REPORT ON PRELIMINARY DESIGN STUDY FOR THE ESTABLISHMENT OF MAHARAJ HOSPITAL IN THE KINGDOM OF THAILAND

February, 1980

JAPAN INTERNATIONAL COOPERATION AGENCY

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FOR
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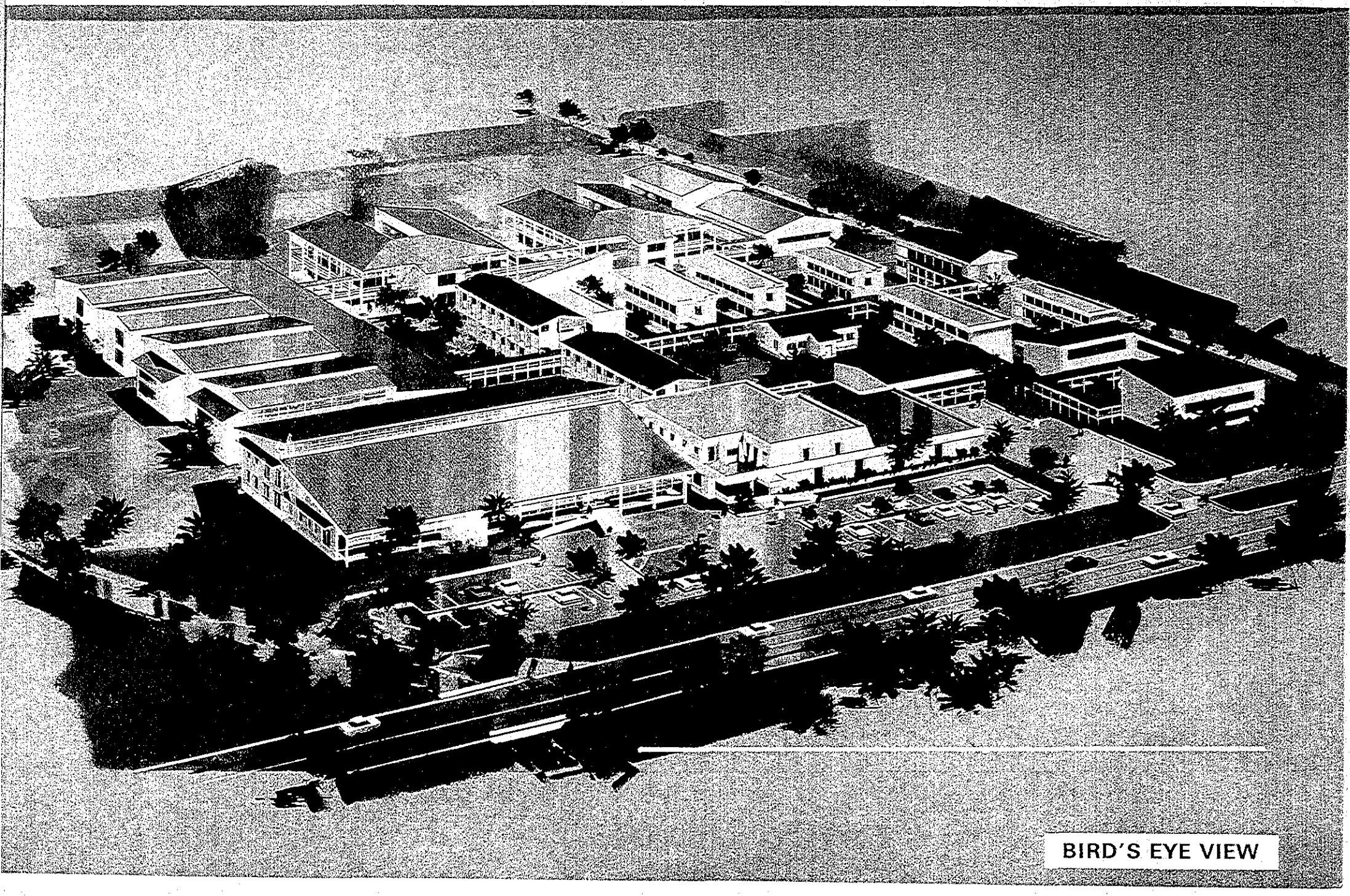
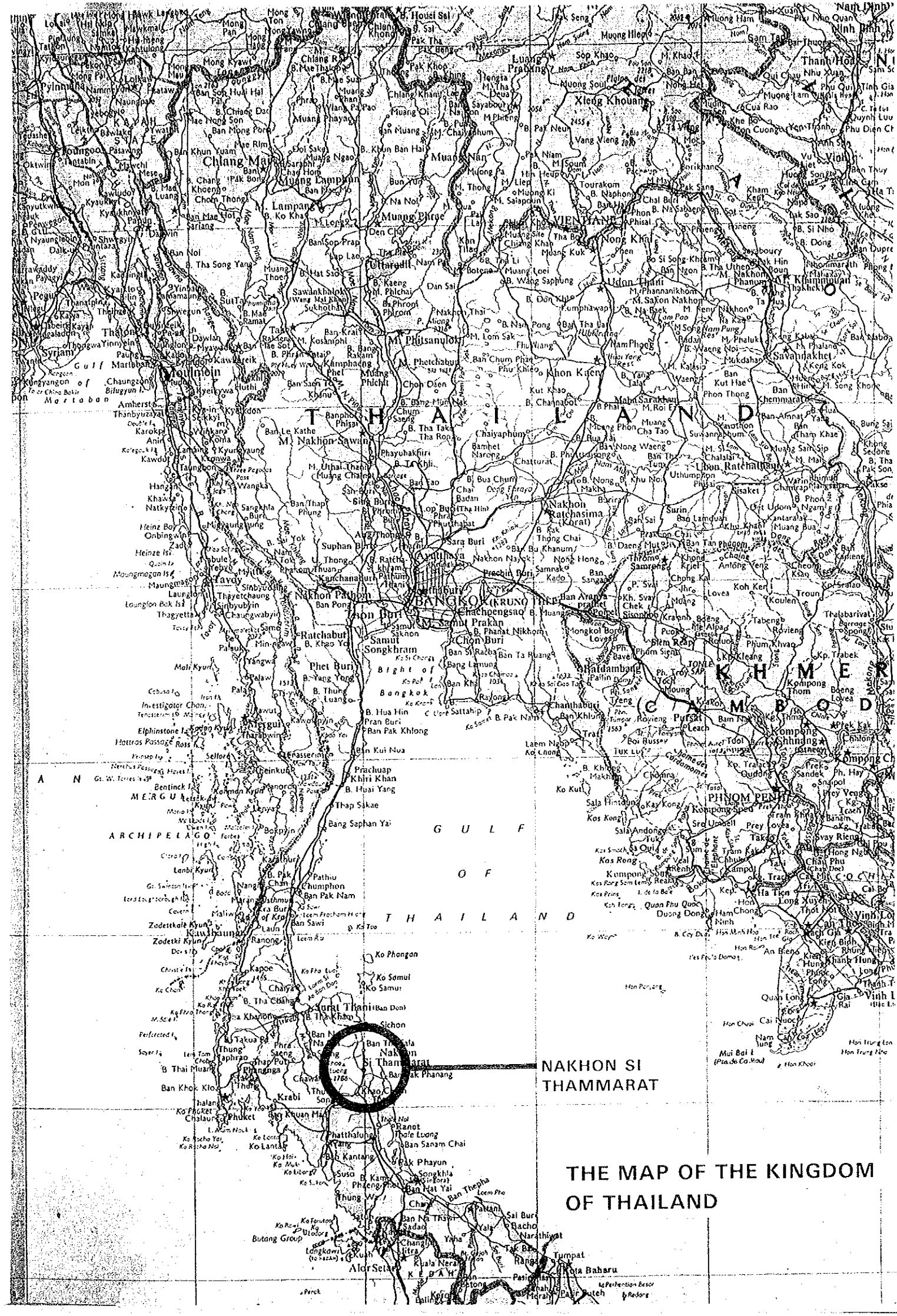
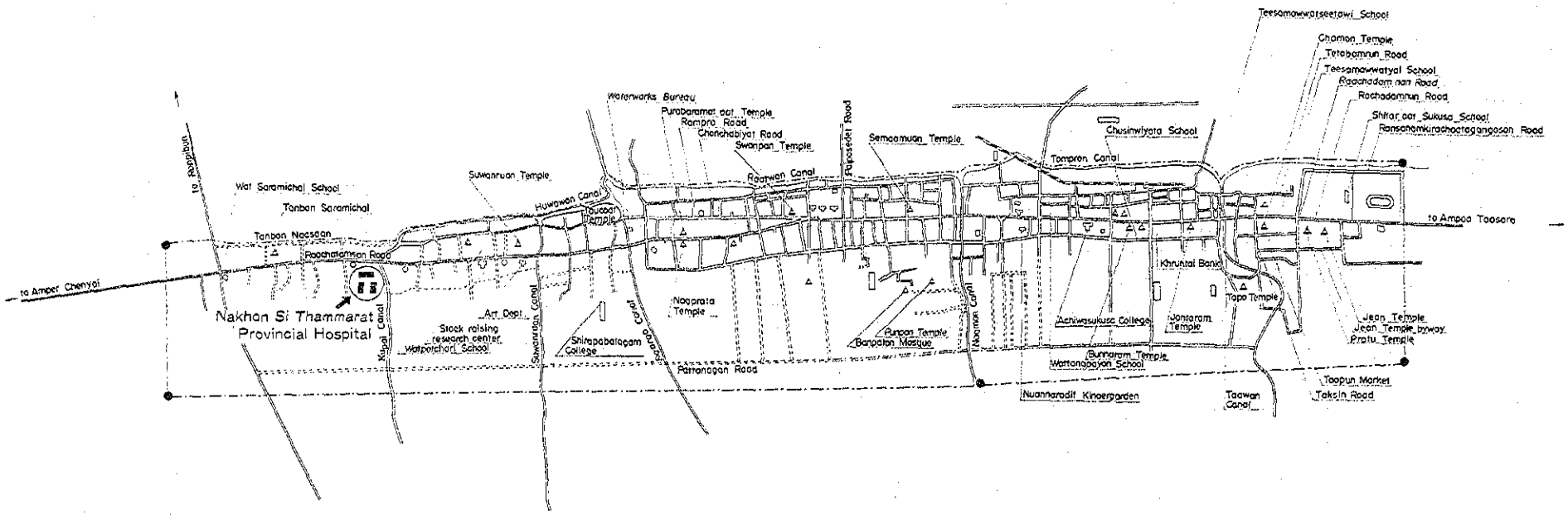
IN THE KINGDOM OF THAILAND



BIRD'S EYE VIEW


NAKHON SI THAMMARAT
THE MAP OF THE KINGDOM OF THAILAND

City of Nahkon si Thammarat



NAKHON SI THAMMARAT VICINITY MAP

Preface

P R E F A C E

In response to the request of the Government of the Kingdom of Thailand, the Government of Japan has decided to carry out a study necessary for the preparation of preliminary design for the establishment of Maharaj Hospital in the Kingdom of Thailand, and the Japan International Cooperation Agency conducted the study.

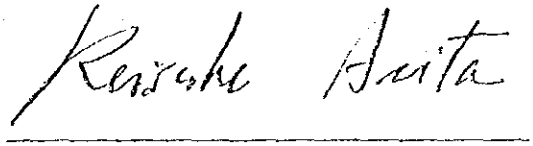
The Japan International Cooperation Agency, recognizing that the establishment of Maharaj Hospital in Nakhon Si Thammarat of southern Thailand, which aims at improving local medical service, will contribute greatly to the welfare of the local inhabitants, dispatched a preliminary design study team headed by Dr. Ichiro Momoi, Executive Director, Social Welfare Organization "Saiseikai" Imperial Gift Foundation Inc. to Thailand from December 2 to 22, 1979 for the purpose of obtaining data necessary for the preliminary design through the field survey and discussions with Thai authorities concerned.

The survey in Thailand was carried out smoothly with the extensive cooperation of the Ministry of Public Health and Department of Technical & Economic Cooperation. Upon its return to Japan, the study team made further studies and has compiled this report.

I hope that this report will contribute not only to the development of this project but also to the strengthening of the friendly relations between our two countries.

I express my hartfelt appreciation to the Government and the people concerned of the Kingdom of Thailand for their close cooperation extended to the study team.

February, 1980



Keisuke Arita
President
Japan International Cooperation Agency

REPORT OF PRELIMINARY DESIGN STUDY FOR THE ESTABLISHMENT OF MAHARAJ HOSPITAL IN THE KINGDOM OF THAILAND

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Summary

Summary

(1) Outline of the Project

Attaching great significance to the upgrading medical care services in the rural area, the Government of the Kingdom of Thailand has plans to construct regional hospitals, each with 1,000 beds, in four districts of the country.

One project is to expand and replenish the existing Nakhon Si Thammarat Provincial Hospital, in the southern part of Thailand. The outline of this project is as follows.

1) Construction of an outpatient building, a ancillary building and a service building for a hospital of about 1,000-beds class.

2) Construction of an inpatients' ward (including an ICU) with 400 beds.

3) A set of medical equipment for 1) and 2), above.

4) A set of building-related facilities.

(2) Relations with Existing Facilities

The main functions will be shared between the newly built buildings (those incorporated in this program) and the existing buildings (including those which are to be renovated by the Thai side) as indicated below.

	Involved in this program	Existing facilities used
Outpatient Department	o	
Outpatient Emergency		o
Ancillary department		
Laboratory	o	
X-ray	o	
Rehabilitation		o
Operation	o	
Delivery	o	
Pharmacy	o	o (part of preparation only)
Blood bank	o	
Central sterilizing supply	o	
Administration		o
Service department		
Food service	o	
Restaurant and tearoom		o
Laundry	o	
Electric and machine room	o (for the new buildings in this program only)	
Wards	400 beds	
ICU	12 beds	
Obsetric	68 beds	
Pediatrics	40 beds	
General	280 beds	

(3) Scale of the Project, Budget and Construction Period

Scale of New Buildings

Outpatient building	
Two-storied building of RC construction	3,000 m^2
Ancillary facilities building	
Two-storied, of RC construction	5,235 m^2
Wards	
Three 2-storied buildings of RC construction	4,650 m^2
Service building	
One-storied building of RC and steel frame construction	1,655 m^2
Connecting corridors, etc.	
One and two-storied, of RC construction	940 m^2
Total	15,480 m^2

In Phase I, the outpatient building, Ancillary buildings and a part of wards with a total floor area of 8,520 m^2 and some of the medical equipment are included and valued at about ¥1,600 million.

A construction period of 17 months would be required for Phase I.

Chapter 1
DISPATCH OF SURVEY TEAM

Chapter 1. Dispatch of Survey Team

1-1 Purpose of Dispatch of Survey Team

In accordance with a request of the Government of the Kingdom of Thailand, the study team from Japan was dispatched to carry out a field survey necessary for the preparation of a preliminary design for the Maharaj Hospital which will be constructed in the Province of Nakhon Si Thammarat in the southern part of the Kingdom of Thailand.

1-2 Members of Study Team

1-2-1 The study team was organized by its leader, Dr. Ichiro Momoi, Executive Director of the Social Welfare Organization, "Saiseikai", an Imperial Gift Foundation Inc., and seven members.

Leader	Ichiro MOMOI, M.D.	Executive Director Social Welfare Organization "Saiseikai" Imperial Gift foundation Inc.
Member	Toru ISHII, M.D.	Professor Department of Clinical Pathology Showa University School of Medicine
Member	Jun-ichi ISHII, M.D.	Professor Department of Surgery Showa University School of Medicine
Member	Akio ITOH	Special Assistant to Director Social Development Cooperation Department Japan International Cooperation Agency
Member	Kazuo NAGATA	Senior Architect Nihon Architects, Engineers & Consultants, Inc.
Member	Haruhide OHNO	Engineer Nihon Architects, Engineers & Consultants, Inc.
Member	Takashi KUWANO	Engineer Nihon Architects, Engineers & Consultants, Inc.
Member	Shigeo NAGASE	Engineer Nihon Architects, Engineers & Consultants, Inc.

1-2-2 Members of Study Team for Explanation on Preliminary Design Draft Report

Leader	Ichiro MOMOI	(ibid)
Member	Akio ITOH	(ibid)
Member	Kazuo NAGATA	(ibid)
Member	Haruhide OHNO	(ibid)

1-3 List of Names of Persons Concerned in This Project in the Kingdom of Thailand

The persons concerns in this project on the part of the Kingdom of Thailand are as follows.

1-3-1 Officials Concerned in the Ministry of Public Health and the Hospital

H.E. Dr. Bunsom Martin:	Minister of Public Health.
H.E. Dr. Sem Pring-Puang-geo:	Minister of Public Health.
H.E. Dr. Krasae Chanawong:	Deputy Minister of Public Health.
H.E. Dr. Prakarb Tuchinda:	Under-Secretary, Ministry of Public Health.
Dr. Nuam Settachan:	Deputy Under-Secretary, Ministry of Public Health.
Dr. Amorn Nondhasuta:	Deputy Under-Secretary, Ministry of Public Health.
Dr. Kamol Sindhavanondha:	Director-General, Department of Medical Services.
Dr. Vikit Viranuvati:	Dean, Faculty of Medicine Siriraj Hospital, Mahidol University.
Dr. Sarote Attawipat:	Director, Rajwithi Hospital, Dept. of Medical Services.
Dr. Narong Sadudi:	Director, Provincial Hospital Div., Office of the Under-Secretary, Ministry of Public Health.

Dr. Rungsun Mahasuntana:	Assistant Director, Provincial Hospital Div., Office of the Under-Secretary, Ministry of Public Health.
Mrs. Chintana Kasemsri:	Director, International Health Div., Office of the Under-Secretary, Ministry of Public Health.
Dr. Somsak Suebasaeng:	Regional Health Inspector, Office of the Under-Secretary, Ministry of Public Health.
Dr. Arvut Seangkla:	Provincial Hospital Div., Office of the Under-Secretary, Ministry of Public Health.
Mrs. Kaisri Tansiri:	Director, Construction Division, Office of the Under-Secretary, Ministry of Public Health.
Mr. Kriang Eksuwan:	Construction Division.
Dr. Chamlong Champaiboon:	Provincial Cheif Medical Officer.
Dr. Suphat Burapat:	Director of Nakhon Si Thammarat Provincial Hospital.
Dr. Yutthana Sincaparatsamee:	Hospital
Dr. Aroon Ratanaparikone:	Hospital
Dr. Samran Tannapai:	Hospital
Mrs. Nawapan Tannapai:	Hospital
Dentist. Vipas Leelaprute:	Hospital

1-3-2 Department of Technical and Economic Cooperation (DTEC)

Mr. Apilas Ostananda:	Director-General
Mr. Sutin Susila:	Member
Mr. Jiroj Itharattana:	Member

1-4 Timetable of Survey Team

1-4-1 Timetable of Preliminary Design Study Team

This study was conducted from December 2 to 22, 1979. The timetable was as follows.

Date	Daily Schedule
Dec. 2 (Sun.)	Leave Tokyo and arrive at Bangkok.
Dec. 3 (Mon.)	Pay a courtesy call at the Japanese Embassy and the JICA. Talk with officials concerned.
Dec. 4 (Tue.)	Make an observation of hospitals in Bangkok. Rajaviti Hospital: Make a tour of the site for an additional building and receive a briefing on construction in the Kingdom of Thailand from PWD officials. Sirarat Hospital:
Dec. 5 (Wed.) (National holiday)	Survey construction sites in Bangkok and collect data.
Dec. 6 (Thu.)	Survey hospitals in Bangkok. Samitivej Hospital Huchiewu General Hospital Attend a dinner hosted by the Ministry of Public Health.
Dec. 7 (Fri.)	Hold talks with the Ministry of Public Health.
Dec. 8 (Sat.)	Move to Haad Yai (by air) Survey hospitals in Hadd Yai. Hadd Yai Hospital: Make tour of the construction site and receive a briefing on the construction. Songkla University Hospital: Ditto

Date	Daily Schedule
Dec. 9 (Sun.)	Move from Haad Yai to Nakhon Si Thammarat (by car). Make a quick tour of the Nakhon Si Thammarat Hospital. Attend a dinner hosted by the Nakhon Si Thammarat provincial hospital.
Dec. 10 (Mon.) (National holiday)	Carry out an elaborate survey on the Nakhon Si Thammarat Hospital (surveying at the construction site, and a survey on the conditions of the buildings, medical care equipment and medical care delivery). Talk with hospital officials on the outline of the new hospital. Receive a briefing from local constructors on local construction and collects data.
Dec. 11 (Tue.)	Momoi, T. Ishii, J. Ishii and Itoh move from Nakhon Si Thammarat to Haad Yai (by car). Nagata, Ohno, Kuwano and Nagase: * Survey the inside of the Nakhon Si Thammarat Hospital's buildings. Survey and confirm boring points and the height of the filling. Survey the conditions of the facilities. * Receive a briefing from local constructors on local construction and collect data. * Receive a briefing from hospital officials.
Dec. 12 (Wed.)	Momoi, T. Ishii, J. Ishii and Itoh move from Hadd Yai to Bangkok (by air). Nagata, Ohno, Kuwano and Nagase: * Carry out a supplementary survey on the buildings of the Nakhon Si Thammarat Hospital.

Date	Daily Schedule
	* Carry out a field survey on a cement plant (Thung Song). * Talk with the electric officer (PEA) and the telegraph and telephone officer (TOT) and water works bureau officer, collect data.
Dec. 13 (Thu.)	Momoi, T. Ishii, J. Ishii and Itoh update the contents of the survey. Nagata, Ohno, Kuwano and Nagase make a field survey on the Surat Thani Hospital.
Dec. 14 (Fri.)	T. Ishii, and J. Ishii leave Bangkok for Tokyo. Momoi and Itoh put the collected data in order. Nagata, Ohno, Kuwano and Nagase move from Nakhon Si Thammarat to Thung Song and further to Haad Yai (by car). On the way, they make a tour of an agricultural school built with Japanese consultant in Thung Song.
Dec. 15 (Sat.)	Nagata, Ohno, Kuwano and Nagase move from Haad Yai to Bangkok (by air).
Dec. 16 (Sun.)	Put the collected data and the findings of the surveys in order and prepare the draft of a summary of discussion. Receive a briefing from local constructors on local construction.
Dec. 17 (Mon.)	Talk with the Thai Ministry of Public Health on the summary of discussion. Receive a briefing from local constructors on local construction.
Dec. 18 (Tue.)	Prepare the manuscript of the summary of discussion. Collect data and put them in order. Receive a briefing from local constructors on local construction.

Date	Daily Schedule
Dec. 19 (Wed.)	Report to the Japanese Embassy on the summary of discussion. Put the collected data in order. Receive a briefing from local constructors on local construction.
Dec. 20 (Thu.)	Conclude the Summary of Discussion. Put the collected data in order.
Dec. 21 (Fri.)	Put the collected data in order.
Dec. 22 (Sat.)	Momoi, Itoh, Nagata, Ohno, Kuwano and Nagase leave Bangkok for Tokyo.

1-4-2 Construction Plans for Maharaj Hospital in the Kingdom of Thailand Draft Explanation of Basic Design Survey Timetable

Date	Daily Schedule
Feb. 12 (Tue.)	Leave Tokyo and arrive in Bangkok.
Feb. 13 (Wed.)	A.M. pay a courtesy call at the Japanese Embassy and the JICA. Briefing on draft report and basic design plan. P.M. courtesy call to Thailand's DTEC, briefing. Pay a courtesy call to Thailand's Ministry of Health, briefing.
Feb. 14 (Thu.)	Detailed explanation and discussion concerning Thailand's Ministry of Health.
Feb. 15 (Fri.)	Leave Bangkok and head for Nakhon Si Thammarat Hospital by bus.
Feb. 16 (Sat.)	Explanation, observation, and hearing at Nakhon Si Thammarat Hospital Dinner hosted by Nakhon Si Thammarat Hospital.

Date	Daily Schedule
17 (Sun.)	Leave Nakhon Si Thammarat Hospital and visit Surat Thani Hospital Return to Bangkok by car
18 (Mon.)	Observation and hearing at Chom Buri Hospital Dinner hosted by Chom Buri Hospital
19 (Tue.)	Discussion at Ministry of Health (Summary of Discussion and completion of manuscript)
20 (Wed.)	A.M. Report on summary of discussion at Japanese Embassy P.M. Conclusion of summary discussion Dinner hosted by Dept. of Health
21 (Thu.)	Leave Bangkok for Tokyo

Chapter 2
RESULTS OF SURVEY

Chapter 2. Results of Survey

2-1 Preliminary Design Study

The study team arrived in Bangkok on December 2, 1979. Immediately on December 3, the study team paid a courtesy call to the Thai Ministry of Public Health, and had directly discussions between the Deputy Under-Secretary, Ministry of Public Health, Director of Provincial Hospital Division and Director of the Construction and Design Division and the study team on the preliminary design and the incidentals.

On December 3, the team paid a courtesy call to the Japanese Embassy and the Bangkok Office of the JICA to take over the administrative matters since the previous preliminary survey and talk on the matters of which the team should take note. On the same day, the team also paid a courtesy call to the DTEC and requested to designate counterparts.

- On December 4, the team made an observation of the Rajaviti and Sirarat Hospitals in Bangkok and was briefed by the hospital directors and doctors. At the Rajaviti Hospital, a new 12-storied hospital building was under construction, and the team visited the construction site to observe the hospital design and the construction. At the construction field office, the team was briefed by PWD officials and the director of the field Office and provided with their data.

- On December 5, the team made an observation of construction sites in Bangkok and surveyed construction cost, construction periods and the unit prices in construction costs.

- On December 6, the team made an observation of the Samitivej and Huchiewu General Hospitals in Bangkok and briefings were given by their directors and doctors.

- On December 7, the team held another discussion with the Deputy Under-Secretaries and the directors of the Construction Division on matters of primary concern. The discussion evolved around the selection of the site, functional and administrable integration of the new and old hospitals, number of stories, foundations, structures, etc..

- On December 8, the team left Bangkok to survey the construction site. On the way, the team dropped in to Haad Yai to make an observation of the Haad Yai Provincial Hospital, and also visited the construction site of an additional building in the precincts of the hospital and was briefed on the construction from the director of the construction field office. On the same day, the team made an observation of the Songkla University and its annexed hospital which was under construction.

- On December 9, the team arrived at Nakhon Si Thammarat, the construction site and made a quick investigation of the existing Nakhon Si Thammarat Provincial Hospital.

- On December 10, the team had a very lively discussion with doctors of the hospital and the chief nurse and the Regional Health Inspector at the hospital on the basic concept of the new hospital and the construction site. In the evening, the team looked for local constructors and requested a briefing to local construction representatives and received data.

- On December 11, the team measured the site of the hospital by actual observation, elaborately surveyed the existing buildings and medical care facilities, checked into the actual conditions of the facilities, water works and energy sources, and received a briefings by doctors at each department of the hospital on the actual conditions of medical care and medical equipment. At the same time, data were collected and studied.

- On December 12, a supplementary survey was conducted on the inside of the existing buildings. The team later called at the Electric Power Corporation (PEA), Telegraph and Telephone Corporation (TOT) and Water Works Bureau to have discussions and to collect data. The team also visited a cement plant in Tung Song to survey the quality, output, transportation and unit prices.

- On December 13, the team visited Surat Thani to make an observation of the outpatient building of the Surat Thani Provincial Hospital, the construction of which was about to complete. Its outpatient building were the latest one for a provincial hospital according to a design of the Ministry of Public Health.

- On December 14, the team visited an agricultural school which had been completed in Tung Song with Japanese consultant to survey the conditions of its buildings that had been completed 10 years before.

- On December 15 and 16, the team returned to Bangkok and put the survey records and data in order. It was conducted to prepare the draft of a Summary of Discussion. It also received a briefing on local construction affairs from constructors in Bangkok.

- On December 17, the team reported on the progress of the study at the Ministry of Public Health and held a discussion on the demolition of existing buildings, scope of the site required as well as the number and position of test borings for a geological survey. As on the previous day, the team also received a briefing on local construction affairs.

- On December 19, the team reported on the progress of the study and briefed on the substance of the Summary of Discussion at the Japanese Embassy and the JICA. The last briefing was held with local constructors.

- On December 20 at 9 a.m., the Summary of Discussion was signed by Dr. Bunson Martin, Minister of Public Health, and Dr. Ichiro Momoi, leader of the study team, at the Ministry of Public Health.

- On December 21, the team put the study records and data in order and prepared for return to Japan.

In the preliminary design study for the construction of the Maharaj Hospital in the Kingdom of Thailand, it was originally scheduled to construct an independent general hospital in the same precincts of the existing Nakhon Si Thammarat Hospital. From the standpoint of making the new hospital as a pivotal hospital for the southern part of Thailand to play a part of its program for an expansion of medical care faciliteis in the nation, the primary task was to discuss with the authorities and officials concerned with local medical care, and reach agreement with them, on the projection that the optimum site of the new hospital would be an area of about 20,000 m^2 in the northwestern part of the precincts where exclusive dwellings are in existence and that this area is the place where the cost for preliminary construction projects, such as the ground formation of the site, would be less expensive. In carrying out a field survey of the Nakhon Si Thammarat Hospital, therefore, earnest discussions were evolved with local medical care officials with the presence of the Director of the Construction Division of the Ministry of Public Health, supervisors of the Regional Medical Department and DTEC officials. The cooperation rendered by the Thai side was indeed great, to make the study team sense the unusual enthusiasm the Thai side has in this project.

2-2 Basic Concept of This Project

The Government of the Kingdom of Thailand is stepping up plans for the construction of four pivotal hospitals, each with

1,000 beds, in the following four regions of the nation which excludes the Bangkok metropolitan area.

North:	Chiang Mai
Northeast:	Nakhon Ratchasima (Korat)
Central:	Phitsanulok
South:	Nakhon Si Thammarat

In February 1979, a request was filed for grant aid in respect to the program for the development of a provincial hospital in Nakhon Si Thammarat area in the south, the Kingdom of Thailand.

The existing Nakhon Si Thammarat Provincial Hospital has wards for 334 beds, and plans for the construction of additional wards with 100 beds are being prepared by the Kingdom of Thailand. At present, wards with 25 beds are under construction with non-governmental funds. Therefore, the construction of a hospital with 400 beds would make it possible to build Maharaj Hospital with a little over 900 beds by integrating the existing hospital into the new one and converting some of the existing faciliteis into wards.

The medical facilities of the existing Nakhon Si Thammarat Provincial Hospital are extremely inadequate even for the existing 334 beds, and the primary task of the Maharaj Hospital program will be to offer the replenished medical sector of the project hospital. Should it be completed in 1982, this program will produce significant side effects as a project to celebrate the bicentennial anniversary of the Chakkri dynasty founded in 1782.

During its stay in Thailand, the study team held several discussions with Thai officials, and the basic concept which was agreed upon between the two parties is incorporated in "2-3 Summary of Discussion" below. The main points are as follows:

(1) The new hospital, functioned and managed integratedly with the existing hospital, should be a pivotal hospital for the southern part of the Kingdom of Thailand. For this, it is necessary that the outpatient and ancillary should be adequate in substance to cope with a scale which will incorporate the existing wards.

(2) For this, the facilities of the existing hospital should be used or put to different uses, depending on the budget with a view to making maximum use of the existing buildings and facilities. An emergency department will be constructed on the ground floor of the existing hospital, and its second floor will be used as the administrative department after completion of the new hospital.

(3) The existing building used for the rehabilitation center and the laboratory will be turned into wards for patients with contagious diseases in the future.

(4) The new hospital should be designed with due attention paid to future extension in preparation for rises in the budget scale and in the medical care services and for the construction of additional buildings in the future.

(5) The buildings of the new hospital should be fully adapted to the local climate, topology and custom.

2-3 Summary of Discussion

Following the request by the Government of the Kingdom of Thailand for assistance in the construction of the extension to the Maharaj Hospital in Nakon Si Tammarat Province, Southern part of the Kingdom of Thailand, (hereinafter referred to as "the New Hospital"), the Government of Japan has sent, through the Japan International Cooperation Agency, a preliminary design study team for the establishment of the Maharaj Hospital, headed by Dr. Ichiro Momoi, Director of Social Welfare Organization, to conduct a preliminary design study on the programme for 21 days, from December 2nd to December 22nd, 1979.

The team held a series of discussions and field surveys with the Ministry of Public Health of the Government of Thailand.

As a result of the exchange of discussion, both parties have agreed that it is desirable to consider the following items in preparation for a preliminary design study report. However, this agreement shall not be binding to either party.

1. The new hospital should be managed together with the existing hospital as one general hospital. Therefore, after completion of the new building, it will be considered as Maharaj hospital.

2. As a result of item 1, the necessary ground must be obtained for the construction of the new hospital in the northern part of the existing site. (See Annex 1, hereinafter referred to as the proposed site). Therefore, it is necessary that the existing residences of hospital personnel must be re-located away from the proposed site.

3. It is necessary to consider that the new hospital should consist of O.P.D. Ancilliary (such as X-ray, OP, Labour Delivery, I.C.U. Laboratory, Pharmacy, CSSD etc.), Service Kitchen, Laundry, etc. to serve the whole of Maharaj Hospital, and wards to contain approximately 400 beds.

4. When planning the new construction, it is necessary to consider that it should be designed with flexibility for extension in the future.

5. The Emergency Department should however, utilize the existing building.

6. After completion of the new hospital, the existing buildings should be used mainly as wards and for administration.

7. The medical equipment installed in the new hospital should be selected from the proposed medical equipment list. (Refer to Annex 2).

8. It is necessary to consider that the new hospital should be designed and planned with a view to local climate /customs (e.g. ventilation, protection from sunshine and rain; ceiling height, width of corridors and lavatory etc.).

9. A suitable oxygen supply should be supplied for I.C.U. labour etc. in the new hospital.

10. It is desirable that the ground level of the new hospital should be at the same level as that of the existing hospital building. (Refer to Annex 3-1).

11. Boring tests should be finished by the explanation of the draft final report next February (refer to Annex 3-2, Annex 3-3).

12. A new well for the new hospital should be prepared and its location should be decided at the explanation of the draft final report meeting.

13. Sewage treatment should be prepared for the new hospital.

14. There should be sufficient city water and electric power to adequately supply the new hospital.

15. There should be an adequate number of telephone lines provided for the new hospital.

Further, the preliminary design Study Team should make a detailed analysis of the collected field survey data. They should then make the most suitable preliminary design and planning concept for the new hospital, taking into consideration social, economic and functional factors.

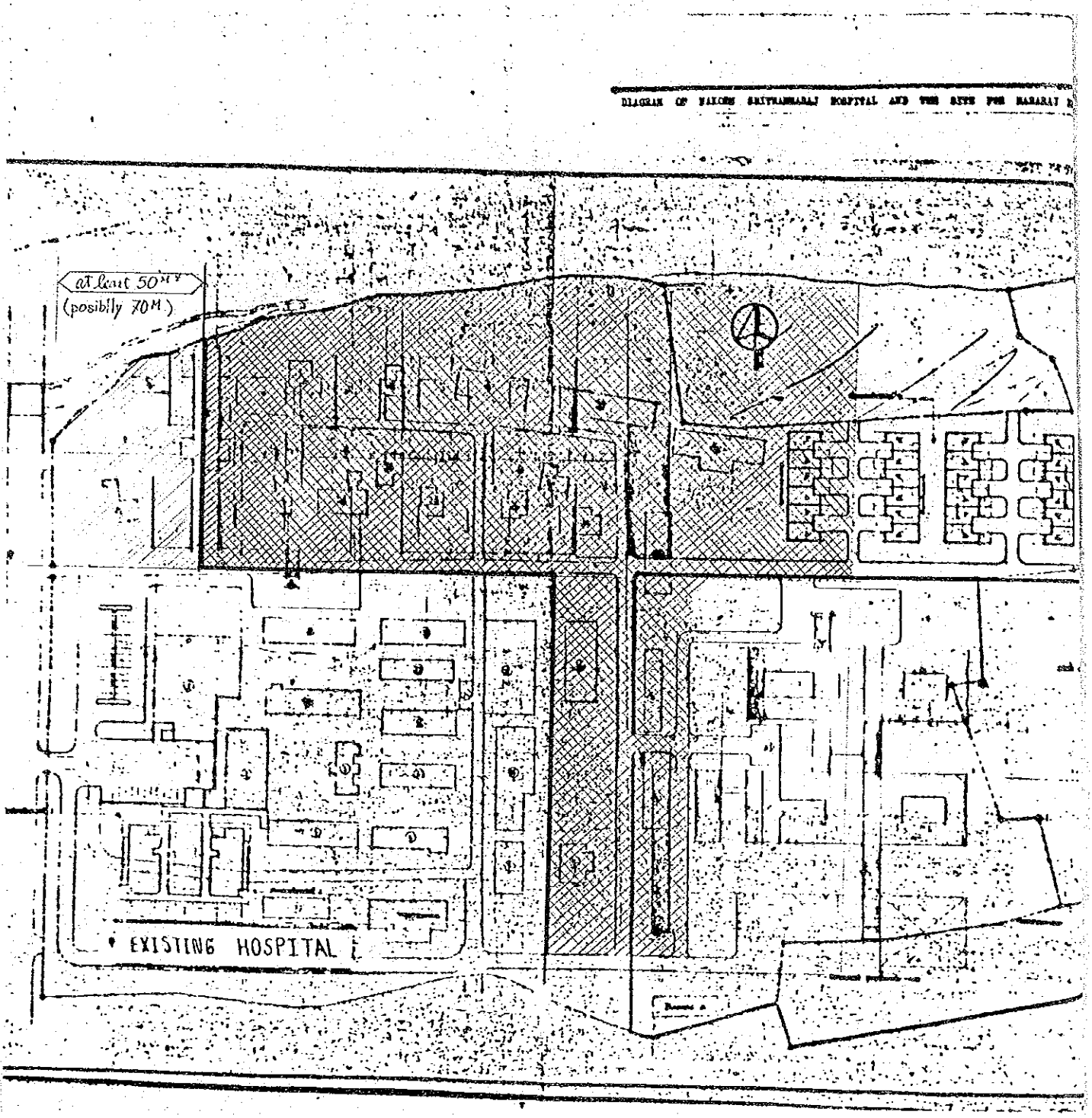
The Study Team will visit the Kingdom of Thailand again during mid-February, 1980, for discussions with the Ministry of Public Health.

20th December, 1979.

(Dr. Bunsom Martin)
Minister of Public Health;

Ichiro Nomoi M.D.
Leader
The Japanese Preliminary Design Study Team

ANNEX 1



showes the area where new buildings can be constructed.

showes open space

} the proposed site

ANNEX 2 (20 pages)

	DEPARTMENT, ITEM	UNIT	JUSTIFICATION
	X - RAY		
1.	500 MA. X - ray machine c̄ image intensifier c̄ closed circuit TV monitor 2 videocassette recorder	2	
2.	1000 MA. X - ray machine c̄ image intensifier c̄ closed circuit TV monitor 2 videocassette recorder	2	
3.	300 MA mobile X - ray machine c̄ image intensifier CCTV c̄ videocassette recorder	2	
4.	Scanner	1	
5.	Automatic radioopaque injector	2	
6.	THERAPEUTIC X-RAY MACHINE # DEEP X-RAY	1	
7.	AUTOMATIC X-RAY FILM DEVELOPER	2	

	DEPARTMENT, ITEM	UNIT	JUSTIFICATION
	OPERATING ROOM		
1.	General Operating Table, Operating Lamp, Electric Cauterizer, Electric Sucktion Anesthetic Machine C̄ Accessories Mayo Tables 2 Stands O_2, NO_2 Tanks Or Pipes	12	Should Be Standard Equipments in OR.
2.	Bronchoscope C̄ Accessories (Camera, Cine Etc.)	2	
3.	Gastroscope C̄ Accessories	2	
4.	Colonoscope C̄ Accessories	2	
5.	Hysteroscope C̄ Accessories	2	
6.	Closed Circuit Television X - Ray Unit For Orthopedic Operation	1	
7.	Microsurgical Instruments Set	2	
8.	E. N. T. Instruments Set	2	
9.	Orthopedic Instruments Set For Adult & Children	2	Each
10.	Small Size Autoclave	2	For Rapid & Small Sets of Instruments
11.	Small Laundry Machine	1	For Operating Gowns, Masks,&
12.	Hipspica Table	1	

DEPARTMENT, ITEM	UNIT	JUSTIFICATION
OB GYN		
1. Fetal monitoring unit	3	
2. Infant resuscitation unit	3	
3. Amnioscope c Accessories	2	
4. Ultrasound diagnostic device	1	
5. Sucktion unit for Sucktion currettage and Vaccuum extractor	2	

DEPARTMENT, ITEM	UNIT	JUSTIFICATION
I.C.U.		
1. Cardiac monitor 10 scopes	1	
2. Ecchocardiogram	1	
3. Cardiac defibrillater and cardiac pacemaker	1	
4. Hypothermia unit for adult and child	1	Each
5. Portable Electro Cardiogram	3	
6. Bedside Resuscitator	10	
7. O_2 tent for adult and children	1	Each
8. Bird's Respirator	4	

	DEPARTMENT, ITEM	UNIT	JUSTIFICATION
	CSSD		
1.	Big Sized Electric Autoclave	6	
2.	Medium Sized Autoclave	4	
3.	Small Sized Autoclave	4	
4.	Dressing Drum 18 Inch Diameter	50	
5.	Electric Gauze Cutter	3	
6.	Storage	10	

	DEPARTMENT, ITEM	UNIT	JUSTIFICATION
	ANESTHETICS		
1.	Blood Pressure, Cardiac Respiration Rate Monitor Units	4	
2.	Mask of Various type	100	
3.	Endotracheal Tube of Various size	100	
4.	Air - Way NO 0 - 5	100	

	DEPARTMENT, ITEM	UNIT	JUSTIFICATION
	LAB - RESEARCH		
1.	Autoanalyzer S.M.A. 12 or 30	1	
2.	Blood pH, Gas analyzer	1	
3.	Blood WBC. count, hemoglobin analyzer	1	
4.	CO_2 and chloride analyzer	1	
5.	Flame photometer for sodium and pottasium	1	
6.	Electrophoresis for H.A.A. and abnormal protein	1	
7.	Automatic slide staining	2	
8.	Hot air oven	3	
9.	Anaerobic bacteria incubator	2	
10.	Freezer	1	
11.	Refrigerator 10 CU.FT.	3	
12.	Centrifuge 24 heads	3	

DEPARTMENT, ITEM	UNIT	JUSTIFICATION
PATHOLOGY		
1. Microtome	2	
2. Tissue Processing Machine	2	
3. Frozen section microtome	1	
4. Teaching microscope	2	
5. Binocular microscope c̄ Accessories (Camera, Cine ETC.)	6	
6. Microtome sharpening roter	1	
7. Dictating machine	3	

DEPARTMENT, ITEM	UNIT	JUSTIFICATION
BLOOD BANK		
1. Machine for Separating Plasma and Blood Cells	1	
2. Blood Storing Refrigerator	2	

DEPARTMENT, ITEM	UNIT	JUSTIFICATION
OPTHALMOLOGY		
1. Trial Lens Set	1	
2. Digital Lensometer	1	
3. Retinoscope	1	
4. Fundus Camera	1	

DEPARTMENT, ITEM	UNIT	JUSTIFICATION
DENTAL DEPARTMENT		
1. Dental Unit & Chair	8	
2. Ultrasonic Scaler	4	
3. Mobile Aeroter	2	
4. Dental X - ray	2	
5. Sterilizer	6	

DEPARTMENT, ITEM	UNIT	JUSTIFICATION
FOOD SERVICE		
1. Large Boiling Pot	4	
2. Large Freezer	4	
3. Large Meat Grinder	2	
4. Large Blender	2	
5. Microwave Cooker	2	
6. Water Cooler	3	
7. Ice Cube Maker	2	
8. Large Pressure Cooker	2	

DEPARTMENT, ITEM	UNIT	JUSTIFICATION
SOCIAL MEDICINE		
Color Television Set (Large Screen)	6	This Number Including All Department Need
C̄ Color Video Cassette Recorder		Using These Machine for
C̄ Color Video Camera		Educating Patients and Personnels # Library, OPD Surgery, MED - PED LAB.
8 or 16 Sound Cinema Projector	3	For Health Education Outside Hospital.
C̄ Cinema Camera		For Mobile Medical Team.
Still Picture Projectors Syncronize	6	For OPD, While Patients Waitin
C̄ Cassette Tape Recorders		Small Group, Health Education.
4 Wheel Drive Van C̄ Air Condition	1	For Mobile Medical
Microbus C̄ Air Condition	1	Team Transportation

	DEPARTMENT, ITEM	UNIT	JUSTIFICATION
	O.P.D.		
1.	Computerized medical filing system	1	
2.	Ambulance c air conditioning c FM communication link to O.P.D.	3	
3.	FM communication system for doctors and nurses	100	
4.	Paging system for O.P.D. and wards	1	
5.	Doppler instruments for fetal heart detection	3	
6.	Cryosurgical instruments for minor surgery and uterine cervical cauterization	2	
7.	Small Sized Electric autoclave	1	
8.	Electric water boiler	2	
9.	Refrigerator 6 CU. FT.	2	
	10 CU. FT.	2	
10.	Non Heating lamps	20	
11.	Electric Sterilizer	3	
12.	Pelvic Examination Tables	6	

	DEPARTMENT, ITEM	UNIT	JUSTIFICATION
	PHARMACY		
1.	Bacterial filtration instruments	2	
2.	Washing machine for Bottle and infusion SET	3	Each
3.	Water distillation machine	2	
4.	Hot air oven	3	
5.	Autoclave	3	
6.	Emulsion mill	2	
7.	Thermometer for pyrogen test	2	

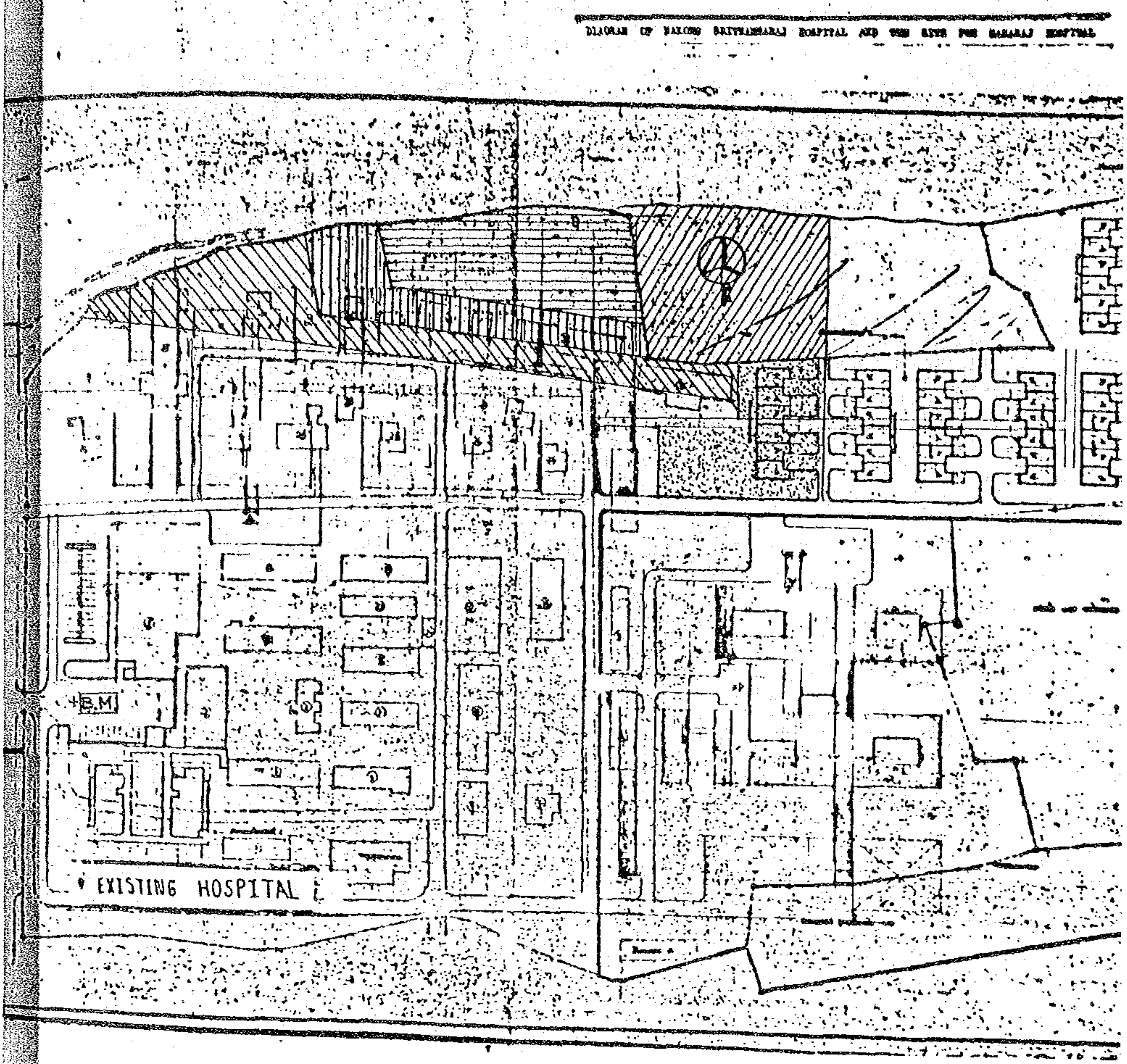
DEPARTMENT, ITEM	UNIT	JUSTIFICATION
PEDIATRIC		
1. Resuscitator for Children	4	
2. Side Room Laboratory To Do Hematocrit Hemoglobin Parasite Staining Equipments Need Microscope Centrifuge Hematocrit Meter Etc.		Serial Hematocrit is Importa Indication for Dengue Hemo- rrhagic Fever Which Occurs E year. Staining Useful for Antibiot use Before Result of Culture and Sensitivity come in Pediatric Infection.

	DEPARTMENT, ITEM	UNIT	JUSTIFICATION
	NURSING		
1.	Bed	400	
	- Fowler's	200	
	- Fowler's for Chlldren	50	
	- Normal	120	
	- Striger Frame	10	
	- Delivering Bed	20	
2.	Refrigerator 6 CU. FT.	20	
3.	O_2 Tent For Adult	10	
	O_2 Tent For Children	10	
4.	Incubator For Premature Baby	10	
5.	Water Purifier	30	For Patient, Personel
6.	Water Boiler	10	
7.	Milk Storage Cabinet	1	
8.	Television Set Large Screen	20	For in Patients Recreation

	DEPARTMENT; ITEM	UNIT	JUSTIFICATION
	ADMINISTRATION		
1.	Electronic Cash Registration Machine	5	Financeal Section
2.	Plain Paper Copier Machine	3	
3.	IBM . Electric Typewriter	3	
4	12 Digit Electronic Calculator	6	Financeal Section
5.	Off - Set Printing Machine	1	For Hospital Printed Materia # Prescription, Medical Car Medical Records, Operatin Report, Progress Note, Nurse Note

	DEPARTMENT, ITEM	UNIT	JUSTIFICATION
	LAUNDRY		
1.	Automatic Laundry Machine (Minimum 50 Kg Per Loading)	3	
2.	Cloth Pressing Machine	3	
3.	Big Cloth Cabinet	10	

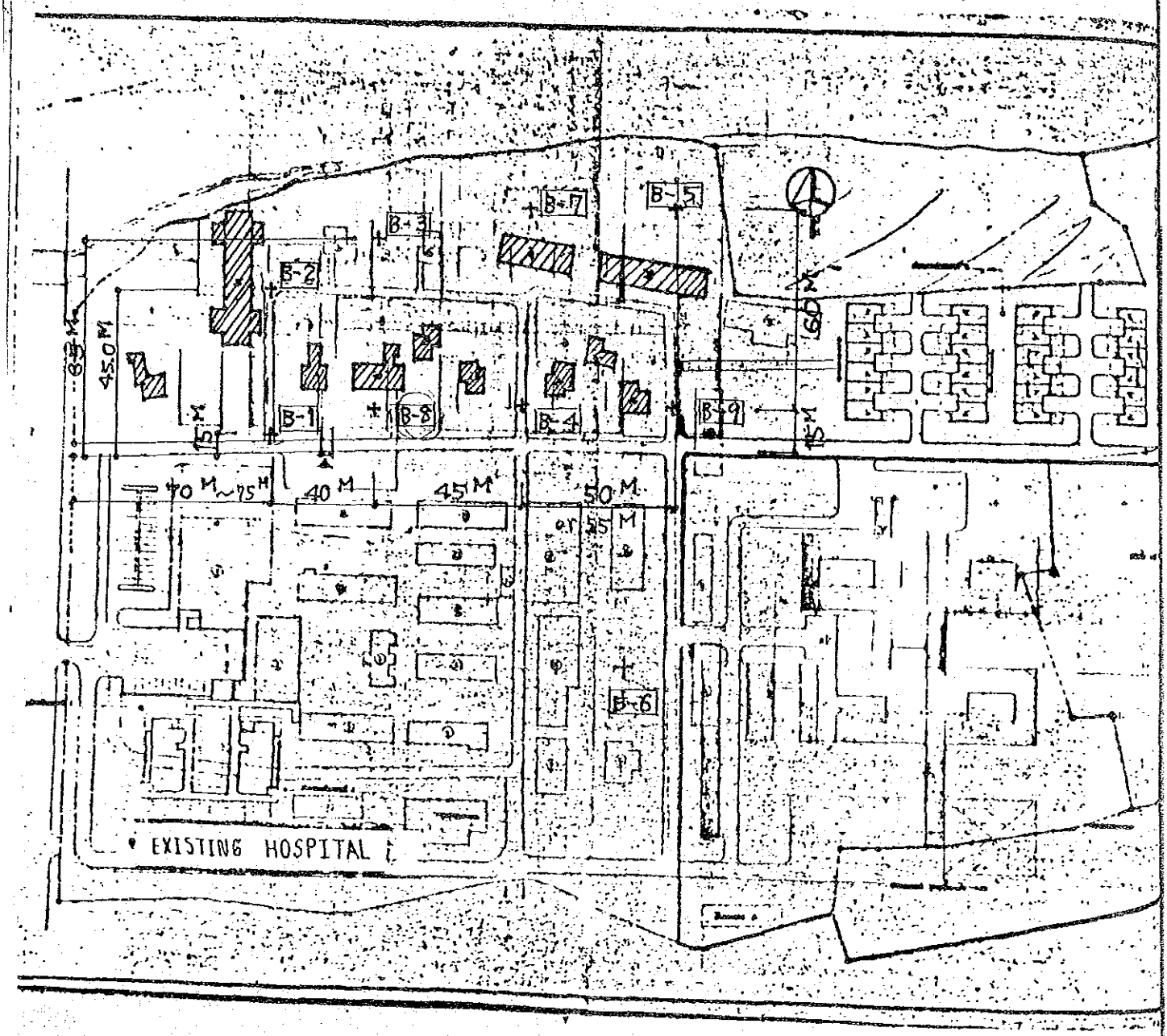
	DEPARTMENT, ITEM	UNIT	JUSTIFICATION
	REHABILITATION		
1.	Short Wave Diathermy	5	
2.	Ultravioht lamps	3	
3.	Ultrasound	5	
4.	Infrared Lamp	3	
5.	Hydrocollator	3	
6.	Paraffin bath	3	
7.	Hubbard Tank	2	
8.	Swimming Pool	1	
9.	Electric Tilt Table	1	
10.	Full body Suspension Walker	2	
11.	Wheel chair Exercise Unit	1	
12.	Exercise Unit With Table	1	
13.	Heavy duty Model Knee Exercise Unit	1	
14.	Ankle & Leg Exercisers	1	
15.	Bicycle Exerciser	3	



The height of Filling.

ZONE	Height	INDICATE
A	approximately 80 CM	
B	approximately 110 CM	
C	approximately 180 CM	
D	approximately 200 CM	
E	approximately 200 CM	
F	approximately 180 CM	

; ROAD



Location Diagram of Bored Hole

ANNEX 3-3

SPECIFICATION FOR FIELD INVESTGATION WORKS AND SOIL MECHANICAL TESTS.

1. GENERAL

This specification is applicable to the excution of investigation works relative to the preliminary study for establishment of Maharaj Hospital Project. The field investigation works will be carried out to grasp an outline the geological and soil mechanical conditions at proposed site.

2. Drilling, Standard Penetration Test.

A) Location and Depth of Bore Halest;
Location and Depth of bore holes will be pointed out by the Engineer, but are only approximate and will be modified in the course of work in accordance with the under ground condition. Such modification shall be directed by the engineer or the site.

B) Drilling of Bore Holes
B-1 Drilling of bore holes shall be aarried out by rotary drilling method in order to obtain samples and cores. Through out the cores of drilling operation, the contractor shall make certain of changes of strata, variation of under ground water level, seepage or leakage pressure and it amounts etc.

Contractor shall make entry of such observation on diary, and inform the Engineer.

The minimum hole diameter shall be 66 milimeter or more.

B-2 Core samples shall be collected at 1.5 m interval or at the changes of soil stratum. Core samples thus taken shall be placed into wooden box.

B-3 After the bore hole has been drilled up to the prescribed depth. the Engineer will examine it by means of drilling rods.

The contractor shall assist the Engineer in this examination

B-4 Upon completion of all drilling works, the following shall be submitted to the Engineer.

(1) drilling logs in form approved

(2) field work diary.

(3) Photo-print of core boxes

(4) Core boxes

C) Standard Penetration Test.

The standard penetration test shall be conducted at all bore holes (B1-B9) at every 1.0 meter.
The test shall be in compliance with ASTM designation : D1586-64T.

3. Soil Test

Soil test shall be conducted at B1-B6 bore holes.
A) Undisturbed Soil Sample

As for undisturbed sample take in the field; the following tests shall be carried out.

(1) Water- Content Determination (ASTMD2216-71)

(2) Grains- Size Analysis Test (ASTMD422-63)

(3) Unconfined Compression Test (ASTMD2166-66)

(4) Consolidation Test (ASTMD2435-70)

(5) Unit Weight of Soil

Summary of the discussion on the draft report of the preliminary design study for the establishment of Maharaj Hospital in the Kingdom of Thailand.

The Government of Japan has sent through Japan International Cooperation Agency (hereinafter refered to as "JICA") a preliminary design study team headed by Dr. Ichiro Momoi, Executive Director of the Social Welfare Organization, "Saiseikai" Imperial Gift Foundation Cooperation, from 12 - 21 February, 1980, on the second visit to submit the draft report of the preliminary design, for the construction of Maharaj Hospital at Nakorn Si Thamaraj, the Kingdom of Thailand.

The study team explained the draft report and preliminary design to the Thai authorities concerned and held the detailed discussion.

As the result of the discussion, the Thai authorities concerned and the study team have confirmed the following items:

1. The original plan of the preliminary design proposed by the study team was accepted by the Thai authorities concerned.
2. Ten printed copies of the final reports and blueprints will be submitted to the Thai authorities concerned toward the end of March through the Embassy of Japan.
3. The Thai authorities concerned will carry out the following works as shown in the Annex I in time for the commencement of the work or according to the progress of the work.

Annex I:

1) Site preparation work such as; removal of the existing structures and all of the obstacles as follows:

- garage 1
- doctors' and nurses' houses 12
- club house 1
- kitchen and cafeteria 1
- laundry 1
- workshop 1
- storage building 1

2) Land formation for the project site :

The land at the construction site has to be filled to reach the level of about 0.50 metre above the average land level of the existing hospital.

3) Soil condition data :

Soil boring test has to be done as soon as possible.

4) Intake of the water for the project :

Well and pumping machine have to be installed. The rest will be provided by the Government of Japan.

5) Intake of the electric power for the project area from outside the hospital up to the transformer will be provided.

6) Intake of the telephone wire for the project area will be installed to the project hospital, including the extension of the exchanger.

7) Construction of the drainage line from the sewerage treatment plant and the drainage line for the surface water will be managed by the Ministry of Public Health. The sewerage treatment plant and pipe lines for the project hospital will be constructed by the Government of Japan.

8) All kinds of furniture and miscellaneous except built-in furniture and patients'beds.

9) Land development and landscaping of the proposed area.

10) Roads and parking area except at the front part of the project buildings.

11) Taking various necessary procedures in obtaining the permission and exemption of custom duties and taxes from the competent authorities of the Government of Thailand for :

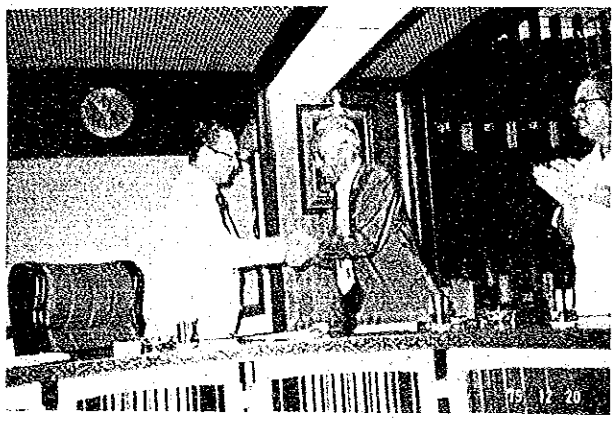
- Japanese products concerned with their project.
- Construction materials, equipment, construction machines, etc.

12) Securing expenses for providing services of the Thai counterparts necessary for the design and construction supervision of the project.

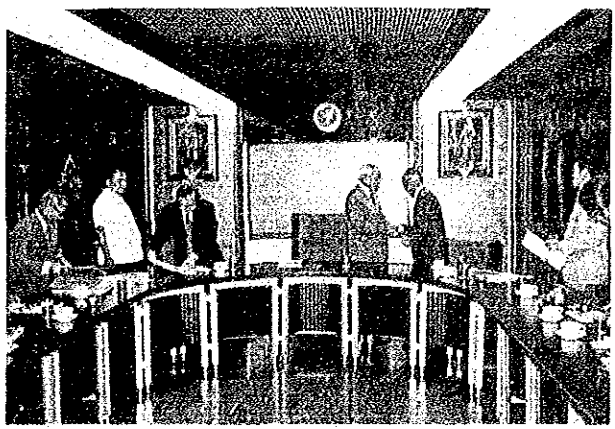
20 February, 1980

(Dr. Sem Pring-puang-geo)
Minister of Public Health

(Ichiro Momoi M.D.)
Leader
The Japanese Preliminary
Design Study Team



Dec. 20, 1979
Signing of the
summary of discussion



Feb. 20, 1980
Signing of the summary
of discussion

2-4 Significance of This Project and Its Problems

As policy targets incorporated in the fourth five-year program (1977-81), the Government of the Kingdom of Thailand take up the replenishment of public services and the maintenance of order in the rural areas. Particularly in the medical care, the development of medical care services are emphasized in the rural area. Medical care facilities are being expanded, medical workers increased and their abilities developed. As things now stand, the differentials in medical care between the urban areas and the rural area is great, so there are much more needs of beds and medical specialists at provincial and district hospitals in the rural areas. It is to be noted, however, that knowledge and ability of medical workers in the country are to be respectably appreciated. Therefore, the strengthening of medical care facilities and the increase of beds with the construction of the new hospital are expected to contribute greatly to the spontaneous development of functions of medical care in the country side of the Kingdom of Thailand.

2-4-1 Problems for the Construction

To give fully play to the functions of the projected hospital with due consideration given to the economic conditions of the Kingdom of Thailand, it is necessary not only to replenish the new hospital but also to utilize existing facilities for other purposes and improve them. These attempts of the utilization and improvement must be accomplished at the expense of the Government of the Kingdom of Thailand. In other words, it is an urgent task to complete the existing hospital's emergency department, which is now under construction, simultaneously with the completion of the new hospital. At the same time, it is necessary to convert the rooms of the outpatient and clinical service department in the same building into those of an administrative department

and the existing building containing the laboratory into a ward of inpatients with contagious diseases in proportion to the progress of construction of the new hospital.

2-4-2 Maintenance and Management

The budget of the Government of the Kingdom of Thailand for national institutions for medical care consists mainly of personnel expenses, and a very small portion of outlays is set aside for the maintenance of facilities and equipment, it follows as a logical consequence the maintenance and management of buildings as well as facilities and euqipments yet. For this reason, the functions of the facilities have been impaired and the energy coefficiency has dropped to reduce the ability of the supply of medical care. By providing small funds for the maintenance and repair, it would be advantageous to prevent the deterioration of facilities. In designing the new hospital, the saving of energy is taken up as one of the important elements to reduce the cost for maintenance and management, but this problem could be solved only when maintenance and repair were conducted on a regular basis.

Running cost for Electric fare and Oil consumption

1. Electric fare

a. General loads

Load of name	Load capacity (kW)	Running time/day	Unit cost (BAHT)	Total day/month	Amount (BAHT)
X-ray	150	1	0.9	26	3,510
Lighting	230	8	0.9	26	43,056
Air condition & ventilation	100	8	0.9	26	18,720
Sanitary	32	1	0.9	26	748
Medical equipment	20	8	0.9	26	3,744
Sub-Total					(BAHT) 69,778

b. Constant running loads

Load of name	Load capacity (kW)	Running time/day	Unit cost (BAHT)	Total day/month	Amount (BAHT)
Emergency lighting	46	24	0.9	30	29,808
Air-condition for ICU	22	24	0.9	30	14,256
Medical equipment (freezer, Lab.)	30	24	0.9	30	19,440
Sub-Total					(BAHT) 63,504

2. Cost of oil consumption

c. Boiler for Laundry Service

Consumption rate for hour	Running time/ day	Total day/month	Oil cost	Amount (BAHT)
90 (ℓ/hr)	6	30	6	97,200

d. Generator (not considered case of power failure, only maintenance running)

Consumption rate for hour	Running time/weak	Total hour/month	Oil cost	Amount (BAHT)
24.3 (ℓ/hr)	1/6 hr.	4	6	98

Grand Total a) + b) + c) + d) = 230,580 BAHT.

Note: Running cost is based on the data of Dec. 1979.

2-4-3 Problems for Manpower

As stated earlier, the knowledge and ability of medical care workers in the Kingdom of Thailand are highly rated, but their number is not sufficient. The duty of the projected Maharaj Hospital is to serve as a pivotal hospital for the southern part of Thailand. The authorities and the parties concerned are required to make full systematic and voluntary efforts for the increase and education of physicians, medical technicians, nurses and other medical workers as well as for the upbringing of workers engaged exclusively in the maintenance and management of facilities.

List of Staff Members Expected

Department	Doctor	Nurse	Technician
OP-ROOM	2 (Anesthetist)	10	1
X-RAY	1	2	4
ICU	5	20	2
LAB	1 (Pathologist)	-	15
GYN	5	15	-
OPD			
Surgical	5	4	-
Internal Medicine	10	8	-
OB	5	6	-
Pediatrics	3	6	-
ENT Eye	4	4	-
Nose	2	2	-
Throat	2	2	-
WARD	20	100	-
TOTAL	65	179	22

2-5 Outline of Major National and Private Hospitals

The major hospitals in the Kingdom of Thailand which were surveyed by the study team as follows:

- Rajaviti Hospital
- Sirarat Hospital
- Samitvej Hospital
- Huchiewu General Hospital
- Songkla University Hospital (under construction)
- Haad Yai Provincial Hospital (under construction)
- Suratthani Provincial Hospital (under construction)

The first four hospitals are located in Bangkok, whereas other hospitals, which are under construction, are located in the southern part of Thailand. An outline of the buildings is given below but as for the medical facilities, no explanations will be given in this report although photographs are attached.

(1) Rajaviti Hospital

This hospital was established as a pediatric and gynecological hospital with 168 beds in 1951. At present, it has 988 beds. At present a 12-storied building is under construction and the hospital will be furnished with 1,600 beds upon the completion of the construction in 1980.

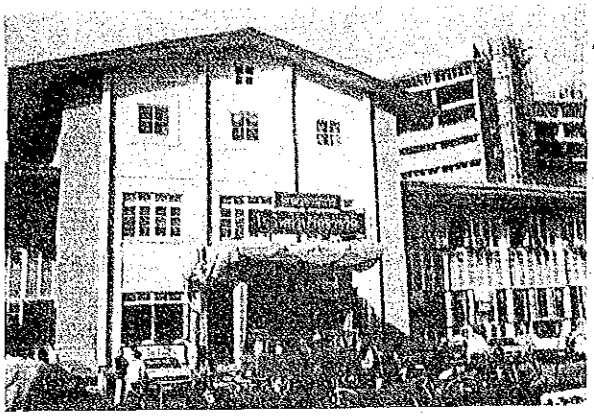
The present hospital is of a pavilion type and has an impressive, roofed courtyard. The OPD consists of a two-storied building which shapes like a square. The corridor is wide and exposed to outside air. The departments include, among others, internal medicine, surgery, obsterics and gynecology, pediatrics, ENT, and many patients were observed at the Department of Obsterics and Gynecology. No modern facilities are used in the hospital kitchen.
The laundry is equipped with washing, dehydrating, pressing, sterilizing and drying facilities. Emergency electric power

generation facilities and a soft water system were equipped, but no fire prevention facilities were observed.

As for its medical equipment, the hospital has eight X-ray systems, which consist of one X-ray television system, one X-ray system for cardiac catheter and six radiographing systems and also has a ultra sound tomogram (PICKER made).

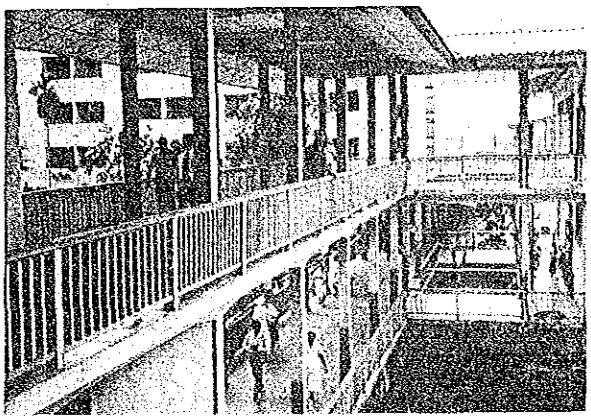
In some section of the second floor, a variety of transfusion liquids and liquids for local anesthesia are produced.

At present, the hospital has 150 physicians and 200 inpatients. The new hospital is scheduled to have 12 X-ray systems and 20 operation rooms, two of which will be for operations on cardiac vessels and the lung and cleaned with a laminate floor. The room for labor and delivery at the Department of Obsterics is large and many single-patient rooms are available. There is also a room for cobalt treatment.

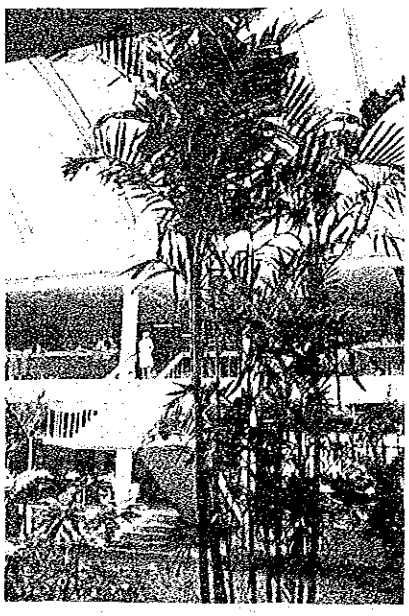


FAJAVITI
Provincial Hospital

Main entrance



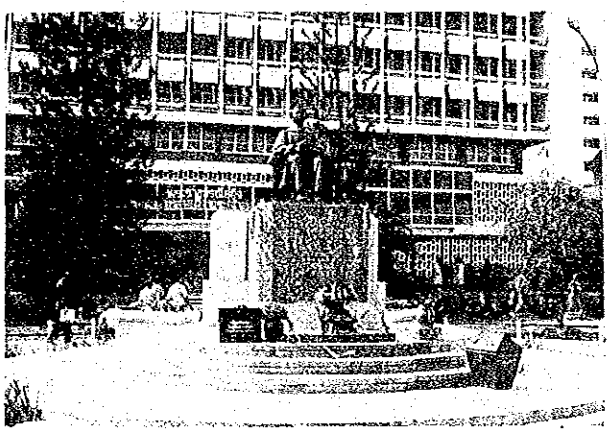
Corridor



Court

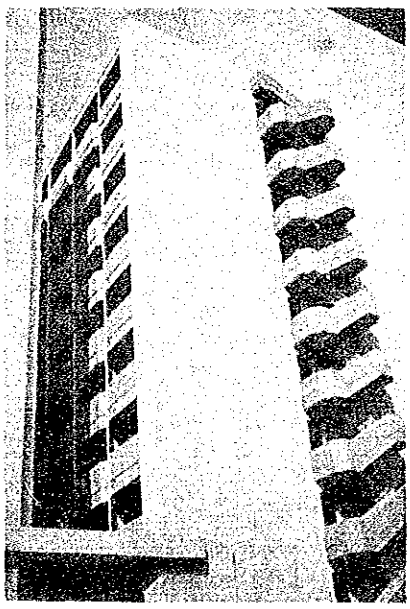
(2) Sirarat Hospital

The Sirarat Hospital is a general university hospital and the total site area is approximately 35 acres. It has more 75 buildings and is a hospital of the pavilion type. Equipped with 2,000 beds, the hospital has 20 clinical departments and about 600 physicians, suggesting that it is a hospital of the largest scale in Bangkok. A cobalt treatment center, a training center and a research center are established.



SIRARAT Hospital

Main entrance



New 9-stories ward building

(3) Samitivej Hospital

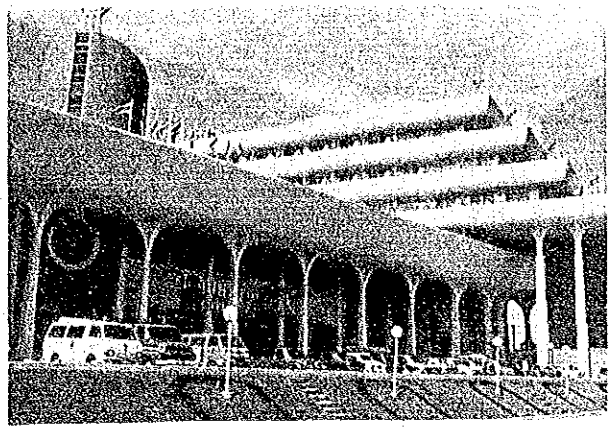
This six-storied hospital with a floor space of 16,000 m^2 was opened in October 1979. It has 240 beds. The whole building is air-conditioned and its ceilings are high. The corridor faces the courtyard. The facilities of the laundry and kitchen are modern. This private hospital is equipped with an emergency power generator, a telephone exchanger and an electronic computer room.

At the center of the OPD, there is a corridor which also serves as a waiting hall. On both sides of the corridor there exist the internal medicine, surgical, gynecological-obsteric, pediatric, dental and other examination-treatment rooms. Facing the front, there is an X-ray room which is equipped with six X-ray systems including two for cardiac vessels. There also is one isotope scanner.

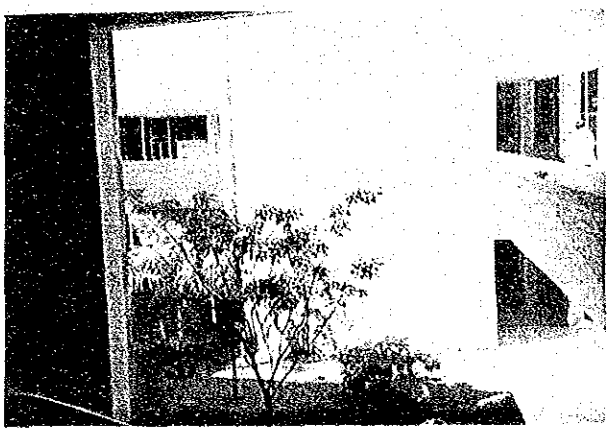
The building containing inpatients' quarters is six-storied, and one nursing unit consists of 17-28 patients. There are nursing stations on each floor. There are rooms for six inpatients, two inpatients and private rooms and VIP rooms. The hospital is equipped with six operation rooms and 16 ICU rooms.

The central laboratory is equipped with BECMAN's electrolyzers, calling gas analyzers and other equipped.

SAMITIVEJ
Hospital



A whole view



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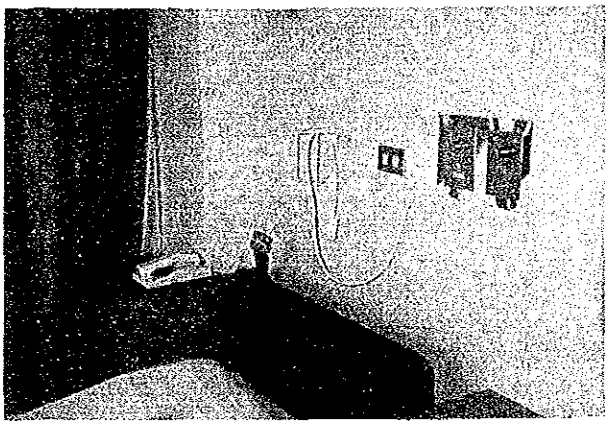
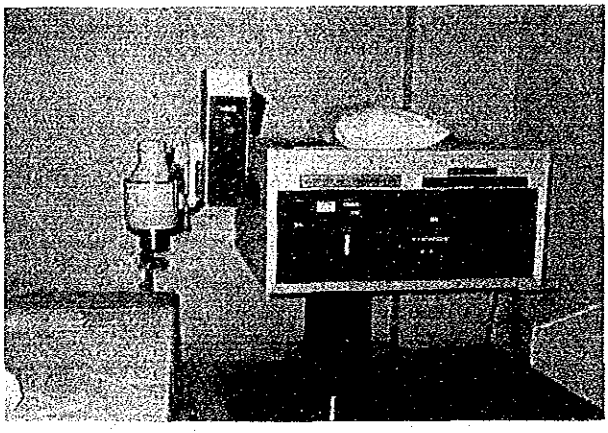


Private room



I.C.U. room

(4) Huchiewu General Hospital

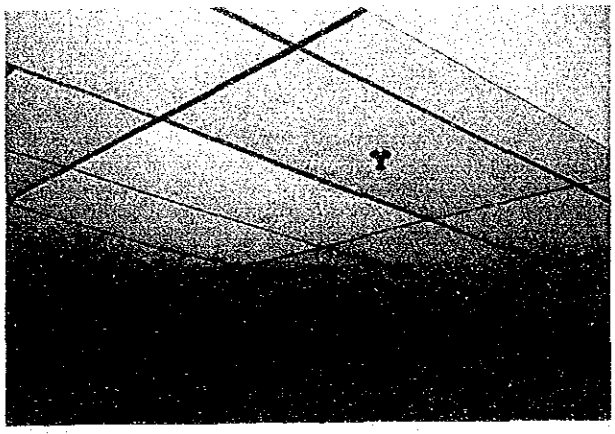
The building has 22 floors. Opened in 1978, the hospital is equipped with 750 beds and air-conditioned.

The hospital is also furnished with full fire prevention and electric facilities. It has a staff of 1,000 persons, including 40 physicians and 400 nurses. Individual patients' rooms of this hospital well furnished. The OPD is located on the first and second floors, and a central plumbing system is installed for gas aspiration. There are five X-ray systems including one for cardiac catheter.

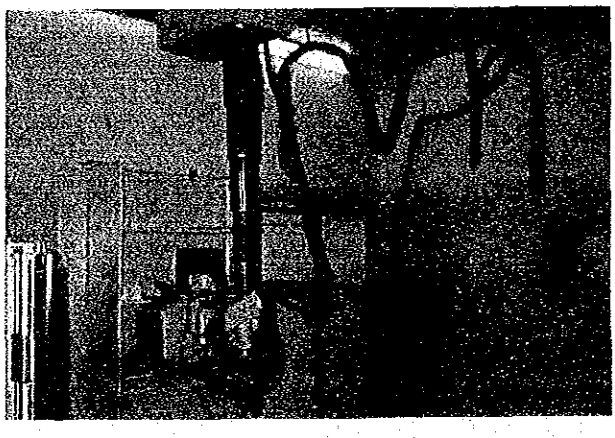
The hospital is also equipped with 16 ICU units, three CCU units and two cardiac resuscitators.

HUCHIEWU
GENERAL Hospital

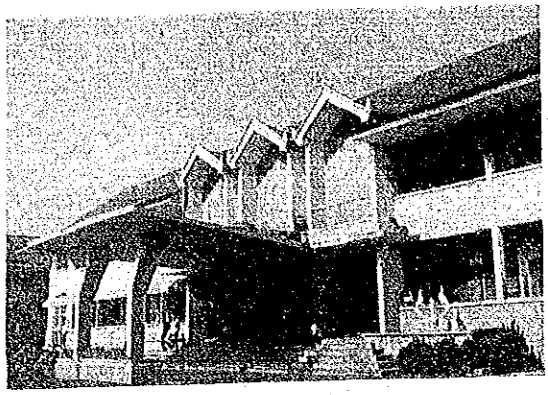
Waiting room of
O.P.D.



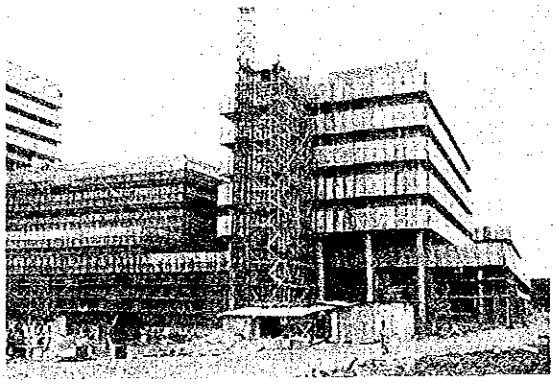
Fire protection
facility (Sprinkler)



X-ray room



HAAD YAI
Provincial Hospital



Hospital of
SONGKLA
UNIVERSITY