5.5 AIRPORT DEVELOPMENT MASTER PLAN

5.5.1 General

Master planning for development of Bacolod Airport was conducted in the First Study Work in Japan. This master plan was prepared based on a set of air traffic demand forecasts and future facility requirements described in Chapters 3 and 4 respectively. Target years of the master planning are;

a) Medium Term Development : Year 2005, and

b) Long Term Development : Year 2015.

As a first step of the master planning study, two alternative development plans of Bacolod Airport, i.e. development of the existing airport and a new airport at the alternative site selected in Section 5.4, were prepared. Then, planning of airspace use, cost estimates, initial environmental evaluation, economic analysis and financial analysis of each alternative development plan were conducted. Finally two alternative development plans were comparatively evaluated to select an optimum development plan for Bacolod Airport.

This section summarizes the results of the master planning under the following headings.

a) Alternative Airport Development Plans

b) Planning of Airspace Use

c) Cost Estimates

d) Initial Environmental Evaluation

e) Economic Analysis

f) Financial Analysis

g) Comparison of Alternative Airport Development Plans

h) Conclusion

5.5.2 Alternative Airport Development Plans

1) Constraints and Policy of Planning

As mentioned in the previous section, the existing Bacolod Airport is located between the seashore and National Road No. 1. Furthermore, airport surrounding areas have already been urbanized densely. These factors will make the airport development at the existing site costly (but still possible).

It is assumed that the following ongoing projects at the existing airport will be completed before

the Medium Term Development.

a) widening of the runway to 45m,
b) installation of ILS on Runway 22,
c) construction of perimeter fence around the existing airport property,
d) installation/replacement of PC/fax machine, VSAT, D-VOR/DME including their shelter and site preparation.

The following policies are applied to planning of the Bacolod Airport development.

a) The airside facilities should comply with international standards.
b) The landside facilities including terminal buildings should be developed to cope with local needs.
c) The existing facilities should be used effectively to optimize the cost of the existing airport development.
d) The existing airport boundary and magnitude of relocation of houses should be considered in facility layout planning of the existing airport development.

2) Formulation of Development Alternatives

Major alternatives for development of Bacolod Airport are;

a) Alternative BE: develop the existing airport up to 2015;
b) Alternative BN: develop the new airport for 2005, then expand it.

Theoretically, there is an alternative to develop the existing airport in the Medium Term then move to the new site after 2005. This alternative is, however, considered impractical, because the major investment is required in the Medium Term Development and the scale of works of the Long Term Development is small. Therefore it is not included in this comparison study.

3) Alternative BE

(1) Runway

The existing runway will require strengthening of the pavement to cope with heavier aircraft such as A320 and A300. Required thickness of asphalt overlay would be about 19cm (refer to Appendix 5.5.1 for details).

At present vehicles on National Road No. 1 are the obstacle for the approach and transitional surfaces. In order to maintain at least 4.8m clear height above the road, the road should not be located within about 110m from the runway center line (based on 150m wide runway strip) and

about 250m from the 22 end of runway strip. To solve this, either diversion of the national road or relocation of the runway threshold is necessary.

In the case of road diversion (Alternative BEa), 550m section of the national road needs to be diverted. (refer to Figure 5.5.1) In the case of runway relocation (Alternative BEb), the Runway 22 threshold will be relocated 500m, and the runway will be extended by 450m towards the southwest to maintain about 2,000m long runway.

Estimated costs of Alternatives BEa and BEb are as follows.

Item	Alternative BEa	Alternative BEb
Land Acquisition	83	0
Compensation	185	0
Land Reclamation	0	215
Runway Overlay	87	64
Runway Extension	0	28
Road and Bridge	21	0
Total	PHP 376 million	PHP 307 million

Advantages of the two alternatives are as follows:

Advantages of Alternative BEa :

a) Less impacts on natural environment because of no runway extension in the sea.

Advantages of Alternative BEb :

a) Less social impacts by relocation of inhabitants.
b) Good alignment of the National Road can be maintained.
c) Easier to install SALS and LLZ at Runway 22.
d) Most of the cost is used for creation of a new land.

As Alternative BEb is economical and has more advantages over Alternative BEa, it is recommended to adopt Alternative BEb : Relocation of Runway Threshold.

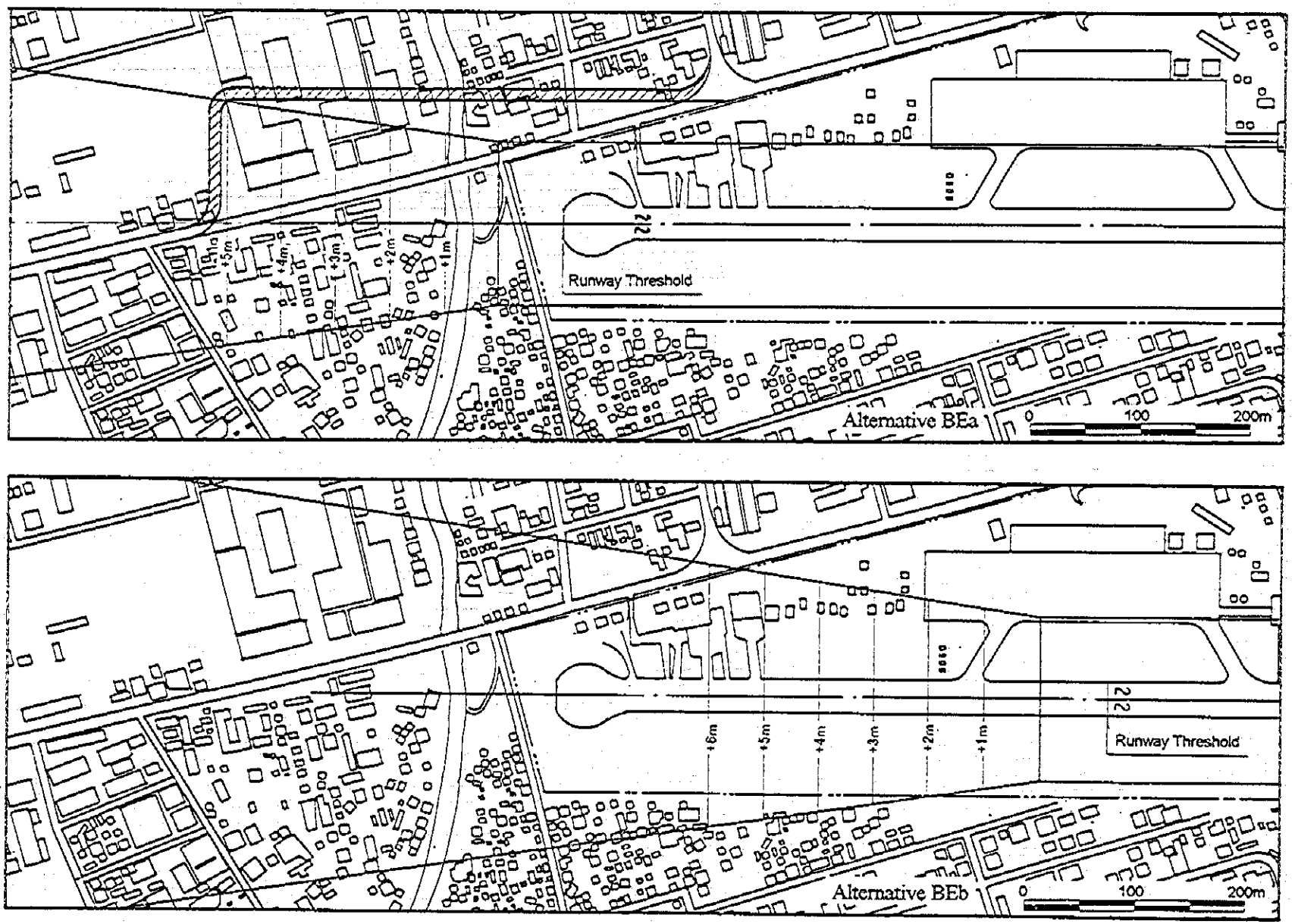


Figure 5.5.1 Alternatives to Provide Enough Clear Height over the National Road

(2) Runway Strip

Figure 5.5.2 shows the runway strips of 150m and 300m wide. As seen, the 300m wide runway strip will require much larger land acquisition and relocation of houses than the case of 150m runway strip (additional 15ha and about 390 houses). In addition, if the 300m wide runway strip is adopted, nearest point of National Road No. 1 under the approach surface will become closer to the threshold than in the case of 150m wide runway strip. To maintain the clearance over the road Runway 22 threshold needs to be replaced 350m more, and the length of the runway extension will be increased by 350m. Therefore, it is considered impractical to widen the runway strip to 300m at the existing site of Bacolod Airport.

(3) Air Navigation Systems

Locations of ILS glide path (GP) and localizer (LLZ) antennas and their critical areas are planned as shown in Figure 5.5.3. Location of Doppler VOR and DME are planned at about 480m from the Runway 22 threshold on the extended center line of the runway so that straight in approaches can be established for both runways.

(4) Aircraft Parking Configuration

A nose-in / push-out aircraft parking configuration, which normally associates with passenger loading bridges, is assumed for the following reasons.

a) Passenger loading bridges will improve safety on the apron, minimize the turnaround time and provide better passenger service.

b) A nose-in parking configuration requires wider separation distance between runway and terminal building than a self-maneuvering angled or parallel parking configuration. Therefore, it is not easy to adopt nose-in parking configuration at a terminal which is designed for angled or parallel parking.

Typical separation distance between the runway center line and passenger terminal building is set at 275m so that the tail wing of A300 does not infringe the transitional surface from the 150m wide runway strip.

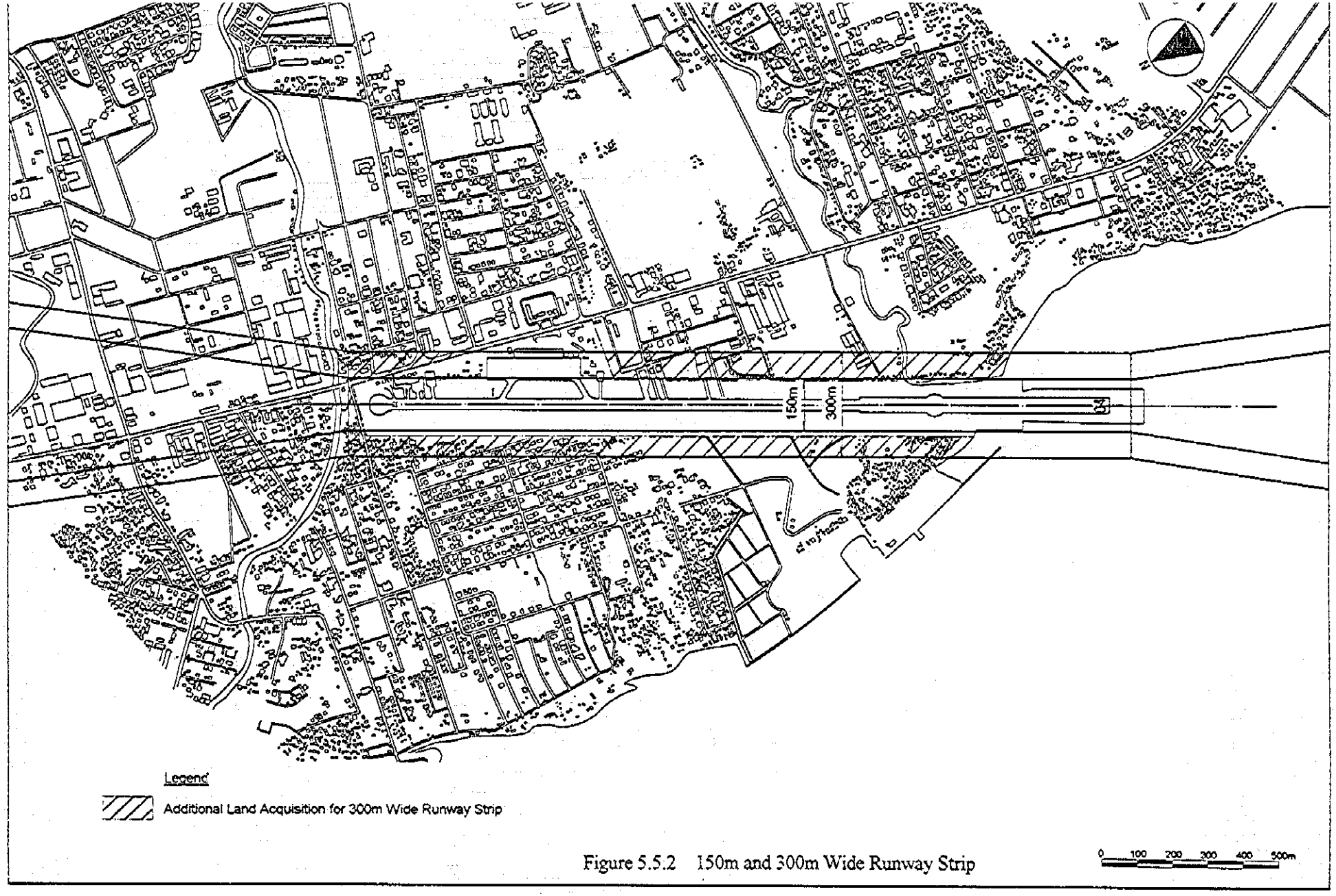
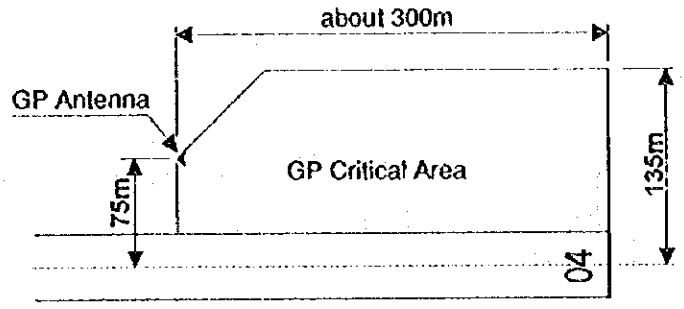
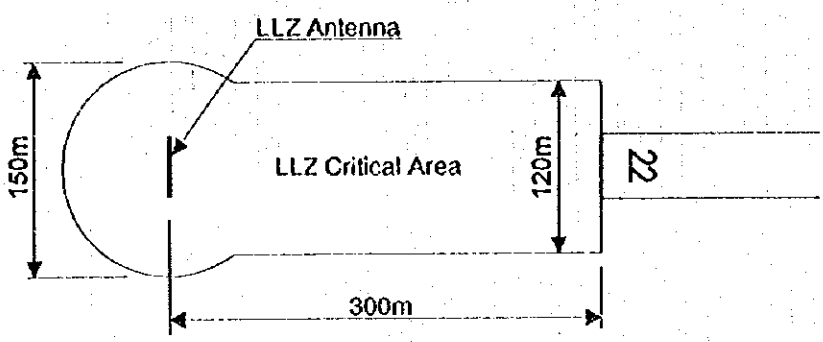


Figure 5.5.2 150m and 300m Wide Runway Strip



Glide Path Antenna and Critical Area



Localizer Antenna and Critical Area

Figure 5.5.3 Proposed Locations of Air Navigation Systems - Existing Bacolod Airport

(5) Location of Terminal Area

As the existing apron is too close from the runway, B737 class aircraft on the apron infringe the transitional surface from the 150m wide runway strip. Therefore, new terminal area needs to be developed. Possible locations of the new terminal are (refer to Figure 5.5.4);

a) Alternative BE1: to the south of the existing terminal area; and

b) Alternative BE2: on the west side of the runway.

In the both alternatives, the existing apron will be used for general aviation, and the existing passenger terminal building will be leased to general aviation operators.

As a result of comparison of the two alternative terminal locations, Alternative BE1 is recommended for the new terminal site for the following reasons:

a) Terminal location of Alternative BE1 faces to the National Road No. 1, and is convenient for airport access.

b) Alternative BE2 will require a new access road through subdivisions on the west of the airport. There will be environmental impacts along the new access road due to the heavy vehicular traffic to/from the airport.

c) Site acquisition of Alternative BE2 will be not economical since the area has been newly developed as "Palmas Del Mar Village & Beach Club".

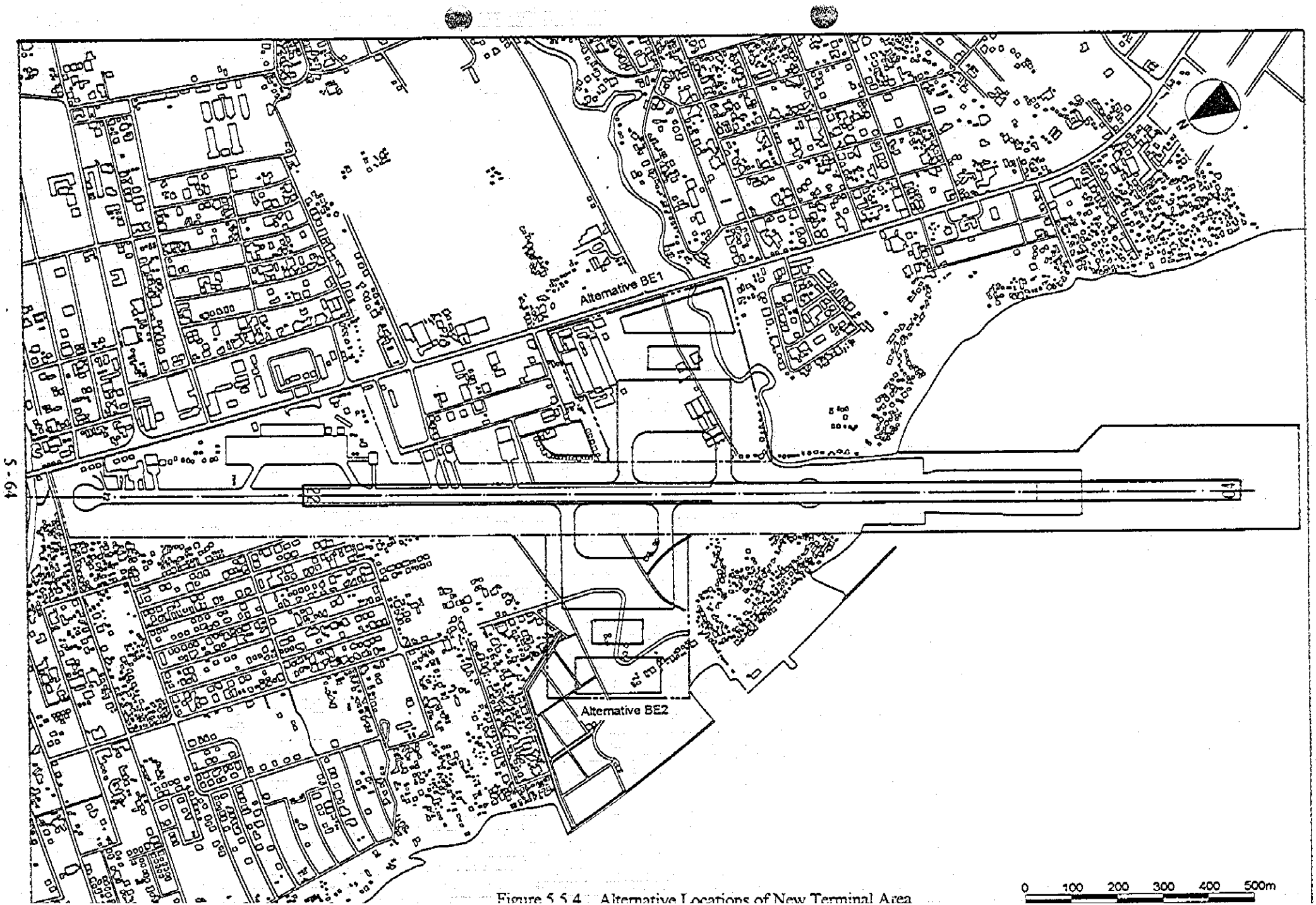


Figure 5.5.4 Alternative Locations of New Terminal Area

(6) Overall Scheme of Alternative BE

Figure 5.5.5 shows the airport facility layout of Alternative BE, and Table 5.5.1 shows the outline of the development works.

Table 5.5.1 Outline of Existing Bacolod Airport Development

Item	Medium Term	Long Term
Shore Protection Wall	2,130 m	-
Earthworks	Cut 10,000 m^3, Fill 1,390,000 m^3	-
Runway	Asphalt overlay 19 cm, Extension 440 m	-
Taxiway	New taxiway 7,000 m^2	-
Apron	New apron 27,000 m^2	-
Passenger Terminal Building	New building 6,300 m^2	Expansion 2,000 m^2
Cargo Terminal Building	New building 1,560 m^2	Expansion 680 m^2
Administration Building	New building 1,800 m^2	-
Control Tower	New building	-
Fire Station	New building 550 m^2	-
Car Park	New car park 11,200 m^2	Expansion 2,550 m^2
Roads	5.6 km	-
Air Navigation Systems	D-VOR/DME, ILS Cat I, PALS, SALS, etc.	-
Fuel Supply Facility	New facility 400 kl	Expansion 200 kl
Obstacle Removal	Fire Station, etc.	-
Land Acquisition	36 ha	-
Diversion / Relocation	78 houses, Creak 0.7 km	-

Figure 5.5.5 Facility Layout Plan of Existing Bacolod Airport (Alternative BE)

4) Alternative BN

Facility layout of the new airport at Site 3 is studied and the following sections outline the major considerations made in the planning.

(1) Runway

Although the new airport site was studied assuming a 2,500m long runway in the future, a 2,000m long runway is planned based on the facility requirements established in Chapter 4. Location of the runway is almost same as planned in Section 5.4. It is planned to construct the southern 2,000m part of the runway so as to avoid relocation of PALS and GP in the future.

(2) Runway Strip

It is planned to provide a 300m wide runway strip based on the facility requirements.

(3) Air Navigation Systems

Locations of GP and LLZ antennas and their critical areas are planned as shown in Figure 5.5.6. Location of Doppler VOR and DME is planned in front of the terminal area opposite side of the runway so that straight in approaches can be established for both runways.

(4) Aircraft Parking Configuration

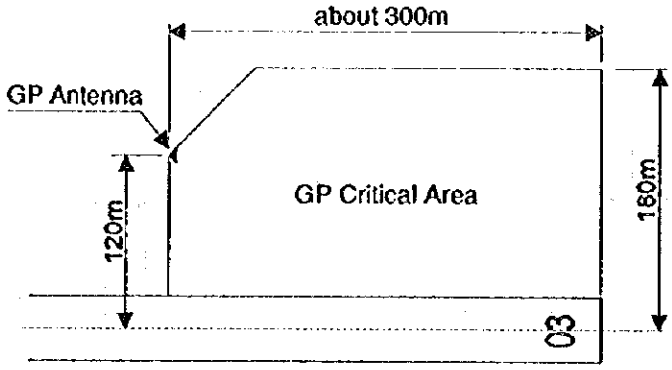
A nose-in / push-out aircraft parking configuration, which normally associates with passenger loading bridges, is assumed. Typical separation distance between the runway center line and passenger terminal building is set at 350m so that the tail wing of A300 does not infringe the transitional surface from the 300m wide runway strip.

(5) Location of Terminal Area

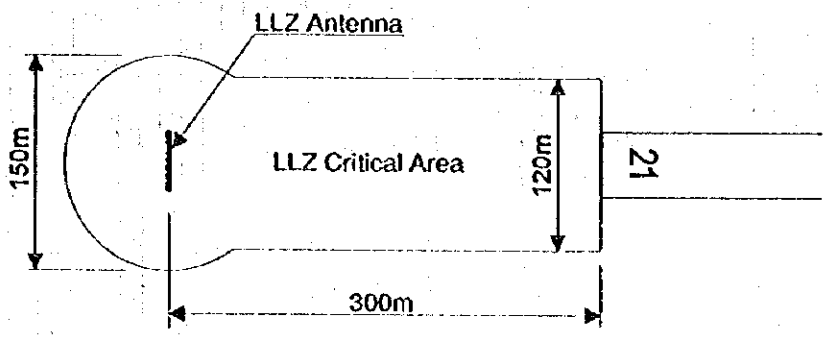
The terminal area is planned on the west side of the runway (closer to Silay City) and between 500 to 1,000m north of the Runway 03 threshold, where the existing provincial road runs.

(6) Overall Scheme of Alternative BN

Figure 5.5.7 shows airport facility layout at the new airport site.



Glide Path Antenna and Critical Area



Localizer Antenna and Critical Area

Figure 5.5.6 Proposed Locations of Air Navigation Systems - New Airport

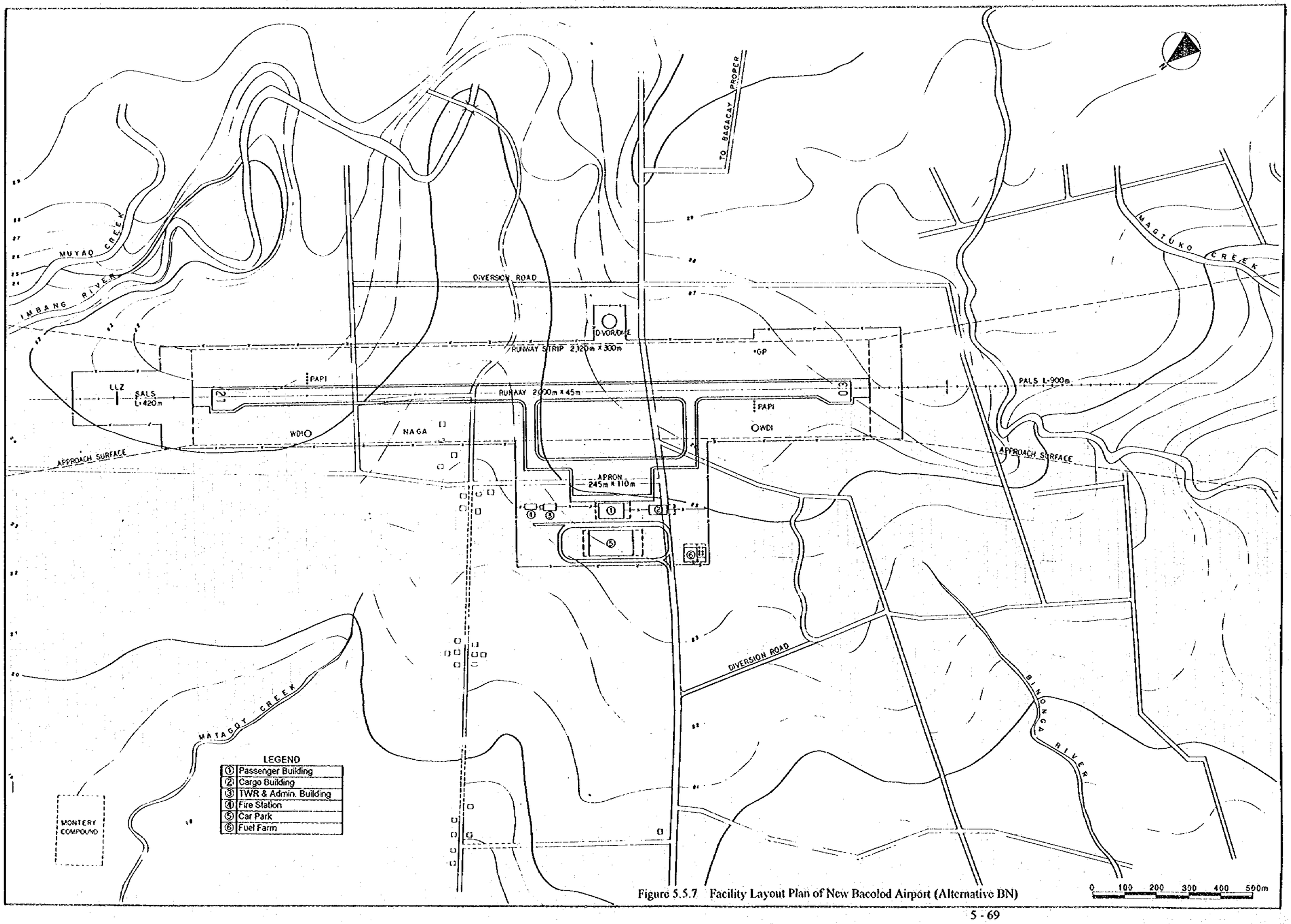


Figure 5.5.7 Facility Layout Plan of New Bacolod Airport (Alternative BN)

Tables 5.5.2 summarize outlines of the new Bacolod Airport Development.

Table 5.5.2 Outline of New Bacolod Airport Development

Item	Medium Term	Long Term
Earthworks	Cut 80,000 m^3, Fill 1,640,000 m^3	-
Runway	New runway 92,000 m^2	-
Taxiway	New taxiway 20,000 m^2	-
Apron	New apron 27,000 m^2	-
Passenger Terminal Building	New building 6,300 m^2	Expansion 2,000 m^2
Cargo Terminal Building	New building 1,560 m^2	Expansion 680 m^2
Administration Building	New building 1,800 m^2	-
Control Tower	New building	-
Fire Station	New building 550 m^2	-
Car Park	New car park 11,200 m^2	Expansion 2,550 m^2
Roads	5.2 km	-
Air Navigation Systems	D-VOR/DME, ILS Cat I, PALS, SALS, etc.	-
Fuel Supply Facility	New facility 400 kl	Expansion 200 kl
Obstacle Removal	Fire Station, etc.	-
Land Acquisition	108 ha	-
Diversion / Relocation	4 houses, Road 4.1 km	-

5.5.3 Planning of Airspace Use

1) Existing Airspace Use

(1) Terminal Control Area (TMA)

The following terminal control area is designated as Bacolod/Iloilo TMA with dimensions as shown in Table 5.5.3.

Table 5.5.3 Dimension of Bacolod/Iloilo TMA

NAME AND LATERAL LIMITS	UPPER LIMIT LOWER LIMIT	UNIT PROVIDING SERVICE	RADIO CALL SIGN	REMARKS
CONTROL AREAS WITHIN THE MANILA FIR a) BACOLOD/ILOILO TERMINAL CONTROL AREA (TMA) Fm 11 35 00 N 122 39 00 E to 10 48 33 N 123 16 53 E thence along the 50 nm radius arc of Mactan TMA (Western Side) to 09 33 45 N 123 38 06 E to 10 00 00 N 122 23 00 E to 10 46 00 N 122 04 00 E to point of beginning.	FL 200 1,500'	APP Bacolod* APP Mactan** ACC Manila***	RTF: Bacolod Approach	TMA/Visual exempted. During IMC, local IFR flights may be authorized if the flight is conducted within the TMA at or below FL 90. * From 1,500 ft. to FL 90 ** From FL 100 to FL 280 *** Above FL 280

(2) Control Zone (CTR) AND Aerodrome Traffic Zone (ATZ)

A control zone and an aerodrome traffic zone are established with dimensions as shown in Table 5.5.4.

Table 5.5.4 Dimensions of CTR and ATZ for the Bacolod Airport

TOWER	HOURS (UTC)	LATERAL LIMITS	UPPER LIMIT(ft)	LAN-GUAGE	REMARKS
1	2	3	4	5	6
BACOLOD TOWER	H24	CTR: Circle, 10 nm radius centered on the Bacolod VOR (10 38 24 N 122 55 18 E)	1,500 ft.	En	Instrument/Visual flts are controlled. CTR controlled by BACOLOD APP.
		ATZ: Circle, 5 KM radius centered on aerodrome reference point (10 38 42 N 122 55 48 E)	Up to but excluding 2,000 ft.		VFR, aerodrome traffic are controlled. Do not enter ATZ on IAS exceeding 200 knots unless authorized by ATC.

(3) Instrument Flight Procedures

Instrument approach procedures using VOR for the runways 04 and 22 are established as shown in Figures 5.5.8 and 5.5.9 and seven standard instrument departure routes are established as shown in Figure 5.5.10 at this airport.

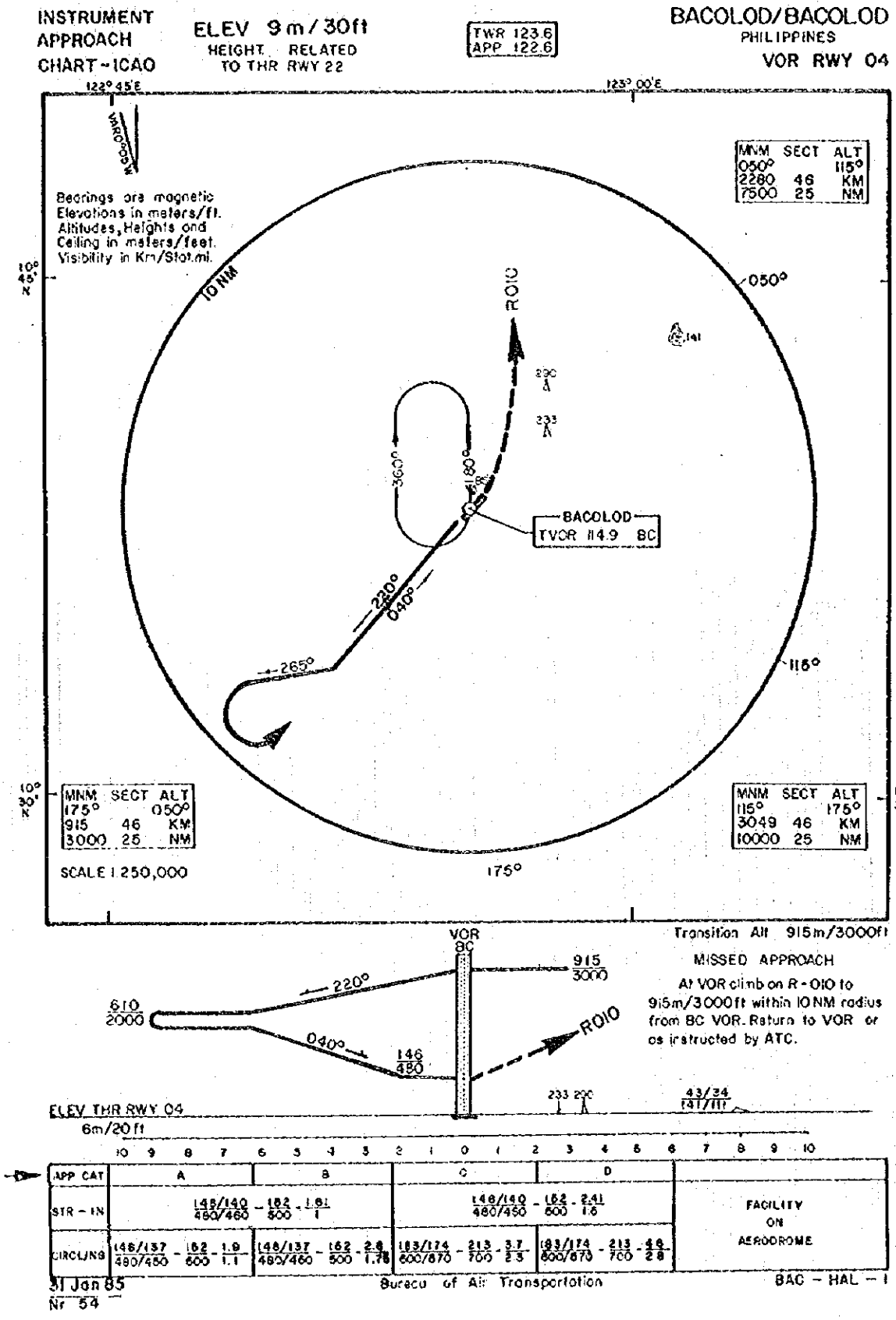


Figure 5.5.8 Instrument Approach Procedure: VOR RWY 04

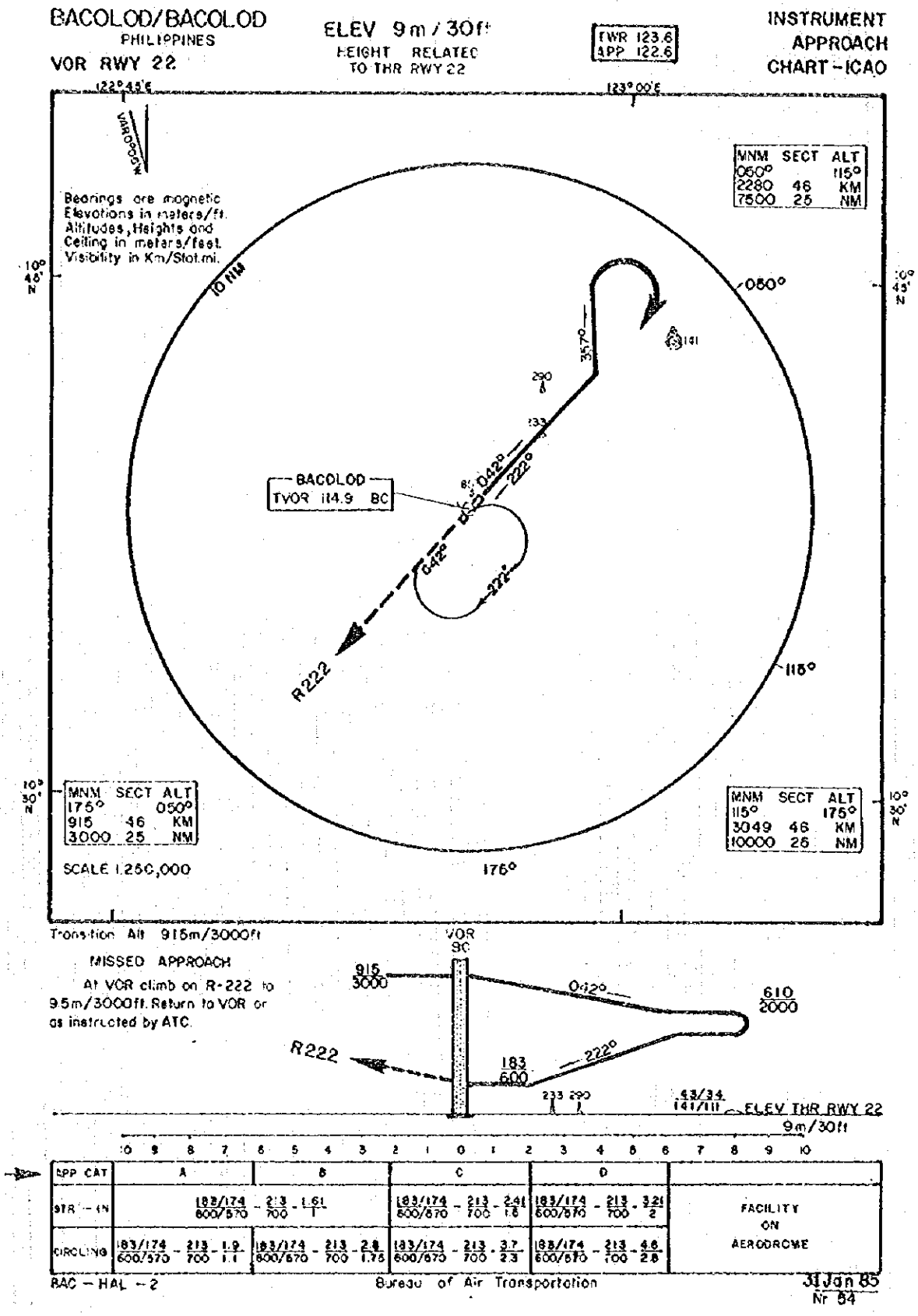


Figure 5.5.9 Instrument Approach Procedure: VOR RWY 22

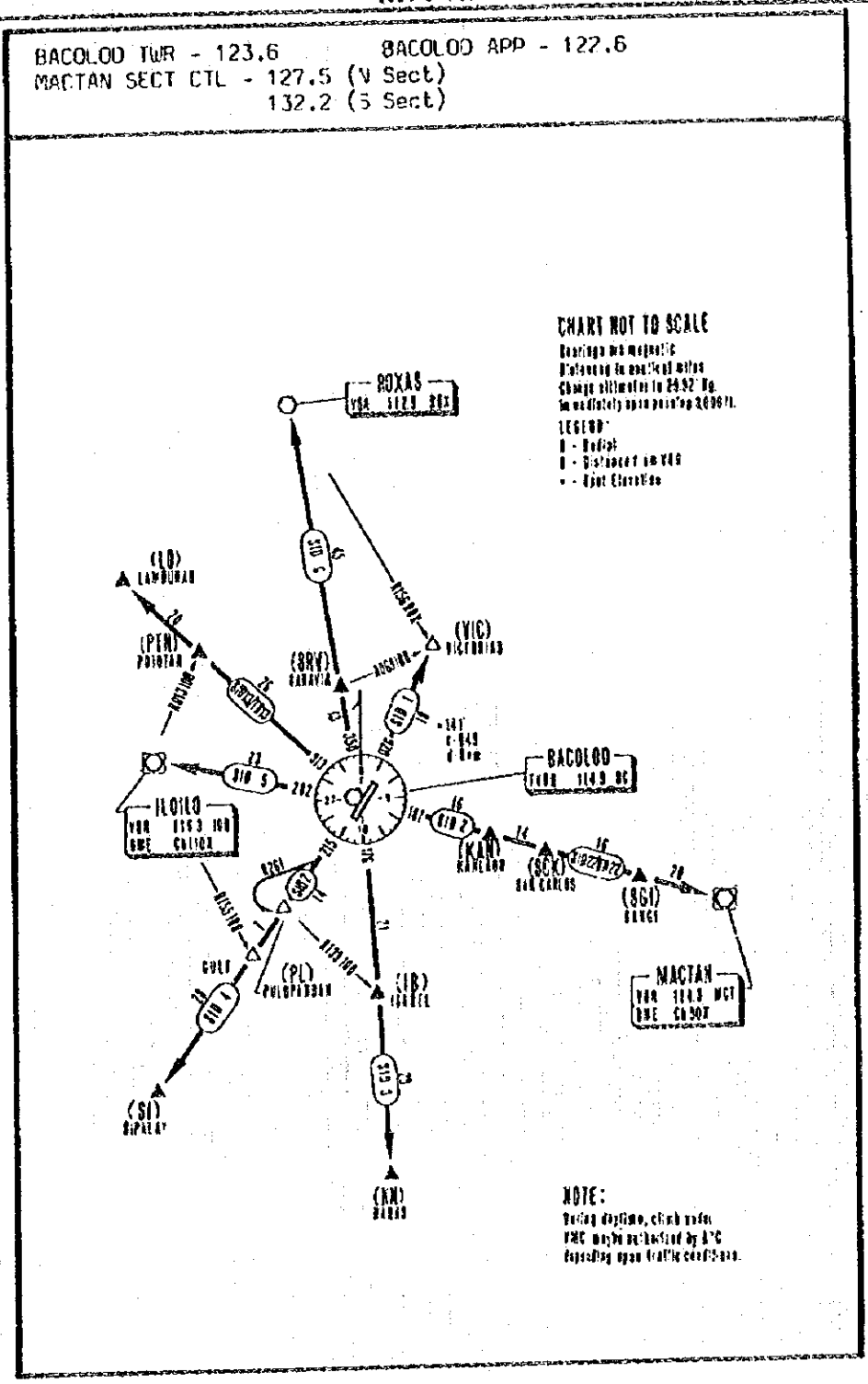


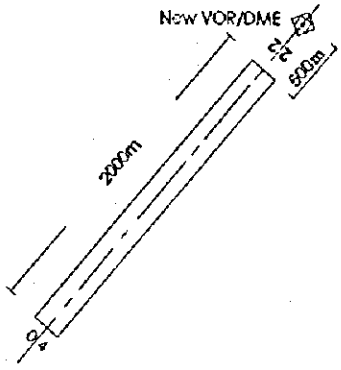
Figure 5.5.10 Standard Instrument Departure Routes

2) Planning of Airspace Use for the Existing Airport Development

Modification of existing airspace use in the case of Alternative BE was planned with the following assumptions.

a) Existing Bacolod VOR will be replaced with VOR/DME at 10°39'01"N/122°56'03"E.

b) Relationship between VOR/DME and new airport runway is assumed as shown below:



c) Iloilo VOR/DME will also be relocated to 10°42'40"N/122°32'27"E as planned in Chapter 6.

(1) Terminal Control Area (TMA) and Control Zone (CTR)

The existing TMA and CTR can be used with some minor changes in the directions and distances between Navaids and fixes and others due to the relocation of Iloilo and Bacolod VOR/DMEs.

(2) Standard Instrument Departure (SID) Routes

The existing SIDs can be used with some minor changes in the directions and distances between Navaids and fixes due to the relocation of VOR/DME.

(3) Instrument Approach Procedure

i) VOR/DME RWY 22

The final approach and missed approach courses will be 220 degrees. These courses are almost same as the existing courses for VOR RWY 22. OCA for this approach will be the same altitude as the existing VOR RWY 22 approach.

ii) VOR/DME RWY 04

The final approach and missed approach courses will be almost same as the existing courses for VOR RWY 04. However, it is recommended to commence the left turn missed approach at point 2.5 DME prior to VOR/DME to reduce noise pollution over Bacolod City. OCA for this approach will be the same altitude as the existing VOR RWY 04 approach.

iii) VOR/DME/ILS RWY 04

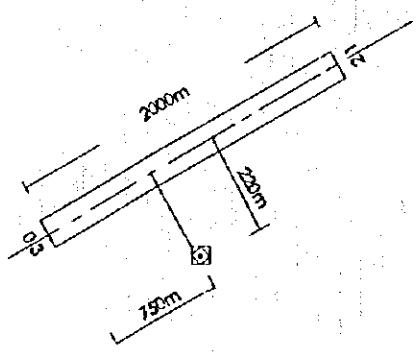
Cat I ILS facility is planned to be installed on the Runway 04. As most part of the final approach area will be above the sea, there will be no significant obstacle projecting above the OAS. Missed approach point is assumed at point 0.6 ILS/DME or 1.8 VOR/DME, and missed approach course will turn to left. There are no noticeable obstacle within the missed approach area. Therefore, Category I ILS operations on Runway 04 will be possible. However, some safety margin should be added on the operational conditions, because the airport will have narrower runway strip than ICAO standard and associated transitional surfaces.

3) **Planning of Airspace Use for the New Airport Development**

Airspace use for the new airport was planned with the following assumptions.

a) New VOR/DME will be located 10°46'29"N/123°01'10"E.

b) Relationship between VOR/DME and new airport runway is assumed as shown below:



c) Iloilo VOR/DME will also be relocated to 10°42'40"N/122°32'27"E as planned in Chapter 6.

(1) Terminal Control Area (TMA)

New Bacolod/Iloilo TMA is planned as shown in Figure 5.5.11. Due to the relocation of Bacolod airport, the northeast boundary of TMA is slightly sifted toward the north. Some other minor changes in the directions and distances between Navaids and fixes and others due to the relocation of Iloilo and Bacolod VOR/DMEs.

(2) Standard Instrument Departure (SID) Routes

Figure 5.5.12 shows the SID for the new airport. As seen, there is no problem to establish these procedures for the new airport. Minimum safe altitudes and facilities usability on each route segment should be confirmed by the flight calibration test.

(3) Instrument Approach Procedure

i) ILS Approach Procedure

Cat I ILS facility is planned to be installed on the Runway 03. Although further study using a precise map is needed, it is considered that no obstacles against aircraft operations in the final and missed approach area for landing on the south side of runway. Figure 5.5.13 shows the proposed instrument approach procedure : VOR/DME/ILS RWY 03.

ii) VOR/DME Approach Procedures

VOR/DME approach procedures for both runways of the new airport can be established without significant restrictions. Figures 5.5.14 and 5.5.15 show the proposed instrument approach procedures : VOR/DME RWY 03 and VOR/DME RWY 21.

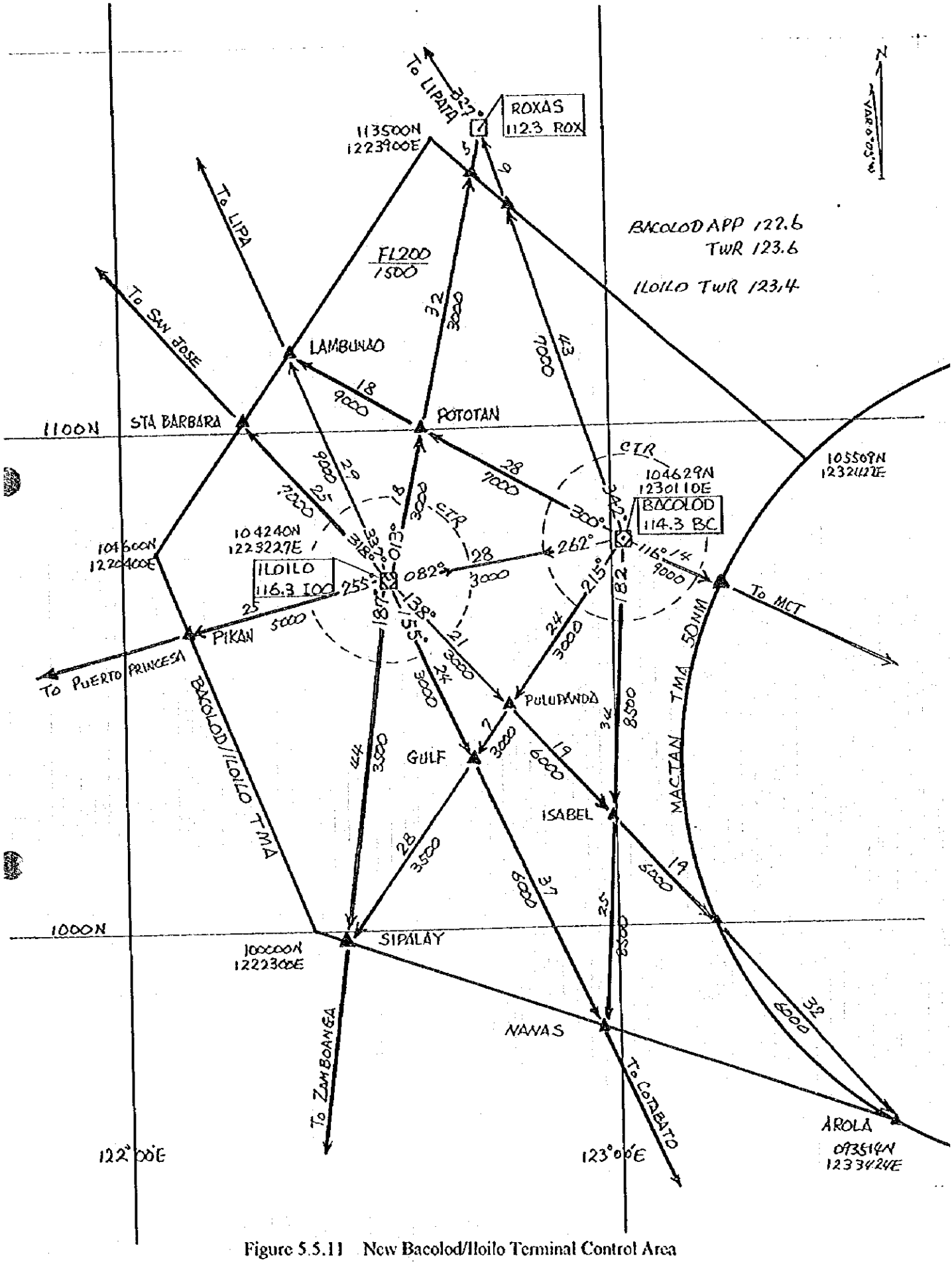


Figure 5.5.11 New Bacolod/Iloilo Terminal Control Area

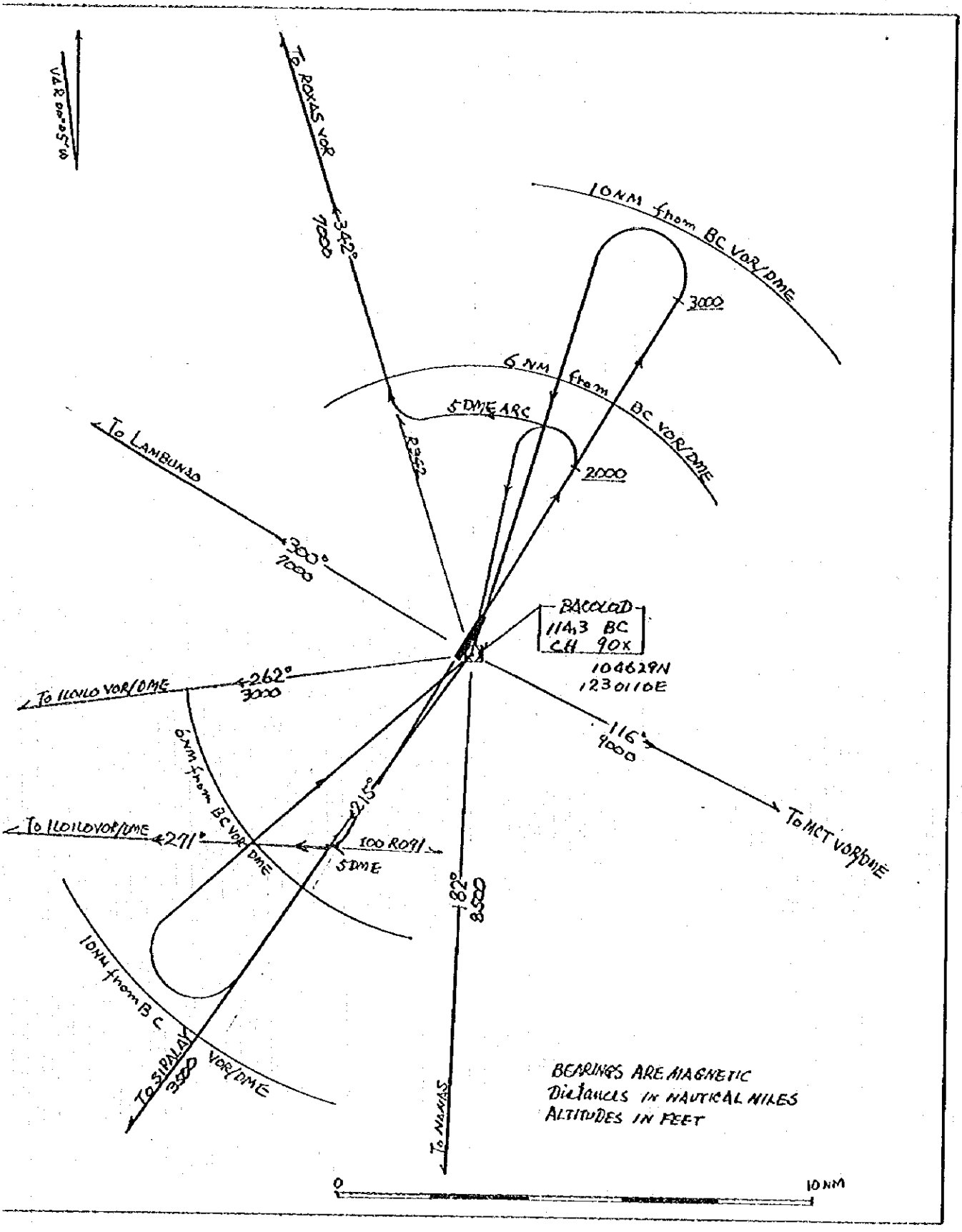
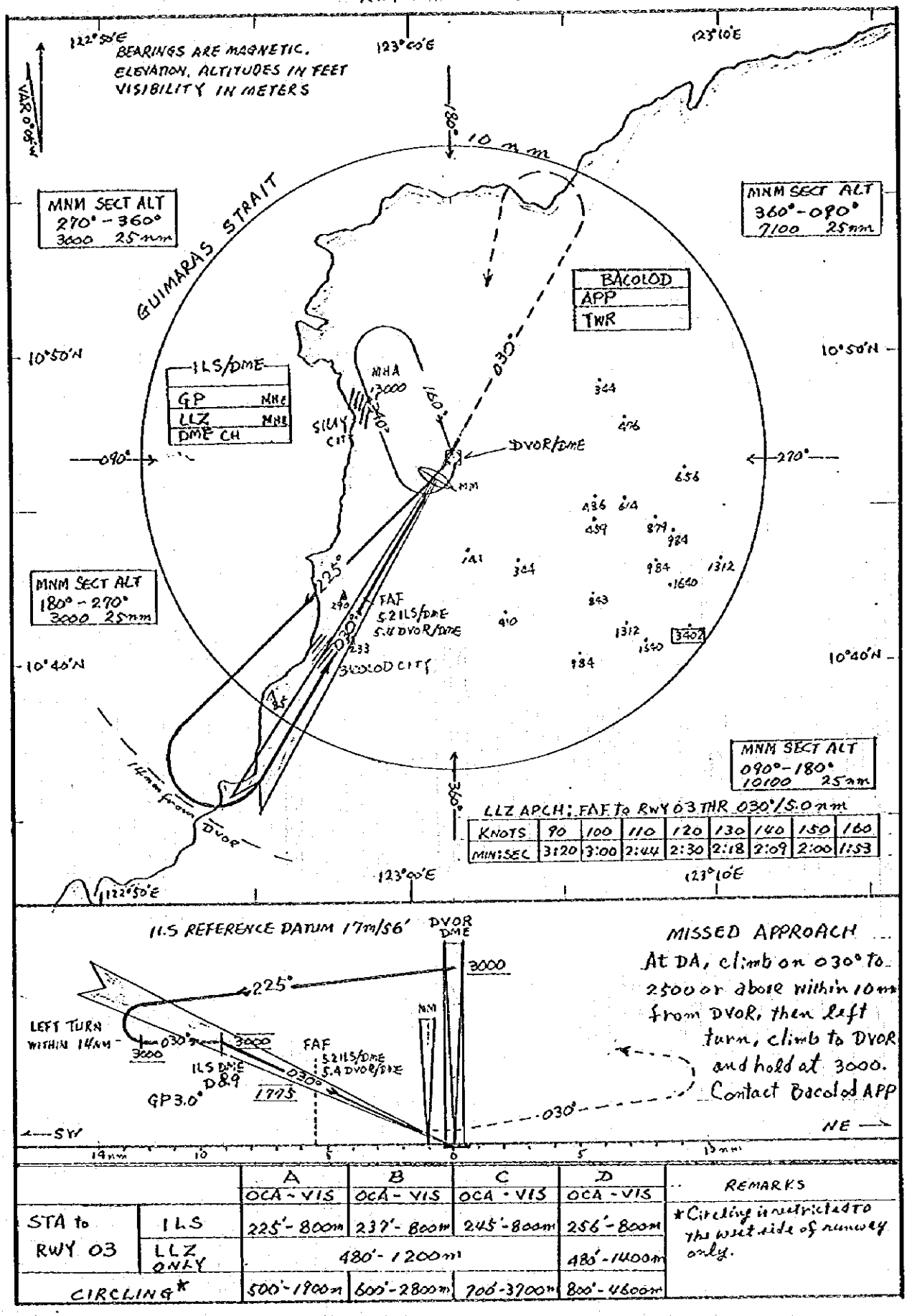


Figure 5.5.12 Standard Instrument Departure Routes for New Bacolod Airport

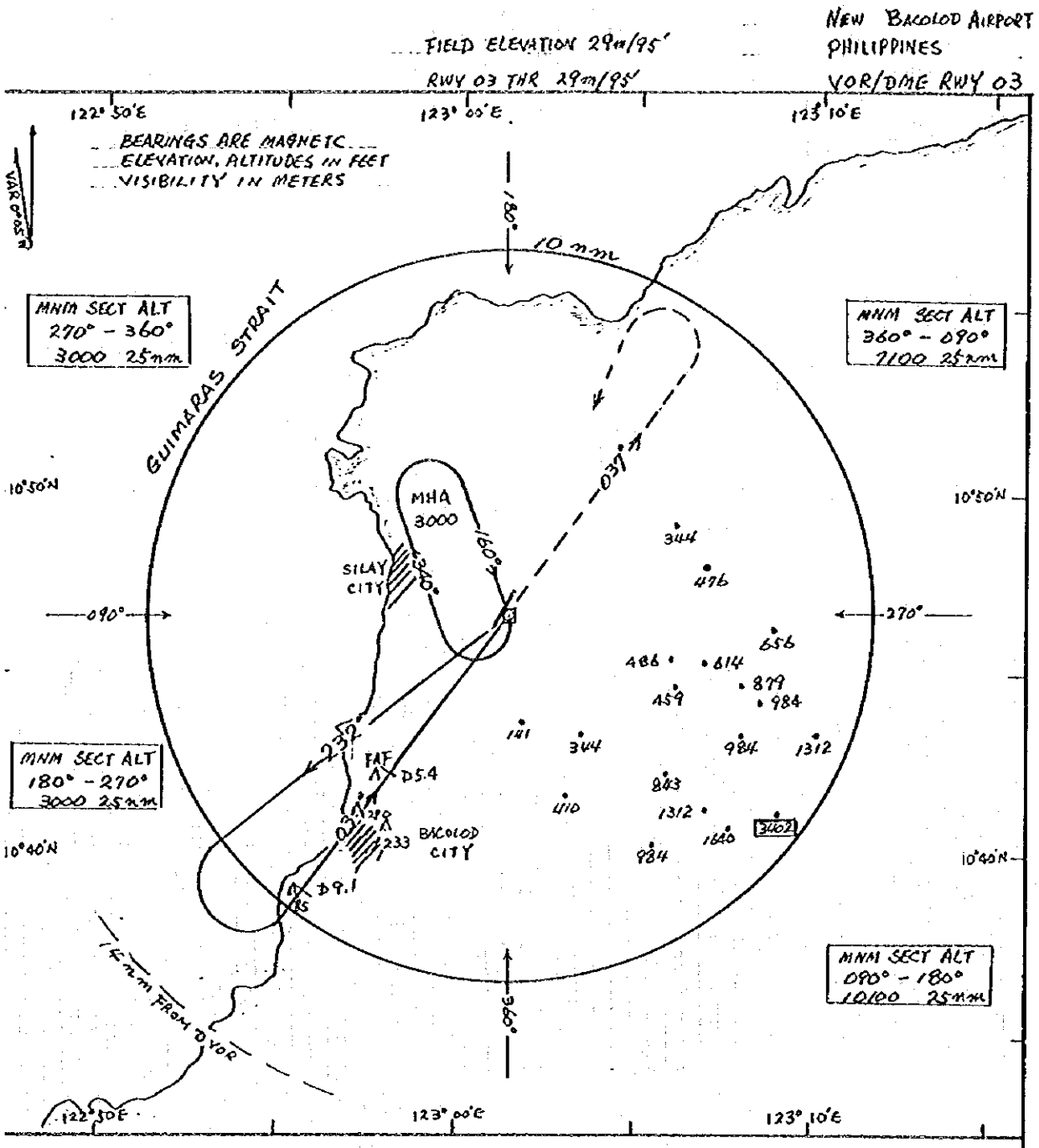
NEW BACOLOD AIRPORT
PHILIPPINES
VOR/DME/ILS RWY 03

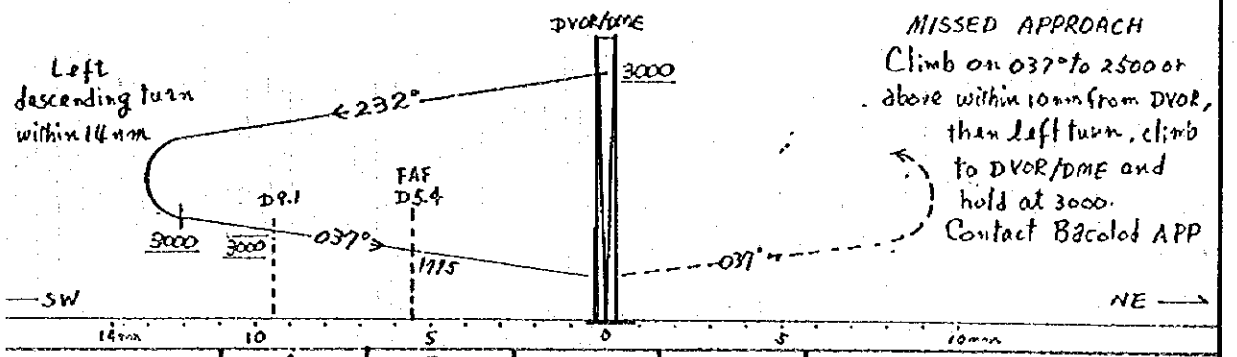
ELEVATION 29m/95'
RWY 03 THR 29m/95'



		A OCA - VIS	B OCA - VIS	C OCA - VIS	D OCA - VIS	REMARKS
STA to RWY 03	ILS	225° - 800m	237° - 800m	245° - 800m	256° - 800m	*Circling is restricted to the west side of runway only.
	LLZ ONLY	480' - 1200m			480' - 1400m	
CIRCLING*		500' - 1900m	600' - 2800m	700' - 3700m	800' - 4600m	

Figure 5.5.13 Proposed VOR/DME/ILS RWY 03 for New Bacolod Airport





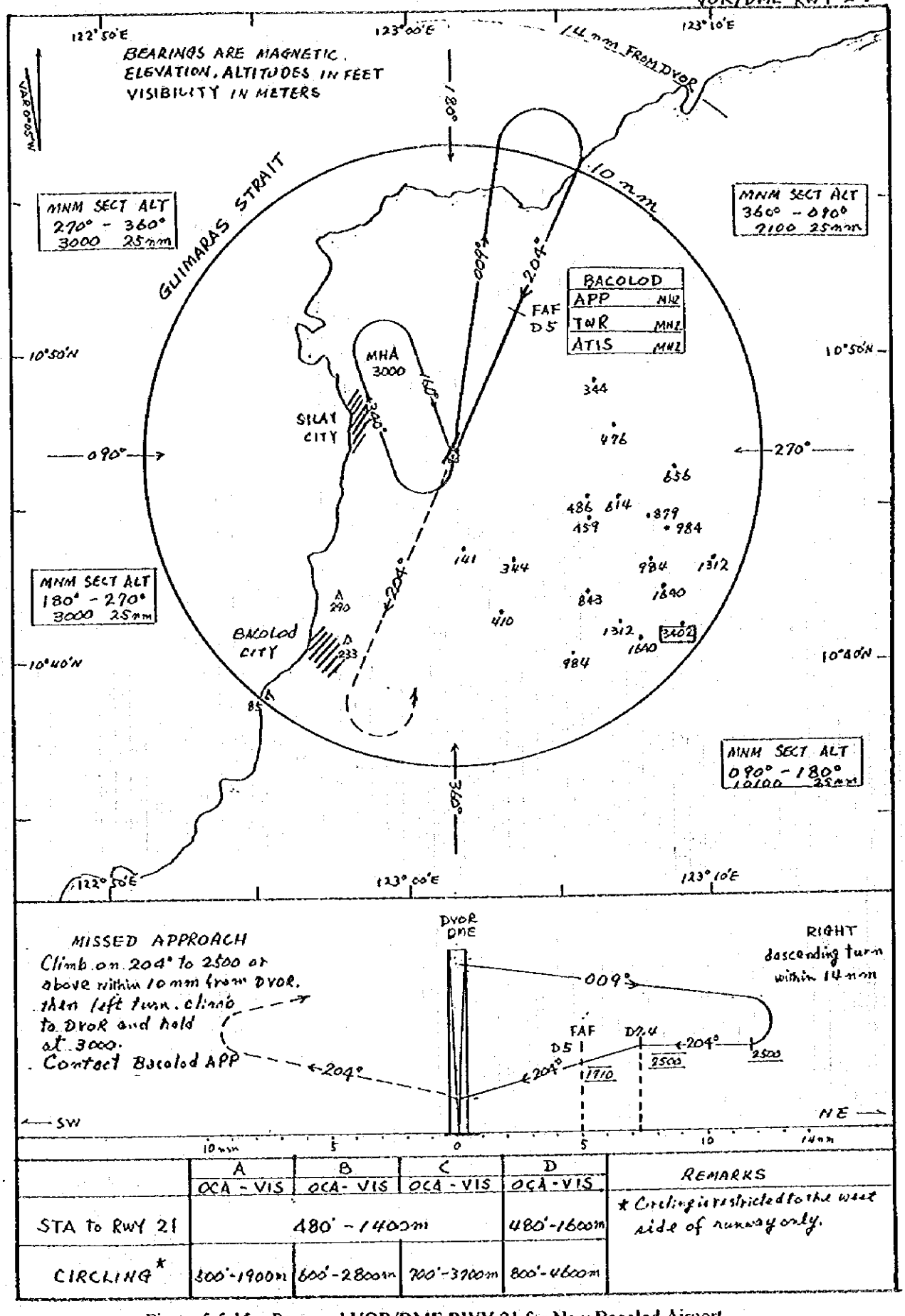
MISSED APPROACH
Climb on 037° to 2500 or above within 10 nm from DVOR, then left turn, climb to DVOR/DME and hold at 3000. Contact Bacolod APP

	A OCA - VIS	B OCA - VIS	C OCA - VIS	D OCA - VIS	REMARKS
STA to RWY 03	480' - 1200m			480-1400m	* Circling approach is restricted to the west side of runway only.
CIRCLING *	500'-1900m	600'-2800m	700'-3700m	800'-4600m	

Figure 5.5.14 Proposed VOR/DME RWY 03 for New Bacolod Airport

FIELD ELEVATION 29m/95'
RWY 21 THR 29m/95'

NEW BACOLOD AIRPORT
PHILIPPINES
VOR/DME RWY 21



	A OCA - VIS	B OCA - VIS	C OCA - VIS	D OCA - VIS	REMARKS
STA to RWY 21	480' - 1400m			480'-1600m	* Circling is restricted to the west side of runway only.
CIRCLING*	300'-1900m	600'-2800m	700'-3700m	800'-4600m	

Figure 5.5.15 Proposed VOR/DME RWY 21 for New Bacolod Airport

5.5.4 Cost Estimates

A preliminary cost estimate of the master plan has been prepared based on the following conditions:

a) Construction costs were estimated based on the 1996 prices.

b) Exchange rates were fixed at US$ 1.00 = PHP 26.00 = Yen 110.

c) Price escalation (inflation) was not included.

d) Cost for engineering services was estimated to be about 10% of the construction cost.

e) Contingencies were estimated to be about 10% of the total cost.

Table 5.5.5 Preliminary Cost Estimate for Existing Bacolod Airport Development

(Unit: million PHP)

Item	Medium Term	Long Term	Total
Construction Cost	1,699.6	229.2	1,928.8
Creek Diversion	14.4	0.0	14.4
Airport Civil Works	689.0	4.1	693.1
Earthworks & Drainage	326.5	1.1	327.6
Runway, Taxiway & Apron	203.3	0.0	203.3
Roads & Car Park	26.3	1.8	28.1
Other Civil Works	132.9	1.2	134.1
Building Works	330.0	84.1	414.1
Passenger Terminal Building	219.1	69.6	288.7
Cargo Terminal Building	33.4	14.6	48.0
Control Tower & Administration Building	53.9	0.0	53.9
Fire Station	12.9	0.0	12.9
Other Buildings	10.7	0.0	10.7
Special Equipment & Fire Fighting Vehicles	107.0	19.3	126.3
Airport Utilities	69.6	18.4	88
Fuel Supply System	186.2	93.1	279.3
Air Navigation Systems	227.6	0.0	227.6
Miscellaneous	75.9	10.2	86.1
Land Acquisition & Compensation	560.4	0.0	560.4
Consultancy Services	170.0	22.9	192.9
Contingency	187.0	25.2	212.2
Total Cost	2,616.9	277.4	2,894.3

Tables 5.5.6 summarizes the preliminary cost estimates for new Bacolod Airport development.

Table 5.5.6 Preliminary Cost Estimate for New Bacolod Airport Development

(Unit: million PHP)

Item	Medium Term	Long Term	Total
Construction Cost	1,762.9	229.2	1,992.1
Road Diversion	10.6	0.0	10.6
Airport Civil Works	757.2	4.1	761.3
Earthworks & Drainage	409.4	1.1	410.5
Runway, Taxiway & Apron	250.8	0.0	250.8
Roads & Car Park	24.8	1.8	26.6
Other Civil Works	72.2	1.2	73.4
Building Works	330.0	84.1	414.1
Passenger Terminal Building	219.1	69.6	288.7
Cargo Terminal Building	33.4	14.6	48.0
Control Tower & Administration Building	53.9	0.0	53.9
Fire Station	12.9	0.0	12.9
Other Buildings	10.7	0.0	10.7
Special Equipment & Fire Fighting Vehicles	107.0	19.3	126.3
Airport Utilities	69.6	18.4	88.0
Fuel Supply System	186.2	93.1	279.3
Air Navigation Systems	223.6	0.0	223.6
Miscellaneous	78.7	10.2	88.9
Land Acquisition & Compensation	11.2	0.0	11.2
Consultancy Services	176.3	22.9	199.2
Contingency	193.9	25.2	219.1
Total Cost	2,144.3	277.4	2,421.7

5.5.5 Initial Environmental Evaluation

1) Existing Bacolod Airport Development (Alternative BE)

(1) Environmental Condition of the Project Site

Table 5.5.7 and the following paragraph summarize the environment of existing Bacolod Airport based on the site reconnaissance and available data.

i) Social Environment

The existing Bacolod Airport is located near the seashore at the east side of Gimalas Strait. The airport is sites at around 3.5km southwest from Bacolod City, takes around 15 minutes by car. The vicinity of the airport is quite urbanized. It has residential areas, shopping centers, residential child care facilities / homes for the old people, hotels, factories, resort areas, and other facilities. Runway at south is facing the ocean with fishing area is located nearby. Along the seashore at southeast, is a squatter area where numbers of squatters are residing while several residential houses can be seen along the runway at west.

The major industry of the area is agriculture and fishery. It is a producing district of sugar and coconut oil. With regards to the road traffic condition of the area, the National Road No. 1 is running towards Bacolod City. The road is wide in size and well-maintained. Its traffic density is relatively high.

ii) Natural Environment

Runway at the south is facing the ocean. According to the head of the airport, the depth of the ocean is around 2 to 3m from the shoreline up to 15m distance towards open sea and the depth therefrom up to 500m distance is around 8 to 18m. The shoreline is well-protected at present but the area is seem to be suffering from flood whenever high wave comes. At the north side of the runway is Magsungay River, a large river with 50m in width and 7 to 8m in depth. The airline is surrounded by tall coconut trees and grasslands while group of mangrove trees can also be seen at the mouth of Tangub Creek which is located at the south side of the runway. Although there is a possibility that some valuable birds or fishes may live around the area since it is located near the seashore, the detail about their presence is still unknown.

iii) Pollution

According to the head of the Airport, he has not received any complaint with regards to the pollution as of present. However, investigation should be undertaken to determine possible impact to the residential houses at east and the residential area and public facilities located both northward and southward.

Table 5.5.7. Environmental Condition of the Existing Bacolod Airport

Item	Condition
Social Environment	
Inhabitants of the area (residents, natives, their consent towards the project, etc.)	Many residential houses in the vicinity of the airport. The area is quite urbanized.
Land Use (city, village, historic spot, scenic spot, hospital, etc.)	Occupied mostly by the residential areas. Shopping area, residential child care facilities/homes for the old people, resort area, industrial area and farms are also present.
Economy and Transportation (commercial industry, agricultural industry, industrial park, bus terminal, etc.)	Major industry of the area is agriculture and fishery. Industrial park and seaport are also located nearby.
Natural Environment	
Topography, Geology (slope, soft ground, damp ground, fault, etc.)	Ocean at the south side of the runway and its depth is quite deep. Also, large river is located at the north side of the runway. The whole airport facility is laid on a flat land.
Valuable animals and plants, their habitat (natural park, habitat of protected species, etc.)	Mangrove trees at the mouth of the river. The existence of animal is still unknown. However, valuable birds or fishes may be existing in the area.
Pollution	
Occurrence of complaints (remarkable pollution)	Complaint is indistinct.
Countermeasure (Law and Compensation)	Countermeasure is indistinct.
Others	Less possibility for airport expansion.

(2) Evaluation of Environmental Impacts

Environmental impacts of the existing bacolod Airport development project was evaluated based on the site reconnaissance and existing data, and the results are summarized in a standard form of JICA as shown in Table 5.5.8.

Table 5.5.8 Evaluation of Environmental Impact of Existing Bacolod Airport

Issue		Evaluation	
Social Environment			
1.	Resettlement	A	Relocation of some 80 houses will be required.
2.	Economic Activities	B	Some fishing grounds will be lost by reclamation. Relocation of some shops will be required.
3.	Traffic and Public Facilities	B	Increase of airport related vehicle traffic will have some impacts on traffic conditions.
4.	Split of Communities	D	There is no major traffic route to be obstructed by the project.
5.	Cultural Property	C	No cultural heritage is known, but attention should be given to buried heritage during the implementation of the project.
6.	Water Rights and Rights of Common	B	Land reclamation will have some impacts on water rights.
7.	Public Health Condition	D	There will be no impact on public health condition, if the garbage from the airport is disposed properly.
8.	Waste	D	As the volume of waste created by the project is not large, there will be no impact if the waste is disposed properly.
9.	Hazards	C	Increase of aircraft operation with narrow runway strip might be hazardous since the surroundings are urbanized.
Natural Environment			
10.	Topography and Geology	C	There might be some impacts where the material of reclamation is taken from.
11.	Soil Erosion	D	No soil erosion is expected, as the ground after the development will be relatively flat and covered by pavements and grasses.
12.	Groundwater	C	Condition of groundwater is unknown.
13.	Hydrological Situation	A	A creek near the new terminal area needs to be diverted.
14.	Coastal Zone	A	The sea surrounding the southern side of the runway will be greatly affected by reclamation.
15.	Flora and Fauna	A	A group of mangrove trees near the reclamation area will be cut.
16.	Meteorology	C	Large scale reclamation might have impacts on the local meteorological conditions.
17.	Landscape	B	Large scale reclamation will have some impacts on landscape, although the area is not a special scenic spot.

Note: Classification of Evaluation
A : Significant impact is expected
B : Some impact is expected
C : Not clear (Necessary to be examined in detail. In case new information was acquired in the future, take it to consideration as well.)
D : No impact. Not necessary to be examined by EIA.

Table 5.5.8 Evaluation of Environmental Impact of Existing Bacolod Airport (Continued)

Issue		Evaluation	
Pollution			
18.	Air Pollution	B	Increase of vehicle traffic and aircraft operations will have some impacts on air quality.
19.	Water Pollution	B	Muddy water generated by the construction works and increase of waste water from the airport operations will have some impacts on water quality.
20.	Soil Contamination	D	No activity which may cause soil contamination is expected.
21.	Noise and Vibration	A	As the surrounding area is urbanized, there will be significant impact on noise due to increase of aircraft operations and vehicle traffic.
22.	Land Subsidence	C	Groundwater may be used at the airport. Condition of ground water is unknown.
23.	Offensive Odor	D	No activity which may cause offensive odor is expected.

Note: Classification of Evaluation
A : Significant impact is expected
B : Some impact is expected
C : Not clear (Necessary to be examined in detail. In case new information was acquired in the future, take it to consideration as well.)
D : No impact. Not necessary to be examined by EIA.

(3) Scope of Environmental Impact Assessment

Table 5.5.9 summarizes major environmental issues and investigation itemswhich need detailed examination in the Environmental Impact Assessment.

Table 5.5.9 Major Environmental Issues and Investigation Plan

Issue	Evaluation	Investigation Plan
Resettlement	A	Investigate population, age, occupation and others of the residents subject for resettlement.
Hydrological Situation	A	Investigate existing hydrological situation around the site, and estimate the changes by the project.
Coastal Zone	A	Investigate reclamation/coast protection plan, tide, current, seabed soil, etc., and estimate possible erosion or sedimentation.
Flora and Fauna	A	Investigate existing conditions of flora and fauna, possibility of resettlement, etc., and evaluate the impacts of the project.
Noise and Vibration	A	Investigate land use, population and current noise level around the airport, and estimate future noise level and impacts.
Economic Activities	B	Investigate existing conditions of fishery and scheme of compensation, and estimate the impacts of reclamation.
Traffic and Public Facilities	B	Investigate current traffic and facilities around the airport, and estimate the impacts during the construction and utilization stages.
Water Rights and Rights of Common	B	Investigate existing conditions of water rights, and estimate the impacts of reclamation.
Landscape	B	Investigate existing landscape around the project site, and evaluate the impact of the project.
Air Pollution	B	Investigate air quality around the airport, and estimate the changes by the project.
Water Pollution	B	Investigate quality of surface water and groundwater around the airport, and estimate the changes by the project.
Cultural Property	C	Conduct site reconnaissance and hearing, and establish a procedure to be applied if buried cultural property is found during the construction.
Hazards	C	Investigate land use and population around the airport, past accidents, and evaluate the future risk of accidents.
Topography and Geology	C	Investigate possible quarry sites, and evaluate impact of the project.
Groundwater	C	Investigate conditions of ground water, and evaluate possible impact of the project.
Meteorology	C	Investigate local meteorological conditions, and evaluate possible impact by the reclamation.
Land Subsidence	C	Investigate conditions of groundwater and soils of the site, estimate volume of groundwater to be used, and evaluate possibility of impact.

Note: Classification of Evaluation
A : Significant impact is expected
B : Some impact is expected
C : Not clear (Necessary to be examined in detail. In case new information was acquired in the future, take it to consideration as well.)

2) New Airport Development (Alternative BN)

(1) Environmental Condition of the Project Site

Table 5.5.10 and the following paragraphs summarize the environment of new airport site (Site 3) based on the site reconnaissance and available data.

i) Social Environment

The new airport site is located at around 6km away to the southeast from the center of Silay City. The vicinity of the airport is occupied mostly by the sugarcane fields where you can find two small barrios named Naga and Bagacay, a barrios of which are composed of field laborers. Naga is located westward of proposed project site while Bagacay is located eastward.

The major industry of the area is agriculture (sugarcane). With regards to the road traffic condition of the area, the Provincial Road Route 357, which is connected to the center of Silay City, is dividing the proposed project site from the middle and therefore, rerouting of the road is necessary. With regards to the presence of educational and welfare facility such as school and hospital, there is an elementary school in Bagacay.

ii) Natural Environment

The vicinity of proposed project area has already been widely developed as sugarcane fields and none of the natural environment, such as forest, can be found.

Two rivers can be found around the proposed project site namely Inbang River, which runs from north to south of the site with its mouth located at north of Silay City, and Catabla River, which runs along the south of the site with its mouth located at the north of Talisay City.

iii) Pollution

Since the proposed project site is almost surrounded by the sugarcane fields, no pollution is being occurred. However, noise and air pollution by aircraft and should be taken into consideration as well as the impact to nearby rivers and underground water by the effluent generated during the construction and utilization.

Table 5.5.10 Environmental Condition of New Airport Site

Item	Condition
Social Environment	
Population (residents, former inhabitants, area division)	Presence of barrios ,including stores and school, at the southeast of project site. Small barrio of field workers is located near the area where terminal is to be constructed.
Land Use (city, village, historic spot, scenic spot, factories, school, hospital, tourist facilities, Natural park, preservation area)	Most of the land within the project site is occupied by sugarcane fields. Small barrio of field workers named Naga is located near the area where terminal is to be constructed. No historical site, scenic spot, industrial plant, hospital, tourist spot, natural park and natural reserve area around the area.
Economic and Traffic (commercial industry, agricultural industry, bus terminal)	Industrial activity within the proposed project area is agriculture (sugarcane) alone. Several roads are running across the project site and therefore, rerouting of roads should be considered.
Natural Environment	
Topography, Geology (fault, slope, soft ground, land subsidence, ground water)	Area around the proposed project site is flat. Muyao Creek and Imbang River at northeast, Matagoy Creek at north and Binonga River and Magtuko Creek at both west and south. The details about fault, slope, soft ground, Land subsidence and underground water are still remained unknown.
Valuable animals and plants (rare species, special species, decrease of the place for extinct species, rare plants and animals)	Since the vicinity of proposed project area has already been widely developed as sugarcane fields, the environment of the area is not suitable for the habitat of valuable species. However, investigation is still necessary since the information relevant to flora and fauna in the area is indistinct.
Pollution	
Occurrence of complaints (remarkable pollution)	The complaint from the nearby residential houses and school is expected. However, the affected area is minimal because of the transfer of residents.
Counter measure (Law and Compensation)	Purchase of lands within the project site(owner of sugarcane fields) as well as residents(mostly field workers) transfer and compensation for their employment are required.
Others	None

(2) Evaluation of Environmental Impact

Environmental impact of the new airport development at Site 3 was evaluated based on the site reconnaissance and existing data, and the results are summarized in a standard form of JICA as shown in Table 5.5.11.

Table 5.5.11 Evaluation of Environmental Impact of New Airport Development

Issue		Evaluation	
Social Environment			
1.	Resettlement	B	Relocation of few houses will be required.
2.	Economic Activities	B	Some sugarcane fields will be lost.
3.	Traffic and Public Facilities	B	Vehicle traffic will increase significantly. However, adverse effect will be small as the access road will be improved.
4.	Split of Communities	B	There will be some impacts by split of community due to the diversion of existing roads.
5.	Cultural Property	C	No cultural heritage is known, but attention should be given to buried heritage during the implementation of the project.
6.	Water Rights and Rights of Common	C	Detail is indistinct.
7.	Public Health Condition	D	There will be no impact on public health condition, if the garbage from the airport is disposed properly.
8.	Waste	D	As the volume of waste created by the project is not large, there will be no impact if the waste is disposed properly.
9.	Hazards	D	The new airport of international standard quality will not be hazardous if the it is operated and maintained properly.

Note: Classification of Evaluation
- A : Significant impact is expected
- B : Some impact is expected
- C : Not clear (Necessary to be examined in detail. In case new information was acquired in the future, take it to consideration as well.)
- D : No impact. Not necessary to be examined by EIA.

Table 5.5.11 Evaluation of Environmental Impact of New Airport Development (Continued)

Issue		Evaluation	
Natural Environment			
10.	Topography and Geology	D	Scale of earthworks and deforestation is not large.
11.	Soil Erosion	D	No soil erosion is expected, as the ground after the development will be relatively flat and covered by pavements and grasses.
12.	Groundwater	C	Condition of groundwater is unknown. Groundwater may be used at the airport if not supplied from the city main.
13.	Hydrological Situation	B	Construction of large pavement area will increase the runoff.
14.	Coastal Zone	D	No impact since it is far from the coastal zone.
15.	Flora and Fauna	C	Although impact on flora and fauna is considered small, detail of existing flora and fauna should be checked.
16.	Meteorology	D	There will be no activity which may have impact on meteorological conditions.
17.	Landscape	D	The area is not a special scenic spot. The airport will not disturb the landscape of the surrounding area.
Pollution			
18.	Air Pollution	B	Increase of vehicle traffic and aircraft operations will have some impacts on air quality.
19.	Water Pollution	B	Muddy water generated by the construction works and increase of waste water from the airport operations will have some impacts on water quality.
20.	Soil Contamination	D	No activity which may cause soil contamination is expected.
21.	Noise and Vibration	B	There will be some impact on noise due to the aircraft operations and airport related vehicle traffic.
22.	Land Subsidence	C	Groundwater may be used at the airport. Condition of ground water is unknown.
23.	Offensive Odor	D	No activity which may cause offensive odor is expected.

Note: Classification of Evaluation
A : Significant impact is expected
B : Some impact is expected
C : Not clear (Necessary to be examined in detail. In case new information was acquired in the future, take it to consideration as well.)
D : No impact. Not necessary to be examined by EIA.

(3) Scope of Environmental Impact Assessment

Table 5.5.12 summarizes major environmental issues and investigation items which need detailed examination in the Environmental Impact Assessment.

Table 5.5.12 Major Environmental Issues and Investigation Plan

Issue	Evaluation	Investigation Plan
Resettlement	B	Investigate population, age, occupation and others of the residents subject for resettlement.
Economic Activities	B	Investigate existing conditions of agriculture at the site and scheme of compensation, and estimate the impacts of the project.
Traffic and Public Facilities	B	Investigate current traffic and facilities around the site, and estimate the impacts during the construction and utilization stages.
Split of Communities	B	Investigate distribution of communities, traffic pattern, and others around the site, and evaluate the impact of the project.
Hydrological Situation	B	Investigate existing hydrological situation around the site, and estimate the changes by the project.
Air Pollution	B	Investigate air quality around the project site, and estimate the changes by the project.
Water Pollution	B	Investigate quality of surface water and groundwater around the project site, and estimate the changes by the project.
Noise and Vibration	B	Investigate land use, population and current noise level around the airport, and estimate future noise level and impacts.
Cultural Property	C	Conduct site reconnaissance and hearing, and establish a procedure to be applied if buried cultural property is found during the construction.
Water Rights and Rights of Common	C	Investigate existing conditions of water rights and rights of common around the site, and estimate the impacts of the project.
Groundwater	C	Investigate conditions of ground water around the site, and evaluate possible impact of the project.
Flora and Fauna	C	Investigate existing conditions of flora and fauna, possibility of resettlement, etc., and evaluate the impacts of the project.
Land Subsidence	C	Investigate conditions of groundwater and soils of the site, estimate volume of groundwater to be used, and evaluate possibility of impact.

Note: Classification of Evaluation
A : Significant impact is expected
B : Some impact is expected
C : Not clear (Necessary to be examined in detail. In case new information was acquired in the future, take it to consideration as well.)

5.5.6 Economic Analysis

1) General

The objective of economic analysis is to judge whether or not the implementation of a specific project is feasible based on the principle of with or without cases which determines the net national economic benefit to be realized by the implementation of the said project. To establish the net national economic benefit, it is necessary to measure the difference in economic productivity between the situation of national economic productivity which is assumed to be increased by the implementation of the project (with project case -- "WP case") and the situation of national economic productivity without the implementation of the project (without project case – "WOP case").

In this analytical process, the economic cost of the project should be the total amount of input, determined by subtracting the monetary transfer cost, taxes and subsidies from the market prices of the project, because of the need to calculate the real amount of input while the economic benefit as the net national economic benefit should be calculated from the viewpoint of economic productivity or improvement of social welfare.

The economic analysis is conducted for the medium and long term airport development plans (in this section collectively referred to as the "Project") in Bacolod for the following cases:

- Redevelopment of Existing Bacolod Airport (Alternative BE1)
- Construction of New Bacolod Airport (Site 3)

The economic costs and benefits, measurable in monetary terms (direct benefits), of the Project are treated under the cash flow analysis and the discount cash flow method is used for the cost benefit analysis. The economic feasibility in terms of the national economy is then determined based on the economic internal rate of returns (EIRR) and net present value (NPV) of the Project.

2) With Project (WP) Case and Without Project (WOP) Case

The investments required to implement the medium and long term development plans will be additional investments for the expansion of airport capacity; therefore, the returns of the Project should be evaluated as incremental benefits derived from the expansion of airport capacity. Benefits and costs should, therefore, be compared between the following two cases:

- With Project (WP) Case: The medium- and long-term development plans will be implemented and airport capacity will be expanded to handle increases in air traffic up to the design capacity for the year 2015.

- Without Project (WOP) Case: No investments will be made on the existing airport facilities. Since many of the existing facilities lack in capacity, there will be no increase in air traffic volume after the year 1996.

3) General Assumptions

The calculations in the economic analysis are based on the following general assumptions.

a) Project Evaluation Period

The new facilities are assumed to become operational in 2002. The airport is usually used for quite a long time, and thus, it is technically difficult to determine the project life of an airport. In this analysis, the project life of 25 years is assumed and the project is evaluated until 2026. Although benefits of the Project will continue to be generated after 2026, discounted benefit thereafter can be neglected.

b) Project Costs and Benefits

All costs and benefits are evaluated at 1996 constant prices in Philippine pesos. Price escalation is not taken into consideration and it is assumed that the general increase of prices will equally affect costs and benefits.

c) Residual Value

The residual value is calculated with a 30 year depreciation period for civil works and buildings. The outstanding value for depreciation in the last year of the evaluation period is considered to be the residual value and is accounted for as a negative item on the cost side of the cash flow.

4) Economic Costs of the Project

a) Construction Cost

The construction cost is calculated on the basis that market prices. However, market prices are subject to price distortion from the viewpoint of the real consumption of national resources. For the present study, shadow prices suggested by NEDA, 1.2 for foreign exchange and 0.6 for unskilled labor, are used as a basis for obtaining a standard conversion factor (SCF). Assuming tradable components of the project costs as 70% of the total costs and wages for unskilled laborers as 10% of the total cost, the SCF can be calculated as 0.84. This value is slightly lower than 0.88 suggested by the ADB's Economic and Development Resource Center in its study on the SER (Shadow Exchange Rate) for the Philippines as of June 6, 1995.

b) Operation and Maintenance Costs

The operation and maintenance costs consist of

- Maintenance costs
- Personnel, overhead and other costs
- Utilities costs

These costs are respectively estimated as follows.

- Maintenance costs

Implementation of the Project will require additional funding to maintain expanded and upgraded facilities. This is estimated by multiplying the construction costs by percentage rates which differs between groups of facilities as follows:

- Buildings and civil works: 1 %
- Utilities, special equipment and vehicles: 3 %
- Air navigation systems: 5 %

The maintenance cost at economic prices is estimated to be 84% of the nominal cost as in the case of the construction cost.

- Personnel, overhead and other labor costs

The incremental number of staff by the implementation of the Project is estimated in Section 10.2.4. This number is multiplied by cost per person to obtain incremental personnel related cost by the Project. The personnel, overhead and other labor costs have been calculated at PHP 65,000 per person at 1996 price.

The estimated personnel cost in market prices is converted to the economic cost by applying a 90% rate to exclude income tax which is a transfer payment in the national economy.

- Utilities costs

When calculating the utilities costs of the project the present total utilities cost has been increased by a percentage of that cost. The percentage is estimated considering the new facilities which will be in operation from the year 2002.

The economic prices for the utilities cost are assumed to be equal to the nominal prices.

5) **Economic Benefits of the Project**

The following economic benefits are considered in the analysis.

a) Time Saving Benefit for Business Passengers

b) Benefit from Increased Number of Tourist Passengers

c) Benefit from Increased Volume of Air Cargo

d) Economic Value of Existing Airport Assets (applicable only for New Bacolod Airport)

Although such other benefits as the improvement of air safety and the impacts on regional development, etc. make an important contribution to the national economy, they are not included here because of the difficulty of estimating these benefits in monetary terms.

a) Time Saving Benefit for Business Passengers

In the WOP case for the Project, any air passenger exceeding the capacity of an airport will either cancel his/her trip altogether or will change to another mode of transport (sea or bus). In particular, a business passenger will have no choice but to use an alternative mode of transport. A business passenger who is forced to make a detour in the WOP case may enjoy a lower traveling cost but may also face a longer traveling time.

This means that there is a difference between the total of the traveling cost and time cost in the WOP case and the corresponding total in the WP case. In general, the WP case proves more economical in such a context. This difference generates an economic benefit for business passengers and, at the same time, increases the productivity of the national economy. The benefit calculation results for business passengers are given in Appendix 5.5.2.

b) Benefit from Increased Number of Tourist Passengers

Among the air passengers beyond the handling capacity of an airport, tourist passengers will cancel their sightseeing trips to areas served by such an airport in the WOP case and will head somewhere else. The benefit for tourist passengers in the WP case arises from the tourist revenue loss in the WOP case. The actual benefit level in the WP case as a consumer's surplus is assumed to be 30% of the total revenue from foreign tourists (approximately the same level with the amount of added value in the tourism industry catering for foreign tourists) and 20% of the total revenue from domestic tourists (approximately the same level as the amount of added value in the tourism industry catering for domestic tourists). The benefit calculation results for tourist passengers are also given in Appendix 5.5.2.

c) Benefit from Increased Volume of Air Cargo

The characteristics of air cargo are quite different from those of other modes of transport, such as railway and road haulage. Air cargo generally shows a high value-to-weight ratio with a short life and/or high vulnerability to damage. It is, therefore, unlikely that air cargo above the airport capacity would be diverted to other modes of transport in the WOP case. The benefit in this situation can be measured in a similar manner to the consumer's surplus in the case of tourist passengers. The unit benefit per ton of increased air cargo is quantified as 50% of the cargo air-fare. The benefit calculation results for air cargo are given in Appendix 5.5.2.

d) Economic Value of Existing Airport Assets (applicable only for New Bacolod Airport)

In the case of constructing a new airport at Bacolod, as the present airport site will not be required, it is assumed that the site will be sold for other land use purposes to realize its value from the viewpoint of economic analysis. The principle idea here is to clear the present airport site (demolition and removal of existing structures and land preparation) for its sale as residential plots. The sales price is estimated by subtracting the clearance cost of PHP 100 per sq.m from the site value, determined on the basis of the ongoing market price of residential land near the airport, as a realizable benefit by means of asset disposal. The existing airport area of Bacolod Airport is 43 ha and the prevailing price is PHP 1,500 per sq.m.

The above economic analysis methodology for the present study is applicable to all four trunkline airports (Bacolod, Iloilo, Tacloban and Legaspi) except for d) Economic Value of Existing Airport Assets which is only applicable to New Bacolod Airport.

6) Economic Evaluation

The comparison of costs and benefits incurred by implementing the Project is indicated in Tables 5.5.13 and 5.5.14 respectively for the cases of the redevelopment of the existing airport and the construction of the new airport.

Table 5.5.14 Comparison of Costs and Benefits by the Project for Existing Bacolod Airport

Unit: PHP '000 at 1996 prices

Year	Costs					Benefits					Net Cash Flow
	Construction Cost	Maintenance Cost	Personnel, Overhead & Other Cost	Utilities Cost	Total Incremental Costs	Time Savings Benefit	Tourism Earnings Benefit	Benefit from Cargo	Value of Existing Airport	Total Benefits	
	(1)	(2)	(3)	(4)	(5)=(1)+(2)+(3)+(4)	(6)	(7)	(8)	(9)	(10)=(6)+(7)+(8)+(9)	(11)=(10)-(5)
1995	0	0	0	0	0	0	0	0	0	0	
1996	0	0	0	0	0	0	0	0	0	0	
1997	0	0	0	0	0	0	0	0	0	0	0
1998	282,500	0	0	0	282,500	0	0	0	0	0	-282,500
1999	282,500	0	0	0	282,500	0	0	0	0	0	-282,500
2000	816,613	0	0	0	816,613	0	0	0	0	0	-816,613
2001	816,613	0	0	0	816,613	0	0	0	0	0	-816,613
2002	0	20,642	819	625	22,086	86,790	40,306	23,790	0	150,886	128,799
2003	0	20,642	819	625	22,086	114,183	48,242	26,993	0	189,418	167,332
2004	0	20,642	819	625	22,086	147,485	57,419	30,195	0	235,099	213,013
2005	232,998	20,642	819	625	255,085	187,238	67,864	33,398	0	288,500	33,415
2006	0	24,329	1,598	720	26,646	223,534	76,589	36,143	0	336,266	309,619
2007	0	24,329	1,598	720	26,646	264,563	86,169	39,345	0	390,077	363,431
2008	0	24,329	1,598	720	26,646	311,198	96,812	42,548	0	450,558	423,911
2009	0	24,329	1,598	720	26,646	364,031	108,617	45,750	0	518,397	491,751
2010	0	24,329	1,598	720	26,646	423,701	121,690	48,953	0	594,344	567,698
2011	0	24,329	1,598	720	26,646	477,130	133,088	51,698	0	661,915	635,269
2012	0	24,329	1,598	720	26,646	535,688	145,405	54,900	0	735,993	709,346
2013	0	24,329	1,598	720	26,646	599,764	158,707	58,103	0	816,573	789,927
2014	0	24,329	1,598	720	26,646	670,468	173,243	61,305	0	905,016	878,369
2015	0	24,329	1,598	720	26,646	747,639	188,923	64,508	0	1,001,070	974,423
2016	0	24,329	1,598	720	26,646	791,753	196,291	64,508	0	1,052,551	1,025,905
2017	0	24,329	1,598	720	26,646	837,587	203,946	64,508	0	1,106,040	1,079,394
2018	0	24,329	1,598	720	26,646	885,208	211,900	64,508	0	1,161,616	1,134,969
2019	0	24,329	1,598	720	26,646	934,687	220,164	64,508	0	1,219,359	1,192,712
2020	0	24,329	1,598	720	26,646	986,096	228,750	64,508	0	1,279,353	1,252,707
2021	0	24,329	1,598	720	26,646	1,034,031	236,757	64,508	0	1,335,295	1,308,648
2022	0	24,329	1,598	720	26,646	1,083,643	245,043	64,508	0	1,393,194	1,366,548
2023	0	24,329	1,598	720	26,646	1,134,993	253,620	64,508	0	1,453,120	1,426,473
2024	0	24,329	1,598	720	26,646	1,188,139	262,496	64,508	0	1,515,143	1,488,496
2025	0	24,329	1,598	720	26,646	1,243,146	271,684	64,508	0	1,579,337	1,552,690
2026	-299,534	24,329	1,598	720	-272,888	1,300,077	281,193	64,508	0	1,645,777	1,918,665
									EIRR =		16.0%
									NPV (at 15% discount rate) =		144,666

Table 5.5.15 Comparison of Costs and Benefits by the Project for New Bacolod Airport

Unit: PHP '000 at 1996 prices

Year	Costs					Benefits					Net Cash Flow
	Construction Cost	Maintenance Cost	Personnel, Overhead & Other Cost	Utilities Cost	Total Incremental Costs	Time Savings Benefit	Tourism Earnings Benefit	Benefit from Cargo	Value of Existing Airport	Total Benefits	
	(1)	(2)	(3)	(4)	(5)=(1)+(2)+(3)+(4)	(6)	(7)	(8)	(9)	(10)=(6)+(7)+(8)+(9)	(11)=(10)-(5)
1995	0	0	0	0	0	0	0	0	0	0	
1996	0	0	0	0	0	0	0	0	0	0	
1997	0	0	0	0	0	0	0	0	0	0	0
1998	53,552	0	0	0	53,552	0	0	0	0	0	-53,552
1999	53,552	0	0	0	53,552	0	0	0	0	0	-53,552
2000	847,037	0	0	0	847,037	0	0	0	0	0	-847,037
2001	847,037	0	0	0	847,037	0	0	0	0	0	-847,037
2002	0	20,173	819	625	21,617	86,790	40,306	23,790	602,000	752,886	731,268
2003	0	20,173	819	625	21,617	114,183	48,242	26,993	0	189,418	167,801
2004	0	20,173	819	625	21,617	147,485	57,419	30,195	0	235,099	213,482
2005	232,998	20,173	819	625	254,616	187,238	67,864	33,398	0	288,500	33,884
2006	0	23,945	1,598	720	26,263	223,534	76,589	36,143	0	336,266	310,003
2007	0	23,945	1,598	720	26,263	264,563	86,169	39,345	0	390,077	363,815
2008	0	23,945	1,598	720	26,263	311,198	96,812	42,548	0	450,558	424,295
2009	0	23,945	1,598	720	26,263	364,031	108,617	45,750	0	518,397	492,135
2010	0	23,945	1,598	720	26,263	423,701	121,690	48,953	0	594,344	568,082
2011	0	23,945	1,598	720	26,263	477,130	133,088	51,698	0	661,915	635,653
2012	0	23,945	1,598	720	26,263	535,688	145,405	54,900	0	735,993	709,730
2013	0	23,945	1,598	720	26,263	599,764	158,707	58,103	0	816,573	790,311
2014	0	23,945	1,598	720	26,263	670,468	173,243	61,305	0	905,016	878,753
2015	0	23,945	1,598	720	26,263	747,639	188,923	64,508	0	1,001,070	974,807
2016	0	23,945	1,598	720	26,263	791,753	196,291	64,508	0	1,052,551	1,026,289
2017	0	23,945	1,598	720	26,263	837,587	203,946	64,508	0	1,106,040	1,079,778
2018	0	23,945	1,598	720	26,263	885,208	211,900	64,508	0	1,161,616	1,135,353
2019	0	23,945	1,598	720	26,263	934,687	220,164	64,508	0	1,219,359	1,193,096
2020	0	23,945	1,598	720	26,263	986,096	228,750	64,508	0	1,279,353	1,253,091
2021	0	23,945	1,598	720	26,263	1,034,031	236,757	64,508	0	1,335,295	1,309,032
2022	0	23,945	1,598	720	26,263	1,083,643	245,043	64,508	0	1,393,194	1,366,931
2023	0	23,945	1,598	720	26,263	1,134,993	253,620	64,508	0	1,453,120	1,426,857
2024	0	23,945	1,598	720	26,263	1,188,139	262,496	64,508	0	1,515,143	1,488,880
2025	0	23,945	1,598	720	26,263	1,243,146	271,684	64,508	0	1,579,337	1,553,074
2026	-308,676	23,945	1,598	720	-282,413	1,300,077	281,193	64,508	0	1,645,777	1,928,191
							EIRR =				21.9%
							NPV (at 15% discount rate) =				697,553

The economic internal rate of return (EIRR) and net present value (NPV) are calculated as shown below.

Table 5.5.15 EIRR and NPV of the Project: Bacolod

Cases/Economic Indicators	EIRR	NPV at 15% discount rate (PHP million)
• Redevelopment of Existing Bacolod Airport	16.0%	145
• Construction of New Bacolod Airport	21.9%	698

The EIRR of the Project should be compared to the opportunity cost of capital, indicating the marginal productivity of capital or a minimum level of returns which could be expected if the capital is used for an alternative project. In this analysis, the opportunity cost of capital of 15% is used based on suggestion from NEDA.

The results indicate that the construction of the new airport is economically feasible, and superior to the redevelopment of the existing Bacolod Airport.

5.5.7 Financial Analysis

1) General

The financial analysis examines the financial returns of investments needed to implement the medium and long term airport development plans (in this section collectively referred to as the "Project") in Bacolod for the following cases:

- Redevelopment of Existing Bacolod Airport (Alternative BE1)
- Construction of New Bacolod Airport (Site 3)

The objectives of the analysis is to determine whether the medium and long term development plans are financially feasible and/or to study alternative measures to make the Project financially feasible. The evaluations are carried out by comparing costs and revenues in terms of financial internal rate of return (FIRR) and net present value (NPV).

2) Methodology

The investments required to implement the Project will be additional investments for the expansion of airport capacity. Therefore, the returns of the Project are evaluated as incremental revenues derived from the expansion of airport capacity. Revenues and costs have therefore been compared between the WP case and WOP cases as in the case of the economic analysis.

3) General Assumptions

The calculations in the financial analysis are based on the following general assumptions.

a) Project Evaluation Period

The Project is evaluated until the year 2026 as in the case of the economic analysis.

b) Project Costs and Revenues

The costs and revenues are estimated at 1996 current prices and no inflation rate is calculated. It is assumed that general increases in costs will be met with timely increases in airport charges and preferably with improvements in productivity.

c) Residual value

Residual values are calculated for buildings and civil works only with a 30-year straight-line depreciation method as in the case of the economic analysis.

4) Costs of the Project

The costs of the Project consist of the construction costs, operation and maintenance costs and utility costs. The estimation method has already been explained in Section 5.5.6. It is noted that no conversion of financial costs to economic costs is required for the financial analysis.

5) Revenues of the Project

The following operating revenues are considered in the analysis.

[Traffic Related Services]

a) Landing fee
b) Operational charge
c) Aircraft parking charge
d) Passenger service charge

[Commercial Services]

e) Passenger terminal space rental
f) Cargo terminal space rental
g) Concession privilege fee
h) Aviation fuel surcharge

[Miscellaneous]

i) Utilities services

In addition to the above, sale value of the existing airport property area is included in the revenue of the Project. ATO's existing airport property area of Bacolod Airport is 24 ha (out of 43 ha total area) and the trade price is PHP 1,500 per sq.m. PHP 100 per sq.m is deducted as a cost for clearing the site.

These revenues items are currently collected either by the airport or by the ATO headquarters but in the calculations they are all allocated to the airport. Since the construction costs for cargo terminals and aviation fuel facilities are included in the project, revenues of item f) and h) above have been calculated in the analysis to recover the capital invested in these facilities.

Traffic growth based on the forecasts for the project regarding:

- Number of air passengers
- Number of landings by type of aircraft
- Volume of air cargo

are the basis for calculating the traffic related revenues.

When calculating revenues of rentals, car parking, concessions, utilities and commercial services the additional space available and opportunities by the Project are regarded.

In calculating the revenue of the Project, two cases of the price levels are considered as follows:

- The present price level as per 1996 for all fees and charges
- All fees, charges, rentals and revenues of concessions, utilities and commercial services are increased 700% by the inauguration of new facilities.

In spite of the increased price levels in 1995 and in 1996, the current price level for domestic traffic at airports in the Philippines has to be considered low compared with current practices at many other airports in the world with similar conditions. The justifications of the assumed price increases are the low current level and the upgrading of the airport facilities to ICAO standard and the considerable improvements in available space, service level and comfort in the passenger and cargo terminal buildings and car parking as a result of the Project.

A comparison of the assumed price levels in the analysis with the current levels at Manila and Cebu Airports is made for landing fee, parking fee and passenger service charge in Table 5.5.16. As the table shows, the assumed landing fee and parking fees will be more or less the same levels as international fees at Manila and Cebu. The passenger service charge level is much lower than international service charge at Manila, but significantly higher than domestic service charge at Manila and Cebu.

Table 5.5.16 Comparison of Assumed Price Levels and the Present Price Levels at Manila and Cebu Airports

Revenue/Airport		Assumed Price Levels	Manila Domestic Present Levels	Cebu Domestic Present Level	Manila International Present Levels	Cebu International Present Level
	Weight 1000 KG	Fee/1000 kg Peso	Fee/1000 kg Peso	Fee/1000 kg Peso	Fee/1000 kg Peso	Fee/1000 kg Peso
Landing fee	0-50	192	21.8	16.3	91	73
	51-100	192	49.0	36.7	182	164
	> - 100	192	51.65	38.75	192	173
Parking fee		After 1 hour Peso/hour	After 2 hours Peso/hour	After 2 hours Peso/hour	After 2 hours Peso/hour	After 2 hours Peso/hour
	0-50	32	24	23.6	44	35
	51-100	32	23	23.6	426	338
	> - 100	32	23	23.6	426	338
Passenger service charge	Peso/dep. Pass.	80	50	10	500	10

6) Financial Evaluation

The comparison of costs and revenues incrementally incurred by implementing the Project is indicated in Tables 5.5.17 and 5.5.18 with increased prices of airport charges respectively for the cases of the redevelopment of the existing airport and the construction of the new airport. (Refer to Appendix 5.5.3 for estimation of incremental revenues.)

The financial internal rate of return (FIRR) and net present value (NPV) are calculated as shown below. A discount rate of 2.7%, current interest rate of OECF loan for the Philippines, is used for calculating NPV.

Table 5.5.19 FIRR and NPV of the Project: Bacolod

Cases/Financial Indicators	FIRR	NPV at 2.7% discount rate (PHP million)
At Current Level of Charges		
• Redevelopment of Existing Bacolod Airport	negative	-2,573
• Construction of New Bacolod Airport	negative	-1,829
At Increased Prices of Charges*		
• Redevelopment of Existing Bacolod Airport	3.0%	112
• Construction of New Bacolod Airport	5.7%	856

Note*: Increase all charges by 700% in 2002 when new facilities start operation.

The results indicate that the construction of the new airport is financially feasible with the assumed increases in the prices of airport charges, and superior to the redevelopment of the existing Bacolod Airport. It is also known from the results that the use of low interest loan is essential for the Project to be financial feasible.

Table 5.5.17 Comparison of Incremental Costs and Revenues by the Project for Existing Bacolod Airport

(Increased Rates of Airport Charges)

Unit: PHP '000 at 1996 prices

Year	Costs					Revenues					Net Cash Flow
	Construction Cost	Maintenance Cost	Personnel, Overhead & Other Cost	Utilities Cost	Total Incremental Costs	Traffic Related Services	Commercial Services	Miscella-neous Revenue	Sale of Existing Airport Land	Total Incremental Revenue	
	(1)	(2)	(3)	(4)	(5)=(1)+(2)+(3)+(4)	(6)	(7)	(8)	(9)	(10)=(6)+(7)+(8)+(9)	(11)=(10)-(5)
1995					0	0	0	0		0	
1996					0	0	0	0		0	
1997					0	0	0	0		0	0
1998	336,309				336,309	0	0	0		0	-336,309
1999	336,309				336,309	0	0	0		0	-336,309
2000	972,158				972,158	0	0	0		0	-972,158
2001	972,158				972,158	0	0	0		0	-972,158
2002		24,574	910	625	26,109	107,510	17,938	688		126,136	100,027
2003		24,574	910	625	26,109	114,972	18,160	688		133,819	107,710
2004		24,574	910	625	26,109	122,971	18,381	688		142,039	115,930
2005	277,379	24,574	910	625	303,488	131,656	18,603	688		150,946	-152,542
2006		28,963	1,775	720	31,458	137,406	23,970	792		162,167	130,709
2007		28,963	1,775	720	31,458	143,606	24,114	792		168,512	137,054
2008		28,963	1,775	720	31,458	150,018	24,259	792		175,068	143,610
2009		28,963	1,775	720	31,458	156,591	24,403	792		181,786	150,328
2010		28,963	1,775	720	31,458	163,647	24,548	792		188,987	157,529
2011		28,963	1,775	720	31,458	169,146	24,727	792		194,665	163,207
2012		28,963	1,775	720	31,458	174,766	24,907	792		200,465	169,007
2013		28,963	1,775	720	31,458	180,780	25,086	792		206,658	175,200
2014		28,963	1,775	720	31,458	186,733	25,266	792		212,791	181,333
2015		28,963	1,775	720	31,458	195,266	25,445	792		221,503	190,045
2016		28,963	1,775	720	31,458	195,266	25,445	792		221,503	190,045
2017		28,963	1,775	720	31,458	195,266	25,445	792		221,503	190,045
2018		28,963	1,775	720	31,458	195,266	25,445	792		221,503	190,045
2019		28,963	1,775	720	31,458	195,266	25,445	792		221,503	190,045
2020		28,963	1,775	720	31,458	195,266	25,445	792		221,503	190,045
2021		28,963	1,775	720	31,458	195,266	25,445	792		221,503	190,045
2022		28,963	1,775	720	31,458	195,266	25,445	792		221,503	190,045
2023		28,963	1,775	720	31,458	195,266	25,445	792		221,503	190,045
2024		28,963	1,775	720	31,458	195,266	25,445	792		221,503	190,045
2025		28,963	1,775	720	31,458	195,266	25,445	792		221,503	190,045
2026	-356,588	28,963	1,775	720	-325,130	195,266	25,445	792		221,503	546,633
									FIRR =		3.0%
									NPV (at 2.7% discount rate) =		111,773

Table 5.5.18 Comparison of Incremental Costs and Revenues by the Project for New Bacolod Airport

(Increased Rates of Airport Charges)

Unit: PHP '000 at 1996 prices

Year	Costs					Revenues					Net Cash Flow
	Construction Cost	Maintenance Cost	Personnel, Overhead & Other Cost	Utilities Cost	Total Incremental Costs	Traffic Related Services	Commercial Services	Miscella-neous Revenue	Sale of Existing Airport Land	Total Incremental Revenue	
	(1)	(2)	(3)	(4)	(5)=(1)+(2)+(3)+(4)	(6)	(7)	(8)	(9)	(10)=(6)+(7)+(8)+(9)	(11)=(10)-(5)
1995					0	0	0	0		0	
1996					0	0	0	0		0	
1997					0	0	0	0		0	0
1998	63,752				63,752	0	0	0		0	-63,752
1999	63,752				63,752	0	0	0		0	-63,752
2000	1,008,377				1,008,377	0	0	0		0	-1,008,377
2001	1,008,377				1,008,377	0	0	0		0	-1,008,377
2002		24,016	910	625	25,551	107,510	17,938	688	336,000	462,136	436,585
2003		24,016	910	625	25,551	114,972	18,160	688		133,819	108,268
2004		24,016	910	625	25,551	122,971	18,381	688		142,039	116,488
2005	277,379	24,016	910	625	302,930	131,656	18,603	688		150,946	-151,984
2006		28,506	1,775	720	31,001	137,406	23,970	792		162,167	131,166
2007		28,506	1,775	720	31,001	143,606	24,114	792		168,512	137,511
2008		28,506	1,775	720	31,001	150,018	24,259	792		175,068	144,067
2009		28,506	1,775	720	31,001	156,591	24,403	792		181,786	150,785
2010		28,506	1,775	720	31,001	163,647	24,548	792		188,987	157,986
2011		28,506	1,775	720	31,001	169,146	24,727	792		194,665	163,664
2012		28,506	1,775	720	31,001	174,766	24,907	792		200,465	169,464
2013		28,506	1,775	720	31,001	180,780	25,086	792		206,658	175,657
2014		28,506	1,775	720	31,001	186,733	25,266	792		212,791	181,790
2015		28,506	1,775	720	31,001	195,266	25,445	792		221,503	190,502
2016		28,506	1,775	720	31,001	195,266	25,445	792		221,503	190,502
2017		28,506	1,775	720	31,001	195,266	25,445	792		221,503	190,502
2018		28,506	1,775	720	31,001	195,266	25,445	792		221,503	190,502
2019		28,506	1,775	720	31,001	195,266	25,445	792		221,503	190,502
2020		28,506	1,775	720	31,001	195,266	25,445	792		221,503	190,502
2021		28,506	1,775	720	31,001	195,266	25,445	792		221,503	190,502
2022		28,506	1,775	720	31,001	195,266	25,445	792		221,503	190,502
2023		28,506	1,775	720	31,001	195,266	25,445	792		221,503	190,502
2024		28,506	1,775	720	31,001	195,266	25,445	792		221,503	190,502
2025		28,506	1,775	720	31,001	195,266	25,445	792		221,503	190,502
2026	-367,471	28,506	1,775	720	-336,470	195,266	25,445	792		221,503	557,973
									FIRR =		5.7%
									NPV (at 2.7% discount rate) =		856,340

5.5.8 Comparison of Alternative Airport Development Plans

Two alternative development plans formulated in Section 5.5.2, i.e. Alternative BE : development of the existing airport and Alternative BN : development of the new airport, are evaluated from the various viewpoints. The following sections summarize the evaluation results.

1) Convenience of Users

Major difference in convenience of users will be airport access. The existing airport is located about 3km southwest of Bacolod City, and it takes about 8 to 10 minutes from the provincial capitol.. The new airport site is about 14 km north-northeast of Bacolod City, and it takes about 25 to 30 minutes (about 20km travel distance) from the capitol at present. Therefore, Alternative BE (the existing airport development) will be convenient for users.

2) Operational Conditions

Alternative BE will have a 150m wide runway strip, while Alternative BN will have a 300m wide runway strip. As the 150m wide runway strip is substandard, some operational restriction will be imposed on Alternative BE.

3) Expandability

It is obvious that the new airport development (Alternative BN) will have larger expandability. It is considered that Alternative BE is almost the ultimate development of the existing airport, because it will be very difficult to provide a parallel taxiway, larger terminal area, etc.

4) Environmental Considerations

Development of the existing airport (Alternative BE) will have more adverse impact on resettlement, water rights and rights of common, hazards, hydrological situation, coastal zone, flora and fauna, meteorology, landscape, and noise and vibration. Split of community is only the environmental issue which Alternative BE will have advantage bover Alternative BN.

It should also be noted that Alternative BE will have significant impacts on resettlement, hydrological situation, coastal zone, flora and fauna, and noise and vibration.

5) Ease of Construction and Project Cost

Construction works of the new airport development (Alternative BN) will be easier than the existing airport development (Alternative BE), because there will be no restrictions due to the aircraft operation.

Cost estimates of Alternatives BE and BN in Section 5.5.4 are summarized in Table 5.5.20. As seen the new airport development (Alternative BN) will be more expensive in construction cost, but less expensive in land acquisition and compensation. There will be no difference in costs of Long Term Development. Total cost of the new airport development (Alternative BN) is estimated to be about 16% less than that of the existing airport development (Alternative BE).

Table 5.5.20 Comparison of Costs of Alternatives BE and BN

Unit: PHP million

Item	Alternative BE	Alternative BN
Medium Term Development		
Construction Cost	1699.6	1,762.9
Land Acquisition & Compensation	560.4	11.2
Consultancy Services	170.0	176.3
Contingency	187.0	193.9
Total	2,616.9	2,144.3
Long Term Development		
Construction Cost	229.2	229.2
Land Acquisition & Compensation	0.0	0.0
Consultancy Services	22.9	22.9
Contingency	25.2	25.2
Total	277.4	277.4
Overall Development		
Construction Cost	1,928.8	1,992.1
Land Acquisition & Compensation	560.4	11.2
Consultancy Services	192.9	199.2
Contingency	212.2	219.1
Total	2,894.3	2,421.7

Results of the economic and financial analyses are summarized in Table 5.5.21.

Table 5.5.21 Comparison of Results of Economic and Financial Analyses

Item	Alternative BE	Alternative BN
Economic Analysis		
Internal Rate of Returns	16.0 %	21.9%
Net Present Value at 15% Discount Rate	PHP 145 million	PHP 698 million
Financial Analysis		
Internal Rate of Returns	3.0%	5.7%
Net Present Value at 2.7% Discount Rate	PHP 112 million	PHP 856 million

Note: Increases of charges by 700% are assumed in the financial analysis.

5.5.9 Conclusion

Table 5.5.22 summarizes relative advantages of alternatives.

Table 5.5.22 Relative Advantages of Alternatives

Item	Alternative BE	Alternative BN
1) Convenience of Users	- About 17km (or 20 minutes) closer to the provincial capitol.	-
2) Operational Conditions	-	- No operational disadvantages due to the narrow runway strip.
3) Expandability	-	- Greater expandability beyond year 2015.
4) Environmental Considerations	-	- Less relocation of inhabitants. - Reduce aircraft noise problem of the province.
5) Project Cost and Ease of Construction	-	- No restricted work due to the aircraft operations. - Lower project cost. - Higher economic internal rate of returns and net present value. - Higher financial internal rate of returns and net present value.

Development of the new airport in Medium Term is considered preferable for the following reasons:

a) Economic Internal Rate of Returns of the new airport development is higher than that of the existing airport development.

b) New airport development has less environmental impacts especially impacts by relocation and aircraft noise pollution.

c) The future expansion area can easily be reserved at new airport site, while expansion of the existing airport after the year 2015 is impossible without relocation of houses at either St. Vincent Village or Villa Cristina Subdivision.

5.6 SCOPE OF MEDIUM TERM DEVELOPMENT

On the basis of the optimum development plan of Bacolod Airport established in the previous sections, the scope of the phased development plan is identified and outlined in Table 5.6.1.

Table 5.6.1 Scope of the Phased Development Plan of Bacolod Airport

Item	Medium Term	Long Term
1. Civil Works		
1.1 Earthworks and drainage works	X	
1.2 Construction of runway	X	
1.3 Construction of apron and taxiways	X	
1.4 Construction of shoulders for runway, taxiways and apron	X	
1.5 Construction of access road	X	
1.6 Construction of car park	X	
1.7 Construction of airside service roads	X	
1.8 Construction of perimeter fence	X	
1.9 Expansion of car park		X
2. Building Works		
2.1 Construction of passenger terminal building	X	
2.2 Construction of cargo terminal building	X	
2.3 Construction of control tower	X	
2.4 Construction of fire station	X	
2.5 Construction of administration building	X	
2.6 Expansion of passenger terminal building		X
2.7 Expansion of cargo terminal building		X
3. Air Navigation Systems		
3.1 Radio Navigation Aids		
3.1.1 Installation of D-VOR/DME	X	
3.1.2 Installation of ILS Cat I	X	
3.2 ATC and Communication Systems		
3.2.1 Relocation of PC/fax machine from the existing airport	X	
3.2.2 Relocation of VSAT from the existing airport	X	
3.2.3 Installation of ATC equipment	X	

(to be continued)

Table 5.6.1 Scope of the Phased Development Plan of Bacolod Airport (Continued)

Item	Medium Term	Long Term
3.3 Aeronautical Ground Lighting System		
3.3.1 Installation of PALS for Runway 03	X	
3.3.2 Installation of SALS for Runway 21	X	
4. Airport Utilities		
4.1 Installation of power supply system	X	
4.2 Installation of telephone system	X	
4.3 Construction of water supply system	X	
4.4 Construction of sewerage system	X	
4.5 Installation of incinerator	X	
4.6 Installation of aircraft fuel supply system	X	
4.7 Expansion of aircraft fuel supply system		X
5. Land Acquisition and Relocation		
5.1 Land acquisition and resettlement of households	X	
5.2 Relocation of provincial road	X	

Chapter 6 Master Planning for Iloilo Airport

CHAPTER 6 MASTER PLANNING FOR ILOILO AIRPORT

6.1 GENERAL

Iloilo Airport is located at about 3km west-northwest of Iloilo City, the capitol of Iloilo Province, Region 6 (Western Visayas). Figures 6.1.1 and 6.1.2 are the airport vicinity map and the existing airport facility layout plan.

This chapter describes the existing conditions of Iloilo Airport and its surroundings, evaluation of the existing airport facilities, airport development master plan and scope of medium term development. Socio-economic conditions of the airport surrounding area are described in Section 2.2.

6.2 EXISTING CONDITIONS OF THE AIRPORT AND ITS SURROUNDINGS

6.2.1 Airport History

No precise record has been maintained to the ATO regarding the inauguration year of Iloilo Airport. However, it is known that the airport initially had a 1,000m long, 18m wide macadam runway with 60m by 40m apron and a small terminal building. By 1966 the runway was paved with cement concrete, and the apron was extended to 218m by 80m. In 1967 the runway was extended to 1,500m. It was further extended and widened phase by phase to 2,100m by 36m by 1973. The overlay of the runway and taxiway pavement was completed in 1992.

In 1975, the old terminal building was demolished, and a new passenger terminal building was constructed, which is presently used as a departing passenger terminal. The annex terminal building was added in 1992, which now accommodates arriving passenger handling facilities, ATO's administration office and PAL's ticketing office. The control tower was built in 1975. Major changes to the airport have been occurring since the entry of new airline companies to Philippine's domestic air transport market in 1994. Air Philippines started operation in February 1996, and Cebu Pacific in the following month. Grand Air was scheduled to commence operation in April 1996, but has not been realized as of May 1996. Philippine Airlines completed a new cargo terminal/domestic ticketing office in January 1996, releasing a part of the terminal to Grand Air. Cebu Pacific constructed a small check-in and ticketing office besides the main terminal building, while Air Philippines established an office besides the vehicle parking area.

There has been no serious aircraft accident at Iloilo Airport.

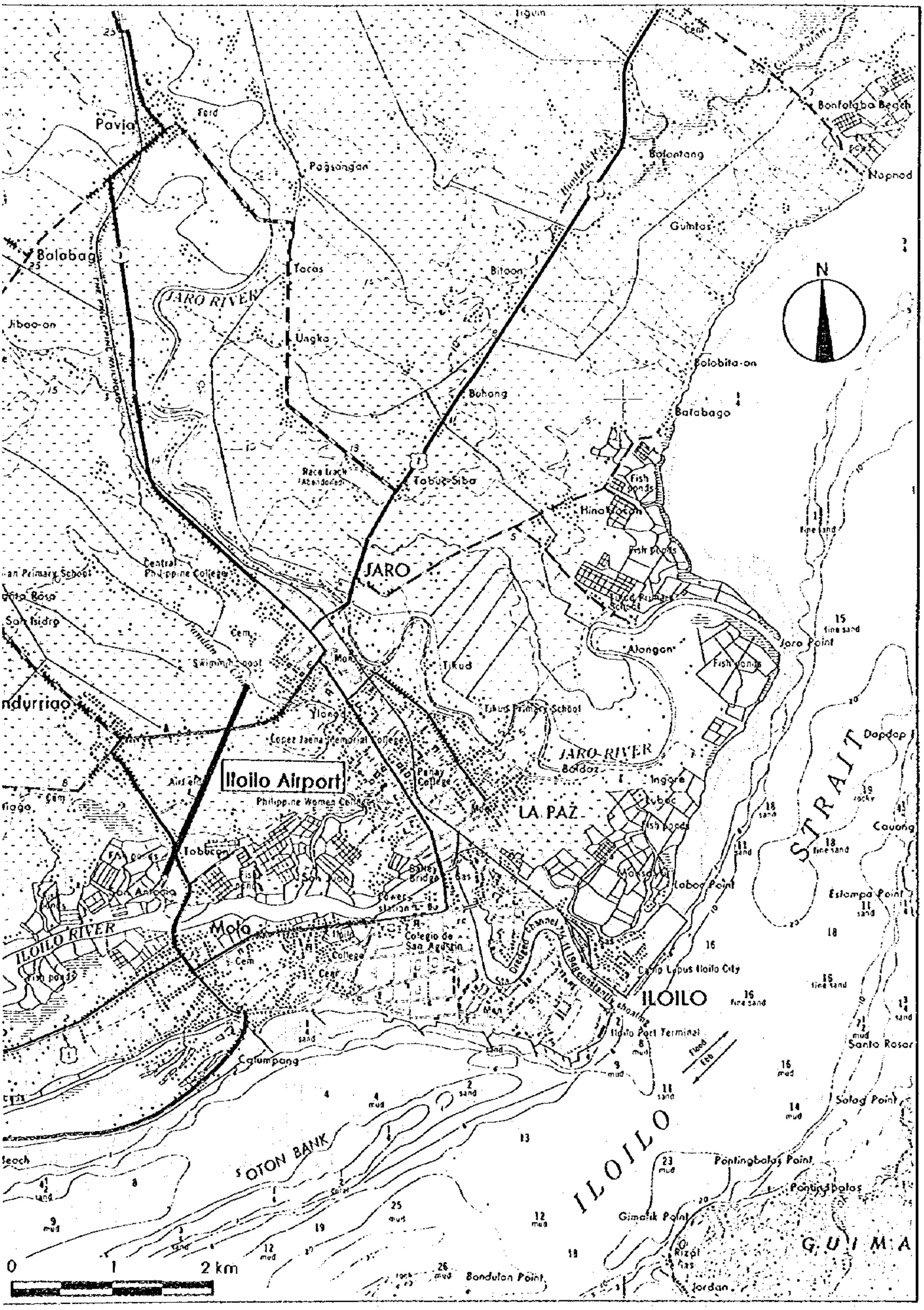
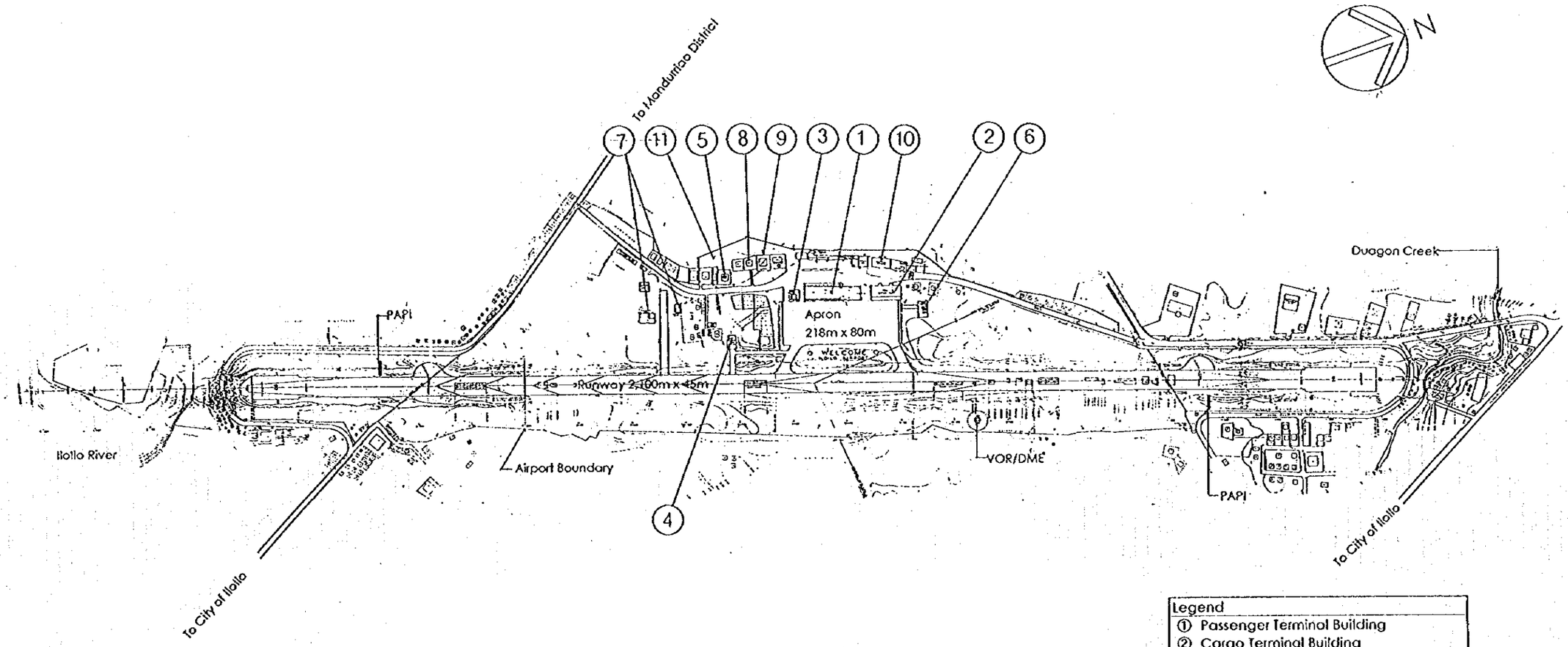


Figure 6.1.1 Vicinity Map of Iloilo Airport



Legend

① Passenger Terminal Building
② Cargo Terminal Building
③ Control Tower
④ Fire Station
⑤ Power House
⑥ PAL Fuel Farm
⑦ General Aviation Hangars
⑧ PAGASA Building
⑨ Aviation Security Command Building
⑩ Concessions
⑪ ATO Staff Housing

0 500m

Figure 6.1.2 Existing Layout of Facilities at Iloilo Airport
Scale=1/8,000

6.2.2 Airport Inventory

Table 6.2.1 shows an inventory of Iloilo Airport.

Table 6.2.1 Inventory of Iloilo Airport

Items	Description
1. Aerodrome Data	
City / Aerodrome	Iloilo / Iloilo Airport
Domestic/International	Domestic (Trunkline, Area 5, Center)
ICAO Reference Code	4C
Aerodrome Reference Point	10°42'53"N, 122°32'37"E
Distance and Direction from City	3.0km northwest of city center
Elevation	8.2m
Reference Temperature	32.5 °C
Magnetic Variation	N00°05'W
Operational Hours	24 hrs.
Seasonal Availability	All seasons
Supervising Authority	Air Transportation Office, DOTC
Transportation Available	Taxi and jeepney
2. Aircraft Operational Data	
Wind Coverage	Data not available
Operational Category	Non-Precision Approach
Established Procedures	VOR RWY02 and 20
Transition Altitude	3,000 ft
Local Flying Restriction	Closed to acft without a functioning 2-way radio
3. Facilities	
Runway	
Designation	02/20
True Bearing	23°37'
Dimension	2,100m x 45m
Longitudinal Slope	0.148% uphill to the N
Stopway	Nil
Clearway	Nil (120m (RWY 02), 150m (RWY 20) in AIP)
Runway Strip	2,220m x 150m
Surface	Asphalt overlay on cement concrete
Strength	PCN39R/B/W/T
Taxiway	
Configuration	2 connection with apron (2 x 60m)
Width	23m
Surface	Concrete
Strength	PCN39R/B/W/T
Apron	
Aircraft Stands	B737 x 4
Parking Configuration	Self-maneuvering
Area	218 m x 80 m
Surface	Concrete
Strength	Data not available

Table 6.2.1 Inventory of Iloilo Airport (Continued)

Items	Description
Passenger Terminal Buildings	
Structure	Reinforced concrete, 1 story
Floor Area	2,202 sq.m (including administration office)
Cargo Terminal Building	(PAL owned)
Structure	Reinforced concrete, 1 story
Floor Area	960 sq.m (including domestic ticketing office)
Control Tower Building	
Structure	Reinforced concrete, 5 stories
Floor Area	170 sq.m
Floor Height	17.0m
Administration Building	
Structure	Part of passenger terminal building
Floor Area	138 sq.m
Fire Station	
Structure	Reinforced concrete, 1 story
Floor Area	300 sq.m
Vehicle Parking Area	
Area	6,000 sq.m
Capacity	150 vehicles
Surface	Asphalt
Access Road	
Number of Lanes	2 lanes
Width	7m (north)/6m (south)
Surface	Asphalt
Air Navigation System	
Radio Navigation Aids	C-VOR "IOO": 116.3MHz DME: Ch. 100x
Telecommunication Systems	TWR: 123.4MHz FSS: 5,205 and 3,872.5KHz APP (at Bacolod)
Aeronautical Ground Lighting Systems	Approach Lights (RWY02/20) Approach Path Indicator (RWY02/20) Runway Edge Lights Runway Threshold and End Lights (RWY 02/20) Apron/Taxiway Edge Lights Aerodrome Beacon Apron Flood Lights
Meteorological Observation Systems	Basic items, manual system (PAGASA) Wind, temperature and air pressure sensors for control tower
Rescue and Fire Fighting Facilities	
Fire Fighting Vehicles	One major vehicle - 800 imperial gal. water and 60 imperial gal. form Two rapid intervention vehicles - 600 gal. water and 50 gal. foam. - 600 gal. water and 50 gal. foam
Level of Protection	Category 6
Number of Trained Personnel	30

Table 6.2.1 Inventory of Iloilo Airport (Continued)

Items	Description
Public Utilities	
Power Supply	
Capacity of Main Transformers	Nil
Receiving Voltage	220V
Stand-by Generators	90KVA x 1 and 100KVA x 1 PAL has a small generator set.
Water Supply	
Water Source	Metro Iloilo Water District
Supply Capacity	Data not available
Water Tank	Elevated tank (10,000 gals.) for terminal building, Small tanks for control tower and power plant
Sewerage System	
Type of Treatment	Septic tanks for individual buildings
Solid Waste Disposal System	Collected by the city authority, incinerate in the airport or dumped outside the city
Telephone System	3 external lines for ATO No PABX Separate contract with PLDT by other users 2 telephone booths of PLDT for public use
Other Facilities	
Aviation Fuel Supply System	
Type of Fuel	Jet-A1
Storage Capacity	12,000 gal. tank x 2
Supply System	Hydrant system with 4 pits
Aircraft Maintenance Hangar	2 for light aircraft (There are 2 more applicants)
Airport Vehicles	Data not available
Airport Maintenance Equipment	Handy grass cutters
Airport Staff Housing	13 lots of land near the airport, 10 occupied

6.2.3 Current Airport Development Projects

A major work which is presently ongoing at Iloilo Airport is the widening of the runway from 36m to 45m. The runway was scheduled to have 45m of width 1,290m from the runway 20 threshold and 85m from the runway 02 threshold by the early May 1996. The remaining 725m middle portion will be widened within the current Five Year National Airport Development Program (1995-2000). The construction of the perimeter fence is expected to be carried out in 1996. A 10,000 sq.m land acquisition for expanding vehicle parking area has also been initiated. The list of projects listed in the Five Year National Airport Development Program (1995-2000) is as follows:

Infrastructure:

a) Widening of runway from 36m to 45m (2,000m x 9m) - Asphalt
b) Expansion of vehicle parking area from 880 sq.m to 2,085 sq.m
c) Rehabilitation of terminal and fire station building
d) Construction of perimeter fence

e) Obstruction removal on both Runway approaches and west side of airstrip
f) Runway strip grade correction
g) Relocation of fire station building
h) Relocation of administration building
i) Asphalt overlay of existing apron and 2 taxiways (2-18m x 60m)
j) Apron expansion from 218m x 80m to 300m x 80m - Asphalt

Air navigation Systems:

a) Construction of power house
b) Construction of 5-story control tower building
c) Purchase/install of FSS/TWR equipment

Total investment requirement is estimated to be PHP 52 million for infrastructure and PHP 17.7 million for air navigation systems..

The estimated costs of the project to be implemented in the fiscal year 1996 is as follows:

a)	Widening of runway to 45m	PHP 3,800,000
b)	Construction of CHB perimeter fence	PHP 1,900,000

In addition to above, the Iloilo ATO identified the construction of general aviation parking area, repair and rehabilitation of the terminal building, etc. as necessary works up to 2000.

Japan's OECF financed Nationwide Air Navigation Facility Modernization Project Phase III will include following equipment and associated works:

a) PC/Fax Machine
b) VSAT
c) D-VOR/DME
d) VOR/DME Building
e) Site Development

The entry of the three new airline companies to Iloilo Airport will bring about further rearrangement of passenger terminal building. The Iloilo ATO approved Air Philippines to use a space between the existing ATO administration office and PAL's domestic ticketing/cargo terminal building for check-in facilities. PAL contemplates to take over the spaces currently occupied by two cafeterias in order to relocate and expend check-in facilities. Also there is a plan to construct new terminal facilities on the opposite side of the existing terminal.

USAID provided a set of ILS equipment to Iloilo Airport in May 1995. The ATO has negotiated the acquisition for necessary land for installing a glide path antenna and its shelter. However, the project has been suspended due to shortage of budget. The equipment is now stored in and around the fire station.

has been suspended due to shortage of budget. The equipment is now stored in and around the fire station.

There is a proposal from a local Congressman that the runway be extended to the south up to 2,500m. The DOTC made a survey for possible runway extension in January 1995. No further decision has been made since then.

6.2.4 Airport Access

Figure 6.2.1 shows existing major road network around Iloilo Airport. As seen, there are two access routes to the airport terminal area. The main access road is the one from the north which connect the airport and Iloilo-Jaro West Diversion Road. The access roads are about 6 m wide two-lane roads with asphalt surfacing, and are in a reasonable condition at the time of investigation. Iloilo-Jaro West Diversion Road has also two lanes near the airport. It normally takes about 10 to 15 minutes from the center of Iloilo City to the airport. Taxis and jeepneys are public transportation available at the airport and in the city.

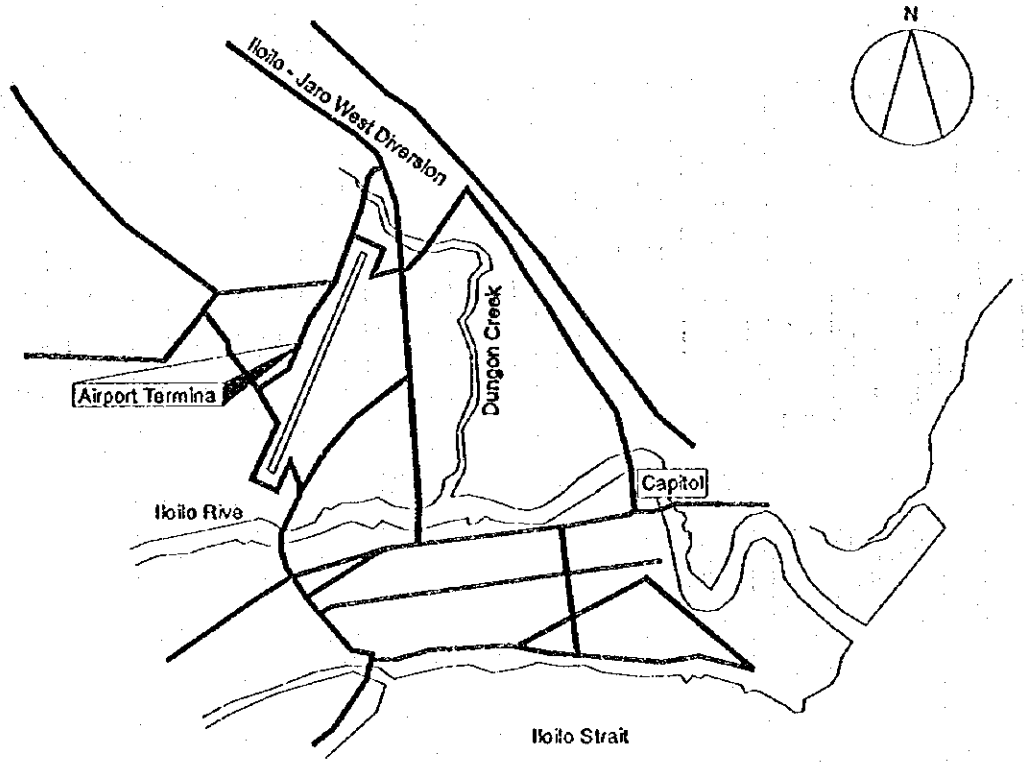


Figure 6.2.1 Existing Major Road Network around Iloilo Airpor

6.2.5 Public Utilities

1) Water Supply

Water is supplied by Metro Iloilo Water District. Existing supply capacity is about 25,000 cu.m per day. The capacity will be doubled soon to meet the demand. Water sources are surface water from Ma-asin, about 40 km north of the city, and ground water from seven wells in San Miguel, Pavia and Oton Districts. Two 400 mm diameter pipes run near the airport, one to the north of the airport terminal and another to the west of the terminal. They cross the runway near the both ends of the runway.

2) Power Supply

Electric power is supplied in the City of Iloilo by Panay Electric Cooperative (PECO). Existing power transmission line to the airport surroundings is 13.2KV, 3-phase, 4-wire, 60Hz. Its capacity is 5.5MW, and is considered sufficient for the years to come.

3) Telephone Facility

Telephone facility is provided by PLDT. Existing telephone cable to the airport is 26-pair, and new 50-pair cable will be installed by May 1996. New Mandurriao Office of PLDT, which is capable to handle 3,000 lines, will start operation by August 1996.

6.2.6 Airport Surroundings

Iloilo Airport is located at about 3km west-northwest of Iloilo City, on the north of Iloilo River. There is Dungon Creek to the north of the airport. Figure 6.2.2 shows existing land use around Iloilo Airport. As seen, the airport surroundings are mainly used as rice fields. There are fish ponds and salt beds between the airport and Iloilo River. Residential areas are scattered along the roads. About 40 squatters in the airport property area near the runway 02 threshold will be relocated soon.

Names and populations (as of 1990) of communities around the airport are as follows:

a) Barangay Airport : 3,678
b) Barangay Buhang : 2,809
c) Barangay Tabukan : 2,756
d) Barangay San Rafael : 826
e) Barangay Santa Rosa : 801

There are several schools, churches and hospitals around the airport.

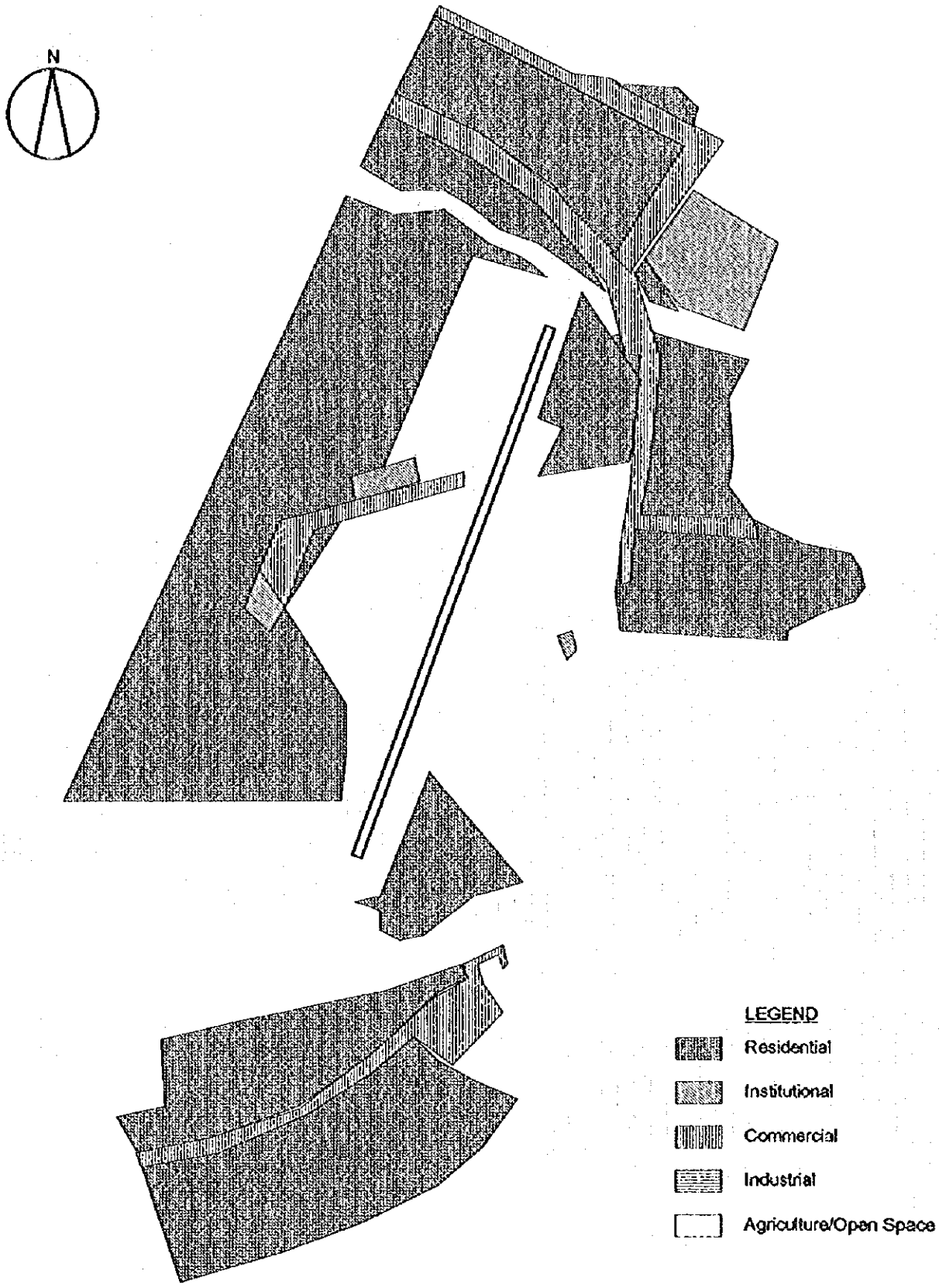


Figure 6.2.2 Existing Land Use around Iloilo Airport

Future land use plan prepared by the City of Iloilo is shown in Figure 6.2.3. As seen, the area to the southeast of the airport is designated as light commercial area, and others are mainly light to heavy residential areas.

It seems that there are no historical or cultural properties in the vicinity of the airport. As the airport surroundings have already been developed, endangered or rare species of fauna and flora, most likely, do not exist. There has been no complaint for pollution in Iloilo City except one related to water pollution of Iloilo River due to the pig breeding project.

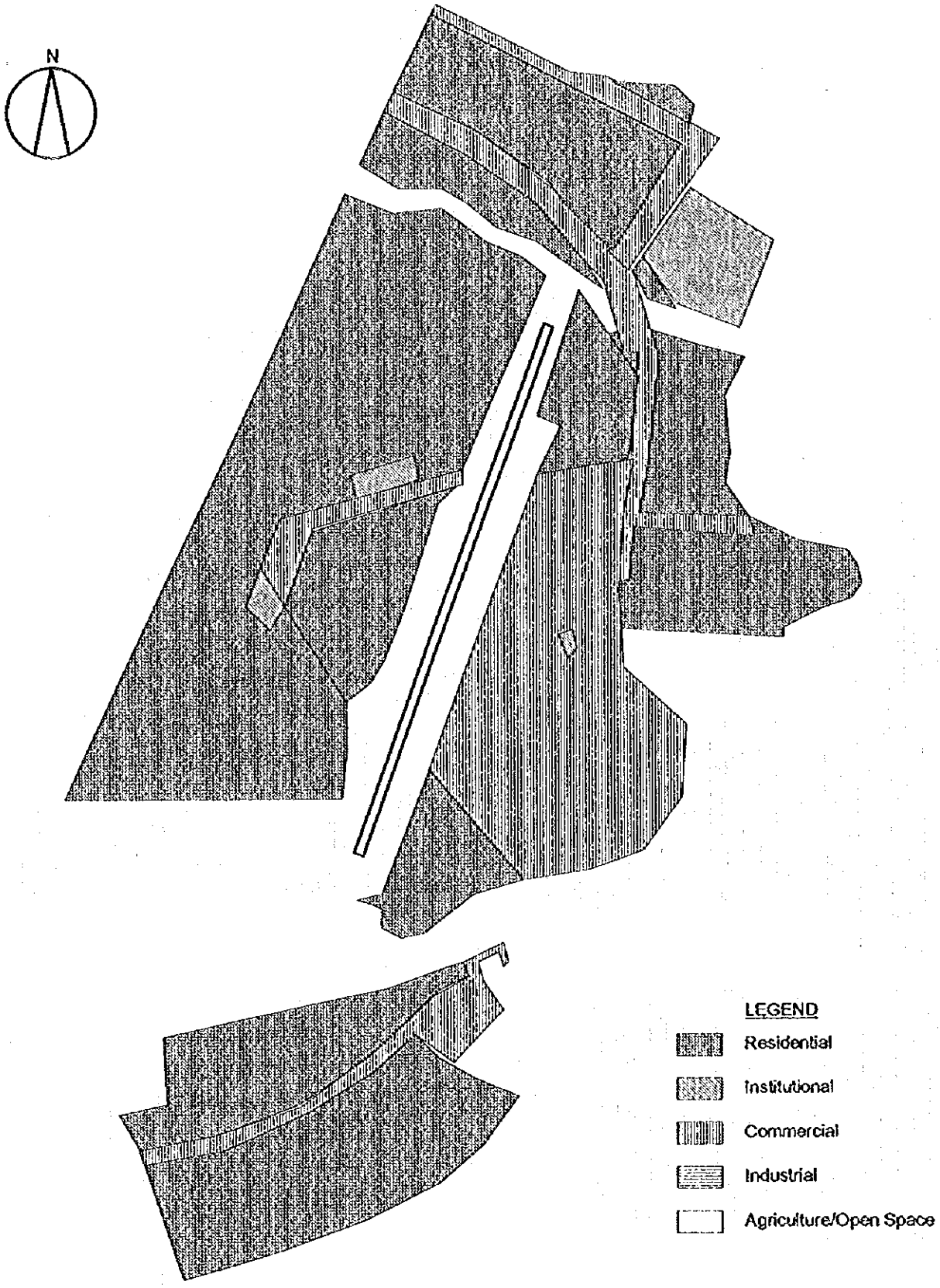


Figure 6.2.3 Future Land Use Plan of Iloilo City around Iloilo Airport