

No. 1

BASIC DESIGN STUDY REPORT
ON
THE PROVINCIAL HOSPITALS REDEVELOPMENT
PROJECT-PHASE II
IN
PAPUA NEW GUINEA

JULY 1991

JAPAN INTERNATIONAL COOPERATION AGENCY

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BASIC DESIGN STUDY REPORT ON THE PROVINCIAL HOSPITALS REDEVELOPMENT
PROJECT-PHASE II IN PAPUA NEW GUINEA

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PREFACE

In response to a request from the Government of the Independent State of Papua New Guinea, the Government of Japan decided to conduct a basic design study on the Provincial Hospitals Redevelopment Project - Phase II and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Papua New Guinea a study team headed by Dr. Ken Okamoto, Director of the 2nd Tokyo National Hospital, from January 19 to February 27, 1991.

The team held discussions with the officials concerned of the Government of Papua New Guinea, and conducted a field study at study area. After the team returned to Japan, further studies were made. Then, a mission was sent to Papua New Guinea in order to discuss a draft report and the present report was prepared.

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

I wish to express my sincere appreciation to the officials concerned of the Government of the Independent State of Papua New Guinea for their close cooperation extended to the teams.

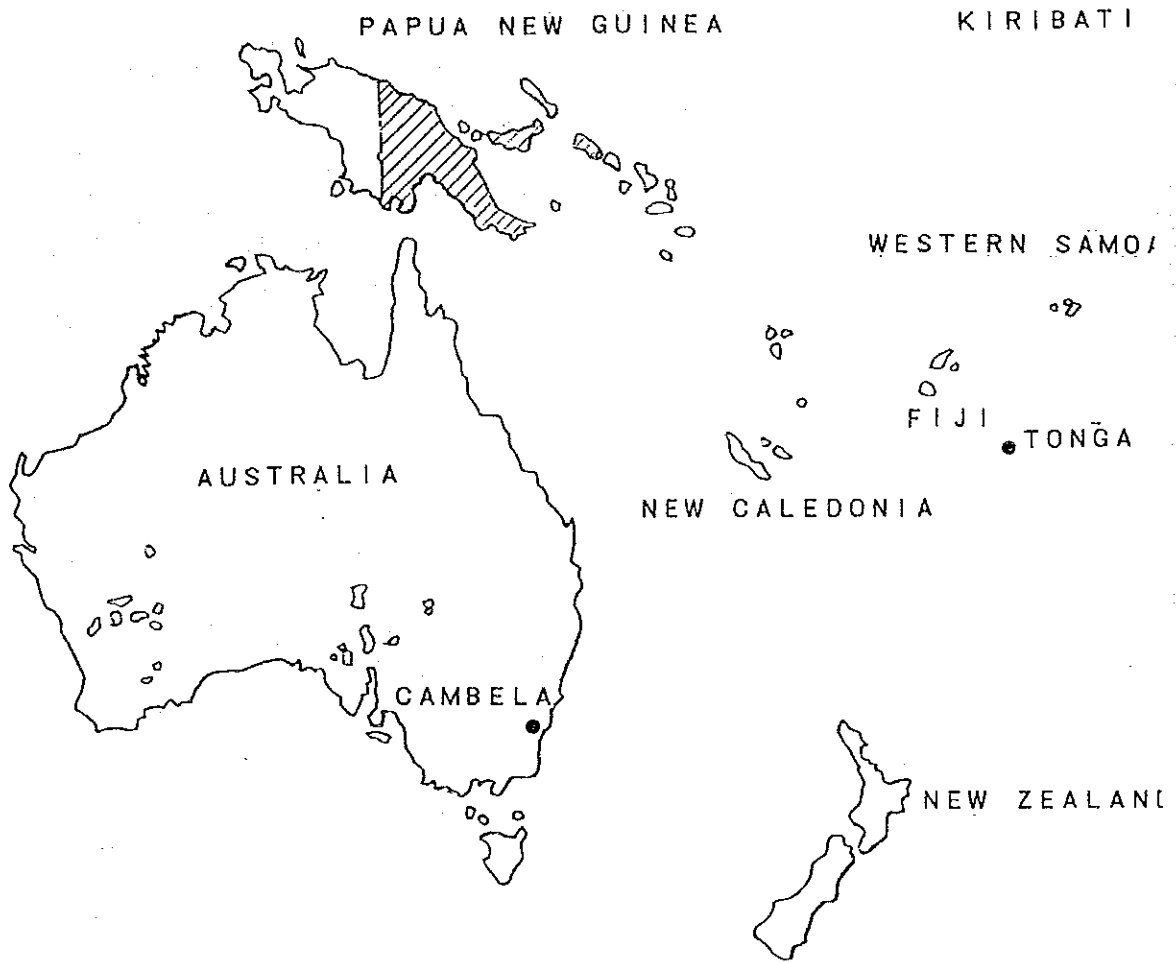
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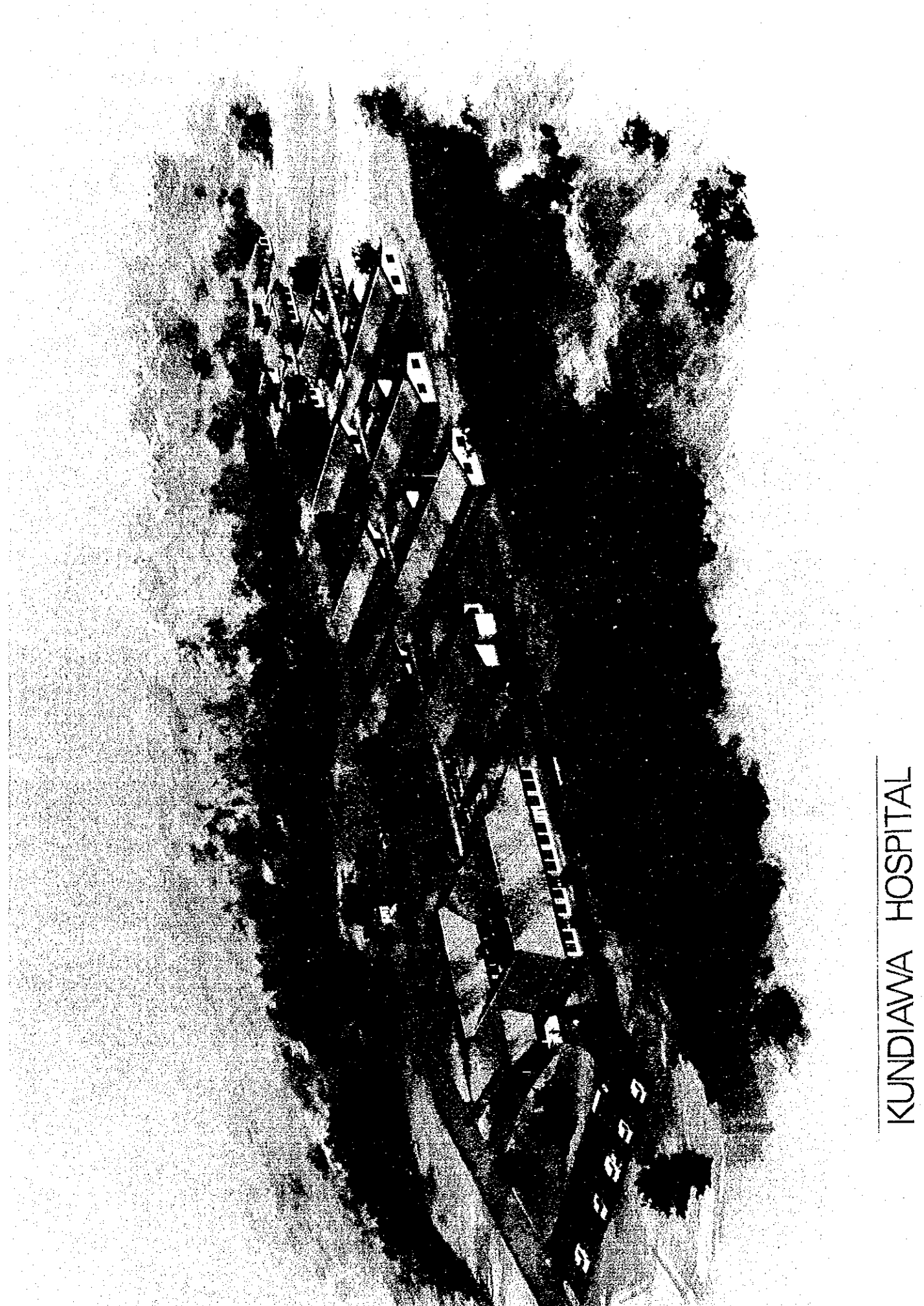
Kensuke Yanagiya

President

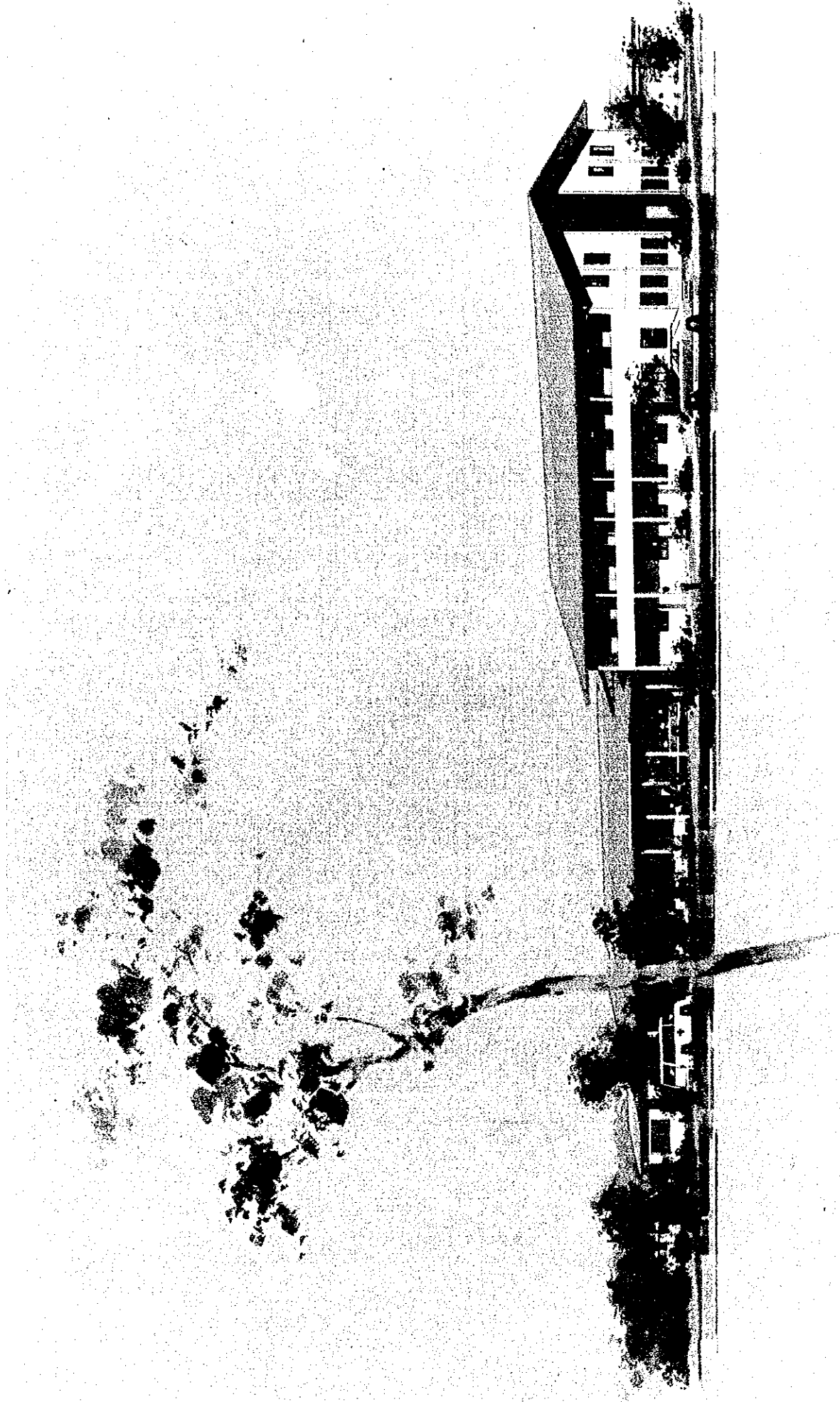
Japan International Cooperation Agency



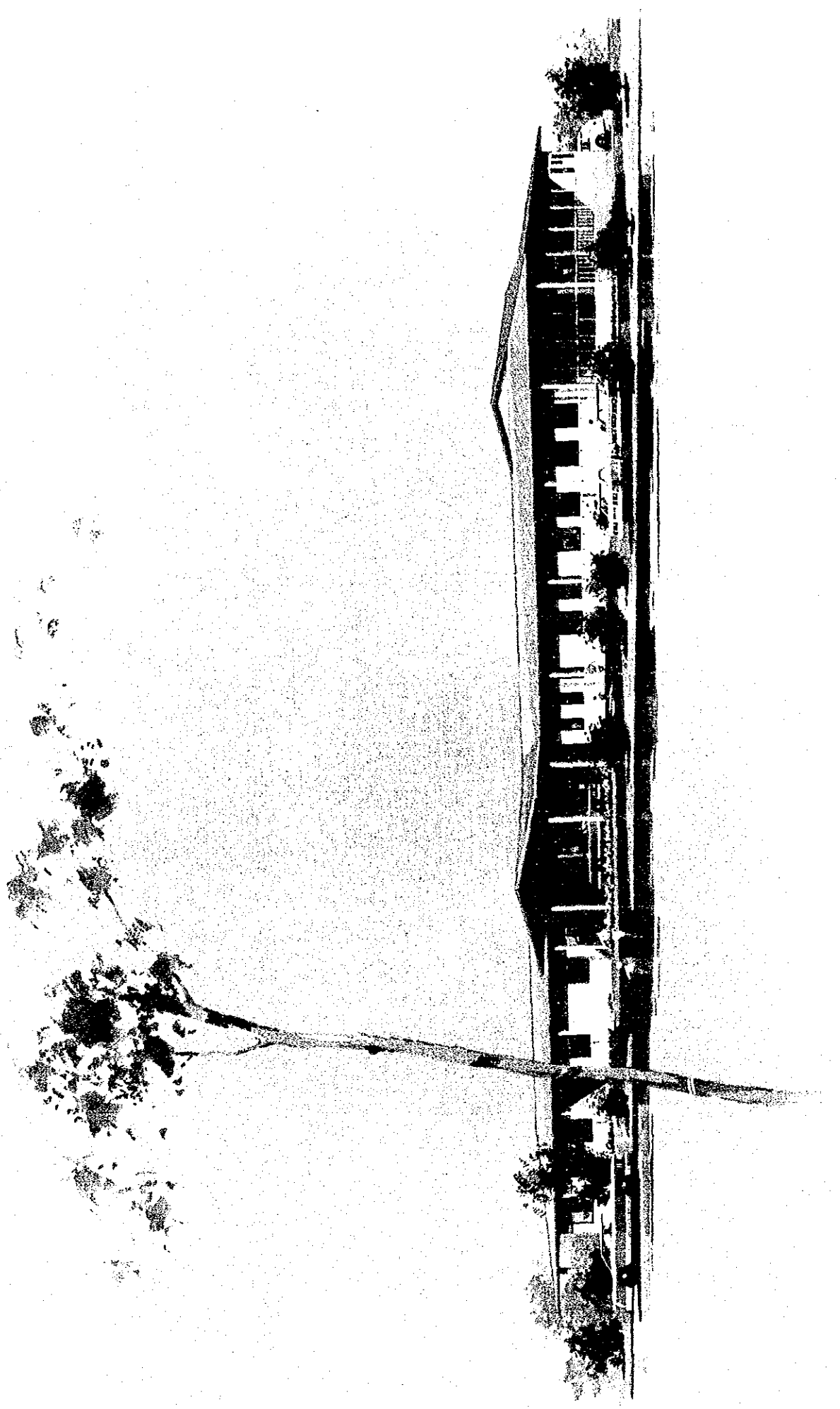
PAPUA NEW GUINEA



KUNDIAWA HOSPITAL



NONGA HOSPITAL



MADANG HOSPITAL

SUMMARY

Summary

The Independent State of Papua New Guinea occupies the eastern half of the island of New Guinea and also includes 600 large and small islands including New Britain, New Ireland, Bougainville, and Manus. The total land area is 460,000 km² and the population is estimated to be 3,800,000. It is a young country as it became an independent state in 1975 when it changed its status from being a trust territory of Australia.

Looking at the incidence of disease in Papua New Guinea, pneumonia, malaria, gastroenteritis, and skin disorders are the most common diseases which have not changed over the last five years. The major causes of death are pneumonia, gastroenteritis, malaria, and perinatal death. The average life expectancy is slightly over 50 years for females and 48.7 years for males which is short compared to the average in southeast Asia of over 60 years for both males and females. The high infant mortality rate is one cause and is indicative of the level of health care in Papua New Guinea.

The Department of Health of the Government of Papua New Guinea has been developing national health plans starting prior to independence with the aim of improving health care services for its citizens. The 1st National Health Plan 1974/78 emphasized the expansion of primary health care services. As a result, health centres and other primary health care facilities were established and built on a nationwide scale and health care facilities were available within 2 hours travel for 96% of the population. The average life expectancy was improved from 40.4 years in 1970 to 49.6 years in 1980.

A decade later the 2nd National Health Plan 1986/90 was prepared. This plan was an important part of the social services sector of the national development plan. While the promotion of expansion of primary health care services was continued from the 1st National Health Plan, strengthening of secondary health care services supporting primary health services was also an important aspect. As a background, the facilities providing secondary health care services in Papua New Guinea, the Port Moresby General Hospital and the central general hospitals in the provinces, provincial hospitals, were mainly established and built during the 1950's and 1960's. It was pointed out that the deterioration of these facilities with age and the yearly increasing demand for health care services were resulting in a difficult situation.

In 1986 with assistance from the Government of Australia, a study of the status of provincial hospitals was carried out and the Hospital Planning Study which included a fundamental plan for strengthening provincial hospitals. In 1987, with assistance from the Asian Development Bank, the Hospital Service Project was prepared which was the first step in developing a master plan for provincial hospitals where the need for urgent renovation was high. In regard to the Government of Papua Guinea's health care redevelopment plans, the Government of Japan extended Grant Aid Cooperation to the implementation of the Medical Equipment Project in 1987 and the Port Moresby General Hospital Redevelopment Project in 1988 - 1989.

With this background, the Government of Papua New Guinea which had insufficient funding to implement hospital facility development for nine provincial hospitals with high urgency for redevelopment (Mount Hagen Base Hospital, Lae Base Hospital, Kundiawa Provincial Hospital, Wabag Provincial Hospital, Madang Provincial Hospital, Wewak Provincial Hospital, Kerema Provincial Hospital, Daru Provincial Hospital, Vanimo Provincial Hospital), requested that the Government of Japan provide Grant Aid Cooperation for the redevelopment project for strengthening provincial hospitals including new facility construction. In response to this request, the Government of Japan extended Grant Aid Cooperation to the implementation of the Hospital Redevelopment Project covering the three hospitals at Lae, Mount Hagen, and Wewak in 1990.

However, the Government of Papua New Guinea which held redevelopment of provincial hospitals to be important made a follow up request to the Government of Japan for Grant Aid Cooperation for a hospital redevelopment project for the six hospitals that were not included in the 1990 program and the Rabaul Nonga Base Hospital.

In response to this request, the Government of Japan decided to implement a Basic Design Study for the 7 provincial hospitals, Kundiawa Provincial Hospital, Rabaul Nonga Base Hospital, Wabag Provincial Hospital, Madang Provincial Hospital, Kerema Provincial Hospital, Daru Provincial Hospital, and Vanimo Provincial Hospital which were subjects for the Provincial Hospitals Redevelopment Project Phase II. The Japan International Cooperation Agency (hereafter referred to as JICA) dispatched the Basic Design Study Team to Papua New Guinea from January 19 to February 27, 1991. The Study Team investigated the background, content, status of the hospitals, system for managing implementation of the project, budgeting mechanisms, construction sites, and other aspects of the project. After returning to Japan, analysis of the collected information and other activities were

conducted and the draft final report was to be presented from June 17 to June 29, 1991 in Papua New Guinea.

If this project is implemented with Grant Aid Cooperation from the Government of Japan, the organization responsible for implementation will be the Department of Health. The organization that will be responsible for the construction borne by the recipient nation will be the Department of Works which will participate in the implementation of the project. It was confirmed during discussions between the study team and government officials during the Field Study that emphasis should be placed on assistance for those hospitals with the highest degree of urgency among the hospitals considered for the project.

The 7 hospitals were grouped for priority based on discussions with the Government of Papua New Guinea taking into account the capability, health care performance, and results of the field study. The Basic Design for the Provincial Hospital Redevelopment Project Phase II was developed after determining the optimum facility content and scale for the three hospitals (Kundiawa Provincial Hospital, Rabaul Nonga Base Hospital and Madang Provincial Hospital) with the highest priority based on consideration of local health care situation, operational administration situation, construction site, infrastructure, construction condition, and status of maintenance of medical equipment. The Basic Design was developed based on the following fundamental policies for this project:

- (1) The redevelopment of the medical facilities would not require increases in the operating staff and budgets for the hospitals
- (2) Health care staff and number of beds would be maintained at current levels
- (3) Improvement of the health care facilities would contribute to provision of equal health care service to the populace

The redevelopment project for each hospital is as shown in the following table.

	Facilities	Type of Const.	Principal Medical Equipment
Kundiawa Provincial Hospital	1) Main Building 1,898m ² Fl. area 2) Operating Theatre 447m ² Fl. area 3) Ward Building (240 beds) 2,496m ² Fl. area 4) Mortuary Building 41m ² Fl. area 5) Other Service Facilities Total 516m ² Fl. area (Single story for all building) 6) Water supply and drainage facilities Total 5,434m ²	New Const.	X ray diagnostic system Operating table Shadowless operating light Anaesthesia apparatus Ventilator ECG monitor High pressure steam sterilizer Ultrasonic cleaner Ultrasound scanner Glucose meter Dental unit Patient bed, etc.
Rabaul Nonga Base Hospital	1) Main Building 2,567m ² Fl. area 2 story	Re-const.	X ray diagnostic system Bedside monitor Ventilator High pressure steam sterilizer Ultrasonic cleaner Glucose meter Ultrasound scanner, etc.
Madang Provincial Hospital	1) Main Building 1,967m ² Fl. area Single story 2) Ablution 36m ² Fl area Single story	Re-const.	Bedside monitor Ophthalmic diagnostic system table Slit lamp Ventilator Bedside monitor Ultrasound scanner, etc.

The above is the outline of the Provincial Hospital Redevelopment Project Phase II. If this project is implemented under Grant Aid Cooperation by the Government of Japan, division of the implementation of the Project into two stage will be the preferred approach taking the scale of the facilities and the framework of Japan's Grant Aid Cooperation System into account. Given the content and scale of project site preparation, the portion of the construction to be funded by the Government of Papua New Guinea, it has been concluded that it would be appropriate to conduct the construction of the facilities for the Kundiawa Provincial Hospital in the first stage while the construction of the facilities for the Rabaul Nonga Base Hospital and the Madang Provincial Hospital and procurement of the medical equipment for three hospitals should be conducted in the second stage. The estimated time required for completing the first stage would include 3.3 months for preparing the detailed design drawings and 12 months for construction of the facilities. For the second stage, the estimated time required would include 3.3 months for preparing the detailed design drawings and 12 months for construction of the facilities and procurement and installation of medical equipment.

The Project is intended to meet the demand for health care from the population of the areas served by the hospitals by improving the secondary health care facilities of the hospitals. The population served by the three hospitals and would benefit from this project is about 640,000. This is 64% of the total population served by the 7 hospital originally proposed for this project and is 17.3% of Papua New Guinea's total population. Thus, it is anticipated that the implementation of this project will contribute to raising the level of health care in Papua New Guinea.

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CHAPTER 1 INTRODUCTION

CHAPTER 1 INTRODUCTION

The Government of Papua New Guinea initiated the 1st National Health Plan 1974/78 in 1974. The major announced goal of this plan was to expand and strengthen primary health services. With assistance from the WHO and other organizations, efforts were made to strengthen rural health services. The results of these efforts are reflected in the major improvement in basic indices for health care and making it possible for the vast majority of citizens to easily use health care facilities.

After review of the results of the 1st National Health Plan, the 2nd National Health Plan 1986/90 was developed with objectives including improving the quality of secondary health services, providing effective regional health education and information, and expanding training for health care professionals.

In Papua New Guinea, responsibility for providing secondary health services is borne by the Port Moresby General Hospital, 4 base hospitals, and 14 provincial hospitals. Most of the facilities of the hospitals that are the backbone of Papua New Guinea's secondary health services were built between 1955 and 1965 and are deteriorating from age. Also, it has become difficult for these facilities to adequately serve the patient load which has grown along with the increase in population in the service areas.

Thus, facility improvements have become indispensable. For these reasons, the Government of Papua New Guinea started to develop concrete plans for improving provincial hospitals. In 1986 with assistance from the Government of Australia, a study of the status of provincial hospitals was carried out and the Hospital Planning Study which included the fundamental plan for improvements was prepared. In 1987, with assistance from the Asian Development Bank, the Hospital Service Plan was prepared which was a master plan for provincial hospitals where the need for improvements was high.

The Department of Health of the Government of Papua New Guinea based on this master plan gave priority for implementing redevelopment of the two base hospitals at Mount Hagen and Lae and the seven provincial hospitals at Kundiawa, Wabag, Madang, Wewak, Kerema, Daru, and Vanimo. The Government of Papua New Guinea requested grant aid cooperation from the Government of Japan to implement the provincial hospital redevelop-

ment plan because it had insufficient funds available for this purpose. In response to this request, the Government of Japan extended grant aid cooperation to the implementation of the Project for Provincial Hospitals Redevelopment based on the results of the basic design study carried out in August 1989. The Project is covering the three hospitals at Mount Hagen, Lae, and Wewak of the hospitals listed above, and construction work for these hospitals started in January, 1991. The Government of Papua New Guinea forwarded a request to the Government of Japan for grant aid cooperation to implement the Project for Provincial Hospitals Redevelopment Phase II (referred hereafter as the Project) covering the 6 provincial hospitals at Kundiawa, Wabag, Madang, Kerema, Daru, and Vanimo which had not been covered in the previous project and along with the redevelopment plan for the Nonga base hospital in Rabaul. The Government of Japan in response to this request from the Government of Papua New Guinea considered implementation of the Basic Design Study for the Project. The Japan International Cooperation Agency (hereafter referred to as JICA) dispatched the Basic Design Study Team lead by Dr. Ken Okamoto, Director, Second Tokyo National Hospital, from January 19 to February 27, 1991.

In order to confirm the feasibility and appropriateness of the Project for grant aid cooperation, the team consulted with government officials and others in Papua New Guinea and conducted field surveys covering the following points:

- (1) The background and situation of the Project
- (2) Confirmation of the content of the Project
- (3) Confirmation and consultation regarding the details of the request
- (4) Confirmation of operational details and management plans
- (5) Confirmation of maintenance plans
- (6) Status of medical service for each hospital
- (7) Status of existing facilities and medical equipment for each hospital
- (8) Condition of proposed construction site and surrounding area
- (9) Related facilities
- (10) Construction related situation
- (11) Share of burden for implementation of the Project to be borne by the Government of Papua New Guinea and system for implementation

This report was prepared by compiling the results of discussions conducted by a team headed by Dr. Ken Okamoto, Director, The 2nd Tokyo National Hospital, in June, 1991 during the explanation of the draft final report which was prepared by analysis and review

of information and materials collected by the study described above. The members of the study team, itinerary for the study team, list of cooperating officials, copy of minutes of discussion, and other related materials are included in the appendices attached to this report.

CHAPTER 2 BACKGROUND OF THE PROJECT

CHAPTER 2 BACKGROUND OF THE PROJECT

2.1. Background of the Project

The Government of Papua New Guinea as it progressed towards independence, drafted the 1st National Health (1974/78) in 1974 based on the 8 Goals which were formulated to serve as the basis for economic and social development. The main objective of the 1st National Health Plan was the expansion and strengthening of primary health care services. In order to achieve this objective, the Government of Papua New Guinea with the cooperation of the WHO and other organizations increased the number of health centers, aid posts, and other health care facilities as well as arranging for installation of medical equipment to improve rural health care services. As a result, during the 1970 - 1980 period, the average life expectancy increased, the infant mortality rate were greatly reduced, and other major improvements in health indices were achieved while it became possible for the population to easily use health care facilities.

After reviewing the results of the 1st National Health Plan, the 2nd National Health Plan 1986/90 was drafted with the objectives of improving the quality of secondary health care, providing effective health education and information transmission, and expansion of training of health care practitioners.

Although the 2nd National Health Plan 1986 - 1990 contained the objective of improving secondary health service, the Port Moresby General Hospital, the 4 base hospitals, and the 14 provincial hospitals were mostly built during the 1950's and 1960's. Along with the deterioration with age, the source of funding for maintenance, the Government of Papua New Guinea's budget, has been under severe pressure. Also, the increase in number of patients accompanying the increase in population of the service areas of the hospitals has caused the facilities scale to become inadequate and it has become difficult for hospitals to fulfill their capacities.

The Government of Papua New Guinea based on the need to improve the facilities of the hospitals stated above in order to improve secondary health care in the country initiated an effort to plan improvements.

The first stage, a survey of the situation of the provincial hospitals, was implemented in 1986 with the assistance of the Government of Australia and the Hospital Planning Study was prepared which included the basic plan for facility improvement. In 1987 with the cooperation of the Asian Development Bank, the Hospital Service Project was planned which formulated a master plan for improvements at provincial hospitals where the necessity was highest.

The priority set by the Government of Papua New Guinea in this master plan for implementation of improvements were two base hospitals at Lae and Mount Hagen and the seven provincial hospitals at Kundiawa, Wabag, Madang, Wewak, Kerema, Daru, and Vanimo. A rural hospital redevelopment plan was prepared for these hospitals.

The Government of Japan was requested to extend grant aid cooperation for implementation of this project as because of the lack of funds on the part of the Government of Papua New Guinea.

In response to this request, the Government of Japan based on the result of the Basic Design Study conducted in August 1989, extended grant aid cooperation to implementing the Provincial Hospital Redevelopment Project covering the hospitals at Lae, Mount Hagen, and Wewak of the hospitals mentioned above as grant aid cooperation.

The Government of Papua New Guinea has made a request to the Government of Japan to provide grant aid cooperation for implementing the Provincial Hospital Redevelopment Project Phase II covering the hospitals among the 9 candidates that were not included in the first phase, the provincial hospitals at Kundiawa, Wabag, Madang, Kerema, Daru, and Vanimo and with addition of the base hospital at Nonga, Rabaul for a total 7 hospitals. This would be an extension of the ongoing cooperation from the Government of Japan in the Provincial Hospital Redevelopment Project.

2.2. Status of Proposed Hospitals

2.2.1 Outline of Hospitals

The seven hospitals being considered for this project are scattered through all regions of Papua New Guinea and are sited in provincial capital as provinces are principal unit of local government. These are all facilities serving a central role in secondary health services excluding the Wabag Health Centre.

The location of the hospitals in Papua New Guinea are as shown in Figure 2.2-1 while the outline of each hospital is shown in Table 2.2-1.

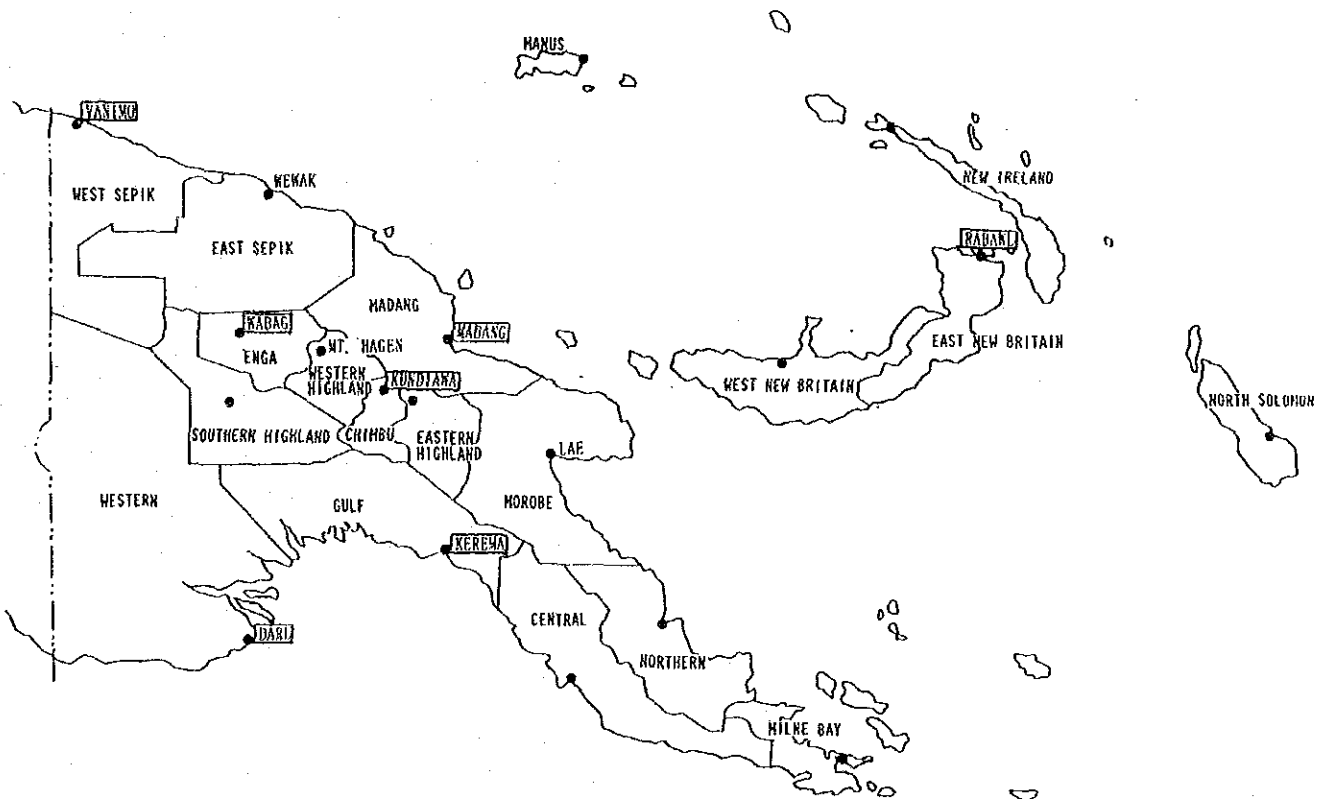


Fig. 2.2-1 Location of the Proposed Hospitals in Papua New Guinea

Table 2.2-1 Outline of Hospitals

	Kundiawa Provincial Hospital	Nonga Base Hospital	Madang Provincial Hospital	Kerema Provincial Hospital	Daru Provincial Hospital	Vanimo Provincial Hospital	Wabag Health Center
Classification	Level 1 Hospital	Base Hospital	Level 1 Hospital	Level 2 Hospital	Level 2 Hospital	Level 2 Hospital	Health Center
Benefiting Population (1990)	Simbu Province 192,000 Kundiawa Town 4,000	East New Britain Province 172,000 Rabaul Town 18,000	Madan Province 175,550 Madan District 78,800	Gulf Province 77,000 Kerema Town 3,600 Kerema District 14,600	Western Province 101,500 Daru Town 4,000 Daru District 13,000	Sandawn Province 138,600 Vanimo District 17,400	Enga Province 47,814 Wabag Town 15,184 Sopas Town 10,952
Number of Inpatient Bed (1990)	250 Beds	450 Beds	405 Beds	80 Beds	81 Beds	134 Beds	80 Beds
Number of Staff Involved in Medical Services (1990)	138 include [Doctor 7] [Assistant Doctor] [Nurse 47]	293 include [Doctor 22] [Assistant Doctor] [Nurse 88]	254 include [Doctor 12] [Assistant Doctor] [Nurse 81]	57 include [Doctor 1] [Assistant Doctor 1] [Nurse 24]	73 include [Doctor 1] [Assistant Doctor 2] [Nurse 30]	67 include [Doctor 1] [Assistant Doctor 2] [Nurse 26]	68 include [Doctor 1] [Nurse 16]
Annual Outpatient (person)	123,000 (1990)	153,200 (1989)	240,000 (1990)	15,000 (1990)	48,000 (1990)	84,000 (1989)	37,909
Daily mean (person)	410	510	800	50	160	280	126
Annual Inpatient (person)	8,600 (1990)	14,400 (1989)	8,700 (1990)	1,023 (1990)	4,860 (1990)	1,558 (1990)	1,758 (1990)
Current Status of Medical Services	<ul style="list-style-type: none"> Objective as a health care facility for Simbu Province is to provide comprehensive diagnosis and treatment, natural environment is severe, and the number of patients is rapidly increasing Capable laboratory department are characteristic 	<ul style="list-style-type: none"> Provides comprehensive diagnostic and treatment as a base hospital The outpatient building, x-ray room, and pathology are especially in need of improvement 	<ul style="list-style-type: none"> A wide range of examination and treatment activities are being carried out including medicine, surgery, obstetrics and gynecology, pediatrics, ophthalmology, dental, tuberculosis, Hansen's disease, reconstructive surgery and mental health A base hospital like role is being required Serves as the training hospital for the College of Allied Health Sciences 	<ul style="list-style-type: none"> The service area and population are limited, the current site of the hospital is cramped and currently the diagnostic and treatment system is probably at its limits 	<ul style="list-style-type: none"> Although this serves as the core of this provinces health and medical care system, it's administration and operation are marginal 2 ambulance boats are used to provide access as it is located on an island 	<ul style="list-style-type: none"> The number of patients is rapidly growing and the expansion of facilities (especially operating theatres, labour room, CSSD, x-ray, and pathology) are urgent matters 	<ul style="list-style-type: none"> Diagnosis and treatment are limited to medicine, surgery, pediatrics, obstetrics and gynecology, and dentistry Maintenance of the facilities is poor and the environment is not appropriate for the conduct of medical activities
Major Diseases	Pneumonia 19% Normal Delivery 13 Malaria 10 Diseases of skin 6 Diseases of Female genital organs 5	Malaria 20% Normal Delivery 19 Pneumonia 8 Diseases of skin 6 Anaemias 3	Pneumonia 17% Normal Delivery 15 Malaria 13 Diseases of skin 10 Infectious diserses 3	Normal Delivery 18% Pneumonia 12 Diseases of skin 7 Malaria 7 Infectious diseases 5	Normal delivery 22% Pneumonia 8 Malaria 7 Infectious disease 5 Tuberculosis 4	Pneumonia 13% Normal delivery 13 Malaria 10 Diseases of skin 7 Anaemias 4	Typhoid fever 25% Normal delivery 20 Pneumonia 19 Disease of musculoskeletal system 8 Discases of digestive systems 7
Facility	Constructed	1961	Lather half of 1950's	1961	1960's	1963	1960's
	Total Floor Area	2,690m ²	7,290m ²	7,095m ²	2,066m ²	2,359m ²	3,290m ²
Principal Facilities	O.P.D. Bldg. Operating Theatre Bldg., Pediatrics & Obstetric Ward Isolation Wards Wards Kitchen & Mess Workshop Others	O.P.D. Bldg. X-ray & Pathology Bldg. CSSD & Physiotherapy Bldg. Operating Theatre Obstetric Wards, Intermediate Ward Wards Others	O.P.D. Bldg. X-ray & Pathology Bldg. Operating Theatre & CSSD Bldg. Wards Medical Store Pediatric O.P.D. Bldg. Specialty O.P.D. Bldg.	Administration Bldg. O.P.D Bldg. Operating Theatre Bldg. Wards Kitchen & Mess	Administration Bldg. O.P.D Bldg. Operating Theatre Bldg. Wards Kitchen & Mess	Administration Bldg. O.P.D Bldg. Operating Theatre Bldg. Wards Kitchen & Mess	Administration Bldg. O.P.D. Bldg. Operating Theatre Bldg. Wards Dining Hall
General Status of Current Medical Equipment	<ul style="list-style-type: none"> Shortages of diagnostic equipment was observed Equipment to efficiently treat the rapidly rising patient load is needed Equipment supplied by the Medical Equipment Supply Project in 1988 is making a large contribution to the laboratory departments 	<ul style="list-style-type: none"> Operating theatres (3), pathology, and x-ray have basic equipment Equipment procured by the Medical Equipment Supply Project in 1988 useful An overall shortage of equipment can be observed 	<ul style="list-style-type: none"> Various expansion and remodelings have occurred without a facility master plan and medical equipment has not been installed in a rational and planned way, the inadequate amount of equipment is evident Much of the equipment being used was installed by the Medical Equipment Supply Project in 1988 is very useful 	<ul style="list-style-type: none"> 80% of current medical equipment (x-ray equipment, surgical tables, labour beds, sterilizers, beds, operating light etc.) was installed by the Medical Equipment Supply Project in 1988. 	<ul style="list-style-type: none"> Equipment provided by the Medical Equipment Supply Project in 1988 includes x-ray equipment, labour beds, sterilizers, operating light etc., and thus it can be said that it fulfills the role of a provincial hospital 	<ul style="list-style-type: none"> There is inadequate equipment to cope with the growing number of patients, and provision of basic diagnostic and treatment equipment is desirable 	<ul style="list-style-type: none"> Operating tables, mobile operating light, anaesthesia equipment, large sterilizing equipment, dental unit, dental x-ray, and other equipment are installed A mobile x-ray unit provided by the Medical Equipment Supply Project in 1988 is being used

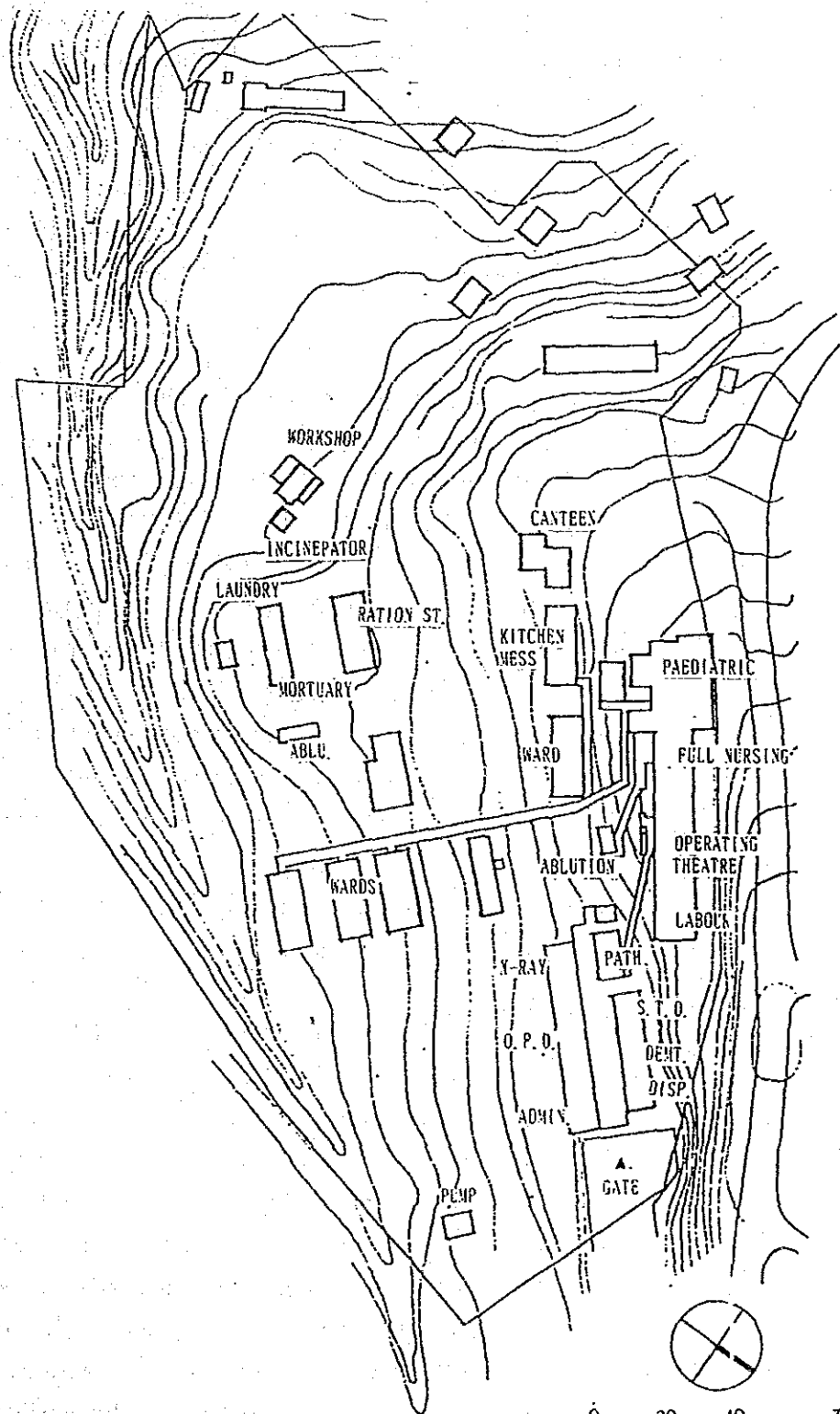
2.2.2 Outline of Hospital Facilities and Scale

In regard to the scale of the facilities for the project hospitals, each hospital due to its status and local conditions has various floor areas, the small hospital has more than 2,000 m² area. Table 2.2-2 shows the scale of the various facilities of each hospital.

Table 2.2.2 Hospitals Facilities and Scale

(sgm)	Kundiawa	Rabaul Nonga	Wabag	Madang	Kerema	Daru	Vanimo	Remarks
Facility Floor Area (m ²)	2,682.56	7,290.00	1,458.53	7,094.53	2,066.20	2,358.80	3,290.75	
Out patient Dept.	416.12	251.44	147.98	1,212.51	191.36	342.36	543.10	
General	162.60	122.76	48.98	248.12	99.80	127.12	466.12	
Emergency	—	40.68	—	73.60	30.32	—	23.22	
Speciality	49.70	72.00	—	108.37	—	76.88	10.00	
Pediatric	*1 144.54	16.00	—	—	—	—	—	*1: MCH Floor area is included
MCH	11.34	—	—	83.36	28.80	93.00	20.00	
Dental Clinic	89.28	—	99.00	71.76	32.44	45.36	23.76	
Others	—	*2 144.00	—	—	—	—	164.80	*2: Physiotherapy
Dispensary	77.76	127.32	48.98	59.00	56.03	24.60	132.80	
Examination Dept.	183.28	272.89	55.20	231.91	80.84	132.16	138.19	
Xray	51.84	81.22	—	88.56	34.72	24.16	6.00	
Pathology	56.16	113.37	16.80	87.15	34.72	*3 18.72	92.50	*3: Blood Bank function is included
Blood Bank	34.56	28.97	—	56.20	—	—	*4 20.00	*4: Blood Bank is located in Pathology
Mortuary	40.72	49.33	38.40	—	11.40	89.28	39.69	
Operating Theatre Dept.	156.69	477.08	—	361.70	262.64	115.00	22.00	
Operating Theatre	119.25	335.00	—	301.70	232.64	85.32	14.00	
CSSD	37.44	142.08	—	60.00	30.00	29.68	8.00	
Ward Dept.	1,255.26	4,336.46	470.74	2,783.21	626.68	1,231.8	930.30	
(Nomber of Beds)	(250)	(450)	(120)	(405)	(80)	(81)	(134)	
Administration Dept.	148.08	294.60	—	138.62	537.68	510.50	—	
Service Dept.	263.60	1,254.09	38.40	932.96	343.94	227.94	230.95	
Kitchen & Mess	110.08	279.59	38.40	252.00	215.00	72.00	200.08	
Laundry	67.72	330.00	—	290.00	29.44	*5	30.87	*5: Laundry facility is inadequate
Workshop	85.80	124.47	—	50.00	34.56	72.00	—	
Others	—	520.03	—	340.96	—	83.94	—	
Open Corridor	288.60	1,290.00	258.24	1,478.24	—	227.94	—	

2.2.3. Kundiawa Provincial Hospital



KUNDIAWA PROV. HOSPITAL

The Kundiawa Provincial Hospital is located in the city of Kundiawa in Simbu Province in the central highlands of Papua New Guinea. It is about 500 meters North of the Chimbu Air Terminal. This hospital is staffed by 7 medical officers and a total staff of 137 including paramedicals and nurses who provide medicine, surgical, pediatric, obstetric, and dental examinations and treatment. It has 250 beds and 122,566 out patients are treated annually (an average of 410 per daily) while 8,693 patients are hospitalized annually. It is the referral hospital for the aid posts and health centres in Simbu Province. Most patients come to the hospital by bus followed by those who walk in. It has been reported that 10% of the patients arrive by air from remote locations.

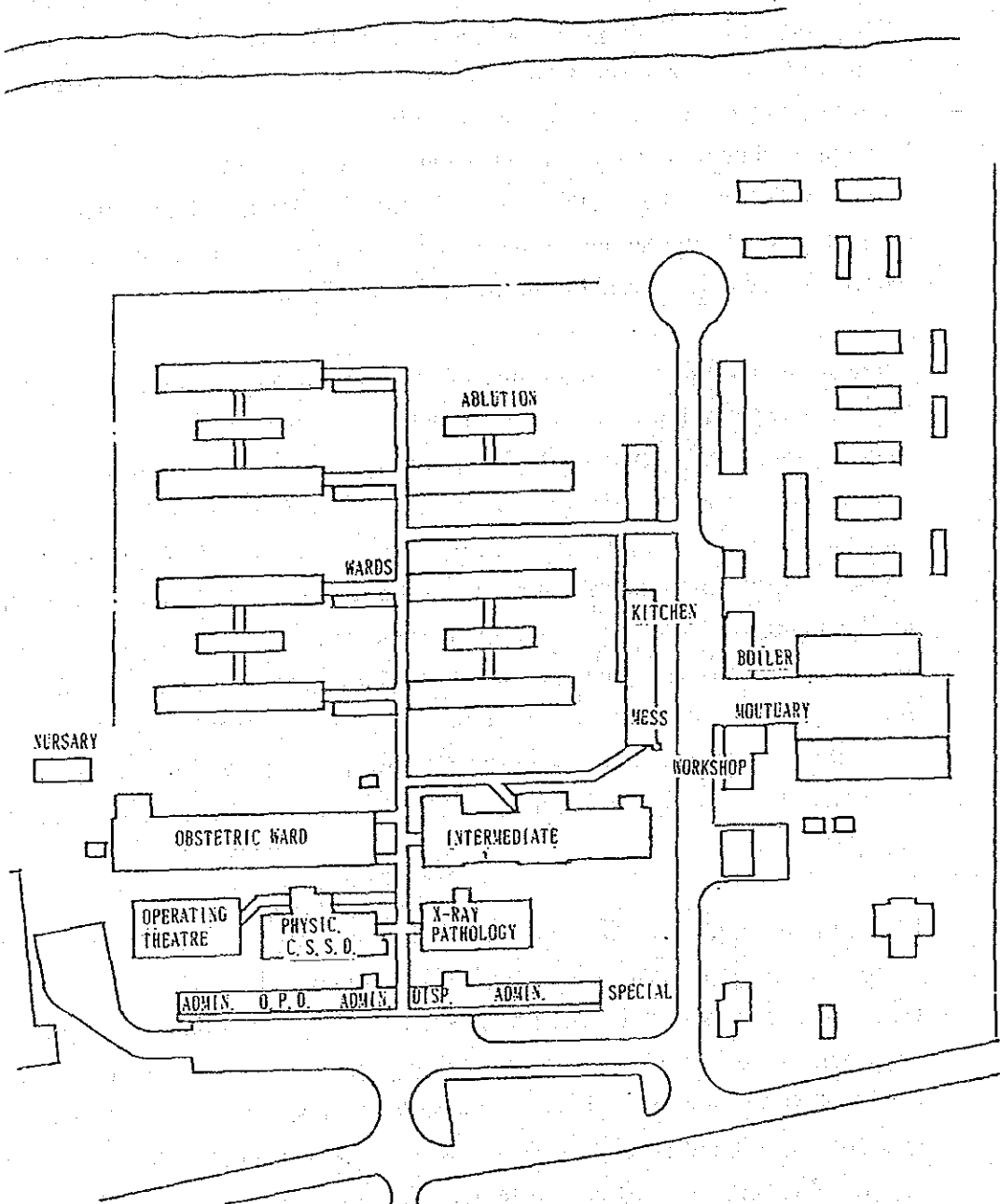
The facilities include general, pediatric, mother and child health, and dental outpatient clinics as well as X-ray, pathology, blood bank, dispensary, and administration which are concentrated in the outpatient building while the labour room, central sterile stores, and operating theatre are in the surgical building and wards for the examination and treatment facilities, in addition there are laundry, mortuary and other service facilities. These are all housed in wooden one storied buildings. Several staff housing buildings are located on the ground. All personnel participate in cleaning of the facilities and grounds on every pay days mornings for two hours. The interior of the entire facility is kept very clean. However, with the growth of population in it's service area, the number of patients has increased and the facility has become very cramped. Particularly the examination and treatment rooms in the outpatient building are extremely congested. There are two operating rooms, one for major and one for minor surgery. Since there is not a separate emergency room, a preparation room has has been converted into a minor operating theatre while a hallway is being used as a recovery room. The central sterilizing and supplies department is very small, about the scale of a preparation room, attached to operating theatre, compared to the scale of the hospital and the equipment is inadequate. The labour room has 2 labour beds which is very inadequate relative to the demand. Additionally, there is inadequate space for improvements. Overall the wards have inadequate window area and the placement is not appropriate so that the natural lighting of rooms is inadequate and the darkness inside the rooms is increased. Most of the buildings were built in 1960 and are deteriorating from age. Also, some of the buildings are being damaged by uneven ground subsidence. The outpatient building which was built in 1980 and is relatively new has warped walls and subsided floor in places. The hospital authorities have reported these problems are due to slippage on

the whole site. The site of this hospital is on a slope which is located at the northern bottom of a slope. Since adequate drainage for rainwater is not provided on the site, rainwater draining from the southern slope passes through the surface soil by the foundations of the building. The soil tends to hold water and thus the ground in the vicinity of the foundations of the buildings is weakened. Severe warping of the buildings due to ground slippage was not observed. The uneven subsidence caused by inappropriate foundation work (ground contact area and support foundation) and inappropriate structural material cross section (inadequate load bearing strength), especially for the outpatient building, were judged to be cause of the bending and the warping of walls caused by subsidence of foundations.

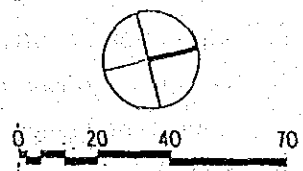
Water for general purpose is supplied by pumping from a small river on the south side of the site. Water for medical purposes is rainwater collected in a tank on located on the outpatient building. However, during periods of drought when rainwater is insufficient, water for general purpose is used for medical purpose. The pumped water is so hard that it's passed through a settling tank and then through a water softener. Water softening cannot be said to be adequate and thus it is feared that the sterilizer and water purification equipment may not work roperly when this water is used. The waste water system is separated for sewage and rainwater. The sewage is discharged without treatment into a nearby river and problems with preventing exposure to disease can be considered. Rainwater is allowed to percolate and the ditch system that does exist is small and flooding occurs when it is overwhelmed by large rainstorms.

Electricity is supplied from 100 KVA transformer facility and a 100KVA automatic emergency generator is also provided. There are no problems with this point, there were many cases of end use equipment such as lighting equipment and ceiling fans being left in out-of-order condition. Although major equipment is maintained at a level that won't interfere with the operation of the hospital, the maintenance level of less vital equipment is rather low, a tendency that was generally observed in this country. Equipment necessary for fundamental medical service including operating tables, operating light, sterilizers, nebulizers, blood storage refrigerators, x-ray equipment, centrifuges, spectrometers, etc. were available. A fair amount of the equipment observed had been supplied by the Government of Japan under grant aid cooperation since 1986 and was contributing to the smooth operation of health services.

2.2.4. Rabaul Nonga Base Hospital



NONGA PROV. HOSPITAL



The Rabaul Nonga Base Hospital is located on the Eastern end of New Britain Island in the Nonga area of Rabaul Town on a site by the ocean. The hospital is 20 minutes by automobile from the Rabaul Town. This hospital is staffed by 293 medical officers, paramedics, and nurses who provide medicine, surgical, pediatric, obstetric, and ophthalmological examination and treatment. The hospital has 450 beds, treats 153,000 outpatients annually (an average of 510 daily), and hospitalizes 14,320 patients annually (1987). The Base Hospital serves not only East New Britain but also serves as the referral hospital for surrounding islands including Kimbe, Lorengau, Kavieng, and Arawa provincial hospitals. Facilities include general and pediatric outpatient, dispensary, specialty clinic, and administration which are concentrated in the outpatient building, X-ray, pathology, and blood bank building, the central sterilizing supplies section and physiotherapy section building, surgical building, and the specialty wards for the examination and treatment facilities, and the kitchen, laundry, warehouse, and other service facilities. A nursing school is attached to this hospital.

In 1989, the outpatient department was split into general and pediatric outpatient to deal with the increase in outpatients.

However, the total area of the outpatient building is small so the crowding was not eliminated. Also, there is not a proper waiting room for the large number of outpatients and part of a 2.5 wide open corridor is used as a waiting room which is cramped and inappropriate.

The emergency outpatient treatment room and the minor procedure operating room are small and impediments to treatment are so great that they are not used very much. The various remodeling conducted by Administration which is located in the outpatient building depending upon the demands on each specialty has resulted in divisions that have poor capability and are barriers to rationalization. The X-ray room had inadequate shielding while the darkroom is cramped and inconvenient. A corridor is used as the waiting room. The blood bank's refrigerator is located in a corridor while the examination building has inadequate space and facilities for the various functions. The Central Sterile Supplies Department is located in the remodeled old surgical building and thus has adequate space but there is need for improvement. The surgical building has two major surgical operating theatres, a minor surgical operating theatre, recovery space, stretcher bay, changing room, and other facilities.

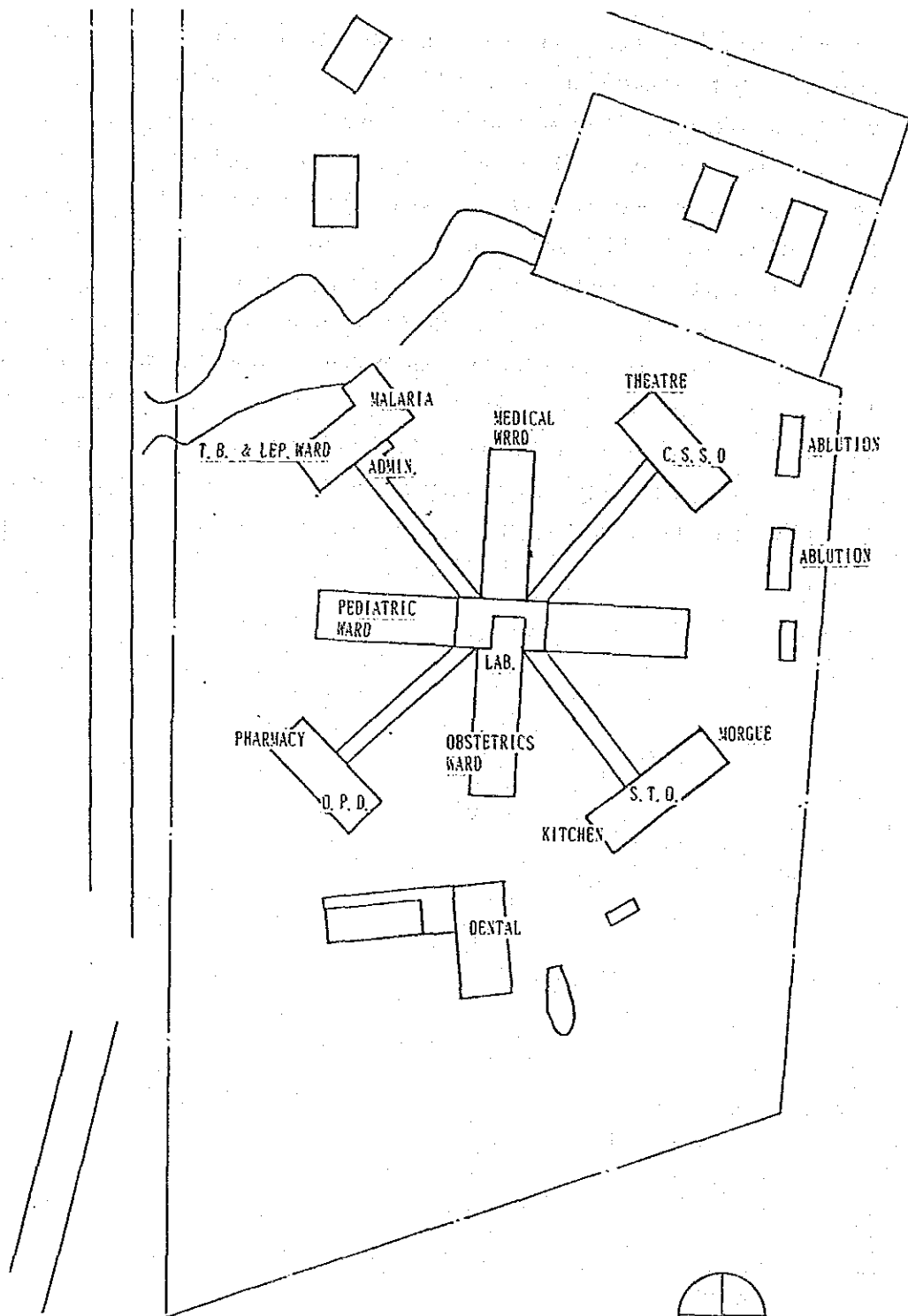
The number of operations and use of the operating theatre is high which has been reported to cause a great deal of inconvenience. In regards to this point, if the emergency outpatient minor surgical operating theatre which is almost unused and the minor surgical theatre in the surgical building which is also not used very much were improved, this problem could probably be resolved. The deterioration of the hospital facilities from age are advanced. Damage from termites to the X-ray and pathology building and the central sterile supplies building is especially large and immediate rebuilding is required. The outpatient building is very cramped compared to the needs of the various groups working there and urgent improvement is necessary for these to function properly. Water supply for the hospital is provided from a well located in nearby mountains and a rainwater storage tank which use gravity feed to supply water to the hospital. The water from well is very hard cannot be used without softening. Waste water including sewage and rainwater drainage are discharged into the nearby ocean. The sewage is discharged without treatment which is the same for the other hospitals. A sprinkler fire extinguishing system is installed which uses water from the same tank in the mountains but supplied from a separate gravity feed system.

However, since the sprinkler heads are rusted, the system is probably not operable. A 400 KVA transformer is installed for the electric power supply system and a 250 KVA automatic emergency generator is also installed. The electric power supply system is not a problem as far as capacity is concerned. The telephone system has 5 trunk lines, 100 extensions, 5 direct lines, the switchboard is digital and is thus relatively modern. A steam boiler is used to provide heat for the sterilizing equipment, kitchen, laundry, etc.. The main areas are air conditioned with window or separate type units. The operating theatres are centrally air conditioned using ducts but the level of cleanliness is probably not very high. At this hospital, basic medical equipment in general is installed in the operating theatres, pathology, and x-ray facilities. However, outpatient and specialty examination and treatment rooms have little medical equipment. In general, there was insufficient diagnostic and analytical equipment. Most of the equipment was installed during the 1980's and equipment provided from Government of Japan grant aid cooperation since 1986 was observed to be contributing.

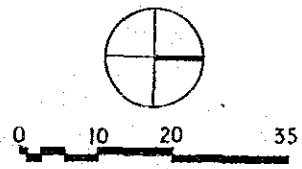
2.2.5. Wabag Provincial Hospital

At the present time, there is not a government operated provincial hospital in Enga Province which located in the rural highlands. The Mission related Sopas Hospital which is subsidized by the Government of Papua New Guinea acts as the provincial hospital in this province. The establishment of a government operated provincial hospital in this province is an urgent task for the expansion of Papua New Guinea health service and has high rank in the priorities for the rural hospital redevelopment plan. The request to the Government of Japan for grant aid cooperation for the Project for Provincial Hospitals Redevelopment Phase II includes the construction of the necessary facilities for establishing the Wabag Provincial Hospital. Since it had been explained that the Wabag Health Centre would be closed when the Wabag Provincial Hospital was constructed and the staff transferred to the hospital along with other personnel to operated the new hospital, the Wabag Health Centre and the Sopas Hospital were visited to study the current health and facility level in the area.

(1) Wabag Health Centre



WABAG PROV. HOSPITAL



The Wabag Health Centre is located in the central area of Wabag which is the capital of Enga province. Internal medicine, surgery, pediatrics, obstetrics, and dental examination and treatment is carried out at the 80 bed health facility. The centre equipped to handle outpatient examination and treatment, mother and child health, family planning, and preventative vaccinations. For hospitalized patients, starting with child birth, general nursing and treatment, medicines, and pathological studies can be provided.

As a health facility it is classified as a health centre, wireless communication with its subordinate aid posts and higher level facilities such as the Sopas Hospital and the Mount Hagen Base Hospital is possible. Arrangements for the referral of patients can be made and it has an ambulance for transporting patients. It's facilities include a general outpatient building, dental clinic building, MCH outpatient building and dispensary building, medicine, surgical, pediatrics, and obstetrics wards, X-ray, central sterilizing supplies department, surgical building, administration building, and other service facilities. The buildings are of wooden construction and on storied. It was recognized that the activities of this facility were not meeting the standards of the Department of Health for standard examination and treatment. The overall state of maintenance and management of the facility was unacceptable and without any sense of cleanliness and medical examinations and treatment were being conducted in such an environment. The ablution for the patient were even worse and appeared to have been abandoned at the limits of unsanitary conditions. Although there facilities and equipment that were badly damaged, the main question was not the buildings but a management system that allowed medical practice to continue in such an unsanitary environment. From this situation, the medical staff of this health center was appeared to lack in the appropriate disposition to be medical practitioners, and as administrators, reeducation is urgently needed. Without re-education as administrators, to expect anything other poor results from medical examinations and treatment would be difficult.

The main medical equipment of this center were a mobile type X-ray unit (Japan grant aid cooperation in 1986), 2 surgical tables, 2 movable operating light, anaesthesia apparatus, large sterilizer (out-of-order), dental unit, 3 dental x-ray units, workshop, and other equipment. The scale of the facility, equipment, and content of health services seemed to have unbalanced aspects.

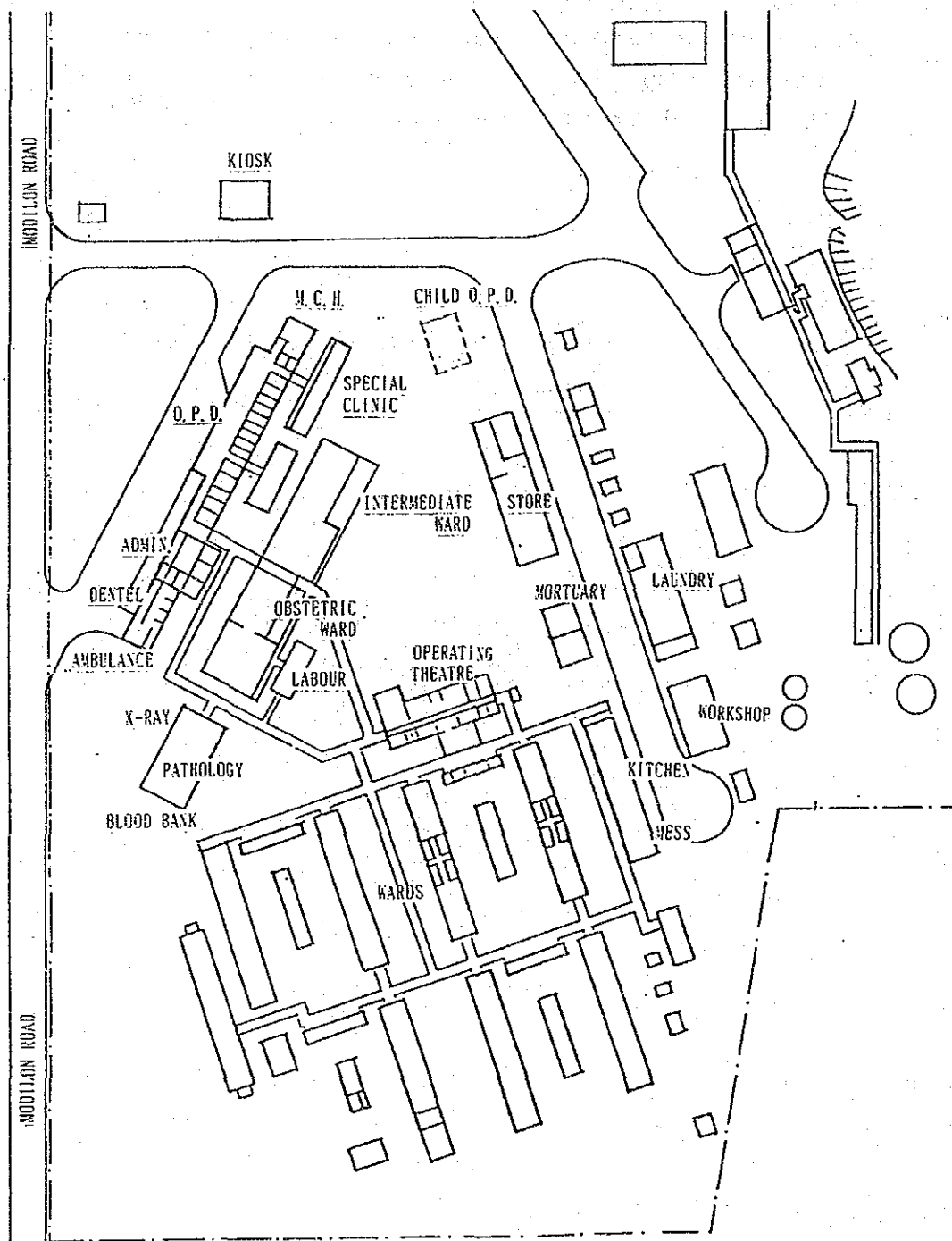
(2) Sopas Seventh Day Adventist Hospital

The Sopas Hospital is located 8 km to the northwest of Wabag Town, about 20 minutes by automobile, at the top of a hill. Although it is a mission church related hospital, as Enga Province does not have a government operated provincial hospital, it is fulfilling the role of a provincial hospital under contract from the Department of Health.

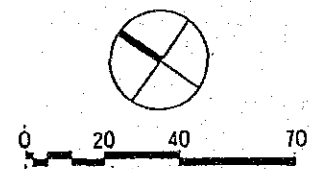
The facility is a one storied wooden building with the administration and the examination and treatment building in front and other building spreading out behind. Roofed slatted wooden walkway raised about 50 cm above the ground connected the buildings and provided an open, airy atmosphere. Superintendent Wilson, a foreigner, has operated and administered this facility for many years. Although the grade of the facility is not high, it has been maintained and managed to preserve a clean environment and functions well. The hospital provides outpatient examination and treatment, medicine, surgical, pediatric, and obstetric/gynecological examination and treatment, and has X-ray, pathological, and other capabilities. It serves as the referral hospital for health centres, health sub-centres, and other primary health facilities in the Enga Province. It has 85 beds and reported treating 34,363 outpatients and 2,836 hospitalized patients. The service area of this hospital is the entire province of Enga which has a population of 186,600. A nursing school is attached to the hospital. The level of examination and treatment maintains an adequately high standard and the deficiencies in hospital facilities and medical equipment from quality and quantity standpoints are made up for by the knowledge and effort of the management. This attitude is reflected in the health services it supports. For example, the mobile X-ray unit which the Government of Japan as grant aid cooperation in 1986 was combined with the stand from an old unit to allow use as a mounted unit. Unusual for a hospital of this level was the examination treatment building and all of the wards were provided with pipes for oxygen and suction, and improvements in nursing service were being pursued. The knowledge and ingenuity of the superintendent were seen in many places. This could be judged to be due to the nature of the medical officers and other health staff and comparison with the Wabag Health Centre reveal a very large gap.

The main medical equipment included the mobile X-ray unit, surgical tables, operating light, incubators, and Na/K analysis apparatus, colorimeters, and microscopes in the pathology laboratory, portable autoclave, and other equipment which was usually the minimum necessary equipment. Beds provided by Government of Japan grant aid cooperation were being used and were assessed being very durable and useful by this hospital.

2.2.6. Madang Provincial Hospital



MADANG PROV. HOSPITAL



The Madang Provincial Hospital is located in the capital of Madang Province on the north coast of New Guinea. The hospital was built in 1961, has 405 beds (January 1991) and is the large hospital in the province. The number of outpatients, 240,000 annually (an average of 800 per day), is very large and it is operated by a staff of 250. The hospital serves as the referral hospital not only for the health centres within the province but also for most diseases, for nearby Manus Province and the highland area. Since ophthalmology, dental, Hansen's disease, and other specialists are stationed here, it has capabilities that rank highly even among the Level One provincial hospitals and is serving in capacity similar to that of the one rank higher base hospitals.

A broad variety of examination and treatment areas including medicine, obstetrics /gynecology, pediatrics, ophthalmology, dental, tuberculosis, Hansen's disease, venereal disease, orthopedic surgery, and psychiatry are conducted at the hospital. The hospital is located in the central area of Madang Town in the area as the provincial government and city hall. The hospital is about 5 minutes by automobile from the airport. The main methods for coming to the hospital include public buses, automobiles, and by foot. Also, adjacent to the hospital site is the College of Allied Health Sciences which is the training school for Papua New Guinea's health related specialists including Health Extension Officer, Health Inspector, and Malaria Control Officer.

The hospital is used the site for the training and giving the students practical experience. The outpatient building is at front of the complex and the specialty clinic, intermediate ward, obstetric ward, X-ray and pathology building are located behind it. On the grounds are located the area medical store of Department of Health, kitchen and dining hall, boiler room, laundry room, mortuary, ration store, malaria control building, mental health building, and other facilities. Among the provincial hospitals, this hospital has the scale and facilities most like an actual general hospital. The hospital site faces onto a 15 m wide trunk road and gently slopes up at the rear. The outpatient building and the buildings immediately it, the intermediate ward, obstetric and gynecology ward, are located on the lowest part of the site and during heavy rain season rain storms, rainwater runoff covers the floors of these building two to three times each rainy season.

The outpatient building is very small compared to the patient load and the small

number of examination rooms means that the waiting are crowded with patients. Also, the medical records room is very small and as clinical charts are piled in mountains, it is very difficult to retrieve past records. The X-ray room, the pathology laboratory, and the blood bank are all in one building and there is no patient waiting room. The radiographer's office is a space curtained off from the central hall, close to minimum as far as work space is concerned. Examination and treatment of tuberculosis, venereal disease, and Hansen's disease are carried out in the specialty clinic building. The observation ward was originally intended to be used as a rest ward for observing malaria patients for a short period (about a day), however, due to stationing of nurses and the duties of medical officers, this space is not being used in this capacity and is being used preparation and treatment rooms. The operating theatre was remodeled three years ago and is being relatively smoothly used. In regards to the wards, a part from the lack of insect screens on several of the buildings, there were relatively few problems. However, the patient ablution were very dirty and this was a big problem in regards to maintenance and management. The dispensary in addition to being small, is located among the wards, away from the outpatient area and thus function for the hospital and convenience for outpatients is a big question.

Both city water and rain water are used for water supply. City water is very hard, a problem shared with other hospitals. Waste water facilities are divided into rainwater runoff and sewage. Sewage is discharged directly into the ocean and rainwater runoff into the city sewers. The discharge of untreated sewage is a problem from disease prevention. It has been reported that due to deficiencies in the drainage system on the hospital grounds, runoff concentrates in one area and results in flooding during heavy rains.

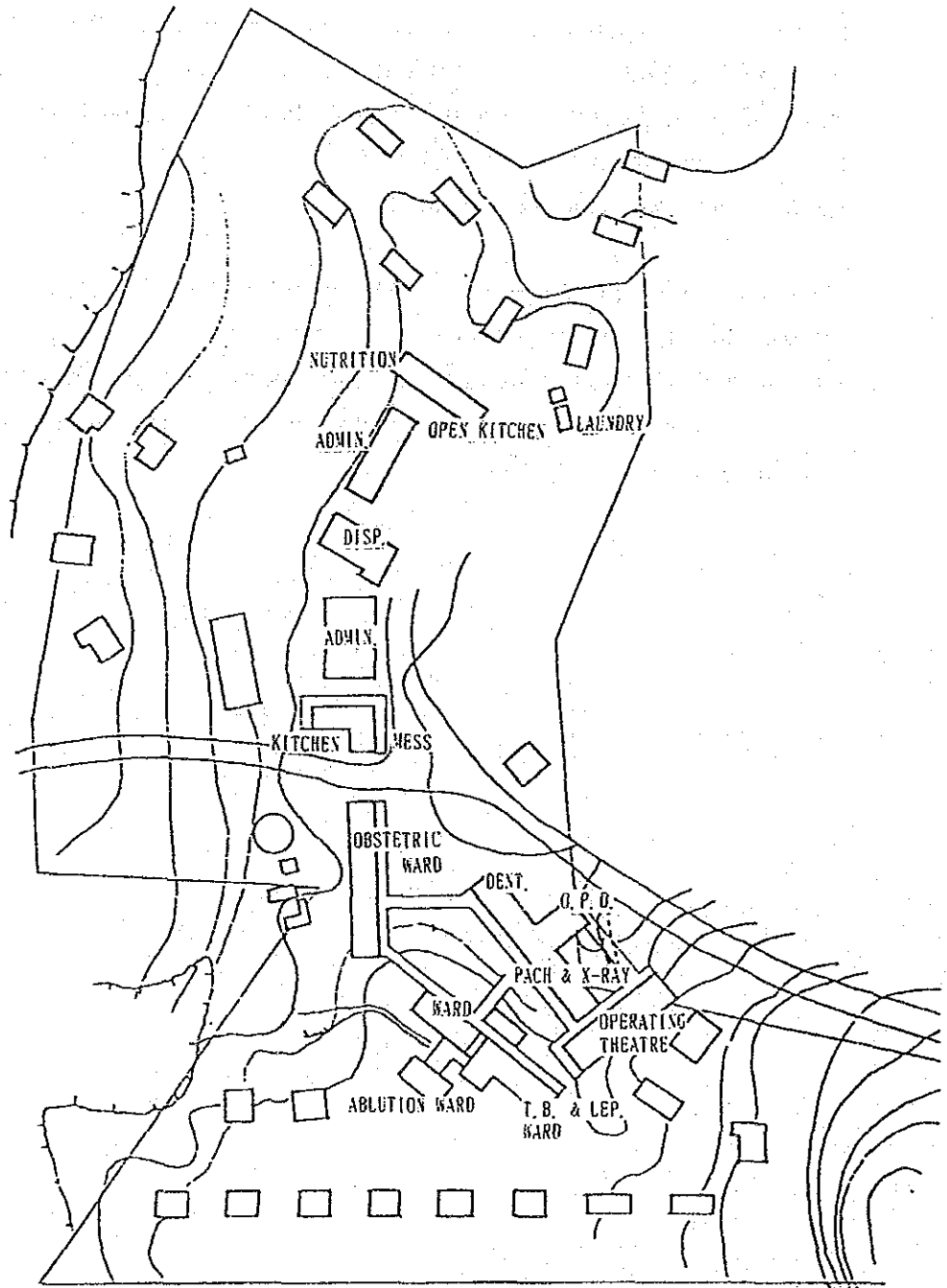
The sewage and rainwater runoff problems are both related to the deficiencies in Madang City's waste water handling system and the topography which is close to sea level. There are no problems with the electric power supply system which has a 300 KVA transformer and 300 KVA generator. A sprinkler system is installed in part of the hospital for fire protection but is probably not in a condition that could be relied upon. Air conditioning is installed in the administration areas main rooms, the operating room, dispensary, and sterilizer room, etc..

Since the hospital was built and expansion of facilities has occurred in response to de-

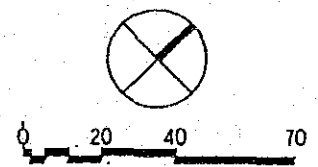
mand, the assignment of health care staff parallels this situation and shortfalls have handled in the same way and medical equipment has not been rationally installed in a planned approach. Thus, the equipment situation is not adequate to meet the demands for capability and capacity that this hospital is being called to meet. The current status of medical equipment at this hospital has been achieved since 1987. Within this, the Government of Japan's Grant Aid cooperation in 1986 which help fulfilled the Medical Equipment Plan is valued.

Current equipment includes 500 mA X-ray unit (1974), ECG (1981), electric knife (1980) which have exceeded normal service life expectancy. Also, due to the expansion of facilities and the increase in number of patients, the outpatient, pathology, gynecology, surgical, and the wards do not have sufficient medical equipment. Meeting these needs is urgent.

2.2.7. Kerema Provincial Hospital



KEREMA PROV. HOSPITAL



The Kerema Provincial Hospital is located in Kerema Town, the capital of Gulf Province, which is located on Papua Bay on the south side of New Guinea. It is Gulf Province's referral hospital and is operated by a staff of 57. The hospital facilities were built in the second half of the 1960's and has 80 beds. The number of outpatients treated annually is 15,000 (50 per day) and it can be said that this is a relatively new facility among the provincial hospitals of Papua New Guinea. However, since Kerema Town is located on a sandbank jutting out into a river mouth and is surrounded by mangrove marshes, there is very little suitable space for buildings. Thus the site for this hospital is located at the top of a hill next to the Kerema Airport's runway, a location like the back of horse. Due to the topography, there is almost no road network. Thus, 65% of the patients arrive by plane while 15% arrive by boat. Considering that the population of the province is 77,000 and that of Kerema City is 3,600, the population benefiting from this hospital is limited. In addition, the site is divided by a public road and the facilities of the hospital are divided into the facilities for medical examination and wards and the administration, kitchen, mess, and pharmacy.

On the north side of the site, there are a two story administration building (also housing the provincial Health Division), kitchen and dining hall, the health office building, laundry building, dispensary building, and the nutrition supervision building. On the south side, general outpatient, dental, pathology, and X-ray are housed in the outpatient examination and treatment building, the obstetrics ward, and the general ward to which the medical officers examination rooms and the nurse's rooms are attached, tuberculosis, Hansen's disease, and operating theatre buildings are built on flat areas. This hospital like other hospitals does not have a master plan and the siting of facilities is such that functional connections are very bad.

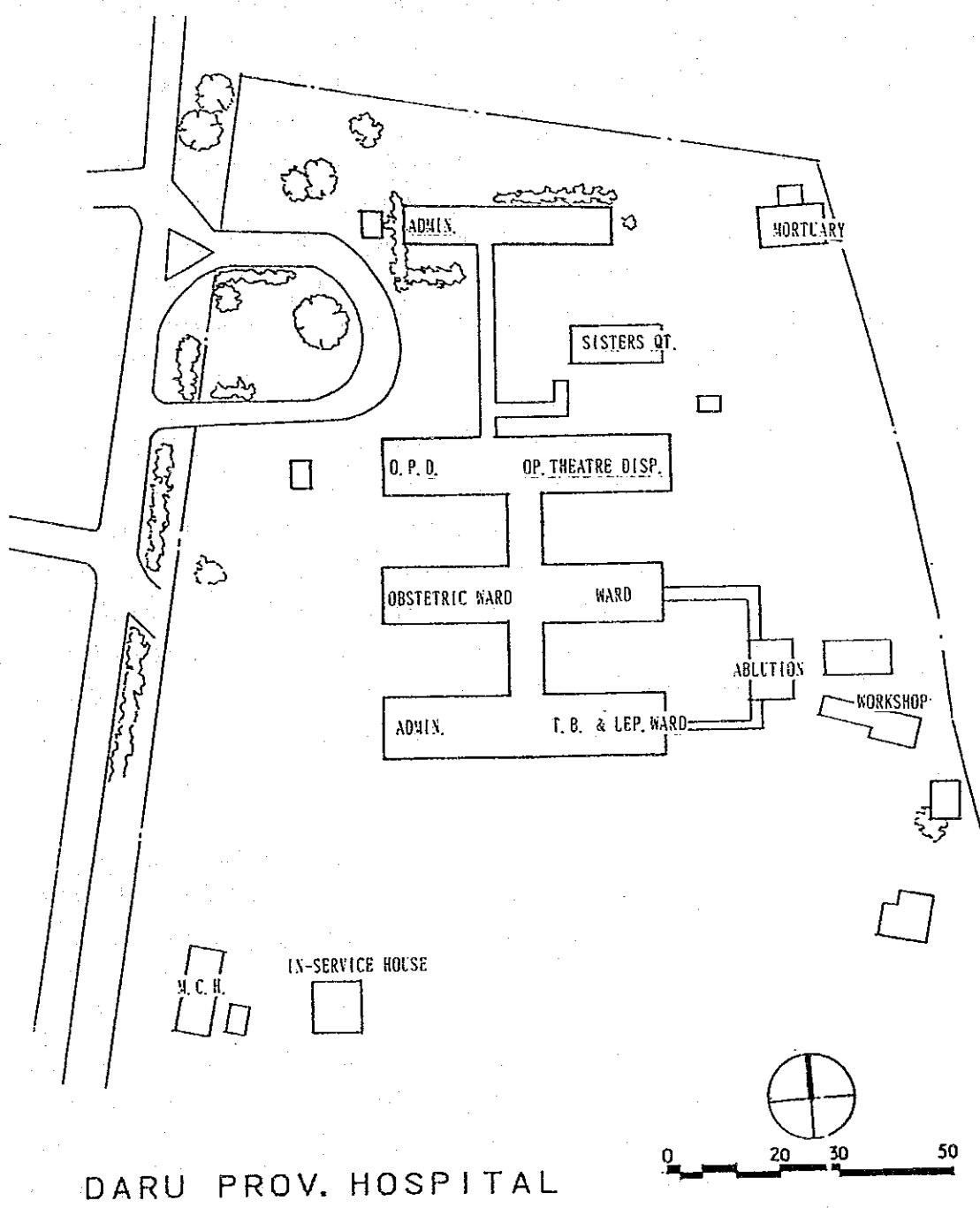
Of the buildings, the operating theatre building and the kitchen/dining hall building were constructed in 1987. Although the kitchen is equipped with modern equipment, there is not staff available to take advantage of it. Also, since the building was completed, it has not been used in intended manner, the dining room being used as a meeting room. Also, since pipes and power lines for the sterilizing equipment in the CSSD in the operating theatre building have not been installed properly, it was informed that the equipment has not been used for the 4 years since it was installed. Current the outdoor kitchen next to the nutrition supervision building is being used while sterilizing equipment in the obstetrics ward building is being used. Sterilized

equipment is placed on shelves in an open corridor.

In regard to water supply, Kerema Town does not have water mains for general use. Only the high school and hospital are served by the reservoir. However, this water supply capability is uncertain and the risk of depending only on this city water supply is high. Thus the hospital is also using rain water and well water. The collected rain water stored in a tank on the site and well are pumped to a tank at the highest part of the site and water is supplied by gravity feed from there. However, since the elevation is insufficient, water pressure is low and adequate water supply for the various facilities is not being provided. Also, there is only one water storage tank with 111 liter capacity, this is a very insecure supply situation especially during the dry season. In regard to sewage, there are septic tanks in the site. Since the discharge is to a percolate into the ground and not the ocean, there may be problems from a sanitation point since there are drinking water wells located in the vicinity.

The available medical equipment includes X-ray unit, surgical tables, labour beds, sterilizers, beds, operating light (mobile), and various laboratory equipment. 80% of the current equipment was provided by the Medical Equipment Supply Project funded by the Government of Japan's grant aid cooperation in 1986. In addition emergency generator, washing machines are installed. However, the necessary pipes and wiring are not always installed.

2.2.8. Daru Provincial Hospital



DARU PROV. HOSPITAL

The Daru Provincial Hospital is located in Daru, the capital of Western Province in the south part of New Guinea facing the Coral Sea. Western Province is located in the western part of Papua New Guinea where it borders Indonesia and Australia. The hospital was built in 1963 and internal medicine, surgical, pediatric, obstetric and gynecology, tuberculosis, Hansen's disease, and dental services are provided by a staff of 73. The hospital has 81 beds and serves 48,000 patients (160 per day) annually and is the central general hospital for the province. The hospital is located about 500 meters from the central commercial district of Daru Town and faces the police station. The main entrance to the site is on the west side and the site slopes gently to the east side of the site. As the climate is very humid, the floors of the hospital buildings are raised 1.5 to 2.4 meters above ground. Since Daru Town is located on an island, patients reach the hospital mainly by motorboat and canoe while referral patients arrive by airplane.

The facility has 4 buildings of 10 m by 50 m with east west axis. These are the building housing administration and the medical records department, the building housing the outpatient department, the emergency casualty room, pathology, X-ray, the operating theatre, CSSD, and dispensary, the building houses the obstetric ward, pediatrics, internal medicine, and surgical wards and the building housing the Provincial Health Division. Administration office, tuberculosis and Hansen's disease ward. These building are connected by open corridors. Next to these corridors are attached the dental clinic, doctors office and clinic rooms, and the office for health extension officer.

Other buildings on the grounds include the maternal and child health clinic building, nurse training building, patient toilet, nurses' dormitory, and 20 houses for staff on the south side of the site. The facility has deteriorated in the 30 years since construction and rain leaks were observed within the hospital.

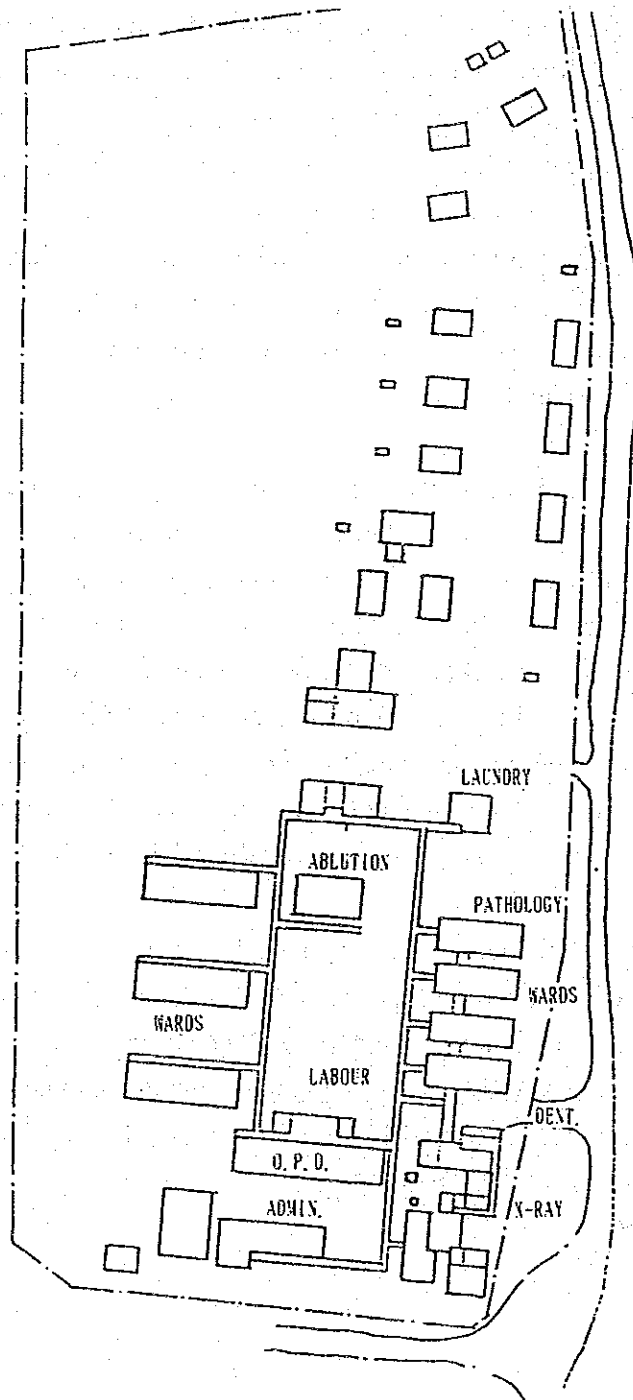
The hospital's main capabilities are dispersed within the hospital due to conversion of facilities and construction of new facilities. Also, many of the service facilities have very bad working conditions. Principle services which have especial problems in this respect are the x-ray and pathology department where the former has no shielding and the later where 5 specialists are working in a room of 15 m². In regard to surgery department, the major operating theatre is composed of one room plus its attached preparation room, the preparation room also serves as the CSSD. There is

no preparation and/or recovery room for surgical patients. Also, it seems that minor surgery is also conducted in the preparation room as a surgical table and operating light (mobile) are kept there. The dispensary is located at the end of a corridor and does not have a waiting area for patients, the connection with the out patient department is very bad. Also, there are a number of problems related to the service facilities including location of the laundry room and its washers, dryers, and other equipment below the elevated ward floor. Also the food storage area is also located below the floor. If the necessary capability of the hospital and the climate care taken into to account, these are no appropriate locations for these facilities. The patient ablution are not filling their functions since they are out-of-order and temporary toilets are installed at the present time.

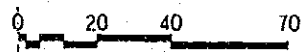
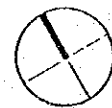
Water is supplied primarily by the city water supply and three large rainwater tanks are installed for the dry season. However, since the pump for pumping water to the raised water tank was broken, the water supply system was not adequately fulfilling its function. The waste water treatment system was not fulfilling its function and untreated waste water was being discharge into a mangrove swamp where people are living in boats. One of the causes of the breakdowns of the water related equipment is the inappropriate rainwater runoff on the site and an appropriate drainage plan is necessary. There were few problems with the electric power supply system other than the capacity of the emergency generator being small.

Current medical equipment at the hospital installed as part of the Medical Equipment Supply Project funded by the Japanese Government as grant aid cooperation in 1986 include mobile X-ray unit and table, labour beds, sterilizer, operating light (mobile), surgical tables, microscopes, autoclaves, spectrophotometers, etc. which provides the hospital the capability to fulfill some functions. Due to local topography, 2 sea ambulances are used by the hospital.

2.2.9. Vanimo Provincial Hospital



VANIMO PROV. HOSPITAL



The Vanimo Provincial Hospital is located 30 km from the border with Indonesia in the northwest coast of New Guinea in Sandaun Province. The hospital site is located on a coastal site on the eastern side of the peninsula where Vanimo Town is located and is about 1 km from the Vanimo airport.

The hospital was established in 1965 as a level 2 provincial hospital and the staff of 67 including one medical officer and 26 nurses is actively engaged in operations. Examination and treatment areas include medicine, surgery, pediatrics, obstetrics and gynecology, and dental care. The hospital has 138 beds and serves as the referral hospital for Sandaun Province. It serves 84,000 outpatients annually (280/day) and the number of patients has doubled for the last two years. One of the reasons for this is that a foreign forestry related company has established an operating base in this city and brought in staff.

In 1965, masonry buildings including an administration building, library building, a building housing the operating theatre, CSSD, labour room, and X-ray room pathology building, and the number 1 through 3 wards were built. In 1978 the wooden number 4 through 6 wards, the dispensary and medical records building, the kitchen building, and the laundry building were built while the wooden structure making up. Outpatient department building was built in 1987. In addition to these buildings, non-medically related building on the hospital grounds include the provincial health division's building and the community hall. All of these facilities are maintained and clean. However, the buildings built in 1960 have low eaves and ceilings compared to the other buildings. Also, because there are many small buildings, the ones with several services have limited space for each service. Especially, the operating theatre, CSSD, labour room, X-ray room, and pathology laboratory are extremely small and it is difficult to meet the increasing demand. The buildings constructed since 1978 with cooperation from the Government of New Zealand have adequate space for the various services and maintains a good medical environment.

The disparity with the older facilities is very large and there is an extreme imbalance. Also, mortuary does not have the necessary water supply and waste water equipment, an extremely inconvenient situation.

As there is no public water supply, rainwater supplies the water used for drinking and medical services. When the rainwater stored in the tank is insufficient, water is

purchased and put into the tank.

However, the cost burden of this to the hospital is very heavy. Water used for washing and showers is pumped from a well on the site and after passing through a settling tank, the water is pumped to an elevated tank to be gravity fed within the hospital and to staff housing. Sewage passes through a septic tank and is then released into the ocean. The electric power supply situation is good except for the two to three outages a month. As a backup, a self starting 100 KVA backup generator (Caterpillar) is used and is tested once every two weeks as part of a good maintenance program.

In regard to medical equipment in general, the budget is very inadequate compared to the rapidly growing patient load. The equipment contributed from the 1986 Government of Japan grant aid cooperation can be said to be helped alleviate the medical equipment problem slightly.

The current medical equipment for proposed hospital is showing following Table 2.2-3.

Table 2.2-3 Current Principal Medical Equipment List

	(Unit)						
	Kundiawa P.H.	Nonga B.H.	Madang P.H.	Wabag H.C.	Kerema P.H.	Daru P.H.	Vanimo P.H.
Operating Light (Major)	2	2	2	—	1	1	1
Operating Light (Minor)	1	1	1	—	1	1	—
Operating Light (Battery)	2o	1o	1o	1o	1o	2o	1o
Xray TV Apparatus	1	1*	1*	—	—	1*	—
Mobile Xray Unit	2o	2o	1o	1o	2o**	1o	3o**
Bucky Table	1o	1o	1o	—	1o	1o	1o
Ultrasound Scanner	—	1o	1o	—	—	—	—
Operating Table (Major)	2o	3o	2o	2o**	1	2o	1
Operating Table (Minor)	1*	1	1*	—	1	1	1
Anaesthesia Apparatus	2	3**	2	1	1	1	2**
Defibrillator	—	1o	1o	1	1	—	—
Electrocardiograph (ECG)	1*	3	—	—	2o	1o	1
High Pressure Steam Sterilizer (L-Type)	2	2	2	1	1	2*	1
High Pressure Steam Sterilizer (M-Type)	1*	2o	—	—	—	1	—
High Pressure Steam Sterilizer (Portable)	1o	1o	1	1	1o	1o	1o
Medical Refrigerator	2	4*	2	1	2**	1	2
Microscope	4o	6**	6o	2	3o	3o	5o
Ultrasonic Cleaner	—	2**	1o	—	—	1o	—
Hemacyto Counter	1	1	1	1	1	1	1
Spectro Photometer	1o	1o	—	—	—	1o	1
Analytical Balance	3o	2	2	1o	1o	1	1o
Colorimeter	3	2	1	1	1	2	1o
Centrifuge	5	8*	2o	1	3o	2	2
Dental Unit	2	—	1o	3o**	2o	1	1
Slit Lamp Microscope	—	1o	—	—	—	—	—

- o : Procured by The Government of Japan's Grant Aid Cooperation in 1988
 * : Deteriorated equipment
 ** : Only one unit is deteriorated

2.3 Outline of the Request

The facilities of hospitals will be improved under this project to improve the capabilities of provincial hospitals which is an indispensable part of the effort to improve the quality of secondary health service in Papua New Guinea. The overall objective is to improve the quality of this country primary and secondary health services.

The requested project with the exception of the Wabag Provincial Hospital would take place at the current sites of the six hospitals. In the case of the Wabag Provincial Hospital, Department of Wabag has prepared two athletic fields within the city. The location of the sites is as follows.

Hospital Name	Location
(1) Kundiawa Provincial Hospital	500m from Kundiawa Air Port Terminal Building in Kundiawa
(2) Rabaul Nonga Base Hospital	Northern Coast of island, 15 minutes from center of Rabaul by vehicle
(3) Wabag Health Center	Central area of Wabag, Enga Province
(4) Madang Provincial Hospital	5 minutes drive from Air Port, central area of Madang, Madang Province
(5) Kerema Provincial Hospital	Adjoining the run way of Kerema Air Port
(6) Daru Provincial Hospital	5 minutes drive from central area of Daru, Western Province
(7) Vanimo Provincial Hospital	3 minutes drive from Air Port, East coast of Vanimo, Sandawn Province

The organization that will accept the grant aid cooperation for this project from the Government of Japan will be the Department of Finance and Planning, Office of International Development Assistance, while the executing organization will be the Department of Health. The organization that will be responsible for the construction borne by the Government of Papua New Guinea will be the Department of Works which will participate in the implementation of the project.

This project will include the rebuilding of facilities that have deteriorated from age or become too small in the redevelopment of the 5 provincial hospitals at Kundiawa, Madang, Kerema, Daru, and Vanimo and the Rabaul Nonga Base Hospital as well as

construction of the facilities for the Wabag Provincial Hospital and necessary medical equipment. The main facilities for each hospital is as follows:

Kundiawa Provincial Hospital:

Rebuilding of wards, operating theatre, administration, kitchen, Improvement of outpatient, and other

Rabaul Nonga Base Hospital:

Priority of Each Department for New Construction is as listed below

Priority 1- outpatient, x-ray, pathology, dispensary, CSSD

Priority 2- blood bank, ICU, obstetric and gynecology

Priority 3- wards, service facilities

Wabag Provincial Hospital:

Construction of a new 120 beds general hospital including outpatient, operating theatre, x-ray, pathology, dispensary, administration, and service facilities.

Kerema Provincial Hospital:

Expansion and repair of outpatient facilities, remodeling of all other medical facilities, improvement of waste water facilities on the site

Daru Provincial Hospital:

Building of administration and new wards, remodeling of outpatient pathology, and repair of service facilities.

Vanimo Provincial Hospital:

Building of operating theatre, X-ray, examination rooms, speciality clinic, and administration building, renovation and repair of three wards, repair of the water supply system

In regard to medical equipment, those necessary medical equipment in connection with the above redevelopment of facilities are included.

2.4 Priority of Proposed Hospitals in the Request

- (1) Kundiawa Provincial Hospital
- (2) Rabaul Nonga Base Hospital
- (3) Wabag Provincial Hospital
- (4) Madang Provincial Hospital
- (5) Kerema Provincial Hospital
- (6) Daru Provincial Hospital
- (7) Vanimo Provincial Hospital

CHAPTER 3 OUTLINE OF THE PROJECT

CHAPTER 3 OUTLINE OF THE PROJECT

3.1. Objective

This project to redevelop provincial hospitals is one aspect of the overall effort to strengthen and expand secondary medical service in Papua New Guinea. This project assumes that:

- (1) Staff available to operate hospitals and operation budget will not be increased over current levels
- (2) Current number of beds and health care staff will be maintained at current levels
- (3) Equal medical service will be provided to the populace

It has the overall objective of improving hospital facilities including construction new facilities:

- (1) Rebuilding/remodeling deteriorated hospital facilities and facilities that are inefficient as for providing health care service
- (2) Expanding and improving secondary health care facilities by providing new facilities and strengthening support of primary medical service

For the 7 provincial hospitals proposed for project, the improvement of hospital facilities including construction of new facilities is intended to:

- (1) Resolve problems related to the project hospitals
- (2) Improve facilities for each service areas to meet demand and provide necessary medical equipment

3.2. Study and Examination on the Request

3.2.1. Necessity and Appropriateness of Request

The hospitals proposed for this project as described in 2.4.3 to 2.4.9 have a number of problems that will hinder improvements to capabilities or are reducing capability.

(1) Outline of Problems

The following can be raised as common problems for the hospitals.

- 1) The shortage of health care staff with the shortage of physicians being especially severe. There are few physicians in Papua New Guinea and there is a nationwide shortage with specialists being in especially short supply. Thus, it will be very difficult to fill the planned posts. Also, although it is relatively easy to hire nurses, budget shortfalls means that it's difficult to obtain the necessary number of nurses.
- 2) Most of the existing facilities were built twenty to thirty years ago and deterioration with age is advanced. In addition, the number of patients has increased with the increase in population in the service areas of the hospitals. Thus the inadequate scale of the facilities is a hindrance to appropriate medical services.
- 3) Each hospital has proceeded successive new construction, expansion in response to demand, and conversions have in places disrupted the overall plan for the hospitals. Although this is possible to attribute to the impacts on hospital administrators of the lack of an appropriate operating budget framework and the terrain and other physical characteristics of sites, the lack of master plans was a feature shared in common by the hospitals reviewed during this study.
- 4) There is inadequate housing for hospital staff (especially for physicians). Especially in rural provinces, the availability of appropriate housing for physicians is essential. The lack of appropriate housing for physicians and other health care professionals is a factor that makes securing staff difficult,

especially in rural areas.

- 5) In regard to equipment of support facilities at hospitals, especially in rural provinces, modern equipment in laundry and kitchen facilities were observed to not be in use due to the lack of staff who had mastered this equipment. Also, due to the high running cost of electric ovens and other electric appliances, it was confirmed that these were not being used at the Kerema, Vanimo and Kundiawa provincial hospitals. The lack of training in the use of equipment and the installation of equipment without consideration for running costs can be raised as problems held in common.
- 6) At all of the hospitals, patient toilet and shower facilities were often out-of-order and/or lack of cleanliness was a problem. This can be attributed to the lack of direction regarding the use of sanitary facilities and lack of education of sanitary principles. The introduction of Asian type toilets and other measures as soon as possible is desirable. Also, the discharge of untreated sewage was a common and major problem.
- 7) The complexity of the hospital administration system in Papua New Guinea is one hindrance to improving health care. Since this is deeply rooted in the history and social customs of Papua New Guinea, it is not possible to make immediate improvements. Currently, of the expenditures made at a given hospital, hospital administrators (hospital superintendents) have solid information only on personnel costs. Other costs such as drugs, equipment repair, etc. are handled by the Department of Health and the Department of Works. Thus, the hospital superintendent is unable to know how much was spent in a year for equipment repair. This situation is also similar for the spare parts depots and other aspects of the medical equipment that are being considered as part of the problems that should be considered as the approaches for Papua New Guinea's hospital administration.
- 8) In regard to the medical equipment aspect, each hospital serves as the central health care facility for its province and thus has the role of serving as the general hospital. Thus, it's necessary to provide the minimum medical equipment required by the basic examination and treatment departments and the support functions. However, the chronic staff shortage and the poor

condition of the health care budget, means that replacement of old equipment, maintenance of existing equipment, and installation of needed new equipment cannot be accomplished as necessary.

(2) Problems of Individual Hospitals

1) Kundiawa Provincial Hospital

- a. The outpatient building which was constructed in 1980 is the newest facility in the hospital. However, due to insufficient drainage for rainwater runoff on the grounds, inappropriate foundation and structure frame, uneven settling and warping is occurring. This is impossible to rectify and it would be a waste of money to repair/remodel this building as a medical facility.
- b. The operating theatre, labour room, and CSSD are both decrepit and too small to have the capability to meet current demand.
- c. Deterioration of the wards and service facilities are advanced and rainwater runoff is eroding surface soil by the foundations of these buildings. The patient toilets and showers facilities are particular problems.
- d. The river on the south side of the grounds serves as the water supply for the hospital. The effectiveness of filtering, softening and disinfection of water drawn from the river is uncertain and is a problem from water quality and sanitary standpoints.
- e. The site of this hospital has an overall slope of about 10%, rain water runoff from upslope flows into the grounds, and construction work for the facilities on such a site is costly.
- f. The lack of medical equipment of the various areas is undeniable. Supplying appropriate equipment for the labour room and operating theatre are especially urgent. Also, the pathology facilities should be sectionalized as far as practical and laboratory work should be conduct-

ed by ward in order to more rationally locate equipment.

2) Rabaul Nonga Hospital

- a. The space of the outpatient department is very small compared to the increase in number of outpatients and is very crowded. Remodeling including waiting space is an urgent need.
- b. The emergency outpatient area had inadequate space, especially the minor operating theatre is almost unused because it's too small. Also, the transport of emergency patients is the view of all as the entrance to the emergency outpatient is in the center of building and the relationship with the surgical building has not been considered at all.
- c. In order to make the arrangement and order of the dispensary storage area easier, the storing system should be improved.
- d. The administrative units are divided by health care area and are scattered and the cramped work space is too small for efficiency. These should be combined and a environment suitable for efficient work be created.
- e. The rooms where the x-ray department and blood bank are located are inappropriate environment for the needs of these units and termite damage to this building is very advanced and the need to improve these facilities by rebuilding is urgent.
- f. The buildings where the CSSD and physiotherapy are located are heavily damaged by termites and rebuilding of these facilities is urgent.
- g. The intermediate ward and the obstetrics and gynecology building are also damaged by termites and this needs to be dealt with.
- h. Ultrasonic diagnostic equipment, electrocardiograph, equipment for the ICU, and other diagnostic and treatment equipment should be installed to allow the hospital to fulfill it's role as a base hospital.

3) Wabag Health Centre

- a. The maintenance and management of this facility has major problems. The facility does not provide examination and treatment meeting the standards of the Department of Health.
- b. The administrative system that allows health care activity in an environment littered with abandoned and dirty things is a greater problem than the physical deterioration of the buildings.

4) Madang Provincial Hospital

- a. The outpatient department is very small compared to the number of outpatients and there are not enough treatment rooms.
- b. Pathology departments are too small and inadequately equipped.
- c. The location of the dispensary is inconvenient for patients and the space is too small. Also, adequate equipment including sufficient shelves are not available.
- d. Termite damage of buildings is advanced.
- e. Drainage for rainwater runoff is inadequate and the flooding of the outpatient building and obstetric ward which are located in a lowest part of the site during heavy rains is major sanitary problem.
- f. The lack of adequate amounts of medical equipment for the various departments and wards is notable and there is urgent need to provide adequate equipment to treat the annually increasing outpatient load.

5) Kerema Provincial Hospital

- a. The location of the outpatient department relative to movement of patients cannot be said to be appropriate and the treatment rooms are

very small.

- b. The emergency generator and the sterilizing equipment for the operating theatre have been installed but since the necessary wiring and pipes have not installed, this equipment has not been used in the years since installation.
- c. The x-ray room is not properly shielded and the fact that mother and child health is carried out in the area around it is a problem.
- d. The pathology laboratory is too small to serve as a proper working area.
- e. The dispensary is inconvenient because it is located away from the outpatient building. The work space and the pharmaceutical storage area are too small.
- f. Leaks due to the deterioration of the roofs was observed in places.
- g. The emergency casualty entrance does not have a roof and considering that this area of Papua New Guinea is very rainy, this is inconvenient for arriving patients. The emergency operating theatre is too small and the operating light was out-of-order.
- h. The incinerator does not have a roof and is exposed to rain.
- i. Water supply pressure is low and interferes with water supply. The mixing of well and city water is an issue.
- j. The infiltration of drain water from septic tank into the ground may be questionable due to the use of wells for drinking water by local residents.

6) Daru Provincial Hospital

- a. The administrative offices are dispersed.

- b. As the entire facility is raised and there is not ramp, moving emergency patients into the hospital is a major burden for nurses.
- c. The x-ray room is small and is not properly shielded. The pathology laboratory has 5 specialist working in a 15 m² space and is extremely small and the work tables are not appropriate. The pharmaceutical warehouse in addition to being too small had little equipment and the management of the stores is a problem. The dispensary is small and the location cannot be said to be appropriate.
- d. The medical records room is small and the lack of shelves, etc. means that records cannot be properly arranged.
- e. Many of the hospital's service facilities are inadequate and the location of the laundry and food storage below the main floor may be a large sanitary problem. The incinerator does not have a roof despite this being a very rainy climate.
- f. Due to the pump being out-of-order, the elevated water tank was not being used and the water pressure was very low. Sewage is discharged untreated and rainwater runoff handling is inadequate. Installation of appropriate waste water facilities are necessary.

7) Vanimo Provincial Hospital

- a. The facilities for this hospital which were built when the hospital was established with the exception of 1 - 3 wards where diagnosis and treatment are carried out are very small and makes it very difficult to deal with the increasing case load and can be said to be completely inappropriate.
- b. The operating theatre while being a major operating theatre is smaller than the usual minor operating theatre and does not have an ante room. Thus, it is possible to enter directly from outside. As a operating theatre it does not have the minimum required environment.

- c. The CSSD like the operating theatre be entered directly from outside and although it is adjacent to the operating theatre, supplies for the operating must be first be taken outside. It only has space equivalent to a operating theatre preparation room and is completely inappropriate relative to the scale of the hospital.
- d. The labour room does not have an ante room and is entered directly from outside. There is only two labour bed which is completely inadequate compared to demand. Not only space but the environment needs to be expanded and improved.
- e. The x-ray room is only about 6 m² compared to the Papua New Guinea standard of 36 m² and is extremely small. Improvement to provide an appropriate working environment is unavoidable.
- f. The pathology laboratory was converted from a old ward building and each space is very small and the space is inadequate relative to the required function.

As described above, it is clear that each of hospitals that were the subject of this study have a number of problems which need to be dealt with rapidly. This redevelopment project assumes the points listed in 3.1:

- (1) Staff available to operate hospitals and operation budget will not be increased over current levels
- (2) Current number of beds and health care staff will be maintained at current levels
- (3) Equal medical service will be provided to the populace

The based on a clear understanding of the situation of the hospitals included in this project, the appropriateness and necessity of rapid response to these needs was recognized to be very high.

3.2.2 Examination of Operating Plans

This project is one of the elements making up the Provincial Hospital Redevelopment Project which is part of the Government of Papua New Guinea's 5 Year Plan. This project will be implemented with the cooperation of the Department of Health, Department of Works, Provincial Governments, and mainly the provincial hospitals involved. After implementation of this project is completed, the operation and administration of the facilities of the hospitals will be conducted by the hospitals as it is currently with the Department of Health, Department of Works, and Provincial Governments supervising and cooperating in the operation.

(1) Examination of Staff Allocation Plans

After implementation of the project, it cannot be expected that the increasing of the hospitals' staff. Thus, one of the conditions for implementation of this project is that the current staff will be able to operate the facilities after implementation is completed. However, for all of the facilities, increases in the capability and number of staff is desirable for future improvements in health care services. The following table shows the staffing of the proposed hospitals being reviewed for this project.

Table 3.2-1 Proposed Hospitals Principal Staff and Allocation

Hospital Name	Doctor	Nurse	Others	Total
	[include Assistant Doctor]	[include Nurse Aid]		
Kundiawa P.H.	7	97	34	138
Rabaul Nonga B.H.	22	168	125	315
Madang P.H.	12	154	88	254
Wabag H.C.	1	16	68	85
Kerema P.H.	2	24	15	41
Daru P.H.	3	30	40	73
Vanimo P.H.	3	26	38	67

Source: Data Collected by Field Survey

(2) Examination of Budget Allocation and Plans

The operating budgets for the hospitals is as shown in Table 2.2-12 "Operation Budget for Proposed Hospitals". In regard to operation budgets, there is a substantial difference between hospitals. This has a strong linkage with the fiscal condition of the provincial government to which the operation of the hospital has been entrusted. Thus, although it is understood that this will be difficult to improve immediately, it will be necessary to improve this in order to achieve the objective of providing equal health care service. As the major part of the operating budget is related to personnel costs, the central and provincial governments will need to make even greater efforts. For provincial hospitals as shown in Table 2.2-11 "Budget Items Supporting Provincial Hospitals, etc.", the personnel costs for physicians for provincial hospitals, repair of medical equipment, supply of drugs and other budget items are borne by the budget of the Department of Health and not directly by the hospitals.

3.2.3. Examination of the Requested Facilities and Equipment

(1) Examination of Requested Facilities

The hospitals included in this project as confirmed by a field study need to *improve their facilities in order to maintain health care quality and serve increasing demand for health care service*. The details of the requested facilities will be examined based on the current status of each hospital and discussions with officials concerned of the Government of Papua New Guinea.

1) Kundiawa Provincial Hospital

The rebuilding, expansion, and repair of existing major facilities on the current grounds of the Kundiawa Provincial Hospital is requested. The facilities planned for rebuilding are of wooden construction and over thirty years old. The deterioration of these buildings is marked and it would not be *worthwhile to repair these buildings*. In addition to the deterioration of the building, rebuilding was considered to be appropriate for the reasons discussed below.

Wards

The various facilities that should be attached to each ward building (examination rooms, treatment rooms, isolation rooms, dirty utility room, etc.) are either insufficient or do not exist and are a hindrance to nursing care.

Labour Room

The space is inadequate and the number of labour beds (2) are insufficient to meet demand.

Operating Theatre

Overall space is inadequate. Although there is one main and one small operating theatre, the hospital does not have an emergency outpatient facility and this is insufficient in relation to demand and a preparation room is being used for minor operating room. Also, there is not a proper recovery room and part of a hall is being used for this purpose. Other facilities including the CSSD do not have appropriate area or environments.

Administration

The various rooms used by administration are small and scattered so there are a number of inconveniences. Space of appropriate area close together is necessary.

Other Service Facilities

The kitchen and staff mess, ration store, laundry room, incinerator, workshop, and mortuary are all more than 30 years old.

Outpatient Building

This facility which was built in 1980 does not show signs of deterioration from age so it will not be rebuilt. Also, the plan to expand and remodel the

building to expand currently inadequate medical office examination rooms, pediatric outpatient, obstetric, and family planning outpatient is understandable. However, since aspects of the foundation and structure frame of this building are inappropriate and the problem of warping of the floor and walls is evident, this plan cannot be said to be appropriate.

The original request was for construction to take place at the current site of the Kundiawa Provincial Hospital. However, since the site is sloping and the ground is unstable, construction of a new hospital at a new site based on the original plan and needs has been requested.

In regards to this reason, the slope of the entire site is about 10%. It was confirmed that the surface soil was very weak because it readily absorbs water and the presence of an impermeable layer of clay beneath the surface soil. In addition, part of the foundation of the existing outpatient building has sunk unevenly and bending of the building has occurred. Given the structural problems with the building, remodeling will be an wasted investment. Since most of this project excluding the outpatient building is for rebuilding facilities and given that construction costs on a site of this type are relatively high, it was thought that construction of a new facility at another site would be appropriate.

The following three sites were proposed as candidates for construction the new hospital facility:

Site 1

This is 5.23 ha flat site owned by the government and currently the site of a Technical Training School. It is located across a valley on the southeast side of the runway Simbu Airport and approximately 1.2 km from the center of the city. City water supply and electric supply is available within the site. The current waste water uses a septic tank and a percolation field. As a project, there are no problems with road access, water supply, and electric power. In regards to waste water, it is 3 km to the public sewer system which is at a high elevation and the handling of waste water must be con-

sidered. Also, the existing buildings must be demolished and removed as part of the site preparation.

Site 2

This site is in an area of rolling hills of 10 - 15 m elevation at the end of the residential district stretching from the east side of the center of the city. The candidate site is currently owned by the Lutheran Church and apart from an abandoned church at the top of the hill, there are no other buildings on the sites. Water, waste water, and electric power supply can be easily connected from the residential district and there is no problem with access roads. However, in order to construct the various hospital facilities, large scale earth moving would be required for site preparation.

Site 3

This site is located 3 km to the north of the center of town and is a privately owned field. Although there are a number of ups and downs, overall the site is relatively flat and 5.61 ha in area. There is currently no water, waste water, or electric power on the site and lines would have to be laid for about 3 km to connect to these services.

When the location, topography, status of infrastructure in the vicinity of the candidate sites, and the acquisition status was considered and discussed, Site 1 which is owned by the government was selected and the Papua New Guinea side concurred.

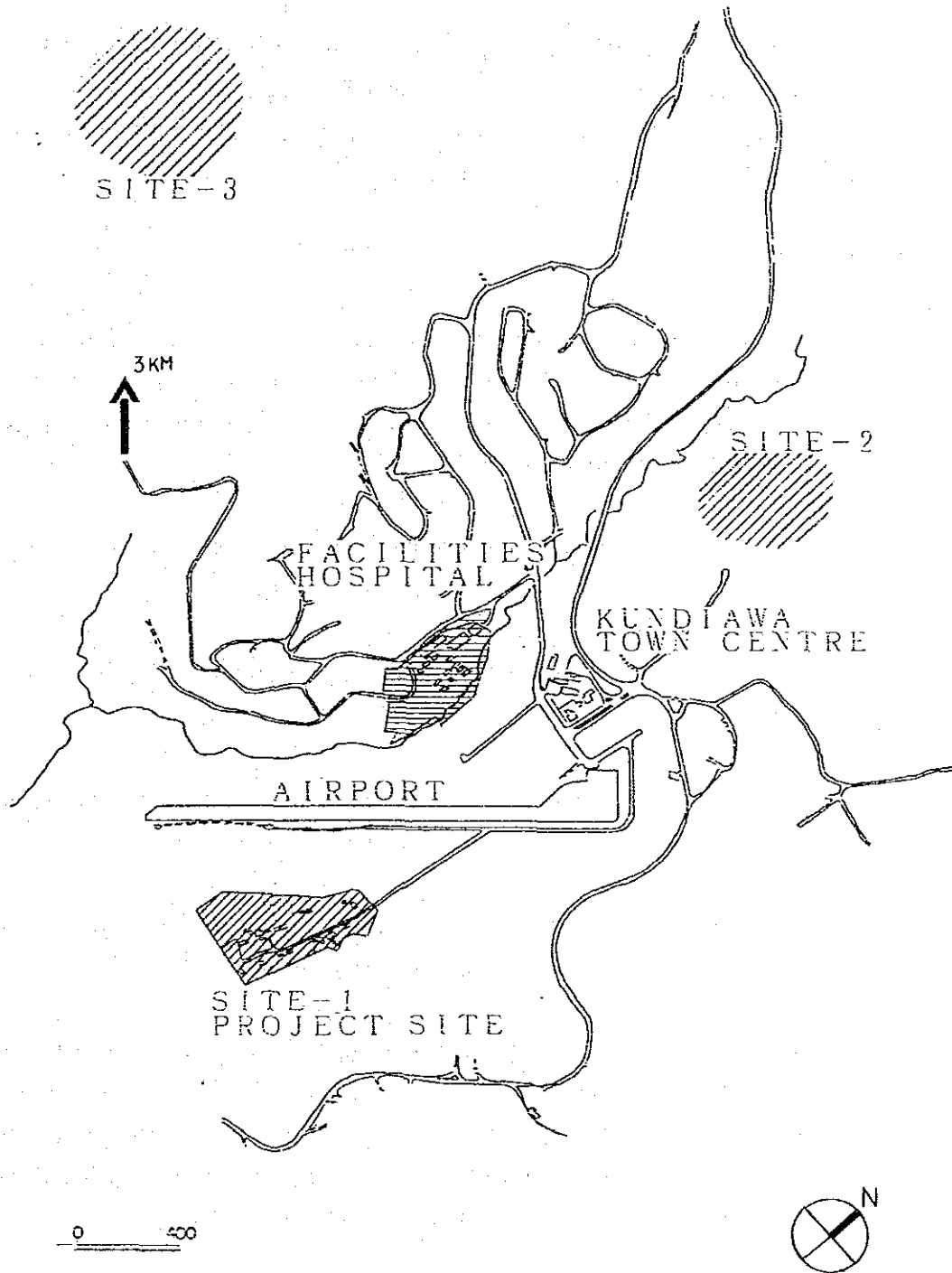


Fig. 3.2-1 Location of Three Sites Prepared as Candidates

2) Rabaul Nonga Base Hospital

All of the facilities listed in project request are new construction and these facilities are prioritized. From that list, those being considered for the project are those that are requested as being urgent and the appropriateness of these facilities is considered below:

Outpatient

- (1) Waiting, examination and treatment rooms for general and pediatric outpatient are too small for the expanding patient demand the extreme crowding caused by the small facilities which is a big impediment to diagnosis and treatment activity.
- (2) Emergency outpatient has inadequate space, especially the minor operating theatre is too small and is hardly used at all.
- (3) Specialty outpatient has only 2 examination rooms which is insufficient.
- (4) As there is not dental outpatient at the present time, local residents must go to the dental clinic in the center of Rabaul for treatment.
- (5) The dispensary was expanded in response to need and the formulating room and store room are not appropriately located.
- (6) The above are in the outpatient building which has deteriorated with age and the individual facilities are extremely small. The administrative offices due to the priority on the health care areas for improvement and expansion are currently scattered within a 100 m long building which is inconvenient for normal operations.

Laboratories

- (1) The x-ray room has inadequate shielding. In regard to the various rooms attached to the x-ray room, the corridor is the waiting room, the

darkroom is small, and there is no room for the staff.

- (2) The blood bank has inadequate capability for its role and the refrigerator for storing blood and blood products is located in the corridor.
- (3) The pathology department is located in the same building which was observed to be badly damaged by termites

CSSD

- (1) This building is badly damaged by termites.

ICU

- (1) Currently a single bed in the corner of the intermediate ward building is setup as the ICU which is inadequate as far as the number of beds is concerned while the utilization of the intermediate ward is low.

In addition to the above, the construction of one or two major operating theatres was added to the request as a first priority. However, it is probable that if the emergency outpatient were properly equipped and effective use was made of the existing operating theatres that these demands could adequately be met. The obstetrics and gynecology ward building, general ward building, and service facilities raised second and third priority are probably not urgent needs.

3) Wabag Provincial Hospital

The requested facility would be a government related provincial hospital and would be an eighty bed general hospital facility. This hospital would serve as the primary health care center in the Wabag region while also serving Enga Province and the surrounding highlands area as the referral hospital providing secondary health care service. The appropriateness of the details of the request were considered taking this into account. However, the health care staff of the Wabag Health Centre who would become the core of the operation of the new hospital probably do not have the capability

to operate a new hospital properly. Until an appropriate staff can be assembled, delay in construction of a new hospital is unavoidable.

4) Madang Provincial Hospital

This hospital was built in 1961 and been used for 30 years. The initial request was for expansion and rebuilding of the outpatient building and remodeling of the majority of the other existing facilities. However, the deterioration of the existing facilities has proceeded steadily and there are differences in the degree of termite damage to the buildings. Space allocated to most of the departments is very small and it is difficult to smoothly meet the growing demand for diagnosis and treatment. The request has been modified to request construction of new facilities for those areas where the need for remodeling was high. The appropriateness of these requests is considered based on the needs for the facilities discussed below and the status of deterioration.

Outpatient

- a. The Outpatient Department is small compared to the number of patients and there are few examination and treatment rooms. The waiting room is especially small and extremely crowded.
- b. Pediatric outpatient is located in another building which is inconvenient because it is in a different area.
- c. Emergency outpatient only has a treatment room and along with the lack of necessary facilities, access to related facilities is inconvenient.
- d. Due to the location on the lowest part of the site, flooding of the floors can occur after heavy rains.

Administration

The rooms used by administration are located in the outpatient building and scattered within the 90 m long facility. The space available is very

small and operations are inconvenient.

Dispensary

The dispensary is located away from outpatient and in a building close to the wards. It is inconvenient to have large numbers of outpatients in the area of the wards and it is inconvenient for the outpatients. Also, the space is inadequate.

Pathology

The Pathology Department occupies an area of only 30 m² which is too small and conducts its studies there. In addition, since the blood bank does not have a laboratory, necessary work is performed here.

X-ray

While the x-ray room and darkroom are appropriate facilities, there is no waiting room or locker room.

Obstetric Ward

The floor space of the ward installed 30 beds cannot be said to be adequate for demand.

Full Nursing Ward

Currently part of the intermediate ward building is used for the full nursing ward. The utilization rate of the full nursing and intermediate ward is low. Also, installation of an ICU facility is underway.

As the floors of the Obstetric Ward and Intermediate Ward Buildings are at the same level as the Outpatient Building flooding can occur during heavy rains.

5) Kerema Provincial Hospital

Except for the operating theatre and the kitchen and mess facilities, the remaining facilities were built during the second half of the 1960's and are relatively new for provincial hospital facilities in Papua New Guinea and can be said to be in comparatively good condition. The request mainly includes expansion, remodeling, and repair of existing facilities. The appropriateness of this request is considered in relation to the facilities that are the subject of the request.

Wards

Leaks of rainwater were observed in places due to deterioration of the roofs.

X-ray

Shielding is not installed.

Pathology

Laboratory space is small.

Outpatient

The MCH Outpatient, Dispensary, and Medical Records Room are not located with Outpatient.

MCH Outpatient, Dispensary, Medical Records

Inconvenient location away from the Outpatient Building.

Service Facilities

The capabilities and environment of the laundry room, patient showers, sink, and toilets are below standards.

Water Supply Facility

Because water supply pressure is low, it is difficult to provide appropriate water supply to the various facilities.

6) Daru Provincial Hospital

This hospital was built in 1963 and nearly 30 years have passed. Requested facilities include construction of new administration and wards and remodeling of other facilities. Deterioration of these facilities is advanced and the requests for each of the facilities is considered to be appropriate for the reasons listed below.

Administration

The various rooms used by administration are scattered and inconvenient to use.

Wards

The 81 beds currently available are inadequate compared to the demand for hospitalization.

Laboratory

The x-ray room and pathology laboratory are small, especially the pathology laboratory which has only 15 m² is too small compared to standards. This limits the content of work that can be conducted.

Outpatient and Dental

Repeated changes in scale have made the coordination between the various diagnosis and treatment rooms bad.

Ablution

Ablution are out-of-order and temporary facilities are being used.

Water Supply and Waste Water

Low water pressure hinders providing appropriate water supply while the waste water treatment tank was not functioning.

7) Vanimo Provincial Hospital

The facilities at this hospital are divided between those built in 1965 and relatively new facilities built in 1978 and 1987. Overall maintenance has been effective and the facilities are in good condition. However, the old facilities excluding the wards are small in scale and the groups located in these facilities are forced to conduct examination, treatment, and laboratory activities in extremely cramped spaces. The requests for the groups in the old facilities is considered to be appropriate for the reasons listed below.

Maternity Ward

The necessary attached facilities are so defective as be equivalent to being non existent.

Labour Room

The Labour Room is located away from the wards and since there is no anteroom, entry is directly from outside. The two labour beds are inadequate compared to demand and there is no space for increasing the number of beds in this space.

Operating Theatre

The operating theatre's area at 20 m² is extremely small and is equivalent to a minor operating theatre and is inappropriate for major surgery. There is only one entry door which opens directly outside due to the

lack of a ante room which shows that sterility management was not considered. This facility does not meet the minimal environment requirements for an operating theatre.

CSSD

The CSSD is 10 m² which is the scale for a sterile supply preparation room attached to an operating theatre. This is inadequate when compared to overall scale of the hospital and the direct entry from outside is inappropriate.

Pathology

The facility which was remodeled from an old ward had inadequate space. The blood bank which is located in the building is not equipped with the appropriate facilities.

X-ray

The x-ray room is extremely small, about 6 m², with a mobile unit installed in it.

Dental Clinic

The dental clinic has appropriate equipment but the facility itself is a temporary prefabricated building.

Specialty Outpatient (MCH, STD)

These are located away from the main facilities and the linkage with other disciplines is not convenient. In addition the facilities are too small.

Administration

The offices are scattered and the area of the rooms is small. There are

many inconveniences for operations.

Patient Toilet and Shower

While the scale and capability are good, the location away from the wards makes their use inconvenient.

Mortuary

The current mortuary was not built for that purpose and refrigerated storage and an autopsy table were located in an existing facility. There is no water supply and drainage, and location is not appropriate.

(2) Consideration of Requested Equipment

The request for medical equipment will not be discussed in detail here as "it will be determined based on the Basic Design Study". The basic design on the medical equipment is prepared with regard to the equipment needed in the departments for each hospital other than the existing equipment available to relocate and use and those departments are the subject of this facilities redevelopment plan.

1) Kundiawa Provincial Hospital

As rebuilding of the entire facility is being considered, the installation of medical equipment must take into account the capabilities required for the overall diagnostic and treatment system for diagnosis, examination, treatment, and recuperation. At the time of the field study, the main equipment requested by the hospital included ultrasound scanner, endoscope, nebulizer, plaster cutter, doppler, and other maternity and surgical equipment. This is needed for the hospital to conduct it's necessary diagnosis and treatment.

2) Rabaul Nonga Base Hospital

The needs of the various diagnosis and treatment areas in outpatient building, laboratories, dispensary, CSSD, and other areas which are the subject

of this development project, existing equipment, and the role of the hospital as a base hospital must be taken into account in preparation for the medical equipment plan.

During the field study, the main equipment requested by the hospital, glucometer, ICU bed, cardiac monitoring set, ultrasound scanner, electrocardiograph unit, nebulizer, cardiac pacemaker, etc.. Within the remodeling project, there is more than adequate necessity for the ICU room, ultrasonic diagnostic and electrocardiograph apparatus.

3) Wabag Health Centre

Since as a result of the field study it was obliged to defer the construction of a new hospital, consideration on medical equipment was suspended.

4) Madang Provincial Hospital

General outpatient, Pediatric, Obstetric, and Emergency outpatient, ICU room, full nursing room, blood bank, and dispensary are the subject of this redevelopment project. This hospital from the number of outpatients, number of beds, health care staff, population of the hospital's service area, and other factors approaches the scale of a base hospital. The demands for health care services must be adequately reflected in the preparation of medical equipment.

During the field study, the equipment request by the hospital included ultrasound scanner, examination room equipped with electrocardiograph, ICU, establishment of a full nursing care room, and establishment of rationalize diagnostic system for general outpatients. It was recognized that installation of the requested equipment would make a major contribution to the diagnostic and treatment activities of this hospital.

5) Kerema Provincial Hospital

This hospital is located in a malaria region and the population in the service area is also limited. However, this hospital must provide a wide range

services in the field of secondary health services. Because of the wide range of demands, there is adequate justification for the installation of the medical equipment. Because this hospital is located in a rural area, the response of specialists in the maintenance and repair of medical equipment is often slow. Thus, the equipment to be installed should be as maintenance free as possible.

6) Daru Provincial Hospital

The facilities that are requested for the redevelopment project are the wards with high demand for hospitalization, the x-ray room and pathology laboratories, and the general outpatient areas. As with the Kerema Provincial Hospital, this hospital serves as the central hospital for Garufu Province and adequate medical equipment is required to meet the needs of secondary health care services provided.

7) Vanimo Provincial Hospital

As a result of the field study, especially the operating theatre, labour room, x-ray room, and pathology laboratories were found to be extremely small and deteriorated to the extent that appropriate service could not be provided. Thus the redevelopment project and the installation of appropriate medical equipment is necessary.

3.2.4. Basic Policy of Implementation of Cooperation

(1) Role of Project Hospitals

Within Papua New Guinea's health care system, the 7 hospitals which are the subject of this project have the following roles.

1) Kundiawa Provincial Hospital

- a. Referral hospital for Simbu Province
- b. Primary health care center for the Kundiawa area

- 2) Rabaul Nonga Base Hospital
 - a. Referral hospital for Eastern New Britain
 - b. Base Hospital for 4 hospital near Eastern New Britain Province (Arawa, Kimbe, Kabiien, Lorengau)
 - c. Primary health care center for the Rabaul area
 - d. Training hospital for nursing school

- 3) Wabag Provincial Hospital
 - a. Referral hospital for Enga Province
 - b. Primary health care center for the Wabag area

- 4) Madang Provincial Hospital
 - a. Referral hospital for Madang Province
 - b. Primary health care center for the Madang area
 - c. Training hospital for Health Extension Officers and Health Inspector

- 5) Kerema Provincial Hospital
 - a. Referral hospital for Kerema Province
 - b. Primary health care center for the Kerema area

- 6) Daru Provincial Hospital
 - a. Referral hospital for Western Province
 - b. Primary health care center for the Daru area

- 7) Vanimo Provincial Hospital
 - a. Referral hospital for Sandaun Province
 - b. Primary health care center for the Vanimo area

(2) Health Care Statistics for Project Hospitals

Table 3.2-2 Proposed Hospitals Medical Service Record

Hospital Name	Beneficial Population	Outpatient (Person)		Inpatient per/year	Number of Bed
		per/year	per/day		
1. Kundiawa P.H.	192,000	123,000	410	8,600	250
2. Nonga B.H.	172,000	153,200	510	14,400	450
3. Wabag P.H. (Wabag H.C.)	190,000 (47,800)	(37,900)	(130)	1,758	(74)
4. Madang P.H.	275,600	240,000	800	8,700	405
5. Kerema P.H.	77,000	15,000	50	1,023	80
6. Daru P.H.	101,500	48,000	160	4,860	81
7. Vanimo P.H.	138,600	84,000	280	1,558	134

Source: Data Collected by Field Survey

(3) Priority of Hospital for Project and Cooperation Implementation

In regard to the requested project, discussions with the Department of Health of the Government of Papua New Guinea confirmed that it had judged that the most effective use of Grant Aid Cooperation from the Government of Japan in the implementation of the Provincial Hospital Redevelopment Project would be to place emphasis on assistance for those hospitals with the highest degree of urgency among the hospitals considered for the project. Based on the roles of the hospitals discussed in (1), the health care statistics in (2), and the results of the field study, discussions were conducted with the Department of Health of the Government of Papua New Guinea to set priorities for the implementation of the project. The following groups were agreed upon:

First Priority Kundiawa Provincial Hospital
 Rabaul Nonga Base Hospital

Second Priority Madang Provincial Hospital

Third Priority Wabag Provincial Hospital
 Kerema Provincial Hospital
 Daru Provincial Hospital
 Vanimo Provincial Hospital

The result of discussions of contents of the requests, the details of the facilities requiring improvement, scale, the health care record, and the effectiveness of the facility improvements, the reasons that will be presented later, the highest priority hospitals, Kundiawa Provincial Hospital, Rabaul Nonga Base Hospital, and the Madang Provincial Hospital were selected for inclusion in this Government of Japan Grant Aid Cooperation Project. It was concluded that this would be the most effective possible contribution to improving the health care situation in Papua New Guinea. The reasons for judging that Government of Japan Grant Aid Cooperation would be most effectively used for these three hospitals is as follows:

- i. The Kundiawa Provincial Hospital and Mount Hagen Base Hospital would have a synergistic effect in the highlands where the population is high.
- ii. The Rabaul Nonga Base Hospital in the Papua New Guinea health care system serves as the referral hospital for the island areas. As the area that it serves is very wide, expanding and improving the facilities is anticipated to be effective in the support of its subordinate health care facilities.
- iii. The Madang Provincial Hospital serves as the referral hospital for the north coast area of New Guinea. It also serves as the training hospital for the students of the College of Allied Health Sciences. Thus, it is anticipated that the expansion and improvement of facilities will not only affect the limited area of Madang Province but through improving the training of the graduates of the CAHS, will have raised the level of primary health care throughout Papua New Guinea.

The hospitals that were not included in this Grant Aid Cooperation project based on the results of the Field Study and discussions from consideration of Papua New Guinea's health care system and degree of urgency also play important roles in the health care systems for their provinces. Thus, implementation of redevelopment projects for other hospitals is important in terms of fulfillment of the Government of Papua New Guinea's Provincial Hospital Redevelopment Project which is a key aspect of the effort to improve Papua New Guinea's care system.

3.3 Project Description

3.3.1. Operation and Maintenance

(1) Operating System of Implementing Organization and Hospital

The operating system for the project hospitals, Kundiawa Provincial Hospital, Rabaul Nonga Base Hospital, and Madang Provincial Hospital is the same for other provincial hospitals and is supervised by provincial governments as a trust from the Department of Health. The standard operating system for provincial hospitals is entrusted to provincial governments by the central government. At the working level, the medical superintendent operates his hospital under the supervision of the provincial government Health Division. Inside the hospital, the hospital secretary and the matron assist the medical superintendent. Also, in regard to health services, the medical officers responsible for each department, and the staff responsible for the radiography, pathological study, and other support function are responsible for the management of their department. The following is an organization chart. Also, the support of the Department of Health of the central government for operations is being received such as employment of physicians, procurement of drugs, and in the installation and maintenance of hospital facilities, equipment, and medical equipment.

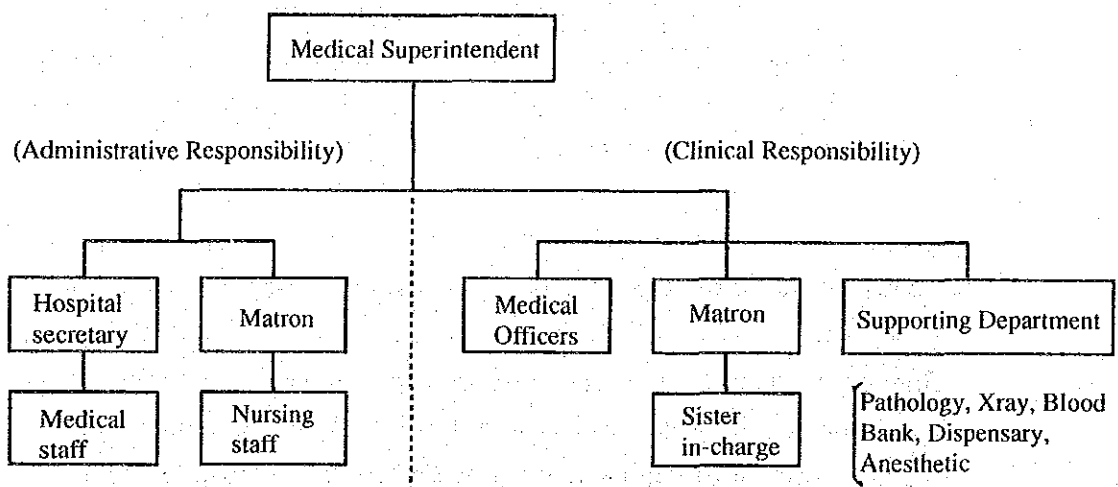


Fig. 3.3-1 Standard Organization Chart of Base/Provincial Hospital

(2) Kundiawa Provincial Hospital

1) Organization

The organization for operation of hospital established in conformity with standard organization of provincial hospital as stated in the above.

2) Constitution of Hospital Staff

The constitution of hospital staff in 1990 is shown on Table 3.3-1.

Table 3.3-1 Constitution of Staff for Kundiawa Provincial Hospital

Staff	Number of Person	Staff	Number of Person
Doctor (and Assistant Doctor)	7	Dental Aid	5
Nursing Officer	47	Medical Laboratory Technician	3
Nurse Aid	50	Medical Laboratory Assistance	1
Midwife	4	Pharmacist	1
Administratives	4	Housekeeper Aid	2
Dental Officer	1	Others	13
Total			137

Source: Data Collected by Field Survey

3) Operation Budget

The operation budget for Kundiawa Provincial Hospital is shown on Table 3.3-2.

Table 3.3-2 Operation Budget for Kundiawa Provincial Hospital

	1000 kina		
	1989	1990	1991
Salaries, Allowance	—	720.2	812.1
Travel and Subsistence Expenses	—	4.8	2.9
Utilities	—	37.4	34.0
Office Materials and Supplies	—	37.5	4.5
Operational Materials and Supplies	—	17.5	56.0
Transport and Fuel	—	31.1	8.0
Routine Maintenance Expenses	—	0.5	2.6
Other Operational Expenses	—	12.0	8.0
Retirement Benefits, Pensions, etc.	—	5.1	0.0
Office Furniture and Equipment	—	6.5	0.0
Purchase of Vehicle	—	0.0	17.0
Total	800.1	872.6	945.1

Source: 1991 Estimates of Revenue and Expenditures, Part 2

Since the doctor's salary, medical drugs and consumables supplied by area medical store and required cost for maintaining facility equipment and medical equipment executed by Department of works are shared by the budget for Department of Health, those cost are not included in the above table.

(3) Nonga Base Hospital

1) Organization

Nonga Base Hospital is a national function delegated to the East New Britain Provincial Government to administer and oversee its operations. The hospital is administered by an Executive Committee made up of Medical Superintendent, Hospital Secretary, Matron and Principal of School of Nursing and Assistant Secretary of the Division of Health within the Province. The Executive Committee is assisted with advice from Senior Staff

Committee. The Medical and Technical Division, Nursing Service Division and Administrative Support Division constitute the organization for operation of hospital at working level.

2) Constitution of Hospital Staff

The constitution of hospital staff in 1990 is shown on Table 3.3-3.

Table 3.3-3 Constitution of Staff for Nonga Base Hospital

Staff	Number of Person	Staff	Number of Person
Doctor (and Assistant Doctor)	22	Medical Laboratory Technician	14
Nursing Officer	88	Radiologist	3
Nurse Aid	58	Pharmacist	1
Administratives	98	Dispenser	2
Medical Technologist	1	Housekeeper, etc.	6
			293

Source: Data Collected by Field Survey

3) Operation Budget

The operation budget for Nonga Base Hospital is shown on Table 3.3-4.

Table 3.3-4 Operation Budget for Nonga Base Hospital

	1000 kina		
	1989	1990	1991
Salaries, Allowances, Wage, Overtime, etc.	—	1,536.5	1,876.1
Travel and Subsistence Expenses	—	14.0	15.0
Utilities	—	200.0	200.0
Office Materials and Supplies	—	3.0	60.0
Operational Materials and Supplies	—	242.5	200.0
Transport and Fuel	—	34.7	35.0
Routine Maintenance Expenses	—	4.5	32.8
Routine Maintenance Expenses (DOW)	—	—	7.1
Other Operational Expenses	—	100.0	90.0
Office Furniture and Equipment	—	33.9	8.5
Total	2,428.1	2,169.1	2,524.5

Source: 1991 Estimates of Revenue and Expenditures, Part 2

(3) Madang Provincial Hospital

1) Organization

The organization for operation of hospital was established in conformity with standard organization of provincial hospital as stated in the above 3.3.1-(1).

2) Constitution of Hospital Staff

The constitution of hospital staff in 1990 is shown on Table 3.3-5.

Table 3.3-5 Constitution of Staff for Madang Provincial Hospital

Staff	Number of Person	Staff	Number of Person
Doctor (and Assistant Doctor)	12	Dental Aid	7
Nursing Officer	81	Medical Laboratory Technician	3
Nurse Aid	73	Medical Laboratory Assistance	5
Midwife	7	Dispenser	2
Administratives	27	Others	36
Dental Officer	1		
Total			254

Source: Data Collected by Field Survey

3) Operation Budget

The operation budget for Madang Provincial Hospital is shown on Table 3.3-6

Table 3.3-6 Operation Budget for Madang Provincial Hospital

	1000 kina		
	1989	1990	1991
Salaries, Allowances, Wage, Overtime, etc.	—	1,228.8	1,181.8
Travel and Subsistence Expenses	—	6.4	6.0
Utilities	—	134.4	159.0
Office Materials and Supplies	—	0.3	6.0
Operational Materials and Supplies	—	195.6	181.0
Transport and Fuel	—	19.8	26.6
Routine Maintenance Expenses	—	4.0	24.5
Other Operational Expenses	—	17.2	33.0
Office Furniture and Equipment	—	—	5.0
Plant, Equipment and Machinery	—	—	6.0
Total	1,674.6	1,606.5	1,628.9

Source: 1991 Estimates of Revenue and Expenditures, Part 2