6. Master Plans

6.1 Natural Condition of the Site for the New Cebu Port

Current, tide, bathymetry and topography conditions are surveyed. The results are briefly described below

6.1.1 Current

(1) Current Meter Survey

30 day-continuous observation has been carried out with an automatic recording current meter. The observation point is located at the 1.5 km offshore in Consolacion Area

(2) Characteristics of the Current

Main current in the site are flood and ebb tide flow. The characteristics are mentioned below from the view points of velocity and direction.

1) Velocity of Current
In reference to "the chart of Cebu Harbour and Approaches", "Tide and Current Tables Philippines 2001", and current survey result, current velocity in this site is estimated at 0.2 m/sec (0.4 knot) to 0.7 m/sec (1.3 knot), in both flood and ebb tide.

2) Direction of Current
The major current direction is from SW (bearing 195° to 240°) to NE (bearing 0° to 45°). Direction NE corresponds to the flood tide direction, on the other hand SW corresponds to the ebb tide direction.

(3) Tide Level

In this survey, tide levels are observed continuously for 30 days. In reference to the observation record and the data of the Tide and Current Tables Philippines 2001 the following referential tide levels are estimated:

Datum-line (0.00m) : MLLW (Mean Lower Low Water) is applied.
HWL = 1.90 m
MSL = 0.58 m
LWL = -0.35 m

6.1.2 Bathymetry

(1) Bathymetric Survey

A bathymetry survey around the proposed new Cebu Port area of 150 ha (1.5 km wide and 1.0 km long towards offshore) is conducted. Water depth is measured by echo sounding method which is common procedure for bathymetric survey. While in the shallow tidal zone which spreads in front of shoreline, ground height is measured by direct levelling and water depth is reckoned.

(2) Bathymetric Features

From geological/topographical view point, this region is classified into the following 2 types; i.e. 1) Tidal Flat Zone and 2) Deep Channel.

1) Tidal Flat Zone
It spreads widely in front of shore, about 600 m toward offshore and its area is counted approximately 60 ha. It appears as relic of old lagoon of coral reef.

During high tide it is submerged and the water depth ranges from 20 to 50 cm. While at low tide it comes in sight and muddy shoals/sand bars are seen where short mangroves are scattered.

2) Deep Channel
In the offshore side of the tidal flat zone, deep channel is formed where main navigation route is set up. Water depth increases sharply toward offshore from 50 m to as deep as 150 m in the deeper place.

(3) Geological Condition

1) Tidal Flat Zone
Main Geological type consisting of clayish soil with coral fragments while limestone boulders are scattered in some places. Engineering properties are summarized as follows:

- Soft Clay layer with coral fragments, S.P.T. blow number N 1 to 3 widely covers sea bed surface. Its thickness is 10 m on average, and it is consolidable layer in which subsidence to some extent will be caused in case of embankment.

- Under Soft Clay layer, sand/gravel layer accompanying coral boulders is interlaid 15 to 20 m in thickness. S.P.T. blow number N is 12 on average although it exceed 50 sporadically due to big boulders.

- Bearing layer for pile foundation underlies between 25 m and 30 m deep.

2) Deep Channel

Geological type in this area is composed of sand/gravel of coral fossils. In addition limestone boulders are scattered in some places. From the engineering view point, soft soil is scarcely contained, therefore it is regarded to be sufficiently firm for structure foundation.

6.1.3 Topography

(1) Topographic Survey

In order to design the facilities to be built in the land including access road, topographic survey has been carried out by total station method together with leveling in the area connecting to the shore. Survey area is 150 ha, 1.5 km long along shoreline and 1 km wide inside land.

(2)Topographic Features

This area is old coral reefs which have become the land through earth-crust uplift and/or draw down of sea level. From the view point of topographic element, 2 types are observed: (1) Terrace and (2) Hill. Around sea side area of the shore, tidal flat spreads widely as described above.

1) Terrace

Low terrace elevation 5 to 7 m is distributed along shore line. Width is measured about 300 m inside from the shore. It is nearly flat though slope declines very gently towards the shore, 1/500 in grade.

Although there is a monastery at inland part, major part consists of natural glass and/or shrub land in which cocos and broad leaved trees are scattered. Small mango gardens are found locally.

Soil type of ground surface is composed of clayey soil of limestone origin mixed with old coral fragments. Thickness is estimated at less than 1 m and rocks of limestone crop out in some places.

2) Hill

Inland region is a gently undulated hill 15 to 30 m in elevation which is gradually transferred from the terrace region. Undulation has been caused by erosion action and, as a result, limestone rock outcrops in higher hill top. On the contrary in the valley and basin, soil sediments are relatively thick.

Major parts are developed for residential area which many houses with gardens and/or vegetable farms are found.

6.2 Natural and Social Environmental Conditions

6.2.1 Natural Environmental Condition

Natural environmental survey was conducted in 1) Cebu Baseport, 2) New Cebu Port, 3) Toledo Port, 4) New San Remigio Port in May and June in 2001. Measured environmental items are as follows: 1) Water quality, 2) Seabed quality, 3) Fauna and flora, 4) Air quality (Cebu Base Port and New Cebu Port area only).

(1) Water Quality

26 chemical analyses were carried out. Almost all items were below the environmental standards of the Philippines (ESP), however Coliform samples in Cebu Baseport and Oil and grease in Cebu Base Port and New Cebu Port exceeded the ESP.

(2) Seabed Quality

23 chemical analyses were carried out. Coliforms were higher in order, Cebu Baseport - New Cebu Port - Toledo port - New San Remigio Port. Heavy metals were generally below ESP.

(3) Fauna and Flora

Fauna and flora inventory was made by the field survey in the sites. Rare species does not occur in the all of 4 sites.

Regarding the mangrove community in the New Cebu Port proposed area Consolacion, the mangrove areas are not specified as a protected mangrove area. So the area shall be specified as development area for industry of land use program by the local government of Consolacion, Mandaue city. The mangrove community concerned may possibly be transplanted at the specified mangrove mitigation area, then the area can be developed.

(4) Air Quality and Noise

Four air quality items were measured in Cebu Baseport and New Cebu Port area. All of the items are below ESP. Air quality in New Cebu Port was better than that in Cebu Baseport. Regarding the noise pollution, noise sources in Cebu Baseport were mainly vehicles and docks. The highest level of the noise is 66 dB(A). Noise sources in New Cebu Port were from the domestics (TV, Stereo sets).

6.2.2 Social Environmental Condition

The examination used the Socio-cultural and Economic survey as one of the baseline data to formulate recommendation to mitigate adverse impacts; the perception interviews of key-persons and authority figures to verify data from the survey, as well as other information not captured in the survey and the impact assessment and mitigations.

The survey interview instrument used a 55- item questionnaire covering 12 areas such as: the respondent's profile, migration and settlement history, perception of the project, housing and utilities, household income and employment, community problems, land resources, coastal resources, perception of environmental situation, health condition, pattern of decision making and sources of information.

Cebu Baseport area is estimated to have 1,063 households with a respondent sample size of 104 households, while that of Tayud, Consolacion of the New Cebu Port area is estimated to have 1,370 households with a sample size of 135.

Most of the respondents in the base port are migrants and have moved to the place to stay because of the livelihood and work opportunities the port offered. More than half know of the base port rehabilitation and are in favor of it because of the improvement it will bring to the area. Most fear the demolition of their shanties because they are only squatters. They hope that they are given a decent resettlement area with amenities and that the said area be close to their source of livelihood which is the port.

A majority of the respondents in Barangay Tayud, Consolacion are either born in the barangay or have moved to the community by affinity (marriages). In-migration in the past years has occurred due to the establishment of the eight industrial firms. Almost all are aware and are in favor of the project. The few who are not in favor cited the project's adverse effects such as the displacement of fisher folk and increase of crime against property. If relocated, the respondents mentioned proper negotiation and equitable pricing of their lands together with the package of disturbance fee. Based on the focus interviews, almost all shipyard owners agreed, except for Mr. Porter who owns El Nor Marine Services who pointed out that if expansion plans for the port were made, he would not agree to sell.

6.3 Traffic Demand Forecast

6.3.1 Socio-economic Frame Work

(1) Population

National Statistical Coorporation Board (NSCB) provided *1995 POPCEN-Based National and Regional Population Projections* as the official figures for planning and programming in

NSCB Resolution No. 05-97 issued on 21 March 1997, which contains the summary of projected Philippine population, annual geometric population growth rates and others.

Table 6.3.1 Future Trend of Population by Region

	2000 (May 1, 2001)	2005	growth rate	2010	growth rate	2015	growth rate	2020	growth rate
NCR	9,932,560	10,774,186	1.64%	11,470,282	1.26%	12,013,663	0.93%	12,427,721	0.68%
CAR	1,365,220	1,513,975	2.09%	1,658,481	1.84%	1,790,179	1.54%	1,908,663	1.29%
Region 1	4,200,478	4,547,443	1.60%	4,872,399	1.39%	5,161,631	1.16%	5,406,153	0.93%
Region 2	2,813,159	3,087,727	1.88%	3,342,778	1.60%	3,562,263	1.28%	3,742,121	0.99%
Region 3	8,030,945	8,801,807	1.85%	9,505,423	1.55%	10,119,547	1.26%	10,646,280	1.02%
Region 4	11,793,655	13,369,494	2.54%	15,074,775	2.43%	16,947,840	2.37%	18,849,777	2.15%
Region 5	4,674,855	5,078,463	1.67%	5,468,252	1.49%	5,821,543	1.26%	6,127,593	1.03%
Region 6	6,208,733	6,758,048	1.71%	7,283,924	1.51%	7,758,351	1.27%	8,174,309	1.05%
Region 7	5,701,064	6,245,222	1.84%	6,757,759	1.59%	7,222,826	1.34%	7,628,918	1.10%
Region 8	3,610,355	3,986,124	2.00%	4,362,307	1.82%	4,722,639	1.60%	5,057,620	1.38%
Region 9	3,091,208	3,454,974	2.25%	3,808,964	1.97%	4,135,780	1.66%	4,431,319	1.39%
Region 10	2,747,585	3,064,912	2.21%	3,380,595	1.98%	3,681,501	1.72%	3,958,213	1.46%
Region 11	5,189,335	5,828,421	2.35%	6,450,836	2.05%	7,028,477	1.73%	7,556,758	1.46%
Region 12	2,598,210	2,902,542	2.24%	3,190,527	1.91%	3,445,578	1.55%	3,670,001	1.27%
Region 13	2,095,367	2,343,377	2.26%	2,584,425	1.98%	2,806,863	1.67%	3,008,181	1.40%
ARMM	2,412,159	2,634,621	1.78%	2,852,244	1.60%	3,045,528	1.32%	3,205,637	1.03%
Others	2,851								
Philippines	76,498,735	84,419,391	1.99%	92,069,186	1.75%	99,233,530	1.51%	105,749,155	1.28%

Source: 1995-Based National and Regional Population Projections + latest data of Census May 1, 2000

Notes: 1) Regional levels may not ad up to National levels due to rounding.

2) Growth rates except Region 13 are provided in the source indicated in above.

3) Growth rate of Region 13 is estimated from an average of Region 9,10,11 and 12.

(2) GDP

"The World 2020, OECD" provided Growth rates of 7.0 % for 2000-2010 and 6.4 % for 2010-2020 as the high projection, and these figures may be applicable to the study as the most reliable and practicable alternative.

The annual average growth rates of GDP and GRDP from 1985 to 2000 are obtained from Philippines Statistical Yearbook 1998, 2000 and Economic and Social Statistics Office, National Statistical Coordination Board (As of July 2001). These growth rates may be applied for the case of low projection since these growth rates are the trend, which may be a minimum growth. The high projection growth rate of each GRDP may be assumed in pro-rata to GDP. Average growth rate of high and low projection may be applied for the case of medium projection.

Table 6.3.2 GDP and GRDP Projection

	1985-2000	1985-1990	1991-2000	2000-2010			2010-2020		
	Average	Average	Average	LG	MG	HG	LG	MG	HG
Philippines	3.5%	4.7%	2.9%	3.5%	5.3%	7.0%	3.5%	5.0%	6.4%
NCR	4.1%	6.2%	3.0%	4.1%	6.2%	8.2%	4.1%	5.8%	7.5%
CAR	5.4%	6.1%	5.2%	5.4%	8.1%	10.8%	5.4%	7.6%	9.9%
Region 1	1.9%	-1.2%	3.4%	1.9%	2.9%	3.8%	1.9%	2.7%	3.5%
Region 2	2.7%	0.7%	3.7%	2.7%	4.1%	5.4%	2.7%	3.8%	4.9%
Region 3	3.2%	4.9%	2.3%	3.2%	4.8%	6.4%	3.2%	4.5%	5.9%
Region 4	3.9%	5.9%	2.9%	3.9%	5.9%	7.8%	3.9%	5.5%	7.1%
Region 5	2.0%	2.3%	1.8%	2.0%	3.0%	4.0%	2.0%	2.8%	3.7%
Region 6	3.1%	3.7%	2.8%	3.1%	4.7%	6.2%	3.1%	4.4%	5.7%
Region 7	4.1%	5.7%	3.3%	4.1%	6.2%	8.2%	4.1%	5.8%	7.5%
Region 8	2.4%	1.4%	2.9%	2.4%	3.6%	4.8%	2.4%	3.4%	4.4%
Region 9	2.6%	2.6%	2.6%	2.6%	3.9%	5.2%	2.6%	3.7%	4.8%
Region 10	0.9%	2.8%	0.0%	0.9%	1.4%	1.8%	0.9%	1.3%	1.6%
Region 11	2.3%	2.8%	2.1%	2.3%	3.5%	4.6%	2.3%	3.3%	4.2%
Region 12	1.1%	2.2%	0.5%	1.1%	1.7%	2.2%	1.1%	1.6%	2.0%
ARMM	4.2%	-	4.2%	4.2%	6.3%	8.4%	4.2%	5.9%	7.7%
Region 13	1.6%	-	1.6%	1.6%	2.4%	3.2%	1.6%	2.3%	2.9%

6.3.2 Premise and Methodology of Forecast

(1) Premise of Forecast

1) Ports for Analysis

Traffic demand forecast was carried out according to the three areas below.

Cargo and passenger of Cebu Baseport

Cargo and passenger of the New San Remigio Port

Cargo and passenger of Toledo Port

2) Target year

Target year for forecast of the long term plan was set at year 2020. The analysis was carried out for years of 2005, 2010, 2015 and 2020. The data of past 10 years is used for the future demand estimate.

(2) Methodology

1) Cebu Baseport

a. Macro Analysis

Traffic demand is forecasted through macro analysis and commodity basis for planning the project. Future demand is closely related to socio-economic activities in the port hinterland. Therefore the following method was used for macro analysis

- By correlative analysis between GRDP of the hinterland and cargo handling volume at Cebu Baseport.

- By classifying conventional and containerized cargo volume of inbound/outbound of domestic and import/export of foreign trades based on the macro traffic volume considering the following impacts and generated components.

    - Bulk cargo volume has been small quantity, tentatively it is included as parts of the conventional cargo
    - Diversion of Manila Transit Cargo
    - Diversion of Traffic from Visayas Region
    - Influence of Development of the New San Remigio Port and Toledo Port

- Passenger traffic is forecasted by correlative analysis between the growth of population of the hinterland as in case 1 (covering direct hinterland) and case 2 (covering indirect hinterland) and embarking/disembarking totaled traffic volume of passengers at Cebu Baseport.

b. Micro Analysis

- Demand forecast of 18 specific commodities closely related with the growth of traffic volume with the economic indicators is estimated by the correlation of the socio-economic indicators based on past trends and by the balance of supply and demand.

- Demand forecast of passenger traffic is estimated by types of service and by movement of passengers using five different types of vessels calling to the Cebu Baseport

c. Selection of Traffic Demands for the Study

Estimated figures between the macro analysis and the microanalysis are different.
The detailed microanalysis based on the commodities basis is considered more accurate and reflective of cargo movements through the port. Thus the result thereof is used for the project planning. Cargo forecast for the long-term plan was carried out in three cases as low, medium, and high, due to future uncertainty. Here the medium case is adopted.

Regarding the passenger traffic, the forecast by the type of vessels is used for the plan of the project, since passenger traffic volume will be sensitive to characteristics of vessel types and to quality of service thereof.

2) Outports

a. Cargo Demand

Projection of cargo demand is estimated by considering normal traffic, diverted traffic and development traffic.

- Normal traffic estimated by GRDP correlation by economic sectors, and by main commodities.
- Diverted traffic estimated for relative advantage of the use of land transport along with sea transport.

- Development traffic estimated by considering additionally developing traffic by economic activities in the hinterland and by development of RORO route projects.

b. Passenger Traffic

Passenger traffic is calculated by combining each estimate of the normal traffic, diverted traffic and development traffic. Projection of each traffic is based upon the same method as in the case of cargo, in which the population is replaced with the GRDP for cargo.

6.3.3 Demand Forecast of Cebu Baseport

(1) Demand Forecast by Macro Analysis

1) Correlation between Cargo Volume and Regional GRDP by Macro Analysis

The forecast is conducted with the different growth rate of low case, medium case and high case for the future regional GRDP. This data is based upon the result of the socio-economic analysis in the previous chapter.

Coefficient correlation equation between GRDP of region 7 and cargo throughput of inbound/outbound of domestic and import/export of foreign is worked out respectively as follows.

Inbound	Y=29.636x-923259
Outbound	Y=65.623x-1000000
Import	Y=26.501x-919180
Export	Y=6.9212x-180230

The growth rate of each case is set as follows:

Table 6.3.3 The Growth Rates by Scenario

Case	2000-2010			2010-2020		
	GRDP	Cargo	Cargo/GRDP	GRDP	Cargo	Cargo/GRDP
Domestic						
Low	4.1%	5.1%	1.24	4.1%	4.0%	1.0
Medium	6.2%	7.2%	1.16	5.8%	5.7%	1.0
High	8.2%	9.1%	1.11	7.5%	7.3%	1.0
Foreign						
Low	4.1%	5.4%	1.31	4.1%	5.8%	1.41
Medium	6.2%	8.4%	1.35	5.8%	7.4%	1.27
High	8.2%	11.2%	1.36	7.5%	9.0%	1.20

The result of macro cargo forecast of Cebu Baseport of each case is worked out as follows:

Table 6.3.4 Cargo Forecast by Macro Analysis, Cebu Baseport Unit: Metric Tons

Year	GRDP	Domestic	Foreign	Total
1990	47,193	3,572,696	550,872	4,123,568
1991	46,971	4,214,747	262,921	4,477,668
1992	47,086	4,160,424	487,843	4,648,267
1993	47,757	4,073,895	351,669	4,425,564
1994	49,663	4,320,846	491,737	4,812,583
1995	52,327	3,998,244	801,336	4,799,580
1996	56,615	4,468,156	747,829	5,215,985
1997	59,926	4,755,554	683,188	5,438,742
1998	60,771	5,821,570	853,290	6,674,860
1999	63,101	5,690,476	863,023	6,553,499
2000	65,031	5,515,566	1,144,631	6,660,198
Case		Domestic	Foreign	Total
a) Low Estimation				
2010	97,191	9,154,105	2,036,441	11,190,546
2020	145,256	13,718,592	3,579,609	17,298,201
b) Medium Estimate				
2010	118,677	11,194,462	2,726,247	13,920,710
2020	208,556	19,729,828	5,611,896	25,341,723
c) High Estimation				
2010	143,019	13,506,104	3,507,770	17,013,874
2020	294,766	27,916,798	8,379,758	36,296,556

(2) Demand Forecast of Conventional/Containerized Cargo Volume

1) Forecast of Containerized Cargo Volume

The containerized cargo volume of inbound/outbound of domestic and import/export of foreign basis and the number of container (TEU) under the conditions of "with project" is estimated by considering the following impacts.

- Bulk cargo volume has been small quantity, tentatively it is included as parts of the conventional cargo
- Diversion of Manila Transit Cargo
- Diversion of Traffic from Visayas Region
- Influence of Development of the New San Remigio Port and Toledo Port

2) Conventional Cargo (break-bulk + bulk cargo)

Bulk cargo volume is about 1 % of total domestic cargo and 5 % of the total foreign cargo volume. These cargo are included as part of conventional cargo in break-bulk cargo.

3) Diversion of Manila Transit Cargo

With project, transit cargo volume via Manila at present which is 7 % of the total container cargo is to divert to foreign cargo. Consequently, the domestic inbound and outbound cargo volume will be shifted to foreign cargo import and export volume. This diversion is expected to gradually increase from year 2010 to 9 % in 2020.

4) Estimation of Diverted Traffic from Visayas Region

Some containerized cargoes-- mainly domestic inbound cargo presently handled in ports such as Dumaguete, Iloilo, Tacloban and Tagbilaran as well as in other private ports in Visayas region are expected be diverted to the New Cebu Port upon its completion.

This diversion is gradually generated from year 2010 and will reach 30 % by year 2020. Cargo diversion is not expected to happen in the Mindanao area since new container handling port will be developed in Mindanao before 2020.

5) Influence of the new San Remigio and Toledo Ports

As a result of development of the new San Remigio port and Toledo port, cargo volume handling at Cebu Baseport will decrease since the cargo will be diverted from sea transport to land transport. The estimation shows that the rate of decrease of domestic cargo is 1.6 %-1.8 % in Cebu Baseport- Bantayan Island and 3.9 % in Cebu Baseport-West Visayas.

6) Result of Demand Forecast of Conventional/containerized Cargo Volume

The total cargo volume is estimated at low, medium and high growth rate.

The recommended case is the medium growth rate because it will be the most realistically obtainable and reflective of past growth rates. Total conventional and containerized cargo volume in medium case are shown below:

Table 6.3.5 Forecasted Cargo Volume

Unit: Metric Tons

Case	Domestic Cargo			Foreign Cargo		
	Conventional	Containerized	Total	Conventional	Containerized	Total
Medium Case						
2005	4,295,514	3,972,536	8,268,050	511,687	1,224,848	1,736,535
2010	5,597,231	5,379,419	10,976,650	477,024	2,663,075	3,140,099
2015	6,317,440	7,867,940	14,185,379	614,783	4,753,612	5,368,395
2020	6,905,440	11,670,193	18,575,633	756,369	7,258,169	8,014,538

7) Difference of Demand Forecast by Macro in GRDP Basis

The difference of cargo volume between GRDP basis macro analysis (case 1) and macro analysis with project (case 2) in the medium case is as follow.

Table 6.3.6 Traffic Forecast Volume by Analysis Method

Unit: ton/year

Cargo	Case 1	Case 2
Domestic Cargo Volume		
Year 2010	11,194,000	10,976,650
Year 2020	19,729,828	18,575,633
Foreign Cargo Volume		
Year 2010	2,726,247	3,140,099
Year 2020	5,611,896	8,014,538 s

(3) Forecast of Number of Container Cargo

The number of containers of domestic and foreign cargo is estimated based on the traffic volume of case 2 with the sequence of 1) setting containerization ratio of inbound/outbound of domestic and import/export of foreign cargo, 2) cargo volume per TEU, and 3) ratio of "full" and "empty" of containers for the forecast.

The following containerization ratio was applied for inbound/ outbound domestic and import /export foreign cargo respectively.

Table 6.3.7 Containerization Ratio

Year	Domestic Cargo		Foreign Cargo	
	Inbound	Outbound	Import	Export
2000	50%	43%	50%	93%
2010	50%	50%	80%	93%
2020	65%	65%	85%	93%

The forecast of number of full and empty containers of domestic and foreign trades in TEU is shown below.

Table 6.3.8 Forecasted Number of TEU

Case	Domestic Cargo			Foreign Cargo		
	Full	Empty	Total	Full	Empty	Total
Medium Case						
2005	317,480	83,248	400,728	135,967	60,716	196,683
2010	425,669	139,186	564,855	285,420	159,604	445,024
2015	619,817	202,072	821,889	506,138	284,079	790,217
2020	916,261	287,214	1,203,475	768,527	430,019	1,198,547

(4) Estimation of Cargo Volume by Commodity Basis

1) Selection of Commodities for Forecast

CPA classifies the cargo into 35 commodities. Out of 35 commodities, 18 items are selected, which have the correlation with the economic index more than 80 % and reaches cargo volume to 91 % of the total domestic cargo of 1999.

2) Forecast Volume by Commodity Basis

The results of forecast cargo volume by commodity basis are shown below.

Table 6.3.9 Forecast Volume by Commodity Basis

a. Domestic Cargo Forecast Volume (1,000 tons)		
	Inbound	Outbound
2010	4,349	6,627
2020	6,679	11,896
b. Foreign Cargo Forecast Volume (1,000 tons)		
	Import	Export
2010	2,534	605
2020	6,492	1,522

3) Cargo Traffic for Planning the Project

In general, projection by commodity can be worked out from production trend, consumption trend, and supply and demand trend of each commodity.

Analysis based upon sector correlation and elasticity between cargo and indicators as undertaken in this study can result in more correct projection of the volume. The cargo demand forecast derived from the commodities basis will more accurately project the trends of cargo and economic activities, the volume of which are used for planning the project.

The demand forecast of cargo traffic for planning the project is as follow:

Table 6.3.10 Forecasted Cargo Traffic for Port Plan

Domestic Cargo (1,000 tons)							
Year	Non-Containerized Cargo			Containerized Cargo			Total
	Inbound	Outbound	Total	Inbound	Outbound	Total	
2000	1,435	1,506	2,941	1,426	1,148	2,574	5,515
2010	2,218	3,379	5,597	2,132	3,248	5,380	10,977
2020	2,483	4,422	6,905	4,197	7,474	11,671	18,576
Foreign Cargo (1,000 tons)							
Year	Non-Containerized Cargo			Containerized Cargo			Total
	Import	Export	Total	Import	Export	Total	
2000	442	17	459	446	239	685	1,144
2010	442	35	477	2,093	570	2,663	3,140
2020	686	71	757	5,807	1,451	7,258	8,015

(5) Cargo Demand Forecast by Vessel Type

From the forecasted cargo demand with present and estimated future cargo share by vessel type, cargo demands by vessel type are forecasted. The result is shown below.

Table 6.3.11 Cargo Demand by Vessel Type

Year	Domestic Cargo					Foreign Cargo	
	Large RORO	Middle RORO	Container	Conventional	P/C	Container	Conventional
	TEU	1,000 ton	TEU	1,000 ton	1,000 ton	TEU	1,000 ton
2000	113,000	1,783	82,000	1,177	882	104,000	459
2010	283,000	3,853	57,000	2,799	560	502,000	477
2020	602,000	6,263	120,000	3,453	691	1,319,000	756

Note: After the completion of the new port, it is presumed that 10 % of the domestic container cargoes, carried by container vessels, will be handled at the foreign terminal. Therefore it is included in the volume of foreign cargo in this table.

(6) Estimation of Passenger Traffic

1) Macro Forecast of Passenger Traffic

Estimation of two cases as macro analysis were carried out; Case 1 is on the correlation between population in the direct hinterland and passenger traffic through Cebu Baseport, and case 2 is on the indirect hinterland.

The projection of passenger traffic of case 1 and 2 are summarized below.

Case of Passenger Traffic	Traffic Volume	Remarks
Case 1(direct hinterland)		
Year 2010	18,463,944	1.85 times of 2000 traffic
Year 2020	24,711,548	2.47 times of 2000 traffic
Case 2(indirect hinterland)		
Year 2010	17,220,944	1.72 times of 2000 traffic
Year 2020	22,902,114	2.29 times of 2000 traffic

2) Forecast of Passenger Traffic by Type of Vessels

In microanalysis passenger traffic is estimated based on the traffic trends by type of vessel and the share of passenger traffic using each type of vessels in 2000 and estimated growth rate of passenger of each type of vessel.

The result of passenger traffic forecast by type of vessels is shown below.

Table 6.3.12 Passenger Demand by Vessel Type Unit: No. of Passenger

Year	Large RORO	Fast Craft	Middle RORO	P/C	Metro Bus	Small Craft	Total
2000	668,575	1,799,617	2,120,751	3,181,126	2,288,979	84,109	10,059,048
2005	905,803	2,438,169	3,068,047	3,835,058	2,288,979	76,028	12,536,057
2010	1,227,207	3,303,298	4,500,733	4,500,733	2,288,979	68,723	15,820,949
2015	1,493,085	3,821,514	5,699,909	4,664,562	2,288,979	62,120	17,967,048
2020	1,816,566	4,421,027	7,161,478	4,774,319	2,288,979	56,152	20,462,368

Passenger traffic volume will be affected by characteristics of vessel types and by quality of service. Consequently, the projection by vessel types does not agree with the estimate derived from regression analysis based on population and passenger traffic as case 1 and 2. The micro analysis as conducted resulted in very close estimates with the results of the macro analysis of case 2, as follows.

The results by the micro analysis is proposed to use for planning of the project.

Table 6.3.13 Forecast Passenger Traffic by Analysis Method

Year	Macro Projection Case 2 (Indirect hinterland)	Micro Projection (By Vessel types)
2010	17,220,944	15,820,949
2020	22,902,114	20,462,368

(7) Forecast of Calling Vessels

From the estimated vessel size, average loading volume/passenger per vessel and cargo/ passenger demand, number of calling vessels are calculated. The result is shown below.

Table 6.3.14 Forecast of Calling Vessels (Cebu Baseport and New Cebu Port) Unit: Vessels

Year	Domestic							Foreign	
	Large RORO	Middle RORO	Container	Conven-tional	P/C*	Fast Craft*	Metro Bus*	Container	Conven -tional
2000	816	3,553	344	1,492	14,559	6,099	17,122	287	155
2010	1,292	7,860	228	3,240	14,065	8,260	17,122	450	57
2020	2,090	12,800	429	3,600	11,367	9,020	17,122	600	90

Note: Numbers of vessel marked * are given by passenger demand.

6.3.4 Demand Forecast of Toledo Port

(1) Cargo Forecast

1) Components of Forecast in Cargo Traffic

Under this project, cargo traffic demand of Toledo port consists of the following three different kind of traffic.

- Cargo traffic at the existing Toledo port, which is the normal traffic
- Diverted cargo traffic of Cebu Baseport-Visayas area to Toledo port
- Development traffic generated by new economic activities

2) Forecast of Cargo Volume at Toledo Port

The cargo handling volume at Toledo port has increased rapidly since 1997.

The rapid increase is due to additional traffic by vehicle transport. In 1999 vehicle transport accounted for 54 % of the total cargo traffic. Thus, cargo traffic demand was estimated through regression analysis between GRDP of commodity sector in Region 7 and its cargo volume, after subtracting vehicle transport.

3) Forecast of Diverted Traffic Volume from Cebu Baseport
It assumes road improvement of Trans Cebu highway between Cebu City and Toledo. According to Origin-Destination survey of sea transport, cargo transport volume amounts to 6.5 % of the whole traffic from Cebu City to West Visayas Region by Vessel.

Since the whole cargo traffic may not be diverted to land transport, 60 % of the 6.5 % of West Visayas, that is 3.9 %, will be as the diverted traffic. Cargo traffic will depend on the development of RORO route of Cebu city-Trans Cebu-Toledo- San Carlos -land transport- Bacolod City (West Coast) -Iloilo

4) Forecast of Development Traffic by Regional Development
Development traffic was projected at 10 % of Toledo port cargo volume by the regional development. The Toledo city is located at the center of the West Coast Cebu Province, and situated as the gate port to the East Coast of Negros island with San Carlos, facing with Tanan Strait. Both ports have high potential for future development as industrial area and business district.

5) Results of Forecast of Cargo Volume
Total amount of cargo demand was projected as follows.

In year 2010	1,223,560 tons with growth rate of 8.2 % between 2000 - 2010
In year 2020	2,3321,290 tons with growth rate of 6.1 % between 2010 - 2020

(2) Passenger Traffic Forecast

1) Normal Traffic Forecast Based on Population and Passenger Traffic at Toledo port
Normal demand was estimated by regression analysis between the hinterland population and number of passenger at Toledo port

2) Forecast of Diversion from Cebu Baseport and Development Traffic
According to Origin-Destination survey by National Statistic Office, the movement of passenger traffic by vessels is as follow:

Between Cebu and Panay Island:	4.1 % of the total traffic
Between Cebu and Negros Island:	0.3 % of the total traffic.

Estimation is made that 70 % of the passenger between Cebu and Panay will be diverted to Toledo port, while 100 % passenger between Cebu-Negros uses Toledo port. Consequently diversion rate is calculated as 4.1 % multiplied with 70 % plus 0.3 % equals to 3.2 %.Under this project, generated traffic in Region 6 and 7 is projected at 30 % of passengers in 2000 at Toledo port. For the growth rate of those two regions was applied.

3) Result of Passenger Traffic Forecast
Total amount of passenger traffic was estimated as follows.

Year	Traffic	Growth rate
In year 2010	1,088,830 (2,980/day)	3.9 % between 2000 - 2010
In year 2020	1,283,160 (3,790/day)	2.4 % between 2010 - 2020

(3) Forecast of Calling Vessels

The number of vessel calls are estimated as shown below.

Table 6.3.15 Forecast to Calling Vessels (Toledo Port)

Year	RORO		Conventional		Fast Craft	
	Vessel call	Average size (GRT)	Vessel call	Average size (DWT)	Vessel call	Average size (GRT)
2000	721	480	26	1,200	2,220	150
2010	1,460	1240	107	1,600	3,297	200
2020	2,920	2000	155	2,000	3,717	200

6.3.5 Demand Forecast of the New San Remigio Port

(1) Cargo Forecast

1) Components of Forecast in Cargo Volume
The cargo demand forecast of the New San Remigio Port consists of the following three components.

- Diverted traffic from Hagnaya
- Diverted traffic from Santa Fe port, Baigad and from Cebu Baseport
- Generated traffic by development of RORO route networks

2) Results of Forecast of Cargo Traffic
Total estimation of cargo volume in the target year is summarized as follows.

a. Diverted traffic from Hagnaya

Year 2010	11,800 tons
Year 2020	20,420 tons

b. Diverted traffic from Three ports in Bantayan Island and Cebu Baseport

Year 2010	113,080 tons
Year 2020	280,368 ton

c. Generated traffic by RORO routes

Year 2010	37,630 tons
Year 2020	687,710 tons

d. Total demand projection

Year 2010	382,132 tons
Year 2020	789,041 tons

e. Growth rate

2000-2010	11.0 %
2010-2020	7.5 %

(2) Passenger Traffic

1) Important Feature in Passenger Service of Hagnaya port

For the new San Remigio port the function of the Hagnaya port for passenger traffic is primarily important.

2) Forecast of Diverted Passenger Traffic from Hagnaya Port

With project, 100 % of the passenger traffic from Hagnaya port is diverted to the new port. Number of passengers is estimated from correlation established between the past hinterland population and passengers traffic volume.

3) Forecast of Diverted Traffic from Cebu Baseport and Generated Traffic from RORO Route

Diverted traffic from Cebu Baseport is 0.9 % of the total passenger traffic according to Origin Destination Survey. As for new development traffic by RORO project, 10 % of passenger traffic of Hagnaya port in 2000 is estimated for daily passenger and 5 % is estimated for tourists.

4) Result of Passenger Traffic

Total passenger traffic estimation is summarized as follows.

a. Diverted traffic from Hagnaya

Year 2010	442,070 passengers
Year 2020	595,000 passengers

b. Diverted traffic from Three ports in Bantayan Island and Cebu Baseport

Year 2010	166,180 passengers
Year 2020	222,400 passengers

c. Generated traffic by RORO routes

Year 2010	20.510 passengers
Year 2020	31,040 passengers

d. Total demand projection

Year 2010	669,760 passengers
Year 2020	900,840 passengers

e. Growth rate

2000-2010	5.2 %
2010-2020	3.0 %

(3) Forecast of Calling Vessels

The number of vessel calls are estimated as shown below.

Table 6.3.16 Forecast of Calling Vessels (San Remigio Port)

Year	RORO		Conventional Passenger		Fast Craft	
	Vessel call	Average size (GRT)	Vessel call	Average size (GRT)	Vessel call	Average size (GRT)
1999	-	-	1,625	182.5	-	-
2010	1,274	500	-	-	2,624	150
2020	2,631	500	-	-	3,874	150

6.4 Master Plans of Cebu Baseport / the New Cebu Port

6.4.1 Required Facilities and Equipment

(1) Facilities for the New Cebu Port

1) Foreign Container Terminal

a) Berths

Berth Dimension	300m long and 13m deep (40,000DW)
Cargo Volume	1,319 thousand TEUs in 2020
Handling Productivity	389 thousand TEUs/berth (72.6box/h/berth) in 2020
Required Number of Berths	4 in2020

b) Required Land Depth of the Container Terminal: 500m

apron and back reach area (65m), stacking area (270m), facilities and buildings (100m), traffic space (65m)

c) Container (Cargo) Handling Equipment

An important factor for the operation of the container port is the introduction of the a fully

container (cargo) handling system for discharging, loading and transporting in the container terminal and port area. The efficient and appropriate container operating system and capacity of the equipment is decided through total system planning based on the assumed number of containers to be handled and seasonal variations. Cost of each equipment to offer required performance is one of the essential factors for the selection of the cargo handling system.

Table 6.4.1 Required Container Handling Units

Kind of Container Handling Equipment		2020
Quay side Gantry Crane (QSGC)		10 Units
Rubber Tier Mounted Gantry Crane (RTGs)		32 Units
Prime Mover	Tractor Head	65 Units
	Trailer(20'/40'/45' Combine)	78 Units

d) Required CFS and Required LCL Cargo Handling Equipment

Required CFS area is 3,200m2. Required units of forklifts are shown in the following table.

Table 6.4.2 Required LCL Cargo Handling Equipment

Capacity	2.5 tons	3.0 tons	5.0 tons	10.0 tons
Container Side	3 Units	2 Units	2 Units	1 Unit
Truck Side	3 Units	2 Units		

2) Foreign Multi Purpose Terminal

a) Berths

Berth Dimension	190m long and 10m deep (18,000DW)
Cargo Volume	756 thousand MT in 2020
Handling Productivity	105MT/h in 2020
Required Number of Berths	2 in 2020

b) Required Land Depth of the Yard: 100 m

open storage and sheds area (50 m), apron and traffic space (50 m)

c) Multipurpose Berth Cargo Handling Equipment

Table 6.4.3 Required Multipurpose Berth Cargo Handling Equipment

Capacity and Unit	Project Year(2020)
3.5 tons Fork Lift Truck	8 Units
5.0 tons Fork Lift Truck	5 Units
10.0 tons Fork Lift Truck	1 Unit
15.0 tons Fork Lift Truck	1 Unit

3) Port Service Boats Berthing Facilities

Pontoon berth

(2) Facilities for Cebu Baseport

1) Large RORO Ferry

a) Berths

Berth Dimension	225m long and 8m deep (18,000GRT)
Cargo Volume	602 thousand TEUs in 2020
Number of calling vessels	2,090 vessels in 2020
Service cycle	2 cycles at one berth per day
Required Number of Berths	3 in 2020

b) Passenger Terminal; 7,000m^2

2) Middle RORO Ferry (stern ramp)

a) Berths

Berth Dimension	60 m long and 6 m deep (4,000 GRT, right angle mooring system)
Cargo Volume	120 thousand TEUs in 2020
Number of calling vessels	12,800 vessels in 2020
Service cycle	3 cycles at one berth per day
Required Number of Berths	12 in 2020

b) Passenger Terminal; 2,800m^2 × 3 in 2020

3) Domestic Container Vessel

a) Berths

Berth Dimension	175m long and 8m deep (7,000DW)
Cargo Volume	120 thousand TEUs in 2020
Handling Productivity	44box/hour/vessel in 2020
Required Number of Berths	1 in 2020

4) Domestic Conventional Cargo Vessel

a) Berths

Berth Dimension	100m long and 6m deep (2,000DW)
Cargo Volume	3,453 thousand TEUs in 2020
Handling Productivity	75MT/h in 2020
Required Number of Berths	11 in 2020

5) Passenger/Cargo Vessel

a) Berths

Berth Dimension	60m long and 4m deep (500GRT)
Number of calling vessels	11,367 vessels in 2020

Service cycle	3 cycles at one berth per day
Required Number of Berths	11 in 2020

6) Fast Craft

a) Berths

Berth Dimension	55m long for 2 vessels and 3m deep (500GRT)
Number of calling vessels	9,020 vessels in 2020
Service cycle	5 cycles at one berth per day
Required Number of Berths	5 in 2020

7) Metro Bus Ferry

a) Berths

Berth Dimension	small pontoon
Number of calling vessels	17,122 vessels in 2020
Service cycle	24 cycles at one berth per day
Required Number of Berths	2 in 2020

8) Required Land Space for Domestic Container Vessels and RORO Ferries

Domestic containers handled at PMO 1 and 2 have two storage methods -the stacking system and the married system (containers are transported with trailer). CIP capacity for stacking containers (2,300 TEUs / day) is sufficient for the handling volume in 2020 (1,500 TEUs /day). However, the required land space for vehicles of married containers (7.2 ha) is beyond the available space in CIP (2.9 ha). Regarding break bulk cargoes, required land space of the vehicles is 1.5 ha in 2020. Therefore, additional open space of 6 hectares is required near CIP area to accommodate cargo demand in 2020.

(3) Summary of Required Facilities

Required port facilities in 2020 are summarized below.

Table 6.4.4 Required Port Facilities for the New Cebu Port in 2020

	Berth length (m) (No. of berths)	Berth depth (m)	Others
Foreign Container Terminal	1200 (4)	13	Back yard area: 60ha
Foreign Multi Purpose Terminal	380 (2)	10	Back yard area: 4ha

Table 6.4.5 Required Port Facilities for Cebu Baseport in 2020

	Berth length (m) (No. of berths)	Berth depth (m)	Others
Large RORO Ferry Terminal	675 (3)	8	Passenger Terminal (7,000m2) Additional Open Space (6ha*)
Middle RORO Ferry Terminal	720 (12)	6	RORO ramps Passenger Terminals (2,800m2 x 3)
Domestic Container Terminal	175 (1)	8	
Domestic Conventional Cargo Terminal	1,100 (11)	6	
Passenger/Cargo Terminal	660 (11)	4	
Fast Craft Terminal	165 (5)	3	
Metro Bus Ferry	(2 pontoons)	–	

* This area includes parking space for vehicles of middle RORO ferries

6.4.2 Basic Development Plans

(1) The New Cebu Port

1) Evaluation of Alternatives

Based on the required facilities and natural conditions of the site, two alternatives were planned. (See Fig. 6.4.1 and Fig.6.4.2) Alternative-2 is totally superior to Alternative-1 according to the evaluation from the relevant points, such as maneuverability, future expansion, siltation, effective utilization of quay side, and cost.

2) Development Plans

a) Foreign Container Terminal

Quay length	1,200 m (4 berths)
Depth of back yard	500 m
Water depth	13 m
Gantry crane (Panamax)	10

b) Foreign Multi Purpose Terminal

Quay length	380 m (2 berths)
Depth of back yard	100 m
Water depth	10 m

c) Service Boat Mooring Facility

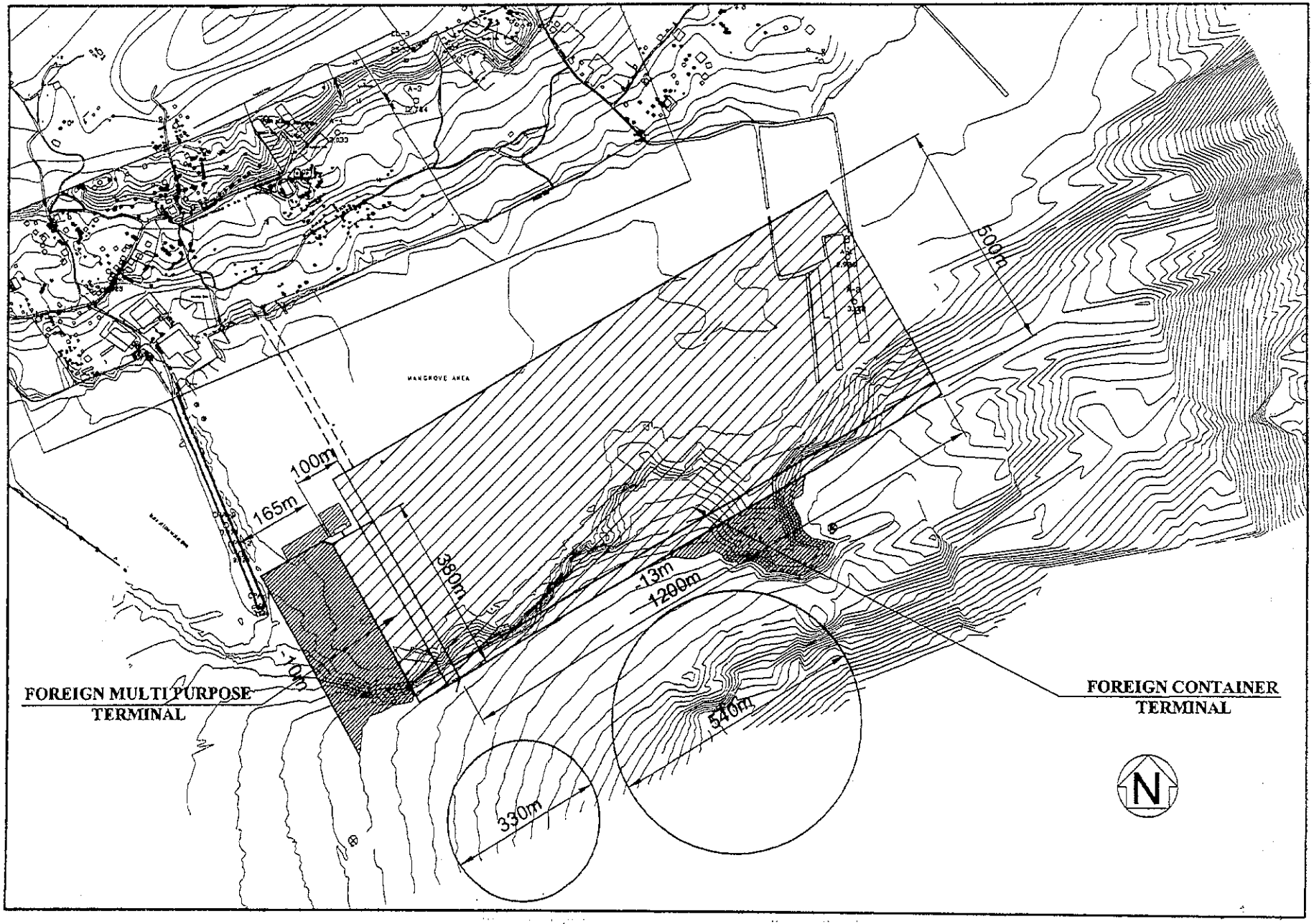

Fig. 6.4.1 New Cebu Port Layout Plan (Alternative 1)

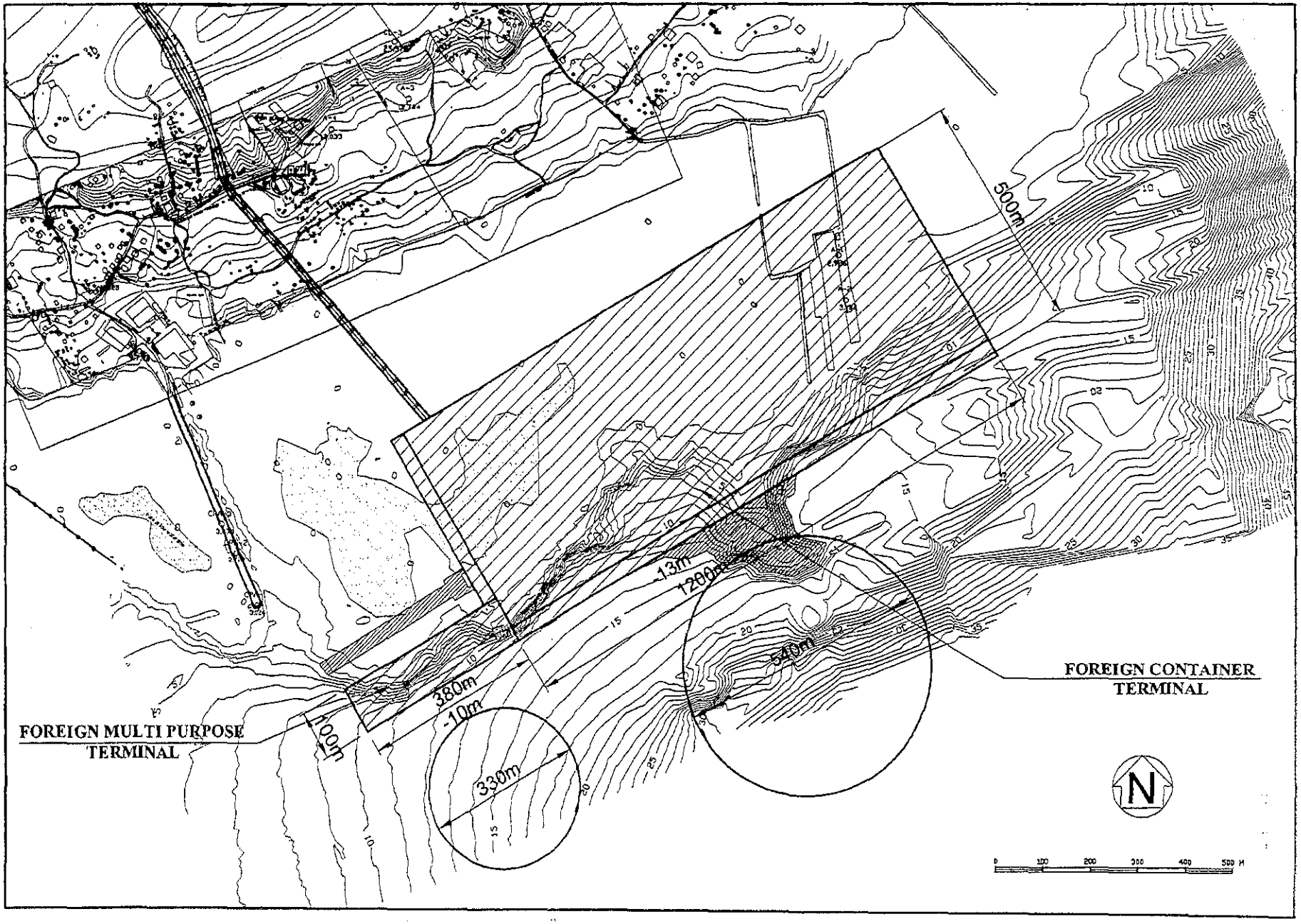

Fig.6.4.2 New Cebu Port Layout Plan (Alternative 2)

(2) Cebu Baseport

1) Ongoing /planned project

a) Expansion (30m offshore) of backyard and deepening the berths of B8-B17 with construction of RORO ramps (PMO 2)
b) Rehabilitation of pier 2 and demolition of the shed (PMO 3, 4)
c) Rehabilitation of fender system and working apron of the berths of B28-30 (PMO 5)
d) Close of the berths of B31-33 due to the Cebu South Coastal Road Project (PMO 5)
e) Relocation of the fast craft terminal

2) Future Utilization Plan

a) PMO 1

This area can accommodate large vessels and will be used for deep draft vessels, such as large RORO ferries and domestic container vessels.

b) PMO 2

Main port function of PMO 2 is as a middle RORO ferry terminal. The required RORO ramp facilities for stem ramp vessels will be developed.

c) PMO3 and PMO4

This area will be used for middle/small class conventional cargo vessels, passenger/cargo vessels, and fast crafts.

d) PMO5

Berths B31-33 are to be closed and berths B28-30 will be used for conventional cargo vessels.

3) Layout in 2020

a) PMO 1 (-8.5m)

Multi purpose berth	243 m (B2-3)
Large RORO ferry berth	450 m (B3-7)
CIP area	10 ha
Passenger terminal	7,000 m^2
Boarding bridge	400 m

b)PMO 2 (-8.5m～-6.0m)

Large RORO ferry berth	225 m (B8-9)
Conventional cargo berth	209 m (B9-11)
Middle RORO ferry berth	720 m (B11-17)
Additional back-up area	6 ha
Passenger terminal	2,800 m^2 × 3

c) PMO3 (-6m)

Fast craft berth	165 m (B18-19)
Passenger/cargo berth	694 m (B20N-23N)

d) PMO4 (-7m～-5m)

Conventional cargo berth	807 m (B23T-27)

e) PMO5 (-7m～-5m)

Conventional cargo berth	371 m (B28-30)

4) Proposed Plan

a) Expansion (30m off-shore) of backyard of conventional cargo berth (B21, 22, 24, 25, 28-30)
b) Renovation of pier1. 2 and 3, including expansion of width of pier1 and 2 for large vessels
c) Construction of passenger terminal buildings with boarding bridge and elevated catwalk for RORO ferries
d) Expansion of back-up area for RORO ferries

The master plan in 2020 is shown in Fig 6.4.3.

5) Timing of Expansion of Foreign Container Yard

The present marshalling yard capacity of CIP is calculated as 216 thousand TEUs/year. According to the demand forecast, foreign container volume is assumed to be beyond the capacity of CIP in 2006. Therefore, an additional container yard area should be developed on a temporary basis near PMO 1 area before 2006. The proposed candidate site is the vacant or hardly utilized private land behind B-8 and 9.

(3) Navigation Aids

Under the International Maritime Organization (IMO) regulations, it is mandatory for every port to have Vessel Traffic Service (VTS) for the harbor. When entering a port, vessels are required to follow "General Principles of Vessel Reporting System" contained in IMO guidelines. These vessels carry the hydrographic chart of the harbor, which shows the details of the topography of the area. The master of the visiting vessel makes contact with Harbor Control through wireless communication, when the vessel is within the calling range.

The harbor control then guides the vessel to come up to the port limits. The navigation of the vessel within the port limits is generally conducted by the local pilots who have the necessary experience. The position of the vessel is then marked on the chart in the Harbor Control room, and its movements are monitored according to the sailing plan.

At the Harbor Masters office of CPA, VTMS (Vessel Traffic Management System) has not

been installed. The operation system and equipment are old. Currently, navigation control is conducted through VHF between the Harbor Master office (Pilot office) and the captain or the boarded pilot.

After vessels come into sight, it is possible to monitor the movement of vessels. But there is no visual navigation aid while vessels are out of sight. Furthermore, it is very difficult to monitor the vessel's traffic during night time, especially in time of bad visibility and bad weather.

The traditional Vessel Traffic Service described above meets the minimum requirement safety for navigation of vessel in the harbor. It however, does not meet the requirement of shipping in modern ports. The modern Vessel Traffic Management System (VTMS) should be introduced to accommodate the increasing vessel traffic in the future.

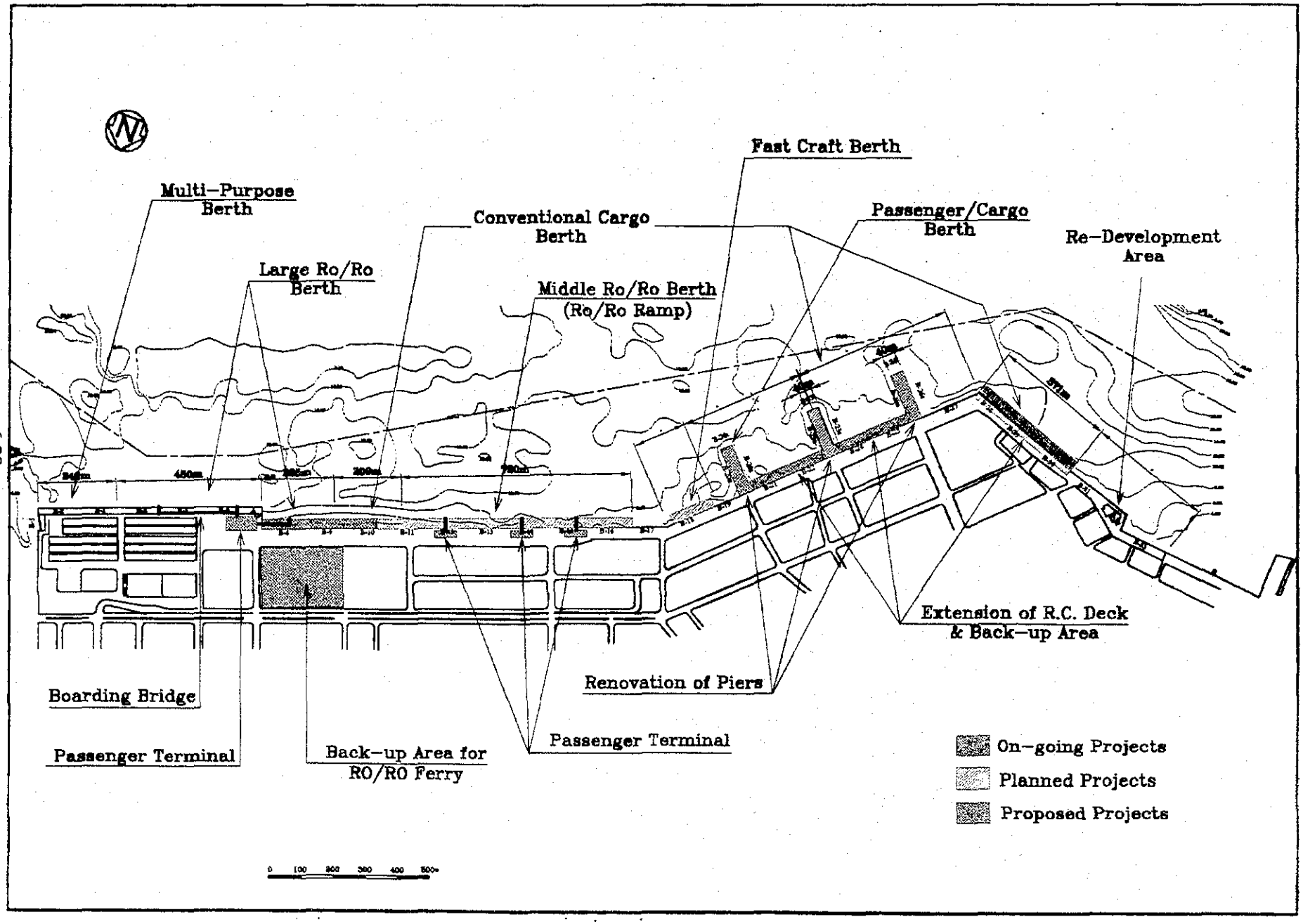

Fig. 6.4.3 Cebu Baeport Development Plan (2020)

6.4.3 Hinterland Road Development for the New Cebu Port

(1) Access Road of the New Cebu Port

Access road needs to be developed from the New Cebu Port to Cebu North Coastal Road. The total traffic volume of the New Cebu Port is calculated as 983 cars/hour in 2020 and 392 cars/hour in 2010. According to the standard traffic volume in Japan, four (4) lanes will be necessary in 2020 and two (2) lanes in 2010.

(2) Cebu North Coastal Road Project

Cebu North Coastal Road Project (Mandaue-Consolacion-Liloan), which includes a new bridge crossing Cansaga Bay, is essential for the development of the New Cebu Port. The commencement of the civil works of Cebu North Coastal Road Project is scheduled in 2007. It should be completed before the New Cebu Port will be in operation.

The Cebu North Coastal Road Project was initiated before the determination of the New Cebu Port development site. Therefore the present estimated traffic volume of this road project does not include the generated traffic of the New Cebu Port. This road is planned as four (4) lanes and the capacity is calculated 7,200 PCU (Passenger Car Unit) /hour from the road capacity standard in the Philippines.

The traffic volume per hour of this road is estimated as 2,101 PCU in 2008-2013 and 3,221 PCU in 2013-2018. Based on this trend, the number of PCU/ hour is estimated around 4,900 in 2018-2023.

The traffic volume (PCU/h) of the New Cebu Port is estimated as 862 in 2010 and 2,163 in 2020. Adding this volume to the above estimation, it is assumed that the total number of PCU/hour is approximately 3,000 in 2010 and 7,100 in 2020. As a result of the preliminary study, the traffic volume in 2020 is considered to reach almost the maximum capacity of the present Cebu North Coastal Road Project. The impact of the new Cebu Baseport development should be carefully taken into consideration for the long-term development plan of the Cebu North Coastal Road Project.

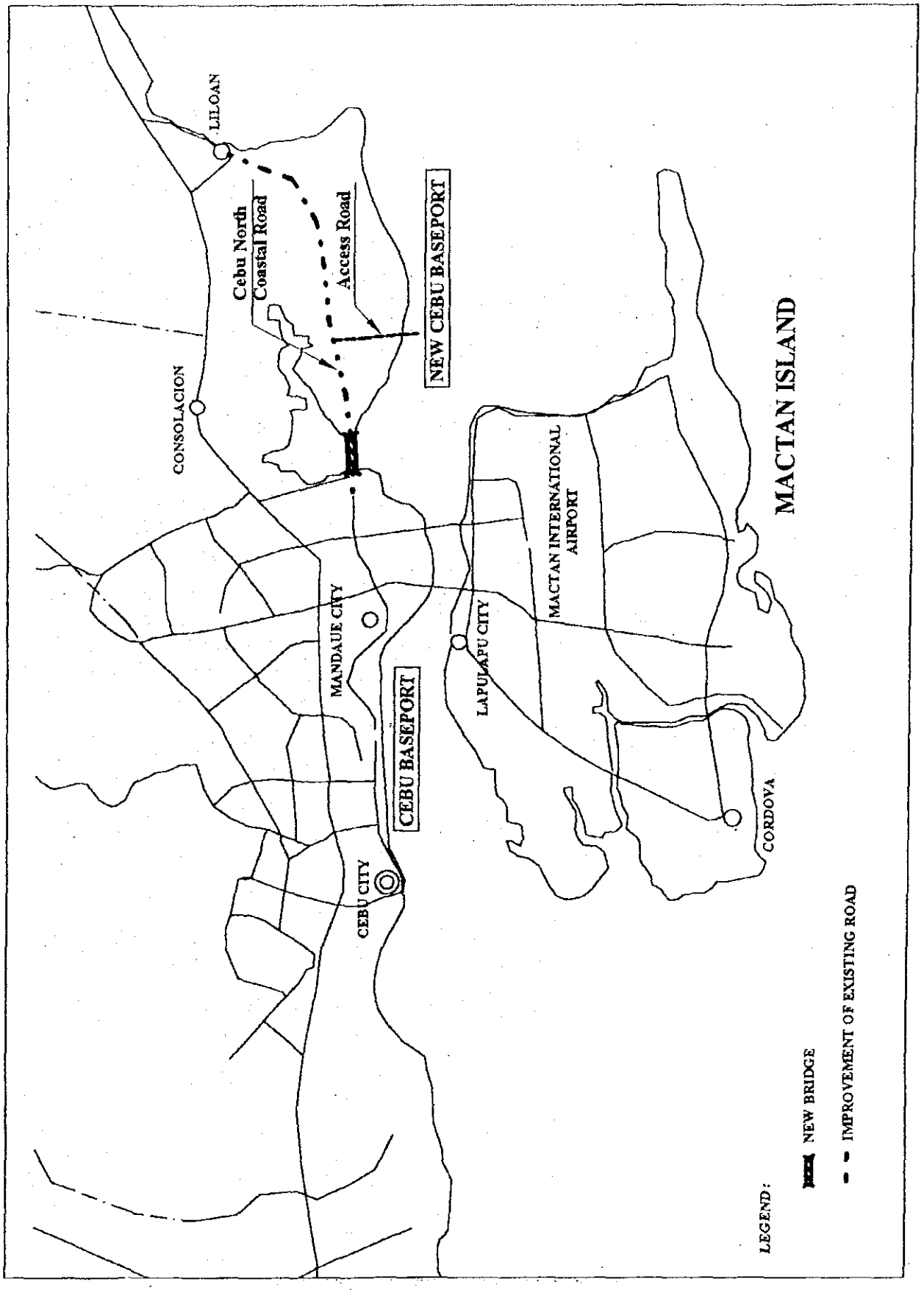

Fig. 6.4.4 Access Road and CCNR

6.4.4 Restriction of Airspace

The area of the inner horizontal surface and the conical surface of the Mactan Cebu International Airport are shown in Fig. 6.4.5. Height limitation at the New Cebu Port is assumed as follows.

(Within the inner horizontal surface)
Height limitation = 9.3m (Elevation of 22 Runway end by AIP) + 45m = 54.3 m
(Above MSL (mean sea level))
(Within the conical surface)
Height limitation
= 54.3m +(Distance from the periphery of the inner horizontal surface) x 5%
(Above MSL)

Within the inner horizontal surface, the height limitation above the top of quay level is calculated by the following formula.

Height limitation above the top of quay level
= Height limitation: MSL + Difference between MSL and MLLW (mean lower low water)
- Height of top at quay wall: MLLW

Difference between MSL and LLW: 0.6m
Height of top at quay wall: 3.0m (LLW)

The height limitation above the top of quay level is calculated as 51.9m. This limitation should be taken into consideration for the design of the quay cranes.

Meanwhile, the maximum vessel size calling at the New Cebu Port is assumed to be 40,000DW. According the to the survey of the vessel size calling at Tokyo Bay in 2000, the maximum air draft (above sea level) of the container vessels under 40,000DW is below 50m. Therefore it is assumed that the height limitation will not affect the mast height of the calling vessels at the New Cebu Port.

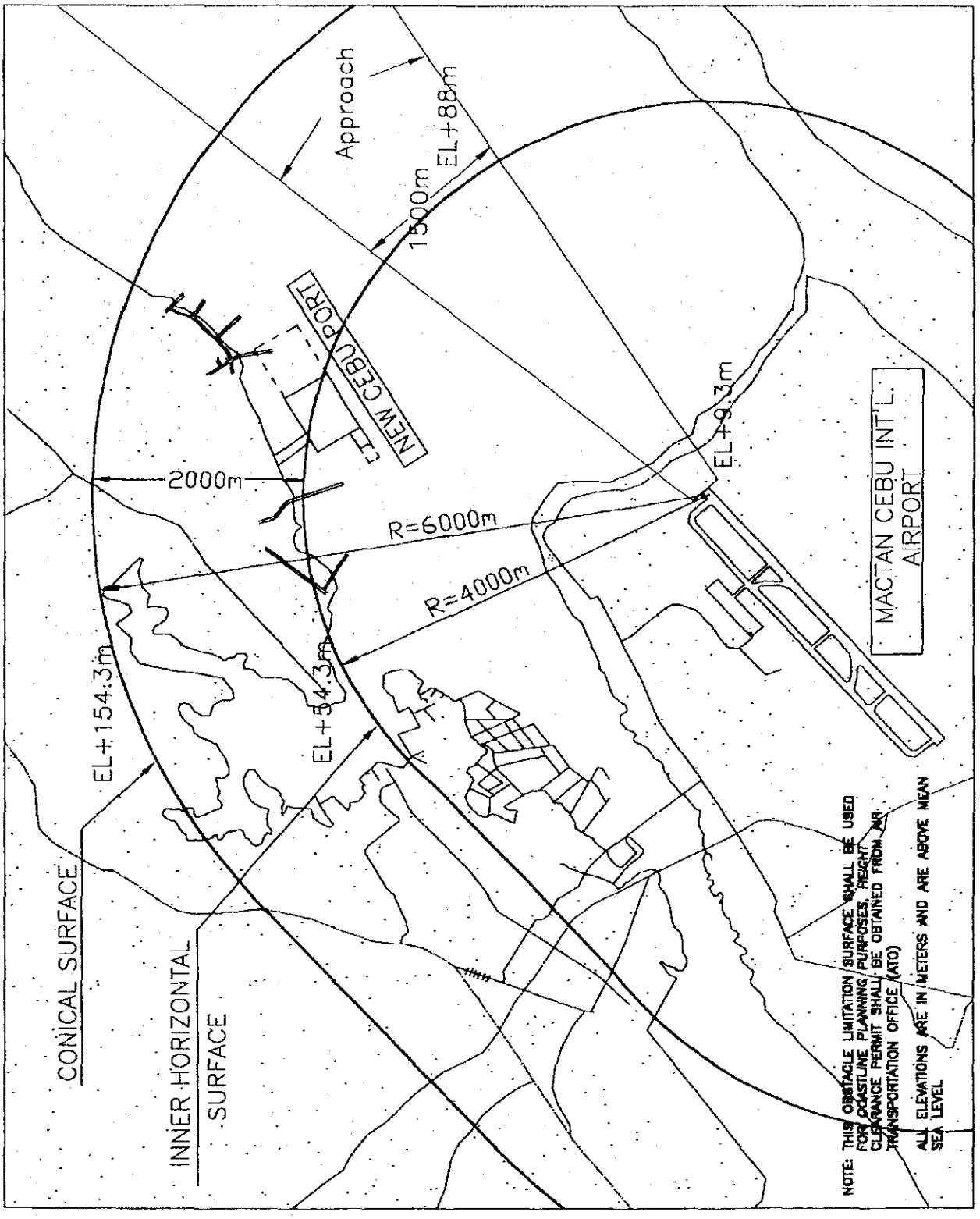

Fig .6.4.5 Obstacle limitation Surface of Inner Horizontal and Conical

6.5 Master Plan of Toledo Port

6.5.1 Development Policy of Toledo Port

The Philippine government is planning to construct a passenger terminal and parking space for waiting passengers and vehicles. The plan is being considered vis-à-vis the annual average demand. Countermeasures for peak hour traffic shall be introduced including, among others, increasing the number of trips and the use of other nearby routes; thereby, avoiding excessive facility investment.

The function of Toledo Port is to provide smooth transportation between the islands of Cebu and Negros. To provide a smooth and efficient transportation between the two islands, a minimum waiting period for the scheduled trips should be actualized. Furthermore, rather than accommodating large ships that requires great depths, Toledo port could be more effective if it provides round trip services using medium-scale vessels. Necessary facilities include a waiting facility for people and vehicles and facilities for loading and unloading. For the handling of cargo, a storage place should be provided but no loading facilities will be made available.

Concerning required depth of the berth, it may change corresponding to the trend of vessel size that calls the port. Therefore the type of structure of the cargo berth is designed as available type that can dig deeply in the future.

6.5.2 Required Scale of Facilities

(1) Future Vessel Type

The standard vessel type in the present Cebu Baseport and in neighboring ports will be the 2000-ton class ferry. The 200-passenger vessel will be the standard for fast ferry while the 2000-ton type will be the standard for the conventional cargo.

(2) Required Scale of Facilities

A depth of 4m is required for the wharf catering to passenger vessels, such as ferry and fast ferry, while a depth of 6m shall be the standard requirement for the cargo wharf. However, it should be considered to develop the ferry berths up to 6 m deep, if the deeper berth is necessary to accommodate the cargo vessels during the first stage.

Ferry and fast ferry berths will be located in a U-shaped reclamation area while the cargo berths will be parallel to the coast. At the first stage, the U-shaped area will be constructed. One ferry berth will be used by cargo vessels temporarily. Normal operations, as planned, will resume at the final stage of the implementation of the plan.

The following space is required within the port: 6000 square meter area of parking space for passenger automobiles, bus and trucks, and administrative cars; 1000 square meter area passenger terminal for departing and arriving passengers, which includes the ticketing office, shipping company offices, management offices; 1,800 square meter open yard for cargo; 1,800 square meter storage yard; and 500 square meter warehouse.

6.5.3 Port Master Plan

Three alternative proposals are compared and considered. There can be two possible ways for the vessel course: ships can come alongside the quay in the same direction as the existing pier or ships can come alongside the quay parallel to the coastal line. In the former, there are two directions of harbor development being considered, to the south and to the north.

(1) Evaluation of Alternative Proposals

Three alternatives are evaluated based on such factors as maneuverability, maintenance and operation, construction cost, future expansion, environmental consideration, easiness of implementation, etc.

As the result of evaluation (see Table 6.5.1), Plan 1 is recommended as the master plan.

(2) Phasing Plan

The long-term development project is planned to be carried out separately at two phases. At the first phase, the U-shaped area will be constructed. Cargo vessels will use one RORO ferry berth temporarily. Normal operations, as planned, will resume at the second stage of the implementation of the plan.

Table 6.5.1 Comparison of Evaluating Items

Alternative Proposal	Plan 1: Southward Development	Plan2: Northward Development	Plan3: Parallel Quay
Maneuverability	X Difficult for Ferry to come alongside quay O Advantageous for countermeasures against southerly winds	X Difficult for Ferry to come alongside quay	O Easy for Ferry to come alongside quay
Maintenance and Operation		O Ease of transport between existing fertilizer factory and the cargo wharf	X The width of the harbor region becomes longer
Construction Cost	- 970 M Peso	- 940 M Peso X additionally fishery pier shall be replaced	- 960 M Peso
Future Expansion	O Possible	O Possible	O Possible
Environmental Consideration	O Existing harbor area O No dangerous and bulk cargo	O Existing harbor area O No dangerous and bulk cargo	O Existing harbor area O No dangerous and bulk cargo
Easiness of Implementation	O Few adjustments vis-à-vis the constructed coastal road	X Much adjustments vis-à-vis the constructed coastal road	
General Evaluation	OOOO (ooooox-)	O (ooooxxx-)	OOO (oooox-)

Table 6.5.2 Phasing Plan of Toledo Port

Works	Short-term (Phase 1)	Long-term (Phase 2)
Total dredging works	20,000 m3	44,000 m3
Total reclamation works	60,000 m3	180,000 m3
Berthing Facilities	2 unit of RORO berth (temporally conventional vessel use) Fast craft berth	2 unit of RORO berth Fast craft berth General cargo berth 320m Small vessel berth 150 m
Revetment	280 m	250 m
Total Pavement works	12,500 m2	38,000 m2
Passenger Terminal Building	500 m2	1,000 m2
Warehouse	500 m2	2,300m2
Utility Supply	Water, electricity	Water, electricity

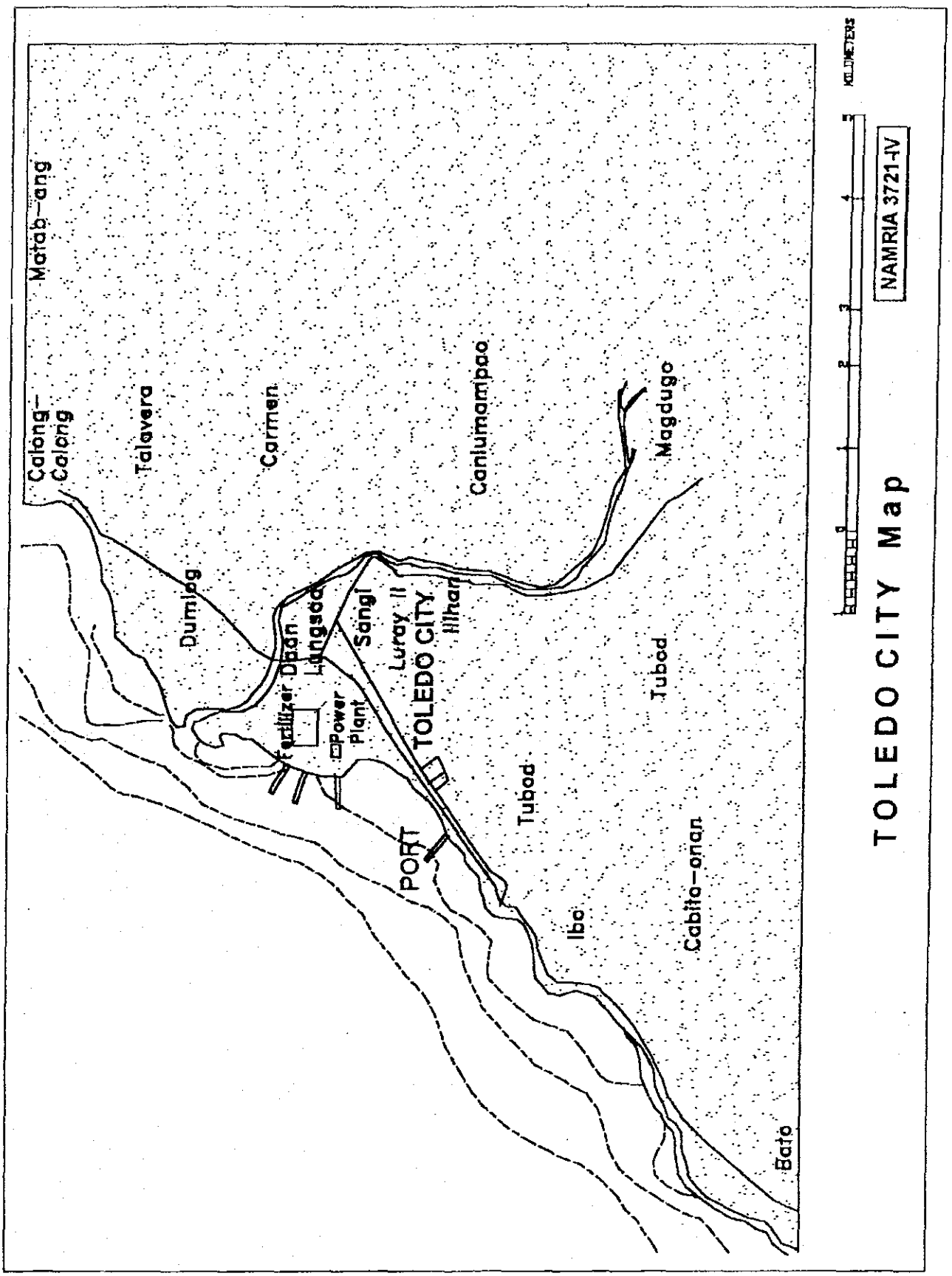

Fig. 6.5.1 Map of Toledo City

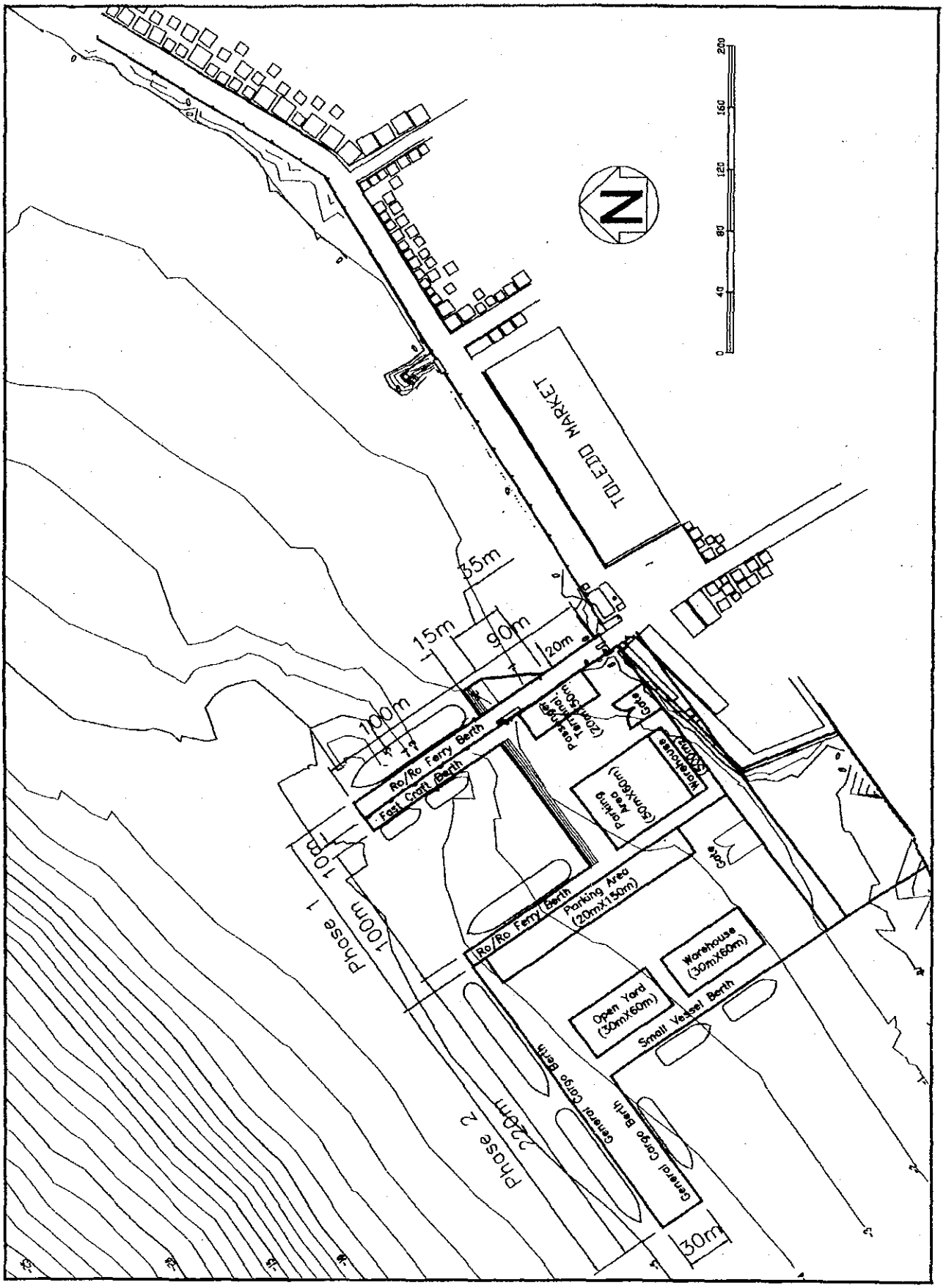

Fig. 6.5.2 Toledo Port Master Plan

6.6 Master Plan of the New San Remigio Port

6.6.1 Development Policy of the New San Remigio Port

Harbor development in the region should first consider the expansion of the existing harbor. Dredging works of about 2.5 km from the mouth of Hagnaya Bay are necessary to deepen the harbor to a depth of 4m. Since the scale of construction for the new port and the existing harbor do not greatly differ, maneuverability, accessibility, potential of future expansion and construction cost are the determining factors favoring a new port construction as part of the Master Plan.

In the Master Plan level, the construction of two berths for the fast ferry and another two berths for the ferry is necessary in order to satisfy the volume of the cargoes loaded on trucks and the number of passengers according to the demand forecast. Two piers are planned for construction. Each pier will have a fast ferry berth and a ferry berth on both sides of the pier.

6.6.2 Required Scale of Facilities

(1) Future Vessel Types

The 500-ton class ferry presently traversing the Toledo - San Carlos route is planned to be the main transportation measure while for fast ferry, the 70-passenger vessel will be used as the standard vessel.

(2) Required Scale of Facilities

A depth of 4m is required for the ferry and fast ferry wharf.

Two piers are prepared for two fast ferry and two ferryboats. Initially, one pier for a fast ferry and a ferryboat is set to operate depending on the demand.

The following areas are required within the port: 3,000 square meter area for parking space of passenger cars, buses and trucks; 600 square meter area for the waiting facilities of the departing and arriving passengers, which include the ticketing office, the ship companies offices, and management offices; 600 square meter area for the warehouse (maintenance shop, cargo depository); and 600 square meter area for cargo loading and public parking place.

6.6.3 Port Master Plan

Three alternatives are considered for the future port site: the mouth of the bay, the private development area, and the site of the existing port.

It is difficult to find a suitable area for the port on the coast—from the mouth of Hagnaya Bay to the existing Hagnaya Port. Near the mouth, a small area with a coastal length of 165m is available. Approximately 500m away from this area, the Hagnaya Bay Development Corporation, is starting a port development project and has already partially constructed a causeway. This area has enough coastal length, which could qualify as a candidate site due for Master Plan selection. The third alternative is the expansion of the existing port.

(1) Evaluation of Alternative Proposals

Three alternatives are evaluated according to factors such as maneuverability, maintenance and operation, construction cost, future expansion, environmental consideration, easiness of implementation, etc. As the result of the evaluation (see Table 6.6.1), Plan 2 is recommended as the master plan.

(2) Phasing Plan

The long-term development project is planned to be carried out separately in two phases. One pier is included in the first phase to cater to the RO/RO ferries and fast crafts, while two piers should be developed in the long-term. The north pier near the mouth of the bay should be developed in the first phase for the reduction of the initial investment of dredging cost (see Table 6.6.2).

Table 6.6.2 Phasing Plan of the New San Remigio Port

Works	Short-term (Phase 1)	Long-term (Phase 2)
Total dredging works	200,000 m3	250,000 m3
Total Reclamation works	4,000 m3	10,000 m3
Berthing Facilities	1 jetty of 60 m x 20 m Ro-Ro ramp 30 m	2 jetties of 60m x 20m Ro-Ro ramp 60 m
Revetment	45 m	60 m
Total pavement works	7,000 m2	14,000 m2
Total access road works	1,500 m	1,500 m
Passenger Terminal Building	300m2	600m2
Warehouse	300 m2	600m2
Utility Supply	Water, electricity	Water, electricity
Total land acquisition	22,000 m2	28,000 m2

Table 6.6.1 Comparison of Evaluating Items

Alternative Proposal	Plan 1: Mouth of the Bay	Plan 2: Private Development Area	Plan 3: Expansion of Existing Port
Maneuverability	X near the open seas, degree of calmness is not favorable	- Degree of calmness is a little high	O Degree of calmness is high
Maintenance and Operation	O Does not require channel maintenance		X Requires channel maintenance
Construction Cost	X Cost of construction of access road is high O Little dredging works O 490 M Peso	- Cost of access road is medium O Little dredging works O 500 M Peso	O Access road already exists X Much dredging works X 630 M Peso
Future Expansion	X Difficult	O Possible	- Not impossible
Environmental Consideration	X Resort area	O Planned area for harbor development	O Located in existing harbor
Easiness of Implementation	X Requires acquisition of site so hard discussion with locals is expected	O Acquisition and preparation of site is easy X Needs adjustment vis-à-vis the development plan which has already started	X Requires thorough discussion with the locals for the acquisition of the site
General Evaluation	XX (oooxxxxx)	OOOO (ooooox--)	X (oooxxxx-)

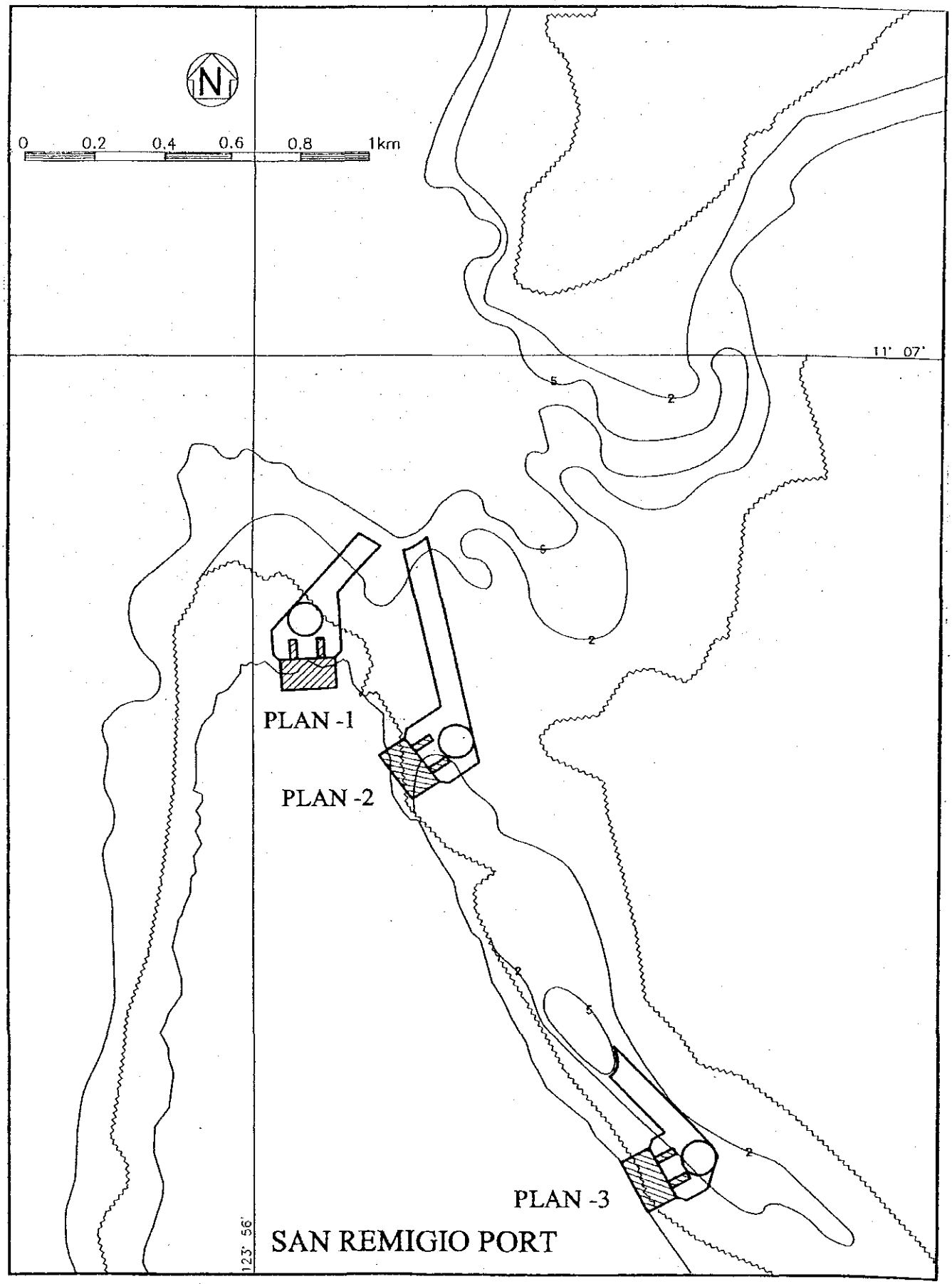

Fig. 6.6.1 Candidate Sites for the New San Remigio Port

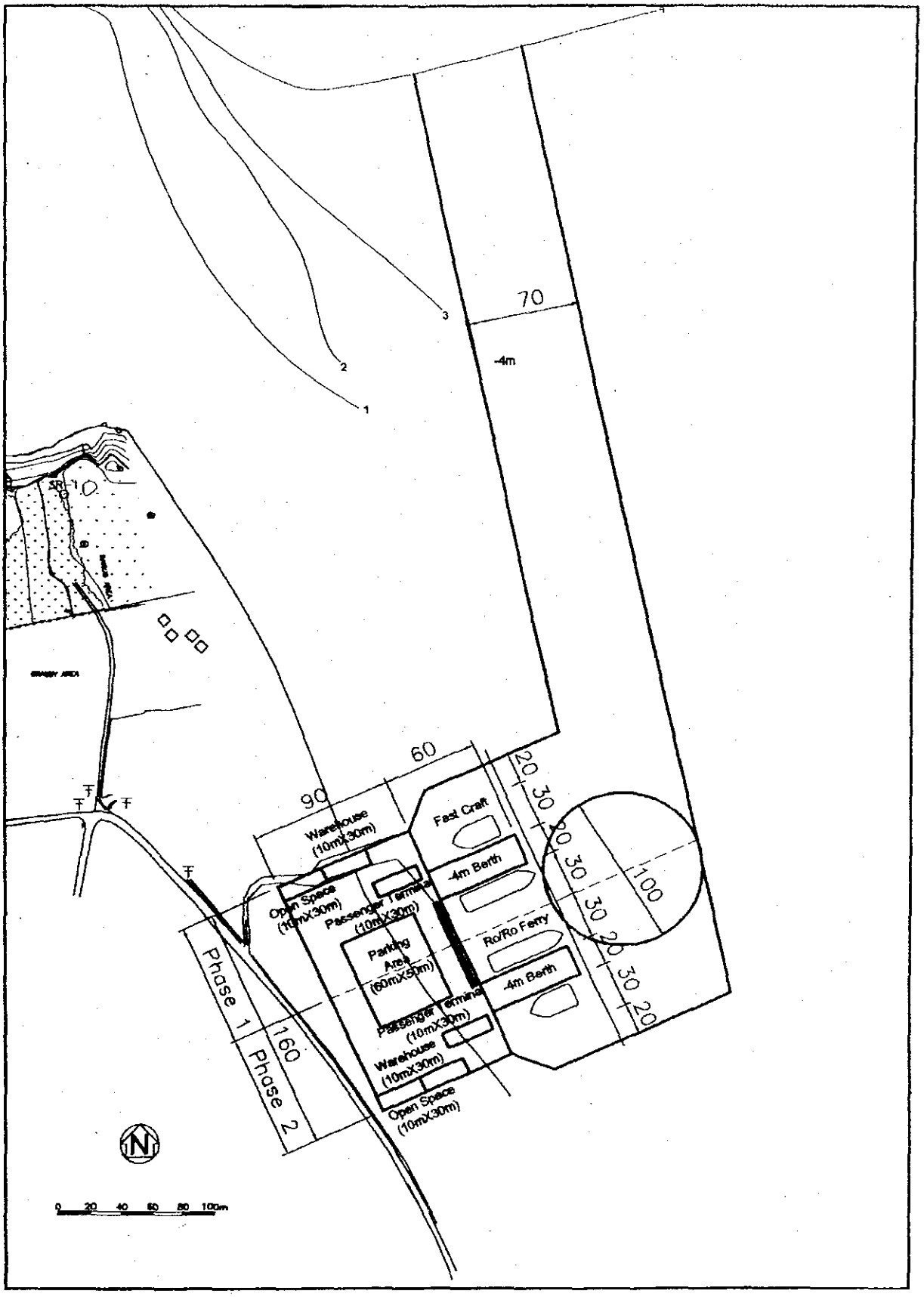

Fig. 6.6.2 Master Plan of the New San Remigio Port

6.7 Preliminary Design, Cost Estimate and Implementation Planning

6.7.1 Preliminary Engineering Design for long-term Plan

(1) Objective Vessels

The dimensions of the vessels for the project ports are summarized below.

Table 6.7.1 Objective Vessels

	Type of Vessel	DWT (GRT)	LOA (m)	Water Depth (m)
New Cebu Port	Container vessel	40,000 DWT	270	13.0
	Cargo vessel	18,000 DWT	165	10.0
Cebu Baseport	Container vessel	7,000 DWT	150	8.0
	Large RORO	18,000 GRT	195	8.0
	Middle RORO	4,000 GRT	120	6.0
	Cargo vessel	2,000 DWT	83	6.0
	Passenger cargo	500 GRT	50	4.0
	Fast craft*	500 GRT	40	3.0
	Metro bus ferry	30 GRT	—	—
Toledo Port	Cargo vessel	2,000 DWT	83	6.0
	RORO ferry	2,000 GRT	80	4.0
	Fast craft	200 GRT	30	4.0
New San Remigio Port	RORO ferry	500 GRT	50	4.0
	Fast craft	150 GRT	26	4.0

Note: * catamaran type

(2) Design Conditions of Berthing Structure

1) Crown Height

As a preliminary design of the New Cebu Port, crown height is fixed at 3.0m from MLLW. The crown height of Cebu Baseport, Toledo and the New San Remigio Port are set at the existing level of + 3.0 m from MLLW.

2) Water Depth along side the Berth

The required water depths for each berth of the project ports are as follows:

Project Ports	Berthing Facility	Required Water Depth
a. New Cebu Port	For Container Terminal	-13 m from MLLW
	For Multipurpose Berth	-10 m from MLLW
b. Cebu Baseport	Reconstruction of Pier No.1	- 6 m from MLLW

	Reconstruction of Pier No.3	- 4 m from MLLW
c. Toledo port	For Cargo Berth:	- 6 m from MLLW
	For RORO Ferry / Fast Craft	- 4 m from MLLW
d. New San Remigio port	For RORO Ferry / Fast Craft	- 4 m from MLLW

3) Loading conditions

a. Surcharge Loads

On the apron of the berths for the New Cebu Port

- Normal condition: 2.5 tf/m²
- Seismic Condition: 1.0 tf/m².

For Cebu Baseport and the Toledo and the New San Remigio Port, surcharge loads at normal conditions 1.0 tf/m² will be considered.

b. Live Loads

The container berth of the New Cebu Port is designed to support the following container cranes

- Rail Gauge : 30 m
- Overall Weight : approximately 750 tf/unit;
- Nominal rated capacity : 41 tf under spreader.

The following wheel loads are considered as the basis at the Cebu Baseport, and Piers of the Toledo and the New San Remigio ports:

- Standard Truck (H22 - 44) : 8.0 tf/wheel
- Tractor Trailer (40') : 5.8 tf/wheel

4) Tractive Force and Berthing Force

a. Mooring

For the New Cebu Port: tractive force acting on mooring bitts of 100 ton per unit will be considered with spacing at 35 m. For Cebu Baseport, Toledo port and the New San Remigio Port: the tractive force acting on mooring bitts of 15 ton per unit will be considered with spacing at 10 m.

b. Fender System

In design of the fender system, berthing speed of vessels to be adopted is as follows:

- For theNew Cebu Port: 0.15 m/sec
- For Cebu Baseport, Toledo port, New San Remigio Port: 0.30 m/sec

Maximum berthing angle is 10 degrees. The rubber fenders is installed from 10 to 15m interval. Fender frame is attached as parts of fender system.

5) Design of Pavement for Apron, Yard and Road

The pavement type depending on the required function of the New Cebu Port is selected respectively considering the critical wheel load condition. The pre-stressed concrete block slab pavement is adopted for the track of rubber transfer cranes (RTG), whose wheel loads exceed well enough 40 tf/wheel. The pavement on the Pier 1 and 3 of the Cebu Baseport is concrete. The pavement of the parking lots on the reclaimed land of the Toledo and the new San Remigio ports will be by interlocking concrete blocks.

Table 6.7.2 Design of Pavement

Area Particulars	Access / Service Road	Container Terminal Area		Stock Yard		Multipurpose Berth	
		Berth / Apron	Road way	RTG pass. Way	Stock yard	Berth/ Apron	Yard Area
Critical Wheel Load Type	Standard Truck (H20-44)	Standard Truck (H20-44)	Forklift Truck (25 tf)	RTG (40ft)	Reach stacker (4.5 tf)	Standard Truck (H20-44)	Forklift Truck (25 tf)
Critical Wheel Load (ton)	8.0	8.0	12.8	40	8.1	8.0	12.8
Pavement Type	Concrete	Concrete	Concrete	PC slab	Inter-lock block	Concrete	Concrete

PC slab: pre-stressed concrete block slab

6) Buildings

All the buildings inside the container terminal and multipurpose cargo berth of the New Cebu Port area is designed in conformity with relevant national codes and standards, Requirements of the floor area for each building are described here.

Building	Floor Area (sq.m)
CPA Office Building	5,000
Container Terminal Building	5,000
Container Freight Station	3,200
Multipurpose Berth Cargo Shed	4,200
Maintenance Shop	2,250
Power Generator House	1,000
Water Supply Reservoir	2,000

The CPA office building around 200 sq.m at Toledo and the New San Remigio Ports are planned as parts of the passenger waiting hall in total of around 600 sq.m together with the vehicles parking lots. No building is planned on Piers of Cebu Baseport.

7) Utilities

a. Water Supply

The water supply pits along the berth of the New Cebu Port will be provided to supply the water to ships. Requirement of Water Supply for the New Cebu Port Area is estimated as follows:

Requirement	Demand
1) Domestic Consumption	143 l/day
2) Ship Supply	
2 % of Full Tank for average 10,000 DWT Vessel	200 tons/call
3) Fire Fighting	200 tons/day

b. Power Supply

Electric power demand in the New Cebu Port is estimated below:

The electric power requirement of the New Cebu Port will be supplied from the Visayas Electric Cooperation (VECO) and the requirement of the Toledo and San Remigio ports is assumed to get from the National Power Corporation (NPC). It is to install a standby generator for the purpose of emergency office use in the port. The demands of power supply for the New Cebu Port is estimated as follows.

Demand Source	Design Values
Gantry Cranes per Unit	1,000 KVA (demand), 4.16 KV, 3 Φ
Reefer Container per Unit	6 KW, 440 V, 3 Φ
Lighting	230 V, 3 Φ
Others	230 V, 3 Φ
TOTAL DEMAND	15 MVA

8) Environmental Treatment Facilities

The following environmental treatment facilities are planned for the New Cebu Port area and Cebu Baseport area respectively.

- Wastewater Treatment
- Solid wastes management facilities
- Drainage/sewerage outfall facilities

CPA has not allowed any bilge water to discharge within the Cebu Baseport area. The septic tanks as sewerage facilities will be provided at each building. Drainage facilities are provided together with the pavement works. For the solid wastes management facilities, necessary number of garbage bines are provided and installed inside the port area and garbage collection companies to collect such garbage under the contract with CPA who will specified the garbage dumping site.

(3) Preliminary Design Concept of Quay wall Structure

1) Preliminary Design of Quay Wall Structure of the New Cebu Port

The berth structure is considered for multipurpose berth to handle general cargo and for exclusive container berth. The same type of berth structure is adopted for both berths by providing the continuation of longer berth utilization for berthing by number of container /cargo ships at the same time, and considering the possibility of utilization for container berth.

The SPSP type structure is considered suitable among three alternative types and adopted for the preliminary design. The steel pipe sheet pile (SPSP) of 1,200 mm Φ will be driven up to 30 m depth, which is anchored by rear steel pipe pile with tie wire at about 30 m away from the frontal piles, and the area between two piles are filled with sand and stones to make a gravity type. The SPSP gravity type structure are adjustable and flexible to the changes of soil resistance at site by broken coral and cohesive granule.

The rear container crane rail foundation piles are provided 30 m away from the seaside foundation piles separately from the anchor piles.

2) Preliminary Design of Reconstruction of Piers 1 and 3 at Cebu Baseport

a. Results by Damaged Survey of Existing Piers Structural Conditions

According to the results of damaged surveys of the existing structural conditions of piers 1 to 3, it was found that the existing concrete slab and beams and pile head connection with beams of these piers are heavily damaged particularly those along the periphery of the each pier. Some of the existing beams, pile heads, slabs of these piers are contaminated with the chlorides and sulfur contents. They are very weak and less sustainable conditions and recommended for immediate rehabilitation for further service.

b. Reconstruction of Pier No.1 for cargo ship

The pier structures No.1 will accommodate cargo ships of around 2,000 DWT. The existing pier structure should be reconstructed. The structure will be reconstructed with steel sheet piles to be driven along side of the existing pier and filled reclamation material inside of the surrounded sheet piles area after demolishing the slab and beams.

The existing concrete piles at the central parts of pier will be used for supporting the newly constructed upper structures.

Alternatively concrete blocks type of berth structure was studied by installing such blocks along the periphery of the pier with soil improvement of the existing seabed soil. The existing concrete piles in the central parts of the pier are used to support the newly constructed slab and beams.

c. Pier No.3 reconstruction for passenger ships

The pier No.3 will be used for small passenger ships due to shallower depth, the existing upper structure of the pier will be demolished and new upper structure is reconstructed on the existing concrete piles in similar manner as rehabilitation works of Pier No.2. Some of the concrete piles along the periphery of the pier No.3 are damaged and they should be repaired.

3) Preliminary design of berthing facility of Toledo Port

The berth structure for 2,000 GRT (LOA=80m, D=3.0m) class RORO ferry is designed for the water depth of -6.0m along side the berth by using the SSP of Type IV (400 mm x 150 mm x 13 mm) to be driven to - 15 m and anchor piles (H shape piles) will be driven to - 11 m at 10 m interval to function as the retaining wall of land reclamation and berthing facilities.

The berthing facilities for fast passenger ships of 200GRT (LOA= 30m, D = 3.0m) is designed by using the concrete square piles of 40 cm x 40 cm to be driven in 4 m interval to around -20 m for supporting concrete deck

4) Preliminary Design of the New San Remigio Port

There are two sites considered for a new port development. One site is adjacent to the resort area of the Warren beach with shallow depth and sandy coral sea bed soil. The other is adjacent to the ice plant jetty located inside the Hagnaya Bay with shallow and silty clay sea bed soil. It is alternatively also considered to expand the existing Hagnaya port facility by dredging the approach channel to depth of - 4.0 m. From the cost and environmental considerations, the New San Remigio Port will be developed at the ice plant area. The berth structure is designed for water depth of - 4.0 m along side the berth with the pre-cast concrete piles (40 cm x 40 cm) supporting concrete deck, which is the same type of the existing jetty at the Hagnaya port. The vertical piles of berthing structure will be driven up to - 15.0 m in 4 m interval.

(4) Preliminary Design Concept of Access Road Way Structure

The access road is required to connect between the existing national road of Mandaue to Liloan and the planned the New Cebu Port area. The preliminary design concept of the access road is described as follows.

1) Number of Required Traffic Lanes

Design traffic volumes inside the New Cebu Port area and access road for the long-term plan of 2020 are estimated at 983 car/hr: 4 lanes are required year 2020 traffic. The width of a traffic lane which is 3.25 m to 3.5 m with two lanes on one way side are planned. In year 2010 the estimated design traffic volume is 392 car/hr, 2 lanes will be enough but the area of 4 lanes will be reserved.

2) Planning the Access Road Alignment Outside of the Port Area
Basically the access road alignment is selected by minimizing the interference of the existing houses, factories, dormitories and its related facilities and no cutting of plants existing on the coastal area. The following alternative access road routes are considered on the landside:

- Widening the existing road,
- Constructing a new road on the ground and partially fly over,
- Constructing a new road with overhead type over the resident, factories area and offshore

The road alignment is planned to have maximum gradient of 4 % for safety running of 80 km/hr by 40 ft container trucks. The new access road alignment is planned with the flyover type from the port area up to the hill, then the road is developed by cutting high hilly parts of the existing ground. The planned access road length is around 1,800 m including the approach embankment to the existing national road.

3) The Design concept of Bridge Pier, Beams and Foundation
The PC concrete piles (Φ 40 cm, 20 to 15 m long) to be driven to - 20 m at sea area and -15m on the land side will be used for column foundation of pier.

The footing foundation (6 m x 13 5 m supported by 36 piles for the short term plan) will be constructed every 30 - 40 m interval starting from the newly reclaimed area for the New Cebu Port island. Interchange with the existing national road is planned by combination of approach embankment of around 75 m long and flyover of 150 to 160 m long.

6.7.2 Preliminary Cost Estimation

The cost estimate is prepared using the market price of June 2001 and based on the cargo volume, terminal facilities and equipment and operational schemes prepared for the long term development plan is presented in the previous chapters.

(1) Capital Cost for the Proposed Plans

The estimated capital cost for the development of the New Cebu Port will be 17.9 billion pesos (or equivalent to 42.6 billion yen) and Cebu Baseport, the New San Remigio and Toledo Port will be approximately 3.6, 0.5 and 1.0 billion pesos (8.6, 1.2 and 2.3 billion yen) respectively. The local currency component for each port development will be 30 %, 37 %, 38 % and 35 %. Those estimated costs include construction of civil and buildings facilities such as dredging, reclamation, berth and pavement, procurement of equipment, land acquisition, engineering service, contingency and VAT. The summary of capital cost for the proposed plans are shown in Table 6.7.3.

Table 6.7.3 Summary of Capital Cost (million Pesos)

Description	New Cebu Port	Cebu Baseport	Toledo Port	New San Remigio Port
Construction	8,376.3	2,762.1	632.2	328.6
Equipment	5,565.5	-	115.0	49.3
Other (land, compensation, etc)	95.1	-	-	9.4
Subtotal	**14,302.3**	**2,762.1**	**747.2**	**387.2**
Engineering Cost	962.8	193.3	52.3	26.4
Contingency (10%)	1,481.2	295.5	79.9	41.4
VAT (10%)	1,664.3	325.1	87.9	45.5
Total	**17,922.1**	**3,576.1**	**967.3**	**500.6**

In this cost estimate, the average exchange rate of June 2001 is used:

US$ 1.00 = 52.5 Pesos = 125 Yen, 1 Peso = 2.38 Yen

(2) Cost Comparison of the Alternative Layout

The capital cost of the alternative layouts for each port is also estimated. The differences among the alternatives are so small that the cost may have little impact on comparison of the alternatives. The summary is shown in Table 6.7.4.

Table 6.7.4 Cost Comparison of Alternative Layout Plans (million Pesos)

Port	Plan 1	Plan 2	Plan 3
New Cebu Port	18,200	17,900	-
Toledo Port	970	940	960
San Remigio Port	490	500	630

Note: VAT is included. Underlined figures signify recommended plans.

6.7.3 Implementation Plan

On the assumption that the project will be started immediately after this study, an implementation plan of the master plan is prepared. The total project length period for the New Cebu Port is 8 years including project preparation, 36 month construction and 12 month maintenance monitoring. The port will be operational in the beginning of 2009. Phase 2 project will be required to start soon after the completion of the Phase 1 and will be partially operational in 2013 and completed in 2014. Phase 1 construction of Toledo port and new San Remigio port will be completed in 2007 and 2006. Rehabilitation works of Cebu Baseport will be carried out berth by berth and continue until 2017. The bar chart of master plan is shown in Fig. 6.7.1.

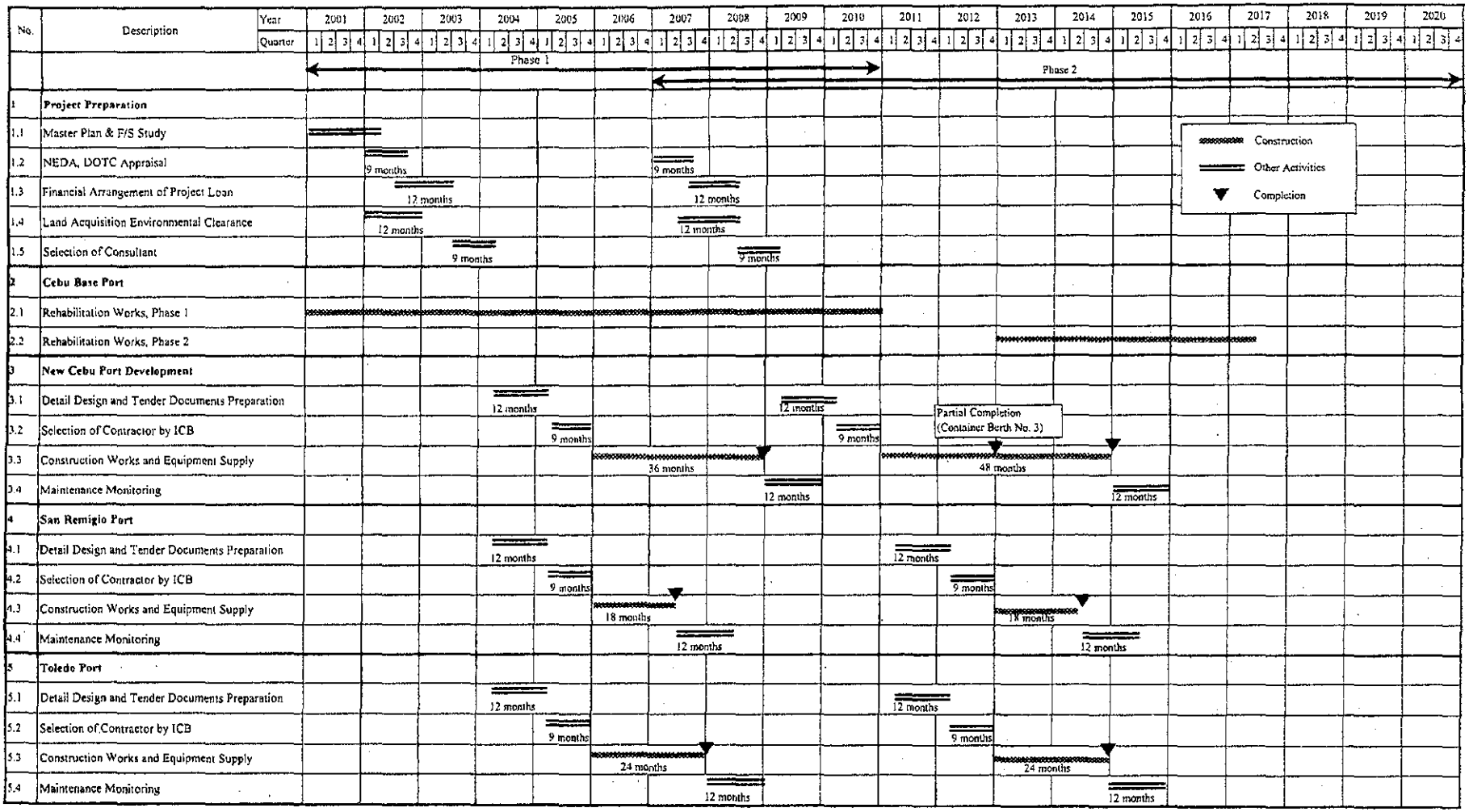

Fig. 6.7.1 Master Schedule

6.8 Preliminary Investment plans

6.8.1 Private Sector Participation

(1) Contract of Private Sector Participation

1) Publication of Invitation of Bidder
A notice inviting all prospective infrastructure or development projects proponents to pre-qualify and bid for the projects so approved, is published in newspapers.

2) Examination of Pre-qualification
To pre-qualify, a project proponent must comply with the following requirements.
The projects proponent and the facility operator must be a Filipino or, if a corporation, must be duly registered with the Securities and Exchange Commission (SEC) and owned up to at least sixty percent (60%) by Filipinos.

3) Bid
The bids shall consist of a technical proposal and followed by a financial proposal.

4) Feature of BOT Law
The government's policy is to promote greater private sector participation in port projects. To secure fairness and neutrality in carrying out such projects, the BOT Law including the detailed rules should be adhered to strictly.

(2) Purposes for Private Sector Participation

1) General Explanation
PSP shall be promoted for the following reasons.
①To increase capacity of port facilities. ② To relieve government from high investment burden. ③To introduce higher standards of efficiency through fair competition. ④ To provide high quality of service with cheaper price to users. ⑤ To transfer technology and know-how. ⑥ To facilitate fast-track implementation.

2) Optimization of PSP
The market in Philippines must be in a state of sound competition in order to optimize these merits brought by PSP. Without a mature market and enough demand for working fields, it will be difficult to succeed in PSP. Therefore, the government needs to consider the following ,①To create an environment which fosters competition among private entities. ② To distinguish between working fields suitable and unsuitable for PSP.

3) Issues of PSP
Some potential problems can be pointed out as follows ;

①Unlimited PSP tends to ignore public interests including environmental consideration and living conditions of the people. ② Competition sometimes result in monopolization by strong private sector, which leads to inefficient operation and high-costs of service. ③ As a result, there is always a danger that some private companies go bankrupt. ④ Excessive competition often leads to lower service level and discriminatory treatment. ⑤ PSP often forces the government to streamline and restructure their organizations. This sometimes leads to labor issues.

4) Necessity of Moderate and Appropriate Control by Government

More careful attention should be paid to the negative aspects. In this sense, moderate and appropriate control by the government is recommended. When "competitive theory " works well, too much involvement by the government often discourages the private sector from participating in projects. Therefore, it is necessary for government to balance both requirements.

5) Risk of private sector participation

Private sector participation has various risks. ① Political Risk ② Construction Risk ③ Operation Risk ④ Commercial Risk.

6) Possibility of PSP at the New Cebu Port

Container traffic at the New Cebu Port is forecast to be high. Efficient management will be required to obtain the maximum benefit. It is necessary to consider the following in selecting a management system. CPA should adopt a lease system.

6.8.2 Preliminary Investment Plans

The composition of the investment sectors is one of the important issues in port investment plans. Another main issue is financial source and its condition. The priority of the projects and phasing plan should be taken into account for the investment plans.

The preliminary plans for investment sector for each port development are as follows.

(1) The New Cebu Port

Public Sector: infrastructure including gantry cranes
Private Sector: cargo handling equipment and buildings

(2) Cebu Baseport

Public Sector Renovation of port facilities
Private Sector: Passenger terminal and the expansion of back-up area for RORO ferries at the private land in Port Zone.

(3) Toledo Port and the New San Remigio Port

Public Sector: All port facilities except cargo handling equipment
Private Sector Cargo handling equipment

(4) Total Investment by Sector

Table. 6.8.1 Total Investment by sector Unit: million pesos

	The New Cebu Port	Cebu Baseport	Toledo Port	The New San Remigio Port
Public Sector	13,347	2,175	758	397
Private Sector	3,019	1,075	135	58
Total	16,366	3,250	893	455

6.9 Basic Strategy for Improvement of Port Management and Operation

6.9.1 Port Management

(1) Formulation and Authorization System of Port Master Plan

1) Significance of the Port Master Plan
Planning for port development in particular is absolutely essential because of its unique nature as ① Systematic provision of light quantity of facilities is , therefore, the most important requirement for reasonable realization of a port development project. ② Ports have close relation to the regional, national and international economic activities. In this respect, it is essential that port services be offered under careful planning so that they can support these activities and generate overall prosperity. ③ The systematic development of such facilities can not be realized under the absence of a comprehensive port plan. ④ Port planning process is indispensable in exchanging views and opinions with these parties so that their opinions can fairly be reflected and incorporated in the port development plan.

2) Basic Nature of a port Master Plan
Port plan which considers not only immediate demand but also the most likely long-term scenario should be established and made public. The port can then be developed efficiently according to such a plan.

3) Function of Port Master Plan
Port must contribute not only to regional growth but also to national economic growth. For systematic port development and proper management, it is very important to coordinate with other policies such as land use plans in surrounding areas.

Port Master Plan is to be the framework for realizing the idea port condition. Establishment of

an adequate port master plan might attract various related facilities and facilitate cooperation with other parties.

4) Objectives of Port Master Plan

The objectives of the port master plan are ① To be guideline of long-term investment and operational improvement scheme for the target port. ② To be a base for short-term development plan. ③ To provide port users, investors and other business entities concerned with future prospect of business environment.

5) Applicability and Practicability

In order to secure applicability and practicability of the port master plan, the following requirements of its functional position should be considered by CPA.

① Time span of the plan should correspond to other long-term national or regional economic development plans.
② The plan should be flexible enough to adjust to possible future contingencies.
③ The plan should be vested with a certain legal power or be authorized by the government to promote its development scheme.
④ Easy access to the contents of the plan should be secured for the interested parties concerned.

(2) Policy on Port Statistics

Port statistics should be edited in a unified style so that they can be easily accessed and understood by all of the nation and concerned parties.

Port statistics should comprehensively involve all ports including private ports based on laws and regulation. In addition, it should clarify at least the trend of cargo volume by lot and origin/destination of each kind of commodity and cargo type, as well as number of calling vessels, number of passenger and situation of basin, warehouse and stock yard, etc. and if possible, port statistics should be integrated with statistics system of land transportation that is closely related to the port activities and be compatible to with international statistics system.

(3) Container Terminal Utilization at the New Cebu Port

There are three types of terminal utilization; "Public use", "Commercial use" "Private use". Because the New Cebu Port is not used by only one shipping company, by plural shipping companies. CPA should secure high efficiency, keep public use. Since stevedoring company demonstrates a lot of advanced know-how, high efficiency can be secured. Moreover, as Commercial Berth does not limit one shipping company, there is a possibility of development. It is recommended that CPA should set up Commercial Berth.

(4) Container Terminal Development Scheme at the New Cebu Port

(Case-1) CPA provides all facilities. Terminal management and operation is conducted by Private Sector. Basic berth allocation is Open use system.
(Case-2) CPA provides all facilities. Terminal management and operation is conducted by Private Sector. Basic berth allocation is Commercial use system. Terminal facilities and superstructure are leased to Private Sector by CPA.
(Case-3) CPA provides infrastructure and quay side gantry crane while Private Sector provides superstructure. Terminal management and operation is conducted by. Basic berth allocation is Commercial use system.
(Case-4) CPA provides infrastructure and quay side gantry crane while Private Sector provides superstructure. Terminal management and operation is conducted by Private Sector. Private use system is adopted when strongly requested by shipping companies.
(Case-5) Private Sector provides superstructure and infrastructure. Terminal management and operation is conducted by Private Sector. Basic berth allocation is Commercial use system.
(Case-6) Private Sector provides superstructure and infrastructure. Terminal management and operation is conducted by Private Sector. Private use system is adopted when strongly requested by shipping companies.

An evaluation of above cases is made as follows.

- In case 1 and 2, CPA can improve facilities and equipment easily in case of need of development. But CPA bears all investment costs by itself which involves a substantial risk.
- From the viewpoint of lessening the CPA's financial burden, case 5 or 6 is favorable for the CPA. But in these cases, the Private Sector must make a large investment which involves a substantial risk. Furthermore in case 6, the Private Sector would own the land although a port is public asset.
- For efficient utilization of berths, Commercial use system should be adopted as a basic scheme. A large shipping company may request to use a terminal exclusively to maximize efficiency. And small shipping companies can also use the terminals. When CPA enters a contract with private sectors, it should contain a provision to ensure the berth is public use.
- From the viewpoint of efficient use of port facilities and equipment, plural operators should be considered. In this system shipping companies can use their preferred terminal operators. And since competition is generated, efficiency is increased.
- Considering above mentioned points, case 3 is considered to be preferable.

(4) Port Development and Management

Plural operators including container and multi purpose terminals are assumed to be Private

Operators because it is generally agreed that efficiency is increased by generating competition. Multi purpose terminal caters for the needs of the region. Multi purpose terminal is generally difficult to make profitable. Therefore, to support region development, CPA should develop necessary infrastructure with the Private Sector should operate the facilities.

Port development and management scheme of container terminal and multi purpose terminal is shown Table. 6.9.1.

Table 6.9.1 Port Development and Management Scheme

		Construction Procurement	Maintenance	Management	Operation
Container Terminal	Infrastructure	CPA	CPA	Private Sector	Private Sector
	Superstructure	CPA	CPA		
	Cargo Handling Equipment	Private Sector	Private Sector		
Multi purpose Terminal	Infrastructure	CPA	CPA	CPA or Private Sector	CPA or Private Sector
	Superstructure	CPA	CPA		
	Cargo Handling Equipment	Private Sector	Private Sector		

6.9.2 Port Operation

CPA has seven important issues to take action in port operation.

1) Avoiding direct cargo loading and discharging to/from the trucks
2) Monitoring performance of port operation
3) Improving the safe handling system of dangerous cargoes (establishment of dangerous cargo storage areas and fire fighting system)
4) Developing and monitoring port industry
   - Development of NVOCC
   - As to import industries, re-packing and marking commodities
   - As to export industries, construction of temperature controlled facilities for disposition of cargoes of fresh vegetables and fruits
   - Construction of large logistic center (warehouse)
5) Separating passenger movement from cargo handling
6) Improving navigation control system
7) Establishing ballast and bilge water treatment system

6.9.3 Information System

(1) Computerization Program

Since the port facilities are ordinarily common use by private companies, such as shipping lines (or their agents), customs brokers, and so forth, it is important to establish a system for processing data necessary for port administration and management of the facilities for proper utilization, collecting charges and fees from user companies, port statistics, and so on. An example of the steps to improve the computerization is as follows.

Phase – 1: Computers are firstly used for the following purposes.
- To keep records of use of the port facilities (processing in batches system).
- To keep tracks of collection of charge and fee for the facilities.
- To make and analyze statistics.

Phase – 2: Computers are secondly used for the following purposes.
- To allocate the port facilities in advance, such as mooring berths, warehouses, open yards where cargoes are to be carried in and so forth
- To simplify the procedures to be conducted before and after the use of facilities
- To keep and make sure of the actual use of facilities without delay.
- To make arrangement for collection of charges without delay.

Phase – 3: Computers are used at the final stage for the following purposes.
- To establish an on-line network of computers connecting each PMO office located in the port area to make the following matters possible.
- To keep tracks of and ensure the actual use of facilities in real time.
- To process clerical work in real time.
- To manage collection of charge in real time (when necessary)

This type of computer system is essential for efficient port administration and management..

(2) EDI

A review of the global development in EDI suggests that while the EDI global user base is still relatively small, the pace of international progress and EDI adoption is growing very quickly. There is a growing need for East-South Asia countries to keep pace with those developments in order to maintain a competitive position in the international trade scene.

6.9.4 Port Promotion

As the regional development of Central Visayas goes on, a need for an international port, especially a container port, will become greater. At present majority of international container

cargoes to the region are transported through the Port of Manila by larger Ro/Ro ferries.

The main aim of the marketing and promotion of Cebu Port is to establish Cebu Port as the major port in Central Visayas Region. Sales points, if employed properly, can become the nucleus of a marketing strategy. Port users, which are main target of the port promotion, are as follows.

- Shippers / consignees
- Shipping Company / Agent
- Container operator
- Forwarding Agent
- NVOCC etc

The following measures are recommended for the port promotion.

- Preparing Port Brochure (Hand Book)
- Preparing Video or Compact Disk
- Building Home Page (Web-site)
- Setting up Port Sales Office (Abroad)
- Holding Port Promotion Tour
- Advertising on Newspapers / Magazines