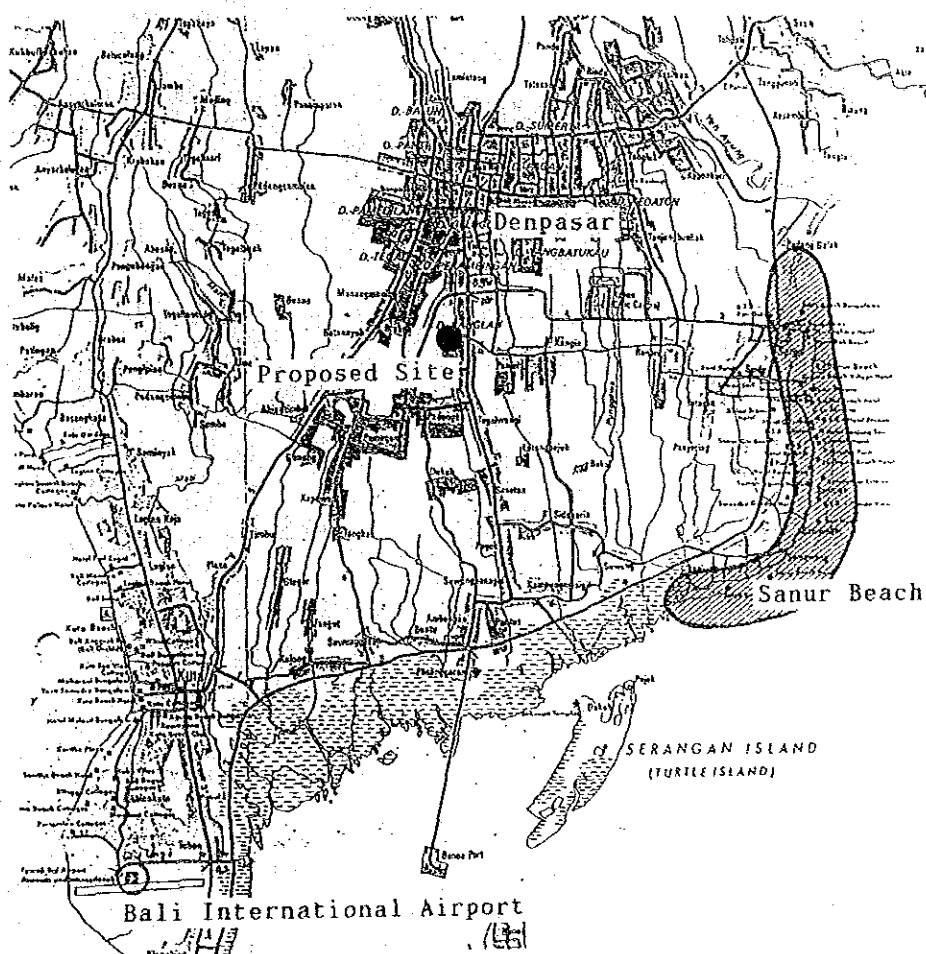


### 3-3-4 General Condition of the Project Site

#### (1) Project Site

Sanglah Hospital is situated in the northern part of Denpasar, where there are many international resort hotels. It is about 20 minutes west Sanur Beach by car.

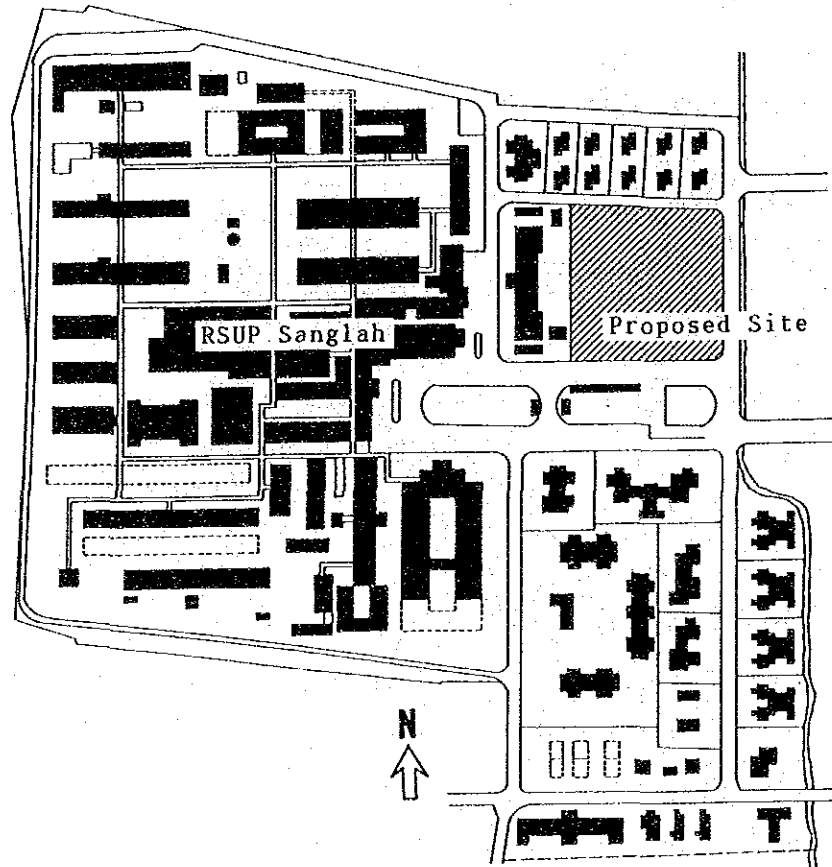
Fig.- 11 Location of RSUP Sanglah



This is a general hospital with 17 clinical departments and 664 beds. It is also serving as the educational hospital of Udayana University. The land area of the site is 13.2ha. Its facilities are 1-story or 2-story ferroconcrete or wooden buildings.

The site for this center is located on the premises of the hospital. It is a plain rectangular lot with a land area of approximately 6,000m<sup>2</sup>, surrounded on three sides by roads.

Fig.- 12 Proposed Site RSUP Sanglah



On the project site are the dormitory of the nurses' school attached to Udayana University and two houses for doctors. None of these facilities is in use. They will be removed by the Ministry of Health of Indonesia.

An outline of the project site is shown in the table below.

Table 77 Outline of site

Location	On the premises of Sanglah Hospital
Area	About 6,000 m <sup>2</sup> (75 × 80 m)
Sharpe	Rectangular lot facing roads on the east, south and north, and being bounded by outpatient ward on the west
Ownership	Sanglah Hospital
Undulation	No difference of elevation and slope; almost flat
Sunshine	Good condition for want of high buildings in surrounding area
Ventilation	Good condition because of roads on three sides
Noise	Low for staff houses
Pollution	No origin of pollution in surrounding area
Obstruction	Removal
Soil	Surface stratum to depth of abcent 8 m consists of sand layer with clay
Underground water level	GL-0.5 to 0.8 m
Draining	Good condition from 4 meter to 5 meter deep
Allowable bearing capacity of soil	10 t/m <sup>2</sup>
Preparation	No need

## (2) Present Condition of Infrastructure

As a result of the on-the-spot survey, the study team confirmed the following concerning the infrastructure in and around the project site.

### 1) Source of Water

At present, groundwater (pumped up from a depth of 200 meters) is utilized throughout the city of Denpasar. It seems likely however that the current boom in tourism development and the continuing influx of population into the urban areas will cause a serious shortage. Therefore, the provincial government is promoting a plan to develop a new water service system aimed at taking water from nearby rivers. The project site is included in the area to be covered by the city's new water service system.

Sanglah Hospital is utilizing groundwater supplied by the city (supplied to the facilities of the hospital via a water main with a diameter of 4 inches) as well as well water, the latter being a safeguard against any suspension of the supply of city water. The water supply system for the center will be basically the same as this system.

The results of water quality testing show that the hardness of both the city water and other groundwater is rather high, although it is within the range of standard values. It is high in iron. Except for these facts, however, there is no problem with its quality.

For the implementation of this project, the City Water Supply Corporation of Bali has guaranteed supply of new city water to the project site. It will be necessary to install water treatment equipment in this center when the center begins to receive new city water to make assure water quality.

### 2) Discharge of Sewage

On Bali sewage is generally discharged directly into the ground or through septic tanks. However, there is no government control on the discharge of sewage. No standard BOD values for effluents are established. As a result, there has recently been widespread pollution of seawater near the coast. At Sanglah Hospital, on the premises of which

the center is going to be constructed, sewage is discharged through septic tanks. No standard BOD values are established.

### 3) Discharge of Rainwater

On the premises of Sanglah Hospital, rainwater is discharged into the ditches dug around the buildings. Similar ditches will be dug around the facilities of the center.

### 4) Power Supply

At present, the hospital is receiving 1,110KVA electric power from the power plant of the Electric Power Corporation. It has filed an application with the corporation for an increase of 620KVA in power supply.

According to the explanation given by the Electric Power Corporation, the present situation of power supply is relatively stable, but power supply is suspended rather often during the year.

According to the local investigation conducted by Sanglah Hospital, the voltage fluctuated in a range between approx. 19.5 kV-22 kV.

### 5) Telephones

The switchboard installed in Sanglah Hospital is very old. The hospital intends to install a new one, which will be compatible with the one to be installed in the center.

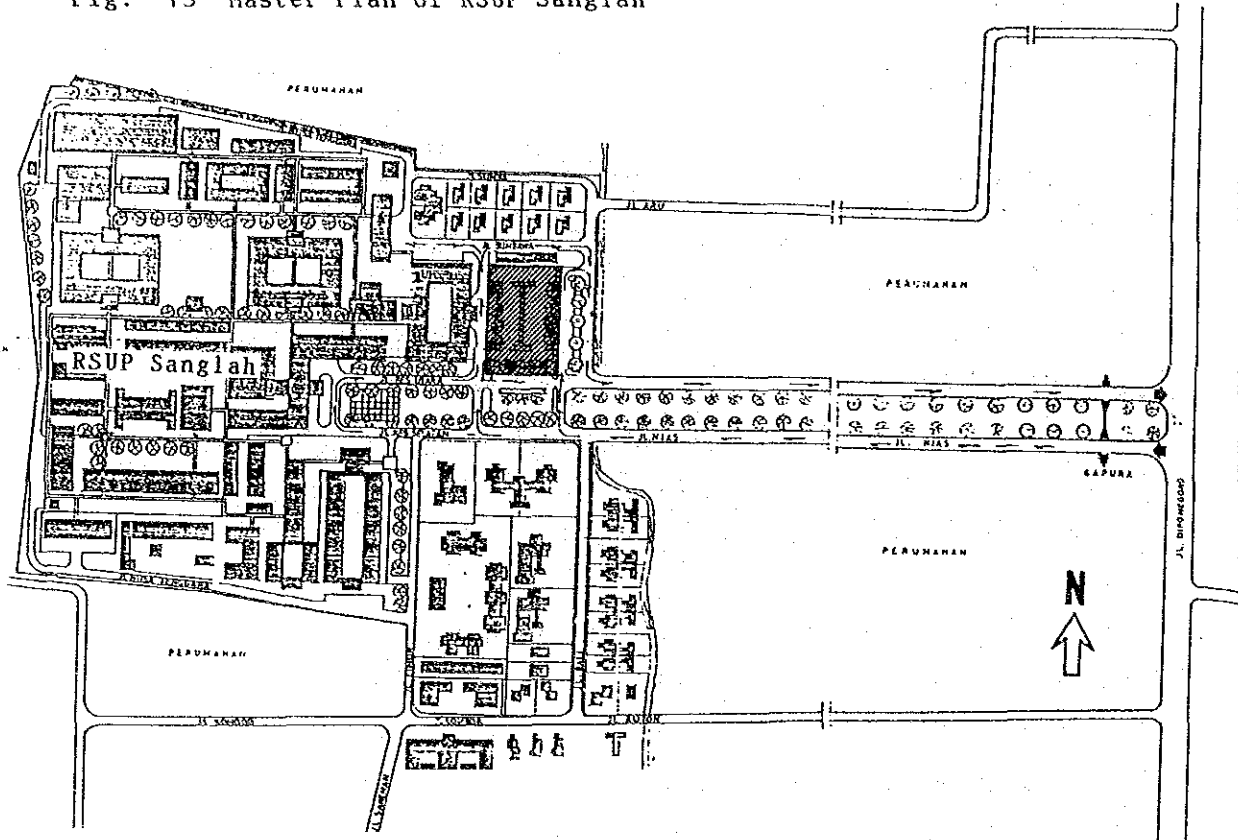
### 6) Gas

The hospital is currently using propane gas as the main heating source.

### (3) Other Aspects of the Project Site

The hospital is planning step-by-step replacement of old facilities on the basis of a master plan worked out in 1984.

Fig.- 13 Master Plan of RSUP Sanglah



According to the master plan, no construction is being planned that would conflict with the center. With this in mind, the selection of the project site indicated in the Indonesian proposal is considered reasonable.

In addition, the hospital has filed an application with the provincial government for approval of a plan to connect the main approach of the hospital to be constructed in accordance with the master plan, to the trunk road which is Diponegoro St. If this works out, the project site will be located in a very convenient place for an emergency medical care facility -- very close to the trunk road, and therefore very visible from there.

### 3-3-5 Technical Cooperation

Although it is actually a Class B hospital, Sanglah Hospital is a very important key hospital to covering four provinces, including Bali, in accordance with the central government's medical care policies. The emergency medical care center to be constructed under this project is positioned as a top referral medical facility and as a part of the hospital. As such, the center is designed to play an important role in educating and training the medical specialists working at lower level medical facilities in the region, at the same time that it provides advanced medical care services.

On the other hand, there is considerable regional difference in the level of medical administration between the Java area (which has the RSCM Emergency Medical Care Center, a top referral hospital, in Jakarta, its capital) and the Bali area which consists of many small islands. It was against such a background that the Ministry of Health of Indonesia requested technical cooperation from Japan. This request should be examined as an important subject of discussion between the two countries.





## **CHAPTER 4 BASIC DESIGN**



## CHAPTER 4 BASIC DESIGN

### 4-1 Basic Design Policies

Design of the facilities will be carried out in accordance with the following basic design policies formulated on the basis of the review of the request, the findings of the on-the-spot survey of similar facilities in Indonesia (for the purpose of evaluating the present technical level of medical care in the country) and the Indonesian Government's emergency medical care policies.

- (1) The capabilities of the center should be on the same technical level as the RSCM Emergency Medical Care Center, as it is designed to function as a top referral medical facility.
- (2) The medical and architectural equipment and devices selected should emphasize strength and durability rather than state-of-the-art technology.
- (3) Although the center is to be an emergency medical care center attached to Sanglah Hospital, its facilities should be completely independent and have their own operating, examining, and radiological equipment, since the center is designed to operate under a one-gate system.
- (4) In general, it is customary for an emergency medical care center in Indonesia to hospitalize patients for an average of 24 hours. In the case of this center, however, emergency patients should be hospitalized for 4 to 5 days as the hospital's main facilities are not equipped with a sufficient number of beds for emergency patients.
- (5) The center should be designed to function smoothly under the wide-area emergency communications system which is to be implemented in the future.
- (6) The center should be designed to function effectively (for example, be equipped with a lecture room, a training room, etc.) as an institution for education and training individuals in emergency medical care.

- (7) The center should employ the services of a local consultant for guidance regarding the procedures such as applying for approval concerning matters related to architecture and the like. In designing the facilities of the center, Balinese style should be reflected as much as possible, since Indonesian architectural laws require that designs of buildings and other structures constructed on Bali reflect traditional Balinese culture.

## 4-2 Examination of the Conditions for the Basic Design

### 4-2-1 Conditions for Design of the Facilities

#### (1) Examination of the Scale of the Facilities

The scale of the facilities of this center was determined according to the area of each of the required rooms, passageways, and other facilities mentioned in the basis of the Indonesian request concerning the required facilities and equipment (as examined in 3-2-2 "Examination of the Facilities and Equipment Requested"). When calculating the required area for a room, the standard values employed in Japanese hospitals for wards, radiology rooms, and the like, i.e. those rooms having the same general function, were used. Additionally, this same method was employed for the ICU, the surgery department, and other areas wherein functions unique to emergency care will be performed. Finally, the same area values as those used for general facilities were employed for the calculation of the needs of the administration department. Reference documents used and similar facilities employed for reference are as follows:

Table 78 References and similar facilities

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a	"Hospital construction from the viewpoint of medical activity" issued by Japan Planning Center
b	Osaka Emergency Medical Care Center
c	Area per person (from information of architectural design)

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The standard values of the area and dimensions of each required facility are shown in the table below.

Table 79 Standard area

Department		Area (m <sup>2</sup> )	a	b	c
First emergency treatment	Examination	36		0	
	Triage	36		0	
	Treatment	18		0	
Radio-diagnosis	X-ray TV, CT	30		0	
	Operator's room	30		0	
Intensive care	ICU (per bed)	18		0	
	Isolation	18		0	
	Nurse station	20		0	
Operation	Operation	36		0	
	Prep, hall (per operation (1))	24		0	
Central sterilizing supply	Central sterilizing supply	72		0	
Emergency obstetric and gynecology	Labor	48		0	
	Delivery	36		0	
	Nurse station	36		0	
	Neonatal	36		0	
	Ward (4 beds)	30		0	
Ward	Ward (1 bed)	15		0	
	Ward (2 beds)	15		0	
	Ward (4 beds)	30		0	
	Ward (6 beds)	39		0	
	Nurse station	45		0	
Administration	Superintendent	25			0
	Medical office	42			0
	Library	36			0
	Staff	30			0
Services	Cafeteria (dinning)	55			0
	Kitchen	20			0
Others	1) The effective width of corridor should be over 2 m (2.5 m on calculation from the center of columns or walls). 2) The entrance hall and the meeting room are hoped to increase the area as far as possible. This is the reason that the number of nursing attendance for each patient is more than that in Japan, and these rooms may fulfill their functions in disasters.				

The values determined for the area and dimensions of each required facility are shown in the table below.

a) Emergency First Medical Examination Department

As the passageways are important in connecting the facilities of this department to the facilities of the Administration Department and the Emergency Obstetrics/Gynecology Department, the actual dimensions are larger than those indicated in the Indonesian proposal.

Table 80 Room scales at department of first emergency examination

Department	Rooms	design requested(m <sup>2</sup> )	Area decided (m <sup>2</sup> )	a	b	c
First emergency treatment	Treatment room (Otorhinolaryngology)	21	18 (6 × 3)	o		
	Treatment room (Orthopedics)	27	12 (6 × 2)	o		
	Treatment room (Ophthalmology)	24	12 (3 × 4)	o		
	Examination room (1)	12	36 (6 × 6)		o	
	Examination room (2)	12				
	Laboratory	32	18 (6 × 3)		o	
	Triage room	47	36 (6 × 6)		o	
	Resuscitation room		18 (6 × 3)		o	
	Toilet for patients		6 (3 × 2)		o	
	Washing room		12 (4 × 3)		o	
	Observation room		36 (6 × 6)		o	
	Corridor	18	52.5 (21 × 2.5)	o		
	Total	193	256.5			

b) Radiology Department

The scale of each required facility for this department is shown in the table below.

Table 81 Room scales of radiology department

Department	Rooms	Design requested(m <sup>2</sup> )	Area decided (m <sup>2</sup> )			
				a	b	c
Radiology	X-ray TV room	18	35.75(5.5×6.5)		o	
	CT room	18	39(6× 6.5)		o	
	Locker room	8	-			
	Dark room	6	6 (3 × 2)			o
	Examination room	16	-			
	Waiting room	14	-			
	Operator's room	Undecided	33(6 × 5.5)		o	
	Corridor	Undecided	38(15 × 2.5)		o	
	Total	80	151.75			

c) Intensive Care Department

The minimum space necessary for intensive care, in both general hospitals and emergency medical care centers, is 18m<sup>2</sup>/bed. As this department is equipped with a total of 6 beds, the total floor space for it should be more than 108m<sup>2</sup>.

The value determined for the scale of each facility in this department is shown in the table below.

Table 82 Room scales of ICU department

Department	Rooms	Design requested(m <sup>2</sup> )	Area decided (m <sup>2</sup> )			
				a	b	c
ICU	Recovery room	40	-			
	ICU room (3 beds)	48	117(6.5× 18) (6 beds)		o	
	Isolation room	20 (1 room)	39(6.5× 6) (2 rooms)		o	
	Nurse station	32	20(6.5× 3)		o	
	Equipment and linen room	8	20(6.5× 3)		o	
	Corridor	20	75(2.5× 30)		o	
	Total	168	271			



d) Operating Department

In the Indonesian proposal, the total floor space of the annex to the operating room is 60m<sup>2</sup>. If this value is for all necessary facilities, including the locker room and the machine room, it is nearly equal to the value determined after examination of the Indonesian proposal (69m<sup>2</sup>) and is therefore appropriate.

The value determined for each facility in this department is shown in the table below.

Table 83 Present conditions of operation department

Department	Rooms	Design requested(m <sup>2</sup> )	Area decided (m <sup>2</sup> )	a	b	c
Operation	Operation room(1)	33	39(6.5 × 6)		o	
	Operation room(2)	44	39(6.5 × 6)		o	
	Prep. hall	60	48(4 × 12)		o	
	Locker room	Undecided	8(2 × 4)		o	
	Air conditioning machine room	"	24(4 × 6)		o	
	Total	137	158			

e) Central Sterilizing Supply Department

The value determined for each facility in this department is shown in the table below.

Table 84 Room scales of central sterilizing supply department

Department	Rooms	Design requested(m <sup>2</sup> )	Area decided (m <sup>2</sup> )	a	b	c
Central sterilizing supply	Central sterilizing supply room	33	72 (6 × 12)		o	
	Washing room	16	-			
	Corridor	Undecided	22.5(2.5 × 9)		o	
	Total	57	94.5			

f) Emergency Obstetrics/Gynecology Department

The value determined for each facility in this department is shown in the table below.

Table 85 Room scales of department of emergency obstetrics and gynecology

Department	Rooms	Design requested(m <sup>2</sup> )	Area decided (m <sup>2</sup> )	a	b	c
Emergency obstetrics and gynecology	Labor room	30	45(6 × 7.5)	o		
	Delivery room	30	36(6 × 6)	o		
	Neonatal room	36	30(6 × 5)	o		
	Ward (18 beds)	64	60(5 × 12)	o		
	Toilet and shower room	24	21(6 × 3.5)	o		
	Toilet for staff	9	-			
	Sterilizing room	9	-			
	Nurse station	22	30(6 × 5)	o		
	Physician office	9	-			
	Equipment room	7	15(3 × 5)	o		
	Sanitary room	Undecided	6(2 × 3)	o		
	Corridor	53	75(2.5 × 30)	o		
	Total		293	318		

g) Ward Department

Only the values determined for the nurses' station and the passage-ways are larger than those indicated in the Indonesian proposal. The value determined for the nurses' station is twice that indicated in the Indonesian proposal because the spaces for maintenance and management of case histories, precision medical equipment, and doctors' conferences were added to the original plan by the Indonesian side. The scale of the facilities of this department is considered appropriate.

The value determined for each facility in this department is shown below.

Table 86 Room scales of ward department

Department	Rooms	Design requested(m <sup>2</sup> )	Area decided (m <sup>2</sup> )	a b c		
Ward	6-bed room (1 room)	44	-			
	3-bed room(6 rooms)	168	-			
	2-bed room(7 rooms)	154	-			
	4-bed room(8 rooms)	Undecided	240(5 × 48)		o	
	1-bed room(4 rooms)	"	60(5 × 12)		o	
	(Total 36 beds)	"	-			
	Nurse station	42	96		o	
	Linen room	17	30(5 × 3) (2 places)		o	
	Toilet & shower for patients (1 room)	56	60(6 × 5) (2 places)		o	
	Meeting room	63	60(6 × 5) (2 places)		o	
	Toilet at meeting room	27	19.5(3 × 6.5)		o	
	(Ward corridor)	135	240(2.5 × 96)		o	
	Sanitary room	Undecided	12(2 × 3) (2 places)		o	
	Store	"	6(3 × 2)		o	
	(Corridor for exclusive use of staff)	"	48(3 × 16)		o	
	Treatment	"	30(3 × 5) (2 places)		o	
	Total		706	901.5		

The value determined for the corridor is more than twice that indicated in the Indonesian proposal. This is because a plan to place each corridor on a side of the facility was adopted in place of the middle corridor style proposed by the Indonesian side. The reason for this is shown in the table below.

Table 87 Study on corridor

	Items	Middle	Side
Facilities	Air conditioning	Requirement	Needless
	Lighting during daytime	"	"
	Eliminating smoke when fires	"	"
Refuge	View unobstructed	Disadvantage	Advantage
	Relief work	"	"
Environment	Degree of comfortableness	Low	High
	Custom	Few	Many
Cost	Ease of maintenance and management	Disadvantage	Advantage
	Efficiency of floor area	Advantage	Disadvantage

## h) Administration Department

The value determined for each facility in this department is shown in the table below.

Table 88 Room scales of administration department

Department	Rooms	Design requested(m <sup>2</sup> )	Area decided (m <sup>2</sup> )			
				a	b	c
Administration	Superintendent room	33	20(5 × 4)			o
	Conference room	48	-			o
	Office	48	25(5 × 5)			o
	Reception	48	15(5 × 3)			o
	Dispensary	19	15(3 × 5)			o
	Night-duty room for physicians	Undecided	60(5 × 12) (4 rooms)			o
	Toilet and shower room(for night-duty)	"	21(3.5 × 6)			o
	Patient's record room	"	15(3 × 5)	o		
	Medical office	"	25(5 × 5)			o
Data room	"	25(5 × 5)			o	

Staff room	"	20(5 × 4)	o
ME room	"	15(3 × 5)	o
Equipment room	"	15(3 × 5)	o
Toilet for staff	"	24(3 × 8)	o
Guard house	"	15(3 × 5)	o
Store room	"	15(3 × 5)	o
Corridor	"	92.5(2.5×37)	o
Total	148	417.5	

i) Service Department

The value determined for each facility in this department is shown in the table below.

Table 89 Room scales of service department

Department	Rooms	Design requested(m <sup>2</sup> )	Area decided (m <sup>2</sup> )	a	b	c
Service	Dissecting room	27	-			
	Preparation room	18	-			
	Mortuary	18	32.5(5 × 6.5)	o		
	Kitchen	33	20(5 × 4)			o
	Dining hall	42	45(9 × 5)	o		
	Electrical equipment room	15	57.75 (5.5 × 10.5)	o		
	Power generator room	Undecided	27.5(5 × 5.5)	o		
	Medical gas room	"	22(4 × 5.5)	o		
	Pantry	"	9(3 × 3)	o		
	Corridor	"	32.5(2.5 × 13)	o		
Total		180	246.25			

j) Department of Education and Training in Emergency Medical Care

As educational and training programs will be implemented in the form of seminars given in the lecture and training room, the required minimum space per trainee should be approximately 2m<sup>2</sup>.

The value determined for each facility in this department is shown in the table below (the required area of each facility was not indicated in the Indonesian proposal).

Table 90 Room scales of department of education and training in emergency medical care

Department	Rooms	Design requested(m <sup>2</sup> )	Area decided (m <sup>2</sup> )	a	b	c
Education and training in emergency medical care	Lecture room (30 persons)	-	54(6 × 9)			o
	Practice room (30 persons)	-	54(6 × 9)			o
	Preparation room	-	36(9 × 4)	o		
	Accommodations for men (10 persons)	-				
	Accommodations for women(20 persons)	-				
	Corridor	Undecided		40(2.5 × 16)	o	
	Total		184			

k) Common Facilities

As can be seen from the table below, the value determined for the area of the drawing room is larger than that indicated in the Indonesian proposal. The larger value was chosen in view of the fact that it is customary in Indonesia for patients to come to a medical facility accompanied by many family members. If this facility is too small, it might cause confusion in and around the entrance hall in emergencies. It should also be noted that this room could be used as a facility for emergency medical care in the event of a large-scale disaster.

The value determined for each facility in this department is shown in the table below.

Table 91 Common room scales for departments

Department	Rooms	Design requested(m <sup>2</sup> )	Area decided (m <sup>2</sup> )			
				a	b	c
Common use	Entrance hall	60	60(6 × 10)	o		
	Elevator (for first floor to third floor)	36	-			
	Emergency waiting room	63	120(10 × 12)	o		
	Toilet for visitors	27	30(6 × 5)	o		
	Stair, corridor and slope	611	516		o	
	Total	797	726.00			

Thus, the total floor space of each department is as shown below.

Emergency First Medical Examination	256.50m <sup>2</sup>
Radiology	151.75m <sup>2</sup>
Intensive Care	271.00m <sup>2</sup>
Operating	158.00m <sup>2</sup>
Central Sterilizing Supply	94.50m <sup>2</sup>
Emergency Obstetrics/Gynecology	318.00m <sup>2</sup>
Ward	901.50m <sup>2</sup>
Administration	417.50m <sup>2</sup>
Service	246.25m <sup>2</sup>
Education and Training on Emergency Medical Care	184.00m <sup>2</sup>
Common Facilities	726.00m <sup>2</sup>
<b>Total</b>	<b>3,725m<sup>2</sup></b>

(2) Conditions for Determining the Functional Levels of the Facilities and Building Materials

As this center is required to function as a top referral medical facility in the region, its facilities must have the same advanced

capabilities as the RSCM Emergency Medical Care Center. In determining the functional level of the facilities, however, it is necessary to understand precisely the major local construction methods, equipment which can be locally procured, the local climate, and other factors. If building materials such as those currently used in Japan are used in this project, it would not necessarily result in a high functional level. Therefore, it is necessary to determine functional levels suited to each type of building material while trying to maximize the capabilities of the facilities. In other words, it is important to determine the level of building materials and facilities from the standpoint of the prospective users of the facilities.

The results of the study team's examination of the conditions for determining the functional level of the facilities and the proposed building materials are shown in the table below.

Table 92 Grading of facilities

Item	Repair and material supply available on the spot	Part required to be of high grade for maintaining medical facilities	Contents
Main structure	o		R.C. (Rahmen structure)
External walls	o		R.C.
Internal partitions	o		Rehiforced concrete blocks (150 m/m thick)
Floor slab	o		R.C. monobloc structure
Exterior walls	o		Blicks plus sand rock mounting (partial)
	o		R.C. concrete finish (partial)
	o		Concrete block mounting (partial)
Exterior flooring	o		Terrazzo tile
	o		PC concrete slab
Exterior fittings	o		Aluminium-framed window,
	o		Steel door
Coping window frame	o		PC concrete



Interior flooring	o	Vynil floor tile
	o	Long vynil chloride sheet
	o	Terrazzo tile
	o	Terrazzo finishing
Ceiling	o	Plaster board
	o	Asbestos-cement board
	o	Rock wool sound-absorbing board
Interior fittings	o	Door of operating room & door of ward
	o	Wooden door

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#### 4-2-2 Conditions for Selection of the Required Medical Equipment

##### (1) Design Policies

Careful attention was paid to the following 11 points in selecting the required medical equipment. The basic plan of the required medical equipment will be discussed in 4-4.

- ① Strongly-built, durable, and easy to maintain.
- ② No complexities involved in handling and no long training periods required for operation required.
- ③ Low running cost
- ④ High degree of necessity for carrying out emergency medical care.
- ⑤ Level of application suitable for the present objectives, functions, patients, and the center's plans for the future.
- ⑥ Effective for educating and training medical specialists (on equipment, for medical examinations, treatment, testing and research).
- ⑦ Unlikely to cause discomfort to patients, quick in actuation, equipped with fail-safe mechanism, and not potentially harmful to either patients or operators.
- ⑧ Equipped with safeguards against power failure.
- ⑨ Effectiveness recognized by medical facilities in Japan.
- ⑩ Function and performance level can be maintained utilizing local maintenance system, reagents, and spare parts.
- ⑪ Can cope with future increases in number of patients, the need to carry out emergency medical examinations, as well as unexpected breakdowns.

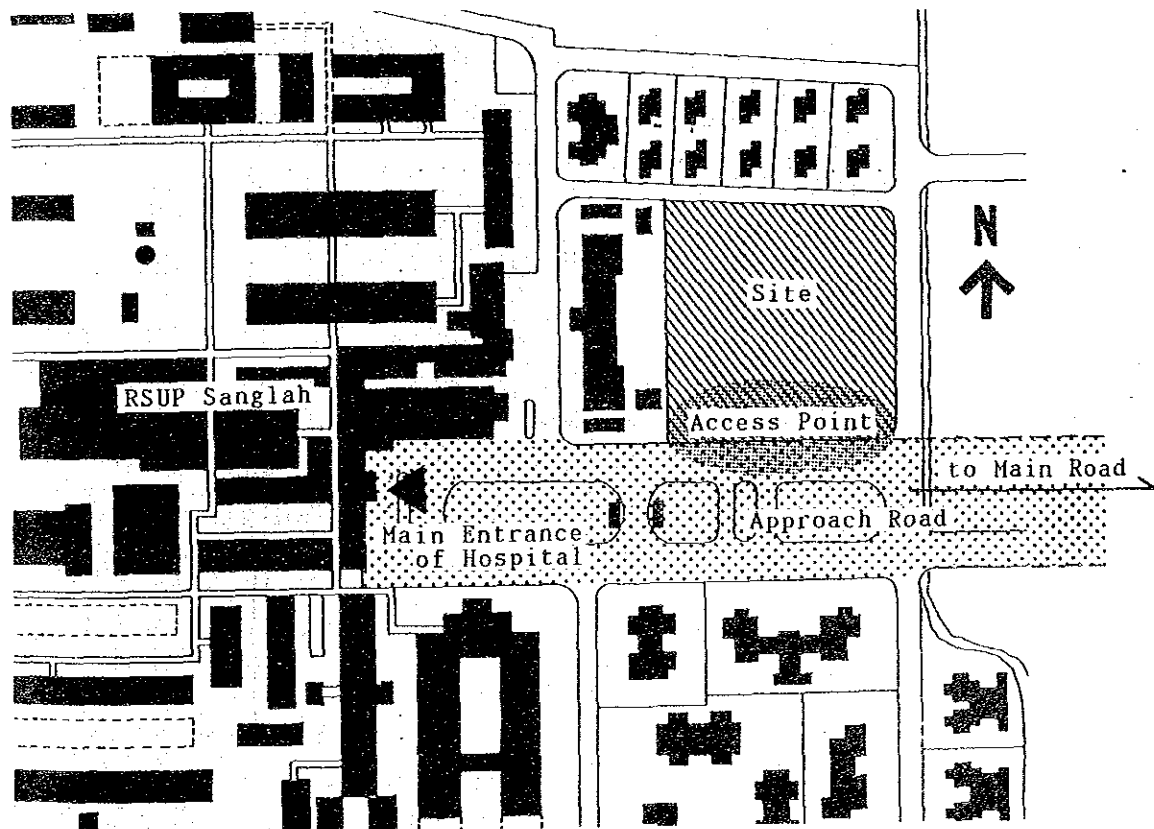
#### 4-3 Basic Facility Plan

##### 4-3-1 Layout Plan

###### (1) Approach to the Site

According to the master plan of Sanglah Hospital, the present main approach to the hospital is to be extended up to Diponegoro Street. The site where this center is to be located is in the southern part of the hospital's premises and borders this main approach. Accordingly, the urgency of emergency patients transport has been taken into account, and the approach to and the main entrance of the site are planned to be located on the southern end of the premises.

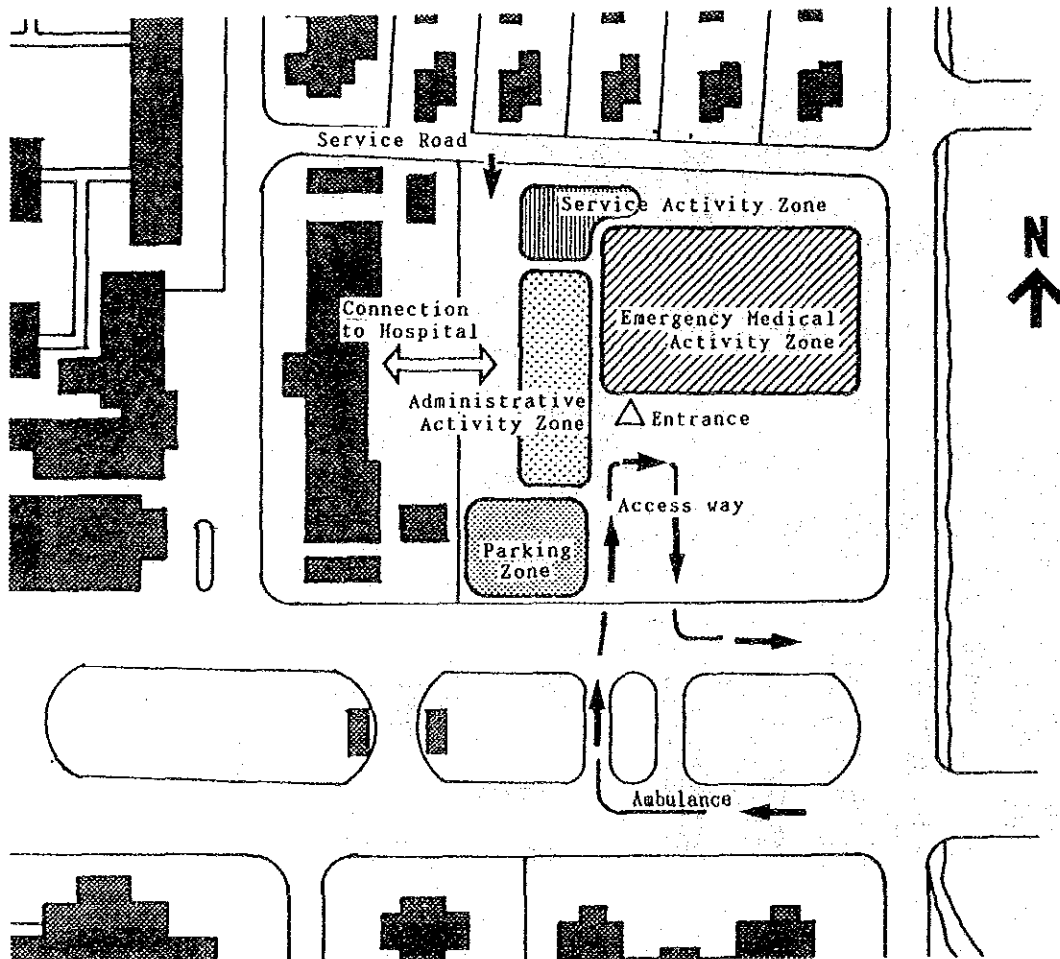
Fig.- 14 Access to the Site



(2) Layout Plan

The center's facilities will be laid out to facilitate ambulance approach. There will be a clear distinction between the direction of vehicles entering the center and that of vehicles leaving it. All access to the parking lot and the entrance of the building will be one-way. As a safeguard against heavy rainfall during the rainy season, outdoor eaves will be attached above every entrance of every building. A service passageway will be installed on the northern side, a machine room, an incinerator and other facilities and equipment will be installed alongside this. Administration-related rooms will be installed on the western side so that they may provide easy access to the hospital's main facilities.

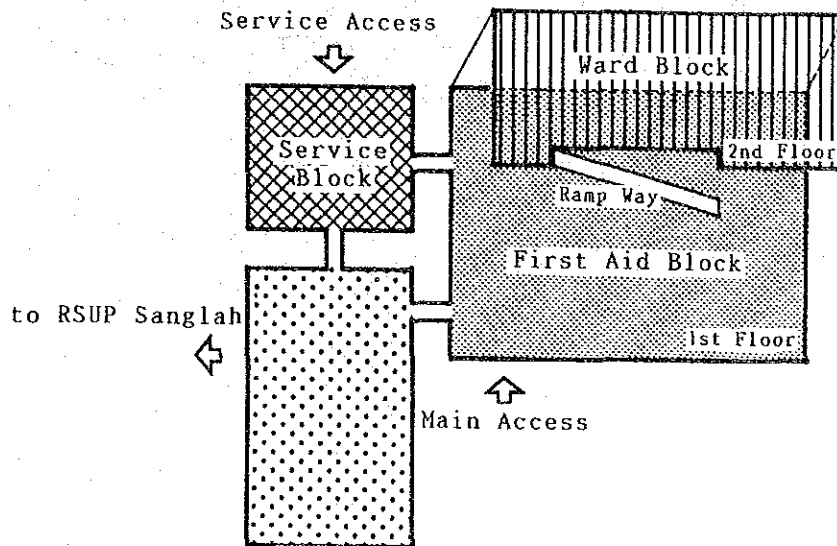
Fig.- 15 Zoning



### (3) Block Layout Plan

The center's facilities will be divided by function into four blocks as shown below.

Fig.- 16 Block Distribution



#### 1) Emergency First Medical Examination Block

This block will be composed mainly of the Emergency First Medical Examination, Intensive Care, Radiology, and Emergency Obstetrics/Gynecology Departments. The facilities of these departments will be located on the first floor because this arrangement will make it possible to align all the paths of flow in a horizontal direction. This arrangement eliminates the need to install elevators and other means of transportation.

#### 2) Ward Block

The Ward, Education, and Training in Emergency Medical Care, and Training Departments which comprise this block will be located on the second floor. Paths of flow between these facilities and those on the first floor will be resolved by installing ramps instead of elevators.

3) Administration Block

The facilities of this block will be located in places which provide easy access to both the emergency first medical care block and the hospital's main facilities.

4) Service Block

The mortuary, the machine room and other facilities which comprise this block will be located on the northern side. The service passageway will connect these facilities to the service road on the northern side.

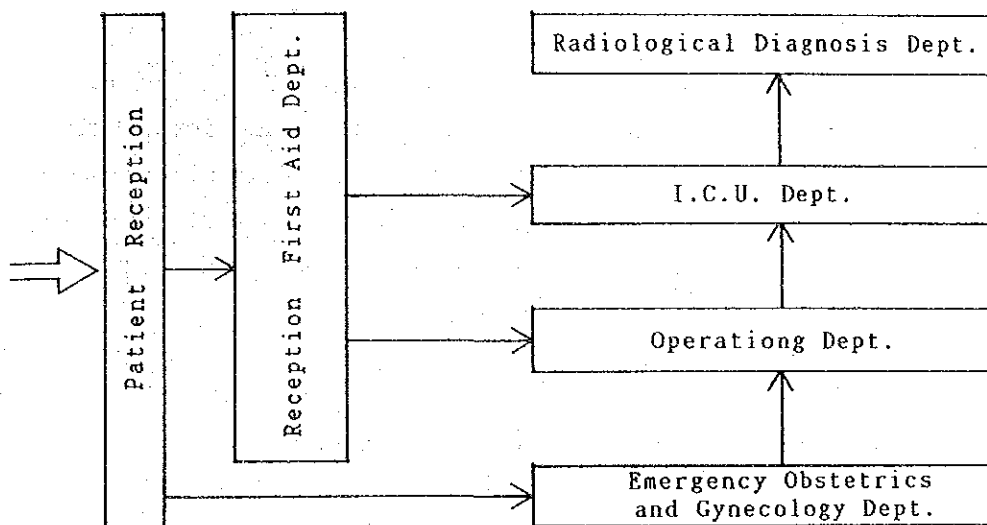
#### 4-3-2 Architectural Plan

##### (1) Floor Plans

###### 1) Emergency First Medical Examination Block

The major paths of flow in this block for patients and staff are as shown below.

Fig.-17 Patients' Paths of Flow in first Aid Block

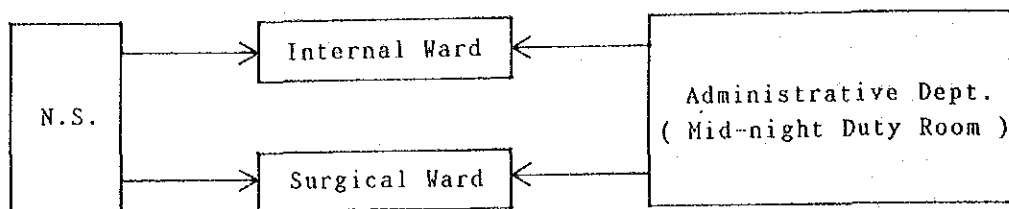


As can be seen from the above, there will be two types of patient paths of flow -- one, starting from the facilities of the Emergency First Medical Examination Department, and the other, starting from the Emergency Obstetrics/Gynecology Department. These two paths of flow will never cross each other. Accordingly, the floor plan of this block will be divided into two parts-- one for the entrance hall and the facilities of the Emergency First Medical Care Department, and the other for the facilities of the Emergency Obstetrics/Gynecology Department. The two parts will be connected to each other within this block.

###### 2) Ward Block

The main paths of flow in this block for patients are as shown below.

Fig.-18 Patients' Paths of Flow in Block

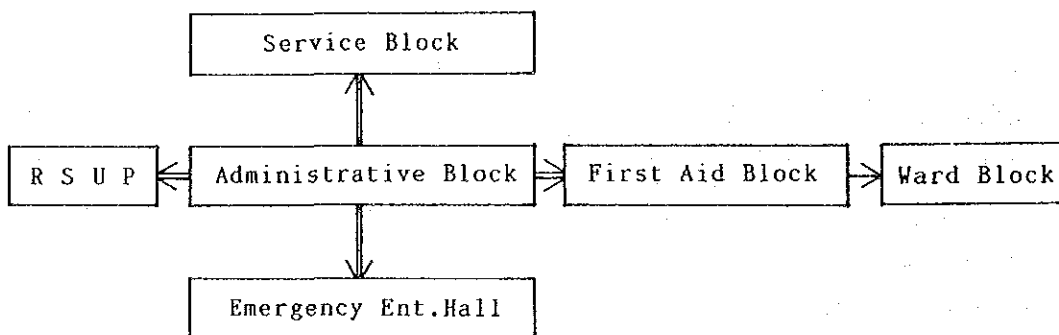


This block will consist of two types of wards, those for internal patients sent from the operating room and the ICUs, and those for surgical patients sent directly from the emergency first medical examination room. The room for duty doctors will be located near the wards to facilitate the nursing service that will be provided around the clock.

3) Administration Block and Service Block

The major paths of flow in these blocks are as shown below.

Fig.-19 Staffs' Paths of in Administrative and Service Block



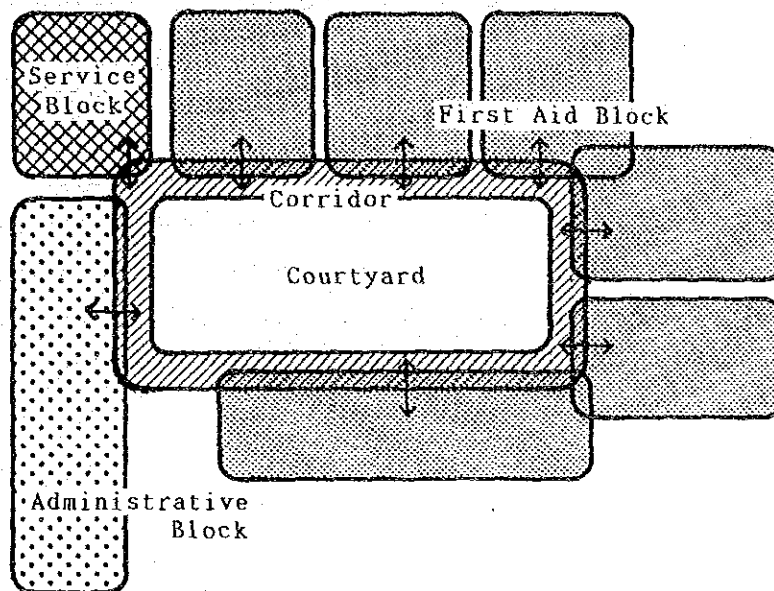
(2) Arrangement of the Blocks

Based on the results of this examination listed in 4-2-1, the basic design of this center is characterized by the positioning of its passageways. Each of them is attached to one side of a building. In other words, the courtyard is surrounded by passageways. All the facilities of



this center are centered around the courtyard. They are connected with each other by these passageways. As a result of this arrangement, every facility will be identifiable functionally and visually, and every room will be provided with natural lighting and ventilation.

Fig.- 20 Block Composition



### (3) Arrangement of the Blocks

It is necessary to locate the sickrooms, the ICUs, and the rooms of the Emergency Obstetrics/Gynecology department on the southern or northern side of the courtyard, because all of them have to avoid direct sunlight and intense heat. These departments should thus be arranged along the east-to-west line.

Although the space on the western side is where the heat intensity load is the greatest, the rooms of the Administration Department have to be located in this space from the standpoint of the path of flow between this center and the hospital's main facilities. Accordingly, in working out the elevations of the facilities located on the western side, it is necessary to take steps to create shade against the afternoon sun such as attaching long eaves above the windows facing west and erecting high block walls.

The facilities which have to provide emergency services, namely, those of the Emergency First Medical Examination Department, the Administration Department, and the Service Department will be located on the first floor. The facilities which require a quiet environment, namely, the sickrooms, the rooms for duty doctors, and rooms for education and training purposes will be located on the second floor.

#### (4) Cross-sectional Plans

##### 1) Height of the First Floor

The project site is on a plain and therefore requires no special work for preparing the ground. However, it is necessary to protect the facilities against floods and humidity. Accordingly, the first floor level should be elevated about 0.5 meters above the ground level. Furthermore, as the space below the first floor will be used for plumbing fixtures, a cellar floor which is about 1.8 meters lower than the first floor should be added.

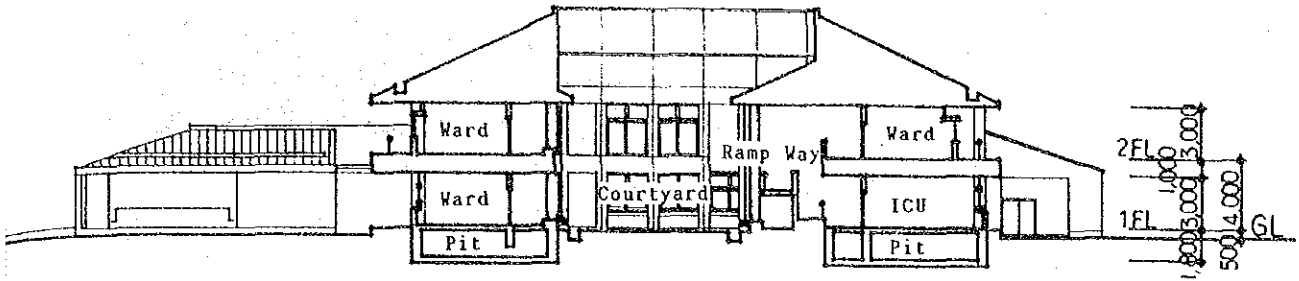
##### 2) Story and Ceiling Heights

These being the facilities of a medical institution, the heights of the stories and the ceilings were determined after examining the necessary height of the ceiling of each room.

Under tropical climatic conditions, the ceiling must be more than 2.5 meters high for air-conditioned rooms, and more than 3 meters high for rooms which are not air-conditioned.

In the case of this center, most of the rooms of the clinical departments require air-conditioning. There will be occasions that preclude the use of air-conditioning according to the type of medical care provided, the air temperature, and the humidity. Accordingly, the height of the ceiling should be 3 meters, which will be optimal for natural ventilation and air-conditioning. As almost all of these rooms are for medical care, they should be equipped with a ceiling to avoid the accumulation of dust. Also, there should be a distance of about 1 meter between the ceiling and the floor above or the roof to create space for plumbing.

Fig.- 21 Section



(5) Elevations

1) Roofs

The roofs should be shed style to avoid strong sunlight, to provide insulation and to cope with torrential downpours. As the architectural laws and regulations in the Province of Bali require that all architectural structures reflect traditional Bali style, the roofs should do so.

2) External Walls

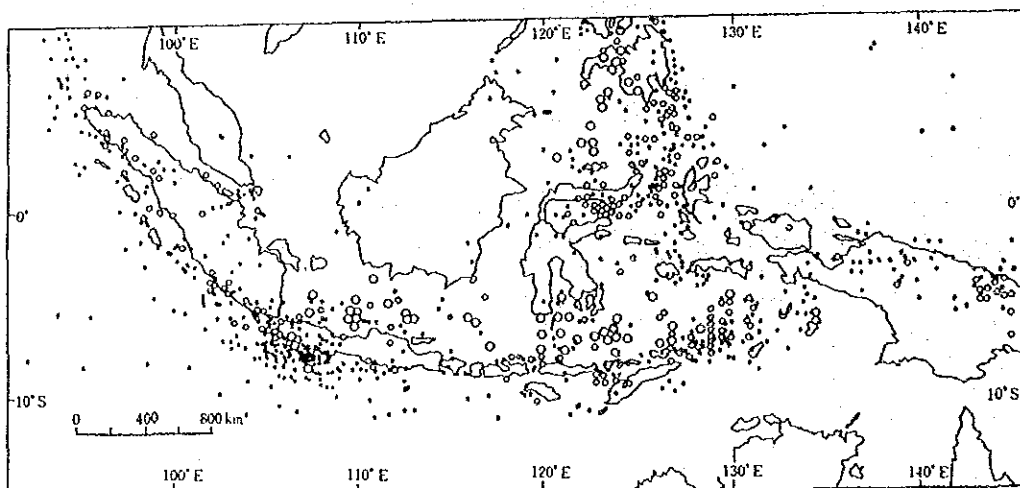
To provide an easy means of evacuation in case of emergency, and to prevent the external walls and interior from being exposed to direct sunlight, balconies will be installed on the external walls which face open areas. And the windows to the balconies should be as large as possible to provide natural lighting and ventilation. The external walls of toilet rooms or staircases should be equipped with blocks that open to the outside to provide natural ventilation.

### 4-3-3 Structural Plan

#### (1) Structural Plan

Indonesia belongs to the Pacific Rim Volcanic and Earthquake Zones. Therefore, there is considerable volcanic activity in this country. It can be said that Indonesia is geologically very similar to Japan. As shown in Table 6, earthquakes are frequent there. All facilities of this center should be earthquake-resistant so that they may remain intact if a large earthquake occurs.

Fig. -22 Distribution of Epicenters in and around Indonesia



#### Legend

- Depth of centrum less than 60 km
- Depth of centrum ranging between 60km to 300km
- ◌ Depth of centrum over 300km

#### (2) Structural Design

The center will be a reinforced concrete building equipped with earthquake-proof walls. This type of building is one of the commonest types in Indonesia. As it will be a 2-story building, its weight will be approximately 4 to 5 tons/m<sup>2</sup>. According to the boring data on the site, the capacity to support weight is approximately 10 tons/m<sup>2</sup> for the silty sand layer with an N value of 10 to 15 at a depth of more than 2 meters. Accordingly, the foundation will be a direct foundation. The space

between the foundation level and the slab of the first floor can be utilized as space for plumbing. The structure and the form of the foundation should allow for plumbing maintenance. Values for stress and sections will be calculated in accordance with the local Building Standards Laws and those established by the Japanese Architectural Society.

a. Fixed load

The fixed load is the sum total of the weights of the structural, finishing, and interior fixing materials.

b. Bearing load

To be calculated in accordance with the local building standards and those established by the Japanese Architectural Society.

c. Earthquake load

To be calculated in accordance with the local building standards and those established by the Japanese Architectural Society.

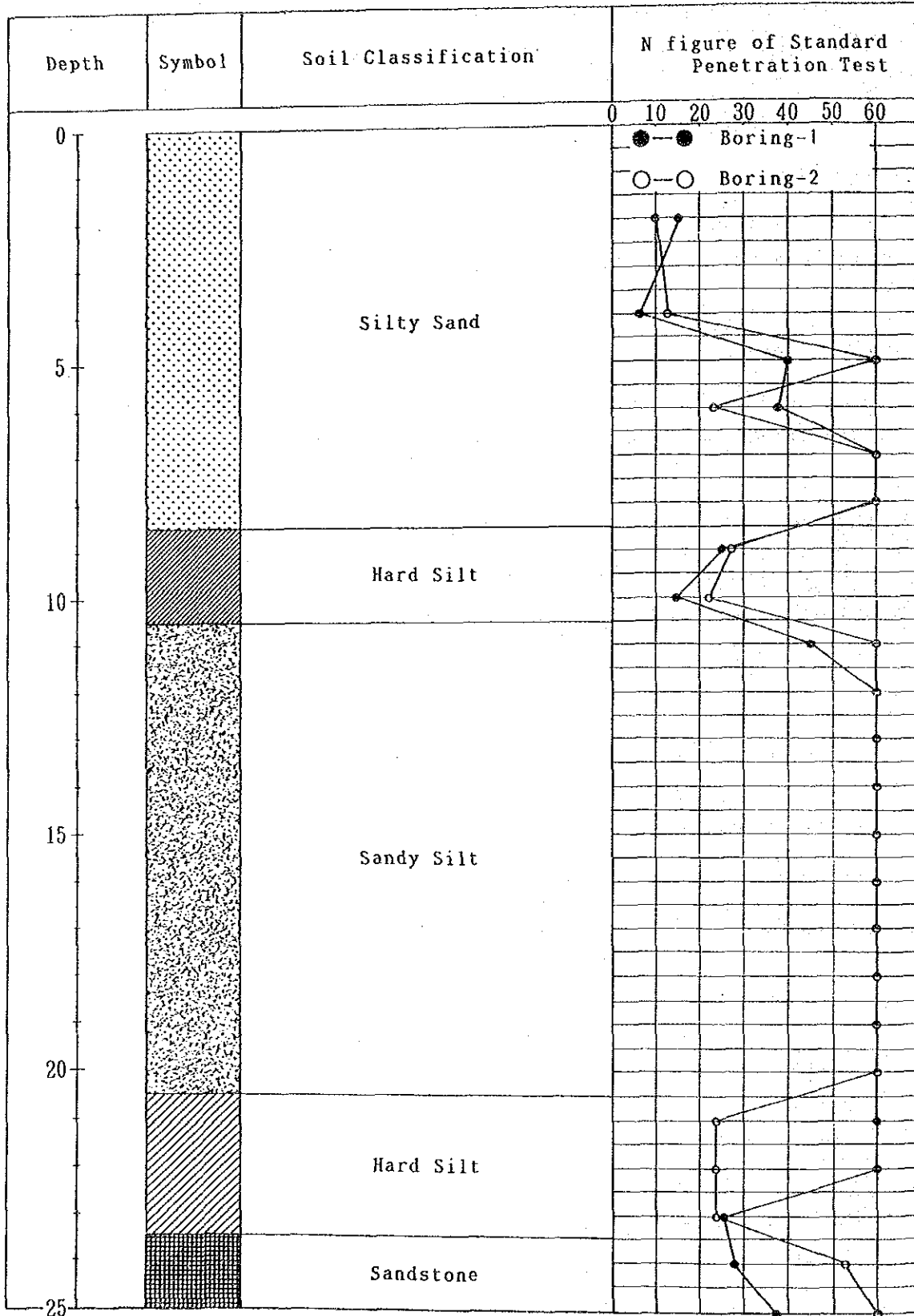
d. Materials

In principle, all structural materials will be procured locally. The required unit stress will be calculated in accordance with the Industrial Standards of Indonesia (SII).

• Concrete  $F_c = 180 - 210\text{kg/cm}^2$

• Reinforcing bars Locally manufactured (SD30 or the like)

Fig.- 23 Boring Data of the Site



#### 4-3-4 Mechanical Plan

##### (1) Electrical Equipment

###### a) Transformer

An indoor transformer will be installed in consideration of durability.

The 3-phase, 22KV electric power received at the main power room of Sanglah Hospital will be changed into 3-phase, 4-line 380V/220V electric power.

Equipment and devices required for receiving the electric power at the facilities of the center are:

- a. Outlets for general lighting fixtures.
- b. Outlets for airconditioners, ventilators, and water supply equipment.
- c. Outlets for X-ray machines.
- d. Outlets in the operating rooms, ICUs, and examination rooms.

Outlets in the operating rooms, ICUs, and examination rooms should be equipped with a fixed voltage device so that they may cope with changes in voltage.

###### b) Independent power plant

An independent power generator will be installed in the power generating room.

In the case of power failures, the independent power generator should be able to cover approximately 30 percent of total electric power normally supplied to the center.H

The emergency independent power generator will operate automatically.

c) Outlets to receive main line electric power

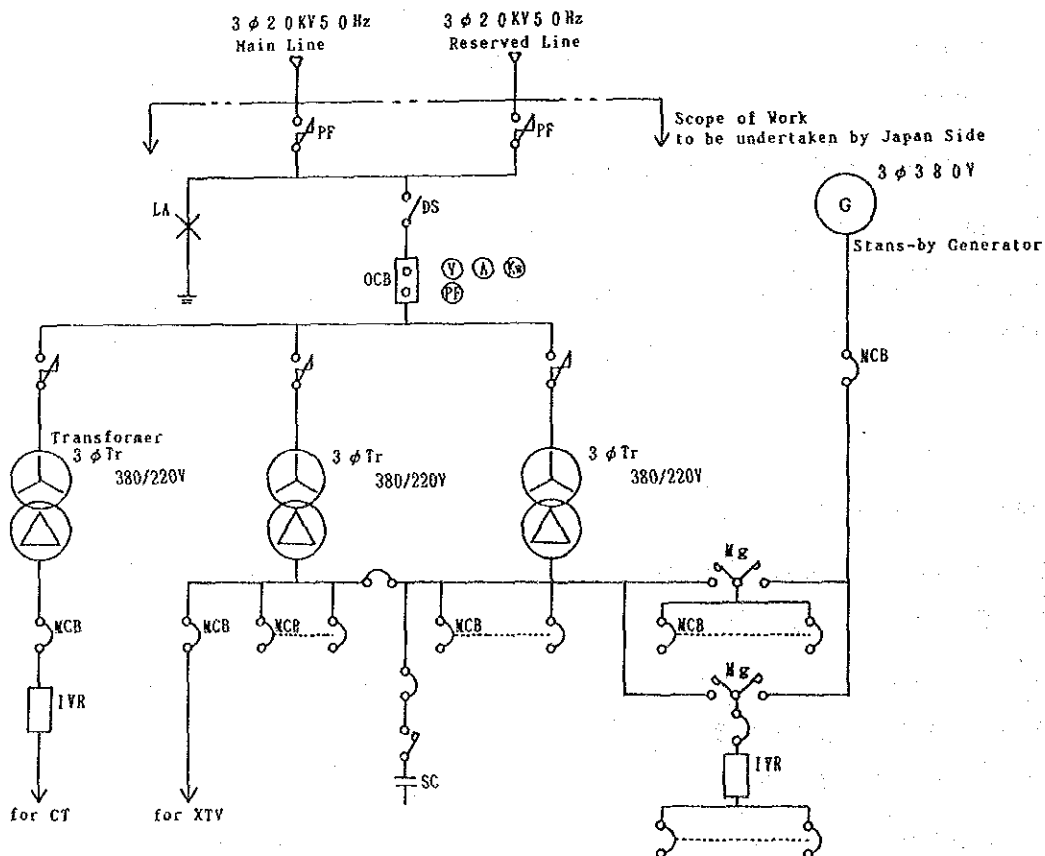
The outlets to receive main line electric power will be of a 3-phase, 3-line 380V type. Those to receive low-voltage electric power will be of a 3-phase, 4-line 380V/220V type.

In principle, metal wires will be used for electric wiring.

Each unit of main line wiring will be protected against overloads and short circuits by means of a circuit breaker.

An isolation transformer will be installed in each of the operating rooms and ICUs to protect the medical staff against both small and large.

Fig.- 24 Electric Power Supply and Distribution Daiagram



d) Outlets for lighting fixtures

Glare-free fluorescent lights will be used as the main light source. There should be as many switches as possible for turning on and off the



lights to contribute to energy conservation efforts and the economical use of electric power.

Streetlights equipped with an automatic switch will be installed on the premises of the center.

All outlets should be equipped with a ground terminal and some of them should be equipped with a ground terminal for medical use.

The values of design luminous intensity for major facilities are as shown below.

	Design l.i.	Design l.i. in Japan
◦ Clerks room, conference and nurse station	300 Lx	(300 - 750 Lx)
◦ Operating room, ICU and treating room	500 Lx	(300 - 750 Lx)
◦ Sickroom	200 Lx	(100 - 200 Lx)
◦ Passage, hall	100 Lx	( 50 - 100 Lx)

e) Telephones

Telephones will be installed in the center (up to the MDF board) by the Indonesian side. An electronic switchboard will be installed. The switchboard should be able to continue operating by the use of a direct current power generator or an ordinary power generator if the supply of electric power is suspended.

f) Public address system

A public address system will be installed for paging purposes, with the amplifier to be installed in the clerks' office.

g) Intercommunication system

Communications between the nurses' station and the sickrooms, operating rooms, and ICUs will be conducted by intercom phones.

Each sickbed will be equipped with an intercom phone for calling a nurse.

h) CATV equipment

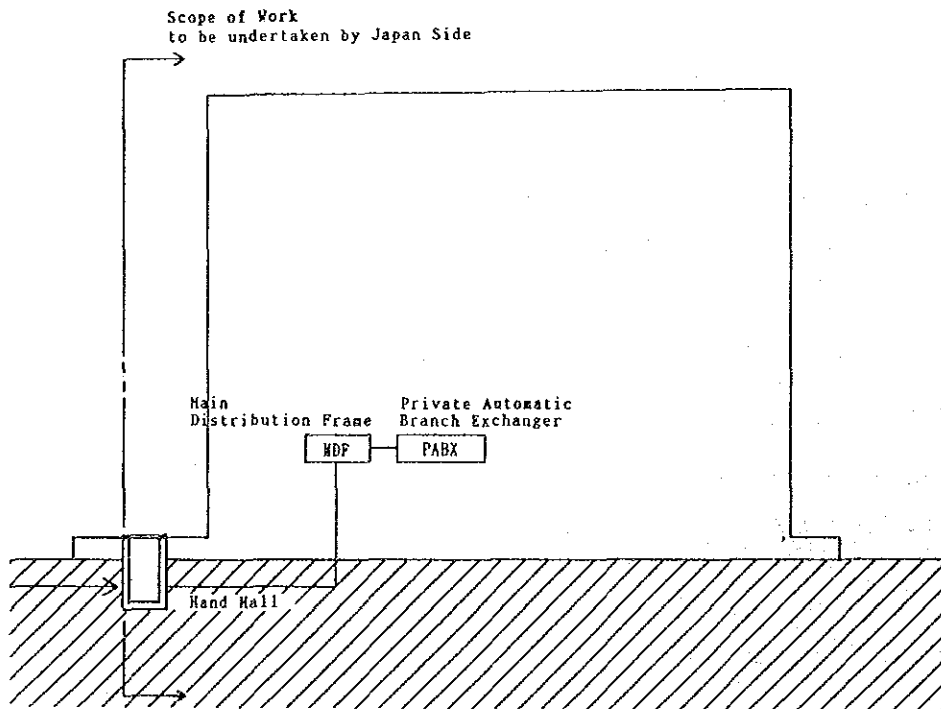
A CATV antenna will be installed on the roof of the building and TV antenna terminals will be installed in the rooms related to administration, emergency medical care, and training department within the building.

The equipment installed outside should be weatherproof.

i) Clocks

Battery-powered clocks should be installed at appropriate places within the building.

Fig.- 25 Telephone System



j) Lightning arresting system

A lightning rod and related equipment will be installed.

k) Fire alarm system

Automatic fire alarms will be installed for early detection of fires. Fire alarm signals will be received at the clerks office.

l) Radio communications system

Piping will be installed to connect the radio communications antenna, to be installed on the roof of the building, to the radio communications room.

m) Telemeter-related equipment

Piping for connecting the telemeters and the medical equipment will be installed, so that remote monitoring of the ICUs and wards from the nurses' stations can be performed.

n) Paging equipment

A paging system (including beepers) will be installed for communication with the medical stations in the main hospital.

(2) Air-conditioning Plan

In the air-conditioning plan, full use should be made of local traditional architectural techniques such as natural ventilation and long eaves to avoid direct sunlight in light of the climatic and weather conditions on Bali. At the same time, it will be necessary to provide a comfortable environment for patients, doctors, and other medical specialists by keeping the air within the building clean and by controlling every heat source.

The conditions for the design of an air-conditioning system to be used at a medical facility include provision for safeguards against

infection, and also safety, reliability, and flexibility for coping with future changes in activities and facilities.

In this project, the number of rooms to be air-conditioned will be minimal in consideration of maintenance cost (including electricity charges). Free-standing air-cooled airconditioners will be installed because they are easy to maintain. The number of models will be limited so that an airconditioner which fails can be replaced by another one of the same model as those in use at the center.

The following rooms will be air-conditioned.

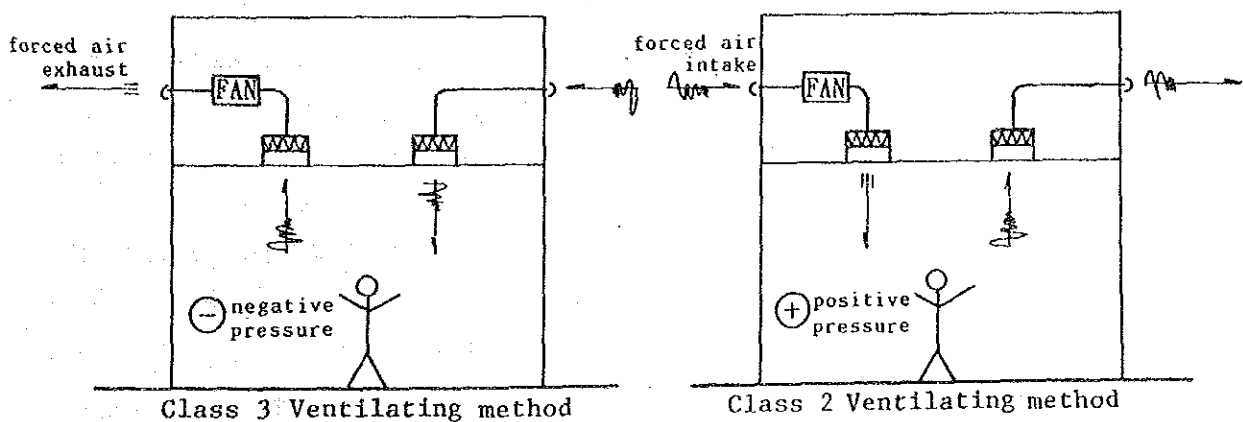
First floor: newborn room, medical examination room, labor room, delivery room, operating rooms No. 1 and No. 2, operating hall, central equipment and materials room, isolation sickrooms No. 1 and No. 2, ICUs, X-ray room, machine operating room, CAT room, and the first medical examination room. On the second floor, single-bed sickrooms only.

The ventilating method for each room is as shown in the table below.

Table 93 Ventilating equipment of each room

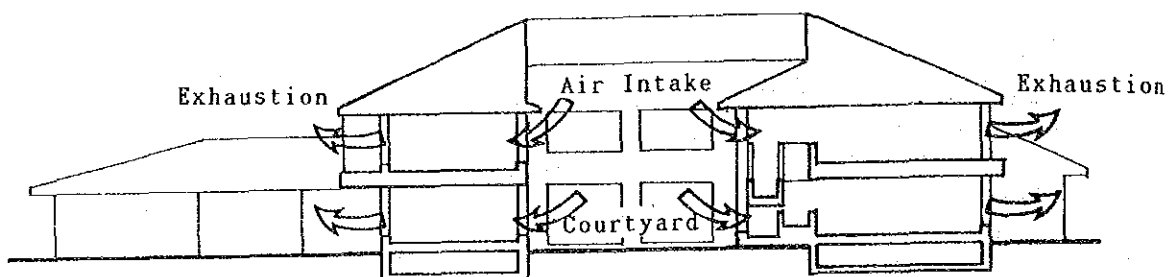
Rooms	Pressure difference between next room + (positive) - (negative) 0 (zero)	Ventilating method	Ventilating volume (day/h)
Neonatal	+	Class 2 venti- lating method	5
Dispensary	+	"	5
Delivery	+	"	5
Operation	+	"	5
Operation hall	+	"	5
ICU	+	"	5
Isolation ward	-	Class 3 venti- lating method	5
Toilet	-	"	10
Washing	-	"	10
Mortuary	-	"	10
Dark	-	"	10
X-ray	-	"	5
Kitchen and pantry	-	"	20
First treat- ment (including laboratory)	-	"	8
NS	-	"	5

Fig.- 26 Ventilation System



Hospital rooms need to be kept cleaner than other rooms. As the volume of air required for ventilation and the balance of pressure within a room greatly affects the degree of cleanliness of the room, it is necessary to design each room in a manner that will let fresh air into it from the courtyard through the external wall of the building, and discharge the room's air from the opening facing outside. (see the drawing below)

Fig.- 27 Air Intake and Exhaustion System



### (3) Equipment for Water Supply and Discharge of Sewage

In selecting the equipment for water supply and the discharge of sewage, it is necessary to fully examine specifications, particularly pressure, flow rate, temperature and water quality. Regarding equipment for the discharge of sewage, careful attention should be paid to possible effects on public health in particular.

It is also necessary to arrange devices and pipes in a manner that will minimize noise levels, for the benefit of inpatients. It is important to give due consideration to the steps to be taken in the case of a disaster or suspension of the water supply. In consideration of these factors, the water supply and sewage discharge equipment plan is as shown below.

a) Equipment for water supply: A water receiving tank (FRP knock down type with built-in pump chamber) will be installed on the northern end of the site. Water will be pumped into the elevated water tank for distribu-

tion to the facilities of the building. As the water tank will be cleaned periodically, it should be of the double-tub type. The tank's capacity will be determined based on the calculated water volume to be consumed per day. The water pumped into the tank will be sterilized with a chlorine sterilizer. In particular, the joints of washing valves and direct connection type medical equipment should be equipped with a vacuum breaker or a backflow prevention unit to cope with cross connections which may cause water contamination.

Special types of water (sterilized water, distilled water and deionized water) will be produced with special devices and supplied on a localized supply basis.

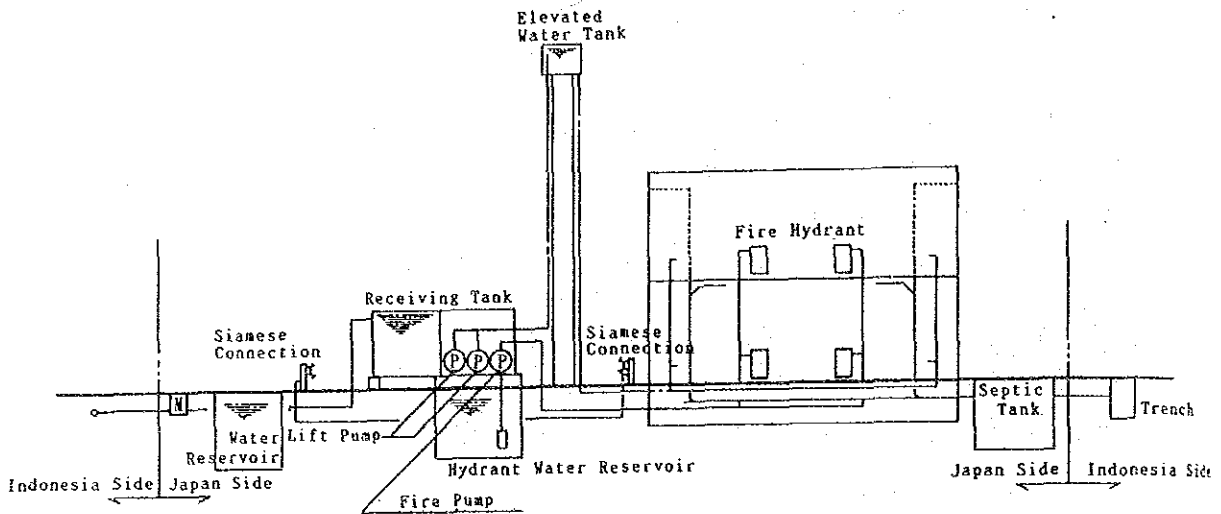
b) Equipment for the supply of hot water: Hot water will be supplied to the first medical examination room, the consultation room and the bathroom from a water heater on a localized supply basis.

c) Sewage ventilating equipment: On Bali sewage is generally percolated into the soil through porous pipes or discharged into rivers and the ocean through septic tanks. As a result, much of the rivers and the sea in the province are polluted by sewage. In this project, sewage and waste water will first be separated within the facilities of the center. They will join outdoors and then be discharged into ditches dug around the site through a septic tank. As waste water from the facilities of the hospital may adversely affect public health, it is essential to use a septic tank for treating it. As there is no government control on effluents in the Province of Bali, the value of 60ppm for BOD, which is the standard value in Japan, will be adopted. As the sink for washing the plastic casts which will be installed in the facility of the Orthopedics Department will discharge plaster and small pieces of plastic, it is necessary that the sink be equipped with a plaster trap. Effluents from the automatic developing machine, and hazardous waste water from the examining room, will be collected on a selective basis.

d) Fire extinguishing equipment: Fire extinguishers, indoor hydrants, and fire prevention water tanks will be installed which meet the

provisions of Indonesian laws, regulations and standards for fire prevention and fire fighting, and which will not hinder rescue activities in case of an emergency or interfere with routine activities of the center.

Fig.- 28 Water Supply and Drainage System



e) Sanitary equipment: Equipment and apparatus which are commonly used in Indonesia and which are easy to use and keep clean will be selected. Toilets for the use of patients will be of Asian style as will some of the toilets for the use of the staff, others will be Western style. Some of the toilets of Asian style will be equipped with a device for holding a roll of paper as well as a tap for washing hands.

Stool-type urinals will be installed since children will also use them.

f) Kitchen equipment: Meals for patients will be prepared using the kitchen equipment of the hospital. The kitchen of the center will be used as a service room. The staff of the center can prepare their own meals at the center's kitchen and eat them at the cafeteria.

The required kitchen equipment and utensils are as shown below.

- Sink (2-tub type)
- Cooking table
- Gas stove



(4) Other Equipment

a) Special plumbing for a medical facility: Medical-use gas (oxygen and nitrous oxide) equipment and compressed air intake equipment will be supplied to each room through a centralized supply system. This type of equipment must operate safely and accurately. Necessary steps should be taken for safe and steady supply of these gases and air in case of disasters like fires, earthquakes, or other emergencies such as power failure.

Table 94 Number of outlets and kinds of gases provided at each room

	Rooms	Oxygen	Nitrous oxide	Compressed air	Absorption
First floor	First treatment	4	2		2
	X-ray	1			1
	CT	1			1
	ICU	6		6	6
	Isolation (1),(2)	each 1			each 1
	Delivery	2	2	1	2
	Neonatal	2			2
	Ward(4 beds)(1),(2)	each 2			each 2
	Operation (1), (2)	each 3	each 2	each 1	each 2
Second floor	Ward(4 beds)(1),(2), (3),(4),(5),(6),(7)	each 2			each 2
	Ward (2 beds) (1),(2),(3),(4)	each 2			each 2

b) Incinerator: Most of the garbage from this center can be burned within the center and an automatic incinerator will be installed for this purpose.

c) Gas equipment: Propane gas will be supplied from cylinders installed outdoors.

#### 4-3-5 Materials Plan

##### (1) Building Equipment and Materials

In principle, locally manufactured building equipment and materials will be procured in light of the present conditions and the technical level of the local construction industry as stated in above 4-2-1 (2). Only those items which require technical levels unavailable in Indonesia will be procured in Japan.

Table 95 Building materials

Type of work	Materials or equipment	Indonesian made	Japanese made	Remarks
Concrete	Portland cement	o		
	Coarse sand	o		
	Fine sand	o		
	Gravel	o		
	Rubble	o		
Reinforcing bar	Deformed bar	o		
Steel frame	Small-sized steel frame (angle, channel)	o		The steel frame cannot be used for the project. Because it is very expensive in Indonesia.
	Steel plate	o		
Brick and block	Brick	o		
	Concrete block	o		
Water proofing	Asphalt		o	Indonesian-made asphalt deteriorates in less than 10 years
	Colking agent		o	
	Polyethylene sheet	o		
	Mortar	o		
Tile (Floor)	Semiporcelain tile	o		
	Mosaic tile	o		
	Terrazzo block	o		

Type of work	Materials or equipment	Indonesian made	Japanese made	Remarks
(Wall)	Semiporcelain tile	o		
Lumber	Teak	o		
	Lauan	o		
Roof metal	Galvanized iron plate	o		
	Checker plate	o		
	Grating	o		
	Stainless steel pipe	o		
Plaster work	Mortar	o		
	Plaster	o		
Wooden fittings	Sliding door	o		
	Hinged door	o		
	Door frame	o		
	Window frame	o		
Aluminium fittings	Sliding window	o		
	Sliding door	o		
	Hinged door	o		
	Curtain wall		o	
Lightweight metal fittings	Operating room door		o	Operating room should be airtight.
	Ward door		o	Doors should be functional for patients to use them.
Finish hardware	Hinge		o	It is very difficult to procure Indonesian-made finish hardware.
	Pivot hinge		o	
	Door check		o	
	Door stop		o	
	Cylinder Lock			
Glass	Transparent polished plate glass	o		
	Rolled plate glass	o		
Pointing	Oil paint	o		
	Emulsion-based paint	o		
	Vinyl chloride-based paint	o		

Type of work	Materials or equipment	Indonesian made	Japanese made	Remarks
	Clear lacquer	o		
	Acryl-based paint	o		
Interior finish work	Vinyl floor tile	o		
Long vinyl chloride sheet (Flooring materials)		o		The sheet is for use in medical rooms and is therefore required to be highly durable and proof against chemicals.
Plywood	o			
Plaster board	o			
Asbestos cement board	o			
Rock wool sound absorbing board (Ceiling material)		o		The board is required to be of high quality because of many metal fittings from the ceiling.
Sink		o		

## (2) Finishing Plan

Interior and exterior finishing materials which are easy to procure and maintain locally will be chosen by giving due consideration to the actual conditions of the local construction industry, the project site, the location of each facility, environmental conditions of the surrounding areas, and the planned purpose and function of each building and room.

In view of the fact that the facilities to be constructed in this project are those for providing medical care services and that their design is required to reflect the traditional Bali style, it is necessary to pay careful attention to the following points.

- a. Modern facilities fully reflecting the Bali style.
- b. Equipped with functions and capabilities required of medical facilities.
- c. Durability (resistance to weather, chemicals, water, shocks, etc.)
- d. Conductive to maintenance of satisfactory sanitary environment.
- e. Flexibility in coping with future need to remodel facilities.

The exterior and interior finishing materials listed below in accordance with the above examination.

Table 96 Exterior design

Roof	Asphalt waterproofing plus Indonesian-made tiled roof
Exterior walls	Indonesian-made bricks, Indonesian-made sand rock bricks, Perforated blocks
Exterior fittings	Steel door, Aluminium-framed windows
Louver	Precasted perforated concrete blocks

Table 97 Interior design

Rooms	Floor	Base board	Wall	Ceiling
Operating room	Long vinyl chloride sheet	Long vinyl chloride sheet finish	Operating room pannel	Rock wool sound absorbing board
I.C.U.	- do -	- do -	Mortar paint finish	- do -
Examination room	- do -	- do -	- do -	- do -
Machine room	Concrete direct finish	Mortar finish	Glasswool lining	Direct ceiling
Laboratory	Long vinyl chloride sheet	Long vinyl chloride sheet	100 square tile	Rock wool sound absorbing board
Treatment room	- do -	- do -	Mortar paint finish	- do -
Ward	Terrazzo block	Terrazzo block	- do -	- do -
X-ray	- do -	- do -	- do -	- do -
Nurse station	- do -	- do -	- do -	- do -
Waiting hall	- do -	- do -	Bricks-Sand stone brick work	Wooden grill
Administration office	- do -	- do -	Mortar paint finish	Rock wool sound absorbing board
Toilet	Mozaik tile	100 square tile	100 square tile	- do -
Corridor and hall	- do -	- do -	- do -	Asbestas board
	Terrazzo block	Terrazzo block	Mortar paint	Rock wool sound absorbing board

#### 4-3-6 Outdoor Structures Plan

The outdoor structures plan, based on the examination made in the layout plan given above, is as described below.

##### (1) Roads and Sidewalks on the Premises of the Center

There will be only one approach (on the southern side) and it will be a one-way road to make it easy for ambulances to enter the premises of the center. This will also serve to control the paths of flow of entering and exiting vehicles. There will also be a roundabout in front of the entrance of the main building to make it easy for ambulances to change its direction. A sidewalk will be attached to the approach for pedestrian safety. A service road will be constructed on the northern side. It will connect the service facilities to the main building. The approach will be 6 meters wide and will be paved.

##### (2) Parking Lot

A parking lot to accommodate 12 cars will be constructed based on the proposal.

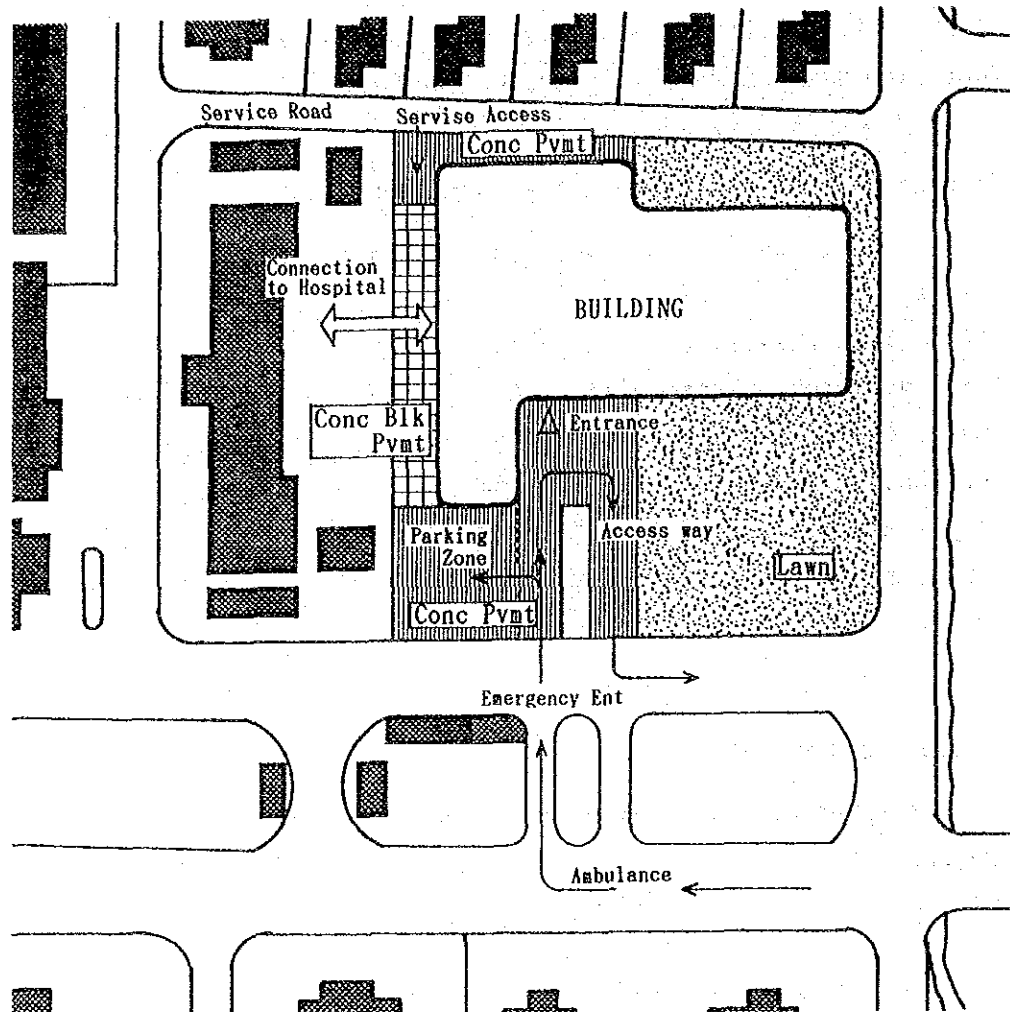
##### (3) Other Outdoor Structures

As this center will operate around the clock, there is no need to construct gates or a gatekeeper's office. The elevated water tank will be located near the approach so that it may serve as a landmark to aid patients and ambulances in finding the center even from far away. It is also necessary to build signs and streetlamps along the approach that indicate the center's location.

##### (4) Plantings and Landscape Gardening

Since a medical facility should be free from sand and dust, lawns should be planted all over the grounds. Tall trees should be planted around the parking lot to protect the cars parked there from direct sunlight.

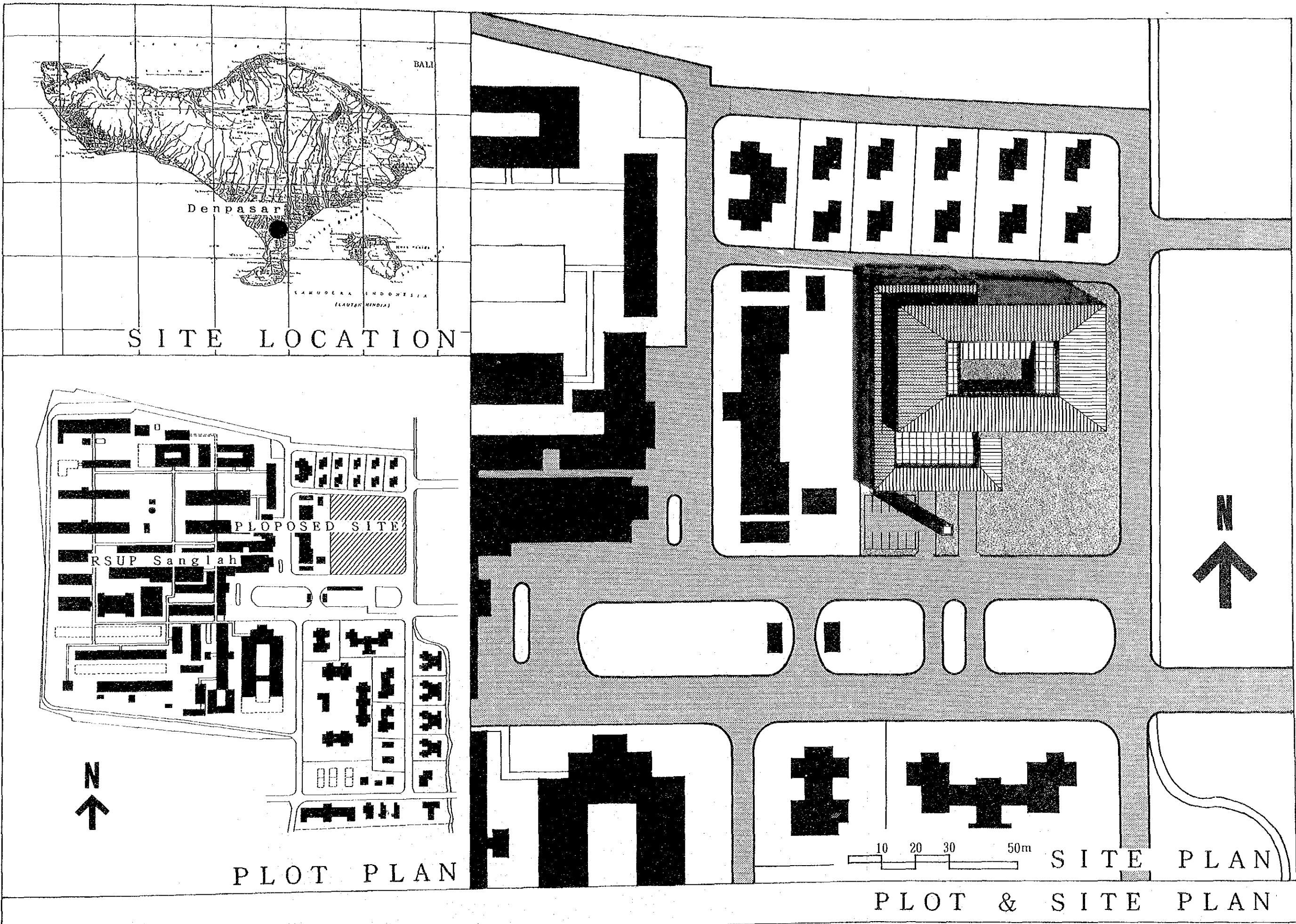
Fig.- 29 Landscape Planning



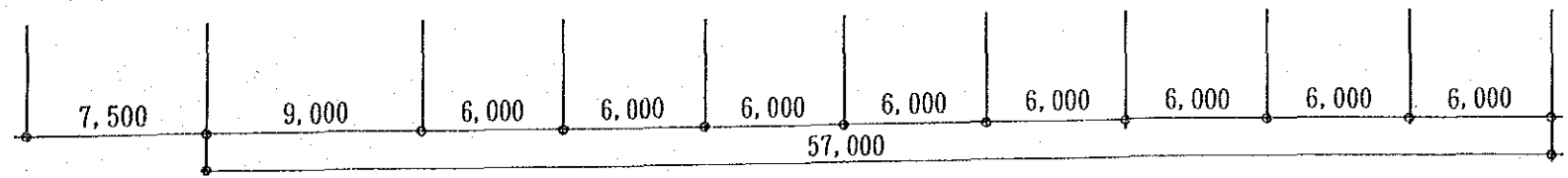
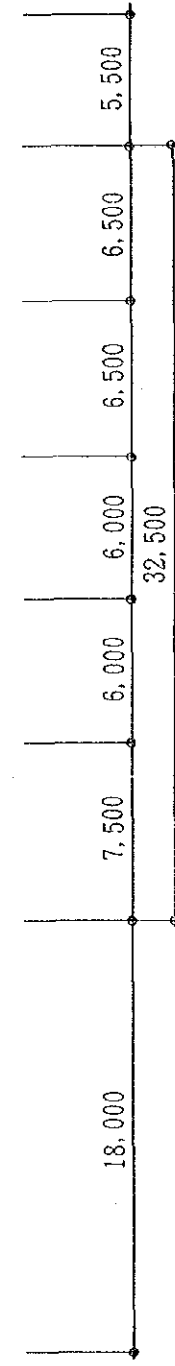
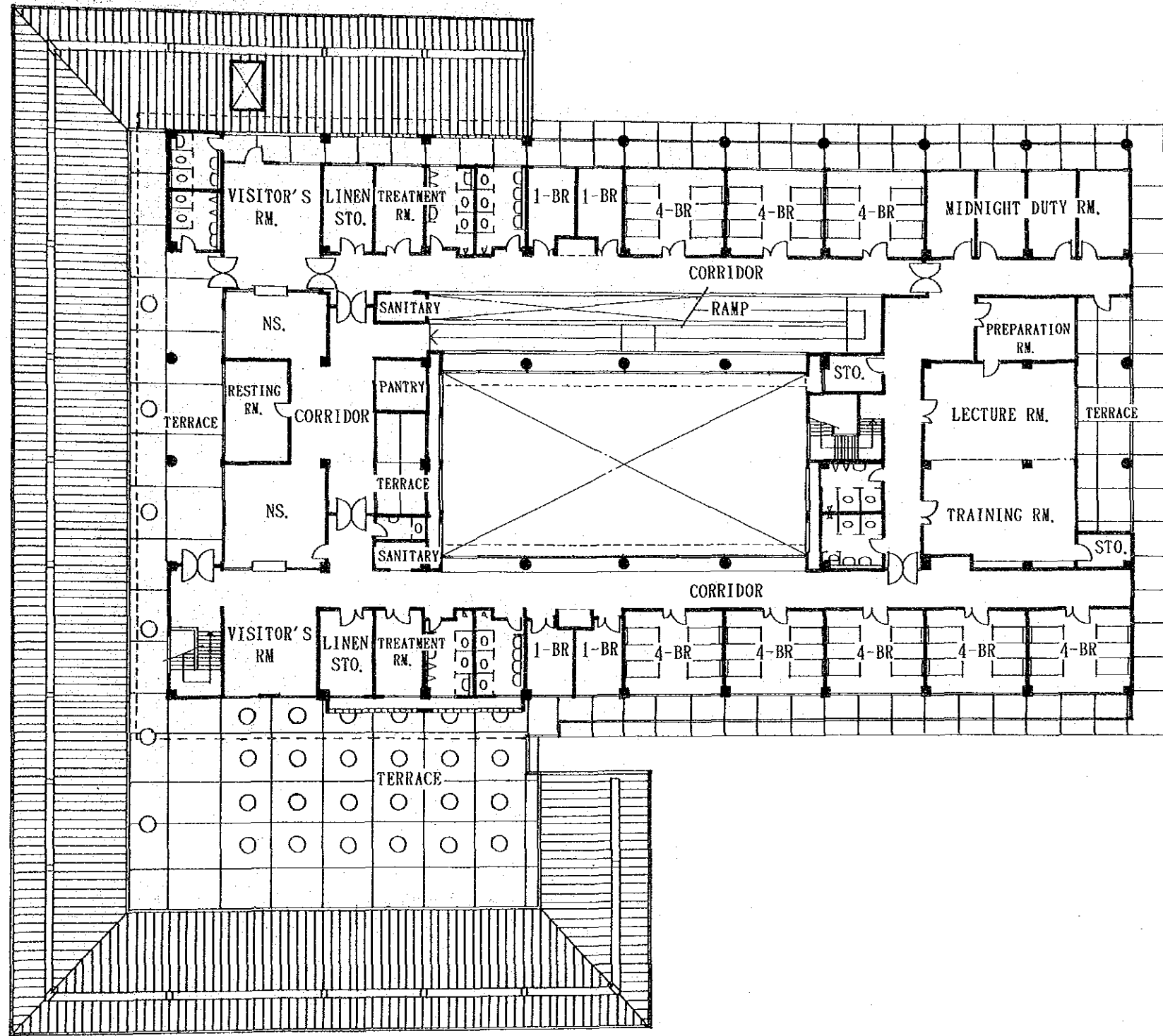



#### 4-3-7 Basic Design

- (1) Location Map and Plot Plan
- (2) First Floor Plan
- (3) Second Floor Plan
- (4) Roof Plan
- (5) Elevation I
- (6) Elevation II
- (7) Cross Section

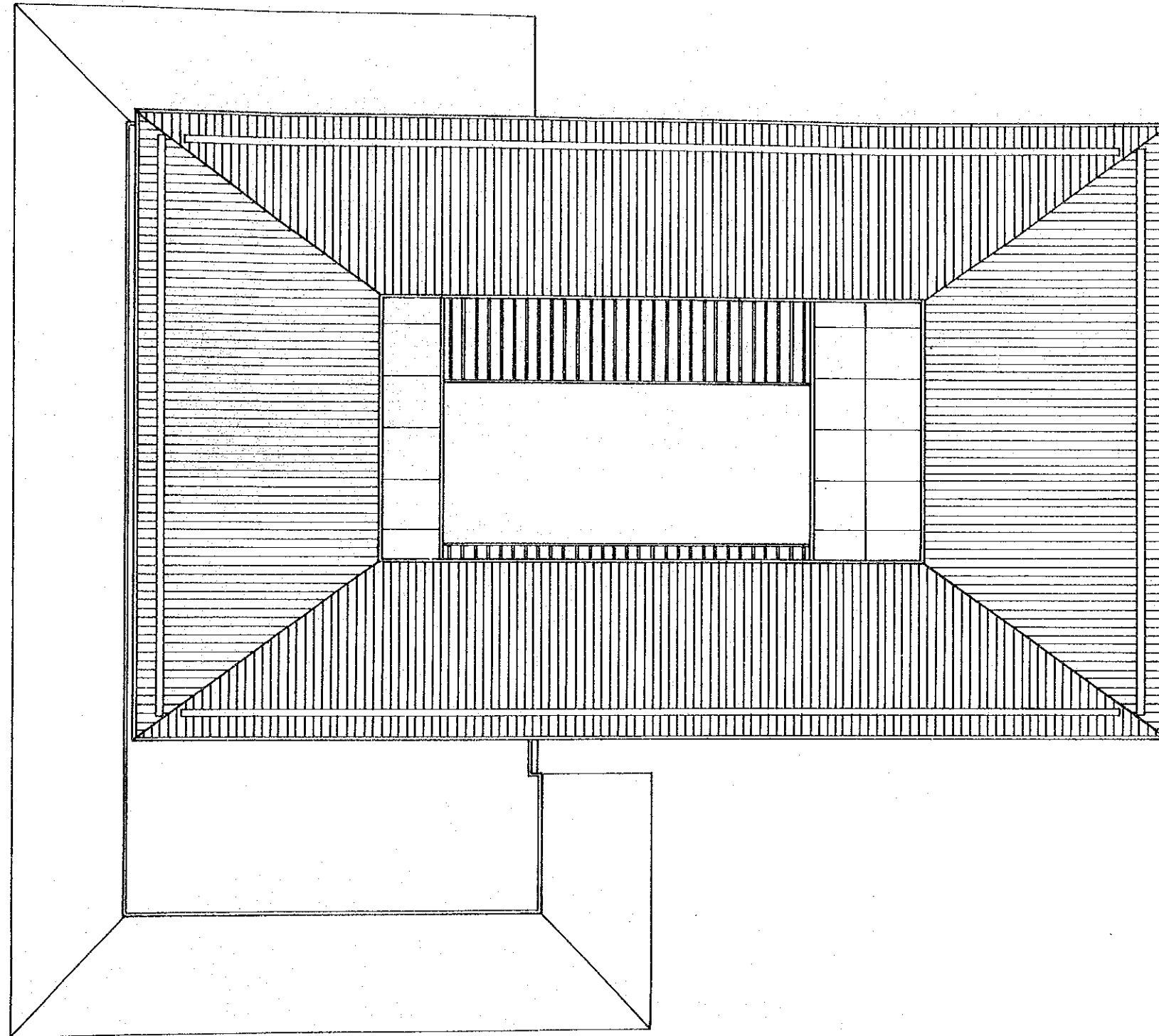






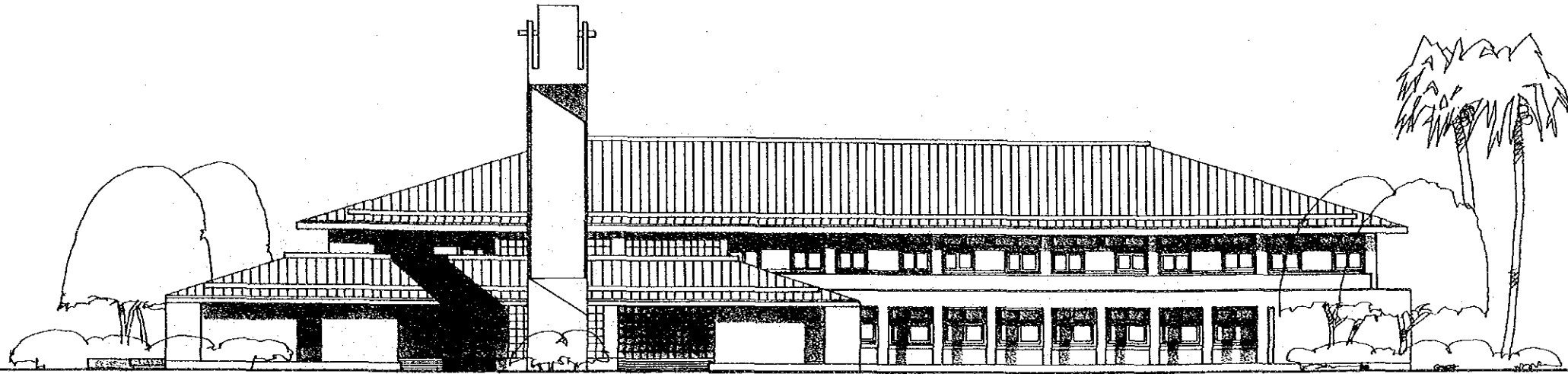
 ELEVATED WATER TANK

2ND. FLOOR PLAN

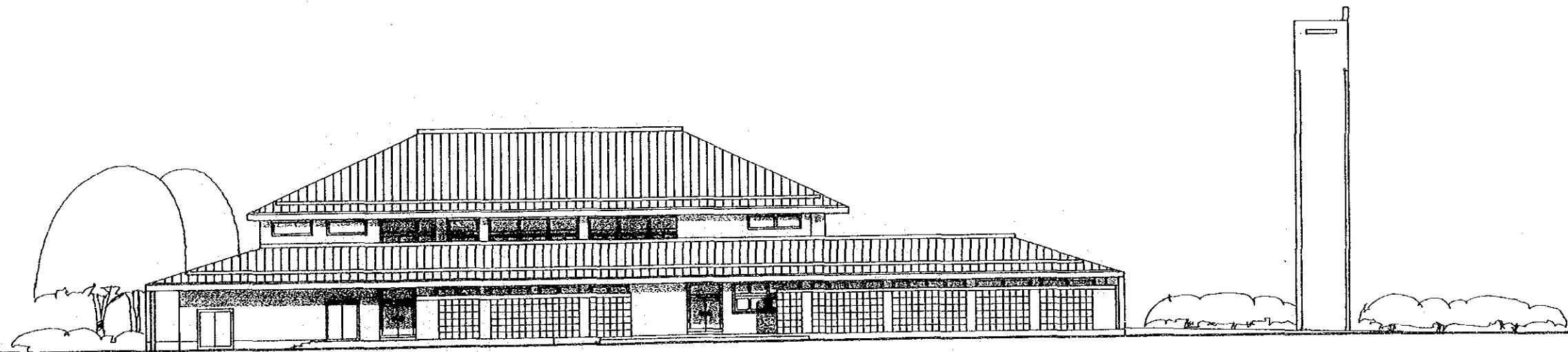


ELEVATED WATER TANK

ROOF PLAN

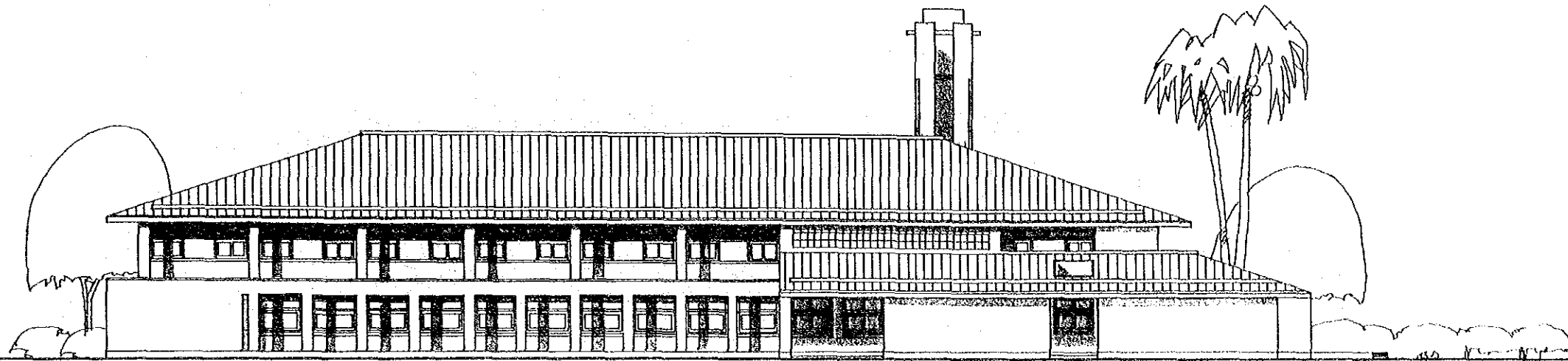


SOUTH ELEVATION

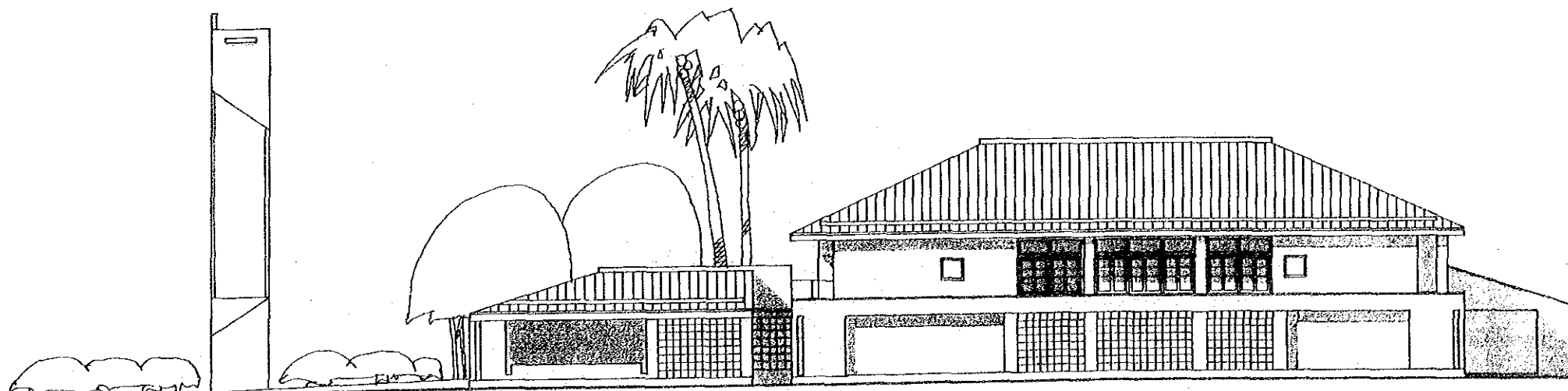


WEST ELEVATION

ELEVATION - 1

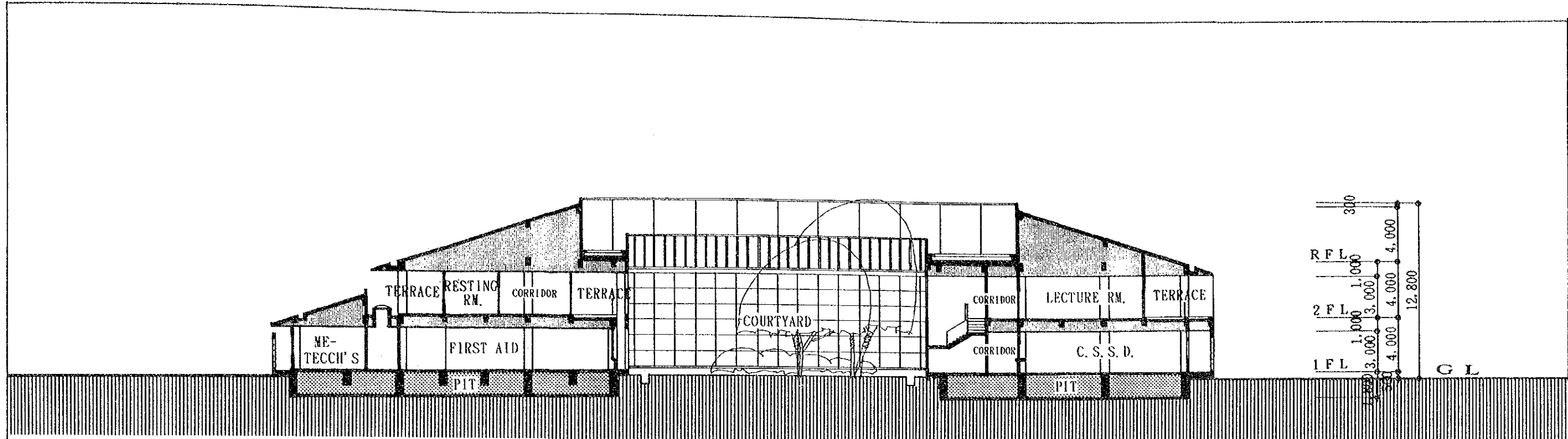


NORTH ELEVATION

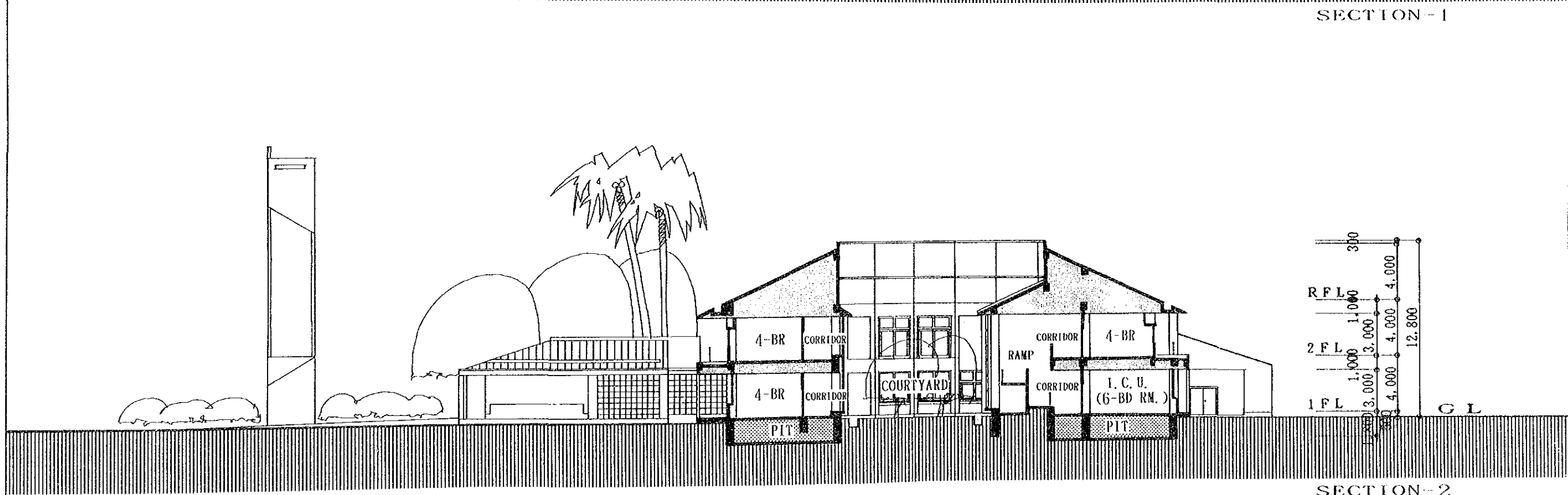


EAST ELEVATION

ELEVATION - 2



SECTION-1



SECTION-2

SECTION





#### 4-4 Basic Plan for Medical Equipment

##### 4-4-1 Basic Design of Medical Equipment

###### (1) Details of Basic Design

The results of the basic design study regarding medical equipment are shown in 4-4-2, "List of Medical Equipment". This section was created to show the items of equipment required by department.

The selection of equipment was determined through careful examination with reference to 4-2-2, "Conditions of Medical Equipment Selection," as well as to reflect the following points.

###### 1) Objectives of Introduction

In light of the role of the emergency medical center as a top referral and education/training-oriented hospital, relevant equipment can be classified in the following categories in order to specify more accurately the reasons for its introduction:

- ① Equipment for diagnosis and treatment: equipment required for the medical services of a tertiary lifesaving center.
- ② Equipment for education: equipment required for education and training as a hospital associated with a university.
- ③ Equipment for emergency treatment education: equipment required for education and training of emergency medical service personnel.

###### 2) Frequency of Use

Based upon the frequency of use, relevant equipment should be classified as follows in order to specify the order of priority for introduction:

- ① Equipment expected to be used once a day or more.
- ② Equipment expected to be used once a week or more.

③ Equipment expected to be used once a month or more.

### 3) Necessity of Installation Work and/or Operational Explanation

Equipment is classified as follows, depending on whether or not it requires special work and/or explanation of operation at the time of installation

- ① Equipment which requires both installation work and explanation of operation
- ② Equipment which requires only explanation of operation.
- ③ Equipment which requires installation work only.
- ④ Equipment which requires neither installation work nor explanation, but requires only an operation manual and a service manual to be installed.

### (2) Range of Equipment

With regard to medical equipment, some medical services in recent years have required a considerable amount of supplementary materials and consumables. Costs for such materials and instruments must be disbursed reasonably through the smooth management of this center. Necessary stocks of spare parts and consumables for the smooth operation of this center in the initial period after its opening are included in this project with the current situation being taken into account.

### (3) Medical Equipment Operation and Training

Much modern medical equipment requires appropriate operational techniques at every step of its use. Minimum training at the time of installation is included in this project to ensure effective operation of the equipment.

#### 4-4-2 List of Medical Equipment

Based on the local studies conducted by the basic design study team, a list of major medical equipment for the purpose of the basic design is presented on the following pages. At the top of each chart, the section in which the equipment will be installed is indicated. When multiple sections are to share the equipment, however, the section responsible for the care of the equipment is the one shown. The name of each piece of equipment is generally the common term used for it.

Regarding the objectives of introduction, frequency of use, requirements for installation, as well as training programs for operation, the numbers in the charts should be interpreted in accordance with the explanatory notes described in 4-4-1.

BASIC DESIGN LIST FOR A NEW EMERGENCY UNIT OF RSUP SANGLAH BALI

1. PHARMACY AND LABORATORY

No.	Equipment Name	Type of Equipment	No of Unit	Objec- tive	Freq Use	Inst Trng
1	Medical Refrigerator	Analytical Equipment	2	①	①	②
2	Prescription Counter	Diagnosis Treatment Equipment	1	①	①	④
3	Water Still	Analytical Instruments	2	①	①	②
4	Bottle Washer	Analytical Equipment	2	①	①	②
5	Desk Top Type Autoclave	Analytical Equipment	2	①	①	②
6	Medical Shelf	Analytical Equipment	4	①	①	④
7	Hemoglobin Meter	Automated Analyzers	1	①③	①	②
8	Blood Bank Refrigerator	Diagnosis Treatment Equipment	1	①	①	②
9	Differential Leucocyte Counter	Automated Analyzers	1	①②③	①	②
10	Binocular Microscope	Microscopes	2	①②	①	③
11	Spectrophotometer, UV-VIS range	Analytical Instruments	1	①②③	①	③
12	PH Meter	Automated Analyzers	1	①③	①	②
13	Incubator	Analytical Instruments	1	①②③	②	③
14	Laboratory Sterilizer	Analytical Equipment	1	①	①	②
15	Hematocrit Centrifuge	Analytical Instruments	1	①③	①	②
16	Multifunctional Hematology Analyzer	Automated Analyzers	1	①②	①	①
17	Blood Gas Analyzer	Automated Analyzers	1	①③	①	①
18	ISE Electrolyte Analyzer	Automated Analyzers	1	①③	①	①
19	Flamephotometer	Analytical Instruments	1	①③	①	③
20	Urine Analyzer	Automated Analyzers	1	①②③	①	③

## 2. EXAMINATION

No.	Equipment Name	Type of Equipment	No of Unit	Objective	Freq Use	Inst Trng
1	Examination Couch With Inclination of the Backrest	Diagnosis Treatment Equipment	2	①	①	④
2	Film Illuminator, Desk Type	Diagnosis Treatment Equipment	2	①③	①	④
3	Examination Instrument Set	Diagnosis Treatment Equipment	1	①	①	②
4	Small Operating Instrument Set	Diagnosis Treatment Equipment	2	①	①	②
5	Examination Lamp	Diagnosis Treatment Equipment	2	①	①	④
6	Instrument Cabinet	Diagnosis Treatment Equipment	2	①	①	④
7	Electroencephalograph	Physiological Test Monitors	1	①②③	①	②
8	Electrocardiograph with Cart	Physiological Test Monitors	1	①②③	①	②
9	Heat Probe Unit	Endoscopic Equipment	1	①	①	②
10	Broncho Fiberscope	Endoscopic Equipment	1	①	②	②

## 3. OPHTHALMOLOGY

No.	Equipment Name	Type of Equipment	No of Unit	Objective	Freq Use	Inst Trng
1	Examination Couch	Diagnosis Treatment Equipment	1	①	①	④
2	Eye Treatment Unit	Diagnosis Treatment Equipment	1	①	①	②
3	Motorized Refracting Unit (Chair & Stand)	Diagnosis Treatment Equipment	1	①	①	②
4	Projection Perimeter with Table Top	Diagnosis Treatment Equipment	1	①②③	②	②
5	Slit Lamp Microscope with Instrument Table Top	Diagnosis Treatment Equipment	1	①②③	①	②
6	Retnal Camera Unit	Diagnosis Treatment Equipment	1	①②③	②	②
7	Retinoscope	Diagnosis Treatment Equipment	1	①	①	②
8	Eye Surgery Instruments Set	Surgical Operation Equipment	1	①③	①	②
9	Operating Microscope	Surgical Operation Equipment	1	①③	①	②

#### 4. ORTHOPAEDIC

No.	Equipment Name	Type of Equipment	No of Unit	Objective	Freq Use	Inst Trng
1	Examination Couch with Inllination of the Backrest	Diagnosis Treatment Equipment	1	①	①	④
2	Martin Human Body Measuring Kit	Diagnosis Treatment Equipment	1	①	①	②
3	Instrument Cabinet	Diagnosis Treatment Equipment	1	①	①	④
4	Plaster Bandage Table	Diagnosis Treatment Equipment	1	①	①	②
5	Gypsum Cutter	Diagnosis Treatment Equipment	1	①	①	②
6	Plaster Spreader, Two-prong	Diagnosis Treatment Equipment	1	①	①	②
7	Folding Wheel Chair	Diagnosis Treatment Equipment	1	①	①	④

#### 5. OTORHINOLARYNGOLOGY

No.	Equipment Name	Type of Equipment	No of Unit	Objective	Freq Use	Inst Trng
1	E.N.T. Treatment Unit, Single Sided Type	Diagnosis Treatment Equipment	1	①	①	①
2	E.N.T. Treatment Chair, Electromotive Pedal System	Diagnosis Treatment Equipment	1	①	①	①
3	SN Nebulizer Unit, for 3 Patients	Diagnosis Treatment Equipment	1	①	①	①
4	SN Powerful Aspirator	Diagnosis Treatment Equipment	1	①	①	①
5	Instrument Cabinet	Diagnosis Treatment Equipment	1	①	①	④
6	Small Instrument for Diagnosis and Treatment	Diagnosis Treatment Equipment	1	①	①	②
7	Examining & Operating Microscope	Diagnosis Treatment Equipment	1	①	①	①
8	Ono-Jackson Endoscopic Instrument Set	Diagnosis Treatment Equipment	1	①	①	②
9	Cottle Instruments for Reconstructive Sergery	Surgical Operation Equipment	1	①	②	②
10	Laryngeal Instrument for Microsurgery	Surgical Operation Equipment	1	①	①	②

### 6. OBSTETRICS AND GYNECOLOGY

No.	Equipment Name	Type of Equipment	No of Unit	Objective	Freq Use	Inst Trng
1	Ultrasound Sanner	X-ray Diagnosis Ultrasonic Equipment	1	①②③	①	①
2	Fetal Monitor	Diagnosis Treatment Equipment	1	①③	①	②
3	Treatment Unit	Diagnosis Treatment Equipment	1	①	①	②
4	Gynecology Examination Table	Diagnosis Treatment Equipment	2	①	①	②

### 7. RADIOGRAFIC DEPARTMENT

No.	Equipment Name	Type of Equipment	No of Unit	Objective	Freq Use	Inst Trng
1	General Purpose X-ray System with R/F Table, TV Un	X-ray Diagnosis Ultrasonic Equip	1	①③	①	①
2	Condenser Discharge Type Mobile X-ray Unit	X-ray Diagnosis Ultrasonic Equip	1	①③	①	①
3	Computed Tomographic Scanner for Whole Body	CT-Scanner	1	①②③	①	①
4	Cassette, Light Weight, Push Type	X-ray Diagnosis Ultrasonic Equip	1	①	①	②
5	Ultrasound Scanner	X-ray Diagnosis Ultrasonic Equip	1	①②③	①	①

### 8. DARK ROOM

No.	Equipment Name	Type of Equipment	No of Unit	Objective	Freq Use	Inst Trng
1	Automatic Film Processor	X-ray Diagnosis Ultrasonic Equip	1	①②	①	③
2	Cassette Pass-box for 6 doz	X-ray Diagnosis Ultrasonic Equip	1	①	①	④
3	Manual Processing Tank	X-ray Diagnosis Ultrasonic Equip	1	①	②	④
4	Film Dryer, One Dozen	Z-ray Diagnosis Ultrasonic Equip	1	①	②	④
5	Film Loading Work Desk	X-ray Diagnosis Ultrasonic Equip	1	①	②	④
6	Sink for Processor Rack, PVC Made	X-ray Diagnosis Ultrasonic Equip	1	①	①	③



9. C.S.S.D.

No.	Equipment Name	Type of Equipment	No of Unit	Objective	Freq Use	Inst Trng
1	Small Steam Sterilizer	Analytical Equipment	1	①	①	①
2	Cabinet Type Steam Sterilizer	Analytical Equipment	1	①	①	①
3	Surgical Glove Conditioner	Surgical Operation Equipment	1	①	①	①
4	Tube Dryer	Analytical Equipment	1	①	①	①
5	Instrument Washer (Ultrasonic Cleaner)	Analytical Equipment	1	①	①	①
6	Ethylene Oxide Gas Sterilizer	Analytical Equipment	1	①	②	①

10. CP-C.S.S.D. (PREPARATION)

No.	Equipment Name	Type of Equipment	No of Unit	Objective	Freq Use	Inst Trng
1	Working Table, Stainless Steel	Diagnosis Treatment Equipment	2	①	①	④
2	Instrument Tray with Lid	Diagnosis Treatment Equipment	1	①	①	④
3	Instrument Cabinet	Diagnosis Treatment Equipment	5	①	①	④

11. OPERATING ROOM (1)

No.	Equipment Name	Type of Equipment	No of Unit	Objective	Freq Use	Inst Trng
1	Universal Operating Table	Surgical Operation Equipment	1	①③	①	③
2	Operating Room Light, Ceiling Type	Surgical Operation Equipment	1	①	①	③
3	Anesthesia Apparatus, Complete Set	Surgical Operation Equipment	1	①③	①	②
4	Mayo Instrument Tray Stand	Surgical Operation Equipment	1	①	①	④
5	Electric Suction Unit	Surgical Operation Equipment	1	①	①	②
6	Electric-Surgical Unit	Surgical Operation Equipment	1	①	①	②

11. OPERATING ROOM (1)

No.	Equipment Name	Type of Equipment	No of Unit	Objective	Freq Use	Inst Trng
7	Operating Instrument Set	Surgical Operation Equipment	1	①	①	②
8	Movable Indoor Sterilizer	Surgical Operation Equipment	1	①	①	②
9	Circulating Water Blanket	Surgical Operation Equipment	1	①③	②	②
10	Defibrillator	Surgical Operation Equipment	1	①③	②	②
11	ECG Monitor with Recorder	Surgical Operation Equipment	1	①③	①	②

12. OPERATING ROOM (2)

No.	Equipment Name	Type of Equipment	No of Unit	Objective	Freq Use	Inst Trng
1	Universal Operating Table w/Leg Traction Apparatus	Surgical Operation Equipment	1	①③	①	③
2	Operating Room Light, Ceiling Type	Surgical Operation Equipment	1	①	①	③
3	Anesthesia Apparatus, Complete Set	Surgical Operation Equipment	1	①③	①	②
4	Eletro-Surgical Unit	Surgical Operation Equipment	1	①	①	②
5	Operating Instrument Set	Surgical Operation Equipment	1	①	①	②
6	Orthopedic Operating Instrument Set	Surgical Operation Equipment	1	①	①	②
7	Leg Traction Apparatus	Surgical Operation Equipment	1	①	②	②
8	Surgical X-ray Unit	X-ray Diagnosis Ultrasonic Equip	1	①③	①	①
9	Circulating Water Blanket	Surgical Operation Equipment	1	①③	①	②

13. OPERATING ROOM (MATERIALS)

No.	Equipment Name	Type of Equipment	No of Unit	Objective	Freq Use	Inst Trng
1	Surgical Sutures, USP, Sterile, Each in a Double P	Surgical Operation Equipment	1	①	①	④
2	Various for Surgical Aid	Surgical Operation Equipment	1	①	①	②

## 14. SCRUB

No.	Equipment Name	Type of Equipment	No of Unit	Objective	Freq Use	Inst Trng
1	UV Water Sterilizer for Operating Theater	Surgical Operation Equipment	2	①	①	①

## 15. I.C.U.

No.	Equipment Name	Type of Equipment	No of Unit	Objective	Freq Use	Inst Trng
1	2-Crank Standard Gatch Bed with Spring Mattress and	Diagnosis Treatment Equipment	2	①	①	④
2	I.V. Hanger Rod	Diagnosis Treatment Equipment	4	①	①	④
3	Low Pressure Continuous Suction Unit	Diagnosis Treatment Equipment	6	①	①	②
4	Hi-Lo Type Stretcher	Diagnosis Treatment Equipment	4	①	①	④
5	I.C.U. Bed with Spring Mattress and I.V. Pole	Diagnosis Treatment Equipment	6	①	①	④
6	Patient Monitoring System for 4-patient	Diagnosis Treatment Equipment	1	①②③	①	②
7	Ventilator	Diagnosis Treatment Equipment	1	①③	①	②
8	Portable Cardiac Resuscitation System with Car	Diagnosis Treatment Equipment	1	①②③	②	②
9	Electric Suction Unit	Diagnosis Treatment Equipment	1	①	①	②
10	Film Illuminator, Mobile Type	Diagnosis Treatment Equipment	1	①③	①	④
11	Ultraviolet Ray Running Water Sterilizer	Diagnosis Treatment Equipment	1	①	①	①

16. NURSE STATION (MATERNITY)

No.	Equipment Name	Type of Equipment	No of Unit	Objective	Freq Use	Inst Trng
1	Examination Instrument Set	Diagnosis Treatment Equipment	1	①	①	②
2	Sphygmomanometer, Desk Type	Diagnosis Treatment Equipment	5	①	①	④
3	Medicine Cupboard	Diagnosis Treatment Equipment	1	①	①	④
4	Ice Maker	Diagnosis Treatment Equipment	1	①	①	②
5	Emergency Cart	Diagnosis Treatment Equipment	1	①	①	②
6	Dressing Cart	Diagnosis Treatment Equipment	1	①	①	④
7	Chart File Cart	Diagnosis Treatment Equipment	1	①	①	④
8	Instrument Carriage	Diagnosis Treatment Equipment	2	①	①	④
9	Suction Pump with Stand	Diagnosis Treatment Equipment	1	①	①	④
10	Ultrasonic Nebulizer with Stand	Diagnosis Treatment Equipment	1	①	①	②
11	Nursing Bottle Warmer	Diagnosis Treatment Equipment	1	①	①	④
12	Treatment Unit	Diagnosis Treatment Equipment	1	①	①	②
13	Laryngoscope Pediatric	Diagnosis Treatment Equipment	1	①	①	②

17. LABOUR ROOM (MATERNITY)

No.	Equipment Name	Type of Equipment	No of Unit	Objective	Freq Use	Inst Trng
1	Labor Bed	Diagnosis Treatment Equipment	3	①	①	④
2	Irrigator Stand, Double Hook	Diagnosis Treatment Equipment	3	①	①	④
3	Infusion Pump	Diagnosis Treatment Equipment	3	①	②	②

18. DELIVERY (MATERNITY)

No.	Equipment Name	Type of Equipment	No of Unit	Objective	Freq Use	Inst Trng
1	Delivery Table	Diagnosis Treatment Equipment	2	①	①	①
2	Vacuum Extractor	Diagnosis Treatment Equipment	2	①	①	②
3	Infant Warmer	Diagnosis Treatment Equipment	1	①③	①	③
4	Sterilizing Tray Stand	Diagnosis Treatment Equipment	2	①	①	④
5	Washing Basin Stand for One Basin	Diagnosis Treatment Equipment	2	①	①	④
6	Cesarean Section Set for Operating in OBGY Emergen	Surgical Operation Equipment	1	①	③	②
7	Electro Cardio Tocograph (Fetal Monitor)	Diagnosis Treatment Equipment	1	①②③	①	②

19. NURSERY ROOM (MATERNITY)

No.	Equipment Name	Type of Equipment	No of Unit	Objective	Freq Use	Inst Trng
1	Infant Incubator (Manual control type)	Diagnosis Treatment Equipment	3	①③	①	②
2	Infant Incubator (Servo control type)	Diagnosis Treatment Equipment	2	①③	①	②
3	Phototherapy Unit Stand Type	Diagnosis Treatment Equipment	1	①③	①	②
4	Infant CPAP System	Diagnosis Treatment Equipment	1	①③	②	②
5	Infusion Pump	Diagnosis Treatment Equipment	3	①③	①	②
6	Syringe Infusion Pump	Diagnosis Treatment Equipment	2	①③	①	②
7	Infant Warmer	Diagnosis Treatment Equipment	1	①③	①	③
8	Neonatal Monitor	Diagnosis Treatment Equipment	2	①③	①	②
9	Neonatal Patient Stimulator	Diagnosis Treatment Equipment	2	①③	②	②
10	Neonatal Monitor A Type	Diagnosis Treatment Equipment	2	①③	②	②
11	Transport Incubator with Power Pack	Diagnosis Treatment Equipment	1	①③	②	②
12	Resusci Bag	Diagnosis Treatment Equipment	2	①	②	②

19. NURSERY ROOM (MATERNITY)

No.	Equipment Name	Type of Equipment	No of Unit	Objective	Freq Use	Inst Trng
13	Phlebotomy Instrument Exchange Transfusion	Diagnosis Treatment Equipment	1	①	②	②
14	Infant Bassinet Stand	Diagnosis Treatment Equipment	10	①	①	④
15	Pediatric Examining Table with Warmer	Diagnosis Treatment Equipment	1	①	①	②
16	Infant Respirator	Diagnosis Treatment Equipment	1	①③	②	②

20. BED ROOM (MATERNITY)

No.	Equipment Name	Type of Equipment	No of Unit	Objective	Freq Use	Inst Trng
1	Standard Patient Bed with Palm Pierce	Diagnosis Treatment Equipment	8	①③	①	④
2	Bedside Cabinet	Diagnosis Treatment Equipment	8	①	①	④
3	Oxygen Inhaler Apparatus with Empty Cylinder	Diagnosis Treatment Equipment	2	①	②	②
4	Portable Resuscitator	Diagnosis Treatment Equipment	2	①	②	②
5	Ultrasonic Nebulizer with Stand	Diagnosis Treatment Equipment	2	①	②	②
6	Electric Suction Unit	Diagnosis Treatment Equipment	2	①	①	②
7	Oxygen Analyzer	Diagnosis Treatment Equipment	2	①	②	②

21. NURSE STATION

No.	Equipment Name	Type of Equipment	No of Unit	Objec- tive	Freq Use	Inst Trng
1	Examination Instrument Set	Diagnosis Treatment Equipment	1	①	①	②
2	Sphygomanometer, Desk Type	Diagnosis Treatment Equipment	5	①	①	④
3	Instrument Boiling Sterilizer	Diagnosis Treatment Equipment	1	①	①	④
4	Medicine Cupboard	Diagnosis Treatment Equipment	4	①	①	④
5	Instrument Tray with Lid	Diagnosis Treatment Equipment	4	①	①	④
6	Ice Maker	Diagnosis Treatment Equipment	1	①	①	②
7	Infusion Pump	Diagnosis Treatment Equipment	1	①	①	②
8	Syringe Pump	Diagnosis Treatment Equipment	1	①	①	②

22. WARD

No.	Equipment Name	Type of Equipment	No of Unit	Objec- tive	Freq Use	Inst Trng
1	Standard Patient Bed with Palm Pierce	Diagnosis Treatment Equipment	36	①	①	④
2	Bedside Cabinet	Diagnosis Treatment Equipment	36	①	①	④
3	Overbed Table	Diagnosis Treatment Equipment	36	①	①	④
4	Oxygen Inhaler Apparatus with Empty Cylinder	Diagnosis Treatment Equipment	3	①	①	②
5	Portable Resuscitator	Diagnosis Treatment Equipment	4	①	①	③
6	Ultrasonic Nebulizer with Stand	Diagnosis Treatment Equipment	2	①	①	②
7	Electric Suction Unit	Diagnosis Treatment Equipment	3	①	①	②

23. RADIO COMMUNICATION

No.	Equipment Name	Type of Equipment	No of Unit	Objec- tive	Freq Use	Inst Trng
1	Base Station	Facility Other Equipment	1	①③	①	①
2	Mobile Unit (Transceiver)	Facility Other Equipment	4	①③	①	①
3	Repeater Station	Facility Other Equipment	1	①③	①	①

## 24. MOBILE ICU

No.	Equipment Name	Type of Equipment	No of Unit	Objective	Freq Use	Inst Trng
1	Mobile ICU	Facility Other Equipment	4	①③	①	②

## 25. LECTURE

No.	Equipment Name	Type of Equipment	No of Unit	Objective	Freq Use	Inst Trng
1	Over-Head Projector & Screen	Administration AV Equipment	1	②③	②	②
2	Video-Camera VTR TV-Monitor	Administration AV Equipment	1	②③	②	②
3	Slide Projector	Administration AV Equipment	1	②③	②	②

## 26. TRAINING

No.	Equipment Name	Type of Equipment	No of Unit	Objective	Freq Use	Inst Trng
1	Television-Monitor	Administration AV Equipment	1	②③	②	②
2	Phantom (Manekin)	Administration AV Equipment	2	②③	②	②
3	Resuscitator Set	Administration AV Equipment	2	②③	②	②
4	Ventilator	Administration AV Equipment	2	①②③	②	②
5	Bandaging & Plaster-gypsum Application Training Ki	Administration AV Equipment	2	①②③	②	②
6	Laryngoscope Set	Administration AV Equipment	2	①②③	②	②
7	Infant Incubator	Administration AV Equipment	1	①②③	②	②



## 27. RESUSCITATION ROOM

No.	Equipment Name	Type of Equipment	No of Unit	Objec-tive	Ferq Use	Inst Irng
1	Respiratory Support & Accessories	Diagnosis Treatment Equipment	1	①	①	②
2	Defibrillator	Diagnosis Treatment Equipment	1	①	①	②
3	Circulatory Warmer blanket	Diagnosis Treatment Equipment	1	①	①	②
4	Thoracic Tube & Continuous Under Waterseales Drain	Diagnosis Treatment Equipment	1	①	①	②
5	Oropharyngeal Airway	Diagnosis Treatment Equipment	1	①	②	②
6	Nasopharyngeal Airway	Diagnosis Treatment Equipment	1	①	②	②
7	Endotracheal Tube Nasal	Diagnosis Treatment Equipment	1	①	②	②
8	Endotracheal Tube Oral	Diagnosis Treatment Equipment	1	①	②	②
9	Handy Ventilator	Diagnosis Treatment Equipment	1	①	②	②
10	Plastic Oxygen Mask	Diagnosis Treatment Equipment	1	①	②	②
11	Infusion Set	Diagnosis Treatment Equipment	1	①	②	②
12	I.V Catheter Set	Diagnosis Treatment Equipment	1	①	②	②
13	Syringe	Diagnosis Treatment Equipment	1	①	①	④
14	Infusion Pump	Diagnosis Treatment Equipment	1	①	①	②

## **CHAPTER 5 EXECUTION PLAN**



## CHAPTER 5 EXECUTION PLAN

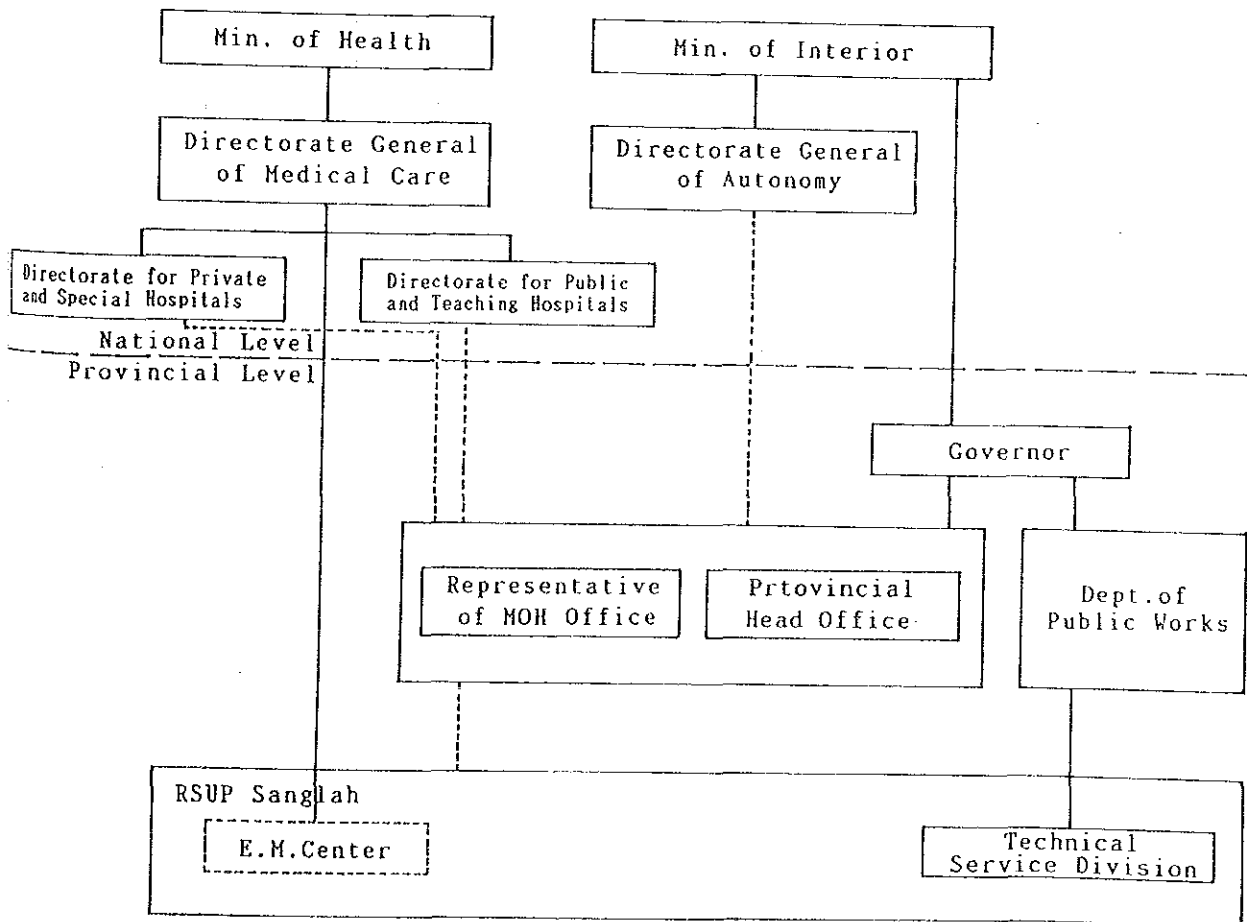
### 5-1 Execution System

#### (1) Execution Body

When this project is considered for grant aid by Japan, the executing body on the part of Indonesia will be the Directorate General of Medical Care of the Ministry of Health of the Republic of Indonesia. Technical coordination for execution will be carried out by the Directorate for Public and Teaching Hospitals, and the Directorate for Private and Special Hospitals.

In addition, the representative office(local branch) of the Ministry of Health will coordinate legal and clerical matters with the Bali Government, since the project site is located on the premises of the Sanglah Hospital, Bali. The organization structures of the parties concerned are as shown below:

Fig.-30 Concerned Institutions for Project Implementation



(2) Consultant

As soon as an exchange of note is concluded between the governments of Japan and the Republic of Indonesia, the Japanese consultant will conclude a consultant agreement with the Republic of Indonesia in accordance with the grant-in-aid procedures. The consultant conducts the following:

<i> Detailed design stage:

Preparation of design documents consisting of execution plan drawings, specifications, and other technical information.

<ii> Tendering stage:

Cooperation concerning selection of contractor, and construction contracts.

<iii> Construction stage:

Construction supervision.

(3) Contractors

The general contractor responsible for contractors involved in construction of this Center, procurement, and installation of medical equipment will be a Japanese corporation. This corporation will be selected via a tender system based upon tender documents prepared by the consultant and approved by the Government of the Republic of Indonesia.

After a construction contract is concluded with the Government of the Republic of Indonesia, the successful bidder will begin construction after obtaining the approval of the Japanese Government for the construction contract. It will complete the construction within the contract period, and turn over the Center to Indonesia.

Organization relations of the three above-mentioned parties regarding the execution of this Project are shown below.