

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS
REPUBLIC OF THE PHILIPPINES

THE STUDY
ON
SELECTED AIRPORTS MASTER PLANNING PROJECT
IN
THE REPUBLIC OF THE PHILIPPINES

FINAL REPORT

Volume 1 : SUMMARY

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March 1997

PACIFIC CONSULTANTS INTERNATIONAL
AERO ASAHI CORPORATION
JOINT VENTURE-TOKYO, JAPAN

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JAPAN INTERNATIONAL COOPERATION AGENCY(JICA)

*DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS
REPUBLIC OF THE PHILIPPINES*

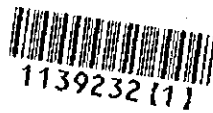
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NOTE

The following exchange rate was adopted throughout this report:

US\$ 1.00 = PHP 26.00 = Yen 110 (June 1996)

PHP 1.00 = Yen 4.231

PREFACE

In response to a request from the Government of the Republic of the Philippines, the Government of Japan decided to conduct a study on the Selected Airports Master Planning Project and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Philippines a study team, consisting of the members from Pacific Consultants International and Aero Asahi Cooperation and headed by Mr. Hideki Murata of Pacific Consultants International, three times between March 1996 and January 1997.

The team held discussions with the officials concerned of the Government of the Philippines, and conducted field surveys at the study area. After the team returned to Japan, further studies were made and the present report was prepared.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Philippines for their close cooperation extended to the team.

March 1997



Kimio Fujita

President

Japan International Cooperation Agency

March 1997

Mr. Kimio Fujita
President
Japan International Cooperation Agency
Tokyo, Japan

Dear Mr. Fujita

Letter of Transmittal

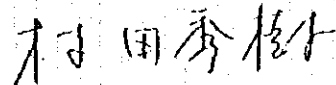
We are pleased to submit to you the final report on the Study on the Selected Airports Master Planning Project in the Republic of the Philippines. The report contains the results of master planning for the four trunkline airports and feasibility study on the medium term development project for one airport selected from the four airports.

The report presents long term development master plans for Bacolod, Iloilo, Tacloban and Legaspi Airports. As the results of comparison of these four airport development master plans indicates that the New Bacolod Airport Development Project has high priority and less problems in implementation, the New Bacolod Airport Development Project was selected for the feasibility study. The feasibility study on the New Bacolod Airport Development Project indicates that the project is technically, economically and environmentally feasible. With regard to the financial feasibility, increase of airport charges is considered necessary.

Since the existing Bacolod Airport has safety problems and limited operational opportunities for the airlines other than Philippine Airlines, who own the existing passenger terminal building, we recommend that the Government of the Philippines implement this project as a top priority.

We wish to take this opportunity to express our sincere gratitude to your Agency, the Ministry of Foreign Affairs, the Ministry of Transport and the Overseas Economic Cooperation Fund of Japan. We also wish to express our deep gratitude to the Department of Transport and Communications, Air Transportation Office and other authorities concerned of the Republic of the Philippines for the close cooperation and assistance extended to us during our study.

Very truly yours,



Hideki Murata
Team Leader

Study Team for the Selected Airports
Master Planning Project

**THE STUDY
ON
SELECTED AIRPORTS MASTER PLANNING PROJECT
IN
THE REPUBLIC OF THE PHILIPPINES**

EXECUTIVE SUMMARY

1. OBJECTIVES OF THE STUDY

The main objectives of the Study are:

- a) to formulate a master plan of each of Bacolod, Iloilo, Tacloban and Legaspi airports for the year 2015; and
- b) to conduct a feasibility study on a selected airport project for the year 2005.

2. OUTLINE OF THE MASTER PLANNING

1) Future Air Traffic Demand

Year	Actual	Forecast	
	1995	2005	2015
Annual Passengers			
Bacolod	371,955	1,003,000	1,436,000
Iloilo	460,423	1,179,000	1,688,000
Tacloban	258,190	655,000	938,000
Legaspi	161,977	375,000	537,000
Annual Cargo Volume (ton)			
Bacolod	7,581	15,600	22,400
Iloilo	4,771	12,800	18,400
Tacloban	2,881	5,600	8,000
Legaspi	919	1,900	2,700
Annual Aircraft Movements			
Bacolod	24,444	7,060	8,890
Iloilo	14,486	9,280	11,400
Tacloban	3,094	5,010	6,730
Legaspi	2,332	4,360	5,130

2) Long Term Development Plan of Bacolod Airport

As a result of the master planning, development of a new airport at about 5km east of Silay City was selected as an optimum development scheme for Negros Occidental. The long term development plan of the New Bacolod Airport includes:

- a) Land acquisition of about 108ha;
- b) Construction of a 2,000m x 45m runway with 300m wide runway strip.
- c) Construction of a new passenger terminal, including apron, passenger building, cargo building, control tower and administration building, fire station, fuel farm, car park, etc., on the west side of the runway; and
- d) Installation of air navigation systems including Cat-I ILS, PALS, SALS, etc.

As a result of the master planning study, it can be concluded that the development of the New Bacolod Airport is economically feasible.

3) Long Term Development Plan of Iloilo Airport

The long term development plan of the existing Iloilo Airport includes;

- a) Land acquisition of about 30ha;
- b) Overlay of the existing runway by 19 cm;
- c) Relocation of the Runway 20 threshold by 160m.
- d) Construction of a new passenger terminal, including apron, passenger building, cargo building, control tower and administration building, fire station, fuel farm, car park, etc., on the east side of the runway; and
- e) Installation of air navigation systems including Cat-I ILS, PALS, SALS, etc.

As a result of the master planning study of the existing Iloilo Airport development, it can be concluded that the development of the existing airport is economically feasible, but has some problems in environmental protection. It is, therefore, recommended to conduct a site selection study for a new airport.

4) Long Term Development Plan of Tacloban Airport

The long term development plan of the existing Tacloban Airport includes;

- a) Land acquisition of about 15ha;
- b) Construction of a new shore protection wall of 1,450m;
- c) Overlay of the existing runway by 8 cm;
- d) Construction of a new passenger terminal, including apron, passenger building, cargo building, control tower and administration building, fire station, fuel farm, car park, etc., to the south of the existing terminal; and
- e) Installation of air navigation systems including Cat-I ILS, PALS, etc.

As a result of the master planning study of the existing Tacloban Airport development, it can be concluded that the development of the existing airport is economically feasible.

5) Long Term Development Plan of Legaspi Airport

The long term development plan of the existing Legaspi Airport includes;

- a) Removal of hill obstacles which involves earthworks (cut) of about 20 million cu.m;
- b) Land acquisition of about 23ha;
- c) Overlay of the existing runway by 4 cm;
- d) Overlay of apron and taxiways by 10cm;
- e) Development / expansion of the existing terminal area, including construction of new passenger building, control tower, administration building, and fire station, conversion of the existing passenger building to a cargo building, etc., in the existing terminal area; and
- f) Installation of air navigation systems including Cat-1 ILS, PALS, SALS, etc.

As a result of the master planning study of the existing Legaspi Airport development, it can be concluded that the development of the existing airport is economically and environmentally infeasible due to the hill obstacle removal for the operational safety. It is, therefore, recommended to conduct a site selection study for a new airport as soon as possible.

6) Selection of an Airport for Feasibility Study

Evaluation results of the four airport development master plans are summarized in the table on the next page.

As seen, the development of Bacolod and Iloilo Airports should have higher priority from the view point of Economic Internal Rate of Returns and number of beneficiaries. Comparing the developments of Bacolod and Iloilo Airports, it was considered that the development of Bacolod Airport had less technical and environmental problems. Therefore, it was decided to conduct a feasibility study on Medium Term Development of Bacolod Airport in the Study.

Comparison of Four Airport Developments

Item	Bacolod Airport	Iloilo Airport	Tacolban Airport	Legaspi Airport
1. Annual Passengers				
Year 2005	1,003,000	1,179,000	655,000	375,000
Year 2015	1,456,000	1,688,000	938,000	537,000
2. Project Costs (PHP million)				
Medium Term	2,144	1,770	1,377	3,049
Long Term	277	320	166	264
Total	2,421	2,090	1,543	3,313
3. Technical / Environmental Issues	<ul style="list-style-type: none"> - Minimal adverse impacts by resettlement of inhabitants. - Reduce aircraft noise problems of the province. - Little adverse impacts on flora and fauna. 	<ul style="list-style-type: none"> - Considerable adverse impacts by resettlement of inhabitants. - Substantial increase of aircraft noise pollution. - Little impacts on flora and fauna. 	<ul style="list-style-type: none"> - Some adverse impacts by resettlement of inhabitants. - Some increase of aircraft noise pollution on Runway 36 side. - Need special attentions to avoid adverse impacts on the mangrove area near the Runway 18 end. 	<ul style="list-style-type: none"> - Some adverse impacts by resettlement of inhabitants. - Substantial increase of aircraft noise pollution. - Adverse impacts on flora and fauna by cutting the hill tops. - Impacts on landscape by removal of hill tops. - Potential environmental problems by transportation and dumping of the removed soils and rocks
4. EIRR	21.9%	21.8%	19.7%	6.1%

Note: Due to the environmental problems, it is recommended to conduct a study on new airport development for Iloilo and Legaspi Airports.

3. OUTLINE OF THE FEASIBILITY STUDY ON MEDIUM TERM DEVELOPMENT OF NEW BACOLOD AIRPORT

1) Scope of Medium Term Development Project

- a) Land acquisition of about 180ha (increased to secure expandability beyond 2015).
- b) Site preparation including earthworks of about 0.08 and 1.48 million cu.m cut and fill respectively, construction of drainage system.
- c) Construction of a 2,000m x 45m runway, a 229m x 110m passenger apron and associated taxiway system.
- d) Construction of a passenger terminal building (7,000 sq.m), cargo terminal building (1,850 sq.m), control tower and administration building (1,910 sq.m), and fire station (560 sq.m).
- e) Installation of radio navigation aids, ATC and communication, airfield lighting, and meteorological observation systems required for CAT-1 instrument approach and other operations expected at the new airport.
- f) Construction of power supply, telephone, water supply, sewerage, solid waste disposal and aviation fuel supply systems.
- g) Procurement of fire fighting vehicles and airport maintenance equipment.

2) Project Implementation Schedule

- | | |
|-----------------------------------|------------------------------------|
| - Foreign Financing Arrangements: | by December 1997 |
| - Selection of Consultant: | from November 1997 to January 1998 |
| - Engineering Design: | from February 1998 to January 1999 |
| - Land Acquisition: | from January 1998 to December 1999 |
| - Pre-qualification: | from January 1999 to March 1999 |
| - Tendering: | from April 1999 to December 1999 |
| - Construction Works: | from January 2000 to June 2002 |
| - Inauguration: | July 2002 |
| - Defect Liability Period: | from July 2002 to June 2003 |

3) Cost of the Project

	Foreign Portion (Yen '000)	Local Portion (PHP '000)	Total (PHP '000)
Land Acquisition and Compensation	0	27,787	27,787
Construction Cost	4,420,289	1,185,761	2,230,557
Consultancy Services	442,029	118,576	223,056
Total	4,862,318	1,332,125	2,481,400

Note: At 1996 price, exchange rates US\$1.00 = PHP 26.00 = Yen110, include about 10% contingency.

4) Feasibility of the Project

(1) Economic Feasibility

The Project is considered feasible in terms of benefits to the national economy since the Economic Internal Rate of Returns is much greater than the 'opportunity cost of capital' of 15% suggested by NEDA.

Economic Internal Rate of Return	:	18.8%
Net Present Value (at 15% discount rate):		PHP 271 million

(2) Financial Feasibility

Since the present level of airport charges are quite low, the Project will be financially infeasible without the increase of charges. A 90% increase of all charges will be required to cover the operation and maintenance costs of the new airport. In order to cover the investment cost as well as operation and maintenance costs much higher pricing will be required. The following are examples of increases, if a soft loan with 2.7% interest rate and a state subsidy equal to 25% of total project cost are available.

- Once-for-all 550% increase of prices by the inauguration of the new airport.
- 10% annual increase of prices from the year 1997.

(3) Environmental Feasibility

The Project will be viable if further study on impacts on traffic, hydrological situation, flora and fauna, air pollution, water pollution, noise pollution, etc. is conducted during the detailed design and construction supervision stages, and appropriate mitigation measures are applied. Careful planning and implementation of resettlement program is required to minimize the adverse impact to the people suffered by the Project.

4. Conclusion and Recommendations

1) Conclusion

As a result of comprehensive study of the development of Bacolod Airport, it can be concluded that the new airport development at approximately 5km east of Silay City is the most effective, efficient and sustainable airport development scheme of Negros Occidental. The existing Bacolod Airport has various safety problems, limited opportunities of operations for the airlines other than PAL, and constraints for further developments. Therefore, the development of the new airport is one of the most urgent requirements for the civil aviation of the Philippines, especially for ensuring safe and reliable air transportation to/from Negros Occidental.

The Study also includes master development planning for Iloilo, Tacloban and Legaspi Airports. It can be concluded that the development of these three airports are also important and urgent requirements for the balanced development of the civil aviation of the Philippines.

2) Recommendations for Development of Bacolod Airport

- a) Approve the medium term development plan of the new airport at about 5km east of Silay City by the Government of the Philippines.
- b) Initiate financial arrangement at the earliest possible time including both the low interest rate soft loan from the foreign country and the local counterpart finance.
- c) Create, as soon as possible, a project team in the ATO and an interagency committee for the implementation of the Project.
- d) Employ as soon as possible a consultant for the basic and detailed designs of the airport facilities and environmental mitigation measures, and preparation of tender documents.
- e) Coordinate with all national and local government units related to the Project so that all government's activities are harmonized with the Project. Special attentions should be given to the road network, city water supply system, and land use zoning around the new airport and in the region.
- f) Initiate, as soon as possible, monitoring and controlling the migration of people and transaction of land ownership at and around the new airport site so as to avoid unnecessary increase of costs for land acquisition and compensation.
- g) Review the levels of airport charges so as to improve the financial status of the airport.

3) Recommendations for Other Airports

(1) Iloilo Airport

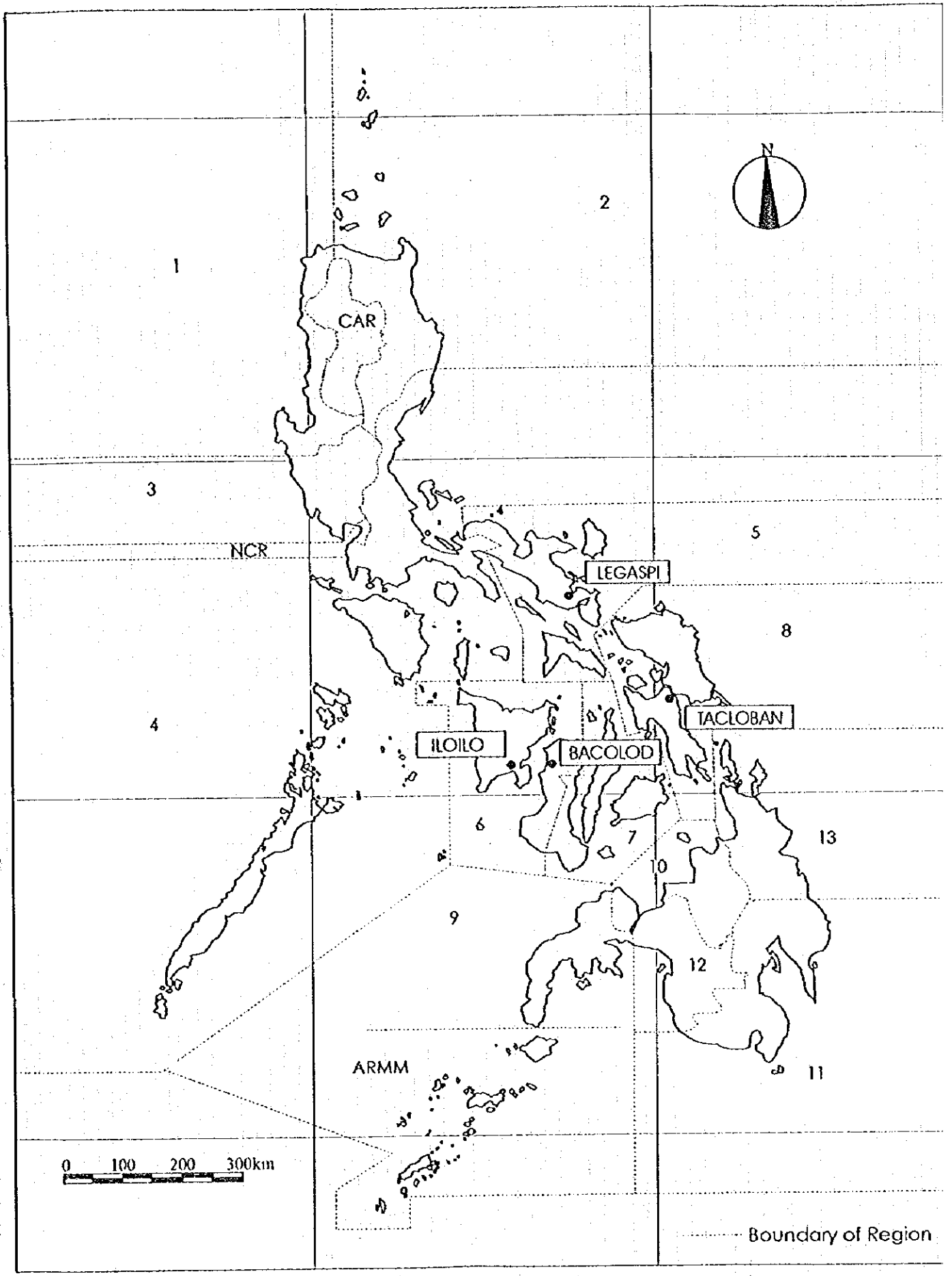
- a) Review the ongoing and planned projects and suspend (or decrease the scale of) the major projects which aim to increase the airport capacity.
- b) Conduct a site selection study for a new airport and decide the optimum airport site (including the existing site).
- c) Prepare and authorize a long term master development plan of Iloilo Airport at the selected site.
- d) Conduct a detailed feasibility study on the Medium Term Development of the airport including environmental impact assessment.
- e) Approve the Medium Term Development, and initiate financial arrangements.
- f) Implement the Medium Term Development.

(2) Tacloban Airport

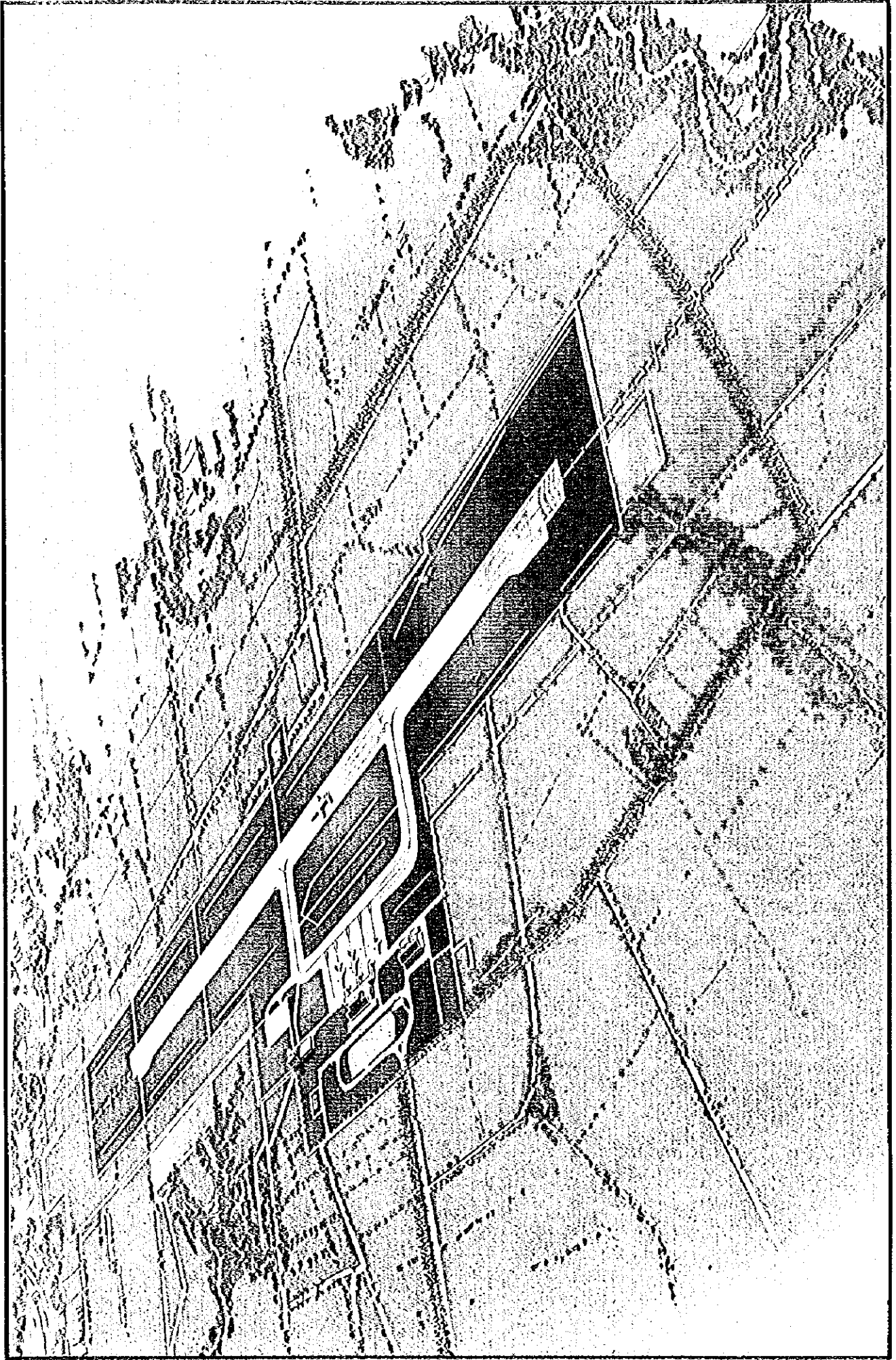
- a) Authorize the proposed master development plan.
- b) Review the ongoing and planned projects and adjust them (if necessary) to suit to the master plan.
- c) Conduct a detailed feasibility study on the Medium Term Development including environmental impact assessment.
- d) Approve the Medium Term Development, and initiate financial arrangements.
- e) Implement the Medium Term Development.

(3) Legaspi Airport

- a) Review the ongoing and planned projects and suspend the major projects which aim to increase the airport capacity such as runway extension to 2,400m.
- b) Establish Standard Instrument Approach procedures using the existing air navigation facilities so as to improve usability of the airport.
- c) Conduct a site selection study for a new airport.
- d) Prepare and authorize a long term master development plan of the new airport.
- e) Conduct a detailed feasibility study on the Medium Term Development of the new airport including environmental impact assessment.
- f) Approve the Medium Term Development, and initiate financial arrangements.
- g) Implement the Medium Term Development.



PROJECT LOCATION MAP



NEW BACOLOD AIRPORT DEVELOPMENT PLAN

TABLE OF CONTENTS

EXECUTIVE SUMMARY	
PROJECT LOCATION MAP	
CHAPTER 1 BACKGROUND OF THE PROJECT	1
CHAPTER 2 AIR TRAFFIC DEMAND FORECAST AND AIRPORT FACILITY REQUIREMENTS	8
2.1 Air Traffic Demand Forecast	8
2.2 Airport Facility Requirements	8
CHAPTER 3 MASTER PLANNING FOR THE SELECTED AIRPORTS	
3.1 General	14
3.2 Bacolod Airport	14
3.2.1 Existing Conditions and Problems	14
3.2.2 Master Planning	14
3.3 Iloilo Airport	20
3.3.1 Existing Conditions and Problems	20
3.3.2 Master Planning	20
3.4 Tacloban Airport	24
3.4.1 Existing Conditions and Problems	24
3.4.2 Master Planning	24
3.5 Legaspi Airport	28
3.5.1 Existing Conditions and Problems	28
3.5.2 Master Planning	28
CHAPTER 4 EVALUATION OF MASTER PLANS AND SELECTION OF AN AIRPORT FOR F/S	32
CHAPTER 5 FEASIBILITY STUDY ON MEDIUM TERM DEVELOPMENT OF NEW BACOLOD AIRPORT	
5.1 Planning and Preliminary Design	35
5.2 Environmental Impact Assessment	39
5.3 Planning of Operations Management and Training	42
5.4 Cost Estimates	44
5.5 Project Implementation Plan	46
5.6 Economic and Financial Analyses	46
5.6.1 Economic Analysis	46
5.6.2 Financial Analysis	48
CHAPTER 6 CONCLUSION AND RECOMMENDATIONS	
6.1 Conclusion	52
6.2 Recommendations for Development of Bacolod Airport	52
6.3 Recommendations for Other Airports	53
6.3.1 Iloilo Airport	53
6.3.2 Tacloban Airport	53
6.3.3 Legaspi Airport	54

CHAPTER 1 BACKGROUND AND OBJECTIVES OF THE STUDY

The Republic of the Philippines is one of the largest archipelagic countries in the world, consisting of some 7,700 islands. As the population of some 70 million (estimate in 1995) is scattered over these islands, air transport has been playing an important role for both passenger and cargo transport in the country. Therefore, the Government of the Republic of the Philippines (GOP) has been developing major airports such as Ninoi Aquino (Manila), Mactan (Cebu) and Davao, and aiming more effective, efficient and sustained developments of the other airports based on the Civil Aviation Master Plan (CAMP) prepared by the United Nations Development Program (UNDP) and the International Civil Aviation Organization (ICAO) in July 1992.

There are 90 national government airports, consisting of 7 international, 12 trunk line, 37 secondary, and 34 feeder airports, in the Philippines. Bacolod, Iloilo, Daniel Z. Romualdez (Tacloban) and Legaspi Airports were the top four airports of the trunk line airports in terms of passenger traffic at the time of the CAMP study. The passengers at these airports are expected to grow by about 5% per year up to the year 2000 by the CAMP study. However, the airports are facing the problems of obsolete facilities, limitations of development due to the seas, rivers, hills, squatters, and/or urbanization around the airports. Since the airports have been developed without airport master plans, it has become more and more difficult to cope with increasing demand with piecemeal development as in the past.

Therefore, the establishment of long term development master plans are urgently required for developments/improvements of these airports. As the master planning, through efficient air transportation, will contribute to the social and economic development of not only the provinces but also whole the Philippines, the GOP included master planning projects for these four airports in the Medium-Term Philippine Development Plan 1993-1998. Under these circumstances, the GOP requested the Government of Japan (GOJ) to conduct a study on master planning of these four airports. In response to the request, the GOJ decided to implement the Study on Selected Airports Master Planning Project in the Republic of the Philippines (hereinafter referred to as "the Study"), and the Japan International Cooperation Agency (JICA) was entrusted to undertake the Study in accordance with the relevant laws and regulations in force in Japan.

The main objectives of the Study are:

- a) to formulate a master plan of each of Bacolod, Iloilo, Tacloban and Legaspi airports for the year 2015; and
- b) to conduct a feasibility study on a selected airport project for the year 2005.

The Study was carried out by the JICA Study Team under the supervision of the JICA. The Advisory Committee was also organized to assist the JICA. The Study was conducted in close coordination with a Steering Committee and a Technical Working Committee that have been organized by the DOTC.

The JICA Study Team and Advisory Committee consisted of the following members:

JICA Study Team

- | | | |
|--|---|---|
| Mr. Hideki MURATA | : | Team Leader |
| Mr. Toru SHIMADA | : | Airport Planner/Airport Maintenance Specialist |
| Mr. Hiroyuki UEDA | : | Airport Civil Engineer |
| Mr. Masashi KABURAGI | : | Airport Architect |
| Mr. Tadamitsu ITO | : | Air Navigation Systems/Air Traffic Control/ Airspace Utilization Specialist |
| Mr. Motoyoshi YAMADA | : | Demand Forecast/Economic Analyst |
| Mr. Staffan KARLSSON,
Mr. Per TOORN | : | Airport Operations Management Specialist/ Financial Analyst |
| Mr. Takashi HARADA | : | Topographic Survey Specialist |
| Mr. Masato DOMON | : | Environmental Specialist |
| Mr. Yutaka YAMASAKI | : | Construction Planner/Cost Estimator |
| Ms. Eiko MORI | : | Coordinator |

JICA Advisory Committee

- | | | |
|--|---|---|
| Mr. Kazuhito ARAO
[Chairman] | : | Director, Office for Airport Construction Market Access, Construction Division, Aerodrome Department, Civil Aviation Bureau, Ministry of Transport |
| Mr. Seinosuke IWATA
[Airport Planning] | : | Chief of Coordination Section, Office for Airport Construction Market Access, Construction Division, Aerodrome Department, Civil Aviation Bureau, Ministry of Transport |
| Mr. Shinichiro KOIKE
[Air Navigation Systems] | : | Chief of Section 2, Planning Division, Aerodrome Department, Civil Aviation Bureau, Ministry of Transport |
| Mr. Kazuto TSUJI
[Project Evaluation] | : | Director, 3rd Division, Operation Department 1, The Overseas Economics Cooperation Fund |

JICA Coordinator

Mr. Hiroyuki KANZAKI : Project Officer,
First Development Study Division, Social Development Study
Department, Japan International Cooperation Agency (JICA)

The designated members of the Steering Committee and Technical Working Committee were initially as follows:

Steering Committee

Mr. Primitivo C. CAL : Under Secretary,
[Chairman] Department of Transportation and Communications (DOTC)

(Former)
Mr. Panfilo V. VILLARUEL, Jr : Assistant Secretary,
[Vice-Chairman] Air Transportation Office (ATO)

(Successor)
Mr. Carlos F TANEGA : Assistant Secretary,
[Vice-Chairman] Air Transportation Office (ATO)

Mr. Cesar T. VALBUENA : Assistant Secretary,
[Project Director] Department of Transportation and Communications (DOTC)

Mr. Manuel GASPAY : Director, Environmental Management Bureau,
Department of Environment and Natural Resources

Mr. William Russel SOBREPENA : Undersecretary,
Department of Tourism

Mr. Ruben S. REINOSO, Jr. : Director, Infrastructure Staff
National Economy and Development Authority

Ms. Margaret DEFENSOR : President,
Federation Aviation Organization

Technical Working Committee

Project Management

Mr. Cesar T. VALBUENA : Assistant Secretary,
[Project Director] DOTC

Mr. Raphael S. LAVIDES : Division Chief, Air Transport Planning Division,
[Project Manager] Transport Planning Service, DOTC

Mr. Reynaldo CACATIAN : Airport Maintenance Section,
[Asst. Project Manager] ATO

Technical Advisory Group

- Mr. George D. ESGUERRA : Director III
[Chairman] Transport Planning Service, DOTC
- Mr. Florante MAGDAMO : Director,
[Co-Chairman] Air Traffic Service, ATO
- Mr. Manuel ESCOBAR : Airways Navigation Service,
ATO
- Ms. Ligaya POSTRERO : Airport Maintenance Section,
ATO

Representatives of domestic airlines

Counterpart Study Team

- Mr. Edmundo GEROCII : Area Manager, Iloilo Airport
[Airport Management Planner] ATO
- Mr. Frisco Sto. DOMINGO : Area Manager, Legaspi Airport
[Airport Management Planner] ATO
- Mr. Ricardito IGUNA : Manager, Bacolod Airport
[Airport Management Planner] ATO
- Ms. Merle NEGRADAS : Officer-in-Charge, Tacloban Airport
[Airport Management Planner] ATO
- Ms. Filipina L. LARRACAS : Air Transport Planning Division,
[Airport Planner] Transport Planning Service, DOTC
- Mr. Alfredo NERA : Air Traffic Service,
[Airspace Specialist] ATO
- Ms. Adelaida OLBOC : Air Transport Planning Division,
[Financial Analyst] Transport Planning Service, DOTC
- Mr. Virgilio BAUTISTA, Sr. : Airways Navigation Section,
[Air Navigation Specialist] ATO
- Ms. Ma. Filipinas CABANA : Air Transport Planning Division,
[Nav aids/Comms. Planner] Transport Planning Service, DOTC
- Mr. Andrew BASALLOTE : Airways Navigation Section,
[Airways Engineer] ATO
- Ms. Elmira DOMINGO : Air Transport Planning Division,
[Airport Engineer] Transport Planning Service, DOTC
- Mr. Roy GAMOSA : Airport Maintenance Section,
[Airport Engineer] ATO

- Mr. Brendo ELEGIO : Air Transport Planning Division,
[Airport Planner] Transport Planning Service, DOTC
- Mr. Felicisimo PANGILINAN, Jr. : Air Transport Planning Division,
[Forecast/Facility Planner] Transport Planning Service, DOTC
- Ms. Elsa PINEDA : Air Transport Planning Division,
[Airport Economist] Transport Planning Service, DOTC
- Ms. Ruby MANZO : Air Transport Planning Division,
[Airport Management Planner] Transport Planning Service, DOTC
- Ms. Carmela LAZARO : Engineering, Architectural and Design Division,
[Architect] Project Management Service, DOTC

In September 1996, the members of the Steering Committee and Technical Working Committee were reconstituted as follows:

Steering Committee

- Mr. Carlos F TANEGA : Assistant Secretary,
[Chairman] Air Transportation Office (ATO)
- Mr. Cesar T. VALBUENA : Assistant Secretary & Officer in Charge,
[Co-Chairman] Office of the Undersecretary for Staff Services, DOTC
- Mr. Miguel Cesar O. Cordero : Assistant Secretary,
Telecommunications Office (TELOF)
- Mr. Manuel GASPAY : Director, Environmental Management Bureau,
Department of Environment and Natural Resources
- Mr. William Russel SOBREPENA : Undersecretary,
Department of Tourism
- Mr. Ruben S. REINOSO, Jr. : Director, Infrastructure Staff
National Economy and Development Authority
- Mr. Arturo Valdez : Chief of Staff, Office of the Secretary,
DOTC
- Mr. Anacleto V. Venturina : Director, Air Traffic Services,
ATO
- Ms. Margaret DEFENSOR : President,
Federation Aviation Organization

Technical Working Committee

Project Management

- Mr. George D. ESGUERRA : Director III
[Project Director] Transport Planning Service, DOTC
- Mr. Zosimo S. Pascua, Jr. : Director III
[Deputy Project Director] Project Management Service, DOTC
- Mr. Raphael S. LAVIDES : Chief, Planning Division,
[Project Manager] ATO
- Ms. Elmira DOMINGO : Planning Division,
[Deputy Project Manager] ATO
- Mr. Brendo ELEGIO : Special Assistant to the ATO ASSEC and Acting Chief,
[Assistant Project Manager] Operations Center, ATO

Technical Advisory Group

- Mr. Reynaldo CACATIAN : Assistant Chief, Airport Maintenance Section,
[Chairman] ATO
- Mr. Manuel ESCOBAR : Airways Navigation Service,
[Co-Chairman] ATO
- Mr. Andrew BASALLOTE : Airways Navigation Service,
ATO
- Ms. Ma. Filipinas CABANA : Planning Division,
ATO
- Mr. Porvenir P. PORCIUNCULA : Office of the Secretary,
DOTC
- Mr. Victor DATO : Chief, Transportation Division, Infrastructure Staff,
NEDA
- Mr. Rolando C. MENDOZA : Manager, Flight Technical Div., Flight Operations Dept.
Philippine Airlines

Counterpart Study Team

- Mr. Edmundo GEROCHI : Area Manager, Iloilo Airport
[Airport Management Specialist] ATO
- Mr. Frisco Sto. DOMINGO : Area Manager, Legaspi Airport
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Ms. Merle NEGRADAS [Airport Management Planner]	: Officer-in-Charge, Tacloban Airport ATO
Mr. Francis Diez [Airways Engineer]	: Airways Navigation Service, ATO
Mr. Mario Radaza [Nav aids/Comms. Planner]	: Airways Navigation Service, ATO
Mr. Roy GAMOSA [Airport Engineer]	: Airport Maintenance Section, ATO
Mr. Felicisimo PANGILINAN, Jr. [Forecast/Facility Planner]	: Transport Planning Service, DOTC
Ms. Liberty Garcia [Economist]	: Project Management Service, DOTC

CHAPTER 2 AIR TRAFFIC DEMAND FORECAST AND AIRPORT FACILITY REQUIREMENTS

2.1 AIR TRAFFIC DEMAND FORECAST

Air traffic demand forecasts principally determine airport facility requirements, i.e., the size of the airport and thus the scale of required investment. The objective of forecasting is not to predict the future with precision, but to provide information that can be used to evaluate effects of uncertainty about the future.

Analysis of the air traffic records indicated that the demand forecasts based on the traffic records at the each airport would be inappropriate due to the traffic fluctuations in the past. Therefore, the total annual air passenger demand in the Philippines was forecasted by an econometric modeling using GDP as a parameter. Three cases of the forecast, i.e., high, medium and low cases, are produced for three different scenarios of GDP growth rate. Annual air passenger demand of each of the four airports is estimated with a fixed share to the total air passenger demand in the Philippines. Annual aircraft movement forecast is carried out based on the result of air passenger forecast and the projection of aircraft introduction criteria, which determine type of aircraft to be used as a function of annual air passenger demand of a route. Peak hour forecast is finally undertaken to obtain important planning basis such as peak hour air passengers and peak hour aircraft movements.

The summary results of air traffic forecast (medium case) are presented in Table 2.1.

Table 2.1 Summary Results of Air Traffic Demand Forecast (Medium Case)

Year	1995	2005	2015
Annual Passengers			
Bacolod	371,955	1,003,000	1,436,000
Iloilo	460,423	1,179,000	1,688,000
Tacloban	258,190	655,000	938,000
Legaspi	161,977	375,000	537,000
Annual Cargo Volume (ton)			
Bacolod	7,581	15,600	22,400
Iloilo	4,771	12,800	18,400
Tacloban	2,881	5,600	8,000
Legaspi	919	1,900	2,700
Annual Aircraft Movements			
Bacolod	24,444	7,060	8,890
Iloilo	14,486	9,280	11,400
Tacloban	3,094	5,010	6,730
Legaspi	2,332	4,360	5,130
Peak Hour Passengers (2-way)			
Bacolod	280	630	830
Iloilo	330	670	900
Tacloban	280	480	600
Legaspi	280	290	380
Peak Hour Aircraft Movements (2-way)			
Bacolod			
Iloilo	2	3.9	4.5
Tacloban	3	4.6	5.4
Legaspi	2	3.2	3.8
	2	3.0	3.2

Note: Aircraft movements does not include general aviation aircraft.

2.2 AIRPORT FACILITY REQUIREMENTS

The major airport facility requirements are established based on the air traffic demand forecast and in compliance with the relevant standards and recommended practices of the International Civil Aviation Organization (ICAO). The standards and practices of International Air Transport Association (IATA), Federal Aviation Administration of the United States (FAA) and the Civil Aviation Bureau of Japan are also referred to.

Tables 2.2 through 2.5 summarize the facility requirements of Bacolod, Iloilo, Tacloban and Legaspi Airport respectively.

Table 2.2 Summary of Airport Facility Requirements of Bacolod Airport

Item	Present Condition as of May 1996	Future Requirements			
		2000	2005	2010	2015
1. Annual Passengers	371,955	736,000	1,003,000	1,229,000	1,436,000
2. Annual Cargo (tons)	7,581	12,300	15,600	19,000	22,400
3. Annual Aircraft Movements	24,444	5,520	7,060	8,310	8,890
4. Peak Hour Passengers (2 ways)	280	510	630	720	830
5. Peak Hour Aircraft Movements (2 ways)	2	3.4	3.9	4.3	4.5
6. Largest Aircraft	B737	A300	ditto	ditto	ditto
7. Longest Haul	Manila	Manila	ditto	ditto	ditto
8. Aerodrome Reference Code	4C	4D	ditto	ditto	ditto
9. Operational Category	Non-Precision Instrument	Precision Category I	ditto	ditto	ditto
10. Runway Length Width	1,958 m 30 m	1,940 m 45 m	ditto	ditto	ditto
11. Runway Strip Length Width	2,000 m 150 m	2,060 m 300 m	ditto	ditto	ditto
12. Taxiway System Width	2 Stub TWYs 23 m	2 Stub TWYs 23 m	ditto ditto	ditto ditto	ditto ditto
13. Passenger Loading Apron	MJ : 0 SJ/IP : 4 Total : 4	MJ : 3 SJ : 2 TP : 0 Total : 5	MJ : 3 SJ : 2 TP : 0 Total : 5	MJ : 4 SJ : 2 TP : 0 Total : 6	MJ : 4 SJ : 1 TP : 0 Total : 5
14. Passenger Terminal Building	1,003 m ²	5,100 m ²	6,300 m ²	7,200 m ²	8,300 m ²
15. Cargo Terminal Building	450 m ²	1,230 m ²	1,560 m ²	1,900 m ²	2,240 m ²
16. Administration Building	247 m ²	1,800 m ²	ditto	ditto	ditto
17. Fire Station Building	350 m ²	550 m ²	ditto	ditto	ditto
18. Access Road	2 lanes	2 lanes	ditto	ditto	ditto
19. Car Park	4,000 m ²	9,100 m ²	11,200 m ²	12,600 m ²	14,750 m ²
20. Air Navigation Systems	C-VOR LLZ/DME	D-VOR/DME ILS Cat I	ditto	ditto	ditto
21. Rescue and Fire Fighting Category Fire Fighting Vehicles	Category 6 3	Category 7 2	Category 8 3	ditto	ditto
22. Public Utilities Power Supply Water Supply Sewage Disposal Solid waste Disposal Telephone Trunk Line	45 kVA 3 t/day n.a. n.a. 3 lines	970 kVA 140 t/day 140 t/day 0.9 t/day 9 lines	1,110 kVA 170 t/day 170 t/day 1.0 t/day 10 lines	1,220 kVA 200 t/day 200 t/day 1.1 t/day 10 lines	1,350 kVA 220 t/day 220 t/day 1.3 t/day 11 lines
23. Fuel Supply Facility Tank Capacity	total 76 kl	100 kl x 3	100 kl x 4	100 kl x 5	100 kl x 6

Table 2.3 Summary of Airport Facility Requirements of Iloilo Airport

Item	Present Condition as of May 1996	Future Requirements			
		2000	2005	2010	2015
1. Annual Passengers	460,423	886,000	1,179,000	1,445,000	1,688,000
2. Annual Cargo (tons)	4,771	10,100	12,800	15,600	18,400
3. Annual Aircraft Movements	14,486	7,170	9,280	10,230	11,400
4. Peak Hour Passengers (2 ways)	330	540	670	800	900
5. Peak Hour Aircraft Movements (2 ways)	3	3.9	4.6	5.0	5.4
6. Largest Aircraft	B737	A300	ditto	ditto	ditto
7. Longest Haul	Manila	Manila	ditto	ditto	ditto
8. Aerodrome Reference Code	4C	4D	ditto	ditto	ditto
9. Operational Category	Non-Precision Instrument	Precision Category I	ditto	ditto	ditto
10. Runway Length Width	2,100 m 45 m	1,930 m 45 m	ditto	ditto	ditto
11. Runway Strip Length Width	2,220 m 150 m	2,050 m 300 m	ditto	ditto	ditto
12. Taxiway System Width	2 Stub TWYs 23 m	2 Stub TWYs 23 m	ditto ditto	ditto ditto	ditto ditto
13. Passenger Loading Apron	MJ : 0 SJ/IP : 4 Total : 4	MJ : 3 SJ : 2 TP : 1 Total : 6	MJ : 3 SJ : 2 TP : 1 Total : 6	MJ : 4 SJ : 1 TP : 1 Total : 6	MJ : 5 SJ : 1 TP : 1 Total : 7
14. Passenger Terminal Building	2,202 m ²	5,400 m ²	6,700 m ²	8,000 m ²	9,000 m ²
15. Cargo Terminal Building	960 m ²	1,010 m ²	1,280 m ²	1,560 m ²	1,840 m ²
16. Administration Building	138 m ²	1,800 m ²	ditto	ditto	ditto
17. Fire Station Building	300 m ²	550 m ²	ditto	ditto	ditto
18. Access Road	2 lanes	2 lanes	ditto	ditto	4 lanes
19. Car Park	6,000 m ²	9,450 m ²	11,900 m ²	14,000 m ²	15,750 m ²
20. Air Navigation Systems	C-VOR/DME	D-VOR/DME ILS Cat I	ditto	ditto	ditto
21. Rescue and Fire Fighting Category Fire Vehicles	Category 6 3	Category 7 2	Category 8 3	ditto	ditto
22. Public Utilities					
Power Supply	n.a.	990 kVA	1,140 kVA	1,280 kVA	1,400 kVA
Water Supply	n.a.	150 t/day	180 t/day	210 t/day	240 t/day
Sewage Disposal	n.a.	150 t/day	180 t/day	210 t/day	240 t/day
Solid waste Disposal	n.a.	0.9 t/day	1.0 t/day	1.1 t/day	1.3 t/day
Telephone Trunk Line		9 lines	10 lines	11 lines	11 lines
23. Fuel Supply Facility Tank Capacity	total 91 kl	100 kl x 3	100 kl x 4	100 kl x 6	100 kl x 7

Table 2.4 Summary of Airport Facility Requirements of Tacloban Airport

Item	Present Condition as of May 1996	Future Requirements			
		2000	2005	2010	2015
1. Annual Passengers	258,190	481,000	655,000	803,000	938,000
2. Annual Cargo (tons)	2,881	4,400	5,600	6,800	8,000
3. Annual Aircraft Movements	3,094	3,900	5,010	5,910	6,730
4. Peak Hour Passengers (2 ways)	280	400	480	540	600
5. Peak Hour Aircraft Movements (2 ways)	2	2.8	3.2	3.5	3.8
6. Largest Aircraft	B737	A300	ditto	ditto	ditto
7. Longest Haul	Manila	Manila	ditto	ditto	ditto
8. Aerodrome Reference Code	4C	4D	ditto	ditto	ditto
9. Operational Category	Non-Precision Instrument	Precision Category I	ditto	ditto	ditto
10. Runway Length Width	2,140 m 45 m	1,910 m 45 m	ditto	ditto	ditto
11. Runway Strip Length Width	2,260 m 150 m	2,030 m 300 m	ditto	ditto	ditto
12. Taxiway System Width	2 Stub TWYs 23 m	2 Stub TWYs 23 m	ditto	ditto	ditto
13. Passenger Loading Apron	MJ : 0 SJ/IP : 4 Total : 4	MJ : 2 SJ : 2 TP : 0 Total : 4	MJ : 3 SJ : 2 TP : 0 Total : 5	MJ : 3 SJ : 2 TP : 0 Total : 5	MJ : 3 SJ : 2 TP : 0 Total : 5
14. Passenger Terminal Building	1,610 m ²	4,000 m ²	4,800 m ²	5,400 m ²	6,000 m ²
15. Cargo Terminal Building	180 m ²	660 m ²	840 m ²	1,020 m ²	1,200 m ²
16. Administration Building	350 m ²	1,800 m ²	ditto	ditto	ditto
17. Fire Station Building	260 m ²	550 m ²	ditto	ditto	ditto
18. Access Road	2 lanes	2 lanes	ditto	ditto	ditto
19. Car Park	5,600 m ²	7,000 m ²	8,400 m ²	9,450 m ²	10,500 m ²
20. Air Navigation Systems	C-VOR/DME	D-VOR/DME ILS Cat I	ditto	ditto	ditto
21. Rescue and Fire Fighting Category Fire Fighting Vehicles	Category 6 3	Category 7 2	ditto	ditto	Category 8 3
22. Public Utilities					
Power Supply	300 kVA	830 kVA	920 kVA	990 kVA	1,060 kVA
Water Supply	n.a.	120 t/day	140 t/day	150 t/day	170 t/day
Sewage Disposal	n.a.	120 t/day	140 t/day	150 t/day	170 t/day
Solid waste Disposal	n.a.	0.7 t/day	0.8 t/day	0.9 t/day	0.9 t/day
Telephone Trunk Line	3 lines	8 lines	9 lines	9 lines	10 lines
23. Fuel Supply Facility Tank Capacity	total 170 kl	100 kl x 2	100 kl x 3	100 kl x 4	100 kl x 4

Table 2.5 Summary of Airport Facility Requirements of Legaspi Airport

Item	Present Condition as of May 1996	Future Requirements			
		2000	2005	2010	2015
1. Annual Passengers	161,977	276,000	375,000	460,000	537,000
2. Annual Cargo (tons)	919	1,500	1,900	2,300	2,700
3. Annual Aircraft Movements	2,332	3,250	4,360	4,530	5,130
4. Peak Hour Passengers (2 ways)	280	250	290	350	380
5. Peak Hour Aircraft Movements (2 ways)	2	2.6	3.0	3.0	3.2
6. Largest Aircraft	B737	A320	ditto	A300	ditto
7. Longest Haul	Manila	Manila	ditto	ditto	ditto
8. Aerodrome Reference Code	4C	4C	ditto	4D	ditto
9. Operational Category	Non-Instrument	Precision Category I	ditto	ditto	ditto
10. Runway Length Width	2,280 m 36 m	2,010 m 45 m	ditto	ditto	ditto
11. Runway Strip Length Width	2,380 m 150 m	2,130 m 300 m	ditto	ditto	ditto
12. Taxiway System Width	2 Stub TWYs 23 m	2 Stub TWYs 15 m	ditto	2 Stub TWYs 23 m	ditto
13. Passenger Loading Apron	MJ : 0 SJ/IP : 4 Total : 4	MJ : 0 SJ : 3 TP : 1 Total : 4	MJ : 0 SJ : 3 TP : 1 Total : 4	MJ : 2 SJ : 2 TP : 1 Total : 5	MJ : 2 SJ : 2 TP : 1 Total : 5
14. Passenger Terminal Building	913 m ²	2,500 m ²	2,900 m ²	3,500 m ²	3,800 m ²
15. Cargo Terminal Building	210 m ²	230 m ²	290 m ²	350 m ²	410 m ²
16. Administration Building	360 m ²	1,800 m ²	ditto	ditto	ditto
17. Fire Station Building	370 m ²	550 m ²	ditto	ditto	ditto
18. Access Road	2 lanes	2 lanes	ditto	ditto	ditto
19. Car Park	6,500 m ²	4,550 m ²	5,250 m ²	6,300 m ²	6,650 m ²
20. Air Navigation Systems	D-VOR/DME NDB	D-VOR/DME ILS Cat I	ditto	ditto	ditto
21. Rescue and Fire Fighting Category Fire Fighting Vehicles	Category 4 4	Category 6 2	ditto	Category 7 2	ditto
22. Public Utilities					
Power Supply	150 kVA	650 kVA	700 kVA	760 kVA	790 kVA
Water Supply	n.a.	80 t/day	90 t/day	110 t/day	110 t/day
Sewage Disposal	n.a.	80 t/day	90 t/day	110 t/day	110 t/day
Solid waste Disposal	n.a.	0.5 t/day	0.6 t/day	0.6 t/day	0.7 t/day
Telephone Trunk Line	3 lines	7 lines	7 lines	8 lines	8 lines
23. Fuel Supply Facility Tank Capacity	total 83 kl	50 kl x 2	50 kl x 2	50 kl x 3	50 kl x 3

CHAPTER 3 MASTER PLANNING FOR THE SELECTED AIRPORTS

3.1 GENERAL

Master planning for the development of the four airports was conducted based on a set of air traffic demand forecasts and future facility requirements described in Chapter 2. Target years of the master planning are;

- a) Medium Term Development : Year 2005, and
- b) Long Term Development : Year 2015.

The Study focuses on the development planning at the existing airport sites, and the study on alternative airport sites was limited to Bacolod Airport only due to the budget and time constraints of the Study. One of the main objectives of this master planning was to establish a basis of selecting one airport among the four for the detailed feasibility study. The developments of some of the airports are constrained by the surrounding conditions. Therefore, the master plans do not include future provisions beyond the year 2015 so that the fair comparison of the master plans of the four airports could be made.

3.2 BACOLOD AIRPORT

3.2.1 Existing Conditions and Problems

Bacolod Airport is located at about 3km southwest of Bacolod City, the capitol of Negros Occidental Province, Region 6 (Western Visayas). Figure 3.1 shows the existing layout of the major airport facilities. Table 3.1 summarizes the results of evaluations of the existing facilities.

3.2.2 Master Planning

Since the severe constraints on the development of the existing airport had been recognized, a team created by the local government units had conducted a preliminary study on new airport sites and identified four candidate sites. In the early stage of the Study, the JICA Study Team conducted a site selection study and six sites (including four sites identified in the preliminary study) shown in Figure 3.2 were comparatively evaluated. Based on the result of the study and discussions with DOTC, Site 3, the site about 5km east of Silay City, was selected as the best alternative site.

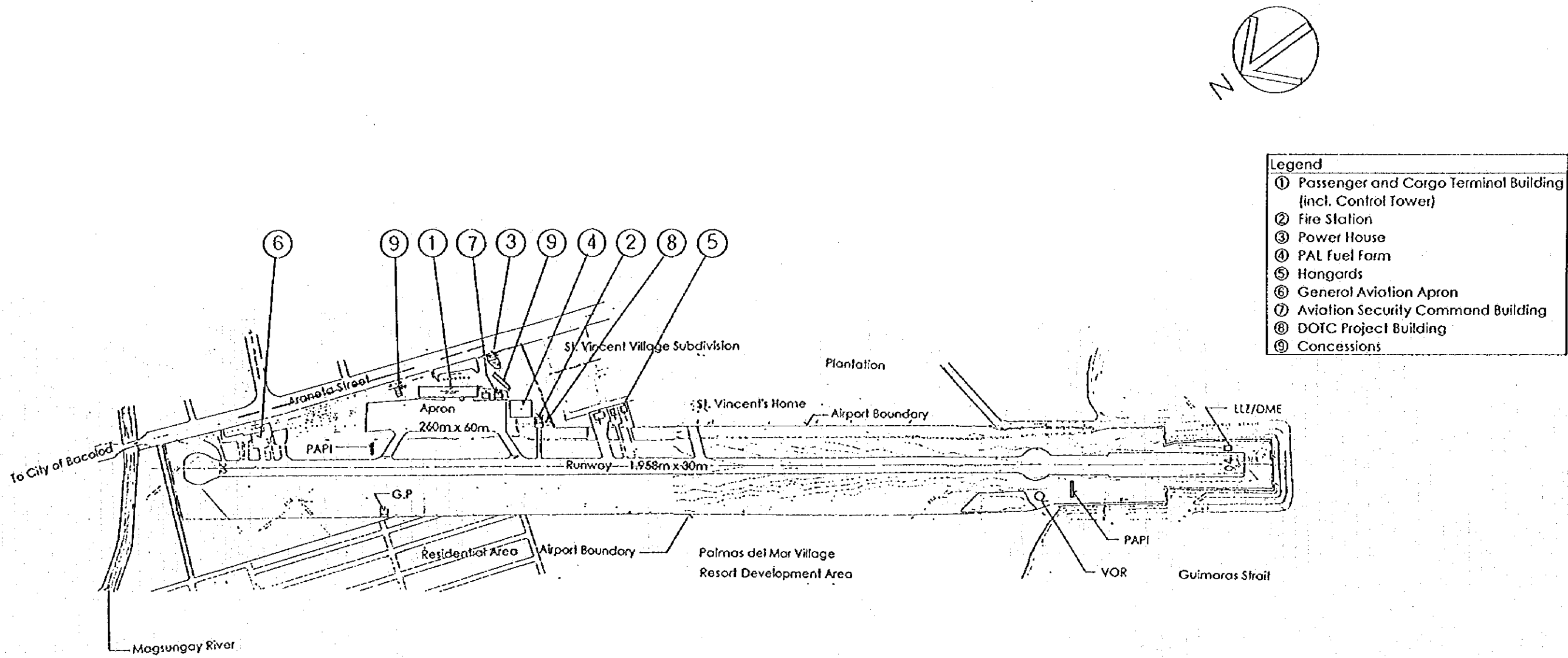


Figure 3.1 Existing Layout of Facilities at Bacolod Airport



Table 3.1 Evaluation of Existing Facilities at Bacolod Airport

Facilities	Year	2000	2005	2010	2015	Remarks
1) Runway Strip and Obstacle Limitation Surfaces		X				<ul style="list-style-type: none"> The National Road No.1 runs within the 150m wide runway strip. The runway strip, not complying with the ICAO's obstacle removal and grading recommendations, may endanger aircraft in the event of running off the runway or low flying. There are many obstacles intruding above the runway 22 approach surface and the transitional surfaces, including aircraft on the apron, fire station, etc.
2) Runway	- Length					<ul style="list-style-type: none"> The existing 1,958m long runway is adequate for operations of B737, A320 and A300 for anticipated domestic destinations by 2015, provided that obstacles upon the runway 22 approach surface are removed.
	- Width	X				<ul style="list-style-type: none"> The width of the runway is 30m for about 80% of the total length, which should be widened to 45m as planned in DOTC's Five Year National Airport Development Plan. No parallel taxiway will be required for anticipated peak hour aircraft movements before 2015.
3) Taxiway	- Aircraft Handling Capacity					
4) Apron	- Aircraft Stand Capacity					<ul style="list-style-type: none"> The existing apron can accommodate up to 4 B737s by rearranging parking positions. It has enough capacity for the present level of aircraft movements, but will be saturated by increasing air traffic volume before 2000.
5) Airfield Pavements		X				<ul style="list-style-type: none"> The existing pavements designed for B737 will need asphalt overlay to accommodate A300, which is adequate for Bacolod-Manila sector even for the present level of air traffic according to our forecast.
6) Passenger Terminal Building	- Passenger Handling Capacity	X				<ul style="list-style-type: none"> The existing 1,003 sq.m passenger terminal area is much smaller than the standard requirement of 2,800 sq.m to handle 280 peak hour passengers at present. The terminal space is not adequate for operations of A300. No space is available for the public in the terminal building. No baggage screening device is available. No air conditioning is available for check-in lobby and arrival area. The passenger terminal building is structurally in good condition except roof.
	- Quality of Services	X				
7) Cargo Terminal Building	- Cargo Handling Capacity					<ul style="list-style-type: none"> The cargo terminal area has sufficient capacity to handle present level of cargo traffic. The expansion of capacity will be required before 2000.
8) Control Tower and Administration Building		X				<ul style="list-style-type: none"> The visibility from the control tower is poor due to trees obstructing the sight and its low elevation. The roof of the control tower has a water leak problem. Very limited space is available for the administration office.
9) Vehicle Parking Area	- Vehicle Parking Capacity	X				<ul style="list-style-type: none"> The existing vehicle parking area has insufficient capacity for the present peak hour vehicular traffic volume. Waiting taxis make a long queue on the National Road No.1. The length of the terminal frontage is also insufficient.
10) Radio Navigation Aids		X				<ul style="list-style-type: none"> The installation work of ILS is ongoing at present. D-VOR/DME will replace existing C-VOR under Nationwide Air Navigation Facility Modernization Project - Phase III.
11) ATC and Communication Systems						<ul style="list-style-type: none"> The existing systems were renewed recently by USAID. PC/Fax machine, VSAT, etc. are planned to be installed under Nationwide Air Navigation Facility Modernization Project - Phase III. The existing approach lights do not comply with ICAO's requirements for precision Category-I approach operations.
12) Airfield Lighting Systems		X				
13) Meteorological Observation System		X				<ul style="list-style-type: none"> No PAGASA station is available at Bacolod Airport. The existing systems are not adequate for civil aviation purpose.
14) Rescue and Fire Fighting		X				<ul style="list-style-type: none"> The existing category 5 level of protection is insufficient for the present requirement of category 6. An increase of CRF capability is required. The replacement of 2 old major vehicles needs to be considered.
15) Power Supply System						<ul style="list-style-type: none"> Back up generators are operating at near their capacity. The expansion of capacity will be needed to cope with increasing electricity demand.
16) Telephone System		X				<ul style="list-style-type: none"> Telephone facility is poor for daily operation of the airport. No public phone is available in the terminal building. A greater capacity may be needed for more efficient airport operation and better service for passengers.
17) Water Supply System		X				<ul style="list-style-type: none"> The supply from the city authority is often interrupted and of low pressure. The airport depends on deep wells, of which water quality is poor.
18) Sewage Disposal System		X				<ul style="list-style-type: none"> The septic tanks used at the airport are working in good condition. However, increasing effluent will require more sophisticated treatment system.
19) Aviation Fuel Supply System		X				<ul style="list-style-type: none"> PAL has own fuel supply system with hydrant pits on the apron. The existing system is working in normal condition. The increase of storage capacity is needed to satisfy standard storage requirement of one-week consumption.

Legend	X	: Indicates that the capacity or quality of existing facility is inadequate at present.
		: Indicates the servicable period of existing facility in terms of capacity or span of life.
		: Indicates the servicable period of existing facility upon completion of ongoing or planned project.

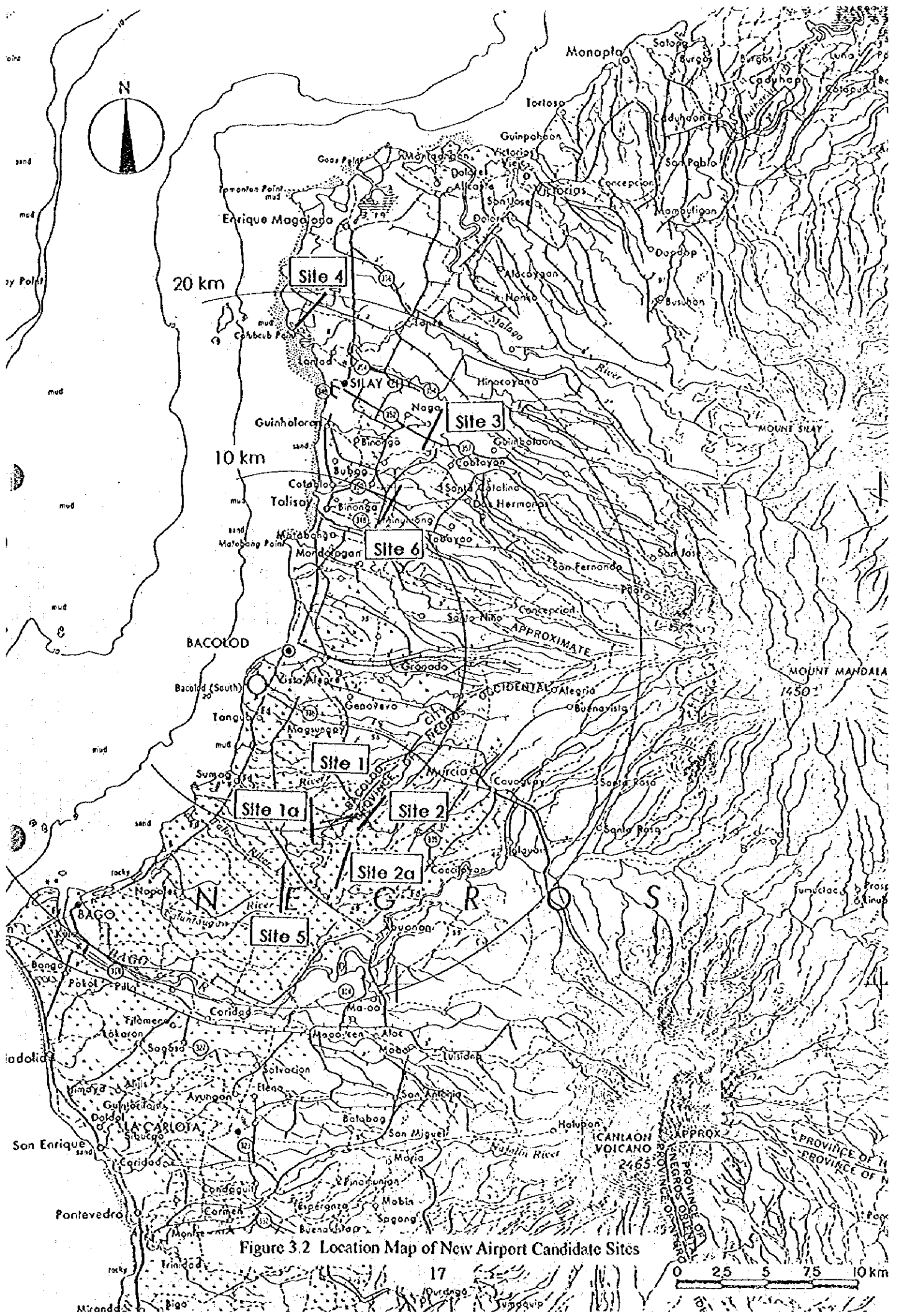


Figure 3.2 Location Map of New Airport Candidate Sites

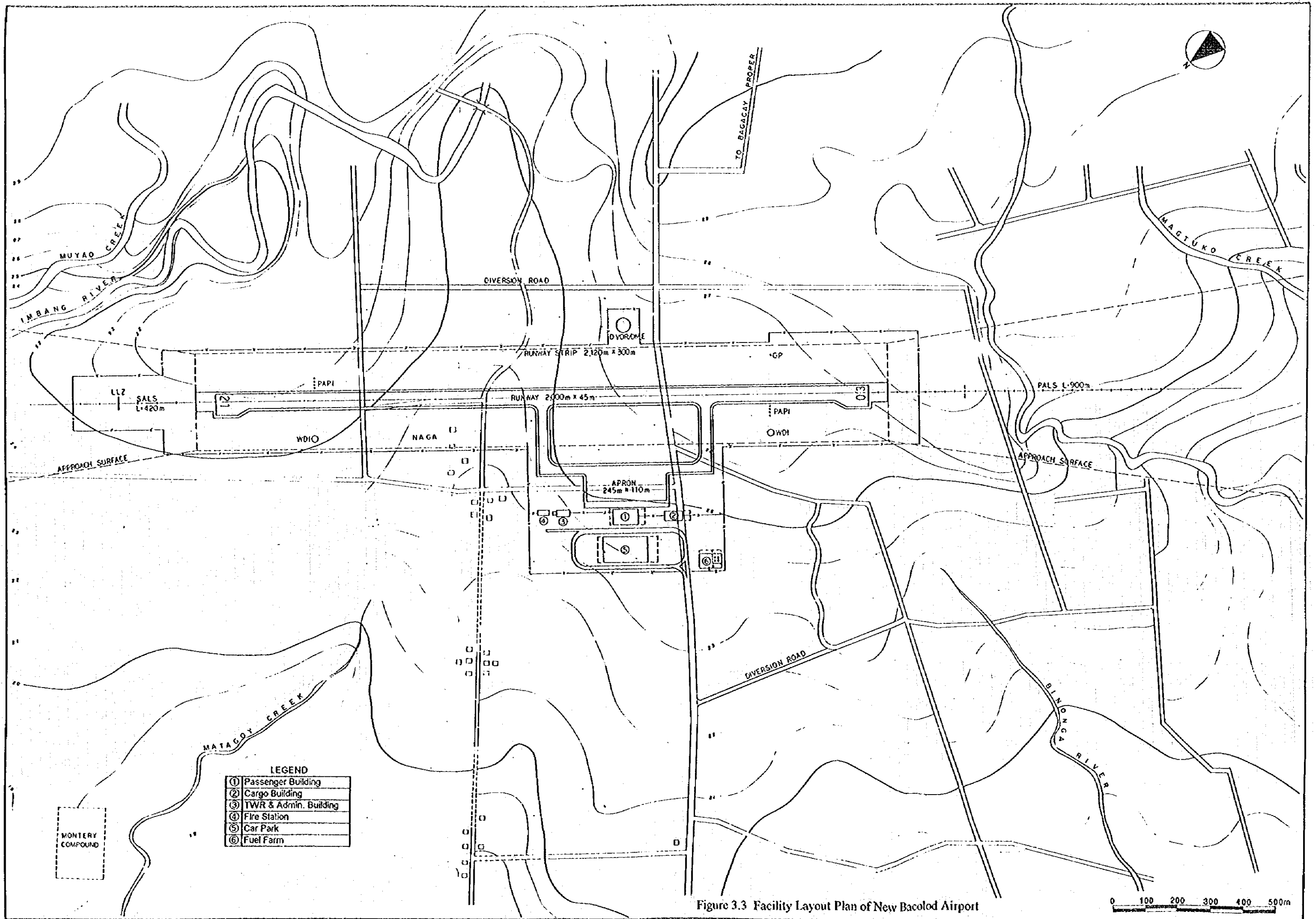
As a first step of the master planning study, two alternative development plans of Bacolod Airport, i.e. development of the existing airport and a new airport at the alternative site, were prepared. Then, two alternative development plans were comparatively evaluated, and the new airport development shown in Figure 3.3 was selected as the optimum development plan for the development of the Bacolod Airport. Major reasons for selecting the new airport development are as follows:

- 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.

Table 3.2 summarizes outline of airport development works.

Table 3.2 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	-



LEGEND

①	Passenger Building
②	Cargo Building
③	TWR & Admin. Building
④	Fire Station
⑤	Car Park
⑥	Fuel Farm

Figure 3.3 Facility Layout Plan of New Bacolod Airport

0 100 200 300 400 500m

3.3 ILOILO AIRPORT

3.2.1 Existing Conditions and Problems

Iloilo Airport is located at about 3km west-northwest of Iloilo City, the capitol of Iloilo Province, Region 6 (Western Visayas). Figure 3.4 shows the existing layout of the major airport facilities. Table 3.3 summarizes the results of evaluations of the existing facilities.

3.2.2 Master Planning

As a first step of the master planning study, three alternative development plans of the existing Iloilo Airport were prepared. These alternative plans were, then, comparatively evaluated, and the development scheme shown in Figure 3.5 was selected as the optimum development plan for the development of the existing Iloilo Airport. Table 3.4 summarizes outline of airport development works.

Table 3.4 Outline of Iloilo Airport Development

Item	Medium Term	Long Term
Earthworks	Cut 60,000 m ³ , Fill 410,000 m ³	-
Runway	Asphalt overlay 19 cm	-
Taxiway	New taxiway 14,000 m ²	-
Apron	New apron 33,000 m ²	Expansion 5,200 m ²
Passenger Terminal Building	New building 6,700 m ²	Expansion 2,300 m ²
Cargo Terminal Building	New building 1,280 m ²	Expansion 560 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 11,900 m ²	Expansion 3,850 m ²
Roads	5.5 km	-
Air Navigation Systems	ILS Cat I, PALS, SALS, etc.	-
Fuel Supply Facility	New facility 400 kl	Expansion 300kl
Obstacle Removal	Control Tower, Fire Station, etc.	-
Land Acquisition	30 ha	-
Diyersion / Relocation	175 houses, Road 7.4 km	-

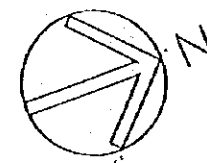
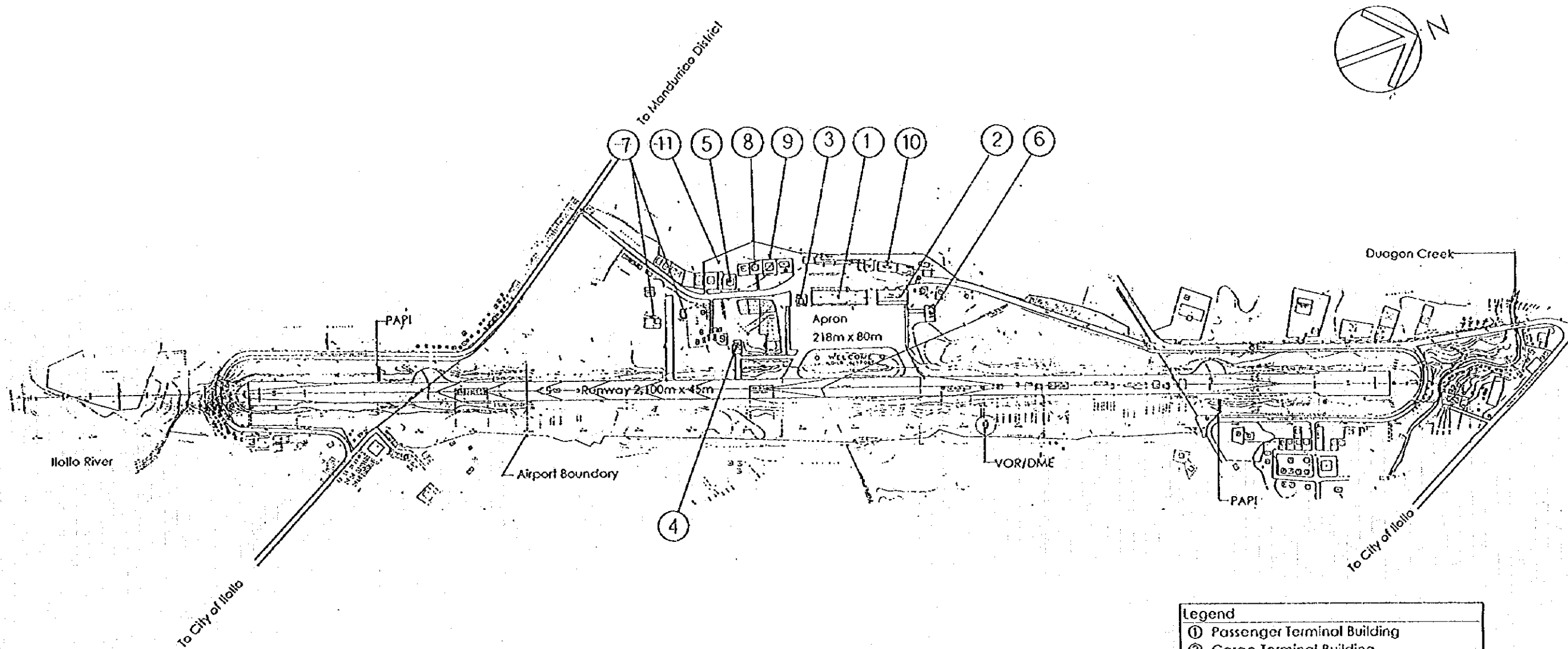


Figure 3.4 Existing Layout of Facilities at Iloilo Airport

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

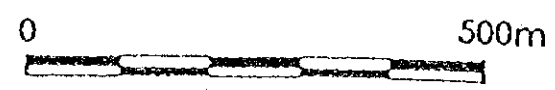
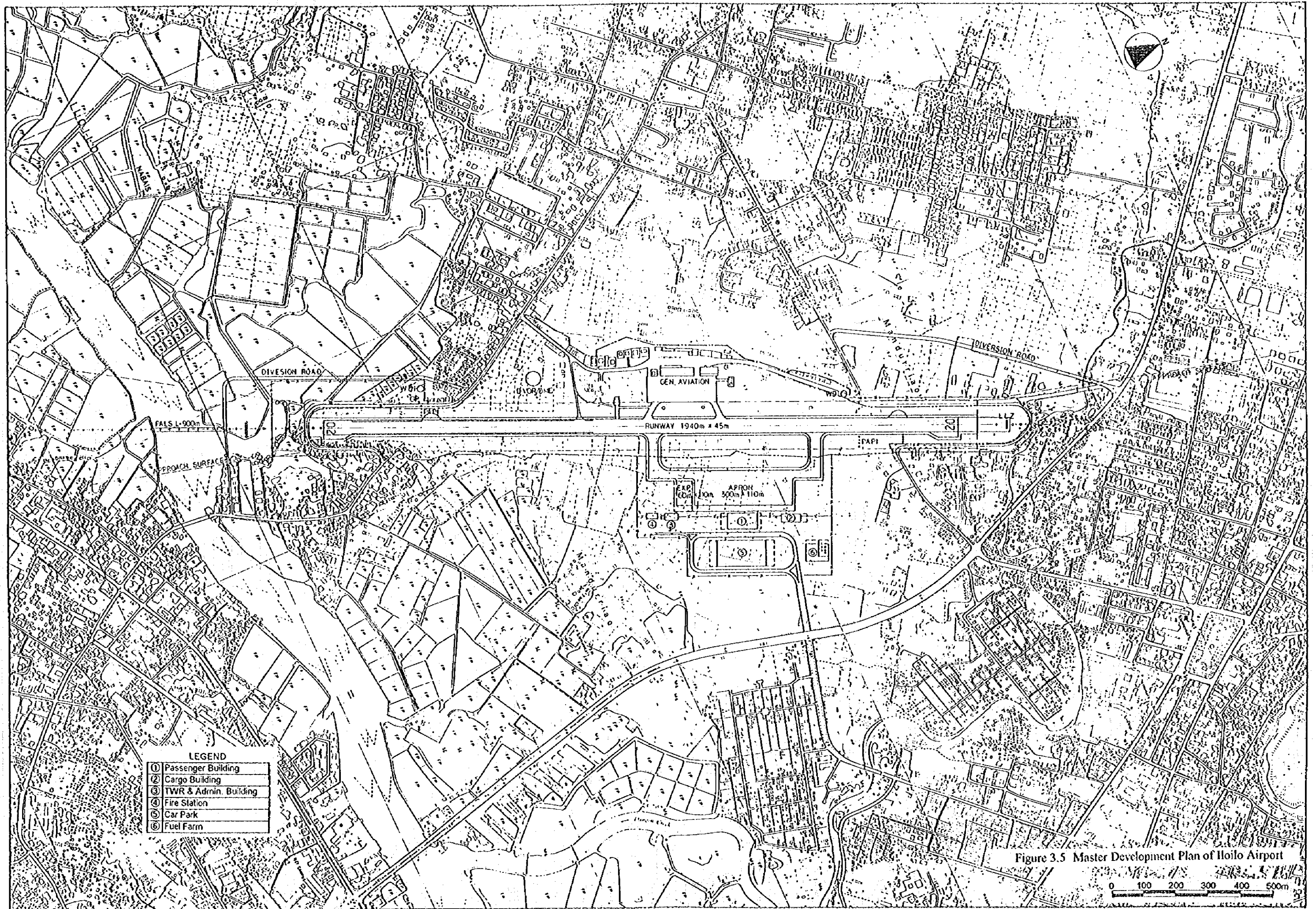


Table 3.3 Evaluation of Existing Facilities at Iloilo Airport

Facilities	Year	2000	2005	2010	2015	Remarks
1) Runway Strip and Obstacle Limitation Surfaces		X				<ul style="list-style-type: none"> Two roads besides the both ends of the runway and squatter shanties along them are located within the 150m wide runway strip. The runway strip do not complying with the ICAO's obstacle removal and grading recommendations. There are many obstacles upon the runway 20 approach surface and the transitional surfaces, including aircraft on the apron, control tower, fire station, etc.
2) Runway	- Length					<ul style="list-style-type: none"> The existing 2,100m long runway is adequate for operations of B737, A320 and A300 for anticipated domestic destinations by 2015, provided that obstacles upon the runway 20 approach surface are removed.
	- Width	X				<ul style="list-style-type: none"> The width of the runway is 36m for about 70% of the total length, which should be widened to 45m as planned in DOTC's Five Year National Airport Development Plan. No parallel taxiway will be required for anticipated peak hour aircraft movements before 2015.
3) Taxiway	- Aircraft Handling Capacity					
4) Apron	- Aircraft Stand Capacity					<ul style="list-style-type: none"> The existing apron can accommodate up to 4 B737s by rearranging parking positions. It has enough capacity for the present level of aircraft movements, but will be saturated by increasing air traffic volume before 2000.
5) Airfield Pavements		X				<ul style="list-style-type: none"> The existing pavements designed for B737 will need asphalt overlay to accommodate A300, which is adequate for Bacolod-Manila sector even for the present level of air traffic according to our forecast.
6) Passenger Terminal Building	- Passenger Handling Capacity	X				<ul style="list-style-type: none"> The existing 2,200 sq.m passenger terminal area is much smaller than the standard requirement of 3,300 sq.m to handle 330 peak hour passengers at present. The terminal space is not adequate for operations of A300.
	- Quality of Services	X				<ul style="list-style-type: none"> No baggage screening device is available. No baggage claim conveyor is available. No air conditioning is provided for public lobby, check-in lobby and arrival area. The passenger terminal building is structurally in good condition.
7) Cargo Terminal Building	- Cargo Handling Capacity					<ul style="list-style-type: none"> The cargo terminal area has sufficient capacity to handle present level of cargo traffic. The expansion of capacity will be required after 2000.
8) Control Tower and Administration Building		X				<ul style="list-style-type: none"> The control tower has good visibility for entire airport area. It is structurally sound but has water leak problem on the roof. The administration office has adequate space for daily activity. However, the existing control tower constitutes an obstacle to transitional surface, and thus discounting safe aircraft operations.
9) Vehicle Parking Area	- Vehicle Parking Capacity	X				<ul style="list-style-type: none"> The capacity of existing vehicle parking area is insufficient for the present peak hour vehicular traffic volume. Many vehicles parked in front of the terminal building obstruct ordinary and smooth flow of vehicles.
10) Radio Navigation Aids		X				<ul style="list-style-type: none"> ILS equipment is procured and stored at the airport although its installation work is suspended at present. D-VOR/DME will replace existing C-VOR/DME under Nationwide Air Navigation Facility Modernization Project - Phase III.
11) ATC and Communication Systems						<ul style="list-style-type: none"> The existing systems were renewed recently by USAID. PC/Fax machine, VSAT, etc. are planed to be installed under Nationwide Air Navigation Facility Modernization Project - Phase III.
12) Airfield Lighting Systems		X				<ul style="list-style-type: none"> The existing approach lights do not comply with ICAO's requirements for precision Category-I approach operations.
13) Meteorological Observation System		X				<ul style="list-style-type: none"> PAGASA station is located in the proximity of Iloilo Airport. However, observation sensors are not adequately located for civil aviation purpose.
14) Rescue and Fire Fighting		X				<ul style="list-style-type: none"> The existing category 6 level of protection is insufficient for A300, which requires at least category 7. An increase of CRF capability is required. The replacement of an old major vehicle needs to be considered.
15) Power Supply System						<ul style="list-style-type: none"> Back up generators are operating at near their capacity. The expansion of capacity will be needed to cope with increasing electricity demand.
16) Telephone System		X				<ul style="list-style-type: none"> Telephone facility is poor for daily operation of the airport. A greater capacity may be needed for more efficient airport operation and better service for passengers.
17) Water Supply System						<ul style="list-style-type: none"> The supply from the city authority is sufficient and of good quality.
18) Sewage Disposal System		X				<ul style="list-style-type: none"> The septic tanks used at the airport are working in good condition. However, increasing effluent will require more sophisticated treatment system.
19) Aviation Fuel Supply System		X				<ul style="list-style-type: none"> PAL has own fuel supply system with hydrant pits on the apron. The existing system is working in normal condition. The increase of storage capacity is needed to satisfy standard storage requirement of one-week consumption.

Legend	X	: Indicates that the capacity or quality of existing facility is inadequate at present.
	■	: Indicates the servicable period of existing facility in terms of capacity or span of life.
	▨	: Indicates the servicable period of existing facility upon completion of ongoing or planned project.



LEGEND

①	Passenger Building
②	Cargo Building
③	TWR & Admin. Building
④	Fire Station
⑤	Car Park
⑥	Fuel Farm

Figure 3.5 Master Development Plan of Iloilo Airport

0 100 200 300 400 500m

3.4 TACLOBAN AIRPORT

3.2.1 Existing Conditions and Problems

Daniel Z. Romualdez (Tacloban) Airport is located at about 3.5km southeast of Tacloban City, the capitol of Layte Province, Region 8 (Eastern Visayas). Figure 3.6 shows the existing layout of the major airport facilities. Table 3.5 summarizes the results of evaluations of the existing facilities.

3.2.2 Master Planning

As a first step of the master planning study, two alternative development plans of the existing Tacloban Airport were prepared. These alternative plans were, then, comparatively evaluated, and the development scheme shown in Figure 3.7 was selected as the optimum development plan for Tacloban Airport. Table 3.6 summarizes outline of airport development works.

Table 3.6 Outline of Tacloban Airport Development

Item	Medium Term	Long Term
Shore Protection Wall	1,450m	-
Earthworks	Cut 40,000 m ³ , Fill 270,000 m ³	-
Runway	Asphalt overlay 8 cm	-
Taxiway	New taxiway 17,000 m ²	-
Apron	New apron 26,000 m ²	-
Passenger Terminal Building	New building 4,800 m ²	Expansion 1,200 m ²
Cargo Terminal Building	New building 840 m ²	Expansion 360 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 8,400 m ²	Expansion 2,100 m ²
Roads	6.0 km	-
Air Navigation Systems	ILS Cat I, PALS, etc.	-
Fuel Supply Facility	New facility 300 kl	Expansion 100 kl
Obstacle Removal	Terminal Building, Control Tower, Fire Station, etc.	-
Land Acquisition	15 ha	-
Diversion / Relocation	73 houses	-

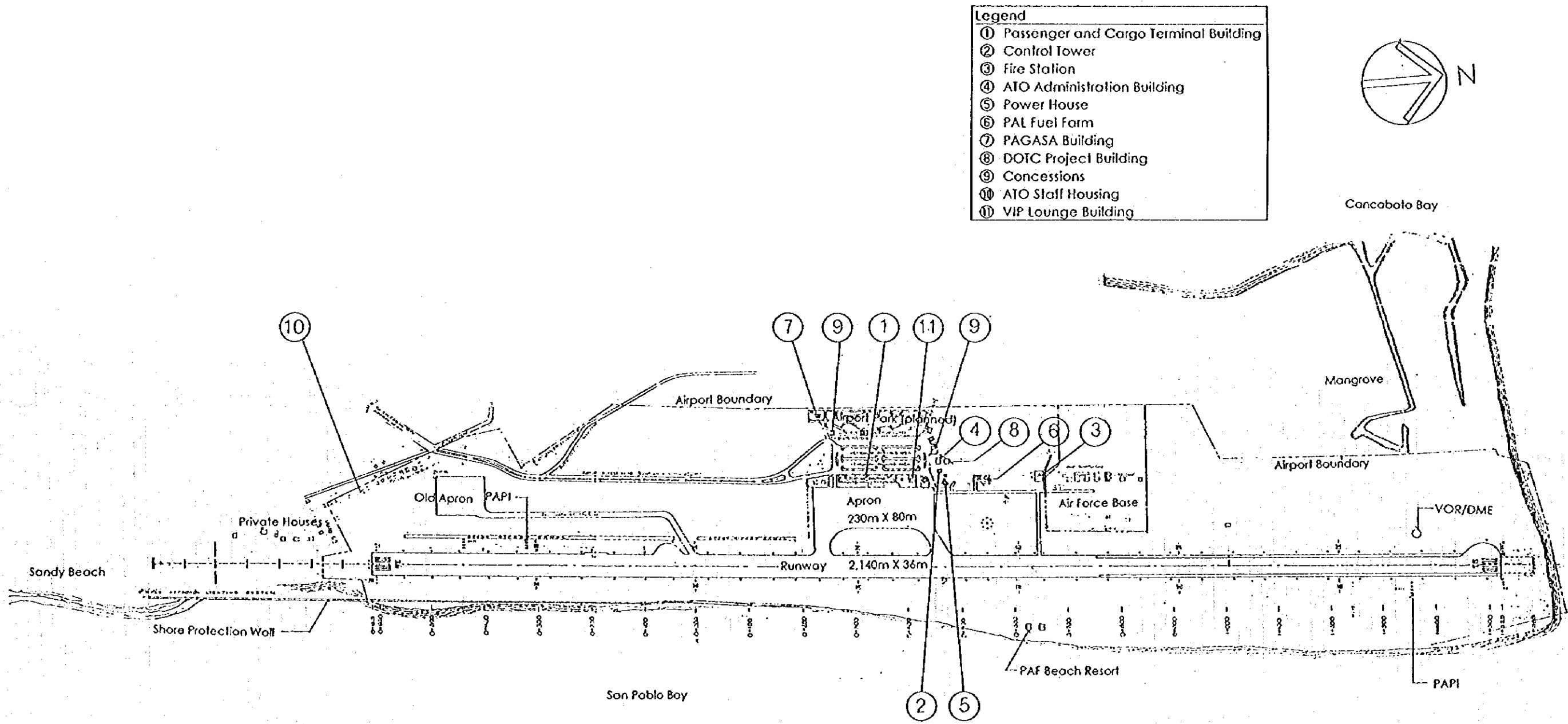


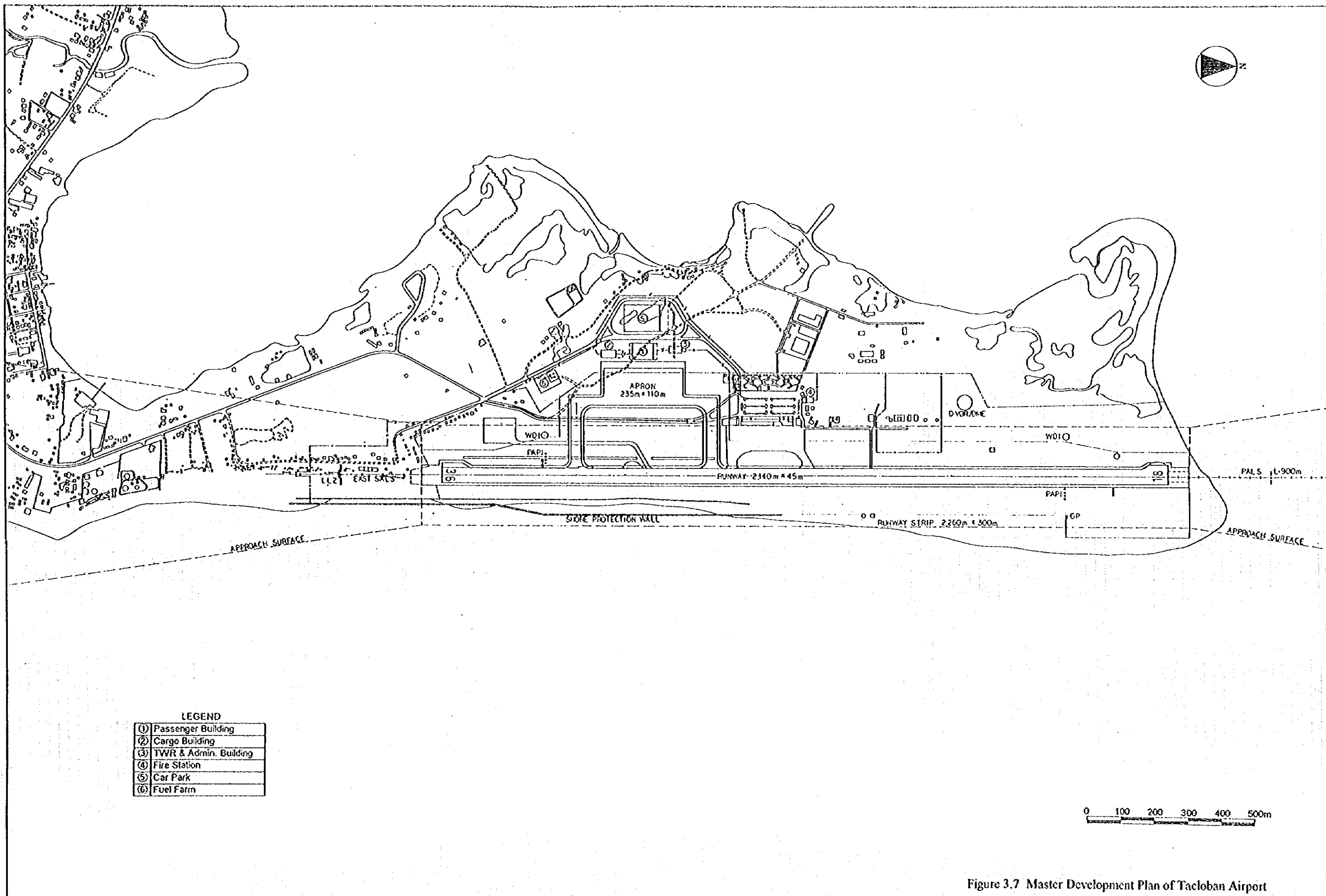
Figure 3.6 Existing Layout of Facilities at Tacloban Airport

0 500m

Table 3.5 Evaluation of Existing Facilities at Tacloban Airport

Facilities	Year	2000	2005	2010	2015	Remarks
1) Runway Strip and Obstacle Limitation Surfaces		X				<ul style="list-style-type: none"> The runway strip, not complying with the ICAO's obstacle removal and grading recommendations, may endanger aircraft in the event of low flying and running off the runway. There are a few obstacles intruding above the runway 36 approach surface and the transitional surfaces, including aircraft on the apron, control tower, etc.
2) Runway	- Length					<ul style="list-style-type: none"> The existing 2,140m long runway is adequate for operations of B737, A320 and A300 for anticipated domestic destinations by 2015, provided that obstacles upon the runway 36 approach surface are removed.
	- Width					<ul style="list-style-type: none"> The runway width of 45m comply with the ICAO's recommendation.
3) Taxiway	- Aircraft Handling Capacity					<ul style="list-style-type: none"> No parallel taxiway will be required for anticipated peak hour aircraft movements before 2015.
4) Apron	- Aircraft Stand Capacity					<ul style="list-style-type: none"> The existing apron can accommodate up to 4 B737s by rearranging parking positions. It has enough capacity for the present level of aircraft movements, but will be saturated by increasing air traffic volume before 2000.
5) Airfield Pavements						<ul style="list-style-type: none"> The existing pavements designed for B737 will need asphalt overlay to accommodate A300, which is anticipated for Tacloban-Manila sector in 1998 according to our forecast.
6) Passenger Terminal Building	- Passenger Handling Capacity	X				<ul style="list-style-type: none"> The existing 1,080 sq m passenger terminal area is much smaller than the standard requirement of 2,800 sq.m to handle 280 peak hour passengers at present. The terminal space is not adequate for operations of A300.
	- Quality of Services	X				<ul style="list-style-type: none"> No baggage screening device is available. No baggage claim conveyor is available. No air conditioning is provided for public lobby, check-in lobby and arrival area. The passenger terminal building is old and deteriorated with many spots of rain water leaks.
7) Cargo Terminal Building	- Cargo Handling Capacity					<ul style="list-style-type: none"> The cargo terminal area has sufficient capacity to handle present level of cargo traffic. The expansion of capacity will be required before 2000.
8) Control Tower and Administration Building		X				<ul style="list-style-type: none"> The control tower has good visibility for entire airport area. It is structurally sound though the tower cab suffer from rain water leaks. The administration office has adequate space for daily activity. However, the existing control tower constitutes an obstacle to transitional surface, and thus discounting safe aircraft operations.
9) Vehicle Parking Area	- Vehicle Parking Capacity					<ul style="list-style-type: none"> The vehicle parking area has sufficient capacity for the present peak hour vehicular traffic volume. A part of the vehicle parking area without awning is designated for unloading of passengers, which is inconvenient for passengers when it rains. The expansion of parking capacity will be needed to cope with increasing vehicular traffic volume before 2000.
10) Radio Navigation Aids		X				<ul style="list-style-type: none"> Existing C-VOR/DME will be replaced by D-VOR/DME under Nationwide Air Navigation Facility Modernization Project - Phase III. There is no ILS, which is a standard equipment for modern jet aircraft.
11) ATC and Communication Systems						<ul style="list-style-type: none"> The existing systems were renewed recently by USAID. PC/Fax machine, VSAT, etc. are planed to be installed under Nationwide Air Navigation Facility Modernization Project - Phase III.
12) Airfield Lighting Systems		X				<ul style="list-style-type: none"> The existing main approach lights are SALS, which does not comply with ICAO's requirements for precision Category-I approach operations.
13) Meteorological Observation System		X				<ul style="list-style-type: none"> PAGASA station is located in the proximity of Tacloban Airport. However, observation sensors are not adequately located for civil aviation purpose.
14) Rescue and Fire Fighting		X				<ul style="list-style-type: none"> The existing category 6 level of protection is insufficient for A300, which requires at least category 7. An increase of CRF capability is required.
15) Power Supply System		X				<ul style="list-style-type: none"> The back-up generating system is reliable only for small demand only. Old back up generators need to be replaced. The expansion of capacity will be needed to cope with increasing electricity demand.
16) Telephone System		X				<ul style="list-style-type: none"> The existing telephone system at the airport is inadequate in terms of capacity. A greater capacity may be needed for more efficient airport operation and better service for passengers.
17) Water Supply System						<ul style="list-style-type: none"> The supply from the city authority is stable.
18) Sewage Disposal System		X				<ul style="list-style-type: none"> The septic tanks used at the airport are working in good condition. However, increasing effluent will require more sophisticated treatment system.
19) Aviation Fuel Supply System						<ul style="list-style-type: none"> PAL has own fuel supply system with hydrant pits on the apron. The existing system is working in normal condition. The increase of storage capacity will be needed to satisfy standard storage requirement of one-week consumption between

Legend	X	: Indicates that the capacity or quality of existing facility is inadequate at present.
	██████████	: Indicates the servicable period of existing facility in terms of capacity or span of life.
	▨▨▨▨▨▨	: Indicates the servicable period of existing facility upon completion of ongoing or planned project.



LEGEND

①	Passenger Building
②	Cargo Building
③	TWR & Admin. Building
④	Fire Station
⑤	Car Park
⑥	Fuel Farm

Figure 3.7 Master Development Plan of Tacloban Airport

3.5 LEGASPI AIRPORT

3.2.1 Existing Conditions and Problems

Legaspi Airport is located at about 2km southwest of Legaspi City, the capitol of Arbay Province, Region 5 (Bicol). Figure 3.8 shows the existing layout of the major airport facilities. Table 3.7 summarizes the results of evaluations of the existing facilities.

3.2.2 Master Planning

Although it was considered impractical, removal of the hill obstacles was planned based on the original Scope of the Study agreed between DOTC and JICA. Then, two alternative development plans of the airport facilities at the existing airport site were prepared. From the comparison of these alternative plans, the development scheme shown in Figure 3.9 was selected as the optimum plan for the development of the existing Legaspi Airport. Table 3.8 summarizes outline of airport development works.

Table 3.8 Outline of Legaspi Airport Development

Item	Medium Term	Long Term
Earthworks	Cut 10,000 m ³ , Fill 140,000 m ³	cut 2,000 m ³
Runway	Asphalt overlay 4 cm	-
Taxiway	Asphalt overlay 10 cm	-
Apron	Asphalt overlay 10 cm	Expansion 17,000 m ²
Passenger Terminal Building	New building 2,900 m ²	Expansion 900 m ²
Cargo Terminal Building	Expansion 80 m ²	Expansion 120 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 5,250 m ²	Expansion 1,400 m ²
Roads	5.3 km	-
Air Navigation Systems	ILS Cat I, PALS, SALS, etc.	D-VOR/DME
Fuel Supply Facility	Expansion 20kl	New facility 150kl
Obstacle Removal	Kemantong Range, Control Tower, Fire Station, etc.	-
Land Acquisition	21 ha	2 ha
Diversion / Relocation	42 houses, Road 2.4 km	4 houses

- Legend**
- ① Passenger Terminal Building
 - ② Cargo and PAL Office Building
 - ③ Control Tower and ATO Administration Building
 - ④ Fire Station
 - ⑤ ATO Power House - 1
 - ⑥ ATO Power House - 2
 - ⑦ PAL Power House
 - ⑧ Aviation Security Command Building
 - ⑨ PAGASA Building
 - ⑩ Concessions
 - ⑪ PAL fuel Farm

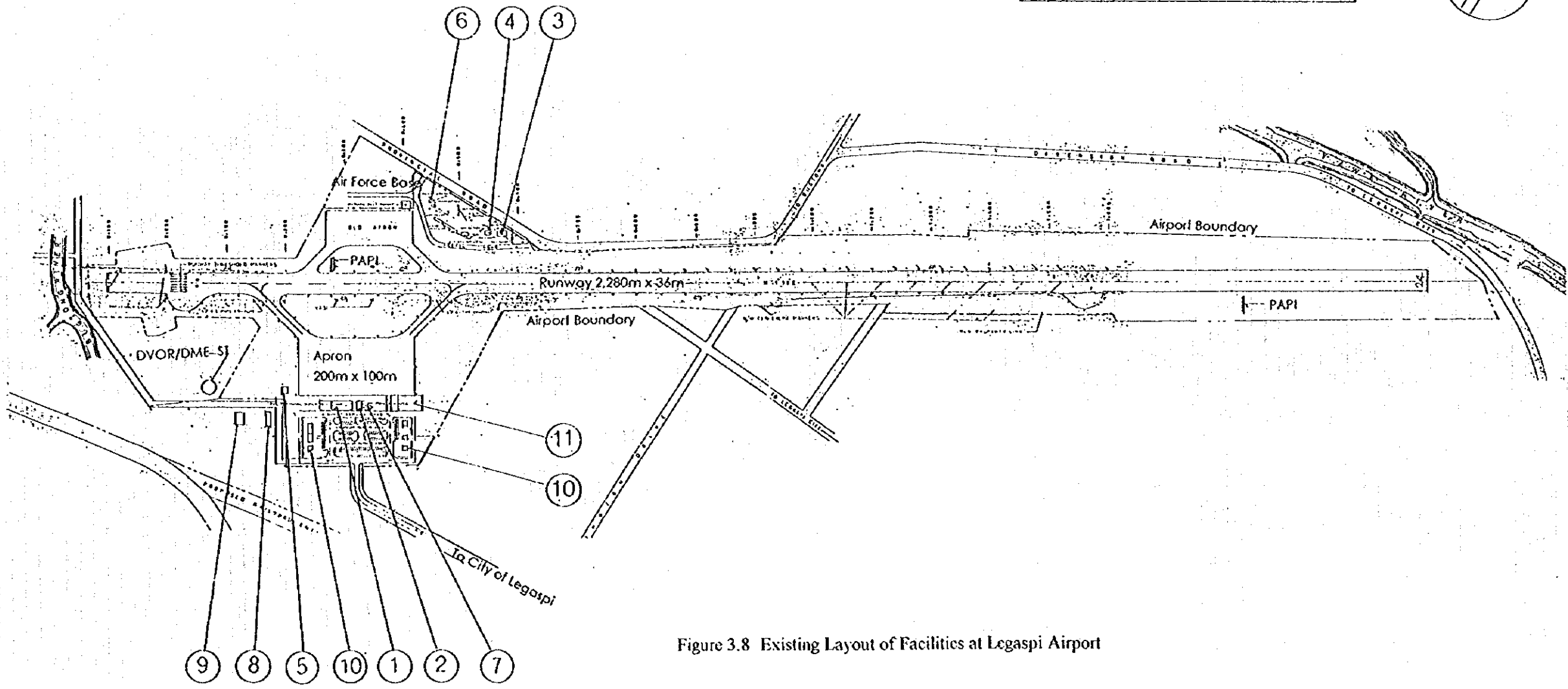


Figure 3.8 Existing Layout of Facilities at Legaspi Airport

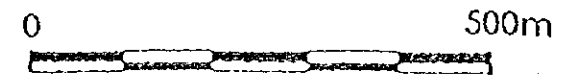


Table 3.7 Evaluation of Existing Facilities at Legaspi Airport

Facilities	Year	2000	2005	2010	2015	Remarks
1) Runway Strip and Obstacle Limitation Surfaces		X				<ul style="list-style-type: none"> A road on the northern side of the airport is located within the 150m wide runway strip. The runway strip does not comply with the ICAO's obstacle removal and grading recommendations. Hilly terrain on the west to north of the airport constitute obstacles, which seriously affect safe aircraft operations. Kemantong Range infringes the runway 06 approach surface as much as 40m. There are many trees outside the 150m wide strip, which infringe transitional surface. The foothill of Mayon Volcano protrude upon the inner horizontal and conical surfaces.
2) Runway	- Length					<ul style="list-style-type: none"> The existing 2,280m long runway is adequate for operations of B737, A320 and A300 for anticipated domestic destinations by 2015, provided that no obstacles exist.
	- Width	X				<ul style="list-style-type: none"> The width of the runway is 36m for the entire length, which should be widened to 45m as planned in DOTC's Five Year National Airport Development Plan.
3) Taxiway	- Aircraft Handling Capacity					<ul style="list-style-type: none"> No parallel taxiway will be required for anticipated peak hour aircraft movements before 2015.
4) Apron	- Aircraft Stand Capacity					<ul style="list-style-type: none"> The existing apron can accommodate up to 4 B737s by rearranging parking positions. It has enough capacity for the present level of aircraft movements, but will be saturated in 2006 when A300 will operate at Legaspi Airport.
5) Airfield Pavements						<ul style="list-style-type: none"> The existing pavements designed for B737 will need asphalt overlay to accommodate A300, which is anticipated for Legaspi-Manila sector in 2006 according to our forecast.
6) Passenger Terminal Building	- Passenger Handling Capacity	X				<ul style="list-style-type: none"> The existing 910 sq.m passenger terminal area is much smaller than the standard requirement of 2,800 sq.m to handle 280 peak hour passengers at present. The additional capacity will be needed to cope with increasing traffic volume.
	- Quality of Services	X				<ul style="list-style-type: none"> No baggage screening device is available. No baggage claim conveyor is available. No air conditioning is provided for check-in lobby and arrival area. The building is structurally in good condition.
7) Cargo Terminal Building	- Cargo Handling Capacity					<ul style="list-style-type: none"> The cargo terminal area has sufficient capacity to handle present level of cargo traffic. The expansion of capacity will be required before 2000.
8) Control Tower and Administration Building		X				<ul style="list-style-type: none"> The control tower has good visibility for entire airport area. It is structurally sound but rain water leakage is reported. The administration office has adequate space for daily activity. However, the existing control tower constitutes an obstacle to transitional surface, and thus discounting safe aircraft operations.
9) Vehicle Parking Area	- Vehicle Parking Capacity					<ul style="list-style-type: none"> The vehicle parking area has sufficient capacity for the present peak hour vehicular traffic volume and vehicular traffic is well regulated. However, the expansion of capacity will be required to cope with increasing vehicular traffic volume before 2000.
10) Radio Navigation Aids		X				<ul style="list-style-type: none"> There is no ILS, which is a standard equipment for modern jet aircraft.
11) ATC and Communication Systems						<ul style="list-style-type: none"> The existing systems were renewed recently by USAID. PC/Fax machine, VSAT, etc. are planed to be installed under Nationwide Air Navigation Facility Modernization Project - Phase III.
12) Airfield Lighting Systems		X				<ul style="list-style-type: none"> The existing approach lights do not comply with ICAO's requirements for precision Category-I approach operations.
13) Meteorological Observation System		X				<ul style="list-style-type: none"> PAGASA station is located in the proximity of Tacloban Airport. However, observation sensors are not adequately located for civil aviation purpose.
14) Rescue and Fire Fighting		X				<ul style="list-style-type: none"> The existing category 4 level of protection is insufficient for the present requirements of category 5. An increase of CRF capability is required. The replacement of an old major vehicle needs to be considered.
15) Power Supply System		X				<ul style="list-style-type: none"> The existing back-up generators have enough capacity for the present demand and in good working condition. The expansion of capacity will be needed to cope with increasing electricity demand.
16) Telephone System		X				<ul style="list-style-type: none"> The existing telephone system at the airport is adequate for present needs. However, a greater capacity may be needed for more efficient airport operation and better service for passengers.
17) Water Supply System						<ul style="list-style-type: none"> The airport uses deep wells. The capacity is enough, but water quality is poor.
18) Sewage Disposal System		X				<ul style="list-style-type: none"> The septic tanks used at the airport are working in good condition. However, increasing effluent will require more sophisticated treatment system.
19) Aviation Fuel Supply System						<ul style="list-style-type: none"> PAL has own fuel supply system with hydrant pits on the apron. The existing system is working in normal condition. The increase of storage capacity will be needed to satisfy standard storage requirement of one-week consumption before 2005.

Legend	X : Indicates that the capacity or quality of existing facility is inadequate at present.
	■ : Indicates the serviceable period of existing facility in terms of capacity or span of life.
	▨ : Indicates the serviceable period of existing facility upon completion of ongoing or planned project.

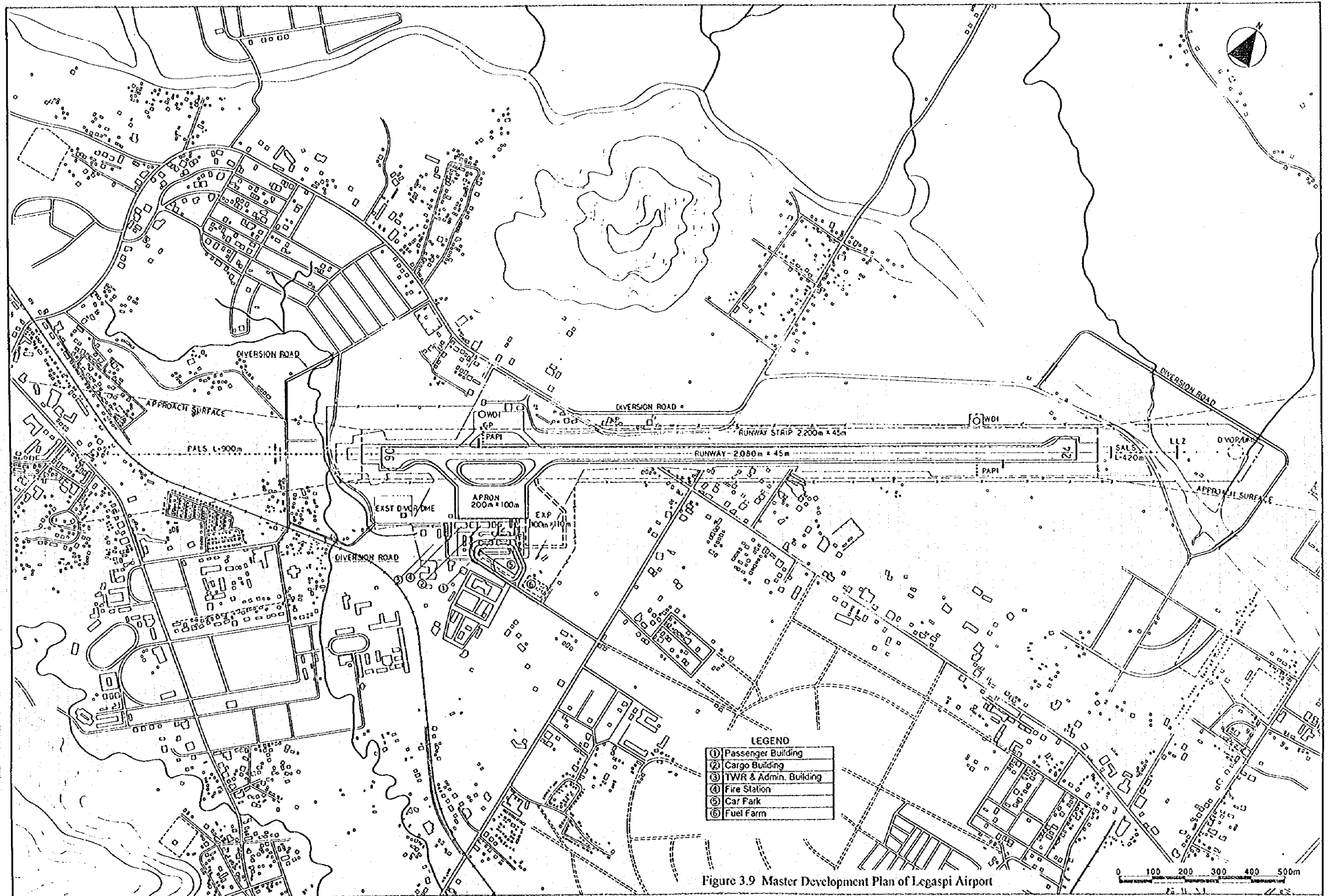


Figure 3.9 Master Development Plan of Legaspi Airport