6.3 EVALUATION OF EXISTING AIRPORT FACILITIES

6.3.1 Summary

The evaluation of existing facilities at Iloilo Airport is summarized in Table 6.3.1.

6.3.2 Runway Strip and Obstacle Limitation Surfaces

1) Runway Strip

The dimensions of the runway strip for Iloilo Airport are not indicated in the AIP Philippines. The Civil Air Regulations of the Philippines requires a 2,220m long, 150m wide strip for the non-precision instrument runway with 2,100m in length. The same dimensions are required by the Japanese Standard. According to ICAO, the airport should have an ICAO reference code of 4C, and the recommended size of the runway strip is 2,220m by 300m. The present conditions of Iloilo Airport do not satisfy even less stringent Philippine or Japanese standard.

The fire station is located only 65m from the runway centerline. Two roads running beside the both ends of the runway are only 40-50m away from the runway pavement edges or ends. Those roads are located within the runway strip when normal standard is applied. Furthermore, there are many squatter shanties between the runway and those roads. In terms of grading requirement, canals located immediately besides the both pavement edges of the runway may endanger aircraft in the event of its running off the runway.

If a 300m wide runway strip is applied, the entire part of the existing terminal area will be situated within the strip.

2) Approach Surface

The obstruction chart produced by the ATO in 1994 indicates many obstacles protruding upon the 2% approach surface for the runway 20 such as TV antennas, trees, electric posts and a building. Although the runway 20 is not a main approach runway, some of obstacles exceed the allowable height as much as 14m, significantly hindering safe aircraft operation. No obstacles are indicated on the same chart for the runway 02 approach surface. However, mobile objects on the road besides the runway 02 threshold are obstacles to the main approach surface.

Table 6.3.1 Evaluation of Existing Facilities at Iloilo Airport

Facilities / Year		2000	2005	2010	2015	Remarks
1) Runway Strip and Obstacle Limitation Surfaces		X				• 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	▬	▬	▬	▬	• 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 ▨	▨	▨	▨	• 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.
3) Taxiway	- Aircraft Handling Capacity	▬	▬	▬	▬	• No parallel taxiway will be required for anticipated peak hour aircraft movements before 2015.
4) Apron	- Aircraft Stand Capacity	▬				• 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 voulne before 2000.
5) Airfield Pavements		X				• 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				• 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				• 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	▬				• 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				• 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				• 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 ▨	▨	▨	▨	• 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		▬	▬	▬	▬	• 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				• The existing approach lights do not comply with ICAO's requirements for precision Category-I approach operations.
13) Meteorological Observation System		X				• PAGASA station is located in the proximity of Iloilo Airport. However, obervation sensors are not adequately located for civil aviation purpose.
14) Rescue and Fire Fighting		X				• 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		▬				• 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				• 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		▬	▬	▬	▬	• The supply from the city authority is sufficient and of good quality.
18) Sewage Disposal System		X				• 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				• 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 serviciable period of existing facility in terms of capacity or span of life.
	▨ : Indicates the serviciable period of existing facility upon completion of ongoing or planned project.

3) Transitional Surface

It would be not possible to evaluate the transitional surface if the runway strip were not declared, as in the case of Iloilo Airport. However, given that a 150m wide runway strip were to be established, there would be many problems for Iloilo Airport. Since the apron is located too close from the runway, aircraft parked on the apron protrude upon the 14.3% transitional surface. The control tower also protrudes upon the transitional surface. There are many other objects which infringe the transitional surfaces.

4) Other Obstacle Limitation Surfaces

There are no obstacles protruding upon the inner horizontal surface or conical surface.

6.3.3 Runway, Taxiway and Apron

1) Runway

Iloilo Airport has a 2,100m long runway, which is adequate for B737-300 for the present flight destinations. However, because of obstacles infringing the runway 02 takeoff surface, PAL's B737-300 is subject to payload penalty of 2,495kg for Iloilo-Manila sector, which is equivalent to 16% of maximum payload or 61% of cargo capacity for full passenger flights.[1]

B737-300 requires a longer takeoff runway than A300-B4, which PAL intends to introduce to Iloilo-Manila sector in its "Airport Development Requirements, Priority 1: 1995-1997".[2] Our forecast indicates that operation of A300 may be justified even for the present level of air traffic volume. According to our calculation, a 1,930m long runway is sufficient for entire planning horizon up to 2015.

There is no stopway. A 120m long clearway and 150m one are respectively declared for the runways 02 and 20 in the AIP. However, they should not be regarded as a clearway because of obstacles including mobile objects on the roads beyond the both ends of the runway, which may endanger aircraft in the air. The width of the runway is 45m for a 1,290m section from the runway 20 threshold and a 85m section from the runway 02 threshold. The remaining 725m middle portion is 36m wide, which will be widened within the current Five Year National Airport Development Program (1995-2000). Upon completion of the remaining widening

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[1] Under 30°C and zero wind condition. 80kg per passenger is assumed including bags.

[2] The required takeoff runway length for PAL's B737-300, A300-B4 and A320 for Iloilo-Manila (450km) under full payload, 30°C and zero wind condition is as follows:

B737-300 (141 seats): 1,880m, A300-B4 (246 seats): 1,700m and A320 (150 seats): 1,771m.

PAL has not received detailed performance data for A330, which is now considered as the replacement of A300-B4 by PAL.

work, the runway will comply with the ICAO's recommendation. There are no paved shoulders for the runway.

The main approach runway is the runway 02. Approximately 60% of the total arriving aircraft use the runway 02 for landing. The weather condition in Iloilo is generally good. According to PAL's branch manager at Iloilo Airport, it is rare that flights are canceled, diverted or delayed due to bad weather in Iloilo.

All weather wind coverage of the runway 02/20 was calculated based on the data from PAGASA in 1995 as follows:

Cross wind component less than 13 knot:	99.61%
Cross wind component less than 20 knot:	100.0%

The result of correlation analysis on visibility and cloud height indicates the coverage of 94.1% for existing IMC minima of 636ft - 2.8km. Since this value is lower than the ICAO recommended minimum usability factor of 95%, the introduction of precision approach procedures are desirable from the meteorological viewpoint. (Refer to Appendix 6.3.1 for more detailed analysis on meteorological data.)

2) Apron and Taxiway

The size of the apron at Iloilo Airport is 215m by 80m It is planned to rearrange parking configuration of two B737s and two smaller aircraft to accommodate four B737 class aircraft. However, the apron capacity will become insufficient due to increasing air traffic volume before 2000. The apron is connected to the runway with two stub taxiways of 25m wide. No parallel taxiway will be required for anticipated peak hour aircraft movements up to 2015.

3) Pavement

The strength of the runway is PCN39/R/B/W/U, which is adequate for B737 class aircraft. The structure of the runway and taxiway pavements is 23cm aggregate base, 20cm cement concrete slab and 10cm asphalt overlay on it. Although the overlay work was completed only four years ago in March 1992, its rough surface suggests that the work was of poor quality materials and workmanship. Complaints from airline companies are reported on loose stones on the runway as FOB.

The apron pavement is of 20cm cement concrete slab on top of 23cm aggregate base. The standard size of a slab is 6.0m by 3.0m. The condition of the concrete slab is poor. Many slabs have major cracks extending one edge to the other. Joint sealant is deteriorated and has lost flexibility. The existence of many standing water after rain implies unevenness of the

apron surface. A detailed investigation report on the existing pavements is shown in the Appendix 6.3.2.

The existing pavements will require substantial repairs and a strengthening work to accept A300, which is adequate for Iloilo-Manila sector even at present according to our forecast. PAL evaluated that the existing pavements will require some 25cm (10 inch) overlay to have PCN52 for A300, which will be reviewed in Section 6.4.

4) General Aviation Area

The general aviation area is located on the south of the fire station. There are two general aviation operators at Iloilo Airport, Rodolpo Grecia (RG) and Ceser Gumayan. RG has one hangar and stations four light aircraft, while Guyaman has two hangars for two aircraft at the airport. There is no paved parking space for those aircraft besides the hangars. Another two operators has applied to station at Iloilo Airport.

There is a PAF's helipad on the south of the general aviation area.

6.3.4 Passenger Terminal Building (including Administration Office)

1) General

The terminal building is one story of a reinforced concrete structure and has a total floor area of about 2,200 sq.m. The terminal building accommodates arrival and departure areas and administration area. Three airlines, PAL, Cebu Pacific and Air Philippines, are operating in the terminal building. Soon a new airline, Grand Air, is scheduled to operate. The floor plan of the terminal building is shown in Figure 6.3.1. The administration area with about 140 sq.m is located in the northern part of the terminal building, next to baggage claim area. The floor space for the administration office is not sufficient. The structure of the terminal building is generally in good conditions.

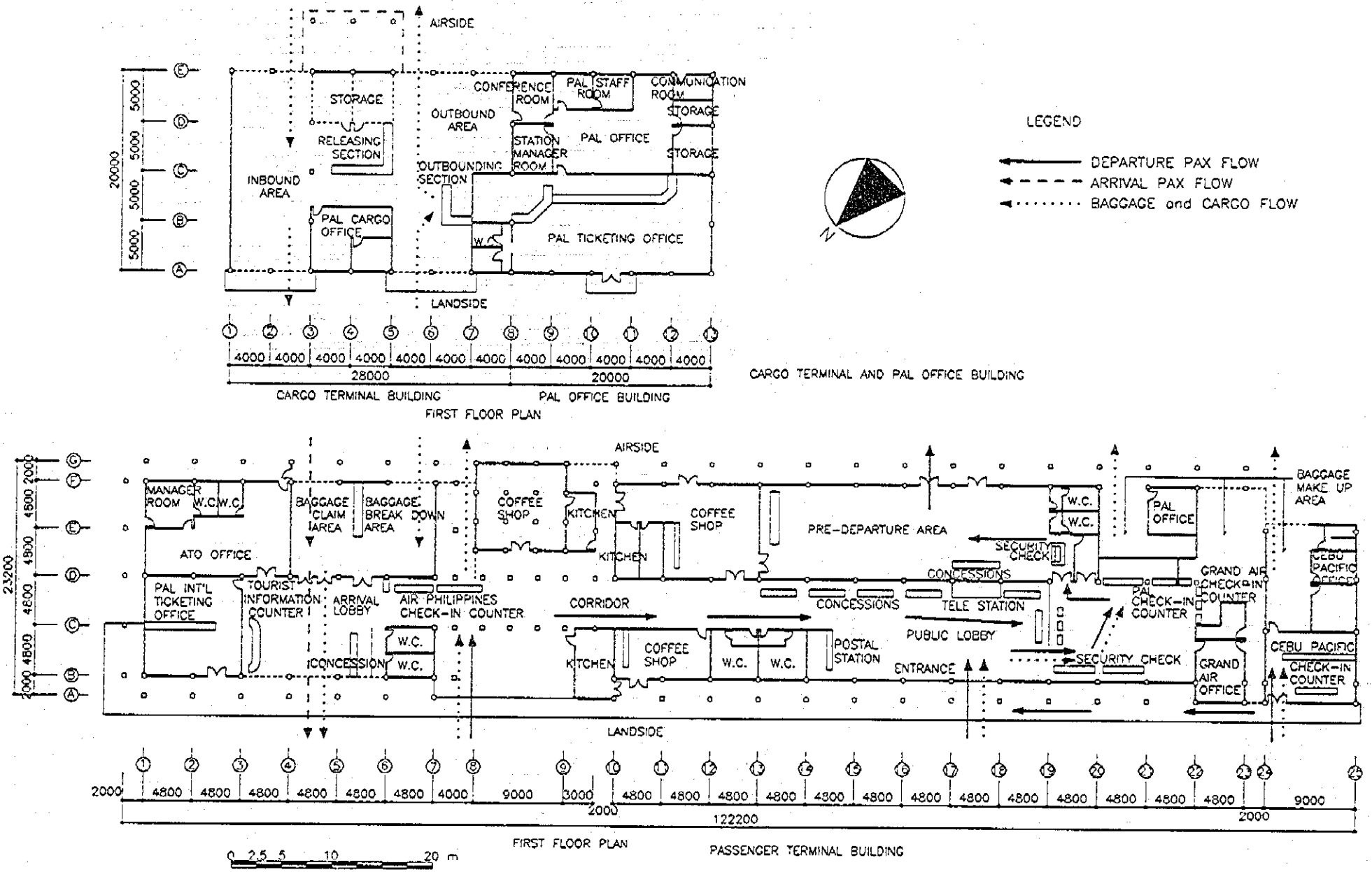


Figure 6.3.1 Passenger and Cargo Terminal Building

2) Total Floor Area

As previously stated in Section 4.4, the unit floor area of 10 sq.m per peak hour passenger is considered adequate for estimating the required floor area for the passenger terminal building. Since the current peak hour passengers in two ways are estimated to be 330 passengers based on the current flight schedule, the required floor area is estimated to be 3,300 sq.m, which indicates that the present available floor area of 2,200 sq.m is not sufficient even for the present peak hour passenger volume.

3) Operational and Functional Aspects

Departing and arriving passengers flows, including baggage flow are shown in Figure 6.3.1. Actual conditions of the major terminal components are compared with the standard requirements in order to evaluate the existing terminal building. As a result, there are many insufficient spaces and facilities at the existing terminal building as shown in Table 6.3.2 below.

Table 6.3.2 Comparison of Standard Requirements and Existing Conditions of Major Components of the Passenger Terminal Building: Iloilo

Major Components and Facilities	Requirements*	Existing	Remarks
Peak Hour Pax 210 One Way			
1. Departure Curb	20m	55m	Sufficient
2. Departure Concourse	488 sq.m	240 sq.m	Insufficient
3. Security Check-Check-in Bag	1 unit X-ray equipment	No X-ray equipment	Insufficient
4. Check-in Queuing Area	58 sq.m	50 sq.m	insufficient
5. Check-in Counters	8 Counters (Common Use)	6 Counters (Exclusive Use)	Insufficient
6. Security Check-Gate Lounge	1 unit X ray equipment & Magnetometer	1 unit Magnetometer No X-ray equipment	Insufficient
7. Gate Lounge (Pre-Departure Area)	188 sq.m	250 sq.m	Sufficient
8. Baggage Claim Area	208 sq.m	65 sq.m	Insufficient
9. Number of Bag. Claim Devices	1 unit 30 m long	1 unit 10 m long	Insufficient
10. Arrival Concourse	450 sq.m	200 sq.m	Insufficient
11. Arrival Curb	20m	30 m	Sufficient

Note*: The requirements were calculated by using IATA formulas and the more details are explained in Appendix 6.3.3.

Major problems of the existing terminal building from operational and functional viewpoints are summarized as follows:

i) Inconvenient Check-in Counter of Air Philippines

The check-in counters are located next to both the baggage claim area and arrival lobby. The check-in counters queuing area and the baggage make up area are very narrow. Thus, in particular, baggage handling difficulties are experienced at the baggage make up area during peak hours. Moreover, as the check-in counters are located far from the entrance of the pre-departure area, it results in long walking distance, and inconvenient for passengers.

ii) Common-Use Check-in Area for PAL and Grand Air

The check-in area is located next to both the public lobby and the pre-departure area in the south of the terminal building. PAL operates check-in services without any problems. However, as previously stated, when PAL and Grand Air make the check-in operations simultaneously, passenger congestion and intersection of passengers lining up is easily foreseen in the check-in area due to a shortage of the check-in queuing area and configuration of the check-in counters to create intersecting queuing lines, L shape check-in configuration. To solve the problems it is recommended that common-use check-in counters be provided.

iii) Congestion in the Baggage Claim Area

As no baggage claim conveyor is installed in the baggage claim area, passenger congestion takes place during peak hours.

iv) Necessity of Centralized Security System with X-Ray Equipment at Security Check before Check-in Counter

As no X-ray equipment is provided for the security check of check-in baggage, passengers are obliged to open all the baggage for security screening. This manual screening causes passenger congestion at the security check during peak hours. For passenger convenience, operational efficiency and safety reliability, X-ray equipment should be installed.

Furthermore, present check-in system is exclusive one, i.e., each airline has its own independent check-in counters. This system results in three independent check-in areas in the terminal building. Similarly, there are three separate security check positions for each check-in area, i.e., decentralized security system. Assuming that flights are increased more and more in future, it is recommended to adopt centralized security system for operational efficiency, mininized manning and effective use of security equipment.

v) Necessity of X-Ray Equipment for Cabin Baggage

Magnetometer (metal detector equipment) is provided for the security check prior to entering the pre-departure area, however, no X-ray equipment is provided for security check of cabin baggage. Thus the same problem of manual search described item iv) above is observed. Installation of X-ray equipment is recommended for the same reasons stated under item iv).

vi) Lack of Airline Operation Offices for Air Philippines

Air Philippines has no check-in operational support office and ticketing office in the terminal building due to space limitation.

6.3.5 Cargo Terminal and PAL Office Building

1) General

The building is located to the northeast of the passenger terminal building and accommodates cargo terminal area and PAL offices including ticketing office. The terminal building is one story of a reinforced concrete structure and has a total floor area of about 960 sq.m. The terminal building was expanded and renovated in 1995 and is owned by PAL. The floor plan of the terminal building is shown in Figure 6.3.1.

Cargo area (520 sq.m) is located in the northeast of the building, and PAL office area (440 sq.m) located in the other side. The terminal building is generally in good conditions.

No particular problems were found out from the viewpoints of cargo and airline operation. However, the expansion of capacity will be required after 2000 to cope with increasing cargo traffic volume.

6.3.6 Control Tower Building

The building is located to the southwest of the passenger terminal building, it is five stories and of a reinforced concrete structure (1F-4F) and a steel frame structure (5F, VFR Room) and has a total floor area of about 170 sq.m. The building was constructed in 1975. Control tower - VFR RM is a pentagonal configuration with about 14m floor height. It has a good visibility for entire airport area. In general, the building is structurally in good conditions except water leak problem from the roof.

It is noted that the existing control tower constitute an obstacle to transitional surface, and thus discounting safe aircraft operations.

6.3.7 Other Buildings

1) Fire Station Building

The building is located at about 200m south of the passenger terminal building. It is one story and of a reinforced concrete structure. Total floor area is about 300 sq.m. The building was constructed in 1983. Generally, the building is in good conditions.

2) Power House Building

The building is located at about 200m southwest of the passenger terminal building. It is one story and of a reinforced concrete structure. Total floor area is about 70 sq.m. The building is in good conditions.

3) General Aviation Hangars

Three general aviation hangars are located at about 200m south of the fire station building. They are generally in good conditions.

6.3.8 Roads and Vehicle Parking Area

Iloilo Airport has one-lane, two-way access roads to its terminal area from two directions of north and south. The main access road is from Iloilo Jaro Diversion Road on the north, and the other is from Molo-Mandurriao Road (consisting of R. Mapa St., Detour Rd. and Tabucan Rd.) on the south. The width of the northern access road is 7m while the southern one is 6m. In terms of handling capacity, the existing roads are sufficient for the present levels of vehicular traffic volume. When the glide path antenna is installed for the runway 02, Tabucan Rd. will be closed and most vehicles will use the northern access road. The access roads are paved with asphalt concrete, which is in good condition.

The vehicle parking area is located on the land side of the passenger terminal building. It is a 200m by 30m, long and shallow rectangular space. Vehicular traffic is regulated by one-way traffic system, and vehicles are parked on the both sides of the circulation lane. The number of parking slots is approximately 150, which is insufficient during peak hours. Due to very limited depth of the parking area, the curb front of the terminal buildings is assigned for parking slots. Therefore, many vehicles have to load or unload passengers away from the terminal frontage. The vehicle parking area is paved by cement concrete, but deteriorated and not adequately drained.

6.3.9 Air Navigation Systems

1) Radio Navigation Aids

(1) VHF Omni-directional Radio Range/Distance Measuring Equipment (VOR/DME)

A conventional VOR and a DME collocated with the VOR are operative at this airport. Dimensions of the facilities are as shown in Table 6.3.3.

Table 6.3.3 Dimensions of Iloilo VOR /DME

STATION	SERVICE	CALL SIGN OR IDENTIFICATION	EMISSION	TRANSMITS		RECEIVES		HOURS UTC	COORDINATES	LOCATION		OPERATING AGENCY AND REMARKS
				kHz	MHz	kHz	MHz			Mag	NM	
1	2	3	4	5	6	7	8	9	10	11	12	13
ILOILO	VOR / DME	ILO	50W PON		116.3 CH110X			H24	10 43.1 N 122 32.8 E	ON	AD	VOR = 100 W DME = 1 KW

The facilities manufactured by Wilcox were installed in 1980. The facilities seemed to have reached the final stage of their life spans. The VOR/DME have the following problems:

i) The site is too close to the runway (72m from the runway centerline) and the facility constitutes an obstacle against aircraft operations.

ii) Flight calibration tests were not executed in the last few years to ensure full reliability to maintain the accuracy of VOR/ DME. ATO staff conduct the ground check on a monthly basis.

iii) No module/ spare parts are available at present. The facilities should be maintained with necessary modules/spare parts for immediate replacement in case of equipment breakdown. However, they face lack of modules/spare parts.

(2) Evaluation of Existing Radio Navigation Aids

The ILS equipment is procured and stored at the airport although its installation work is suspended at present. The existing C-VOR/DME is planned to be replaced by a D-VOR/DME under Nationwide Air Navigation Facilities Modernization Project - Phase III. Upon completion of those works, Iloilo Airport will be capable of precision approach Category-I operations which are the standard requirement for modern jet aircraft although there will be restrictions on operational minima due to sub-standard width of the runway strip.

2) ATC and Aeronautical Telecommunication System

(1) Approach Control

The aircraft operating within the CTR are controlled by the Bacolod Approach Control (APP) with the frequency of 122.6MHz on a 24 hour basis.

(2) Aerodrome Contract

Iloilo Tower has the responsibilities to control the aircraft operating within the ATZ using frequency of 123.4MHz on a 24 hour basis. The console and light gun provided in the tower were renewed in November 1995 by USAID.

(3) Flight Service Station

Flight Service Station for flight service with frequencies 5205 and 3872.5KHz is located in the control tower for transmitting /receiving the flight data between Bacolod APP and Mactan ACC.

(4) Equipment Room

Transmitter/receiver and standby equipment s of VHF and HF frequencies and voice Recorder are installed in the equipment room which is located beneath the VFR room. These equipment are maintained in good conditions.

(5) Evaluation of Existing ATC and Aeronautical Telecommunication Systems

The existing systems were renewed recently by USAID, and generally operating in good condition. PC/Fax machine and VSAT will be added under Nationwide Air Navigation Facilities Modernization Project - Phase III. The existing systems are adequate for operational needs for anticipated air traffic volume up to 2015 if necessary maintenance and replacement of aging equipment are undertaken.

3) Airfield Lighting Systems

(1) Existing Systems

The lighting systems are operative at this airport are as follows:.

- Runway edge lights
- Threshold lights for the both runways 02/20
- Taxiway edge lights
- Apron flood lights

- Aerodrome beacon
- PAPI for the both runways 02/20
- Approach lights for the both runways 02/20

These systems are controlled by the Tower. Apron flood light system is simple type. Angles of PAPI for Runway 02/20 are both 3.0 degrees.

(2) Evaluation of Existing Air Field Lighting Systems

The existing systems are operating normally although some of them are obsolescent. The existing approach lights do not comply with precision approach Category I operations, which are the standard requirement for modern jet aircraft. It is desirable to install Precision Approach Category I Lighting System (PALS) for the main approach runway and Simple Approach Lighting System (SALS) for the other side of the runway.

4) Meteorological Systems

There is a local office of PAGASA proximately to Iloilo Airport. This office sends observation data including wind directions/speed, QNH values, ground visibility, cloud basis, and temperatures, etc. to the control tower on a hourly basis. However, PAGASA's aerovane is located at a distance of approximately 80m off the runway centerline. Sometimes these wind data does not represent actual condition of the runway thresholds. Therefore, for landing/departure aircraft, controllers inform the wind directions/speed data through gauges installed in the console of the tower which have been transmitted from sensors near the runway. More sophisticated observation and recording systems are required for civil aviation purpose.

6.3.10 Rescue and Fire Fighting Services

The crash, rescue and fire fighting services declared for Iloilo Airport are the ICAO's category 6 level of protection, which corresponds to B737 class aircraft. There are two RIVs each of 2,270L (600 gal.) water capacity, one major vehicle of 3,030L (800 gal.) water capacity and two command cars. The total water tank capacity of the fire vehicles is some 8,180L, which satisfies the category 6 requirement of 7,900L. The RIVs were deployed in 1990. The major vehicle is already 16 years old, but in good working condition. There are 30 trained personnel for the services.

The level of protection should be increased at least to category 7 for operating A300, which is justified for Iloilo-Manila sector even at present according to our forecast.

6.3.11 Airport Utilities

1) Storm Water Drainage

Storm water fallen within the airport is drained to either the Iloilo River in the south or the Dungon Creek on the north, through main canals on each side of the runway. The terminal area also discharge storm water via connecting canals to the main canals. Although the system is not well maintained without adequate dredging and grass cutting, it had been working well until the airport experienced major floods in 1994 and 1995. In September 1994, a typhoon initiated flood from the Mt. Baloy overflowed the Dungon Creek and inundated approximately 250m northern section of the runway. In September 1995, about 450m northern section of the runway was inundated by a flood from the same creek, and the airport was closed for four days. The Study on the Flood Control for Rivers in the Selected Urban Centers was conducted by JICA to overcome floods in Iloilo City including the airport.

2) Fencing

The airport has 2,591m long barbed wire/wooden pole fence and 657m long concrete hollow block fence. There are many holes at barbed wire fence and a part of concrete block fence has been fallen down by flood water. As recognized by the Iloilo ATO, it is an immediate need to have a complete fencing at the airport. It is necessary to replace barbed wire fence by galvanized wire mesh fence or concrete hollow block fence for greater security and safety.

3) Power Supply System

Electric power for the airport is supplied by Panay Electric Cooperative (PECO). The ATO receives electricity at 220V from PECO through two meters at the terminal building and the power plant. Electricity received at the power plant is distributed to the control tower, VOR and aeronautical lighting system. The received electricity is once increased its voltage to 4,400V with three 1969 made old 30KVA transformers, and then decreased and/or regulated to respective needs of equipment. Average consumption of the commercial power is about 2,000KWH per month.

There are occasional power failures, 10 times a month on average and sometimes 4 times a day. The ATO has two emergency generators of 100KVA and 90KVA. The 100KVA new generator installed in 1995 is used as a main, while the older one for standby. Those generators are capable of covering all the ATO's facilities. However, the electro-mechanical in-charge of the power plant mentioned that the generator is operating at near capacity when aeronautical lights are turned on during daytime. It takes three minutes to switch over from the commercial supply to the back-up system.

PAL and other concessionaires have individual connection from PECO for their facilities. PAL has a small generator to back up the ticketing office and cargo terminal building.

4) Telephone System

The Iloilo ATO has three external telephone lines, two for the control tower and one for the administration office, with no internal system. There are some difficulties for daily operation of the airport due to the shortage of telephones. The addition of external lines has been requested to Philippine Long Distance Telephone Company (PLDT) since a long time ago. After a long waiting list, the ATO will have three more external lines in July 1996. The installation of PABX needs to be considered for efficient use of external lines.

There are two telephone booths of PLDT in the terminal building for public use.

5) Water Supply System

Water is supplied by the Metro Iloilo Water District (MIWD). The water main to the airport will lead to three elevated water tanks within the airport, the larger one for the terminal building and two smaller ones for the control tower and the power plant. The elevated tank for the terminal building has a capacity of some 37,850L (10,000 gals.). The system is working in good condition without interruption. According to MIWD, water is safe for drinking. Average monthly consumption of water by the Iloilo ATO is approximately 800 cu.m.

6) Sewerage System

Sewage is treated by septic tanks for individual buildings. The present system is not the one which ensures effluent quality, but is working in good condition. More sophisticated treatment system is desirable to cope with increasing effluent.

7) Solid Disposal System

Solid disposal from the airport is collected by the Public Service Department of Iloilo City. In addition, the airport has an incinerating place near the control tower, and dumping site outside the city for the incombustibles.

6.3.12 Fuel Supply System

The aviation fuel supply system at Iloilo Airport is owned and operated by PAL exclusively for PAL aircraft. There are two 45,420L (12,000 gal.) horizontal fuel tanks, a total storage capacity of some 90,840L (24,000 gals.), on the northern side of the apron. The fuel is supplied to aircraft from four pits on the apron through the hydrant system. Average consumption of fuel at the airport is about 26,500L (7,000 gals.) per day. The fuel is supplied by PETRON's fuel truck three times a day.

Aircraft other than PAL's take return fuel from Manila. Ground Air has made arrangement with PETRON to obtain fuel supply from PETRON depot to the aircraft by fuel truck.

Besides coping with increasing supply demand, the storage capacity is desirable to be increased to a seven-day consumption level in the light of normal practice.

6.4 AIRPORT DEVELOPMENT MASTER PLAN

6.4.1 Summary

Master planning for development of Iloilo Airport was conducted in the First Study Work in Japan. This section summarizes the results of the master planning.

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, three alternative development plans of the existing Iloilo Airport were prepared. (Note that study on alternative site for Iloilo Airport was not included in the Scope of the Study.) These alternative plans were, then, comparatively evaluated, and the development scheme shown in Figure 6.4.1 was selected as the optimum development plan for Iloilo Airport. Table 6.4.1 summarizes outline of airport development works.

Table 6.4.1 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	-
Diversion / Relocation	175 houses, Road 7.4 km	-

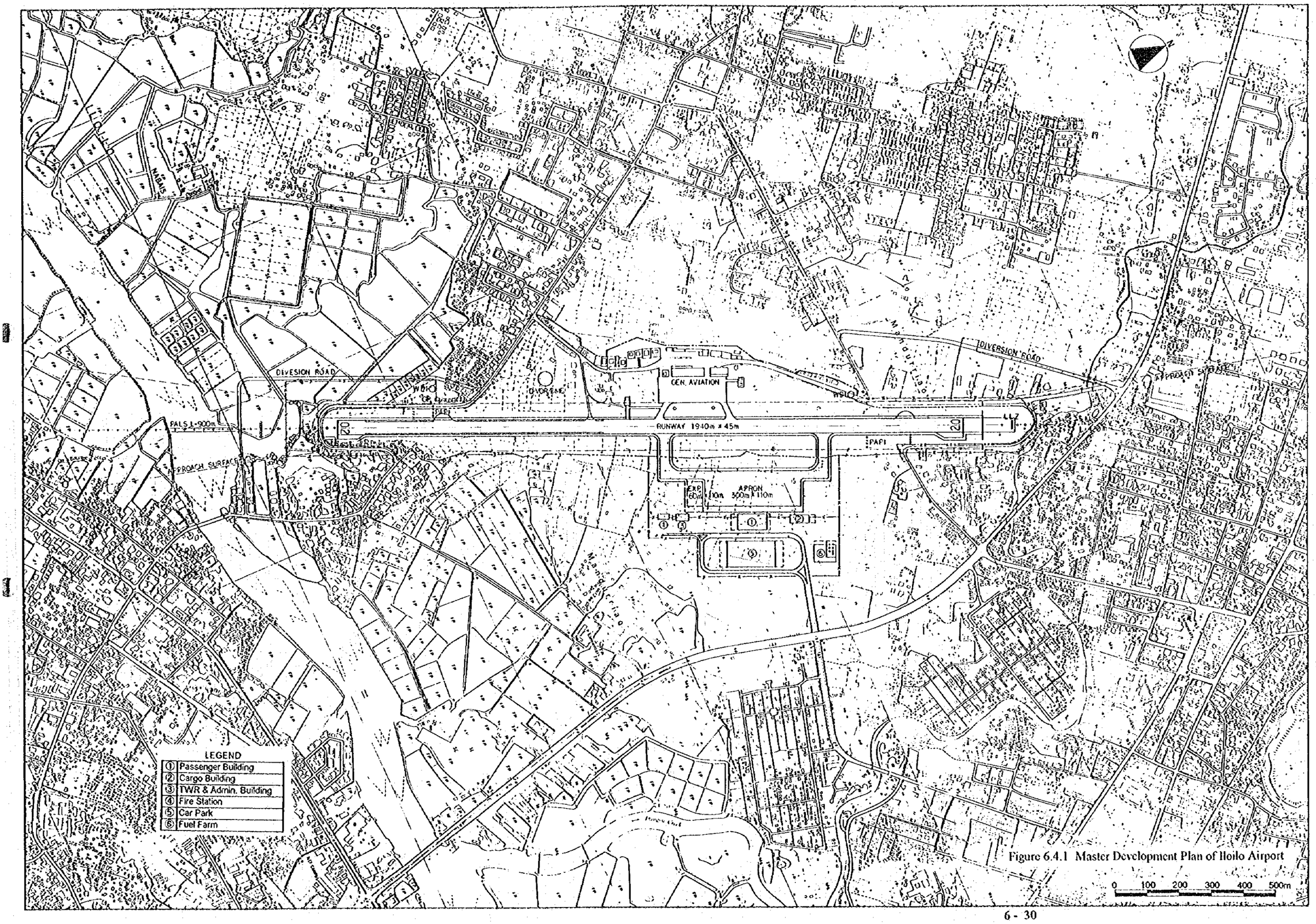


Figure 6.4.1 Master Development Plan of Iloilo Airport

Planning of airspace use, cost estimates, initial environmental evaluation, economic analysis and financial analysis were conducted based on the optimum development plan to confirm viability of the development.

As a result of the study it is concluded that the development of the existing Iloilo Airport to accommodate the anticipated traffic in the year 2015 is economically and financially feasible option. However, there will be substantial impacts on environment, and the airport development will be limited to lower level than the desirable level. Therefore, it is recommended to conduct a study on alternative site of Iloilo Airport as soon as possible.

6.4.2 Alternative Airport Development Plans

1) Constraints and Policy of Planning

As mentioned in the previous section, there are Iloilo River and Dungon Creek to the south and north of the runway respectively. Iloilo River is considered, from its size and alignment, difficult to divert. It is also considered difficult to divert Iloilo-Jaro Diversion Road because the area along the road has already been developed. With regard to the future land use, the areas to the southeast and northwest of the airport are designated as commercial and residential areas respectively. It is, however, considered possible to use these areas for development of the airport terminal since these areas have not been developed much yet.

It is assumed that the following will be completed before the Medium Term Development.

a) widening of the runway to 45m,
b) construction of perimeter fence around the existing airport property,
c) 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 Iloilo 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 development cost.
d) The existing airport boundary and magnitude of relocation of houses should be considered in facility layout planning.

2) Formulation of Development Alternatives

(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 6.4.1 for details).

Runway 20 threshold will be relocated by 160m to maintain 4.8m clearance between the approach surface and Iloilo - Jaro Diversion Road. (Refer to Figure 6.4.2.) As a result of this relocation, the runway length will be reduced to 1,940m, but it is sufficient for A300 and A320 operations to/from Manila at the maximum payload.

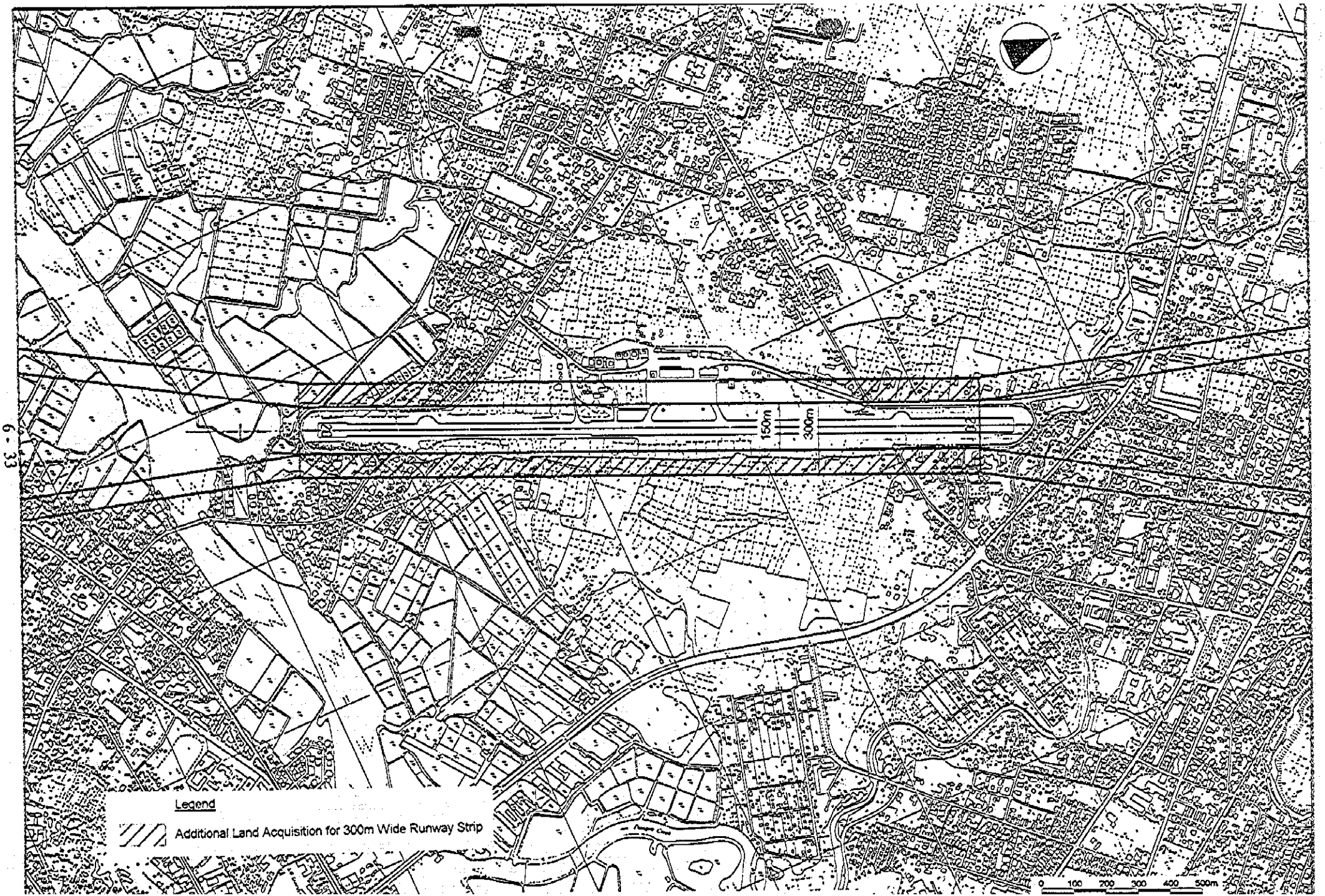
(2) Runway Strip

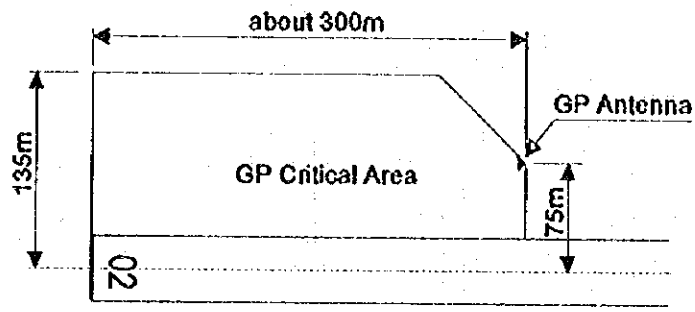
Figure 6.4.2 shows the runway strips of 150m and 300m wide. As seen, the 300m wide runway strip will require much larger land acquisition and relocation of houses than the case of 150m runway strip (additional 23ha and about 140 houses). In addition, if the 300m wide runway strip is adopted, nearest point of Iloilo - Jaro Diversion Road 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 20 threshold needs to be replaced 60m more, and the length of the runway will become insufficient unless it is extended at Runway 02 end. Therefore, it is considered impractical to widen the runway strip to 300m at the existing site of Iloilo Airport.

(3) Air Navigation Systems

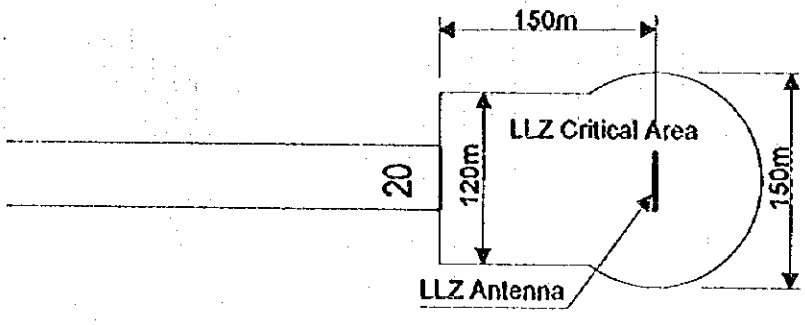
Doppler VOR and DME are assumed to be installed before the Medium Term Development at about 650m inside from the Runway 02 threshold and about 150m nothwest of the runway center line taking account of the site condition and future development plan of the airport.

With regard to the ILS, it is assumed to be installed in the Medium Term Development at the location shown in Figure 6.4.3.


150m
300m
Legend
Additional Land Acquisition for 300m Wide Runway Strip
0 100 200 300 400 500m



Glide Path Antenna and Critical Area



Localizer Antenna and Critical Area

Figure 6.4.3 Proposed Locations of Air Navigation Systems

(4) Aircraft Parking Configuration

A nose-in / push-out aircraft parking configuration, which normally associates with passenger loading bridges, is proposed 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.

(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 6.4.4);

a) Alternative I1: to the south of the existing terminal area;

b) Alternative I2: to the north of the existing terminal area; and

c) Alternative I3: on the east side of the runway.

In the all alternatives, the existing apron will be used for general aviation, and the existing passenger terminal building will be used as an administration building and partially leased to general aviation operators. The existing PAL cargo terminal and ticketing office may be used as it is in the case of Alternatives I1 and I2, but will be inconvenient because it is far from the new terminal. In the case of Alternative I3 new cargo terminal building should be constructed in the new terminal area to avoid the cargo transportation across the runway.

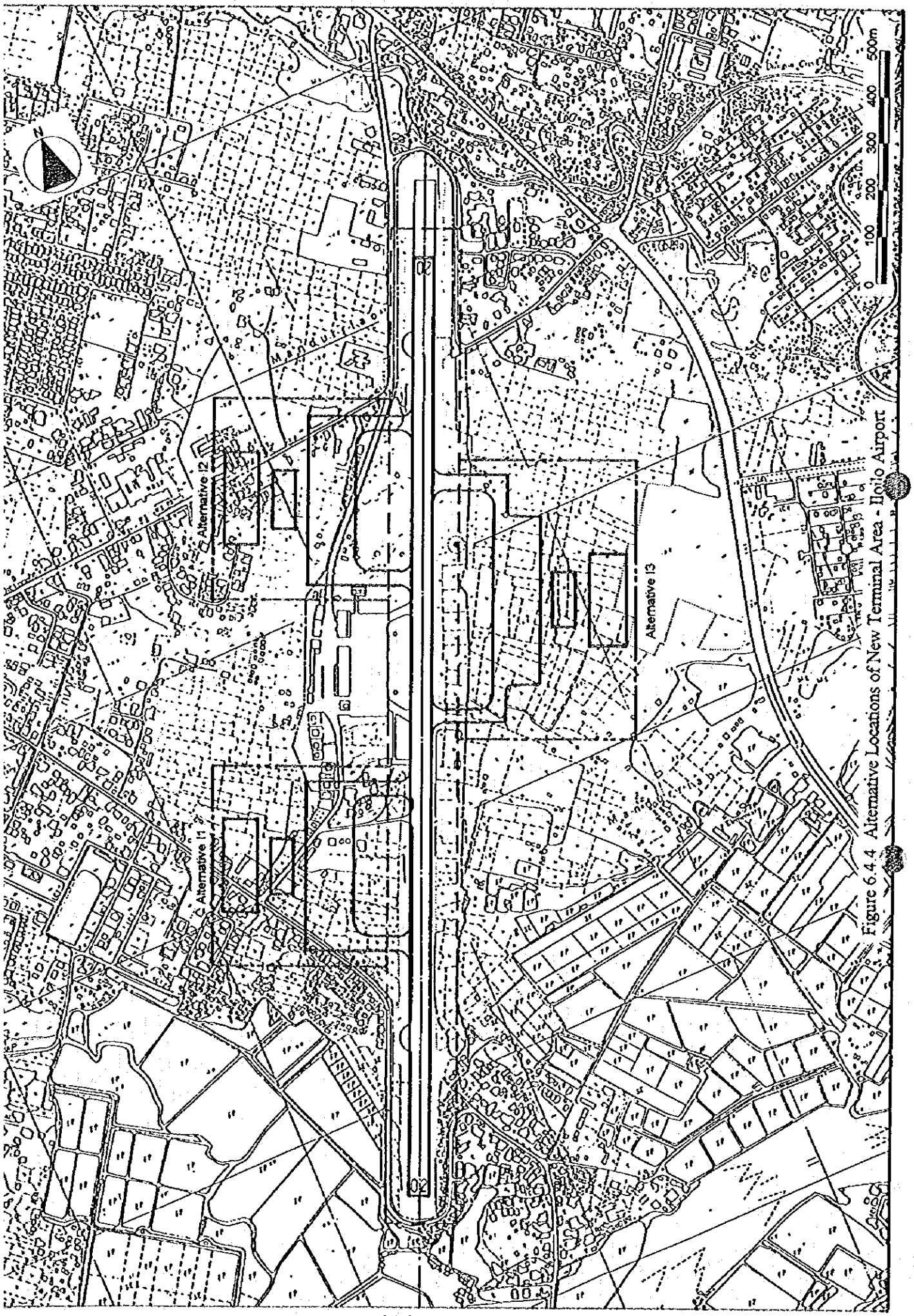


Figure 6.4.4 Alternative Locations of New Terminal Area - Iloilo Airport

6.4.3 Selection of Optimum Development Plan

Three alternative development plans formulated in Section 6.4.2 are evaluated from the various viewpoints. The following sections summarize the evaluation results.

1) Convenience of Users

As the airport is located to the west of the center of Iloilo City, Alternative I3 will be most convenient for airport access. Terminal location of Alternative I1 is the furthest from the access road, and least convenience.

2) Operational Conditions

Terminal area of Alternative I1 is located near the threshold of the main approach runway. Therefore, taxing distance of departing aircraft (which is heavier and require more fuel for taxiing) will be shorter in average than the cases of the other alternatives.

It should, however, be noted that most of the aircraft landing from Runway 02 (main approach runway) under the dry condition would be able to get into the terminal area without turnaround at the Runway 20 end in the case of Alternatives I2 and I3. Therefore, taxing distance of arriving aircraft and total runway occupancy time will be shorter in average in the cases of Alternatives I2 and I3.

3) Expandability

It is easiest to secure the future expandability of the terminal area for Alternative I3, because there are few houses around the proposed site. Alternative I1 will be most difficult to reserve the future expansion area.

4) Environmental Considerations

Alternatives I1 and I2 will require relocation of larger number of houses than Alternative I3. They will, therefore, have larger potential of social environmental problem, i.e. social and cultural maladjustment to the new settlement site.

5) Project Cost and Ease of Construction

Land acquisition, relocation of houses and road diversion are major cost items different by the alternative new terminal sites as shown in Table 6.4.2.

Table 6.4.2 Comparison of Cost (unit : PHP million)

Item	Alternative I1	Alternative I2	Alternative I3
Land Acquisition	14.5	24.5	1.3
Compensation for Houses	12.0	13.0	0.2
Road Diversion	30.0	59.0	-
Total	56.5	96.5	1.5

6) Conclusion

Table 6.4.3 summarizes relative advantages of alternatives.

Table 6.4.3 Relative Advantages of Alternatives

Item	Alternative I1	Alternative I2	Alternative I3
1) Convenience of Users	-	- Second closest to the city center.	- Closest to the city center.
2) Operational Conditions	- Shortest average taxiing distance for departing aircraft.	- Shorter average taxiing distance for arriving aircraft. - Shorter runway occupancy time.	- Shorter average taxiing distance for arriving aircraft. - Shorter runway occupancy time.
3) Expandability	-	-	- Largest future expandability.
4) Environmental Considerations	- Least land acquisition.	-	- Least number of houses to be relocated.
5) Project Cost and Ease of Construction	-	-	- Lowest project cost. - No road diversion required.

As a conclusion, Alternative I3 is selected mainly for the following reasons:

a) Number of inhabitants to be relocated will be less than the other alternatives.

b) It will offer better access to the airport terminal from the city center.

c) It is easier to reserve the space for future terminal expansion beyond the year 2015.

d) It would cost less than other alternatives because there are less residential areas and houses.

6.4.4 Planning of Airspace Use

1) Existing Airspace Use

(1) Control Zone (CTR) and Aerodrome Traffic Zone (ATZ)

A control zone and an aerodrome traffic zone are established with dimensions as shown in Table 6.4.4 for this airport.

Table 6.4.4 Dimensions of CTR and ATZ for Iloilo Airport

TOWER	HOURS (UTC)	LATERAL LIMITS	UPPER LIMIT(ft)	LAN-GUAGE	REMARKS
1	2	3	4	5	6
ILOILO TOWER	H24	CTR: Circle, 10 nm radius centered on the Iloilo VOR/DME (10 43 06 N 122 33 06 E)	1,500 ft.	En	Instrument/Visual flts are controlled. CTR controlled by BACOLOD APP.
		ATZ: Circle, 5 NM radius centered on aerodrome reference point (10 42 51 N 122 33 36 E)	Up to but excluding 2,000 ft.		VFR, aerodrome traffic are controlled.

(2) Instrument Flight Procedures

Instrument approach procedures using VOR for the Runways 02 and 20 and 11 standard instrument departure routes are established as shown in Figures 6.4.5, 6.4.6 and 6.4.7 respectively. To avoid obstacles on the west sides of airport, circling approach to Runways 02 and 20 should be limited to the east side of the runway, and the limitations should be written in the instrument approach charts.

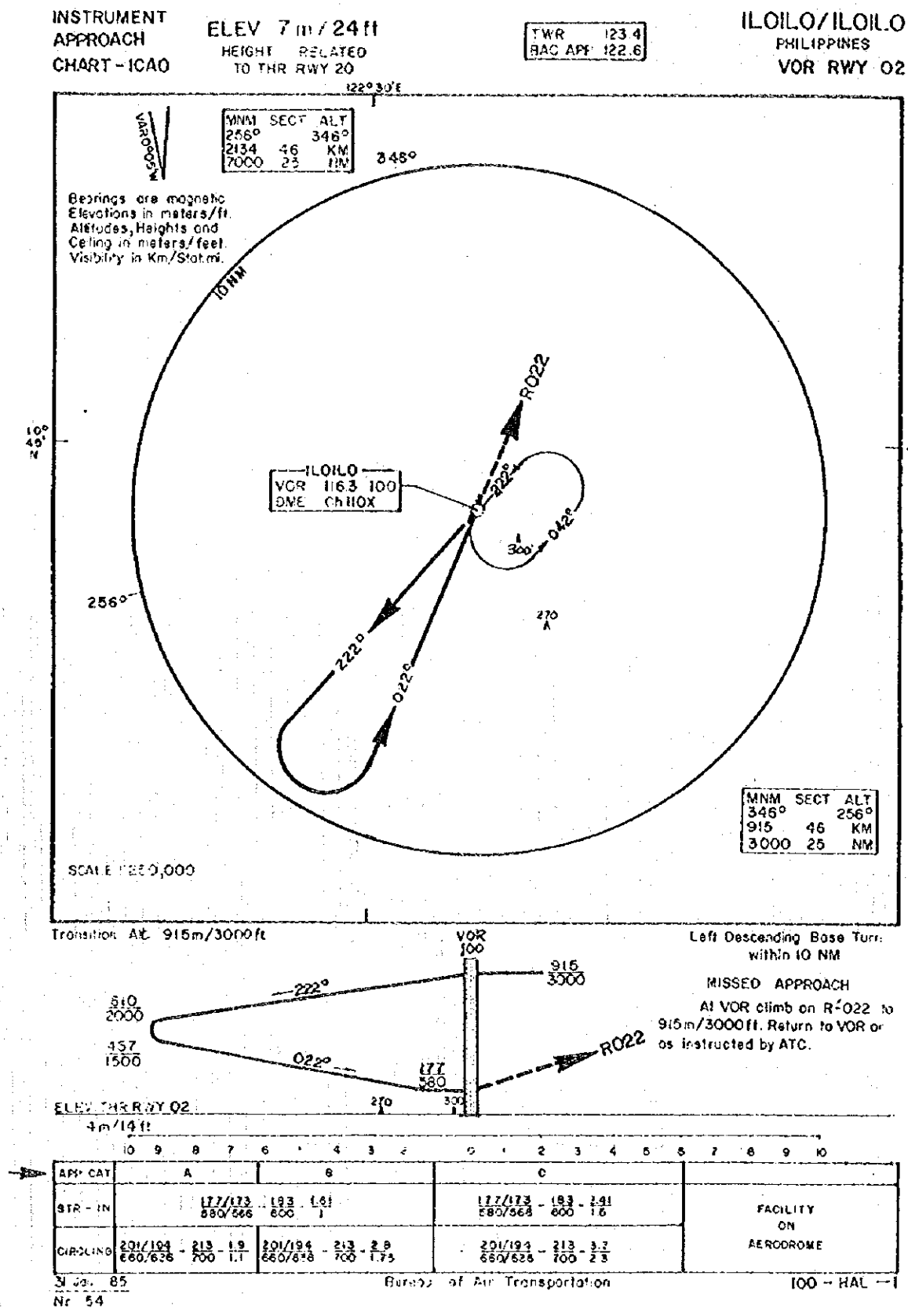


Figure 6.4.5 Instrument Approach Procedure: VOR RWY 02

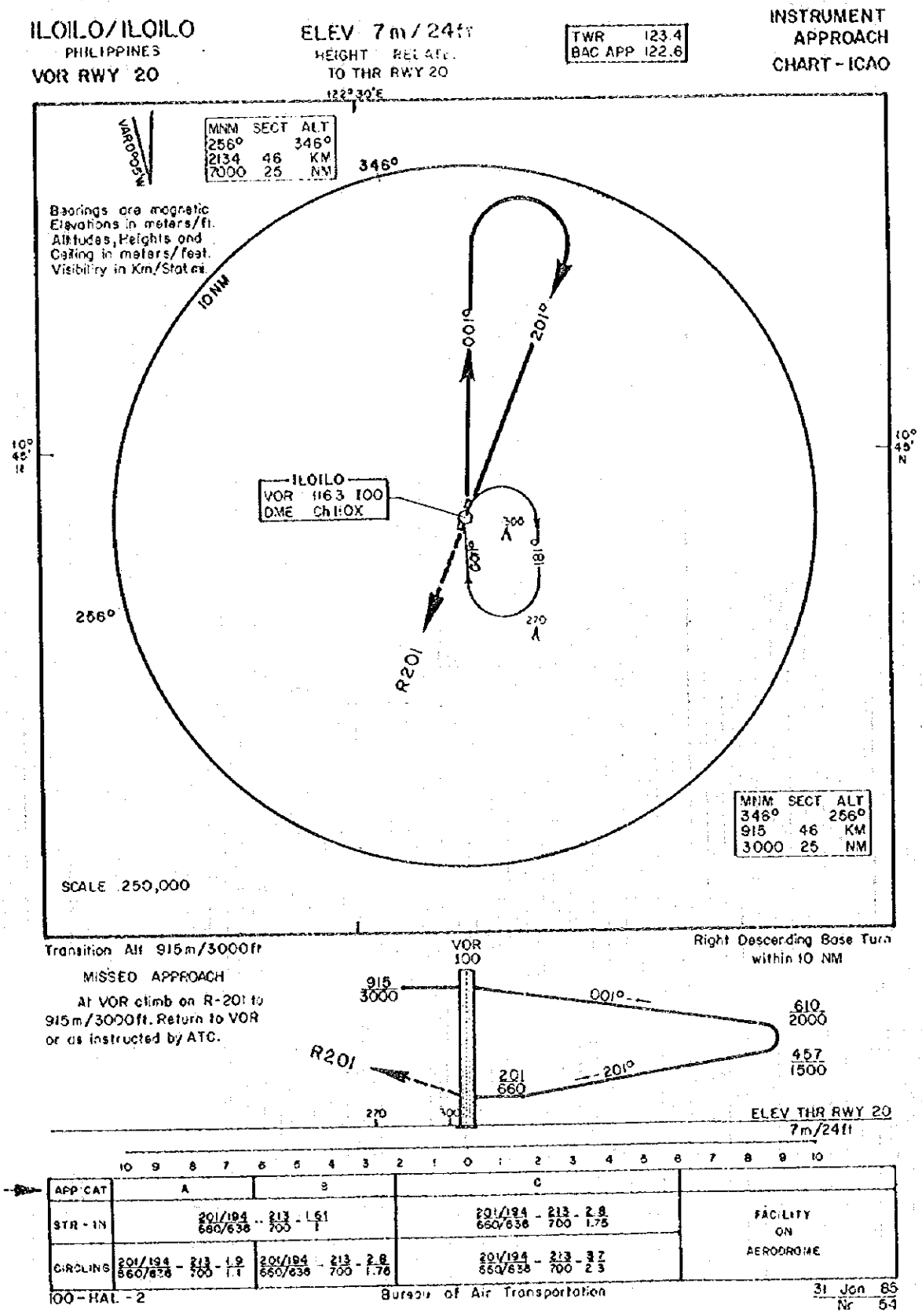


Figure 6.4.6 Instrument Approach Procedure: VOR RWY 20

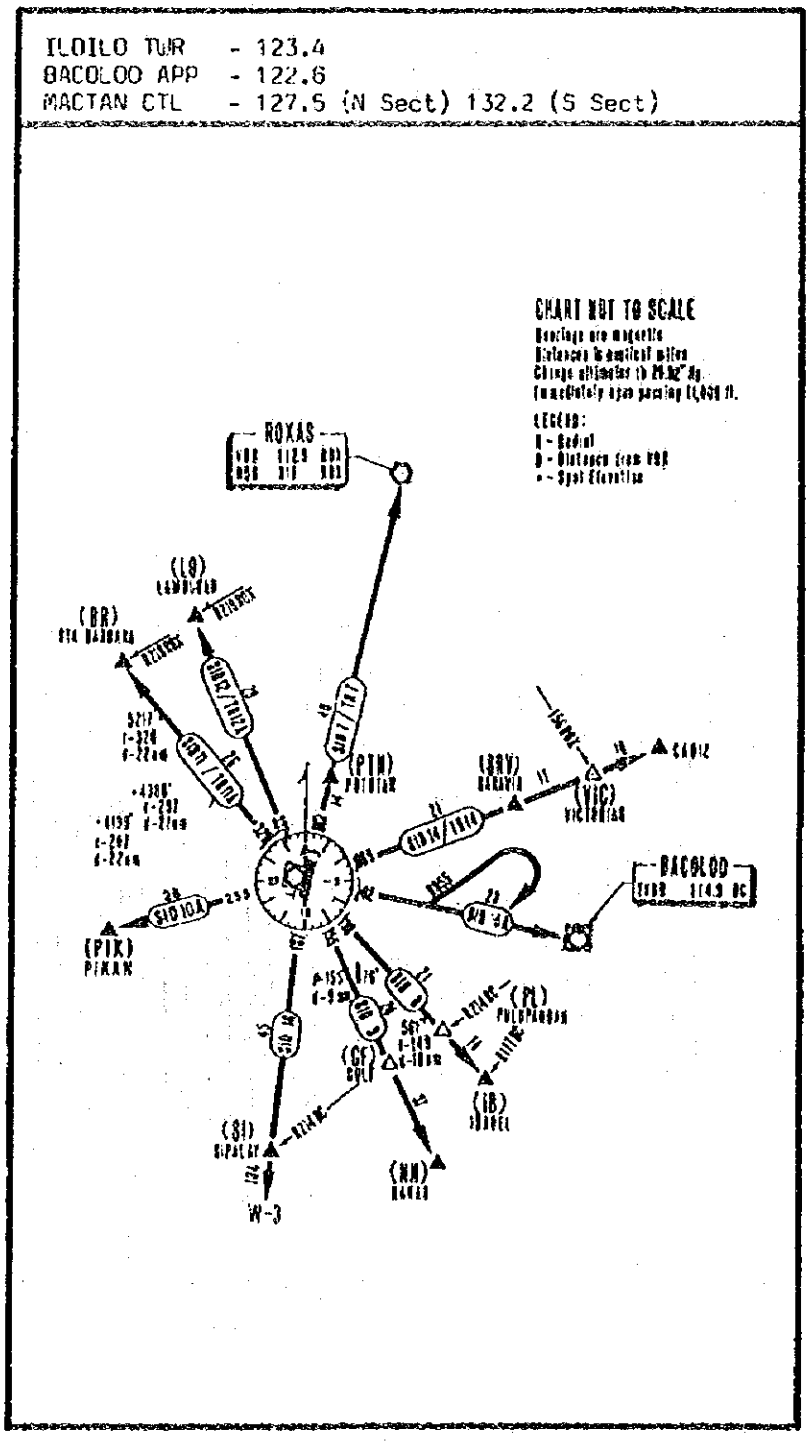
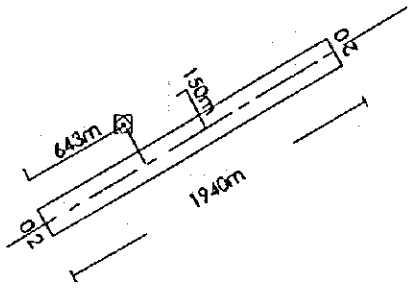


Figure 6.4.7 Standard Instrument Departure Routes

2) **Modification of Existing Airspace Use**

Modification of existing airspace use is planned with the following assumptions.

a) Existing VOR/DME will be relocated to 10°42'40"N/122°32'27"E. Relationship between new VOR/DME and runway is as shown below.



b) Runway 20 threshold is replaced by 160m inside of runway.

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

(1) Terminal Control Area (TMA)

Iloilo Airport is located within the Bacolod/Iloilo TMA, and Bacolod Approach has the responsibilities of the approach control for aircraft to and from Iloilo Airport. Figure 5.5.11 shows proposed ATS routes within Bacolod/Iloilo TMA. There are some minor changes of ATS routes based on the proposed locations of Iloilo and Bacolod VOR/DMEs.

(2) Instrument Approach Procedure

The existing instrument approach procedures of VOR RWY 02 and RWY 20, shown in Figures 6.4.5 and 6.4.6 respectively, can be used with adjustment of final courses from 022° and 201° to 018° and 207° respectively. No change will be required in the obstacle clearance altitude (OCA) for each procedure.

(3) Standard Instrument Departures

Figure 5.5.12 shows proposed SID routes for Iloilo Airport. There are some minor changes on distances and directions between Iloilo VOR/DME and other Navaids and fixes. However, the current SIDs at Iloilo Airport will be still in force provided that these changes are introduced in SIDs.

(4) ILS Approach Procedure

Category I Instrument Landing System is planned for Runway 02. The final approach area for ILS approach with final course of 024° will be established over the Panay Gulf. There is no significant obstacles which project above the obstacle assessment surface (OAS) for this approach procedure except trees and artificial structures around the airport.

6.4.5 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 6.4.5 summarizes results of preliminary cost estimates.

Table 6.4.5 Preliminary Cost Estimate for Iloilo Airport Development (Unit: million PHP)

Item	Medium Term	Long Term	Total
Construction Cost	1424.6	264.1	1688.7
Road Diversion	15.0	0.0	15.0
Airport Civil Works	389.6	10.1	399.7
Earthworks & Drainage	117.9	0.0	117.9
Runway, Taxiway & Apron	219.4	7.4	226.8
Roads & Car Park	28.2	2.7	30.9
Other Civil Works	24.1	0.0	24.1
Building Works	338.0	92.0	430.0
Passenger Terminal Building	233.0	80.0	313.0
Cargo Terminal Building	27.4	12.0	39.4
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	35.3	142.3
Airport Utilities	71.2	21.8	93.0
Fuel Supply System	232.7	93.1	325.8
Air Navigation Systems	207.6	0.0	207.6
Miscellaneous	63.6	11.8	75.4
Land Acquisition & Compensation	47.1	0.0	47.1
Consultancy Services	142.5	26.4	168.9
Contingency	156.2	29.1	185.3
Total Cost	1,770.4	319.6	2,090.0

6.4.6 Initial Environmental Evaluation

1) Environmental Condition of the Project Site

Table 6.4.6 and the following paragraphs summarize the environment of existing Iloilo Airport based on site reconnaissance and available data.

(1) Social Environment

The existing Iloilo Airport is located at the north area adjoining the Iloilo River. Its area size is around 55has. The airport is adjoining each city of Iloilo, Sharo, Mandario and Morola. It is located at around 5km northwest from Bacolod City, takes around 20 minutes by car. The vicinity of the airport is mostly occupied by paddy fields and grasslands. However, many squatters area and resident houses are found at south while urbanization, mostly on residential area, is in progress at north. Also, numbers of farms for shrimps and fishes as well as salt fields are located at the south of runway.

The major industry of the area is agriculture mainly on rice and fishery mainly on aquaculture. With regards to the road traffic condition of the area, the National Road No. 2 is running from the airport towards Iloilo City. The road is well-maintained but experiencing traffic jam since it is a highway. With regards to the presence of educational and welfare facility such as school and hospital, there are several elementary schools, high schools and hospitals in the area including Mandario at northeast.

(2) Natural Environment

Both side of the runway is occupied by paddy fields and grasslands. However, at the south edge of the runway, you can see the vast farms and salt fields following the Iloilo River. According to the information acquired, Iloilo River rises during the heavy rain and south side of runway will be covered by flooded water together with the nearby farms. These area is originally a damp ground. There is a possibility that the valuable species may exist although the details is still remain unknown. At the north side of the runway is Pandan River and thus airport is located on top of a delta-shaped area.

From the above findings, it is assumed that the foundation of this area is relatively weak, although its geographical feature should be studied.

(3) Pollution

The complaint for existing airport is indistinct. However, air pollution and noise problem may occur in the future considering the rapid urbanization in the area as well as increase in numbers of aircraft which will utilize the airport.

Table 6.4.6 Environmental Condition of Existing Iloilo Airport

Item	Condition
Social Environment	
Population (residents, former inhabitants, area division)	Near the city. Many locals/squatters living in the area.
Land Use (city, village, historic spot, scenic spot, factories, school, hospital, tourist facilities, Natural park, preservation area)	Mostly agricultural land. South side of the premises is a damp ground spreaded along the river where salt fields and fish farms are located. The area is quite urbanized. Public facilities such as schools and hospitals are built at the northwest side of a runway.
Economic and Traffic (commercial industry, agricultural industry, bus terminal)	Mainly agriculture and fishery.
Natural Environment	
Topography, Geology (fault, slope, soft ground, land subsidence, ground water)	Generally flat. However, south side of the premises is covered by the damp ground where suffer from flood twice or trice a year.
Valuable Animals and Plants (rare species, special species, decrease of the place for extinct species, rare plants and animals)	Indistinct.
Pollution	
Occurrence of Complaints (remarkable pollution)	Complaints to the existing airport is still unknown. However, it may receive in the future since it is located near the city.
Counter Measure (Law and Compensation)	Indistinct.
Special Item	Expansion is very difficult since it is an airport located near the city.

2) **Evaluation of Environmental Impacts**

Environmental impacts of the Iloilo Airport development project was evalyated based on the site reconnaissance and existing data, and the results are summarized in a standard form of JICA as shown in Table 6.4.7.

Table 6.4.7 Evaluation of Environmental Impact of Iloilo Airport Development Project

Issue		Evaluation	
Social Environment			
1.	Resettlement	A	Relocation of some 180 houses will be required.
2.	Economic Activities	B	Some salt evaporators, fish ponds and paddy fields will be lost.
3.	Traffic and Public Facilities	B	Increase of airport related vehicle traffic will have some impacts on traffic conditions. Diversion of roads and relocation of airport terminal are included in the project.
4.	Split of Communities	B	There will be some impacts due to the diversion of 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	C	Increase of aircraft operation with narrow runway strip may be hazardous since the surroundings are urbanized.
Natural Environment			
10.	Topography and Geology	B	Reclamation of a part of old branch of Iloilo River is included in the project.
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	D	There will be no activity which may have impact on groundwater.
13.	Hydrological Situation	B	Construction of new terminal area will increase the runoff.
14.	Coastal Zone	D	No impact since it is far from the coastal zone.
15.	Flora and Fauna	B	Some wild birds fly over the fish ponds which will be reclaimed for the airport development.
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 project will not disturb the landscape of the surrounding area.

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 6.4.7 Evaluation of Environmental Impact of Iloilo Airport Development Project

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	D	No activity which may cause land subsidence is expected.
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 6.4.8 summarizes major environmental issues and investigation items which need detailed examination in the Environmental Impact Assessment.

Table 6.4.8 Major Environmental Issues and Investigation Plan

Issue	Evaluation	Investigation Plan
Resettlement	A	Investigate population, age, occupation and others of the residents subject for resettlement.
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 salt evaporators, fish ponds and paddy fields to be affected and scheme of compensation, and estimate the impacts of the project.
Traffic and Public Facilities	B	Investigate current traffic and facilities around the airport, and estimate the impacts during the construction and utilization stages.
Split of Communities	B	Investigate distribution of communities, traffic pattern, and others around the airport, and evaluate the impact of the project.
Topography and Geology	B	Investigate topography and geology of the project site, and evaluate the impacts of the project.
Hydrological Situation	B	Investigate existing hydrological situation around the site, and estimate the changes by the project.
Flora and Fauna	B	Investigate existing conditions of flora and fauna, possibility of resettlement, etc., and evaluate the impacts 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.
Water Rights and Rights of Common	C	Investigate existing conditions of water rights, and estimate the impacts of the project.
Hazards	C	Investigate land use and population around the airport, past accidents, and evaluate the future risk of accidents.

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.)

6.4.7 Economic Analysis

1) General

The economic analysis is carried out for the selected alternative development plan for Iloilo Airport, i.e., Alternative 13. The methodology and general assumptions are the same as those employed for Bacolod Airport in Section 5.5.6. Therefore, only the calculation results are shown in this section.

2) Economic Evaluation

The comparison of costs and benefits incurred by implementing the Project is indicated in Table 6.4.9. (Refer to Appendix 6.4.2 for estimation of economic benefits.) The economic internal rate of return (EIRR) and net present value (NPV) are calculated as shown below.

Table 6.4.10 EIRR and NPV of the Project: Iloilo

Cases/Financial Indicators	EIRR	NPV at 15% discount rate (PHP million)
• Redevelopment of Existing Iloilo Airport	21.8%	726

The results indicate that the redevelopment of existing Iloilo Airport is economically feasible.

Table 6.4.9 Comparison of Costs and Benefits by the Project for Existing Iloilo 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	59,285	0	0	0	59,285	0	0	0	0	0	-59,285
1999	59,285	0	0	0	59,285	0	0	0	0	0	-59,285
2000	684,503	0	0	0	684,503	0	0	0	0	0	-684,503
2001	684,503	0	0	0	684,503	0	0	0	0	0	-684,503
2002	0	22,760	293	707	23,760	91,239	57,885	24,752	0	173,876	150,116
2003	0	22,760	293	707	23,760	118,360	68,897	26,962	0	214,219	190,459
2004	0	22,760	293	707	23,760	151,032	81,562	29,614	0	262,208	238,449
2005	269,944	22,760	293	707	293,704	190,035	96,070	32,266	0	318,371	24,667
2006	0	27,245	1,053	850	29,148	226,397	108,637	34,476	0	369,510	340,362
2007	0	27,245	1,053	850	29,148	267,783	122,578	36,686	0	427,047	397,899
2008	0	27,245	1,053	850	29,148	314,712	138,016	39,338	0	492,066	462,918
2009	0	27,245	1,053	850	29,148	367,744	155,088	41,990	0	564,822	535,674
2010	0	27,245	1,053	850	29,148	427,948	174,130	44,642	0	646,720	617,573
2011	0	27,245	1,053	850	29,148	481,736	190,699	46,852	0	719,287	690,139
2012	0	27,245	1,053	850	29,148	540,601	203,576	49,062	0	798,239	769,091
2013	0	27,245	1,053	850	29,148	605,488	228,068	51,714	0	885,270	856,122
2014	0	27,245	1,053	850	29,148	676,300	249,074	54,366	0	979,741	950,593
2015	0	27,245	1,053	850	29,148	753,466	271,699	57,018	0	1,082,183	1,053,035
2016	0	27,245	1,053	850	29,148	797,121	282,295	57,018	0	1,136,434	1,107,287
2017	0	27,245	1,053	850	29,148	842,479	293,305	57,018	0	1,192,902	1,163,654
2018	0	27,245	1,053	850	29,148	889,605	304,744	57,018	0	1,251,367	1,222,219
2019	0	27,245	1,053	850	29,148	938,570	316,629	57,018	0	1,312,217	1,283,069
2020	0	27,245	1,053	850	29,148	989,444	328,977	57,018	0	1,375,440	1,346,292
2021	0	27,245	1,053	850	29,148	1,036,881	340,492	57,018	0	1,434,391	1,405,243
2022	0	27,245	1,053	850	29,148	1,085,979	352,409	57,018	0	1,495,405	1,466,257
2023	0	27,245	1,053	850	29,148	1,136,794	364,743	57,018	0	1,558,555	1,529,407
2024	0	27,245	1,053	850	29,148	1,189,388	377,509	57,018	0	1,623,915	1,594,768
2025	0	27,245	1,053	850	29,148	1,243,823	390,722	57,018	0	1,691,563	1,662,415
2026	-268,417	27,245	1,053	850	-239,269	1,300,164	404,397	57,018	0	1,761,579	2,000,848
							EIRR =				21.8%
							NPV (at 15% discount rate) =				725,877

6.4.8 Financial Analysis

1) General

The financial analysis is carried out for the selected alternative development plan for Iloilo Airport, i.e., Alternative I3. The methodology and general assumptions are the same as those employed for Bacolod Airport in Section 5.5.7. Therefore, only the calculation results are shown in this section.

2) Financial Evaluation

The comparison of costs and revenues incrementally incurred by implementing the Project with increased prices of airport charges is indicated in Table 6.4.11. (Refer to Appendix 6.4.3 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 6.4.12 FIRR and NPV of the Project: Iloilo

Cases/Financial Indicators	FIRR	NPV at 2.7% discount rate (PHP million)
At Current Level of Charges • Redevelopment of Existing Iloilo Airport	negative	-1,863
At Increased Prices of Charges* • Redevelopment of Existing Iloilo Airport	7.1%	1,269

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

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

Table 6.4.11 Comparison of Incremental Costs and Revenues by the Project for Existing Iloilo 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	70,577				70,577	0	0	0		0	-70,577
1999	70,577				70,577	0	0	0		0	-70,577
2000	814,884				814,884	0	0	0		0	-814,884
2001	814,884				814,884	0	0	0		0	-814,884
2002		25,864	325	707	26,896	124,504	18,131	778		143,413	116,517
2003		25,864	325	707	26,896	132,988	18,404	778		152,170	125,274
2004		25,864	325	707	26,896	141,953	18,677	778		161,407	134,511
2005	321,362	25,864	325	707	348,258	151,919	18,949	778		171,646	-176,612
2006		30,960	1,170	850	32,980	158,722	24,598	935		184,255	151,275
2007		30,960	1,170	850	32,980	168,038	24,880	935		193,853	160,873
2008		30,960	1,170	850	32,980	175,828	25,162	935		201,925	168,945
2009		30,960	1,170	850	32,980	183,932	25,444	935		210,312	177,332
2010		30,960	1,170	850	32,980	192,249	25,726	935		218,910	185,930
2011		30,960	1,170	850	32,980	198,808	25,880	935		225,623	192,643
2012		30,960	1,170	850	32,980	205,703	26,034	935		232,672	199,692
2013		30,960	1,170	850	32,980	212,830	26,188	935		239,953	206,973
2014		30,960	1,170	850	32,980	220,247	26,342	935		247,524	214,544
2015		30,960	1,170	850	32,980	227,774	26,496	935		255,205	222,225
2016		30,960	1,170	850	32,980	227,774	26,496	935		255,205	222,225
2017		30,960	1,170	850	32,980	227,774	26,496	935		255,205	222,225
2018		30,960	1,170	850	32,980	227,774	26,496	935		255,205	222,225
2019		30,960	1,170	850	32,980	227,774	26,496	935		255,205	222,225
2020		30,960	1,170	850	32,980	227,774	26,496	935		255,205	222,225
2021		30,960	1,170	850	32,980	227,774	26,496	935		255,205	222,225
2022		30,960	1,170	850	32,980	227,774	26,496	935		255,205	222,225
2023		30,960	1,170	850	32,980	227,774	26,496	935		255,205	222,225
2024		30,960	1,170	850	32,980	227,774	26,496	935		255,205	222,225
2025		30,960	1,170	850	32,980	227,774	26,496	935		255,205	222,225
2026	-319,544	30,960	1,170	850	-286,564	227,774	26,496	935		255,205	541,769
							FIRR =				7.1%
							NPV (at 2.7% discount rate) =				1,269,128

6.4.8 Conclusion

The study on development of existing Iloilo Airport was conducted based on the original Scope of the Study agreed between DOTC and JICA. As a result of the master planning study described in the previous sections, it can be concluded that the development of existing Iloilo Airport to accommodate the anticipated traffic in the year 2015 is economically and financially (at increased prices and charges) feasible option. However, there will be substantial impacts on environment. Further more, the airport development will be limited to lower level than the desirable level, e.g. a runway strip of only 150m wide and no provision for parallel taxiway. Therefore, it is recommended to conduct a study on alternative site of Iloilo Airport before authorizing the master development plan of Iloilo Airport. As the development of Iloilo Airport is an urgent requirement to cope with growing traffic demand, the above-mentioned study should be conducted as soon as possible.

6.5 SCOPE OF MEDIUM TERM DEVELOPMENT

Should the development of existing Iloilo Airport be implemented, the scope of the phased development plan will be as listed in Table 6.5.1.

Table 6.5.1 Scope of the Phased Development Plan of Iloilo Airport

Item	Before Mid Term	Medium Term	Long Term
1. Civil Works			
1.1 Widening of runway to 45m	X		
1.2 Construction of perimeter fence	X	X	
1.3 Removal of obstacles on 150m wide runway strip		X	
1.4 Grading of 150m wide runway strip		X	
1.5 Earthworks and drainage works of new terminal area		X	
1.6 Overlay of the existing runway		X	
1.7 Construction of new apron and taxiways		X	
1.8 Construction of shoulders for runway, taxiways and apron		X	
1.9 Construction of new access road		X	
1.10 Construction of new car park		X	
1.11 Construction of airside service roads		X	
1.12 Expansion of car park			X
2. Building Works			
2.1 Construction of new passenger terminal building		X	
2.2 Construction of new cargo terminal building		X	
2.3 Construction of new control tower		X	
2.4 Construction of new fire station		X	
2.5 Construction of new 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	

(to be continued)

Table 6.5.1 Scope of the Phased Development Plan of Iloilo Airport (Continued)

Item	Before Mid Term	Medium Term	Long Term
3.2 ATC and Communication Systems			
3.2.1 Installation of PC/fax machine	X		
3.2.2 Installation of VSAT	X		
3.2.3 Installation of ATC equipment for new control tower		X	
3.3 Aeronautical Ground Lighting System			
3.3.1 Installation of PALS for Runway 02		X	
3.3.2 Installation of SALS for Runway 20		X	
4. Airport Utilities			
4.1 Installation of power supply system for new terminal area		X	
4.2 Installation of telephone system for new terminal area		X	
4.3 Construction of water supply system for new terminal area		X	
4.4 Construction of new sewerage system		X	
4.5 Installation of new incinerator		X	
4.6 Installation of new 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 public roads near the both ends of the runway		X	

Chapter 7 Master Planning for Tacloban Airport

CHAPTER 7 MASTER PLANNING FOR TACLOBAN AIRPORT

7.1 GENERAL

Daniel Z. Romualdez (Tacloban) Airport is located at about 3.5km southeast of Tacloban City, the capitol of Layte Province, Region 8 (Eastern Visayas). Figures 7.1.1 and 7.1.2 are the airport vicinity map and the existing airport facility layout plan.

This chapter describes the existing conditions of Tacloban 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.

7.2 EXISTING CONDITIONS OF THE AIRPORT AND ITS SURROUNDINGS

7.2.1 Airport History

The original Tacloban Airport was built by the USA during World War II. It had a 1,000m long macadam runway. Philippine Airlines started operation at Tacloban Airport in 1965. At that time, the airport consisted of a 1,000m long, 30m wide cement concrete runway, an asphalt concrete apron and a small terminal building, which are located near the existing runway 36 threshold. The runway extension to the north by 525m and the construction of the existing apron (northern 200m by 80m) were completed in 1969. By the early 1980s, the runway was extended to the south in phases, with 45m width, to have the existing length of 2,140m. The latest overlay of the runway was undertaken in 1990 when PAL replaced BAC1-11 with B737-300. Thereafter, the previous part of the runway was widened from 30m to 45m in phases until it was completed in 1993.

The northern half of the existing terminal building was completed in 1975, just after BAC1-11 aircraft was introduced to Tacloban. It was expanded for the southern half in 1976 to accommodate the VIP terminal. The control tower was built in 1984 under the Nationwide Air Navigation Facilities Modernization Project - Phase I. The new VIP building and new administration building were completed in 1994. The latest development at Tacloban Airport relates to the planned entry of new airline companies. The previous VIP terminal, which occupied the northern part of the terminal building, was renovated for the pre-departure area, and a part of the pre-departure area was changed to accommodate check-in facilities of Grand Air and Cebu Pacific in April 1996.

There was one major accident at Tacloban Airport in the past. In 1983 PAL's BAC1-11 overshot the runway 36 and overran into the sea. There were no injuries, but the aircraft became disabled. Other incidents include a dog's run over by PAL's B737 in March 1996, a few near-misses between aircraft and the PAF's jeep on the runway and others.

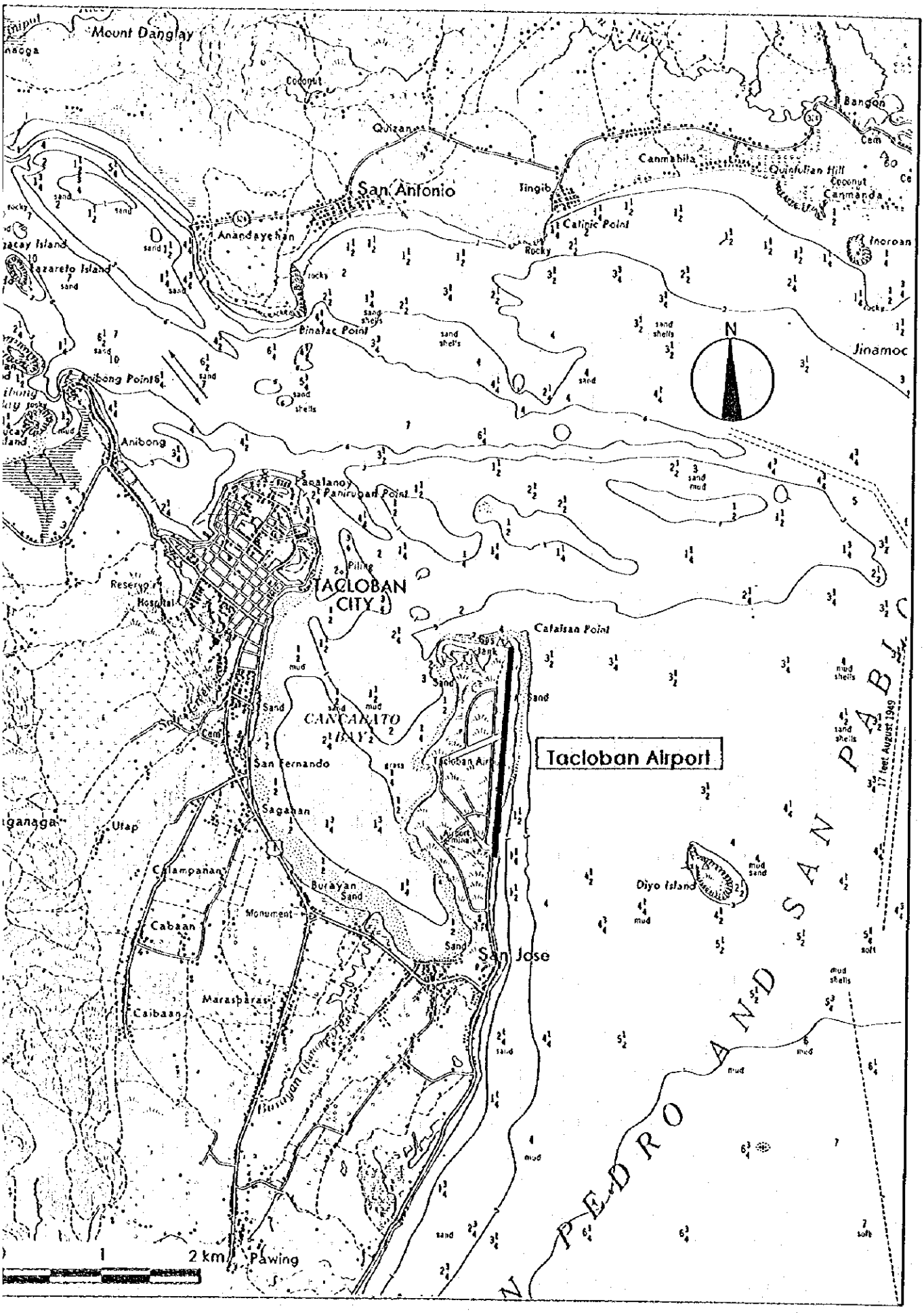


Figure 7.1.1 Vicinity Map of Tacloban Airport

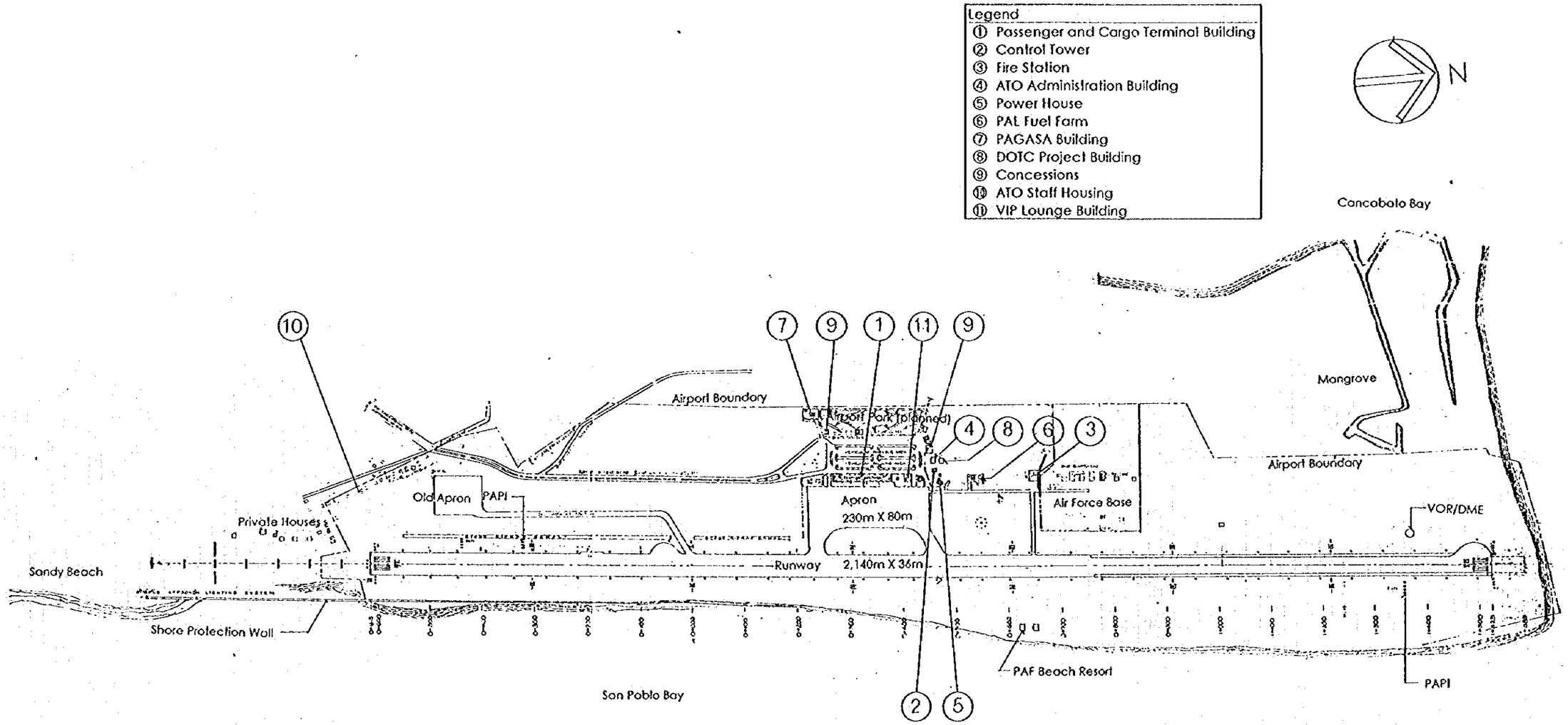


Figure 7.1.2 Existing Layout of Facilities at Tacloban Airport
Scale=1/8,000

7.2.2 Airport Inventory

Table 7.2.1 shows an inventory of Tacloban Airport.

Table 7.2.1 Inventory of Tacloban Airport

Items	Description
1. Aerodrome Data	
City / Aerodrome	Tacloban / D.Z. Romualdez Airport
Domestic/International	Domestic (Area 6, Center)
ICAO Reference Code	4C
Aerodrome Reference Point	11°13'53"N, 125°29'30"E
Distance and Direction from City	3.5 km Southeast of city center
Elevation	1.8m
Reference Temperature	31.4°C
Magnetic Variation	N00°10'W
Operational Hours	0430-2000 local time
Seasonal Availability	All seasons
Supervising Authority	Air Transportation Office, DOTC
Transportation Available	Taxi and jeepney
2. Aircraft Operational Data	
Wind Coverage	
Operational Category	Non-Precision Approach
Established Procedures	VOR RWY36
Transition Altitude	5,000 ft
Local Flying Restriction	Nil
3. Facilities	
Runway	
Designation	18/36
True Bearing	N04°19'E
Dimension	2,140m x 45m
Longitudinal Slope	0.09% uphill to the S
Stopway	60m (RWY 36)
Clearway	60m (RWY 36)
Runway Strip	2,260m x 150m
Surface	Asphalt overlay on cement concrete
Strength	PCN39R/B/W/U
Taxiway	
Configuration	2 connection with apron (1 x 60m, 1 x 50m)
Width	23m
Surface	Asphalt overlay on cement concrete
Strength	PCN39R/B/W/U
Apron	
Aircraft Stands	B737 x 4
Parking Configuration	Self-maneuvering
Area	230m x 80m
Surface	Concrete
Strength	Data not available

Table 7.2.1 Inventory of Tacloban Airport (Continued)

Items	Description
Passenger Terminal Buildings	
Structure	Reinforced concrete, 1 story (partially 3 stories)
Floor Area	1F: 1,620 sq.m (including cargo terminal), 2F: 135 sq.m, 3F: 36 sq.m
Cargo Terminal Building	
Structure	Part of passenger terminal building
Floor Area	180 sq.m
Control Tower Building	
Structure	Reinforced concrete, 6 stories
Floor Area	210 sq.m
Floor Height	13.7m
Administration Building	
Structure	Reinforced concrete, 1 story
Floor Area	140 sq.m
VIP Building	
Structure	Reinforced concrete, 1 story
Floor Area	240 sq.m
Fire Station	
Structure	Reinforced concrete, 1 story
Floor Area	260 sq.m
Vehicle Parking Area	
Area	5,600 sq.m
Capacity	160 cars
Surface	Asphalt
Access Road	
Number of Lanes	2 lanes
Width	10.5 m (including 2.5m wide median)
Surface	Asphalt
Air Navigation System	
Radio Navigation Aids	C-VOR "TAC": 115.5MHz DME: Ch. 102x
Telecommunication Systems	TWR: 122.1 and 286.4MHz APP: 120.8MHz FSS: 5,205KHz
Aeronautical Ground Lighting Systems	Approach Lights (RWY18/36) Approach Path Indicator (RWY18/36) Runway Edge Lights Runway Threshold and End Lights (RWY18/36) Apron/Taxiway Edge Light Apron Flood Lights
Meteorological Observation Systems	Basic items, manual system (PAGASA) Wind, temperature and air pressure sensors for control tower

Table 7.2.1 Inventory of Tacloban Airport (Continued)

Items	Description
Rescue and Fire Fighting Facilities	
Fire Fighting Vehicles	Two major vehicles - 1,585 gal. water and 205 gal. foam - 600 gal. water and 100 gals. form One rapid intervention vehicle
Level of Protection	- Dry chemical cylinders
Number of Trained Personnel	Category 6 15
Public Utilities	
Power Supply	
Capacity of Transformers	100KVA x 3
Receiving Voltage	12,800V
Stand-by Generators	150KVA x 2, 60KVA x 1 and 48KVA x 1
Water Supply	
Water Source	Leyte Metropolitan Water District 1 deep well as backup for control tower
Supply Capacity	Data not available
Water tank	Pressure tank for control tower
Sewerage System	
Type of Treatment	Septic tanks for individual buildings
Solid Waste Disposal System	Incinerate or dump within the airport
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	37,000 gal. x 1 and 4,000 gal. x 2
Supply System	Hydrant system with 3 pits
Aircraft Maintenance Hangar	Nil
Airport Vehicles	Data not available
Airport Maintenance Equipment	Handy grass cutters
Airport Staff Housing	15 lots of land and 4 houses beside the airport

7.2.3 Current Airport Development Projects

At the time of the site investigation by the Study Team in May 1996, no major development works were ongoing at Tacloban Airport.

The list of projects in DOTC's Five Year National Airport Development Program (1995-2000) is as follows:

Infrastructure:

a) Continuation of construction of shore protection at the end of the runway 36
b) Repair/renovation of terminal building
c) Obstruction removal in approach of the runway 18
d) Construction of perimeter fence
e) Asphalt overlay of apron including two taxiways

Air Navigation Systems:

a) Rehabilitation of PAPI power line
b) Rehabilitation of SALS
c) Purchase/install of runway temperature indicator
d) Purchase/install of lighted wind direction indicator
e) Rehabilitation of control tower and replacement of tower equipment
f) Construction of power house
g) Purchase/install of 1-30KVA diesel engine generator set
h) Rehabilitation of power lines
i) Construction of FSS building including purchase/install of equipment

Total investment requirement is PHP 34.7 million for infrastructure and PHP 7.35 million for air navigation systems:

The estimated costs of the projects to be implemented in the fiscal year 1996 are as follows:

a)	Rehabilitation of SALS	PHP 285,000
b)	Rehabilitation of PAPI power line	PHP 380,000
c)	Construction of shore protection	PHP 5,700,000

The 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

7.2.4 Airport Access

Figure 7.2.1 shows existing major road network around Tacloban Airport. The access road is a 8 m wide two-lane road with cement concrete surfacing, and is in a good condition at the time of investigation. (The access road within the airport property line is 10 m wide two-lane asphalt surface road with a 2.5 m wide

median.) It normally takes about 15 minutes from the center of Tacloban City to the airport. Taxis and jeepneys are public transportation available at the airport.

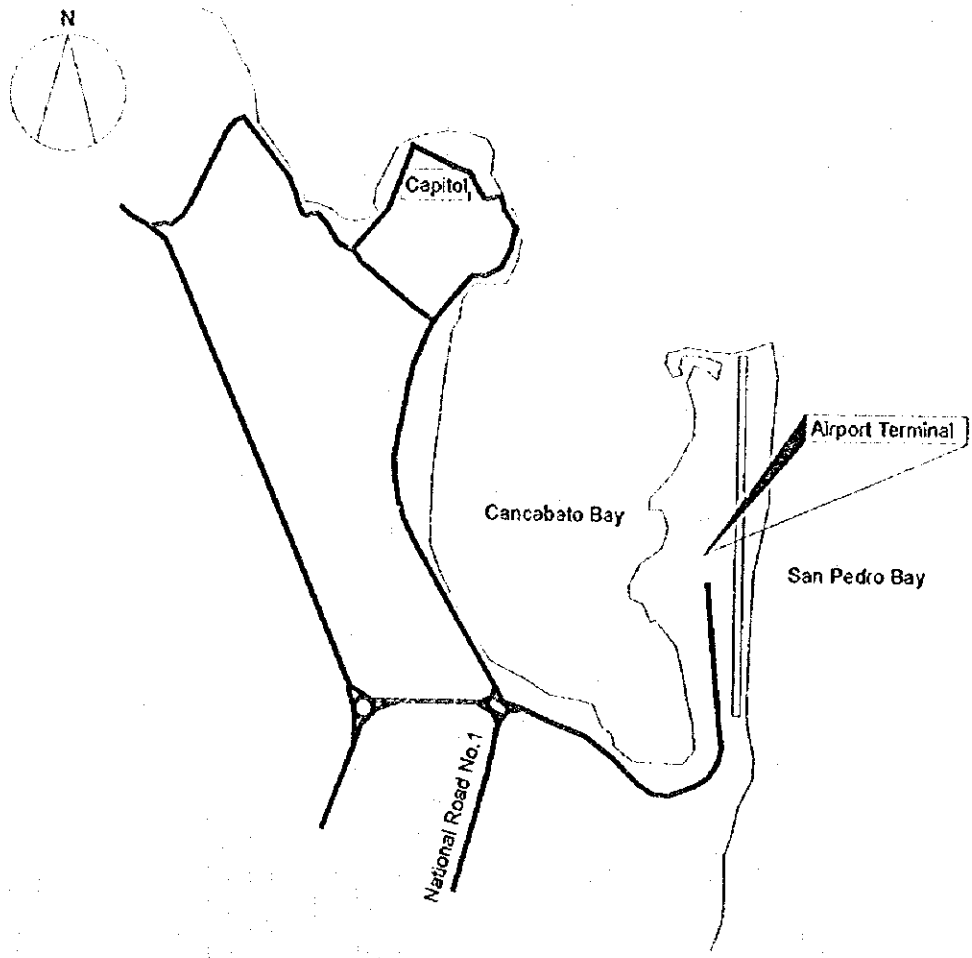


Figure 7.2.1 Existing Major Road Network around Tacloban Airport

7.2.5 Public Utilities

1) Water Supply

Layte Metropolitan Water District supplies water in Tacloban, Palo, Tanauan, Tolosa, Dagami and Pastrana. Existing total supply capacity is about 28,000 cu.m per day. Main source of water is Binaha-an River, and the water is treated at Tingib Treatment Plant which started operation in February 1996. Current average demand of the city is 13,500 cu.m per day.

Existing water supply pipe to the airport area is 200mm diameter. There is a plan to install another 200mm pipe up to San Jose, nearest town from the airport.

2) Power Supply

Electric power is supplied in the City of Tacloban by Layte II Electric Coorpiorative (LEYECO II). LEYECO II has two substations, and their total capacity is 20MVA while current load is 14MVA. Sagkahan Sub-Station supplies the power to the airport through 13.2KV, 3-phase, 4-wire, power transmission line. Its capacity is about 5MW, and is considered sufficient for the years to come. There is a plan to replace one of two 5MVA transformers to a new 10MVA transformer at Sagkahan Sub-Station.

3) Telephone Service

Telephone service is provided by Eastern Visaya Telephone Company (EVTELCO). At the time of site investigation, Government Center Exchage (capacity 2,000 lines) was providing services to the airport. There is an on-going improvement project which includes installation of seven Outside Plant Access Cabinet (OPAC) and fiber-optic cable network connecting Tacloban Host Exchange, Government Center Exchange and seven OPACs. The project is expected to be completed in June 1996. The nearest OPAC to the airport will be OPAC 5 which will have 640-line capacity. Existing telephone cable to the airport is a 100-pair cable. It will be connected to OPAC 5.

7.2.6 Airport Surroundings

Tacloban Airport is located at Barangay 88 with population of 3,580 (in 1990), which is about 3.5km southeast of Tacloban City, on Cataisan Peninsular. The airport faces San Pedro Bay to the north and to the east. Figure 7.2.2 shows existing land use around Tacloban Airport. As seen, there is an institutional area, which includes Headquarters of Leyte Province Police Command, Philippine Public Safety College, Headquarters of Naval Station Tacloban, to the west of the airport. It also includes some houses and dormitories. The area southwest to south of the airport is mixture of agricultural, fishermen's village, residential, tourist facilities and beach resorts.

Land use zoning plan was prepared by the City of Tacloban in 1977, and is almost the same as the existing land use.

There is San Jose Elementary School at 1.5km south of the runway 36.

It seems that there are no endangered or rare species of fauna and flora, and historical or cultural properties in the vicinity of the airport. However, special attention should be given to the mangrove area on the northwestern seashore of Cataisan Peninsular.

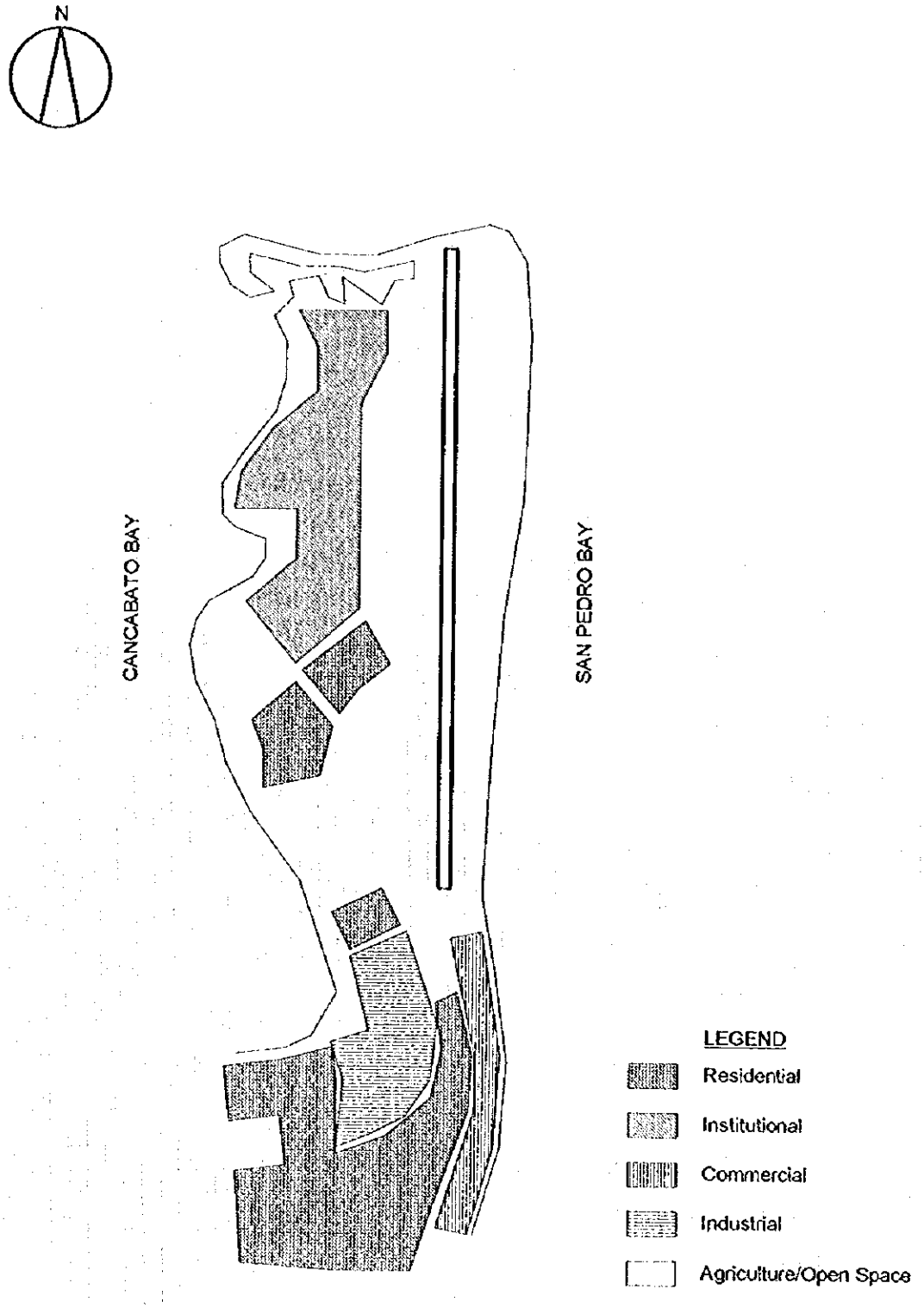


Figure 7.2.2 Existing Land Use around Tacloban Airport

7.3 EVALUATION OF EXISTING AIRPORT FACILITIES

7.3.1 Summary

The evaluation of existing facilities at Tacloban Airport is summarized in Table 7.3.1.

7.3.2 Runway Strip and Obstacle Limitation Surfaces

1) Runway Strip

The size of the runway strip for Tacloban Airport is not officially declared. However, the Civil Air Regulation of the Philippines requires the airport to have a 2,260m long, 150m wide runway strip. This is the same size as required by the Japanese Standard.

There are a few problems for the site preparation of the runway strip in terms of obstacle limitation and slope requirements. The shore protection walls located on the eastern side of the runway 36 threshold is approximately 70m from the runway centerline and should be regarded as an obstacle. A canal located along the southern part of the runway is only 50m away from the runway centerline. It may endanger aircraft in the event of its running off the runway.

The maintenance of the runway strip is far from satisfactory. Grass cutting are conducted only for narrow strips beside the runway to secure the visibility for the runway edge lights. Outside those areas, grass is left to high and said to attract many birds.

If a 300m wide runway strip is applied, the existing apron and terminal building will be situated within the 300m wide strip.

2) Approach Surface

The DOTC's obstruction chart indicates a few obstacles infringing the 2% approach surface. Visual observation by the Study Team confirmed that several trees and a few houses protrude upon the approach surface to the runway 36 threshold. On the runway 18 side, a 86m high hill is located on the Samar Island, about 4,300m in front of the runway 18 threshold. Although the terrain itself is below the 2.5% second section of approach path for the runway 18 threshold[1], trees on the hill protrude upon it.

[1] The hill is 8.3m below the approach surface.

Table 7.3.1 Evaluation of Existing Facilities at Tacloban Airport

Facilities / Year		2000	2005	2010	2015	Remarks
1) Runway Strip and Obstacle Limitation Surfaces		X				• 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	▬	▬	▬	▬	• 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	▬	▬	▬	▬	• The runway width of 45m comply with the ICAO's recommendation.
3) Taxiway	- Aircraft Handling Capacity	▬	▬	▬	▬	• No parallel taxiway will be required for anticipated peak hour aircraft movements before 2015.
4) Apron	- Aircraft Stand Capacity	▬				• 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		▬				• 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				• 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				• 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	▬				• 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				• 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	▬				• 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				• 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		▬	▬	▬	▬	• 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				• 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				• PAGASA station is located in the proximity of Tacloban Airport. However, obervation sensors are not adequately located for civil aviation purpose.
14) Rescue and Fire Fighting		X				• 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				• 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				• 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		▬	▬	▬	▬	• The supply from the city authority is stable.
18) Sewage Disposal System		X				• 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		▬				• 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 serviclable period of existing facility in terms of capacity or span of life.
	▨ : Indicates the serviclable period of existing facility upon completion of ongoing or planned project.

3) Transitional Surface

There is a few obstacles against the 14.3% transitional surfaces, which start from the both side edges of the 150m wide runway strip. Those include the vertical stabilizer of B737 on the apron and the control tower.

4) Other Obstacle Limitation Surfaces

A hilly terrain on the western side of the Tacloban City protrudes above the inner horizontal surface. Their peaks are located 3.0-3.5km west of the runway 18 threshold, and their elevations are approximately 60m AMSL. Mount Naganaga and its range, 360m high mountain located about 4.5-6km west of the airport, infringe conical surface. Adverse effects of those obstacles on aircraft operations can be avoided by establishing a circling approach on the east side of the runway.

7.3.3 Runway, Taxiway and Apron

1) Runway

Tacloban Airport has a 2,140m long runway, which is adequate for B737-300 for the present flight destinations. However, because of obstacles over the runway 18 takeoff surface, PAL's B737-300 suffers from payload penalty of 1,590kg for Tacloban-Manila sector, which is equivalent to 10% of maximum payload or 39% of cargo capacity for full passenger flights.[2]

B737-300 requires a longer takeoff runway than A300-B4, which PAL intends to introduce to Tacloban-Manila in its "Airport Development Requirements, Priority 1: 1995-1997".[3] Our forecast indicates that A300 is likely to be used from 1998. According to our calculation, a 1,910m long runway is sufficient for entire planning horizon up to 2015.

The runway 36 has a 60m long stopway, which can be regarded as a clearway as well. The width of the runway is 45m and conforms with the ICAO's recommendation. There are no paved shoulders for the runway.

The main approach runway is the runway 36. Approximately 70% of the total arriving aircraft use the runway 36 for landing.

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[2] Under 30°C and zero wind condition. 80kg per passenger is assumed including bags.

[3] The required takeoff runway length for PAL's B737-300, A300-B4 and A320 for Tacloban-Manila (565km) under full payload, 30°C and zero wind condition is as follows:
B737-300 (141 seats): 1,910m, A300-B4 (246 seats): 1,750m and A320 (150 seats): 1,793m.

According to the branch manager of PAL, weather condition of Tacloban Airport is generally good except when typhoon comes. In the last 12 months, there were 4 times of flight cancellation.

All weather wind coverage of the runway 18/36 was calculated based on the data from PAGASA in 1995 as follows:

Cross wind component less than 13 knot:	99.61%
Cross wind component less than 20 knot:	100.0%

The result of correlation analysis on visibility and cloud height indicates the coverage of 96.1% for existing IMC minima of 733ft - 3.2km. Since this value is in the lower range of the ICAO recommended usability factor of more than 95%, the introduction of precision approach procedures are desirable from the meteorological viewpoint. (Refer to Appendix 7.3.1 for more detailed analysis on meteorological data.)

2) **Apron and Taxiway**

The size of the apron at Tacloban Airport is 230m by 80m. There are markings for two B737s at present. With rearrangement of the parking positions, it would be possible to accommodate up to four B737 class aircraft. However, the apron capacity will become insufficient due to increasing air traffic volume before 2000. The apron is connected to the runway with two stub taxiways of 23m wide. No parallel taxiway will be required for anticipated peak hour aircraft movements up to 2015.

3) **Pavement**

The strength of the runway is PCN39/R/B/W/U, which is adequate for B737 class aircraft. The structure of the runway and taxiway pavement is 25cm aggregate base, 23cm cement concrete slab and two layers of asphalt overlay of 7cm and 10cm thick on it. The latest overlay work was completed in 1990. The condition of the pavement appeared partially poor.

The apron pavement is of 23cm cement concrete slab over the top of 25cm aggregate base. The standard size of a slab is 6.0m by 3.0m and 3.0m by 3.0m. The condition of the concrete slab is good. A detailed investigation report on the existing pavements is shown in the Appendix 7.3.2.

The existing pavements will require a strengthening work to accept A300, which is anticipated for Tacloban-Manila sector in 1998 according to our forecast. PAL evaluated that the existing pavements will require some 20cm (8 inch) overlay to accept A300, which will be reviewed in Section 7.4.

4) General Aviation Area

There is no hangar for general aviation at Tacloban Airport. General aviation aircraft usually use both sides of the apron. Philippine Air Force (PAF) has four helipads on the northern side of the fire station.

7.3.4 Passenger and Cargo Terminal Building

1) General

The terminal building consists of passenger terminal area, cargo terminal area and airlines office area. It has a total floor area of about 1,790 sq.m. The terminal building is mostly one story and of a reinforced concrete structure. A partially three-story portion of the terminal building is the remains of the former control tower. Floor plan of the terminal building is shown in Figure 7.3.1.

The floor area of the passenger terminal, the cargo terminal and the airlines office area are as follows:

a)	Passenger Terminal Area		1,080 sq.m
	(Departure Area	810 sq.m)	
	(Arrival Area	270 sq.m)	
b)	Cargo Terminal Area		180 sq.m
c)	Airlines Office Area		530 sq.m
		Total	1,790 sq.m

The structure of the terminal building is, generally, in good conditions, except dilapidated materials under the eaves at the apron side. It is necessary to repair the plywood materials to maintain a good facade of the terminal building.

2) Passenger Terminal Area

a) Total Floor Area

PAL is operating in the terminal building and two new airlines, Cebu Pacific and Grand Air, are scheduled to operate daily flights between Manila and Tacloban. In connection with two airlines operations, PAL has a plan to renovate its check-in counters and baggage make up area.

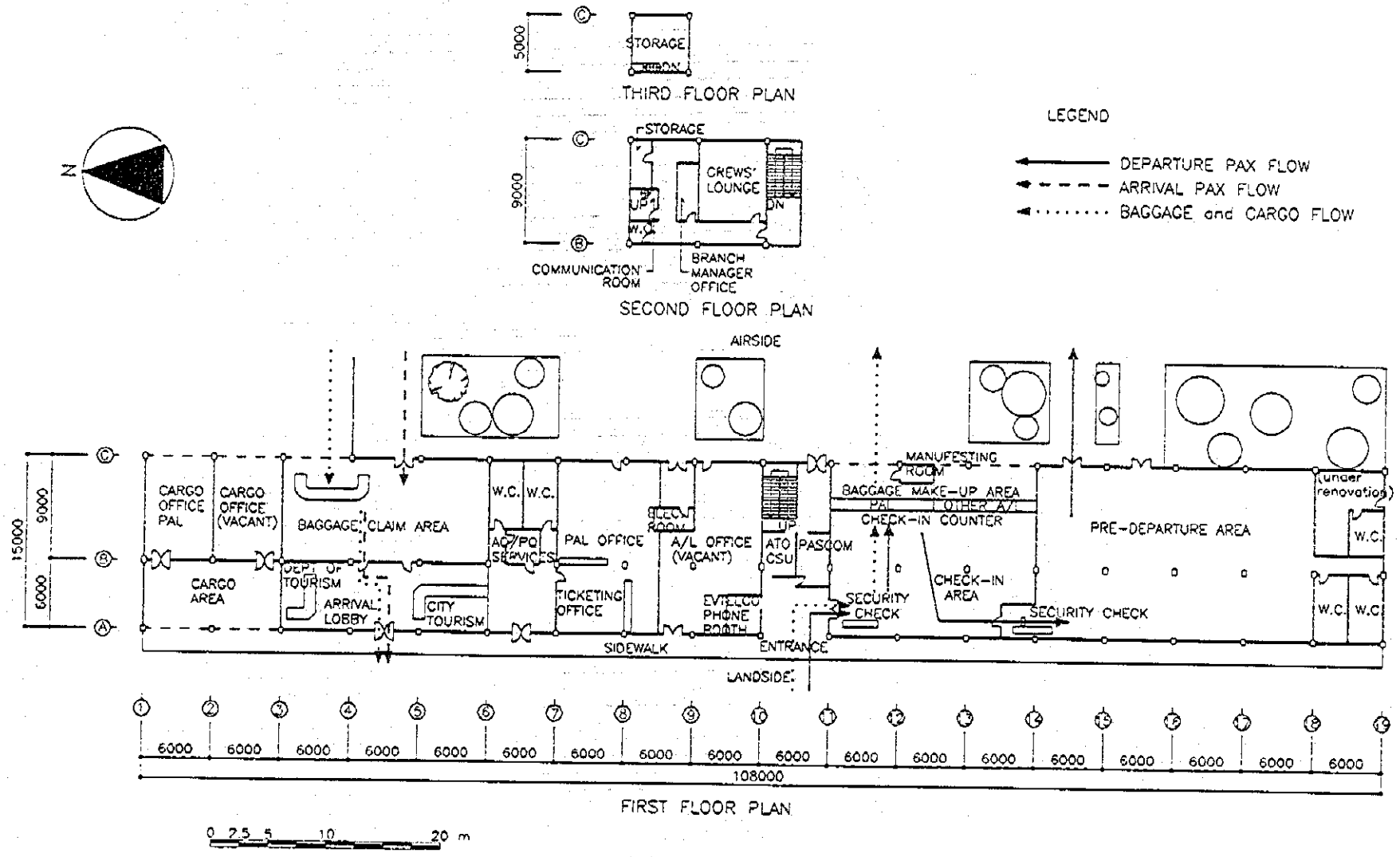

Figure 7.3.1 Passenger and Cargo Terminal Building

As previously stated in Section 4.4, the unit floor area of 10 sq.m per peak hour passenger is considered adequate for estimating the required floor area for the passenger terminal building. Since the current peak hour passengers in two ways are estimated to be 280 passengers based on the current flight schedule, the required floor area is estimated to be 2,800 sq.m, which indicates that the present available floor area of 1,080 sq.m is far from sufficient even for the present peak hour passenger volume.

b) Operational and Functional Aspects

Departing and arriving passengers flows, including baggage flow are shown in Figure 7.3.1. Actual conditions of the major terminal components are compared with the standard requirements in order to evaluate the existing terminal building. As a result, there are many insufficient spaces and facilities at the existing terminal building as shown in Table 7.3.2 below.

Table 7.3.2 Comparison of Standard Requirements and Existing Conditions of Major Components of the Passenger Terminal Building: Tacloban

Major Components and Facilities	Requirements*	Existing	Remarks
Peak Hour Pax 140 One Way			
1. Departure Curb	8m	18m	Sufficient
2. Departure Concourse	294 sq.m	150 sq.m	Insufficient
3. Security Check-Check-in Bag	1 unit X-ray equipment	No X-ray equipment	Insufficient
4. Check-in Queuing Area	39 sq.m	90 sq.m	Sufficient
5. Check-in Counters -Common Use	6 Counters	2 Counters	Insufficient
6. Security Check-Gate Lounge	1 unit X ray equipment & Magnetometer	1 unit Magnetometer No X-ray equipment	Insufficient
7. Gate Lounge (Pre-Departure Area)	125 sq.m	360 sq.m	Sufficient
8. Baggage Claim Area	139 sq.m	130 sq.m	insufficient
9. Number of Bag. Claim Devices	1 unit 30 m long	No Bag Claim Device	Insufficient
10. Arrival Concourse	266 sq.m	90 sq.m	Insufficient
11. Arrival Curb	8m	18 m	Sufficient

Note*: The requirements were calculated by using IATA formulas and the more details are explained in Appendix 7.3.3.

Major operational and functional problem observed at the terminal building are summarized as follows:

i) Congestion at Forecourt

There is no public concourse within the terminal building. Thus, visitors are not allowed to enter the building and forced to crowd at the terminal forecourt. As a result, the forecourt is overcrowded by passengers and visitors during peak hours. The eaves over the forecourt is not long enough to prevent people at forecourt from getting wet by pouring rain with wind.

ii) Necessity of X-Ray Equipment for Check-in Baggage

Passengers are obliged to surrender all check-in baggage for manual security check because no X-ray equipment is provided. Passenger congestion is inevitable during peak hours due to slow process of manual baggage inspection. X-ray equipment should be provided for passenger convenience, operational efficiency and safety reliability.

iii) Necessity of X-Ray Equipment for Cabin Baggage

Magnetometer (metal detector equipment) is provided for the security check prior to entering the pre-departure area, however, no X-ray equipment is provided for security check of cabin baggage. Thus the same problem of manual search described item ii) above is observed. Installation of X-ray equipment is recommended for the same reasons stated under item ii).

iv) Congestion in the Baggage Claim Area

As no baggage claim conveyor is provided in the baggage claim area, passenger congestion is observed each arrival. For better level of passenger service, installation of baggage claim conveyor is recommended.

v) Common-Use Check-in Counter

As a single operator presently, PAL operates exclusive check-in counter system. However, as previously explained, two new airlines will start operation. To accommodate the new airlines, it is recommended to adopt common-use check-in system for effective use of equipment and space as well as passenger convenience.

3) **Cargo Terminal Area**

The cargo terminal area is located on the northern side of the passenger terminal area. It has sufficient capacity to handle present level of cargo traffic volume. However, the expansion of capacity will be required before 2000 to cope with increasing cargo traffic volume.

7.3.5 Control Tower and Administration Building

1) Control Tower Building

The building is located to the north of the passenger and cargo terminal building. The five-story building is of a reinforced concrete structure (1F-4F) and of steel frame structures (5F, VFR room). A total floor area is about 210 sq.m. The VFR room is a pentagonal configuration with about 13.7m floor height. It has good visibility for entire airport area. The building is, generally, in good conditions except water proofing problems at VFR room. Water leakage from the roof and window-type air conditioner were observed. It is necessary to repair the water proofing.

It is noted that the existing control tower constitute an obstacle to transitional surface, and thus discounting safe aircraft operations.

2) Administration Building

The building is located to the west of the control tower building. It is of a reinforced concrete structure with one story. A total floor area is about 140 sq.m, which is not sufficient for daily activity of airport operation. The building is structurally in good conditions.

7.3.6 Other Buildings

1) Fire Station Building

The building is located at about 300m north of the control tower building. It is one story of a reinforced concrete structure, and its total floor area is about 260 sq.m. The building is in good conditions.

2) VIP Building

The building is located to the north of the passenger and cargo terminal building. It is one story of a reinforced concrete structure, and its total floor area is about 240 sq.m. The building is in good conditions.

3) Power House Building

The building is located to the northeast of the control tower building. It is one story of a reinforced concrete structure, and its total floor area is about 90 sq.m. The building is generally in good conditions.

7.3.7 Roads and Vehicle Parking Area

The terminal area of Tacloban Airport is connected to Tacloban's city network by a 750m long airport access road maintained by the ATO. This road has a 4.0m wide lane for each direction with a 2.5m wide median. A vehicle parking area of 160 vehicle slots is located in front of the passenger terminal building. The existing vehicle parking area has sufficient capacity for the present peak hour vehicular traffic volume, but the expansion of parking capacity will become necessary before 2000..

The terminal curb frontage is presently closed for vehicle traffic to avoid congestion in front of the terminal building. Instead, a part of the vehicle parking area is designated for unloading of passengers, which is inconvenient for passengers when it rains.

The airport access road and vehicle parking area are paved with asphalt concrete, which is in good condition. The drainage system of storm water at the vehicle parking area also appeared good.

7.3.8 Air Navigation Systems

1) Radio Navigation Aids

(1) VHF Omni-directional Radio Range/Distance Measuring Equipment (VOR/DME)

A conventional VOR and DME collocated with the VOR are operated at this airport. Dimensions of the facilities are as shown in Table 7.3.3.

Table 7.3.3 Dimensions of Tacloban VOR/DME

STATION	SERVICE	CALL SIGN OR IDENTIFICATION	EMISSION	TRANSMITS		RECEIVES		HOURS UTC	COORDINATES	LOCATION		OPERATING AGENCY AND REMARKS
				kHz	MHz	kHz	MHz			Mag	NM	
1	2	3	4	5	6	7	8	9	10	11	12	13
TACLOBAN	VOR I DME	TAC	B9W P0N		115.5 CH102X			H24	11 33.2 N 125 01 5 E	ON	AD	174M BEFORE END RWY 08 AND 30M RIGHT OF CENTERLINE OUTPUT = 300W SITE ELEV = 1 8 AMSL
		VOR UNUSABLE ON R190 TO R210 BEYOND 35NM BELOW 7000FT. R210 TO R230 BEYOND 30NM BELOW 9000FT. R220 BEYOND 35NM BELOW 8500FT. R230 TO R255 BEYOND 35NM BELOW 8500FT.										

The facilities which were manufactured by Toshiba (VOR) and NEC (DME) were installed in 1984. Some restrictions of operations of VOR exist between R-190 and R-230 due to hills located on the west of the airport as shown in Table 7.3.1. A 16KVA generator is installed in the shelter for use of emergency.

Tacloban VOR/DME has now following problems:

i) Due to the flood by typhoon in December, 1994, VOR/DME were closed its operation for three days. Some parts of stand by equipment were damaged by flood and module spare parts are still not supplied.

ii) Flight calibration does not take place in the last few years and at present ground check takes place on a monthly basis.

iii) Tacloban VOR/DME is located very proximity to the runway (518m inside from the runway 18 threshold and 78m on the west side of runway center line) and constitutes as an obstacle against the aircraft operations. The facilities should be moved to a site to provide sufficient clearance against the transitional surface.

(2) Evaluation of Existing Radio Navigation Aids

The existing C-VOR at Bacolod Airport is planned to be replaced by a D-VOR/DME under Nationwide Air Navigation Facilities Modernization Project - Phase III. The addition of ILS is desirable since it is the standard requirement for modern jet aircraft.

2) ATC and Aeronautical Telecommunication System

(1) Approach Control

Tacloban Approach Control which is located in the control tower has the responsibilities to control the IFR aircraft operating within the CTR with the frequency of 120.8MHz between hours 2200 and 1100 UTC (0600-1900 local time).

(2) Aerodrome Control

Tacloban Tower controls the aircraft operating within the ATZ with the frequencies of 122.1 and 236.4MHz between hours 2100 and 1215 UTC (0500-2115 local time). A new console for approach and aerodrome control and light gun were installed in 1995 by USAID.

(3) Flight Service Station

Flight Service Station which is installed in the control tower to contact with Mactan ACC for flight services with the frequency of 5205KHz is operated between hours 2200 and 1400 UTC (0600-2200 local time).

(4) Equipment Room

Transmitter/receiver and standby equipment of VHF and HF and Voice Recorder are installed in the equipment room which is located beneath the VFR room. These equipment are maintained in good conditions.

(5) Evaluation of Existing ATC and Aeronautical Telecommunication Systems

The existing systems were renewed recently by USAID, and generally operating in good condition. PC/Fax machine and VSAT will be added under Nationwide Air Navigation Facilities Modernization Project - Phase III. The existing systems are adequate for operational needs for anticipated air traffic volume up to 2015 if necessary maintenance and replacement of aging equipment are undertaken.

3) Airfield Lighting Systems

(1) Existing Systems

The following lighting systems which are controlled by the tower are available at this airport.

- Runway edge lights
- Taxiway edge lights
- PAPI for the both runways 18/36
- SALS, total length of 420 m for the runway 36
- Apron flood lights

Some barrettes of simple approach lighting system are not visible from the approaching aircraft due to trees and houses obstructing the lights of barrettes. Apron flood lights system is of simple type.

(2) Evaluation of Existing Air Field Lighting Systems

The existing systems are operating normally although some of them are obsolescent. The existing approach lights do not comply with precision approach Category I operations, which are the standard requirement for modern jet aircraft. It is desirable to install Precision Approach Category I Lighting System (PALS) for the main approach runway and Simple Approach Lighting System (SALS) for the other side of the runway.

4) Meteorological Systems

There is a local office of PAGASA proximity to the airport. The control tower receives hourly the meteorological data observed by PAGASA. However, sometimes wind data to be sent from PAGASA are different from the actual conditions at the runway thresholds. Therefore, for landing/departing aircraft, controllers inform the wind directions/speed data obtained through the gauges installed in the console of the tower which are connected with the sensors near the runway. More sophisticated observation and recording systems are required for civil aviation purpose.

7.3.9 Rescue and Fire Fighting Services

The crash, rescue and fire fighting services declared for Tacloban Airport are the ICAO's category 6 level of protection, which corresponds to B737 class aircraft. There are two RIVs and one major vehicle. One of the RIVs deployed in 1976 has only dry chemical cylinders. The newer RIV was introduced in 1992, which has a 2,270L (600 gal.) water capacity. The major vehicle was made in 1984, and has 6,000L (1,585 gal.) water tank capacity. The total water tank capacity of the fire vehicles is some 8,270L, which exceeds the category 6 requirement of 7,900L. The working condition of the vehicles is reported good. There are 15 trained personnel for the services. A lack of personnel was commented by the CRF in charge.

The level of protection should be increased at least to category 7 for operating A300, which is anticipated for Tacloban-Manila sector in 1998 according to our forecast.

7.3.10 Airport Utilities

1) Storm Water Drainage

A 700m long stone riprap canal running along the eastern side of the southern part of the runway is the only drainage facility available within the runway strip at Tacloban Airport. Although this canal has no water outlet is now completely covered by grasses due to poor maintenance, there seems to be no major problems since the standing water in this area percolates into the sandy ground in few days after rain.

The drainage is insufficient for a section of the runway near the northern taxiway, where storm water often stagnates. This is caused by insufficient capacity of the culvert pipe under the northern taxiway.

The submergence of the runway at Tacloban Airport often occurs during high tide exaggerated by typhoons. Since waves usually comes from southeast, the southern part of the runway from the fire station road to the runway 36 threshold is most frequently submerged. In December 1994, the entire runway and the apron were submerged by high tide from a typhoon. The airport was closed for one day. To solve the problem of high tide, it requires more complete shore protection wall, as planned in the Five Year Airport Development Plan.

2) Fencing

The airport has no fence except for the boundary between the airport and the police quarter. As a result, the runway has a free access, and thus frequent complaints by PAL are filed for animal crossing of the runway. It is an immediate need for the airport to secure safe operation by completing fencing.

3) Power Supply System

Electric power for the airport is supplied by Leyte II Electric Cooperative (LEYECO II). The ATO receives electricity at 13,200V from LEYECO II. The received electricity is stepped down to 220V with three 100KVA transformers of 1983 made, and then distributed to the terminal building, control tower, VOR/DME and aeronautical lighting system, with CCRs for some equipment. Average consumption of the commercial power is about 1,900KWH per month.

There are occasional power failures, twice a week on average. The ATO has four emergency generators, 2 x 150KVA (installed in 1970), 60KVA (1972) and 48KVA (1994). Those generators are capable of covering all the ATO's facilities. However, the 150KVA generators are not in good condition, unable to operate for long hours. The new 48KVA generator is reliable, but for small demand only. The system has a semi-automatic switch, which instantly switches over from commercial power to the main generator only when it is already started. Therefore, the main generator need to be started for each aircraft arrival and departure at night, early morning and other times of poor visibility.

PAL has a power plant besides the control tower. Two small generators can supply emergency power for their office and telecommunication equipment.

4) Telephone System

The Tacloban ATO has five external telephone lines, one each for the control tower, fire station, ANS and two for the administration office. Only one of the five is direct dialing (DD). In addition, there is an internal communication network connecting the administration office, control tower, power plant, fire station, terminal building and warehouse. There are complaints from VIP terminal users that no telephone is available there. Additional telephones may be required; however, it was mentioned by the acting airport manager that the Tacloban ATO does not have enough budget to maintain more lines.

There are two telephone booths in the terminal building for public use.

5) Water Supply System

Water is supplied by the Leyte Metropolitan Water District (LMWD). It is received through two hydrants at the terminal building and fire station. There is no elevated water tank. The control tower has a pressure tank and a deep well for a back up. The water pressure of the LMWD's supply is below standard, particularly during dry season. In addition, there are often interruptions during and after typhoons. The average monthly consumption of the LMWD's water is about 700 cu.m.

6) Sewerage System

Sewage is treated by septic tanks for individual buildings. The present system is not the one which ensures effluent quality, but is working without problem. More sophisticated treatment system is desirable to cope with increasing effluent.

7) Solid Disposal System

Solid disposal from the airport is burnt or dumped within certain places within the airport. There is no designated incinerating or dumping site.

7.3.11 Fuel Supply System

The aviation fuel supply system at Tacloban Airport is owned and operated by PAL. There are one vertical fuel tank of some 140,000L (37,000 gals.) and two horizontal tanks of 15,000L (4,000 gal.) capacity each. The total capacity of the tank is about 170,000L (45,000 gals.). The fuel is supplied to aircraft from three pits on the apron through the hydrant system. Average consumption of fuel at the airport is about 6,800L (1,800 gals.) per day. The fuel is supplied by PETRON's fuel truck from Ormoc City twice a week. The system is in normal working condition. However, since there is no back up power system, no refueling is possible when commercial power fails.

Besides coping with increasing supply demand, the storage capacity is desirable to be increased to a seven-day consumption level in the light of normal practice.