000 | 33,000 |
| Total | 81,000 | 84,000 | 165,000 | 27,000 | 57,000 | 84,000 |
| Commodity | Year = 2010 | | | | | |
| | Iloilo → Bacolod | | | Bacolod → Iloilo | | |
| | Ro/Ro | Others | Total | Ro/Ro | Others | Total |
| Palay & Rice | 61,193 | 26,225 | 87,418 | 0 | 0 | 0 |
| Fruits & Veg. | 23,914 | 0 | 23,914 | 0 | 0 | 0 |
| Sugar | 0 | 0 | 0 | 18,324 | 18,359 | 36,683 |
| Fertilizer | 37,324 | 37,324 | 74,648 | 0 | 25,457 | 25,457 |
| Bottled Cargo | 4,783 | 1,196 | 5,979 | 0 | 0 | 0 |
| Other General Cargo | 96,265 | 24,066 | 120,331 | 75,642 | 18,910 | 94,552 |
| Total | 223,479 | 88,811 | 312,290 | 93,966 | 62,726 | 156,692 |

Chapter 5 Alternatives of Ro/Ro Terminal Site

A. Ro/Ro Vessel Size of the Link

1. Annual total cost, which consists of capital cost and operation cost of three Ro/Ro vessel sizes, was estimated as follows; 128.8 million pesos for 2,000 grt, 147.5 million pesos for 1,500 grt, and 130.0 million pesos for 1,000 grt.
2. The 2,000 grt class is the most favorable among the three alternatives because the 2,000 grt class requires four vessels to meet the traffic demand in the year 2010 while other two types require five vessels. The 2,000 grt class is proposed as a optimum vessel size to be accommodated at Ro/Ro berths, and its required water depth is 5.5 m.

B. Possible Ro/Ro Terminal

3. Among the three terminals at Iloilo Port, Old Foreign Pier is considered to be the most appropriate site for the future Ro/Ro terminal for the following reasons;
 - (i) ICPC was constructed and has been used mainly for the promotion of international trade development.
 - (ii) River Port has a limited expansion area, and water depth is 3.0 m.
 - (iii) Old Foreign Pier is located close to the city center, and connection to other ferry links is better than the other sites.
4. At Port of Bacolod, on the other hand, Banago Pier has a terminal area of 3,400 sq. m with maximum water depth of 5 m. The berth occupancy ratio is rather high, although some parts of the pier are superannuated and cannot support heavy surcharge.
5. Reclamation Area has suffered from heavy siltation and the present water depth is limited to only two meters. The port is heavily congested with small vessels, and handles both bulky cargo and general cargo. Passenger traffic is negligible.
6. Combined cost consisting of construction cost and land transportation cost was compared among the three alternatives shown in Figure II-5-1 under the condition of 15 % discount cash flow rate and 25-year project life. As shown in Table II-5-1, alternative A (Banago Pier) is the most economically advantageous among the alternatives..

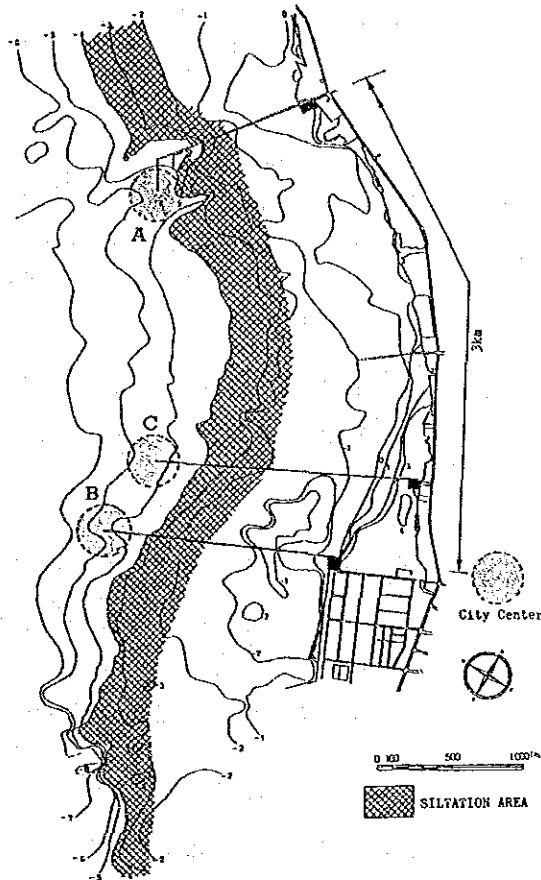


Figure II-5-1 Alternative Sites for Ro/Ro Terminal in Bacolod

Table II-5-1 Comparison of Combined Cost

r(%) = 15

Unit : Million Pesos

| Year | Construction Cost Difference | Construction Cost Difference | Transportation Cost Difference | Transportation Cost Difference | Present Value of | Present Value of | Present Value of | | | Advantage of Alt.A over Alt.B | Advantage of Alt.A over Alt.C |
|------|------------------------------|------------------------------|--------------------------------|--------------------------------|------------------|------------------|------------------|-----------|-----------|-------------------------------|-------------------------------|
| | A - B | A - C | A - B | A - C | (a) | (b) | (c) | (o) + (q) | (p) + (q) | (e) | (d) |
| | (a) | (b) | (c) | (d) | (o) | (p) | (q) | (e) | (d) | | |
| 1 | 94 | 162 | -4.46 | -4.46 | 94 | 162 | -4.5 | 89.5 | 157.5 | 89.5 | 157.5 |
| 2 | | | -4.48 | -4.48 | 0 | 0 | -3.9 | -3.9 | -3.9 | 85.7 | 153.7 |
| 3 | | | -4.46 | -4.46 | 0 | 0 | -3.4 | -3.4 | -3.4 | 82.3 | 150.3 |
| 4 | | | -4.46 | -4.46 | 0 | 0 | -2.9 | -2.9 | -2.9 | 79.4 | 147.4 |
| 5 | | | -4.46 | -4.46 | 0 | 0 | -2.6 | -2.6 | -2.6 | 76.8 | 144.8 |
| 6 | | | -4.46 | -4.46 | 0 | 0 | -2.2 | -2.2 | -2.2 | 74.6 | 142.6 |
| 7 | | | -4.46 | -4.46 | 0 | 0 | -1.9 | -1.9 | -1.9 | 72.7 | 140.7 |
| 8 | | | -4.46 | -4.46 | 0 | 0 | -1.7 | -1.7 | -1.7 | 71.0 | 139.0 |
| 9 | | | -4.46 | -4.46 | 0 | 0 | -1.5 | -1.5 | -1.5 | 69.5 | 137.5 |
| 10 | | | -4.46 | -4.46 | 0 | 0 | -1.3 | -1.3 | -1.3 | 68.3 | 136.3 |
| 11 | | | -4.46 | -4.46 | 0 | 0 | -1.1 | -1.1 | -1.1 | 67.2 | 135.2 |
| 12 | | | -4.46 | -4.46 | 0 | 0 | -1.0 | -1.0 | -1.0 | 66.2 | 134.2 |
| 13 | | | -4.48 | -4.46 | 0 | 0 | -0.8 | -0.8 | -0.8 | 65.4 | 133.4 |
| 14 | | | -4.46 | -4.46 | 0 | 0 | -0.7 | -0.7 | -0.7 | 64.6 | 132.6 |
| 15 | | | -4.46 | -4.46 | 0 | 0 | -0.6 | -0.6 | -0.6 | 64.0 | 132.0 |
| 16 | | | -4.46 | -4.46 | 0 | 0 | -0.5 | -0.5 | -0.5 | 63.5 | 131.5 |
| 17 | | | -4.46 | -4.48 | 0 | 0 | -0.5 | -0.5 | -0.5 | 63.0 | 131.0 |
| 18 | | | -4.46 | -4.46 | 0 | 0 | -0.4 | -0.4 | -0.4 | 62.6 | 130.6 |
| 19 | | | -4.46 | -4.46 | 0 | 0 | -0.4 | -0.4 | -0.4 | 62.2 | 130.2 |
| 20 | | | -4.46 | -4.46 | 0 | 0 | -0.3 | -0.3 | -0.3 | 61.9 | 129.9 |
| 21 | | | -4.46 | -4.48 | 0 | 0 | -0.3 | -0.3 | -0.3 | 61.8 | 129.8 |
| 22 | | | -4.46 | -4.48 | 0 | 0 | -0.2 | -0.2 | -0.2 | 61.4 | 129.4 |
| 23 | | | -4.46 | -4.46 | 0 | 0 | -0.2 | -0.2 | -0.2 | 61.2 | 129.2 |
| 24 | | | -4.46 | -4.46 | 0 | 0 | -0.2 | -0.2 | -0.2 | 61.0 | 129.0 |
| 25 | | | -4.46 | -4.46 | 0 | 0 | -0.2 | -0.2 | -0.2 | 60.8 | 128.8 |

Note : Present Value = Translated value of cost/benefit at objective year
 using the discount cash flow method
 Alt. = Alternative

Chapter 6 Long Term Ro/Ro Terminal Plan

A. Planning Condition

1. In 2010, each of the 2,000 grt Ro/Ro vessels will make three round trips a day to meet the traffic demand of this link. Two berths at each port are required to accommodate four vessels which ply on this link.
2. At Iloilo Port, adjacent northern part of the port area is a green space for citizens. To the south of the existing jetty, Fort San Pedro is located, which has a historical value for residents.

B. Layout Plan of Port of Iloilo

3. In order to ensure the most adequate layout among various ideas, two alternative layout plans are prepared. Alternative 1 is based on an idea to expand the existing berth in the north direction by shortage distance. Alternative 2 is based on an idea to expand the existing berth to the south direction by the shortage distance.

4. Alternative 1 has following advantages and disadvantages.

Since the plan calls for construction of a series of quays near the mouth of the Iloilo river, the impact on the view of the Sta. Maria statue which is one of the landmarks of the city, is smaller than the other alternative. On the other hand, an expanded part of the quay is to be constructed in front of a green square next to the river mouth which is close proximity to a restaurant and an office building owned by some private and public interest. Therefore, the constructor needs to obtain approvals from landlords and buiding owners, which might affect the schedule of the public work. Cost of Alternative 1 is estimated at 184 million pesoes which is slightly higher than that of Alternative 2.

5. In Alternative 2, to construct a series of quays more remote from the mouth of Iloilo river, the new quay is nearer to the statue. However this alternative has following locational advantages:

- (i) For the moment, the expanded quay does not affect the usage of the green square. Also, the quay will be free from siltation by river sand.
- (ii) The plan will have more expansion area to the north than Alternative 1 for larger size of vessels of the other route in the future.
- (iii) The cost of Alternative 2 is around 179 million pesoes, five million pesoes less than Alternative 1.

6. From the above observation, it is concluded that Alternative 2 is the more adequate layout plan. (Figure II-6-1).

C. Layout Plan of Port of Bacolod

7. For the port of Bacolod, two alternatives are also drafted as follows. Alternative 1 is based on an idea to expand the new pier out of the existing Banago berth to the west direction. Alternative 2 is based on an idea to expand the new pier in the same direction of existing Banago berth. In the both Alternatives, the location of parking area is planned the same at the foot of the Banago Pier for the economy of construction.

8. In Alternative 2, the approach road to the Ro/Ro berths runs through the center of the existing pier. Not only is the cargo handling area reduced, but cargo and container flow will be hindered by the Ro/Ro traffic since warehouses and an open shed exist around the approach road. This point dictates the selection of Alternative 1 as the appropriate alternative. (Figure II-6-2).

9. In planning the layout of Alternative 1, the approach way is proposed to pass around the new Ro/Ro terminal to avoid a situation that movement of cargoes and cars within the terminal interferes passenger flow on the approach way.

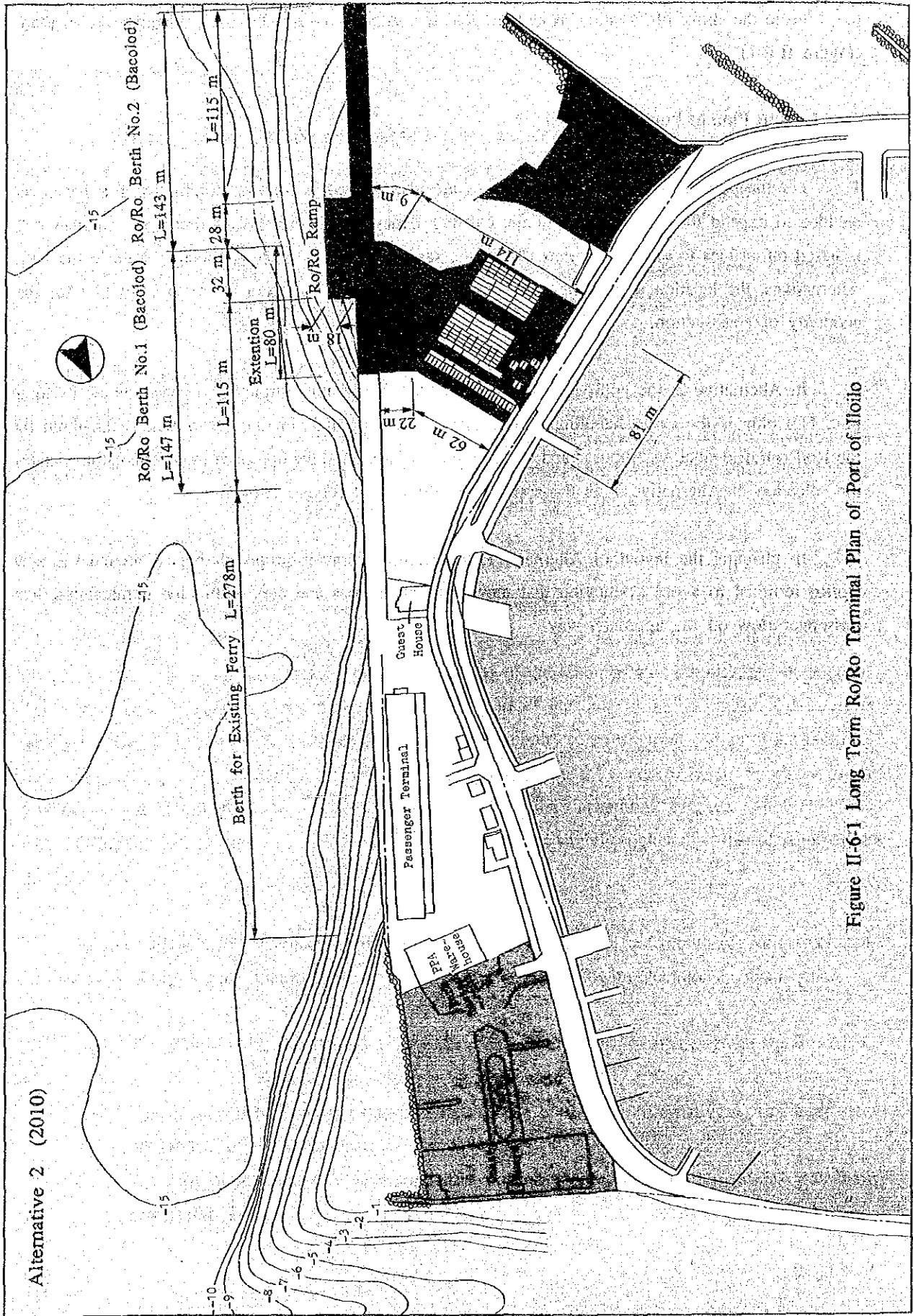


Figure II-6-1 Long Term Ro/Ro Terminal Plan of Port of Iloilo

Chapter 7 Short Term Ro/Ro Terminal Plan

1. Ro/Ro traffic demand for 1997 is estimated at 1,236,000 passengers and 81,000 M ton of cargo for one-way traffic. In order to satisfy the demand, each of the two vessels with 2,000 grt has to make two round trips daily. From the sailing schedule, one Ro/Ro berth at each port should be constructed by 1997.
2. Figure II-7-1 and II-7-2 show the short term layout plans of Ro/Ro terminal at both ports. These short term plans were prepared on the basis of the long term plan of the preceeding chapter. Required scale of the Ro/Ro terminal facilities are shown in Table II-7-1.

Table II-7-1. Required Facilities of Short Term Plan
in Iloilo and Bacolod

| Port | Item | Area Required |
|-----------|---------------------------------------|----------------------|
| (Iloilo) | Apron | 115 m x 12 m |
| | Parking Area | 2,300 m ² |
| | Loading | 1,500 m ² |
| | Waiting | 800 m ² |
| | Passenger Terminal | 600 m ² |
| | Total | 2,900 m ² |
| (Bacolod) | Apron | 115 m x 12 m |
| | * Loading Parking Area | 1,500 m ² |
| | Waiting Parking Area | 800 m ² |
| | Passenger Terminal | 600 m ² |
| | * Utilized Area at Loading Parking | 150 m ² |
| | Off Shore Total | 1,650 m ² |
| | On Shore Total | 1,400 m ² |

Note: * = On Shore Terminal Facilities

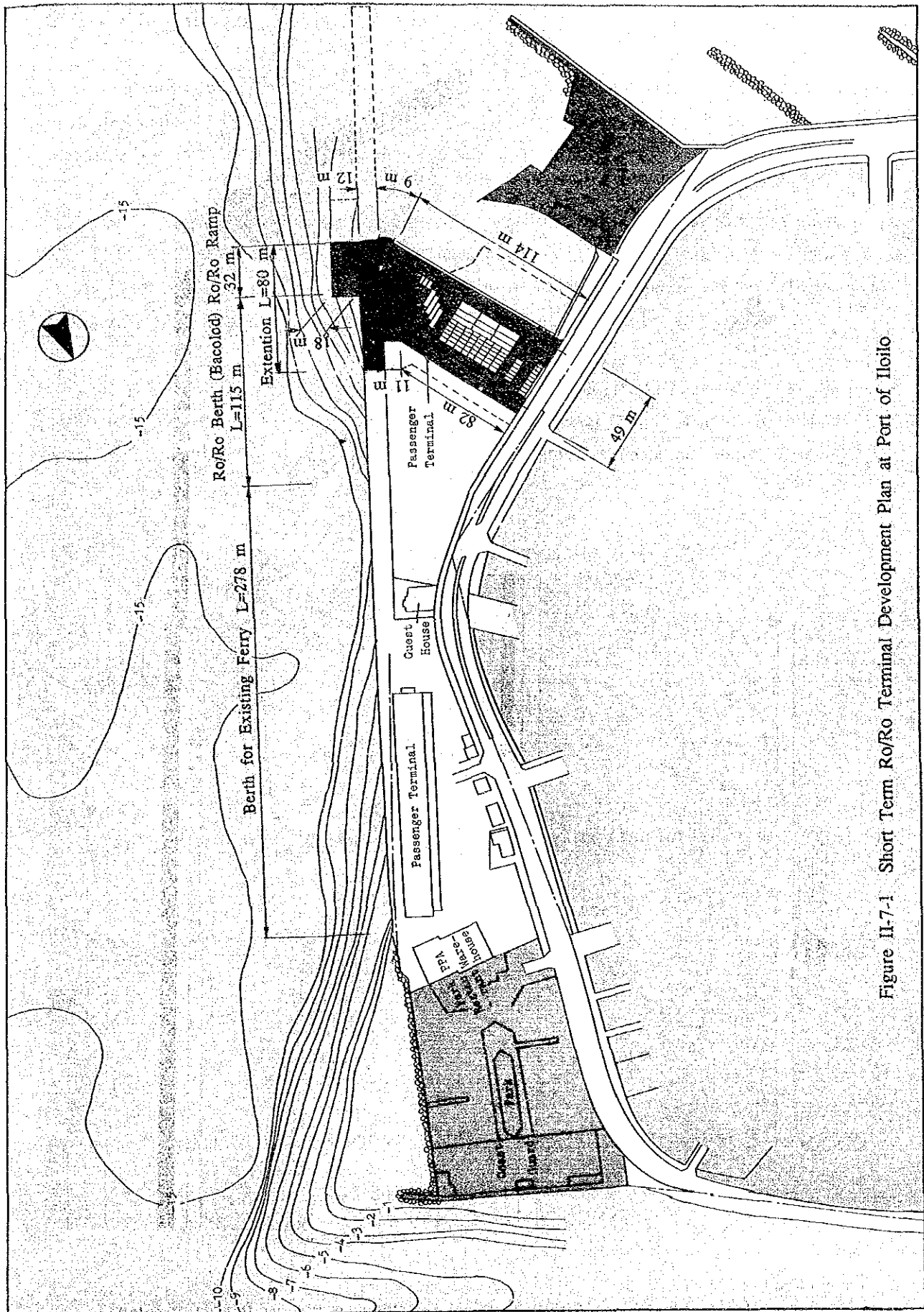


Figure II-7-1 Short Term Ro/Ro Terminal Development Plan at Port of Iloilo

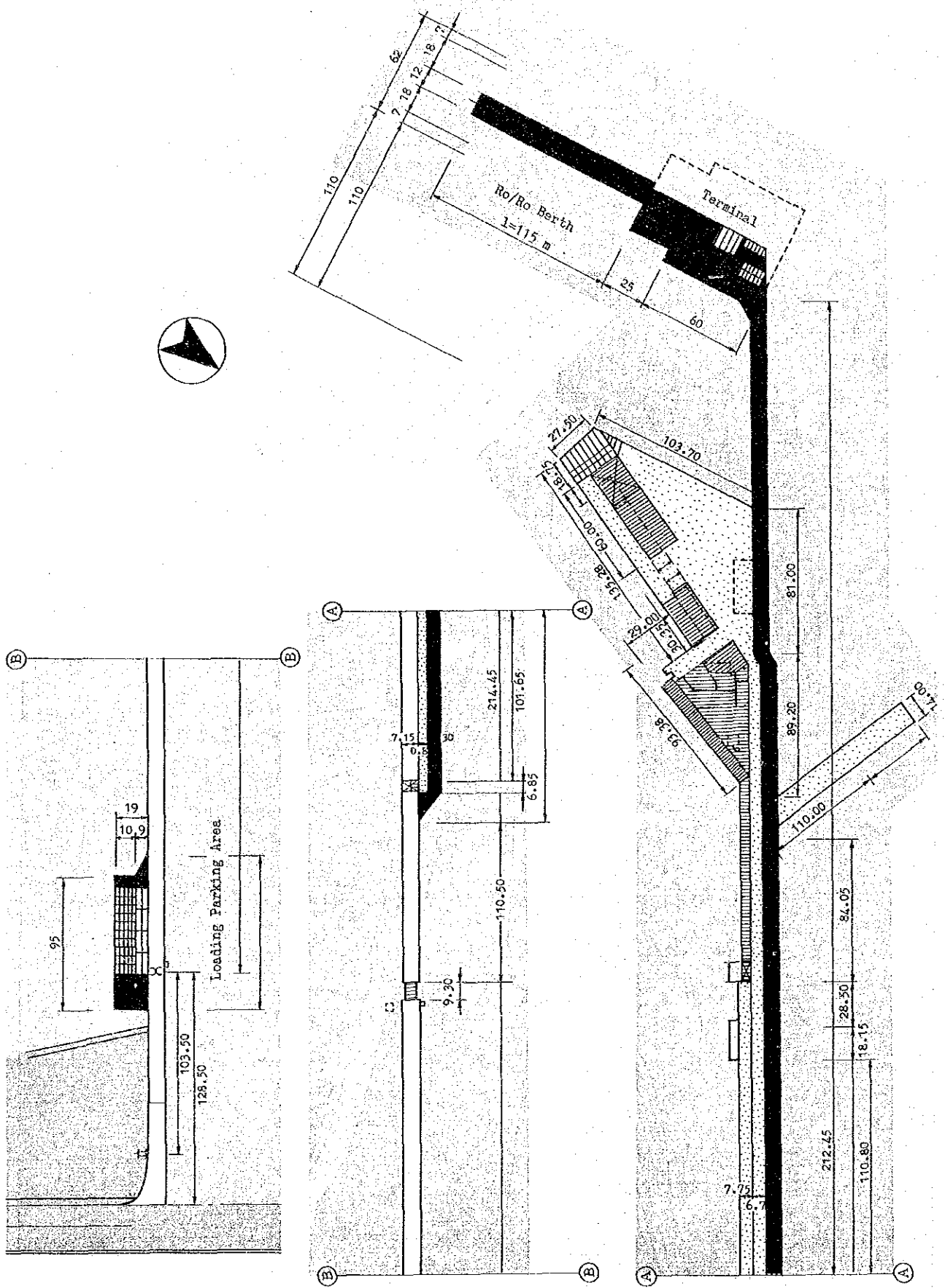


Figure II-7-2 Short Term Ro/Ro Terminal Development Plan at Port of Bacolod

Chapter 8 Design

1. Preliminary for the short term terminal plan design was carried out for the facilities to be introduced in Iloilo and Bacolod such as berth, fixed Ro/Ro ramp, access trestle, revetment and offshore terminal. Standard structure of facilities are in Figure II-8-1.

2. In Iloilo, 48 m of RC pier as Ro/Ro berth, 1 set of RC fixed ramp, 60 m of L-shaped revetment, 600 m² of RC terminal building, 5460 m² of reclamation area, 210 m of rock mole revetment, 1 set of utility for water supply and electric supply, 80 m of RC pier to compensate the existing facility, and 40,000 m³ of dredging for the maneuvering are required.

3. In Bacolod, 115 m of RC pier as Ro/Ro berth, 1 set of RC fixed ramp, 732 m of RC trestle, 2490 m² of offshore terminal supported by RC piles, 600 m² and 150 m² of terminal buildings, 1590 m² of reclamation for the stand-by area, 126.5 m of rock mole revetment and utility for water supply and electric supply are required.

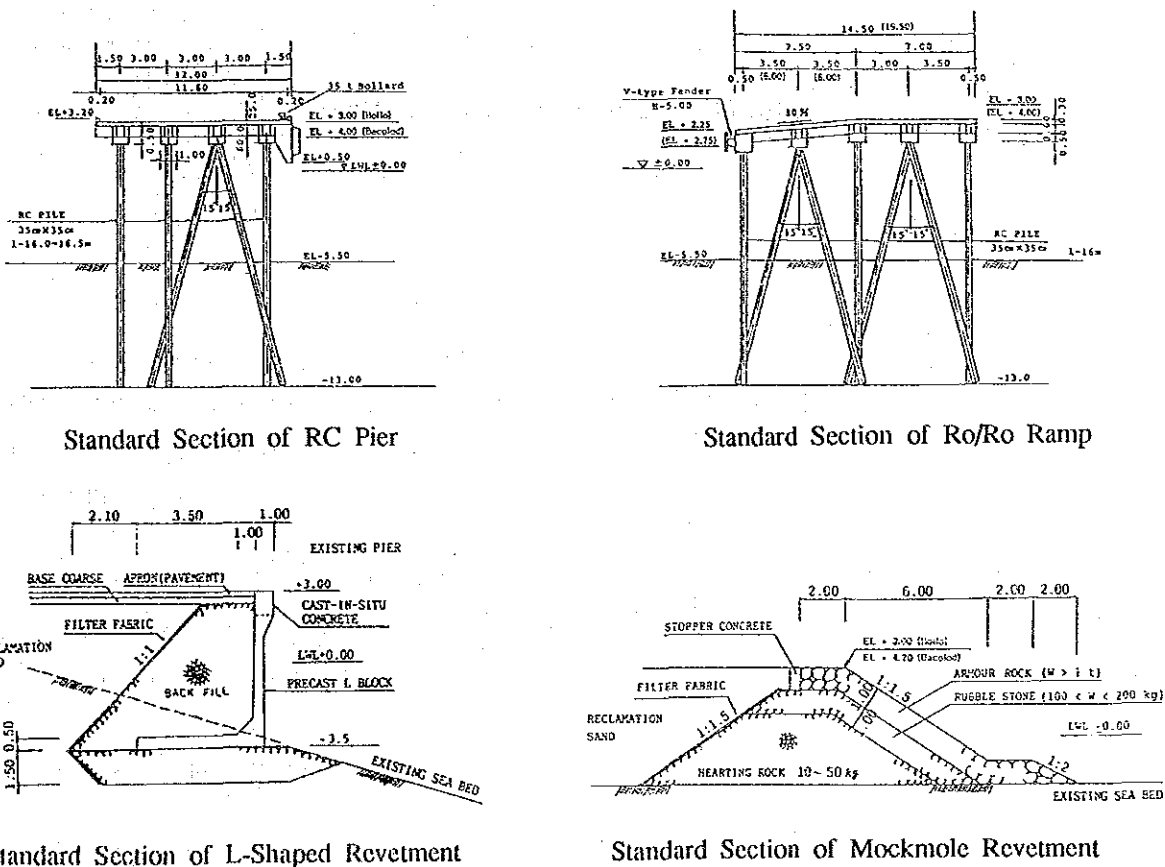
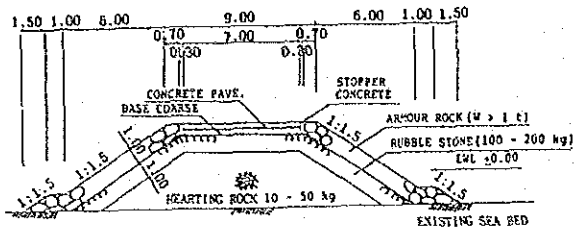
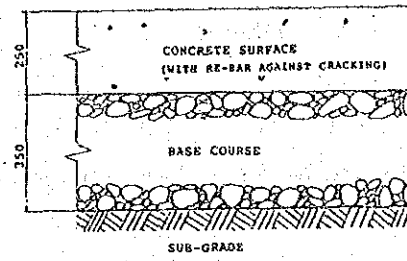


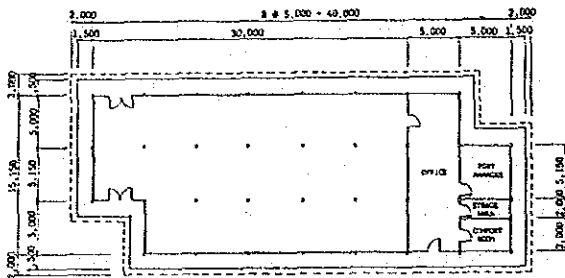
Figure II-8-1 Standard Section of Facilities (continue)



Standard Section of Mockmole Causeway

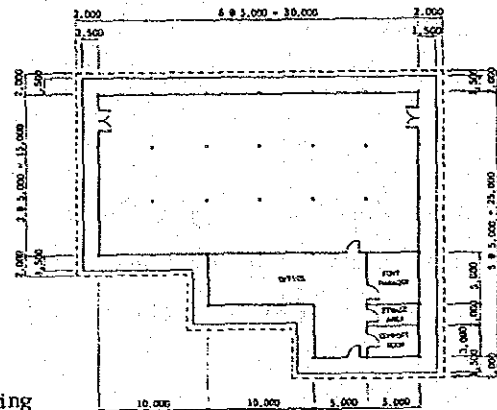


Standard Section of Pavement



(Iloilo)

Plan of Terminal Building



(Bacolod)

Figure II-8-1 Standard Section of Facilities

Chapter 9 Cost Estimate and Construction Schedule

A. Cost Estimate

1. Cost estimates were prepared for the project based on the layout plan and preliminary design work shown in the chapter 7 and 8. Unit price of major construction items are estimated inclusive of material cost and installation cost based on the data collected from DPWH Regional Office in Bacolod, PMO PPA in Iloilo and other government agencies.
2. In the calculation of construction cost, share of the foreign currency and local currency shown in Table II-9-1 are applied.

Table II-9-1 Share of Foreign and Local Currency

| Item | Foreign Portion | : | Local Portion |
|--------------------|-----------------|---|---------------|
| Berthing Pier | 4 | : | 6 |
| Ro/Ro Ramp | 4 | : | 6 |
| L-shaped Revetment | 3.5 | : | 6.5 |
| Pavement | 3.5 | : | 6.5 |
| Reclamation | 3 | : | 7 |
| Terning Area | 4 | : | 6 |
| Dredging | 3 | : | 7 |
| Building | 3 | : | 7 |
| Trestle | 4 | : | 6 |
| Rock Causeway | 3 | : | 7 |
| Revetment | 3 | : | 7 |
| Utility | 3.5 | : | 6.5 |

3. The total construction cost of the project for Port of Iloilo is estimated at 97.9 million pesos, including a foreign exchange component equivalent to 34.0 million pesos. For Port of Bacolod, the total construction cost is estimated at 201.4 million pesos, including a foreign exchange component equivalent to 76.0 million pesos.
4. Base estimates were prepared using the price in July 1991. Cost estimates include a provision of 15 percent of construction cost and 5 percent of the engineering cost for the physical contingency and 10 percent per year of price escalation.

B. Construction Schedule

5. Construction of Ro/Ro terminal at Iloilo Port and Bacolod Port, existing facilities shall be utilized as access way for transportation of construction materials, and construction works have to be carried out in the existing port operation area. Thus, during development works of the Ro/Ro terminals at both ports, suitable safety measures should be taken to avoid unexpected incidents.

6. Table II-9-2 and Table II-9-3 show the construction cost and construction schedule with annual budget schedule.

Table II-9-2 Construction Cost and Schedule of Ro/Ro Terminal (Iloilo)

Unit: 1,000 pesos

| ITEM | QUANTITY | UNIT | CONSTRUCTION YEAR | | | CURRENCY | | TOTAL |
|--|----------|----------------|-------------------------------|----------------------------------|---------------------------------|----------|------------------|----------------------------------|
| | | | 1st year | 2nd year | 3rd year | FOREIGN | LOCAL | |
| PILING WORK | 180 | pcs | | 12,600.0 000 | | 5,040.0 | 7,560.0 | 12,600.0 |
| CONCRETE WORK | 1050 | m ³ | | 14,050.0 000 | | 5,620.0 | 8,430.0 | 14,050.0 |
| ROCK WORK | 9900 | m ³ | | 10,890.0 000 | | 3,267.0 | 7,623.0 | 10,890.0 |
| RECLAMATION/DREDGING (INCLUDING PAVEMENT) | 43200 | m ³ | | 1,234.3 00 | 6,415.7 00000 | 2,296.0 | 5,355.0 | 7,650.0 |
| BUILDING WORK | 600 | m ² | | | 6,600.0 00 | 1,980.0 | 4,620.0 | 6,600.0 |
| UTILITY WORK | 50 | m | | | 100.0 00 | 35.0 | 55.0 | 100.0 |
| OVERHEAD+PROFIT (16% OF DIRECT COST) | | | | 6,203.9 | 2,098.5 | 2,917.9 | 5,384.5 | 8,302.4 |
| V. A. T. (10%) | | | | 4,497.8 | 1,521.4 | 2,115.5 | 3,903.7 | 6,019.2 |
| TOTAL OF COST for CONSTRUCTION | | | | 49,476.0 | 16,735.7 | 23,270.4 | 42,941.2 | 66,211.6 |
| DETAILED DESIGN (V. A. T. 10% of Local) | 1 | L. S. | 5,296.9 344.3 | | | 1,853.9 | 3,443.0 | 5,296.9 344.3 |
| PREPARATORY WORK | | | 000000000000 | | | | | |
| SUPERVISORY WORK (V. A. T. 10% of Local) | | | | 3,310.6 215.2 | 3,310.6 215.2 | 2,317.4 | 4,303.8 430.4 | 6,621.2 430.4 |
| TOTAL OF COST for CONSULTANTS | | | 5,641.2 | 3,525.8 | 3,525.8 | 4,171.3 | 8,521.4 | 12,692.8 |
| PHYSICAL CONTINGENCY 15% of C/C+5% of E/S | | | 282.1 | 7,597.7 | 2,686.6 | 3,699.1 | 6,867.3 | 10,566.4 |
| PRICE CONTINGENCY (10% PER YEAR) | | | | 4,947.6 | 3,514.5 | 2,880.0 | 5,582.1 | 8,462.1 |
| TOTAL FOREIGN LOCAL | | | 5,923.3 1,952.6 3,970.6 | 65,547.0 24,024.6 41,522.5 | 26,462.5 8,057.2 18,405.3 | 34,034.5 | 63,898.4 | 97,932.9 34,034.5 63,898.4 |

Table II-9-3 Construction Cost and Schedule of Ro/Ro Terminal (Bacolod)

Unit: 1,000 pesos

| ITEM | QUANTITY | UNIT | CONSTRUCTION YEAR | | | CURRENCY | | TOTAL |
|--|----------|----------------|--------------------------------|-----------------------------------|----------------------------------|----------|------------------|------------------------------------|
| | | | 1st year | 2nd year | 3rd year | FOREIGN | LOCAL | |
| PILING WORK | 885 | pcs | | 55,125.0 000000 | | 22,050.0 | 33,075.0 | 55,125.0 |
| CONCRETE WORK | 4350 | m ³ | | 36,980.0 0000000 | | 14,792.0 | 22,188.0 | 36,980.0 |
| ROCK WORK | 5580 | m ³ | | | 6,127.0 000 | 1,838.1 | 4,288.9 | 6,127.0 |
| RECLAMATION | 6360 | m ³ | | | 636.0 000 | 190.8 | 445.2 | 636.0 |
| BUILDING WORK | 750 | m ² | | | 8,250.0 00 | 2,475.0 | 5,775.0 | 8,250.0 |
| UTILITY WORK | 225 | m | | | 452.0 00 | 158.2 | 293.8 | 452.0 |
| OVERHEAD+PROFIT (16% OF DIRECT COST) | | | | 14,736.8 | 2,474.4 | 6,640.7 | 10,570.5 | 17,211.2 |
| V. A. T. (10%) | | | | 10,684.2 | 1,793.9 | 4,814.5 | 7,663.6 | 12,478.1 |
| TOTAL OF COST for CONSTRUCTION | | | | 117,526.0 | 19,733.3 | 52,959.2 | 84,300.1 | 137,259.3 |
| DETAILED DESIGN (V. A. T. 10% of Local) | 1 | L. S. | 10,980.7 713.7 | | | 3,843.3 | 7,137.5 | 10,980.7 713.7 |
| PREPARATORY WORK | | | 000000000000 | | | | | |
| SUPERVISORY WORK (V. A. T. 10% of Local) | | | | 6,863.0 446.1 | 6,863.0 446.1 | 4,804.1 | 8,921.9 892.2 | 13,725.9 892.2 |
| TOTAL OF COST for CONSULTANTS | | | 11,694.5 | 7,309.1 | 7,309.1 | 8,647.3 | 17,665.3 | 26,312.6 |
| PHYSICAL CONTINGENCY 15% of C/C+5% of E/S | | | 584.7 | 17,994.3 | 3,325.5 | 8,376.3 | 13,528.3 | 21,904.5 |
| PRICE CONTINGENCY (10% PER YEAR) | | | | 11,752.6 | 4,144.0 | 5,950.3 | 9,946.3 | 15,896.6 |
| TOTAL FOREIGN LOCAL | | | 12,279.2 4,047.9 8,231.3 | 154,582.0 61,292.9 93,289.1 | 34,511.9 10,620.4 23,891.5 | 75,961.2 | 125,411.8 | 201,373.1 75,961.2 125,411.8 |

Chapter 10 Environmental Aspect

1. The environmental impact statement system in the Philippines was set out in P.D. 1580. According to this P.D., a project classified under one of two categories, "Environmentally Critical Project" and "Environmentally Critical Area", is subject to the environmental impact assessment (EIS) procedure.

2. According to the Office Circular No. 3, 1983, the Ro/Ro projects at Port of Iloilo and Port of Bacolod are classified as EIS non-required projects. Based on information obtained through the authorities and the site survey, environmental impacts by the Ro/Ro projects are however, assessed preliminarily according to the EMB guide line. The results are summarized as follows.

- (1) An impact on hydrology and quality of the surface and ground water cannot be found at the project site. The impact to the atmosphere, air quality, wind and inversion is considered to be negligible.
- (2) Since the project sites have been developed as ports, the impact to the wildlife and aquatic species and habitats is not significant.
- (3) The old fort called "Fort San Pedro" is located to the west of existing jetty of the Old Foreign Pier. The port layout plan has been prepared so that the Ro/Ro project site keeps a certain distance from this fort, and thus the historical value of the fort can be sustained.
- (4) Obstacles which might delay the project like "Resettlement of Existing Inhabitants" are not found at either project site.

Chapter II Economic Analysis of Ro/Ro Ferry Transportation

1. The objective of the economic evaluation is to ascertain the project's desirability in terms of its net contribution to the economic and social welfare of the country as a whole. The project objective is port development through the introduction of the Ro/Ro for the Iloilo-Bacolod link.

2. The National Economic and Development Authority (NEDA) of the Philippines assigned the parameters for estimating costs and benefits based on the following shadow values :

- Shadow Exchange Rate : 1.20
- Shadow Wage Rate : 0.60 (for unskilled labor only)

3. The estimate of the benefits is a primary task of the economic evaluation because there are many areas and aspects which could not be quantified and often involve uncertainties in quantification. Although the expected benefits of the project in general are considered quite extensive, the actual benefits calculated in this particular study are as follows:

- (i) Reduction in Port Handling Cost
- (ii) Reduction in Truck Transport Cost
- (iii) Reduction in Pilferage/Damage of Cargo
- (iv) Reduction in Cargo Waiting Time
- (v) Reduction in Truck Waiting Time
- (vi) Benefits from Transfer of Passenger Cars
- (vii) Benefits of Passenger Time Saving

4. Other benefits either tangible or difficult to quantify are described qualitatively based on the available information.

5. The estimated benefits due to the project are summarized in Table II-11-1 from starting to ending year and every 5 years.

6. Project costs are estimated next. They consist of construction cost, maintenance cost and operation cost. Construction cost with disbursement schedule and by currency component (foreign, local, unskilled labor) are based on the cost estimate and the construction schedule in chapter 9. The maintenance costs for this project are set to be 1% of the direct cost, engineering service cost etc. The operation cost is composed of personnel costs and administrative costs. After the port development and the introduction of Ro/Ro vessels, no additional persons will be employed because of the transferred persons from the present ferry system. Neither administrative costs nor personnel costs are considered.

7. The base EIRR and Sensitivity Analysis are summarized in Table II-11-2. The port development through the introduction of the Ro/Ro for the Iloilo-Bacolod link is judged to be more than feasible except in Case III where a combination of cost +20% and benefit -20% from the viewpoint of the national economy based upon the EIRR of the project as well as the unquantified benefits arising from this project.

Table II-11-1 Estimated Benefits due to the Project

(Unit : Million Pesos)

| Year | Transport Fare | Damage | Cargo Waiting | Transfer of P.car | Truck Waiting | Passenger Time Saving | Total |
|------|----------------|--------|---------------|-------------------|---------------|-----------------------|--------|
| 1997 | 4.15 | 21.06 | 2.84 | 1.81 | 2.73 | 4.58 | 37.17 |
| 2000 | 7.48 | 25.71 | 3.42 | 1.81 | 3.22 | 5.95 | 47.59 |
| 2005 | 10.11 | 35.86 | 5.40 | 1.81 | 4.92 | 7.57 | 65.66 |
| 2010 | 11.90 | 44.13 | 7.64 | 1.81 | 6.70 | 7.57 | 79.75 |
| 2015 | 16.82 | 49.15 | 8.99 | 1.81 | 7.56 | 7.57 | 91.90 |
| 2020 | 24.53 | 56.16 | 10.89 | 1.81 | 8.65 | 7.57 | 109.61 |
| 2025 | 47.90 | 63.09 | 12.76 | 1.81 | 8.75 | 7.57 | 141.89 |
| 2026 | 47.90 | 63.09 | 12.76 | 1.81 | 8.75 | 7.57 | 141.89 |

Table II-11-2 Results of EIRR

| Base | Sensitivity Analysis | | | | | | | |
|-------|----------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | Cost Same | | Cost +10% | | | Cost +20% | | |
| | Benefit -10% | Benefit -20% | Benefit Same | Benefit -10% | Benefit -20% | Benefit Same | Benefit -10% | Benefit -20% |
| Base | Case II | Case II | Case I | Case III | Case III | Case I | Case III | Case III |
| 18.4% | 17.2% | 16.0% | 17.1% | 16.0% | 14.9% | 16.0% | 14.9% | 13.9% |

Case I: Increase in projected costs by 10% and 20%

Case II: Decrease in revenues by 10% and 20%

Case III: Combination of Cases I and II

Chapter 12 Financial Analysis

1. The purpose of the financial analysis is to appraise the viability of the project and to examine the financial soundness of the port management body during the project life. The analysis is conducted separately for Iloilo case and Bacolod case.
2. The viability of the project is analyzed using the Discount Cash Flow Method and appraised by the FIRR, and, the financial soundness of the port management body is appraised based on its projected financial statements (Income and Expense Account, Cash Flow Statement and Balance Sheet).
3. Followings are general prerequisites of the analysis:
 - (1) The financial analysis takes the port management body as an implementation body. That is, PPA in Iloilo Port and an anonymous body in Bacolod.
 - (2) The project life is 30 years, following the 3-year period for the construction of the facilities beginning in 1994.
 - (3) Based on PPA Financial Plan 1987-1995, the financial analysis is carried out to forecast the projected financial position of the entire PPA.
 - (4) The revenue from the port activities are calculated based on Ro/Ro oriented tariff.
 - (5) The annual maintenance and repair costs for the port facilities are assumed to be one per cent of the initial construction cost.
 - (6) In the case of Iloilo, the increment cost is assumed to be negligible because Ro/Ro operation is efficient enough to offset the increment personnel and administration cost. As for Bacolod case, it is assumed as 15 per cent of the port operating revenue.

4. The results of FIRR calculation of the Base Case and the sensitivity analysis are shown in Table II-12-1.

Table II-12-1 Results of FIRR

| Case | Iloilo | Bacolod (A) | Bacolod (B) (With Subsidy) |
|----------------------|--------|-------------|-------------------------------|
| Base Case | 6.20% | 2.95% | 7.37% |
| Sensitivity Analysis | | | |
| Case I: | 5.46% | 2.30% | 6.43% |
| Case II: | 5.38% | 2.24% | 6.43% |
| Case III: | 4.70% | 1.62% | 5.46% |

Note: Case I: The project cost increases by 10 %

Case II: The revenue decreases by 10 %

Case III: The project cost increases by 10 % and the revenue decreases by 10 %

5. Table II-12-1 shows the calculation results of each case. The values of FIRR of Iloilo case and Bacolod case (B), where the subsidy to a portion of the causeway is paid, exceed the weighted average interest rates (5.61 % for Iloilo and 5.53 % of Bacolod) in the Base Case. It can be said that both projects are feasible as far as profitability is concerned.

6. All the indicators of the projected financial statements manage to keep the financial position above the vital level both in Iloilo and Bacolod even with narrow margin in some cases. Thus, under the assumed conditions, the projects both in Iloilo and in Bacolod can be regarded as financially feasible.

7. It is recommended that in view of the importance of the Ro/Ro project for the link, the government arrange a public fund to be made available where the private firm implements the project in Bacolod.

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