社会開発調査部報告書

No. 62

SOLOMON ISLANDS

The Study on the Development Project of Henderson International Airport in Solomon Islands

FINAL REPORT
VOLUME II SUMMARY

OCTOBER 1991

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VOLUME I : SUMMARY

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JAPAN INTERNATIONAL COOPERATION AGENCY

PREFACE

In response to a request from the Government of Solomon Islands, the Government of Japan decided to conduct a study on the Development Project of Henderson International Airport and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Solomon Islands a study team headed by Mr. Shota Morita of Pacific Consultants International three times between October 1990 and September 1991.

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

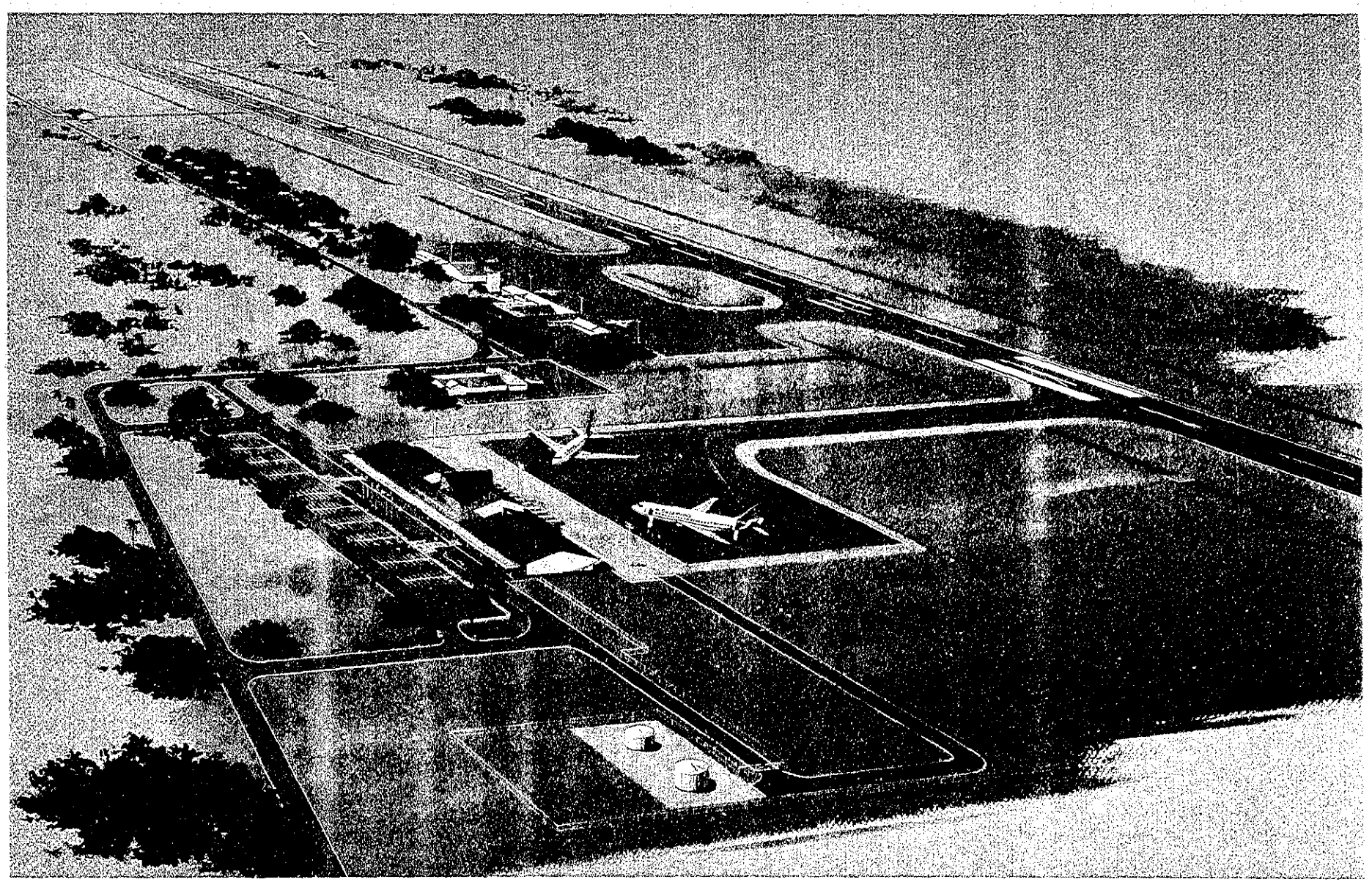
I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

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

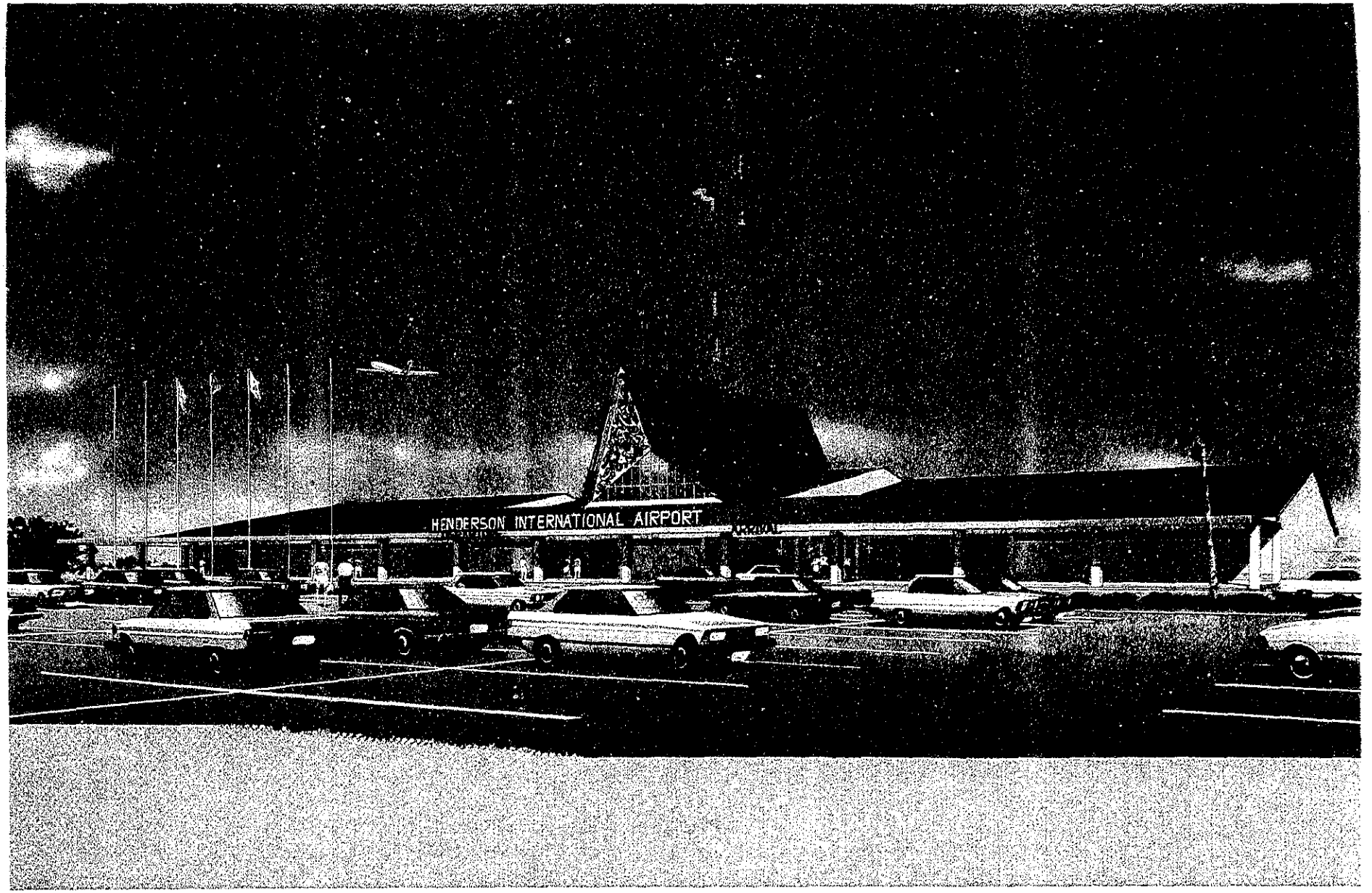
October 1991

Kensuke Yanagiya

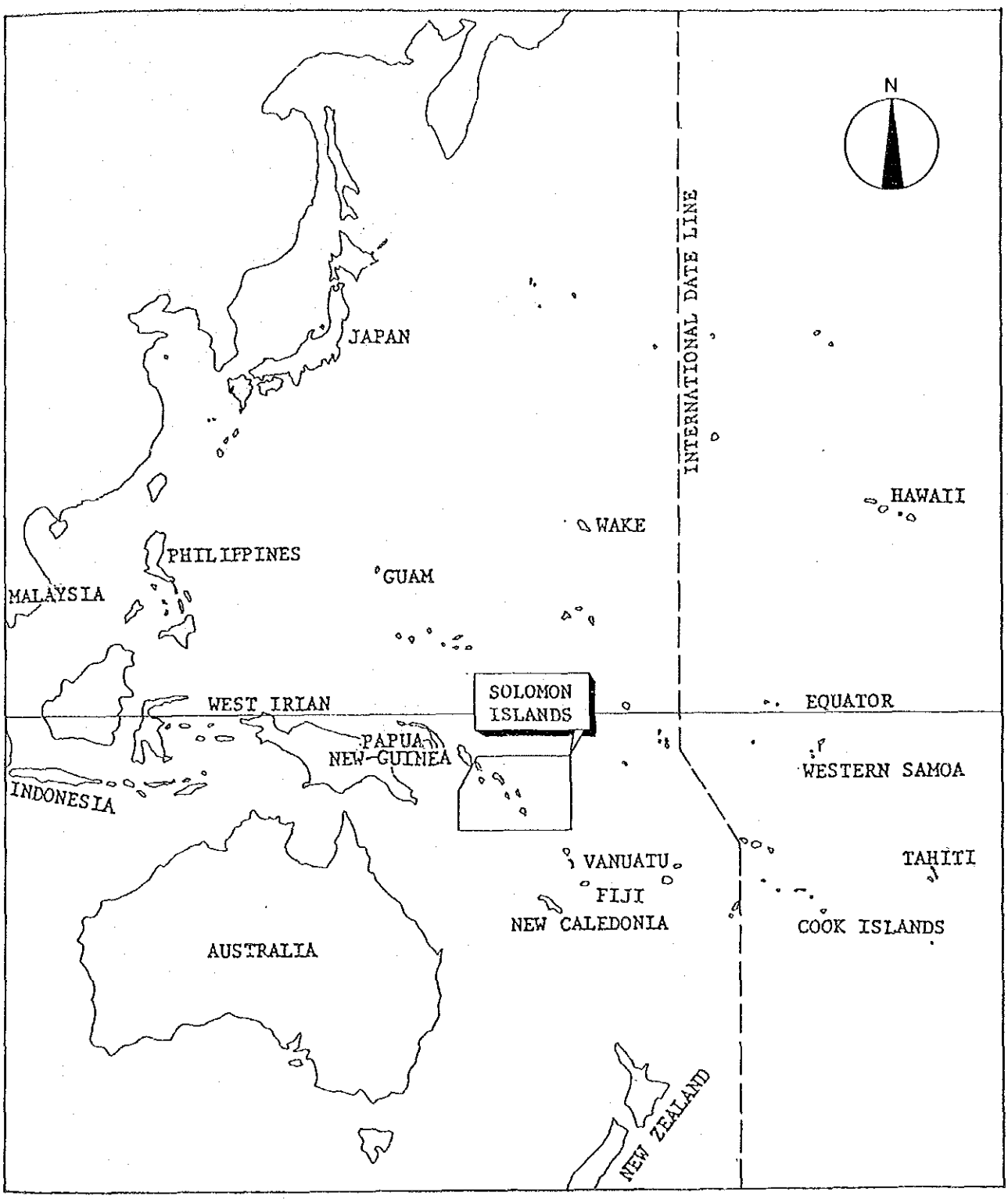
Kensuke Yanagiya
President
Japan International Cooperation Agency



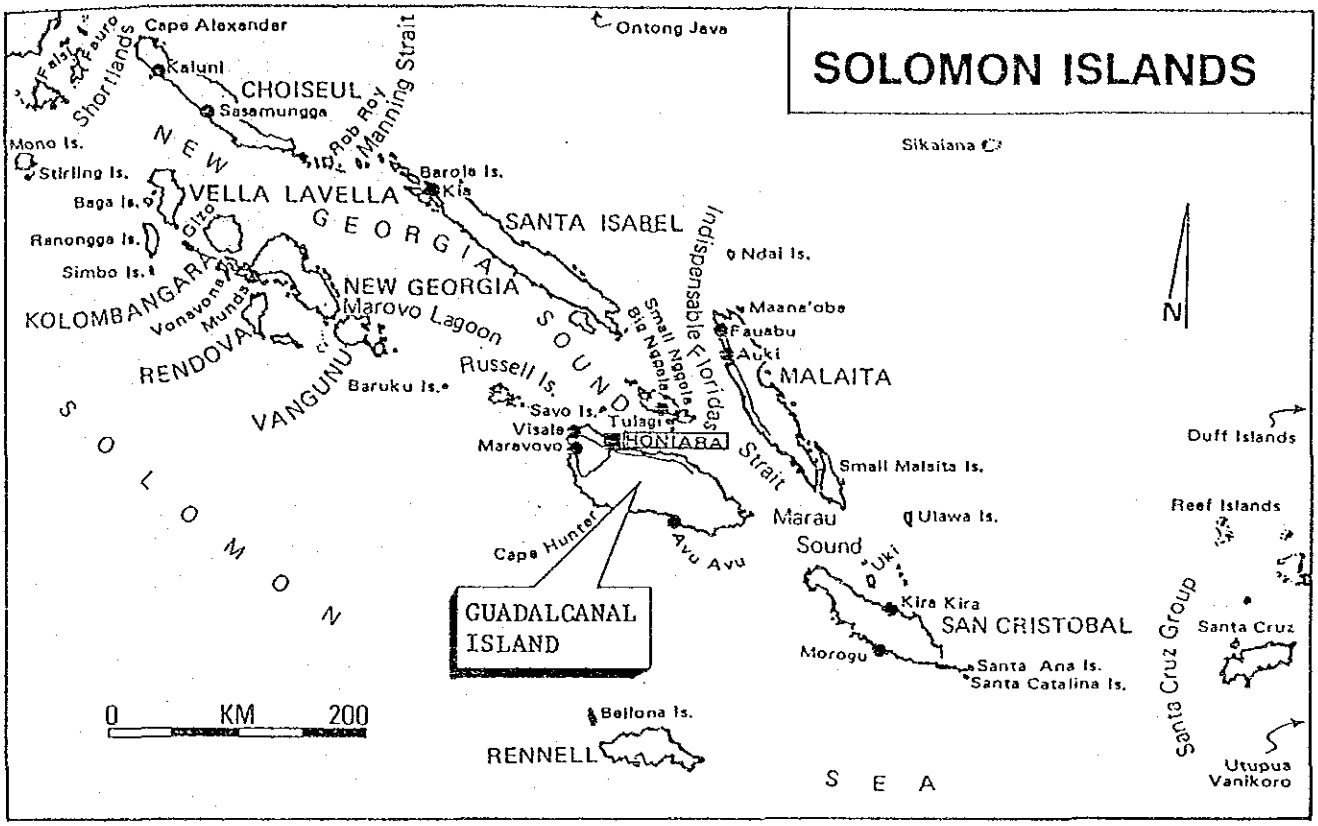
NEW TERMINAL AREA



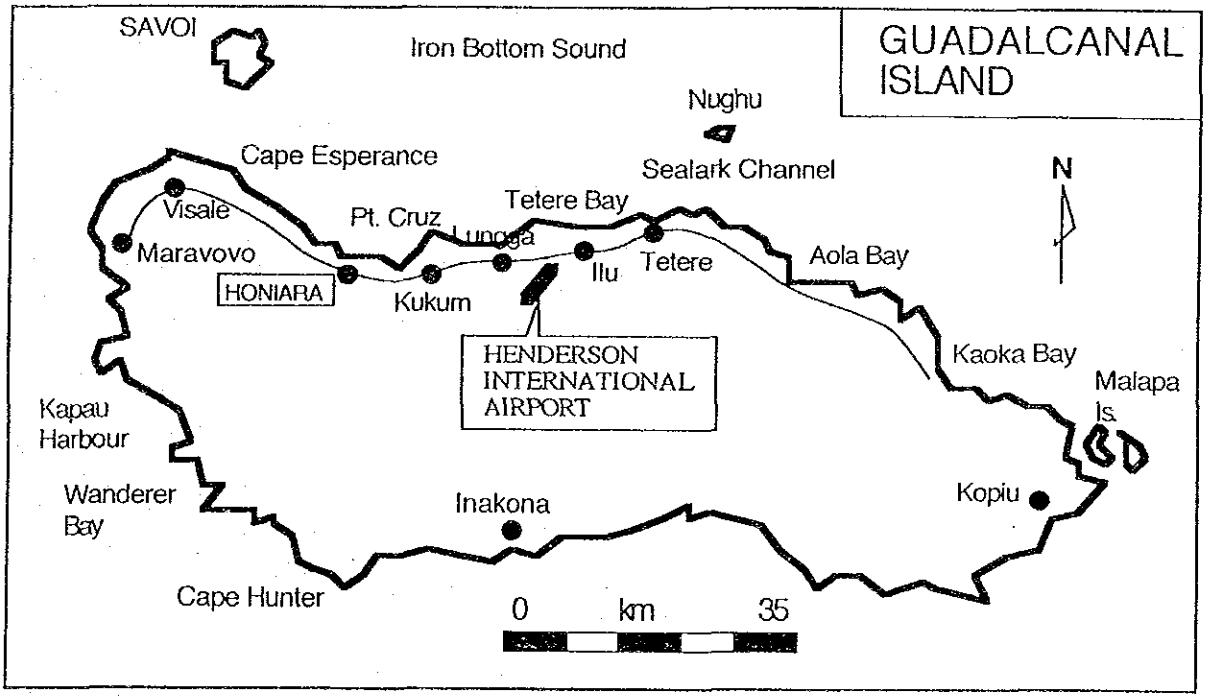
NEW PASSENGER TERMINAL BUILDING



PROJECT LOCATION MAP - 1



PROJECT LOCATION MAP - 2



PROJECT LOCATION MAP - 3

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1. BACKGROUND AND OBJECTIVES OF THE STUDY

1. Background and Objectives of the Study

The Solomon Islands, situated about 5,500 km south of Japan, about 1,800 km northeast of Australia and about 900 km east of Papua New Guinea, is favored by a tropical climate and an idyllic marine environment. The Government of Solomon Islands intends to make best use of this natural environment for its economy through tourism. However, the gateway to the islands, Henderson International Airport, in the national capital of Honiara, is poor in facility size and quality and constitutes a barrier to the socio-economic development of the country.

Thus, the Government of Solomon Islands requested the Government of Japan to assist in developing the airport. In response to the request, the Government of Japan decided to implement the Study on the Development Project of Henderson International Airport in Solomon Islands. Based on this decision, the Japan International Cooperation Agency (JICA), the official agency responsible for the implementation of technical cooperation programs of the Government of Japan, was entrusted to undertake the Study in close coordination with the Government of Solomon Islands.

The objectives of the Study agreed upon between the two parties are as follows:

1) To prepare a master plan of Henderson International Airport; and

2) To examine the technical, economic and financial feasibility of the short-term development project to be formulated within the framework of the master plan.

2. FUTURE AIR TRAFFIC DEMANDS AND PROBLEMS OF THE EXISTING AIRPORT

2. Future Air Traffic Demands and Problems of the Existing Airport

2.1 Outline of the Existing Henderson International Airport

Henderson International Airport is located about 13 km east of Honiara. The airport now consists of a 2,200m long runway, connecting taxiways, apron, passenger terminal building and other supporting facilities. The existing layout of the airport is shown in Figure 1. This airport is the sole international airport in the Solomon Islands. Twenty international scheduled flights and some 130 domestic scheduled flights operate from the airport every week. The airport is under the control of the Civil Aviation Division (CAD) of the Ministry of Tourism and Aviation (MTA).

2.2 Air Traffic Analysis and Demand Forecasts

Based on the analysis on air traffic records at Henderson International Airport, future air traffic demands, which are the principal planning factors for all airport facilities, are forecasted up to the year 2010. Econometric models utilizing various economic indices as explanatory variables are employed for the forecasts, and the annual number of passengers and volume of cargo are estimated for international and domestic traffic as shown in Figures 2 and 3 respectively. The results of the forecasts, including the peak hour forecasts, are detailed in Table 1.

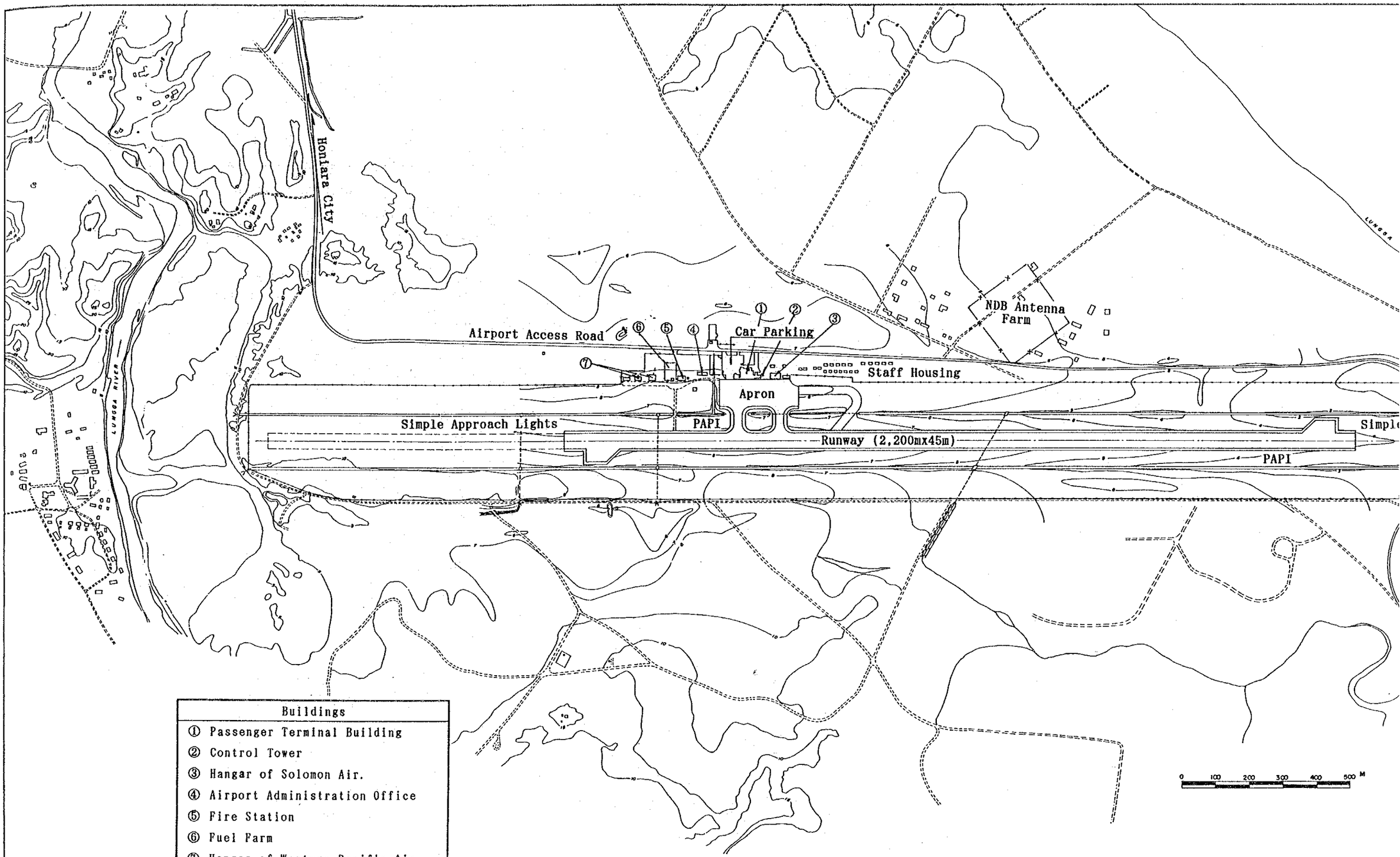


Figure 1 **Layout Plan of E**

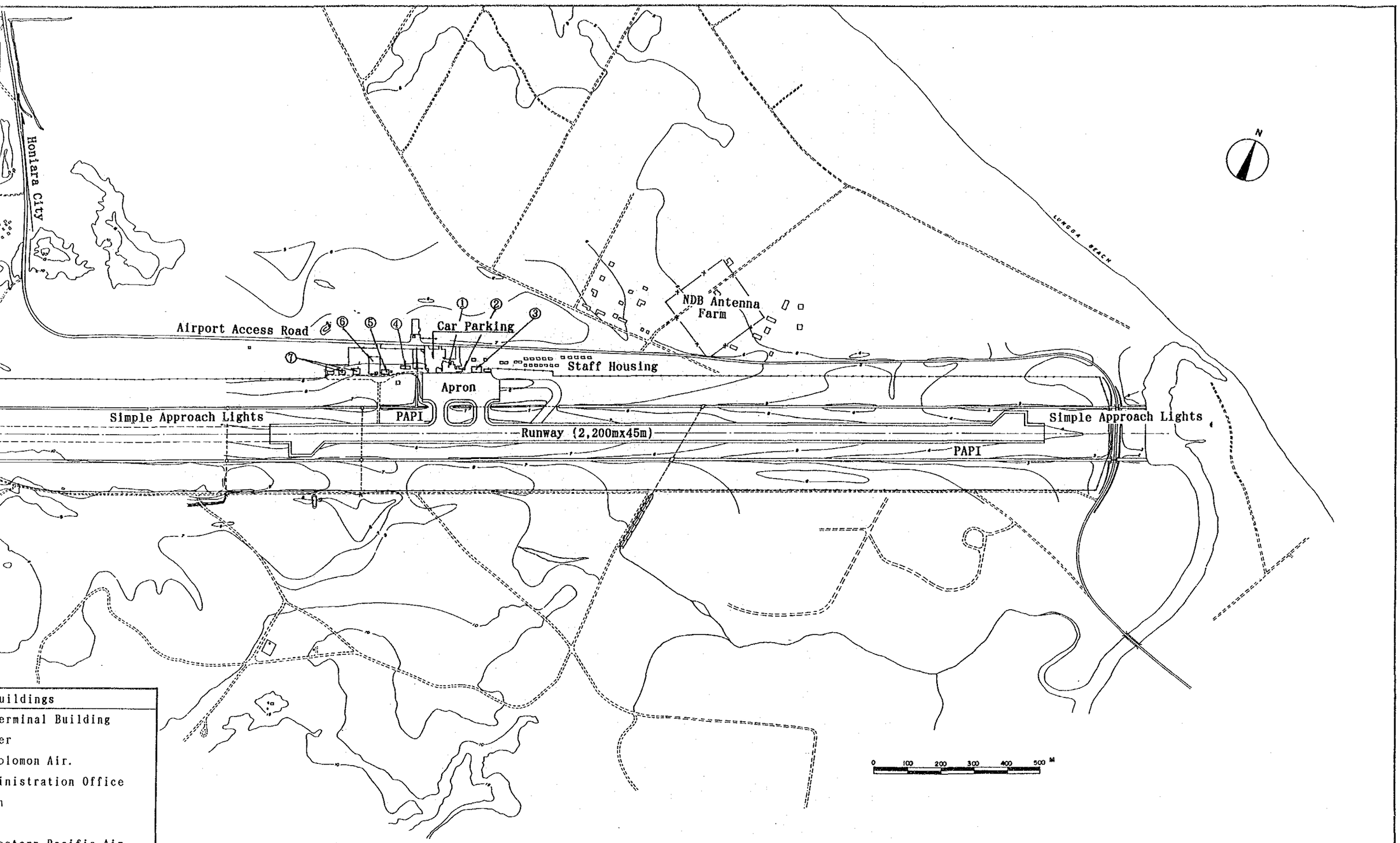


Figure 1 **Layout Plan of Existing Henderson International Airport**

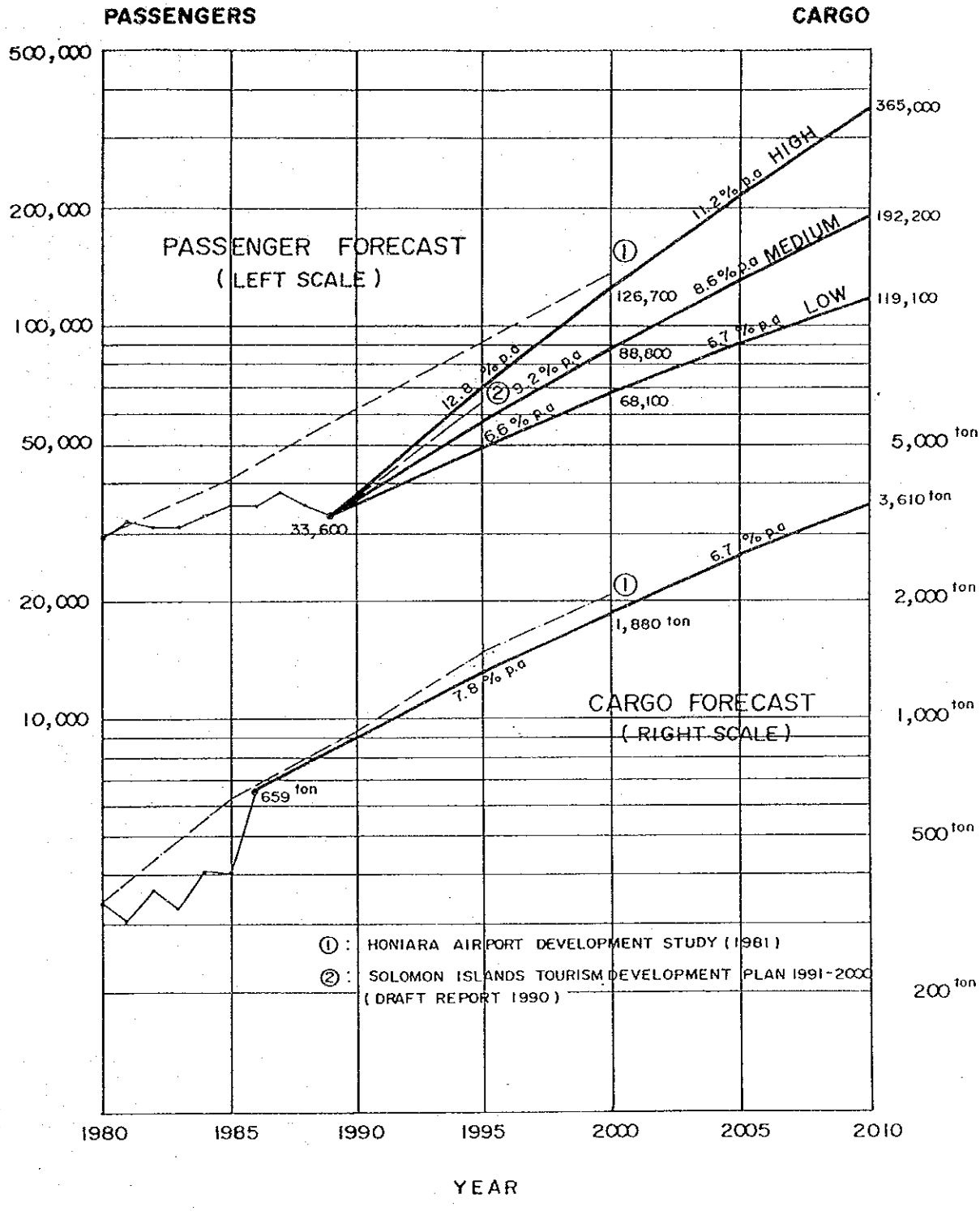


Figure 2 International Passenger and Cargo Forecasts

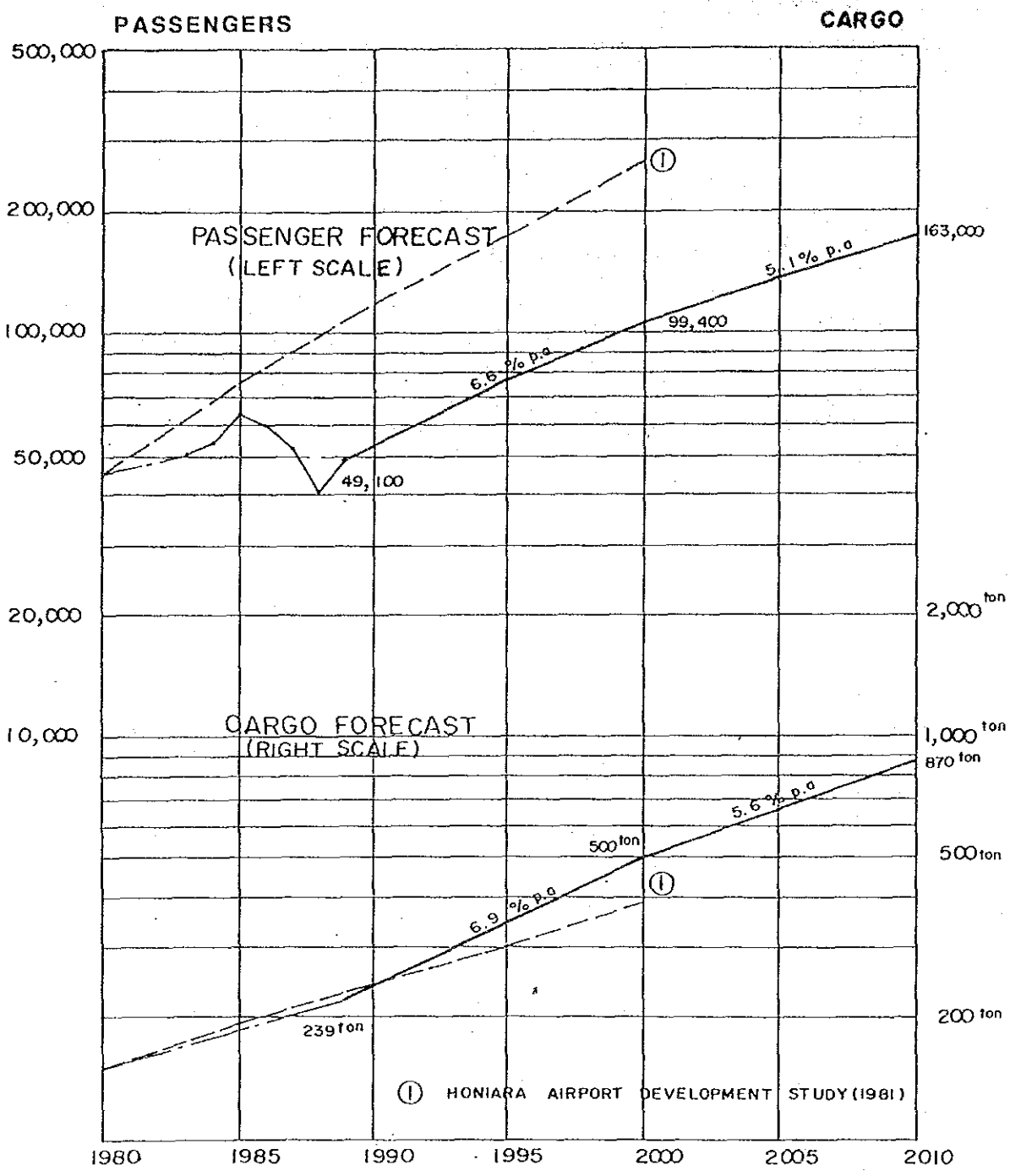


Figure 3 Domestic Passenger and Cargo Forecasts

Table 1 Summary of Air Traffic Demand Forecasts

	Unit	Present Condition (as of 1990)	Year 1995	Year 2000	Year 2005	Year 2010
1. Annual Passengers						
- International	no.	33,600 (1989)	58,300	88,800	131,700	192,200
- Domestic	no.	49,100 (1989)	74,000	99,400	128,800	163,200
- Total	no.	82,700	132,300	188,200	260,500	355,400
2. Annual Cargo						
- International	ton	659 (1986)	1,200	1,700	2,400	3,300
- Domestic	ton	239 (1989)	390	500	630	870
- Total	ton	898	1,590	2,200	3,030	4,170
3. Annual Aircraft Movements						
- International	no.	940 (1989)	1,150	1,350	1,750	2,000
B767			100	200	500	1,150
B737			1,050	1,150	1,250	850
- Domestic	no.	6,440 (1989)	10,500	13,500	17,000	23,500
DHC-6			2,600	4,100	5,900	9,500
BNI			7,900	9,400	11,100	14,000
- Total	no.	7,129	11,650	14,850	18,750	25,500
4. Typical Week Passengers						
- International	no.	780	1,310	2,000	2,970	4,320
- Domestic	no.	1,250	1,860	2,500	3,250	4,110
- Total	no.	2,030	3,170	4,500	6,220	8,430
5. Typical Week Aircraft Movements						
- International	no.	20	22	26	34	38
B767 class	no.	-	2	4	10	22
B737 class	no.	20	20	22	24	16
- Domestic	no.	126	202	260	326	452
DHC-6	no.	22	50	78	114	182
BNI	no.	104	152	182	212	270
- Total	no.	146	224	286	360	490
6. Peak Hour Passengers (both-way)						
- International	no.	140	360	360	440	520
- Domestic	no.	60	58	80	102	146
7. Peak Hour Aircraft Movements (both-way)						
- International	no.	2	4	4	4	4
B767	no.	-	-	-	1	2
B737	no.	2	4	4	3	2
- Domestic	no.	7	6	8	10	14
DHC-6	no.	2	2	3	4	6
BNI	no.	5	4	5	6	8
8. Peak Hour Passengers (one-way)						
- International	no.	70	180	180	260	260
- Domestic	no.	32	29	44	51	73
9. Peak Hour Aircraft Movements (one-way)						
- International	no.	1	2	2	2	2
B767	no.	-	-	-	1	1
B737	no.	1	2	2	1	1
- Domestic	no.	-	3	4	5	7
DHC-6	no.	1	1	2	2	3
BNI	no.	3	2	2	3	4

2.3 Airport Facility Requirements

Airport facility requirements are estimated based on the air traffic demand forecasts as shown in Table 2. These requirements comply with standards and recommended practices of the International Civil Aviation Organization (ICAO), the International Air Transport Association (IATA) and the Japan Civil Aviation Bureau (JCAB).

2.4 Evaluation of the Existing Airport Facilities and Problem Areas

The existing conditions, including capacity, of facilities at Henderson International Airport are evaluated against future facility requirements to identify the problem areas of the airport. The results of the evaluation are summarized in Figure 4.

Major problem areas of the existing Henderson International Airport are identified as follows:

1) The strength of the existing runway presently suitable for the Boeing 737 (B737) aircraft is not sufficient to accommodate the larger Boeing 767 (B767) which is expected at Henderson International Airport before 1995.

2) The handling capacity of the existing passenger terminal building is too small to cater to the passengers of a single B737 movement, and even now, results in heavily congested peak hours. Therefore, the expansion of the terminal building is necessary.

   However, since the existing terminal area, including the apron, passenger terminal building and car parking, infringes the obstacle limitation surface for aircraft operations, it will be difficult to expand the terminal facilities to cope with future air traffic demands at their present locations. Thus, the construction of a new terminal area will be required.

3) The aircraft approach procedures with a non-directional radio beacon (NDB), a VHF omni-directional radio range (VOR) and a distance measuring equipment (DME) presently applied at Henderson International Airport are recommended to be upgraded to the precision approach procedure with an instrument landing system (ILS). The precision approach procedure is a standard requirement for safe operations of aircraft.

Table 2 Summary of Airport Facility Requirements

Items	Unit	Present Condition (as of 1990)	Year 1995	Year 2000	Year 2005	Year 2010
1. Annual Passengers						
- International	no.	33,600 (1989)	58,300	88,800	131,700	192,200
- Domestic	no.	49,100 (1989)	74,000	99,400	128,800	163,200
- Total	no.	82,700	132,300	188,200	260,500	355,400
2. Annual Cargo						
- International	ton	659 (1986)	1,200	1,700	2,400	3,300
- Domestic	ton	239 (1989)	390	500	630	870
- Total	ton	898	1,590	2,200	3,030	4,170
3. Annual Aircraft Movements						
- International	no.	940 (1989)	1,150	1,350	1,750	2,000
- Domestic	no.	6,440 (1989)	10,500	13,500	17,000	23,500
- Total	no.	7,380	11,650	14,850	18,750	25,500
4. Peak Hour Passengers						
- International	no.	140	360	360	440	520
- Domestic	no.	60	58	80	102	146
- Overall	no.	180	389	404	491	564
5. Peak Hour Aircraft Movements						
- International	no.	2	4	4	4	4
- Domestic	no.	7	3	4	5	7
- Overall	no.	6	7	8	9	11
6. Maximum Aircraft in Operation		B737	B767	B767	B747	B747
7. Reference Code		4C	4D	4D	4E	4E
8. Runway						
- Length	m	2,200	2,200	2,200	2,500	2,500
- Width	m	45	45	45	45	45
9. Runway Strip						
- Length	m	2,320	2,320	2,320	2,620	2,620
- Width	m	150	150	150	300	300
10. Taxiway						
- System		Right Angle Taxiways	R-Angle Taxiways	R-Angle Taxiways	R-Angle Taxiways	R-Angle Taxiways
- Width	m	23	30	30	30	30
11. Apron						
- Aircraft Stands	no.	B737 : 3 or B737 : 1 DHC-6: 1 BNI : 4 PA-23: 1 Total: 7	B767 : 2 DHC-6: 2 BNI : 3 Total: 7	B767 : 2 DHC-6: 2 BNI : 4 Total: 8	B767 : 2 B737 : 1 DHC-6: 3 BNI : 4 Total:10	B767 : 2 B737 : 1 DHC-6: 4 BNI : 4 Total:11
12. Passenger Terminal Building						
- International	sq.m	742	2,900	2,900	4,000	4,000
- Domestic	sq.m	108	300	400	500	700
- Total	sq.m	850	3,200	3,300	4,500	4,700
13. VIP Building	sq.m	103	120	120	120	120
14. Cargo Terminal Building	sq.m	NIL	400	600	800	1,100
15. Administration and Operations Building	sq.m	Adm. : 284 Ops. : 150 Total: 434	600	600	600	600
16. Access Road		One lane per direction	One lane per direc.	One lane per direc.	One lane per direc.	One lane per direc.
17. Car Parking						
- Parking Lots	no.	70	225	235	285	325
- Area	sq.m	2,300	7,900	8,200	10,000	11,400
18. Passenger Building Curb	m	28	90	95	115	130
19. Air Navigation Systems		Non-Precision (VOR/DME,NDB)	Precision (ILS,VOR/ DME,NDB)	Precision (ILS,VOR/ DME,NDB)	Precision (MLS,VOR/ DME,NDB)	Precision (MLS,VOR/ DME,NDB)
20. Public Utilities						
- Power Supply	KVA	300	390	400	430	480
- Water Supply	L/day	-	90,000	100,000	120,000	140,000
- Sewage Disposal	L/day	-	90,000	100,000	120,000	140,000
- Solid Waste Disposal	kg/day	-	230	250	290	350
21. Rescue and Fire Fighting						
- Level of Protection		Category-4	Category-6	Category-6	Category-8	Category-8
- Fire Vehicles	no.	2	3	3	3	3
- Fire Station	sq.m	280	450	450	450	450
22. Fuel Supply Facility						
- Jet A1 Tank Capacity	KL	62	140	170	240	320
- Avgas Tank Capacity	KL	25	70	80	110	150
- Fuel Farm	sq.m	1,600	3,150	3,150	3,950	3,950

Figure 4 Summary of Evaluation for Existing Airport Facilities

No.	Facilities		Year 1990 1995 2000 2005 2010	Remarks
1	Runway	* Number	———	- A single runway can handle aircraft movements up to 2010.
		* Length	———	- A 2,500m long runway will be required to introduce B747 charter flights.
		* Width	———	- A 45m wide runway is adequate for aircraft up to B747.
2	Runway Strip	* Length	———	- The length of the strip should be extended when the runway is extended.
		* Width	———	- A 300m wide strip is recommended in a long term.
3	Obstacle Limitation Surfaces	- Approach Surface	———	- First section of approach surfaces are free from obstacles if some trees are felled.
		- Transitional Surface	———	- Transitional surfaces are free from obstacles until the runway strip is widened to 300m.
4	Taxiway	* System	———	- No parallel taxiway is required for aircraft movements up to 2010.
5	Apron	* Aircraft	x	- There is no space to accommodate additional aircraft while maintaining appropriate clearance between aircraft for self maneuvering.
6	Airfield Pavement	* Strength	———	- The strengthening of the existing pavement is required for operations of B767s.
7	Passenger Terminal Building	- International	x	- Passenger terminal building is too small to handle present peak hour passengers.
		- Domestic	x	
8	Cargo Terminal Building		x	- No cargo terminal building is available at the airport.
9	Administration and Operations Building		x	- Operations office is too small for present activities.
10	Access Road		———	- One-lane two-way access road is sufficient for vehicular traffic up to 2010.
11	Car Parking		x	- Existing car parking overflows during peak hours.
12	Air Navigation Systems	- VOR/DME	———	- VOR/DME will reach their operational life around 2000.
		- NDB	———	- NDB will reach its operational life around 1995.
		- ATC & COM	———	- ATC & COM equipment will reach their operational life around 2000.
		- AGL	———	- AGLs will reach their operational life around 2005.
		- MET	———	- MET equipment will reach their operational life around 2000.
		- Emergency Generator	———	- Emergency generator will reach its operational life around 2000.
13	Rescue and Fire Fighting		———	- Level of protection should be upgraded to Category-6 when B767 is introduced.
14	Airport Utilities	- Power Supply	———	- The capacity of the transformer should be increased when a new terminal is constructed.
		- Water Supply	———	- The capacity of the water main from the town is sufficient for the future demand.
		- Sewage Disposal	x	- Existing septic tanks cause a continuous blockage during heavy rain.
		- Solid Waste Disposal	x	- No incinerator is available at the airport.
15	Aviation Fuel Supply		x	- Storage capacity of the fuel tanks is far below standard requirements.

Note: "x" indicates facility reached its capacity or is not available.

3. AIRPORT MASTER PLAN AND SCOPE OF THE SHORT-TERM DEVELOPMENT PROJECT

3. Airport Master Plan and Scope of the Short-Term Development Project

3.1 Phases of the Airport Development

The development of Henderson International Airport is planned to be implemented in two phases for cost-effective development. The phases of the airport development are set forth as follows:

Short-Term Development Plan:	Design Target Year 2000
Long-Term Development Plan:	Design Target Year 2010

3.2 Development Policy

The development policy for the airport master plan was established based on the air traffic demand forecasts, evaluation of existing airport facilities and target years of the phased airport development, and through the discussion with the CAD, as summarized below:

1) Runway and Runway strip

   a) The existing runway will be utilized continuously in the long-term with structural modifications as required;

   b) The existing 150m wide runway strip will be maintained for the short-term development; however, it will be widened to 300m to meet ICAO recommendation for a precision approach runway in the long-term development;

   c) A new passenger terminal with its apron and car parking will be constructed at the location to satisfy a 300m wide runway strip;

2) Terminal Area Development

   a) International and domestic passenger handling will be collocated in a new terminal building to avoid operational inconveniences to be caused by separately located passenger terminals;

b) To minimize the initial investment, the existing passenger terminal building will be utilized as a cargo terminal facility and CAD offices for the short-term development; and for the same reason, other existing facilities, such as the control tower, will be utilized as much as practical for the short-term development.

3) Air Navigation System

a) An ILS will be installed in the short-term development. It will be replaced by a microwave landing system (MLS) in the long-term development in accordance with the ICAO transitional plan.

3.3 Airport Master Plan

The airport master plan for Henderson International Airport is produced through an extensive alternative study. The layout plan indicating the phased development of the airport up to 2010 is shown in Figure 5.

The outline of the master plan is as follows:

[Short-Term Development Plan (Target Year 2000)]

1) The pavement overlay of the existing 2,200m long runway for the accommodation of B767;

2) The construction of the new terminal facilities, including a passenger terminal building, apron and taxiway, roads and car parking, etc;

3) The continuous utilization of the existing terminal facilities for small aircraft parking, cargo handling facility and airport operations and administration offices; and

4) The provision of an ILS and precision approach lighting system (ALS) for runway 24, and the replacement of the existing NDB.

	BUILDINGS
①	PASSENGER TERMINAL BUIL
②	CARGO TERMINAL BUILDING
③	ADMINISTRATION AND OPERA
④	CONTROL TOWER
⑤	FIRE STATION
⑥	POWER HOUSE
⑦	CAR PARKING
⑧	FUEL FARM
⑨	INCINERATOR
⑩	MAINTENANCE APRON
⑪	MAINTENANCE HANGAR
⑫	AIRLINE OFFICE AND CAR P.

PROPOSED INDUSTRIAL ESTATE

LUNGGA RIVER

TERMINAL APRON

RESIDENTIAL AREA

RUNWAY 12,200m x 45m

PR
LIG

ILS LOCALIZER

GP/DME

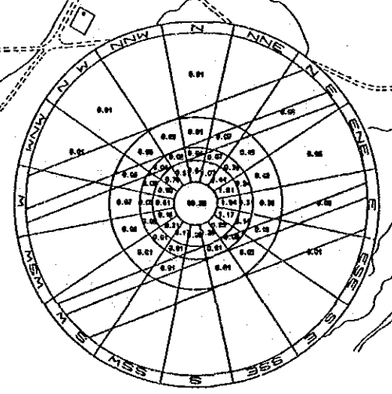
OVERRUN 60m

RUNWAY EXTENSION 300m

RELOCATION OF DVOR/DME

S
O

LEGEND	
SHORT-TERM DEVELOPMENT	
CONSTRUCTION OF NEW FACILITIES	
UTILIZATION/IMPROVEMENT OF EXISTING FACILITIES	
LONG-TERM DEVELOPMENT	
FUTURE PROVISION	



SOURCE	: SOLOMON ISLANDS METEOROLOGICAL SERVICE OFFICE
LOCATION	: HENDERSON AIRPORT
PERIOD	: 1975~1986
RUNWAY ORIENTATION	: N68° E
WIND COVERAGE	: 99.40% (CROSS WIND 10kt)
	99.73% (CROSS WIND 13kt)
	99.97% (CROSS WIND 20kt)

0 100 200 300 400 500 M

ALL WEATHER WIND COVERAGE

Fi

BUILDINGS	
①	PASSENGER TERMINAL BUILDING
②	CARGO TERMINAL BUILDING
③	ADMINISTRATION AND OPERATIONS BUILDING
④	CONTROL TOWER
⑤	FIRE STATION
⑥	POWER HOUSE
⑦	CAR PARKING
⑧	FUEL FARM
⑨	INCINERATOR
⑩	MAINTENANCE APRON
⑪	MAINTENANCE HANGAR
⑫	AIRLINE OFFICE AND CAR PARKING

ROPOSED INDUSTRIAL STATE

TERMINAL APRON

RESIDENTIAL AREA

RUNWAY 12,200m x 45m

PRECISION CAT-I APPROACH LIGHTING SYSTEM L=900m

GP/DME

ZER

RUNWAY OVERRUN EXTENSION 60m 300m

RELOCATION OF DVOR/DME

SITE PREPARATION FOR INSTALLATION OF ILS GLIDE PATH

ALL WEATHER WIND COVERAGE

SOURCE	: SOLOMON ISLANDS METEOROLOGICAL SERVICE OFFICE
LOCATION	: HENDERSON AIRPORT
PERIOD	: 1975~1988
RUNWAY ORIENTATION	: N68° E
WIND COVERAGE	: 99.40% (CROSS WIND 10kt)
	99.73% (CROSS WIND 13kt)
	99.97% (CROSS WIND 20kt)

0 100 200 300 400 500 M

Figure 5 Airport Layout Plan

[Long-Term Development Plan (Target Year 2010)]

1) The runway extension to 2,500m for the accomodation of Boeing 747;

2) The expansion of the passenger terminal building, apron and car parking to cope with demand increase;

3) Transfer of the cargo handling facility, control tower and airport operations and administration offices to the new terminal area, and abolition of the existing terminal facilities; and

4) The construction of aircraft maintenance facilities.

In this master plan, runway usage pattern for jet aircraft is decided to mainly be landing and takeoff from/to the east, i.e., over the sea, for the following reasons:

1) High usability of the ILS is expected, particularly, during poor weather conditions in the vicinities of the mountain, since the aircraft will not be affected by low ceiling height and wake turbulences which prevail in the runway 06 approach area;

2) Airspace is almost free of obstacles; and

3) Head-on operations of jet aircraft over the sea will minimize the aircraft noise influence on Mbetikama Village.

The best location for the new terminal area is determined to be on the west side of the existing passenger terminal building because of the following reasons:

1) It provides the terminal facilities with sufficient expandability and flexibility to cope with the future demand change;

2) The closely located existing and new terminal facilities will reduce operational inconveniences to be caused by separately located terminal facilities;

3) The construction cost of the short-term development is lower than other alternatives.

4) By avoiding disruption on AVIS facilities, it can be free from relocation problems, such as compensation expenses or construction delay due to negotiations, at least during the short-term development stage; and

5) It offers a possibility to utilize the structure of the AVIS maintenance garage to house the flight kitchen facility;

The layout plan of the new terminal area is shown in Figure 6.

3.4 Scope of the Short-Term Development Project

The scope of the Short-Term Development Project is identified in Table 3. In this table the first priority (Priority I) is given to the strengthening of the runway pavement and construction of a new terminal area, while the second priority (Priority I) is for the provision of the ILS.

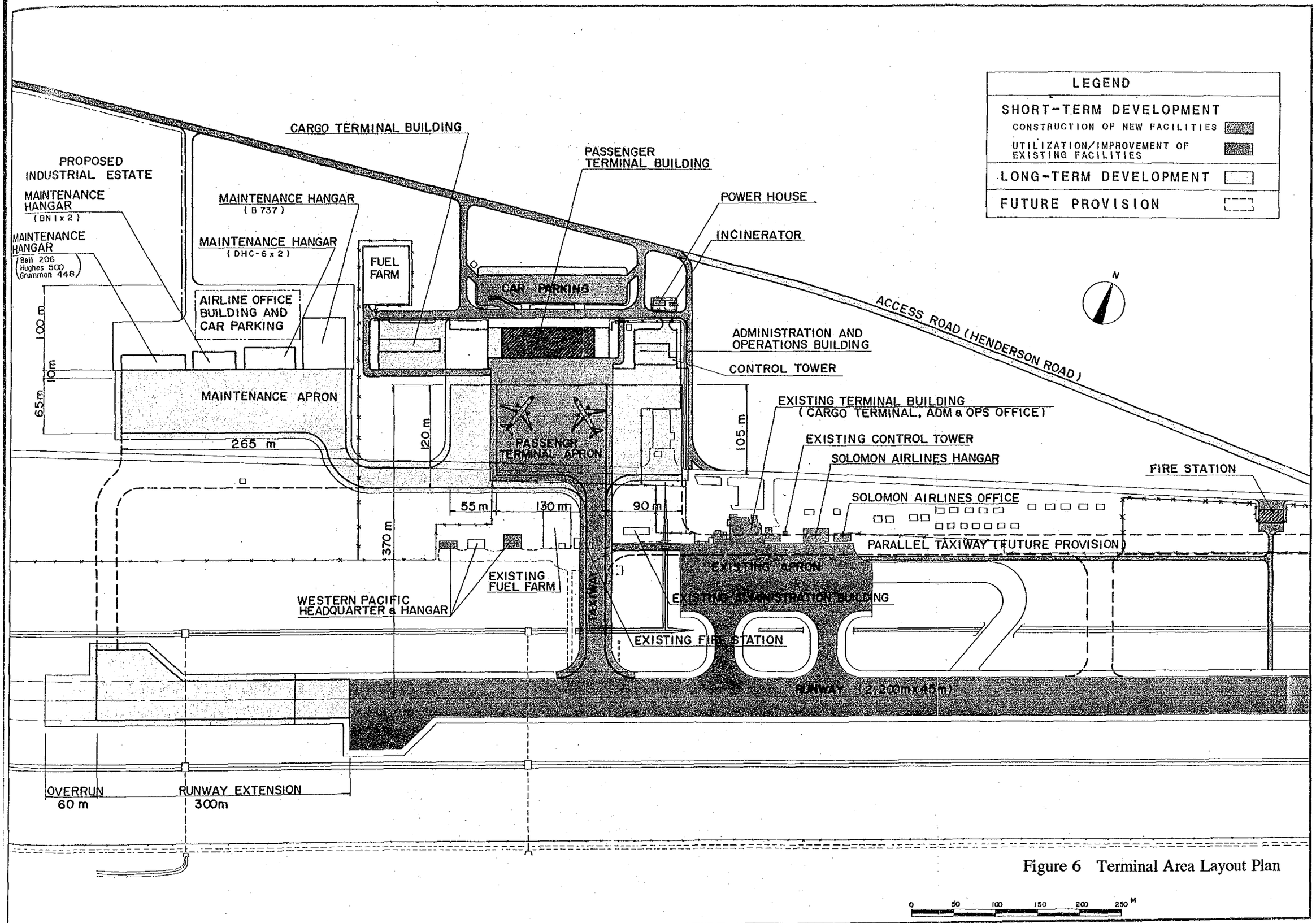


Figure 6 Terminal Area Layout Plan

Table 3 Scope of the Short-Term Development Project

Priority I Work

A. Civil Works

1) Overlay of existing runway (minimum thickness 19 cm)
2) A new terminal apron (130m x 105m for 2 B767s)
3) A new right-angle exit taxiway (222.5m x 23m)
4) A GSE road
5) Realignment of Henderson Road
6) Terminal roads and other roads
7) New car parking (225 cars)
8) Improvement and extension of drainage facilities
9) Boundary and security fences

B. Architectural Works

1) A new passenger terminal building (4,000 sq·m)
2) Remodeling of existing passenger terminal building (950 sq·m)
3) A new fire station (450 sq·m)
4) A new power house

C. Air Navigation System

1) Taxiway edge lights
2) Apron floodlights

D. Airport Utilities

1) Power supply system
2) Water supply system
3) Sewage disposal system with septic tanks
4) Telephone system

Priority II Work

C. Air Navigation System

1) Category-I Instrument Landing System (ILS)
2) Renewal of existing NDB transmitter and antenna
3) Category-I Approach Landing System (ALS)

D. Airport Utilities

1) An incinerator

4. FEASIBILITY STUDY ON THE SHORT-TERM DEVELOPMENT PROJECT

4. Feasibility Study on the Short-Term Development Project

4.1 Preliminary Design

The preliminary design for the facilities to be constructed in the short-term development project is carried out.

An outline of the runway overlay work, grading of the new terminal area, storm water drainage, pavement structures of the taxiway, apron, etc., new passenger terminal building, remodelling of existing terminal building, new fire station, air navigation systems and airport utilities is specified by the preliminary design.

No technical difficulty is expected in constructing the planned facilities.

4.2 Airspace Use Plan

Aircraft operations procedures required after the completion of the short-term development project are established. It is expected that the introduction of instrument approach procedures and standard instrument departures will greatly improve the safety of aircraft operations.

4.3 Airport Management Study

The existing airport is, in general, operated and maintained properly within the present budget allowance. However, the existing CAD is not well organized to take positive action for providing better service. An organizational reform to create a new authority named Civil Aviation Cooperation is proposed by the CAD. This new organization is evaluated in the Study to adequately reinforce the finance and administration function, and the management and technical services which are weak points of the existing organization.

The airport facilities to be completed by the short-term development project will be more properly operated and maintained by the CAD after organizational reform.

4.4 Aircraft Noise Analysis

Aircraft noise influence on the surrounding community has forecasted by computer simulation. As a result, it is estimated that the aircraft noise influence on the surrounding community will decrease due to the introduction of new low-noise type of aircraft, and will be within the acceptable level even in the Mbetikama Village which is located under the runway 06 approach path.

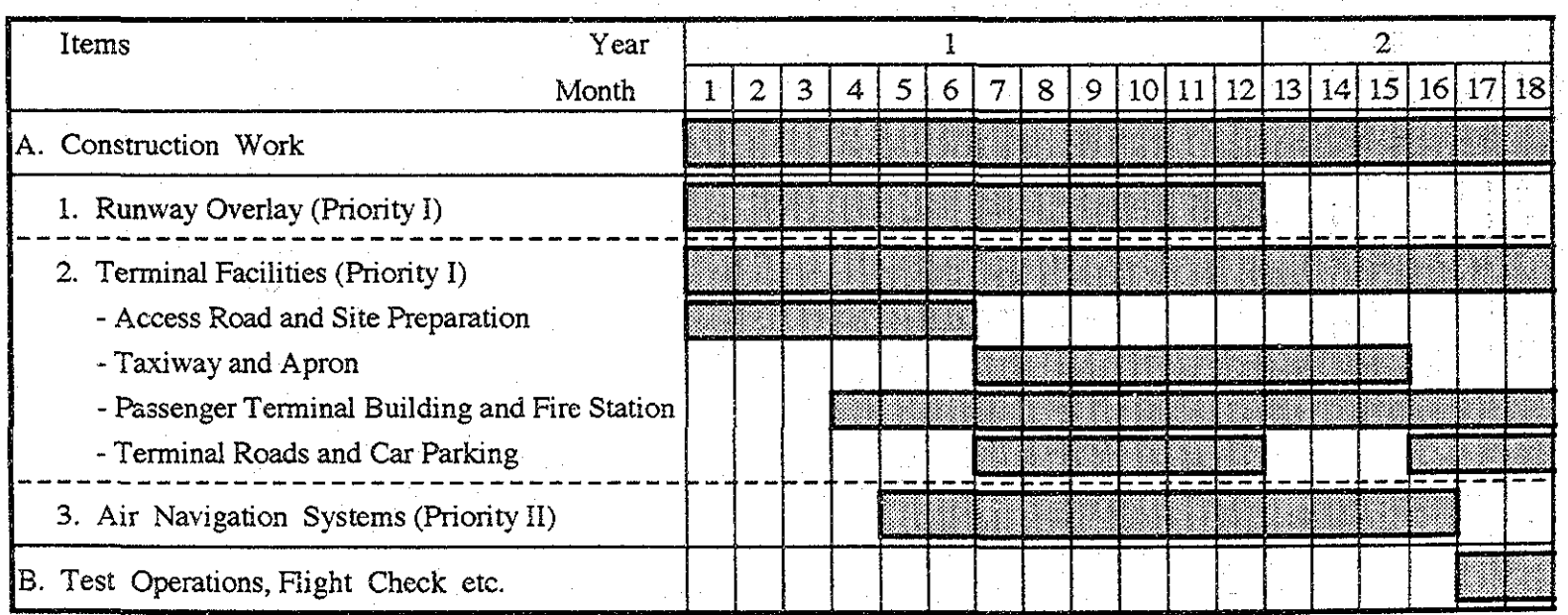
Other environmental impacts caused by the airport development will be minimal since the land use around the airport is mainly for agriculture of low intensity.

4.5 Project Implementation Schedule and Cost Estimates

The next stage of the project implementation to this Study is the financial arrangement for the project. The detailed design, preparation of tender documents, tender and contracting will follow the financial arrangement prior to the commencement of the construction work. The construction schedule for the short-term development project is estimated as shown in Figure 7. The construction work will take approximately 18 months to complete.

The cost of the short-term development project is shown in Table 4. The total cost of the project is estimated to be US$22.0 million (SI$61.7 million). The Priority I works and Priority II works will cost US$17.9 million (SI$50.0 million) and US$4.2 million (SI$11.6 million) respectively.

Figure 7 Construction Schedule



Note: The construction of air navigation systems will require 12 months including 9 months for fabrication, 1 month for transportation and 2 months for installation. This schedule is produced assuming that both Priority I and II work items will be constructed simultaneously. However, the implementation of Priority II work items may be postponed depending on the available budget to the Government of Solomon Islands.

Table 4 Cost Estimates for the Short-Term Development Project

Category	Work Items	Price in US$ (Thousand US$)	Price in SI$ (for reference) (Thousand SI$)
Priority I	1. Runway Overlay	5,660	15,860
	2. Terminal Facilities	9,880	27,640
	Access Road	350	980
	Site Preparation	530	1,480
	Drainage	220	620
	Taxiway and Shoulders	550	1,540
	Apron and Shoulders	1,130	3,160
	Taxiway and Apron Lighting	160	460
	Passenger Terminal Building	5,790	16,200
	Remodeling of Existing Terminal Building	210	580
	Fire Station	250	700
	Power House and Power Supply System	290	800
	Terminal Road and Car Parking	240	660
	Car Parking Lighting	60	180
	Fencing	100	280
	Total Construction Cost	15,540	43,500
	Engineering Services	2,330	6,530
	Subtotal	17,870	50,030
Priority II	1. Air Navigation Systems	3,760	10,540
	ILS	2,310	6,460
	NDB	170	480
	ALS	1,290	3,600
	2. Incinerator	10	20
	Total Construction Cost	3,780	10,560
	Engineering Services	380	1,060
	Subtotal	4,160	11,620
Total Project Cost		22,030	61,650

Note: Exchange rates US$1.00=Japanese Yen 140=SI$2.80

4.6 Economic and Financial Analyses

The economic analysis is carried out to judge whether the short-term development project of Henderson International Airport is feasible or not from the viewpoint of national economy.

The tangible benefits to be generated by the project include the following:

1) Time saving benefits by congestion eradication;

2) Benefit from increase of airport revenues;

3) Benefit from increase of receipt of import duty and/or tax; and

4) Benefits accompanied by foreign visitors' expenses.

Construction cost and additional operations and maintenance costs are required to generate the above-mentioned benefits.

The benefits and cost are compared using evaluation indicators such as the economic internal rate of return (EIRR), net present value (NPV) and benefit cost ratio (B/C). They are shown in Table 5.

Table 5. Evaluation Indicators for Economic Analysis

Items	Simultaneous Constriction of All Work Items	Five Year Postponement of Priority II Work Items
EIRR	12.1 %	13.5 %
B/C Ratio*	1.16	1.26
NPV (Thousand SI$)	8,943	12,943

Note: At discount rate of 10%*

The results of the economic analysis show that the short-term development project of Henderson International Airport is feasible from the national economic viewpoint since the EIRRs are greater than the opportunity cost of capital of 10% which is usually used as a criterion for economically viable projects by the World Bank and the Asian Development Bank.

In addition to the above favorable results, the implementation of the project will have a positive impact on the socio-economy of the Solomon Islands by:

1) Providing an indispensable and safe means of transportation for the archipelago state;

2) Increasing trade and business opportunities,

3) Enhancing foreign investment;

4) Promoting tourism development;

5) Generating employment opportunities; and

6) Securing national integration.

This eventually will increase the national income and enhance income distribution.

The financial analysis is carried out to examine the financial impact of the short-term development project on the planned Civil Aviation Corporation. As a result of the analysis, the following conclusions are obtained:

1) It will be difficult to recover the investment cost of the short-term development plan from the airport's operating revenues.

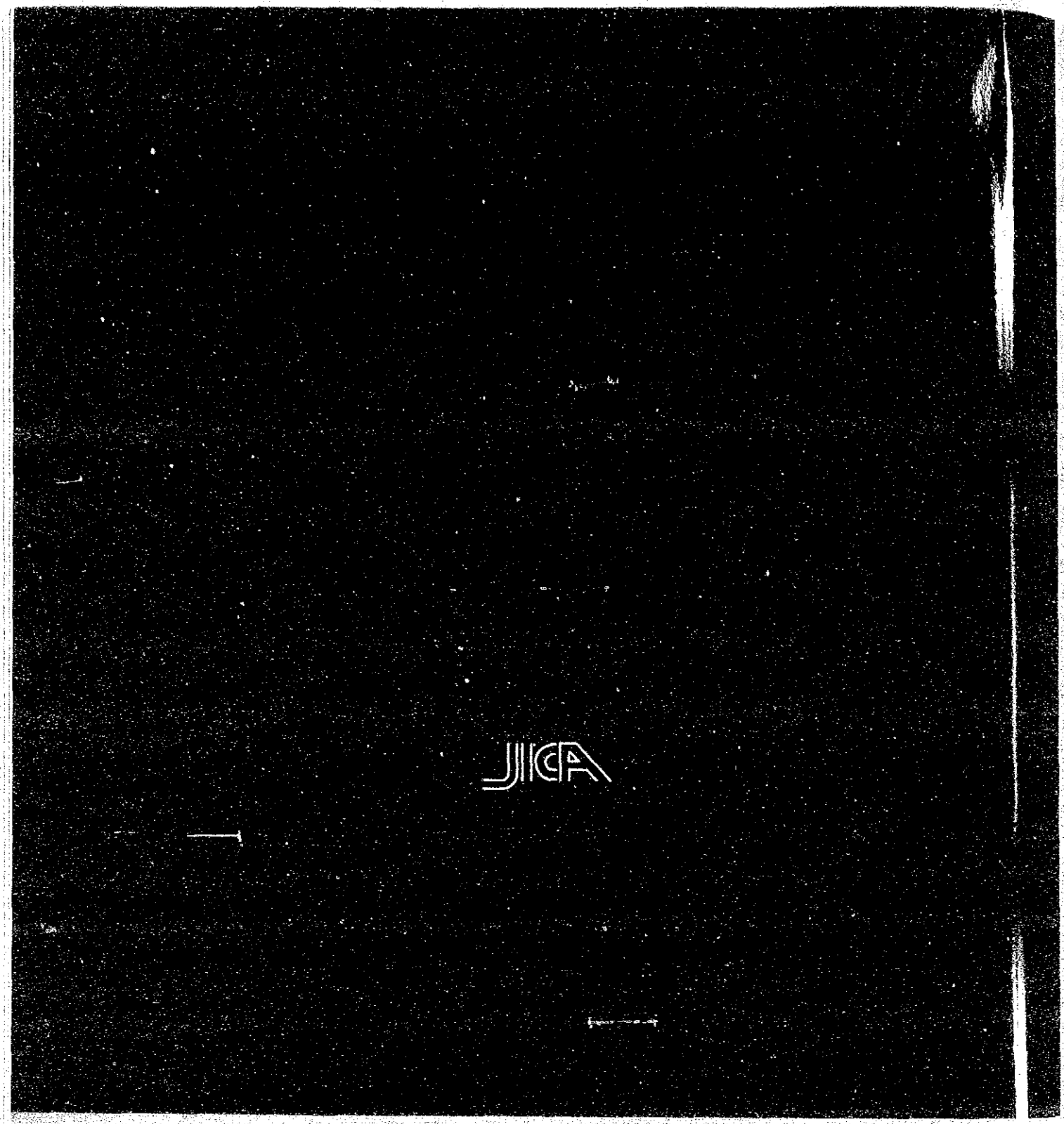
2) However, if the investment cost is not considered, the implementation of the short-term development plan will increase the airport revenues and improve the balance of the airport finance. The planned Civil Aviation Corporation can sustain the airport operations and maintenance by its operating revenues with minimum initial support from the Government.

5. CONCLUSION AND RECOMMENDATION

5. Conclusion and Recommendations

As an overall conclusion of the Study, the short-term development project of Henderson International Airport is feasible from technical, environmental, economic and financial aspects. It is recommended that the project be implemented as soon as possible.

The economic development through the enhancement of tourism as intended by the Government of Solomon Islands will effectively be achieved by the simultaneous progress in the airport development and tourism development since they are in an interdependent relationship. Therefore, the Government of Solomon Islands should make an overall effort to promote the tourism policy in developing tourism infrastructures, providing incentives to obtain foreign capital, undertaking promotion activities, developing human resources, preserving natural environment and eradicating malaria.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