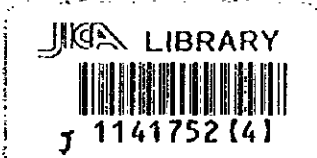


MINISTRY OF HEALTH AND FAMILY WELFARE
THE PEOPLE'S REPUBLIC OF BANGLADESH

STUDY REPORT FOR THE IMPLEMENTATION REVIEW
ON
THE PROJECT FOR STRENGTHENING
OF
MATERNAL & CHILD HEALTH TRAINING INSTITUTE, AZIMPUR
IN
THE PEOPLE'S REPUBLIC OF BANGLADESH

DECEMBER, 1997



JAPAN INTERNATIONAL COOPERATION AGENCY
YAMASHITA SEKKEI INC.

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PREFACE

In response to a request from the Government of the People's Republic of Bangladesh the Government of Japan decided to conduct a study for the implementation review on the Project for Strengthening of Maternal & Child Health Training Institute and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Bangladesh a study team from September 26 to October 16, 1997.

The team held discussions with the officials concerned of the Government of Bangladesh, and conducted a field study at the study area. After the team returned to Japan, further studies were made, and as this result, the present report was finalized.

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

I wish to express my sincere appreciation to the officials concerned of the Government of the People's Republic of Bangladesh for their close cooperation extended to the team.

December, 1997



Kimio Fujita

President

Japan International Cooperation Agency

December, 1997

Letter of Transmittal

We are pleased to submit to you the study report for the implementation review on the Project for Strengthening of Maternal & Child Health Training Institute in the People's Republic of Bangladesh.

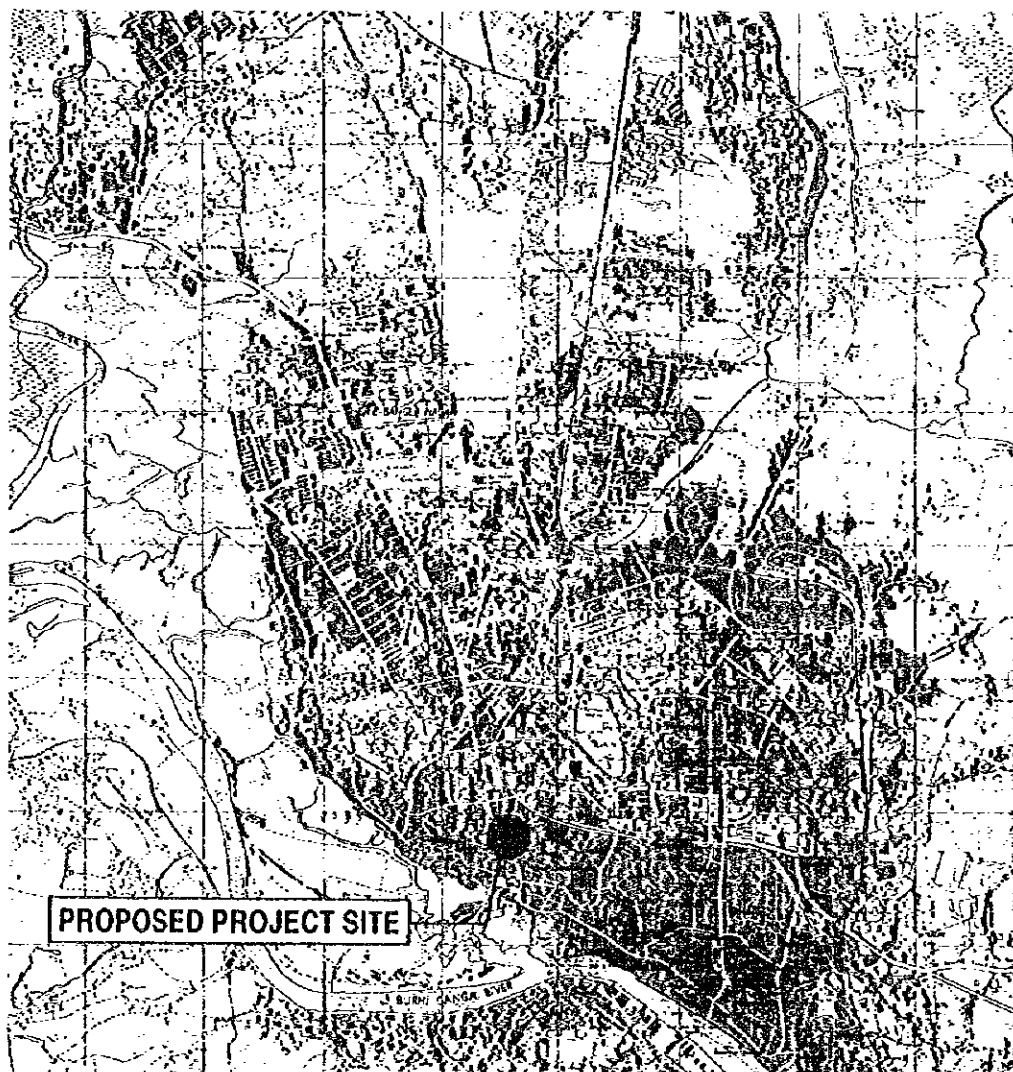
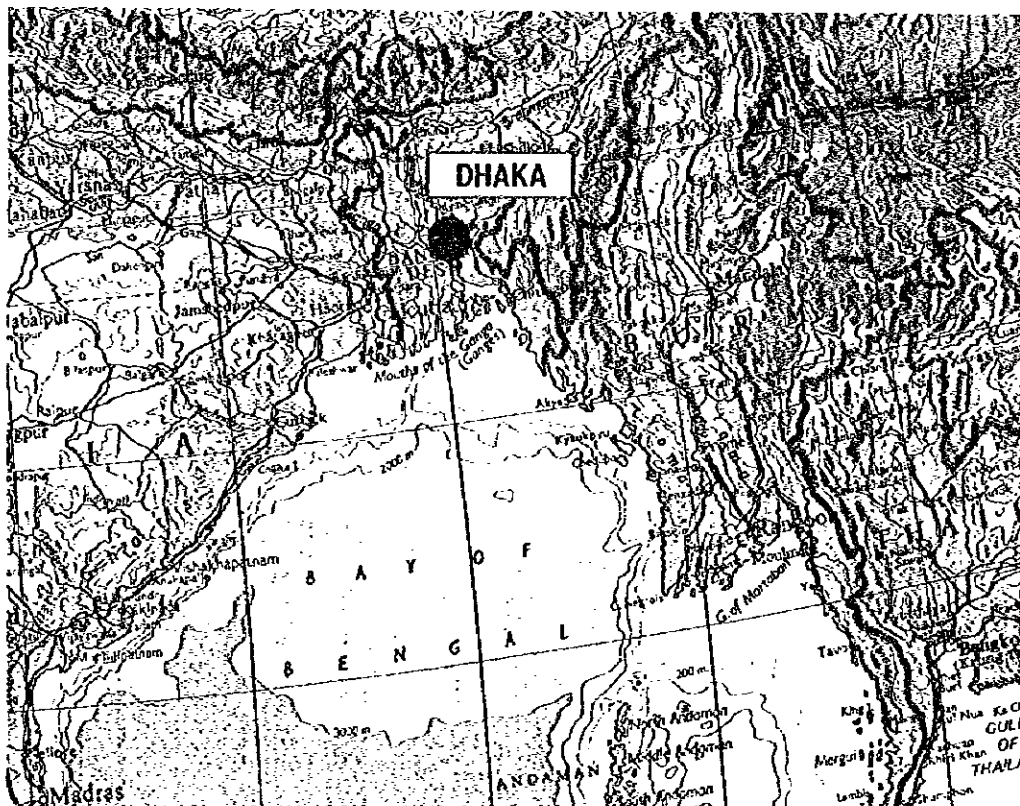
This study was conducted by Yamashita Sekkei Inc. under a contract to JICA, during the period from September 22, 1997 to January 8, 1998. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Bangladesh and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

Finally, we hope that this report will contribute to further promotion of the project.

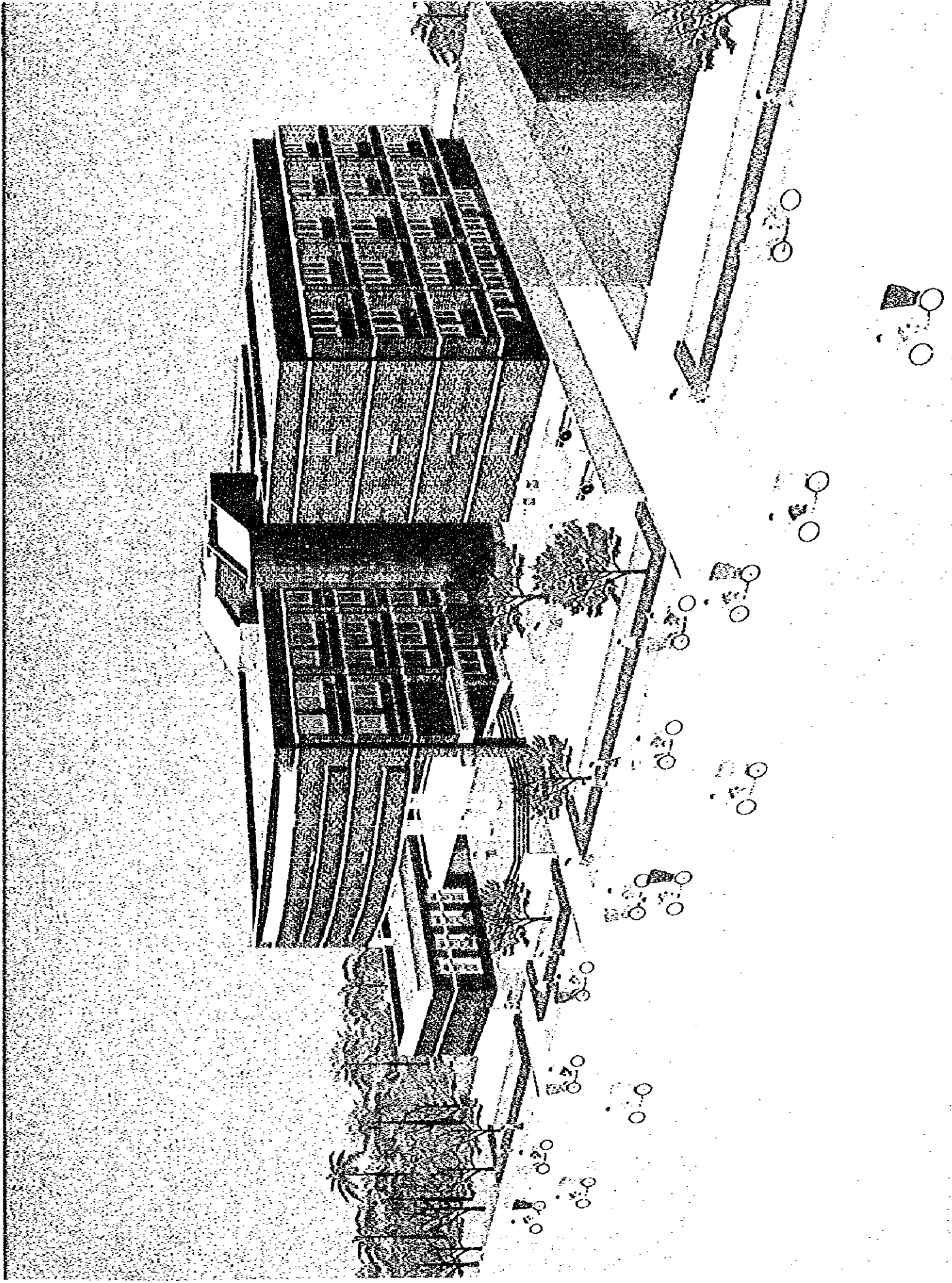
Very truly yours,



Kunihiro Inadome
Project manager,
Study team for
the implementation review on
the Project for Strengthening of
Maternal & Child Health Training
Institute
Yamashita Sekkei Inc.



LOCATION MAP



PERSPECTIVE

ABBREVIATIONS

ABBREVIATIONS (in alphabetical order)	NAME IN FULL
ECNEC	Executive Committee for the National Economic Council
ERD	Economic Relations Division, Ministry of Finance
FP	Family Planning
FWA	Family Welfare Assistant
FWC	Family Welfare Center
FWV	Family Welfare Visitor
FWVTI	Family Welfare Visitor Training Institute
GOB	Government of Bangladesh
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit GmbH
HA	Health Assistant
IEC	Information, Education and Communication
IPGMR	The Institute of Post Graduate Medical Research
MCH	Maternal and Child Health
MCHTI	Maternal & Child Health Training Institute
MOHFW	Ministry of Health and Family Welfare
MO	Medical Officer
MR	Menstrual Regulation
NEMEMW & TC	National Electro Medical Equipment Maintenance Workshop & Training Center
NIPORT	National Institute of Population Research and Training
NIPSOM	National Institute of Preventive and Social Medicine

NRR	Net Reproduction Rate
OECD	Organization for Economic Co-operation and Development
RTC	Rural Training Centre
RAJUK	Rajdhani Unnyan Katripakha
TBA	Traditional Birth Attendant
THC	Thana Health Complex
UHFWC	Union Health Family Welfare Center
WASA	Water Supply & Sewerage Authority
WHO	World Health Organization

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Letter of Transmittal

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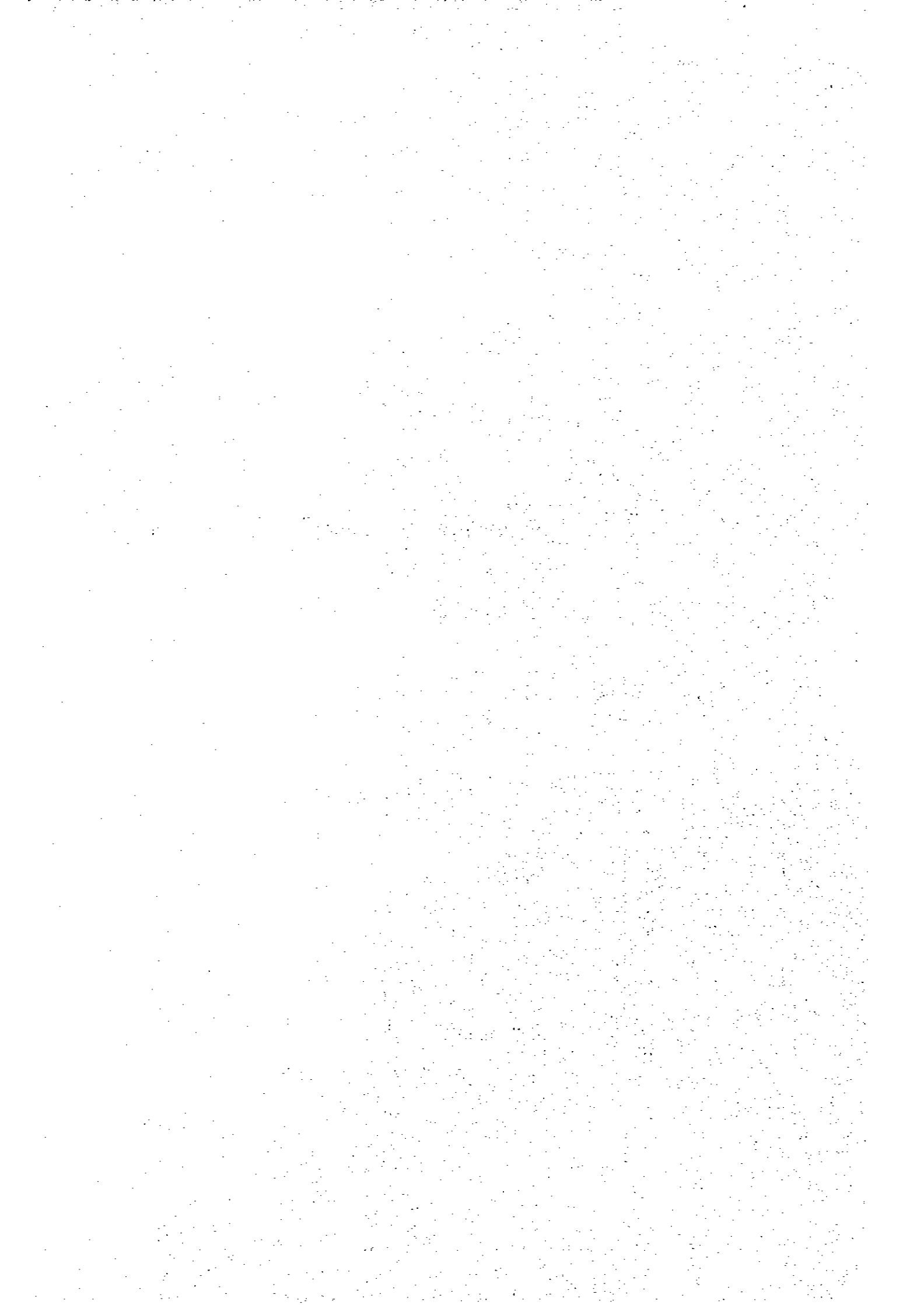
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CHAPTER 1 BACKGROUND OF THE PROJECT



CHAPTER 1 BACKGROUND OF THE PROJECT

1-1 Background of the request

In Bangladesh maternal mortality rate and infant mortality rate are as high as 4.5/1000 and 78/100 respectively. This serious situation is attributable to the low quality and low rate of diffusion of maternal and child health (MCH) services of the country. Therefore, training of paramedical personnel who shall be engaged in improvement of MCH services is urgently necessary. With the background stated above, the Government of Bangladesh made a request to the Government of Japan for grant aid cooperation in strengthening of Maternal & Child Health Training Institute (MCHTI) in April 1991. In response to the request, Japan International Cooperation Agency dispatched the preliminary survey team to Bangladesh in September 1991, the basic design study team in January 1992 and the study team in May 1992 to brief to the Bangladeshi side on the draft report. The Japanese side submitted a basic design study report to the Government of Bangladesh in June 1992 and scheduled to implement the project on the basis of the contents of the report. However, the project had been suspended since the Bangladeshi side was not yet prepared for it.

The facilities of MCHTI has not been rehabilitated nor expanded since it was founded in 1953 and its capacity to accommodate inpatients as well as outpatients has reached its limit. Though the necessity of training at MCHTI is as high as ever, there is only one classroom and clinical rooms are too small to allow trainees observe clinical activities. Therefore, the Government of Bangladesh made the request once again in November 1996 to the Government of Japan for implementation of the project.

1-2 Contents of the Request

It was confirmed in the course of the field survey that the contents of the request submitted by the Bangladeshi side in November 1996 were not different from the contents of the basic design report prepared by the Japanese side in June 1992 on the whole. Contents of the request are outlined as below.

(1) Facilities:

① Clinical Service Section (954m²)

Examination room, Treatment room, Maternity classroom, Pharmacy, Medical record room, Immunization room etc.

② Inpatient Section (2901m²)

Obstetrics ward (6-bed room, 4-bed room, 2-bed room), Gynecology ward (6-bed room, 2-bed room), New born baby room, Pediatrics ward (6 bed room, 2-bed room), Nurse station, Medical Officer's room, Treatment room, Linen room, Waste disposal room, Attendant room etc.

③ Operation/Delivery Section (566m²)

Labour room, Delivery room, Operation theater, C.S.S. room, Recording Office, Nurse station, Preparation room etc.

④ Laboratory Section (126m²)

General lab., Toilet, Hematology lab, Ultrasonograph room etc.

⑤ Administration/Service Department (1042m²)

Director room, Deputy Superintendent room, Senior Consultant room, Administration Office, Account Office, Conference room, Electrical room, Pump room, Generator room, Kitchen etc.

⑥ Training Department (245m²)

Lecture room etc.

⑦ Miscellaneous public space (771m²)

(2) Equipment:

① Clinical Service Section

Obstetrical diagnostic unit, Examining table, Examining light, Gynecological instrument set, Pediatric Surgical instrument set, Diathermy unit, Suction unit, Instrument trolley, Boiling sterilizer, Height scale, Weighing scale, Stethoscope, Fetal detector, etc.

② Inpatient section

Bed, Neonatal bed, Step, Instrument cabinet, Film illuminator, Nurse table, Instrument set, Chart carriage, Work table, Oxygen inhaler, Wash basin stand, Steam sterilizer, Fetal detector, Instrument cabinet, Refrigerator, etc.

③ Operation/Delivery Section

Surgical instrument set, Operating table, Manual resuscitator, Shadowless lamp, Portable infant incubator, Suction unit, Anesthetic machine, Stretcher, Instrument wagon, Fetal weighing scale, Fetal detector, Work table, etc.

④ Laboratory Section

Calorimeter, General purpose centrifuge, Microscope, Incubator, Water bath, Water distiller, Spectrophotometer, Steam sterilizer, Refrigerator, Blood bank refrigerator, Table for blood collecting, Titrator, Glassware, Ultrasonic diagnostic unit, Examining table, etc.

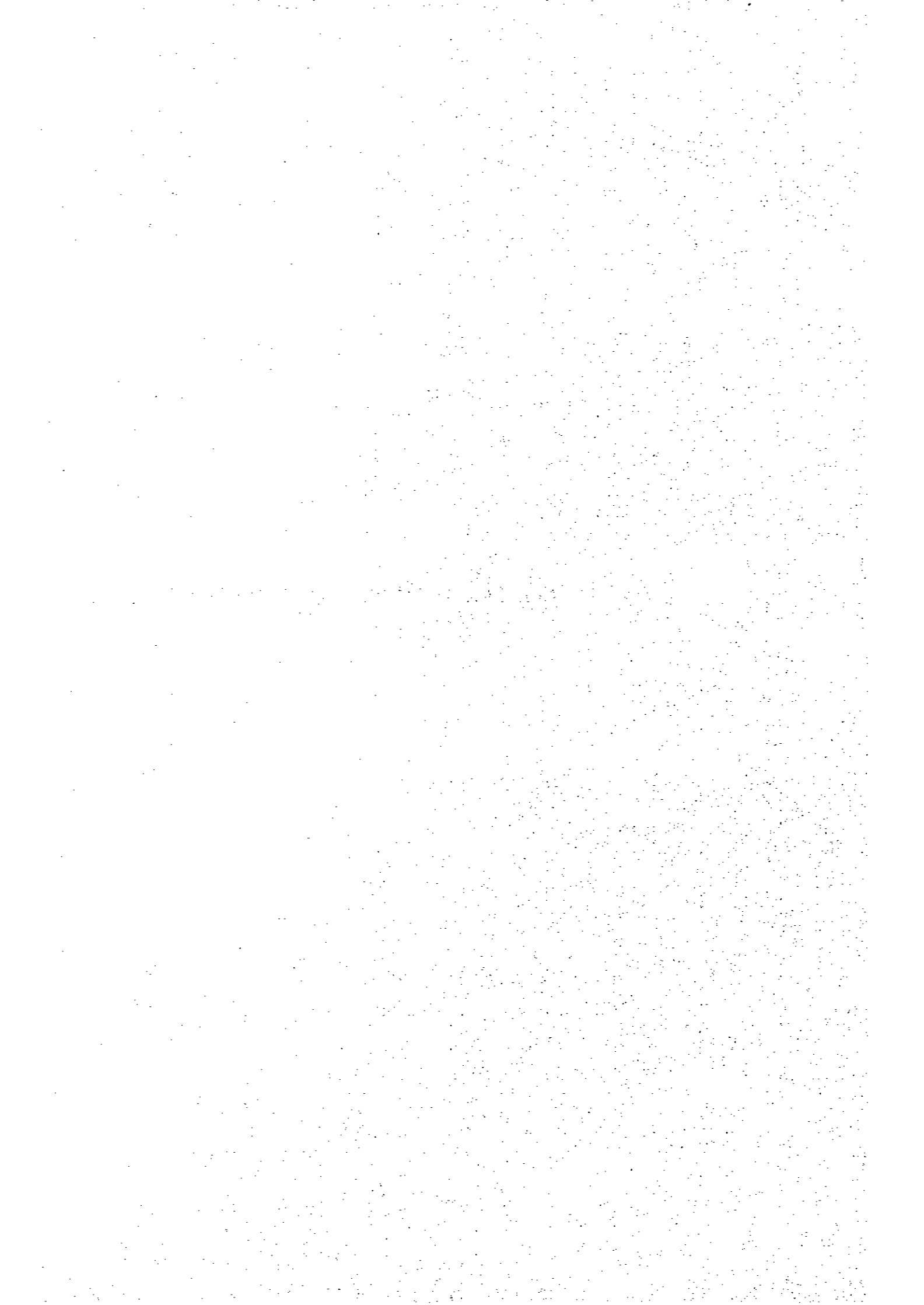
⑤ Administration/Service Department

Storage cabinet, Locker, Desk, Chair, Conference table, Notice board, Photocopier, Typewriter, Personal Computer, Ambulance, Microbus, etc.

⑥ Training Department

Overhead projector, Storage cabinet, Screen, Slide film projector, Video deck, Monitor TV, Notice board, Pregnancy models, Human body models, etc.

CHAPTER 2 CONTENTS OF THE PROJECT



CHAPTER 2 CONTENTS OF THE PROJECT

2-1 Objectives of the Project

In Bangladesh, the life expectancy is shorter with women than with men. This is mainly because of the high maternal mortality rate.

As of 1997, coverage of deliveries by the trained birth attendants account for only 14 percent of the total number of deliveries, the remaining 86 percent being attended by relatives or those who have not received any training in delivery. This is the main reason for the high maternal mortality rate. For the purpose of improving such situation, the following goals are set up in the fifth five-year plan.

Table 2-1 Breakdown of Childbirth by Type of Attendant

Type of attendant	Achievement as of 1997	Target 1997-2002
Doctor	2.1%	10%
Trained nurse	2.2%	30%
Trained Midwife/TBA	9.7%	40%
Relatives and others	86.0%	20%

This project is given a role to contribute to attainment of the goals shown above. The MCH service system of the country is provided with the formation of the personnel consisting of Family Welfare Assistants (FWAs) and Health Assistants (HAs) under the supervision of Family Welfare Visitors (FWVs). At present one FWV is stationed at each of the country's 3,178 health and family welfare centres (HFWCs) operating at the Union level, but that is not enough to increase the ratio of 9.7% to 40% which delivered by trained midwife/TBA. For this reason, a plan is being drawn up to station two FWVs at each HFWC. In addition, it is planned to increase refresher course for FWVs to improve their skill further.

Maternal & Child Health Training Institute (MCHTI) was founded in 1953 as

an obstetric institution to specialize in clinical training for paramedical staff engaged in MCH services. The number of beds of MCHTI, which was 20 at the time of its founding, was increased to 100. At present MCHTI is indispensable institution in Dhaka metropolitan area for clinical training of FWVs, nurses, medical officers and traditional birth attendants. While the scope of its clinical and medical examination functions, as well as its training function, has been expanded greatly, its facilities are superannuated and therefore it is increasingly difficult to maintain even the present level of operations.

The objective of the project is to expand the clinical function and training function of MCHTI by means of constructing the facilities and the procuring items of equipment.

2-2 Basic Concept of the Project

2-2-1 Review of the Basic Design

(1) Review of the contents of the Basic Design

The objective of the basic design remains the same as that of the original basic design, namely, to improve the facilities and equipment with the aim of strengthening the clinical function and the training function, the two main pillars of operations carried out at MCHTI.

The training function was considered a passive one - to provide a place for clinical training conducted by NIPORT and other training institutes at the time of the original basic design. However, in the course of the study for the implementation review of the project, it was discussed to strengthen the training function more in order to increase the expected effects of the project. More specifically, the direction in which MCHTI is to make efforts for more

active cooperation with NIPORT and NIPSOM in the development of training programmes was confirmed. Thus it became necessary to further enhance the quality of the training facilities. As it is difficult to enlarge the scale of the planned buildings due to a limited available space of the site, however, it was agreed that the overall facility plan should be adjusted by reducing the total number of ward beds.

(2) Examination of the Strengthening of the Training Function

As regards the training function, it was confirmed that MCHTI is shifting from its passive positioning - to serve simply as a place for clinical training of NIPORT and other institutes - to its active positioning - to be actively involved in the practical aspects of training.

MCHTI has the following order of priority for training target group.

1. FWV (Family Welfare Visitors)
2. Nurse
3. Doctor

The FWV certificate is issued to each trainee when she completes the 18 month training course. Since the training course is a short term one, FWVs are required to take 25 day periodical refresher course, which is aimed at improving FWVs' skills. MCHTI is accepting only a limited number of trainees for refresher courses conducted by FWVTI, Dhaka. After the implementation of the project, however, MCHTI will be able to accept required number of such trainees. The target annual number of trainees accepted at MCHTI is set at 580 after the year 2003.

The Directorate of family Planning of the Ministry of Health and Family Welfare has stopped the recruitment of new FWVs for the reason that its plan to station FWV at each of the 3,178 FWCs has been completed, but it is in the process of drawing up a plan to station two FWVs at each FWC. If this

plan is to be implemented, it will be necessary to train more than 3,000 FWVs in five years, or to train 50 FWVs every year at each of the 12 FWVs in five years. Under this condition MCHTI will have to accept trainees for clinical training conducted by FWVTI, Dhaka.

Since students of nursing schools and the college of nursing are required to take clinical training in obstetrics, MCHTI has been accepting about 100 fourth-grade students every year. It is planned to increase the annual number of trainees accepted by MCHTI up to 340.

As regards clinical training of doctors, it is planned to continue with its present system to receive short-term training conducted by NI PORT and NIP SOM, on a non-periodical basis.

Under such circumstances, MCHTI has set the following training goals to be achieved in stages by the year 2003.

Table 2-2 Future Training Target of MCHTI, Azimpur

	Course	Period (day)	No. / Batch	2000		2001		2002		2003		2004	
				Batch	Total	Batch	Total	Batch	Total	Batch	Total	Batch	Total
FW	Refresher	12	20	10	200	15	300	21	420	29	580	29	580
	EOC	12	2	10	20	15	30	20	40	30	60	30	60
Midwife	Midwifery	6 months	25	1	25	2	50	2	50	2	50	2	50
Doctor	EOC	12	2	10	20	15	30	20	40	30	60	30	60
	Orientation/ Practice	12	2	10	20	10	20	10	20	10	20	10	20
TBA TBA trainer Health worker	Safe delivery observation	3	10	6	60	9	90	13	130	19	190	19	190
	Orientation	2	10	5	50	7	70	10	100	13	130	13	130
	Skill practice	12	2	5	10	5	10	10	20	15	30	15	30
Nurse	Orientation	12	20	5	100	8	160	12	240	17	340	17	340
	Skill practice	12	20	5	100	8	160	12	240	17	340	17	340
Doctor FW	Blood bank	2	4	5	20	7	28	11	44	15	60	15	60
	Prevent infection	2	4	5	20	7	28	11	44	15	60	15	60
	STD/AIDS	2	4	5	20	7	28	11	44	15	60	15	60
	Adolescent education	2	4	5	20	7	28	11	44	15	60	15	60
	Neonatal minor ailments	2	4	5	20	7	28	11	44	15	60	15	60
Total				92	705	129	1060	185	1520	257	2100	257	2100

The above-mentioned plan shows only a scale of trainee acceptance goal and is not necessarily consistent with the specific training programmes. The actual scale of trainee acceptance at MCHTI, which is estimated on the basis

of the training programmes prepared by training institutions, is as shown below.

Table 2-3 Trainee acceptance at MCHTI, Azimpur

Training Institute	Trainee	Period	Batch /year	No./ Batch	7	8	9	10	11	12	1	2	3	4	5	6
1	New FWV	Through-out year	2	20	One day/week everyday					5 days/week						
2	NIPORT FWVTI, Dhaka	FWV refresher	12 days	14	15	12 days	"	"	"	"	"	"	"	"	"	"
3	M.O, Sr. FWV	2 days	8	4		2 days	"	"	"	"	"	"	"	"	"	"
4	School of Nursing College of Nursing	Students	12 days	120 in total		"	"	"	"	"	"	"	"	"	"	"
				100 in total		12 days	"	"	"	"	"	"	"	"	"	"
5	NIPSCOM	Students for Masters degree	21 days	2	20			21 days					21 days			
6	Others	TBA, TBA trainer, Health worker		100 in total		"	"	"	"	"	"	"	"	"	"	"

As is clear from the above table, two groups of FWV trainees of new FWV training and refresher training are to stay at MCHTI almost continuously. Besides these training, short courses for medical officers and Sr. FWVs conducted by NIPORT as well as other short courses conducted by NIPSCOM and other institutions will be conducted. For these short courses two groups of maximum 20 trainees may possibly stay simultaneously. It will therefore be necessary that MCHTI shall have a capacity of accepting up to four groups of up to 20 trainees simultaneously.

2-2-2 Basic Concept

Basic concept of the project is to improve clinical function and training function of MCHTI by means of constructing facilities and procuring equipment. The goal of the improvement is outlined as below.

- **Clinical Functions**

- To increase the annual number of deliveries from the present 3,500 to 5,000 so that MCHTI may contribute to improve service delivery in the Dhaka metropolitan area.
- To increase the total number of beds from 100 to 173 so that MCHTI may keep up with the expansion of the clinical operation.

- **Training Function**

- To make the facilities be able to accept four groups of up to 20 trainees at a time so that MCHTI may be able to accept all trainees for clinical training from FWVTI, Dhaka and NIPORT, which is currently scattered to other facilities.
- To expand the Training Department so that MCHTI may be actively involved in clinical training programmes on the basis of the collaboration with NIPORT and NIPSOM.

2-3 Basic Design

2-3-1 Design Concept

The facility and equipment plans are to be worked out in consideration of Bangladesh natural and social conditions as well as the present state of the implementing organization of the project.

(1) Design concept concerning natural conditions

1) Project sites

The city of Dhaka, where the project site is located, is 5 to 7 meters

above sea level. During the rainy season, the city is often flooded. The Azimpur District, where MCHTI, main center is located, is situated in the old city of Dhaka. The ground level of this project site is relatively high and the road running in front of the project site is wide and is provided with a pavement, a green belt and side ditches. Therefore, the project site is very unlikely to be flooded.

2) Wind

In and around the project site, the wind blows from the south or the southeast during the period from March to September, from the north or the northwest from October to February. The projected buildings should be so designed as to minimize the air conditioning cost, and they should have as many openings as possible in their southern and northern sides for natural ventilation.

3) Rain

During the rainy season, there are many rainfalls accompanied by gales. Sometimes it continues to rain for several days. It is therefore necessary to attach balconies or eaves to the buildings to prevent rainwater from entering the buildings.

4) Sunlight

In summer, the sun is strong and the temperature is high. It is necessary, therefore, to pay special attention to the insulation of the roofs. It is also necessary not to expose the interior of the building to direct sunlight by means of eaves around window openings especially on the southern sides of the buildings. The number of openings on the western sides of the buildings should be minimized in order to avoid the direct sunlight.

5) Humidity

The humidity rises to more than 80 percent from summer to the rainy season.

It is necessary to maximize the height of the ceiling and make each room well ventilated in order to ensure a comfortable living environment.

(2) Design concept concerning social condition

MCHTI is the institute for benefits of mothers and children. Moreover, most of staff members such as the superintendent and medical officers are women. Therefore, it is necessary to give special consideration to designation of area where men can access both in the outpatient section and the inpatient section.

(3) Design concept concerning the present state of the local construction industry and the local building standards

Before commencement of construction work on the site in the Azimpur District, it is necessary to obtain the building permit from RAJUK (Dhaka City Planning Authority). Projects implemented under Japanese grant aid cooperation are not exception to this rule. For this reason, the Directorate of Family Planning of the Ministry of Health and Family Welfare of Bangladesh, which is the organization to take charge of the implementation of this project, is required to submit all necessary drawings and specifications signed by the architect and engineers to RAJUK for approval.

(4) Design concept concerning the utilization of local suppliers and locally available equipment and materials

The Japanese contractor will not have difficulties to implement construction work since there are a number of local contractors who have working experience under Japanese main contractors. In consideration of maintenance and operation after the completion of this project, locally available materials should be utilized as much as possible. Equipment shall be procured from distributors with sufficient maintenance capabilities in Bangladesh. In

case of materials and equipment, which are not available locally, those shall be imported from Japan or the third countries.

(5) Design concept concerning the maintenance and management capabilities

Tentative estimation of the project operating costs indicates the operating costs need to be 1.73 times as much as the present one after the completion of the project. It appears that these figures will impose a considerable financial burden on the Directorate of Family Planning, the Ministry of Health and Family Welfare, which is the organization responsible for the implementation of the project. For this reason, it is essential to minimize the maintenance and operation costs in designing the facilities of this project.

(6) Design concept concerning Ranges and Grades of the Facility/Equipment

1) Facilities

First priority for procurement of materials shall be placed on the materials which are available in the country. On the other hand, with regard to the materials which were planned to be procured in Japan shall be reviewed whether they can be procured in the third countries, in view of quality and costs.

2) Equipment

As is the case with the original basic design, priority should be given to the procurement of basic items of equipment. Special attention shall be paid on selection of items of equipment which can easily be maintained and managed in Bangladesh and for which procurement of spare parts and expendables is easy in the country. In case of equipment which need power or gas, those which consume city gas should be selected instead of electricity in consideration of saving the maintenance and operation costs.

(7) Design concept concerning project implementation period

Early implementation of this project is desired since the project has been suspended for about five years. On the other hand, during the construction of this project, MCHTI has to rent temporary facilities for its operation. Therefore, it is necessary to complete the project as soon as possible to minimize the period of operation in temporary facilities since temporal operation is inconvenient and costly.

(8) Design concept concerning influence to the environment

1) Medical disposal

Dhaka Municipal Corporation does not accept undisposed medical waste, so that present disposal system with the use of incinerators shall be continued. However, incinerators presently owned by MCHTI are too simple to dispose needles and extracted organs. Therefore, it was concluded to include an incinerator with burner for disposal of medical waste in this project.

2) Waste fluid

X-ray machine will be introduced under this project. X-ray films will be processed within MCHTI. Waste fluid of processing films contain silver, so that it shall not be discharged together with general waste water. In Dhaka there is practice to collect such waste fluid to extract silver from it. Therefore, in MCHTI waste fluid of processing films shall be kept in containers for collection.

2-3-2 Examination of the Design Conditions

(1) Facilities

1) Clinical Department

The clinical department consists of the following four sections.

- ① Outpatient
- ② Laboratory section
- ③ Delivery/Operation section
- ④ Inpatient section

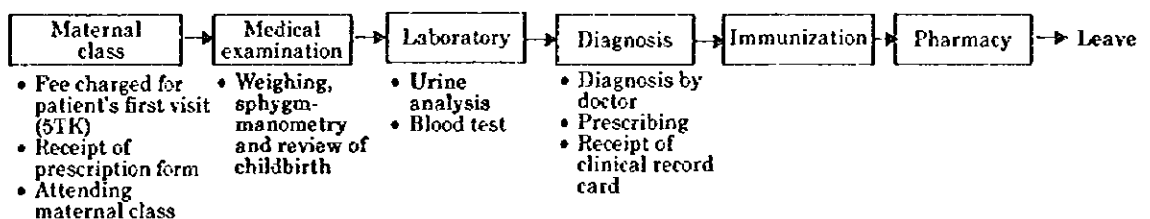
The contents of the basic design for each of the four sections were confirmed in the course of the study for the implementation review of the project, as follows;

① Outpatient section

Medical examination of outpatients in the fields of the obstetrics, gynecology and pediatrics are to be conducted.

The flow chart of the obstetrics examination is as shown below.

New Patients



Revisit patients

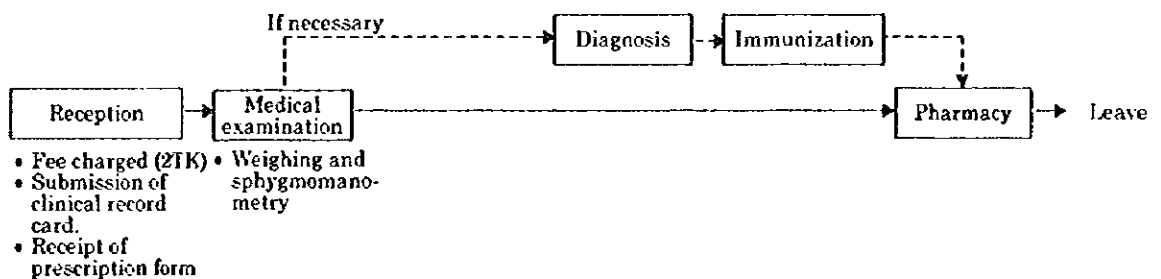


Fig. 2-1 Flow Chart of the Obstetric Examination

Mainly family planning service (including IUD insertion) is conducted at the gynecologic unit. Medical care services of pediatrics is for children of up to five years old. Medical record cards are kept by patients and are submitted when patients visit for consultation. On the other hand, clinical record cards of those patients who were hospitalized are kept by the institute.

The necessary number of the consulting rooms for obstetric unit is to be calculated on the assumption that the unit is to accept up to 250 outpatients a day and that consultation hours are to be from 8:00 a.m. till 2:00 p.m., the average consulting time per patient being five minutes. The number of the consulting rooms and treatment rooms for pediatrics are to be calculated on the assumption that the unit is to accept up to 125 outpatients a day and that the average consulting time per patient is 10 minutes. One family planning room and one IUD room are sufficient for gynecology since not many patients concentrate at a time in this type of consultation.

② Laboratory section

General sample testing, pathological testing and blood testing are planned to be conducted. Haematology lab. will be given a role of the blood bank for blood transfusion purposes as well. A X-ray machine was requested to be included in this project and was judged reasonable for this institute. Therefore, a ultrasonic diagnostic room and a X-ray room are planned in the laboratory section. A darkroom is to be attached to the X-ray room.

③ Delivery/Operation Section

Size of the delivery room shall be determined to install four delivery tables which are necessary for 5000 deliveries a year. The contents of the basic design of this section remain unchanged. Type of

operations conducted in this section are mainly caesarean section and tubectomy operation, which is the same condition as the original basic design. As stated above, scale and components are to be the same as those indicated in the original basic design.

④ Inpatient section

Examination of the necessary number of beds:

a. Obstetric/Gynecology unit

- Given that 90% of the 5000 target annual number of deliveries is normal and that the average length of hospitalization is four days,

$$5000 \times 90/100 \times 4 \times 1/365 \doteq 49 \text{ (bed)}$$

- Given that 10 percent of the total number of deliveries are high-risk and that the average length of hospitalization is 30 days,

$$5000 \times 10/100 \times 30 \times 1/365 \doteq 41 \text{ (beds)}$$

- Necessary beds for gynecology is assumed to be 15% of obstetric, $(49+41) \times 15/100 \doteq 14$

Assuming that the occupancy ratio of bed is 90%,

$$\text{Necessary Obste/Gyne ward beds} = (49+41+14) \times 1.1 = 114$$

Breakdown of obstetric and gynecology shall be flexible to meet the variable situation.

b. Pediatrics unit

- Given that five percent of the total number of outpatients are to be hospitalized for five days on average,

$$44500 \times 5/100 \times 5 \times 1/365 \doteq 31 \text{ (beds)}$$

- Statistics of MCHTI indicates 7% of newborn babies need to be hospitalized for 20 days on average,

$$5000 \times 7/100 \times 20 \times 1/365 \doteq 19$$

Assuming that the occupancy ratio of bed is 90%,

Necessary pediatric ward beds $= (31+19) \times 1.1 = 55$

c. Total number of bed

114 (Obste/Gyne) + 55 (Pediatric) = 169

Thus it is concluded that a reduction of 27 beds from the number of the original basic design will not cause troubles in the function of the institute.

2) Training Function

Thus far the training function of MCHTI has been a passive to provide a place for clinical training conducted by other training institutes. Therefore, special attention has not been paid to the design of facilities for effective training. However, in the course of the study for implementation review, it was agreed that MCHTI would establish close working collaboration with NIPORT and NIPSOM to develop training programs. For this reason, it was decided that the training facility should include a multipurpose room and a simulation room which support clinical training in addition to a general classroom.

3) Administration/Service Functions

The facility plan in the original basic design envisaged the doctors' rooms to be included in the Administration/Service section. However, in the course of the review of the functions of the institute, it was concluded that the doctors are to take charge not only of consultation but also of training. It was thus judged appropriate that doctors' offices are independently situated from the Administration service department while the superintendent's room and Dy. Superintendent room are located in the Administration/Service department since they are

closely related to operation of the institute. Layout of office rooms in the administration service section and the medical staff section shall be flexible to be rearranged for the future change.

(2) Equipment

The details of the requested items of equipment are almost the same as those confirmed at the time of the basic design study. Therefore, as far as no significant changes are found in objectives or condition of uses, basic policy of the original basic design shall be applied to determine specification and quantities of equipment. When selecting type of equipment, the technical levels of the personnel of MCHTI, the NEMEMW & TC and local distributors shall be considered.

2-3-3 Basic Plan

(1) Site Plan/Facility Arrangement Plan

The project site is conveniently located for the residents of the area, western end of old Dhaka. It is surrounded by schools and government employees' living quarters. The road (Azimpur road) running in front of the project site has a width of 25m consisting of a 15-meter-wide carriageway, a pavements and the green belt. Thus the project site is blessed as a clinical institution. However, the area of the site is not large enough with only 2990m² which is a part of the premises of the Directorate of Family Planning. Therefore, it is necessary that the planned buildings should be four storey for accommodating required facilities.

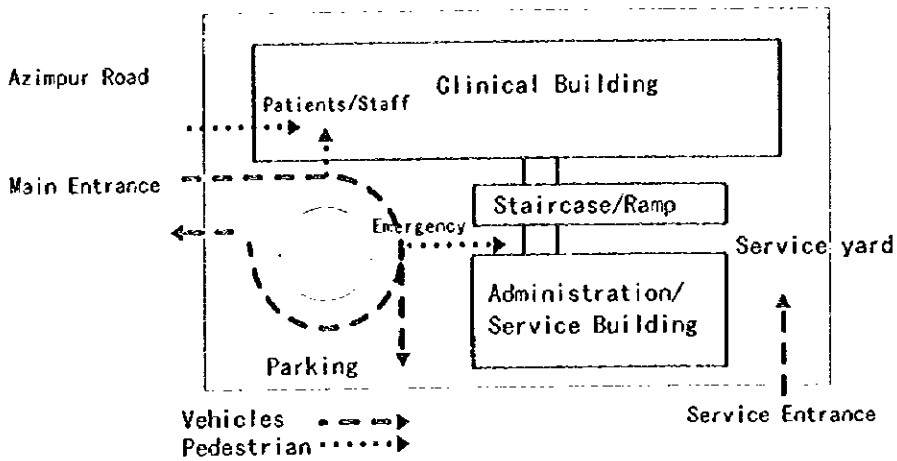


Fig. 2-2 Site Layout Plan

(2) Architectural Plan

1) Floor Plan

In accordance with the concept for the strengthening of the training function, floor plan in the original basic design was reviewed as follows,

- The clinical functions shall be centralized in a building.
- The medical staff section shall be separated from the administration/service section so that the medical staff section keep connection both with the clinical section and the training department.
- Flexibility shall be considered for rearrangement of the facility layout plan of the training department, the medical staff section and the administration section in case training activity is expanded in the future.
- The staircase and the ramp shall be located in the centre of the facilities so that the vertical flow is secured among different functions.

Shown below is a comparison of the facility arrangement plan of the original basic design and the reviewed basic design.

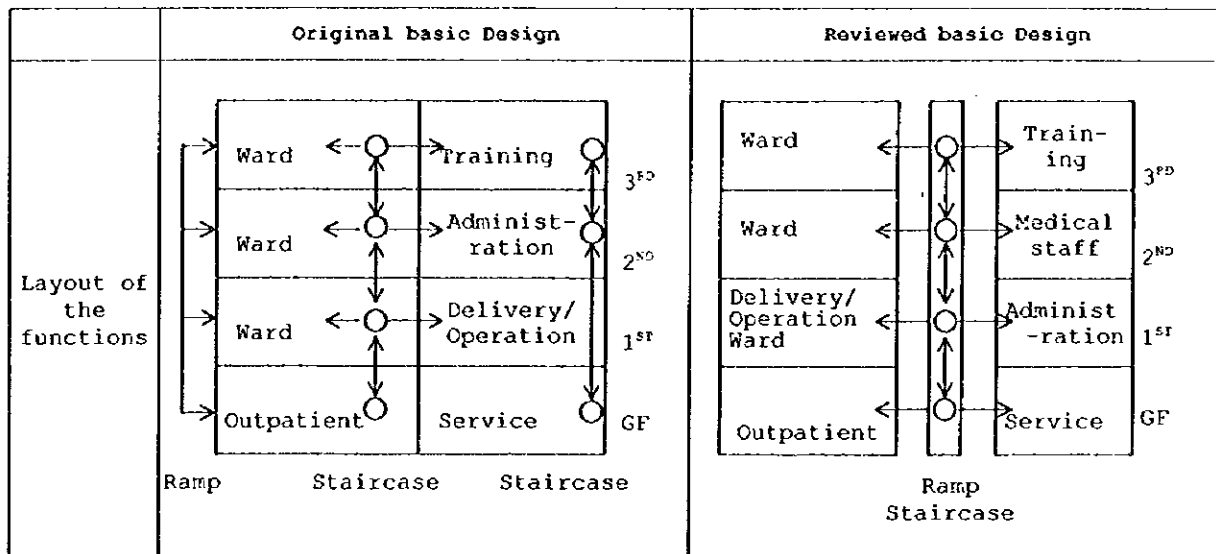


Fig. 2-3 Comparison of the facility arrangement

Shown below is the floor planning of each section.

① Outpatient section

Each patient keeps her clinical record card and submit it when she visits for consultation. Therefore, only a reception desk without a record card storage will be sufficient for registration of patients. The flow chart for the patients' movement in the outpatient section is as illustrated below.

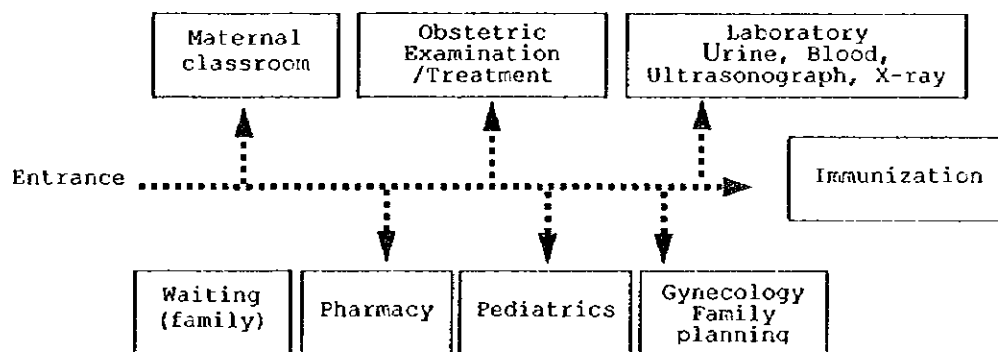


Fig. 2-4 Flow of the Outpatient Section

② X-ray room

Based on the conclusion of the study for the implementation review to include X-ray machine in this project, a X-ray room and a darkroom

will be provided in the facility.

③ Inpatient section

The inpatient ward is reviewed as follows.

- Distribution of obstetric unit and gynecologic unit shall be flexible to meet the variable situation.
- In accordance with the policy of MCHTI to have healthy newborn babies attended by their mothers instead of being isolated in the infant observation room, the size of the infant observation room should be reduced.

Comparison of ward beds is shown below.

	Original basic design	Reviewed basic design																																				
Layout of functions	<table border="1"> <tr> <td rowspan="2">52</td> <td>Obstetric</td> <td>Gynecology</td> <td rowspan="2">3rd</td> </tr> <tr> <td>General 56</td> <td>General 12</td> </tr> <tr> <td rowspan="2">76</td> <td>Obste</td> <td>Pediatric</td> <td rowspan="2">2nd</td> </tr> <tr> <td>General 18</td> <td>Infant 20 ; General 36 ; Infec-tious 1</td> </tr> <tr> <td rowspan="2">72</td> <td colspan="2">Obstetric</td> <td rowspan="2">1st</td> </tr> <tr> <td>Labor 6</td> <td>After Operation 24</td> </tr> </table>	52	Obstetric	Gynecology	3 rd	General 56	General 12	76	Obste	Pediatric	2 nd	General 18	Infant 20 ; General 36 ; Infec-tious 1	72	Obstetric		1 st	Labor 6	After Operation 24	<table border="1"> <tr> <td rowspan="2">68</td> <td>Pediatrics</td> <td>Obstetric</td> <td rowspan="2">3rd</td> </tr> <tr> <td>General 6</td> <td>General 46</td> </tr> <tr> <td rowspan="2">75</td> <td colspan="2">Pediatric</td> <td rowspan="2">2nd</td> </tr> <tr> <td>Infant 30</td> <td>General 46</td> </tr> <tr> <td rowspan="2">30</td> <td colspan="2">Obstetric</td> <td rowspan="2">1st</td> </tr> <tr> <td>Labor 6</td> <td>General 66</td> </tr> </table>	68	Pediatrics	Obstetric	3 rd	General 6	General 46	75	Pediatric		2 nd	Infant 30	General 46	30	Obstetric		1 st	Labor 6	General 66
	52		Obstetric	Gynecology		3 rd																																
		General 56	General 12																																			
	76	Obste	Pediatric	2 nd																																		
General 18		Infant 20 ; General 36 ; Infec-tious 1																																				
72	Obstetric		1 st																																			
	Labor 6	After Operation 24																																				
68	Pediatrics	Obstetric	3 rd																																			
	General 6	General 46																																				
75	Pediatric		2 nd																																			
	Infant 30	General 46																																				
30	Obstetric		1 st																																			
	Labor 6	General 66																																				
	<ul style="list-style-type: none"> • Obstetric: 72, Gynecology: 46, Pediatrics: 82 Total 200 	<ul style="list-style-type: none"> • Obstetric: 104, Gynecology: 12, Pediatrics: 57 Total 173 																																				

Fig. 2-5 Comparison of ward beds

④ Delivery/Operation Section

As there is no change in the basic design conditions to increase annual number of deliveries up to 5,000, there should be no change to be made in the contents of the facilities. Therefore, the location of this section should be changed to the clinical building without change of its contents.

⑤ Administration/Service department

Service facilities such as the kitchen and electrical room shall be

located on the ground floor and administration facilities such as the superintendent room, the office room and other related rooms shall be located on the first floor.

⑥ Medical staff section/Training department

The Medical staff facilities (doctors' rooms) should be located on the second floor of the administration/service building, and a classroom, a multipurpose room, a simulation room and a training related offices on the third floor. Since the doctors are also involved in training activities, possibility of diverting medical staff section into training department is considered.

Shown below is a comparison of the floor areas of the basic design and the reviewed basic design.

Table 2-4 Comparison of floor area

	Original basic design	Reviewed basic design	Remarks
1. Outpatient section	954.0	946.8	
2. Laboratory section	126.0	243.0	X-ray room (36 m ²) is added. In addition, part of corridor is included in the reviewed floor area.
3. Administration/ Service department	1,042.32	673.2	Doctors' rooms are separated as the medical staff section in the reviewed basic design.
4. Medical staff section		360.0	
5. Delivery/ Operation section	565.92	558.0	
6. Inpatient section	2,901.0	2,538.0	Original basic design: 200 beds Reviewed basic design: 173 beds
7. Training department	244.8	360.0	Strengthened with a multi-purpose room and a simulation room being added.
8. Others	770.7	925.9	
Total	6,604.4	6,604.9	

The required rooms and their respective floor areas are as shown in the following table.

Table 2-5 Floor Area Schedule

1. Outpatient Section

Room Name	No.	Floor area	Remarks
Obstetrics/Gynecology			
Examination room	4	108.0	<ul style="list-style-type: none"> • 250patients a day, business hour from 8:00 am to 14:00 p.m., Assuming 5 minutes per patient, $250\text{person} \times 5\text{min.} \div 8\text{hours} = 3.47$ From above estimation, 4 clinical rooms consisting of 2 examination rooms and 2 treatment rooms are necessary. In addition, 2 examination rooms for new patients are planned.
Treatment room	2	54.0	
Maternity classroom	1	108.0	
Pediatrics			
Examination room	2	36.0	<ul style="list-style-type: none"> • 125 patients a day assuming 10minutes per patients, $125\text{person} \times 10\text{min.} \div 8\text{hour} = 3.47$
Treatment room	2	36.0	
Family planning			
IUD room	1	18.0	<ul style="list-style-type: none"> • Used for family planning treatment such as IUD
Family planning room	1	18.0	
Medical Social Worker	1	18.0	
Admission			
Admission room	1	28.8	<ul style="list-style-type: none"> • To receive emergency patients for judging necessity of hospitalization
MR room	1	7.2	
Check up room	1	7.2	
Lavatory	1	3.6	
Common			
Family Waiting room	1	36.0	<ul style="list-style-type: none"> • Waiting room for patients' family (mainly husbands)
Pharmacy	1	36.0	
Immunization room	1	36.0	<ul style="list-style-type: none"> • Waiting area for patients and for registration of old patients
Waiting lobby	1	243.0	
Staff toilet (M)	1	3.8	
Staff toilet (W)	1	11.3	
Patients toilet	1	21.0	
Staircase	1	18.0	
Corridor	1	99.0	
Total		946.8	

2. Laboratory Section

Room name	No.	Floor area	Remarks
Toilet	1	18.0	<ul style="list-style-type: none"> • Collection of urine
General laboratory	1	36.0	
Hematology laboratory	1	36.0	<ul style="list-style-type: none"> • Biochemical and urinal test • Blood tests and storing blood for transfusion
Ultra sonograph room	1	36.0	
X-ray machine room	1	24.0	
Dark room	1	12.0	<ul style="list-style-type: none"> • Development of X-ray films
corridor	1	81.0	
Total		243.0	

3. Administration/Service Department

Room name	No.	Floor area	Remarks
Superintendent room	1	33.6	• Personal office rooms are for superintendent, Dy. Superintendent, Dy. Director, Asst. Director
Dy. Superintendent room	1	24.0	
Dy. Director's room	1	19.2	
Asst. Director's room	1	19.2	
Matron's room	1	19.2	
Office	1	57.6	• Administration office for 16 personals 3.6m ² /person
Accountant office	1	14.4	• To be independent since money be handled
Word mistress/House keeper's room	1	14.4	• Office for Word mistress and House keeper 7.2m ² /person
Central storage	1	19.2	• Store keeper to be stationed
Engineer's room	1	9.6	• Office for maintenance staff
Men's toilet (1 st fl)	1	14.4	
Women's toilet (1 st fl)	1	19.2	
Pantry (1 st fl)	1	4.8	
Corridor (1 st fl)	1	91.2	
Linen room	1	38.4	
Nutrition room	1	19.2	
Canteen	1	28.8	• For officers
Kitchen	1	28.8	• Meals for ward patients(Max.173meals/time) and for officers
Steward's room	1	9.6	• Resting room for kitchen personnel
Food store	1	9.6	
Electrical room	1	96.0	• Transformer and emergency generator
Pump room	1	19.2	• Pump room for pumping up water
Men's toilet (G fl)	1	9.6	
Women's toilet (G fl)	1	10.8	
Corridor (G fl)	1	43.2	
Total		673.2	

4. Medical Staff Section

Room name	No.	Floor area	Remarks
Sr. Consultant's room	5	96.0	• Same rank as Asst. Director
Jr. consultants' room	1	57.6	• Office for 4 Jr. Consultants 14.5m ² /person
Medical officers' room	1	19.2	• Resting room for medical officers. 3 to 4 medical officers to stay simultaneously
Meeting room	1	28.8	• Meeting room for 14 persons including 5 Sr. Consultants, Registrars, medical officers and Superintendent.2m ² /person
Library	1	28.8	• Medical references for doctors to be housed.
Men's toilet	1	14.4	
Women's toilet	1	19.2	
pantry	1	4.8	
Corridor	1	91.2	
Total		360.0	

5. Delivery/Operation section

Room name	No.	Floor area	Remarks
Delivery			
Nurse station	1	27.0	<ul style="list-style-type: none"> Patients after/before delivery/operation to be under control 6 labor beds (9.75m²/bed) 4 delivery tables (19.5 m²/bed)
Duty room	1	18.0	
Labor room	1	58.5	
Store	1	13.5	
Delivery room	4	81.0	
Preparation room	1	18.0	
Ante room	1	18.0	
corridor	1	45.0	
Operation			
Changing room (M)	1	18.0	<ul style="list-style-type: none"> Used by doctors for operation ditto
Changing room (W)	1	18.0	
Corridor	1	63.0	<ul style="list-style-type: none"> Mainly ligation and caesarian section. O.T. 1 is extra in case O.T.2 is infected. Sterilizing operation equipment
O.T. 1	1	36.0	
O.T. 2	1	36.0	
Preparation	1	18.0	
Wash room	1	18.0	
store	1	18.0	
C.S.S	1	28.5	
Staff room	1	7.5	
Ante room	1	18.0	
Total		558.0	

6. Inpatient section

Room name	No.	Floor area	Remarks	
Obstetrics ward				
6-bed room (1 st fl)	4	144.0	<ul style="list-style-type: none"> Three beds to be laid out in 6.0m column span. 6m²/bed Observation ward. 9m²/person Pay ward with attached rest room 	
6-bed room (2nd fl)	3	108.0		
6-bed room (3rd fl)	6	216.0		
4-bed room (4 th fl)	1	36.0		
2-bed room (4 th fl)	8	144.0		
Gynecology ward				
6-bed room (4 th fl)	2	72.0	<ul style="list-style-type: none"> One bed room for infectious patient A group of 5 trainees can be accommodated for clinical training 20 beds including incubators and photo-therapy unit 	
Pediatrics ward				
6-bed room (2nd fl)	6	216.0		
Infectious ward	1	18.0		
Nurse station (2 nd fl)	1	27.0		
Treatment room	1	1		
Duty room (2 nd fl)	1	13.5		
Nurse station (3 rd fl)	1	27.0		
M.O. room (3 rd fl)	1	13.5		
Duty room (3 rd fl)	1	13.5		
Infant ward unit (2nd fl)				
Infant observation room	1	108.0		
Nurse station	1	18.0		
Ante room	1	9.0		

Room name	No.	Floor area	Remarks
Preparation room	1	9.0	
Duty room	1	18.0	
Common			
Toilet (1 st fl)	1	18.0	
Waste disposal room	1	9.0	
Pantry (1 st fl)	1	9.0	
Linen store (1 st fl)	1	18.0	
Corridor (1 st fl)	1	162.0	
Staircase (1 st fl)	1	18.0	
Attendant room(2 nd fl)	1	36.0	• Observation space for infant observation room
Meeting room(2 nd fl)	1	18.0	• Instructions to be given to trainees during training
Store 1(2 nd fl)	1	18.0	
Store 2(2 nd fl)	1	18.0	
Machine room(2 nd fl)	1	18.0	
Toilet(2 nd fl)	1	18.0	
Pantry(2 nd fl)	1	12.0	
Store 3(2 nd fl)	1	6.0	
Wash room(2 nd fl)	1	9.0	
Shower room(2 nd fl)	1	9.0	
Waste disposal(2 nd fl)	1	9.0	
Men's toilet(2 nd fl)	1	9.0	
Linen store(2 nd fl)	1	18.0	
Corridor(2 nd fl)	1	306.0	
Staircase	1	18.0	
Meeting room(3 rd fl)	1	18.0	
Store 1(3 rd fl)	1	36.0	• To store medical records for five years
Toilet(3 rd fl)	1	18.0	
Pantry(3 rd fl)	1	12.0	
Store 2(3 rd fl)	1	6.0	
Wash room(3 rd fl)	1	9.0	
Shower room(3 rd fl)	1	9.0	
Waste disposal(3 rd fl)	1	9.0	
Men's toilet(3 rd fl)	1	9.0	
Attendants' room (3 rd fl)	1	36.0	
Linen store(3 rd fl)	1	18.0	
Corridor(3 rd fl)	1	360.0	
Staircase	1	18.0	
Total		2538.0	

7. Training department

Room name	No.	Floor area	remarks
Classroom	1	28.8	• General classroom for twenty trainees (1.44m ² /trainee)
Multipurpose room	1	48.0	• Used for training of maternal excises etc. on floor. Newly planned in the study for implementation review.
Simulation room	1	38.4	• Simulation of delivery for training. Delivery table to be installed. Newly planned in the study for implementation review.
Store	1	19.2	• To store misc. equipment and furnishings for the simulation room
Meeting room	1	38.4	• Meetings concerning training programs with attendants from other institutions
Training coordinator's room	1	19.2	
M.O. room	1	19.2	
Office	1	19.2	
Toilet (M)	1	14.4	
Toilet (W)	1	19.2	
pantry	1	4.8	
Corridor	1	91.2	
Total		360.0	

8. Others

Room name	No.	Floor area	Remarks
Corridor	4	120.0	
Staircase	3	66.8	
Ramp	4	345.1	
Medical gas store	1	18.0	
Pent house	1	36.0	
Balcony	1	340.0	
Total		925.9	
Grand total		6604.9	

2) Section Plan

Eaves with necessary depth shall be provided to prevent direct sunlight and rainwater from entering the building. Floor height shall be 4.0m to ensure comfortable living condition in the tropical rain forest climate, and the ground floor shall be 0.75m from the ground level to protect the building against flood. Exterior appearance shall harmonize the surrounding to be created with local common materials.

3) Structural plan

① Outline of the buildings

The buildings are four-story to be used for the clinical and training activities. The story height is 4.0 meters and the standard spans are 6.0 meters × 6.0 meters, 6.0 meters × 7.2 meters and 6.0 meters × 4.8 meters.

② Foundation

The foundation will be designed on the basis of the soil survey report of the sites which were provided by the Bangladesh side. There is a clayey silt with hard brown sand, the N value for which ranges between 10 and 15, to a depth of 9.0 to 9.5 meters, below which (up to a depth of 20.0 meters) is a layer of fine sand, the N value for which ranges from 15 to 25. The bearing capacity of 15.0 t/cm² is expected with the upper clayey layer at a depth of 1.5 meters or more.

The existing buildings on the project site, a three-story building and a two-story building, will be demolished by the Bangladesh side before the start of this project. It is estimated that the foundations of the existing buildings are 1.0 to 1.5 meters deep. In light of these figures, the foundations of the buildings should be more than 1.5 meters deep.

Therefore, the planned foundations are direct foundations supported by the clayey layer at a depth of more than 1.5 meters. The ground water level ranges between 3.0 meters and 4.5 meters.

③ Superstructure

A reinforced concrete rigid frame structural system is employed considering the ease of its construction, the conditions of the local construction method, the local climate and the construction costs. The external walls will be of bricks in consideration of the cost and workability.

The ground floor shall be structural slab to be lifted from the ground so that it may resist humidity and termite.

④ Load and external force

• Live load

The value of live loads shall be in compliance with the provisions of the Building Standard Law of Japan. The values of live loads for the main rooms are as shown in the following table.

Table 2-6 Live Load

(Unit: kg/m²)

Rooms	Slab	Column/Girder
Examination Room	300	180
Ward (Bed Room)	180	130
Classroom	230	210
Machine Room	500	300
Store	800	600
Office	300	180

- Seismic force

Dhaka is not located in a major seismic zone, and no major earthquakes which can affect buildings have been recorded. For these reasons, there is no need to give consideration to seismic force in the structural design.

⑤ Main materials

- Concrete : $F_c=210\text{kg/cm}^2$ (4-week compressive strength)
- Reinforcing bars : SD295 $F_t=3,000\text{kg/cm}^2$
SD345 $F_t=3,500\text{kg/cm}^2$

4) Electrical Facilities plan

① Substation

Power will be received from the 11kV PDB overhead power line running along Azimpur road on the western side of the project site. The service wire laid underground within the project site will be connected to a transformer in the electrical room via a meter panel. After transformed down to 400V/230V in the electrical room, power is to be distributed via low tension panel boards. Since the 11kV PDB voltage fluctuates widely, an IVR (Induction voltage regulator) will be installed in the transformer to stabilize the voltage.

- Power receiving method: 3-phase, 3-line 11,000V 50Hz
- Low-tension power distribution method:
3-phase, 4-line 400/230V 50Hz
- Transformation capacity: 630kVA

The Bangladesh side shall be responsible for the installation of the 11kV overhead power line and the procurement and installation of the meter panel.

② Generator facility

A power generator will be installed as an emergency power source. The following equipment will be supplied power from the generator:

- Emergency lighting
- Fire extinguishing equipment, including fire hydrant pump
- Pumps
- Items of medical equipment (sterilizers, computers, etc.)
- PABX

The power generator will have a capacity of about 300kVA.

③ Power distribution equipment

Power will be supplied from the low-tension panel board to the lighting panel board and power control panel installed in the building.

④ Power of 3-phase, 4-line

Power of 3-phase, 4-line will be supplied to the air-conditioning equipment and water supply/discharge equipment.

⑤ Lighting system

a. Lighting fixtures

The main light sources will be fluorescent lamps. Lighting fixtures for the examination rooms, laboratory rooms and ward rooms will be mounted to the ceiling, while those for the operation theater will be built into the ceiling. The designed luminous intensity for each of the main rooms is as shown in the following table.

Table 2-7 Target Illumination Level

Rooms	Illumination Level (Lx)
Office	250
Examination Room	250
Treatment Room	250
Pharmacy	250
Nurse Station	200
Operation theater	700
Ward	100

The designed luminous intensity is relatively low except for operation theaters. In case necessary, desk lamps will be provided.

b. Socket outlets

Socket outlets will be installed at all relevant places as the power source for small-size portable electrical appliances.

⑥ Telephone equipment

A lead-in wire will be connected to the telephone line via a T & T C.T. box installed at the intersection of the road running on the western side of the project site and Azimpur Road. Within the project site, the lead-in wire will be laid underground from the box to the building and connected to an MDF in the office. The switchboard is to cover 10 telephone lines and 50 extension lines. The superintendent room, the Deputy Superintendent room, the Sr. Consultant room, the nurse station, and the administration office will be provided with telephone sets.

The Bangladesh side will be responsible for the installation of the telephone line (including the procurement of related equipment and materials) up the MDF.

⑦ Automatic fire alarm system

A receiving unit will be installed in the administration office so that proper evacuation instructions may be given when a fire breaks out. The standards of sensors and installation should be in compliance with the Japanese standards.

⑧ Lightning arrest system

A lightning arrest system will be installed to protect the building against lightning.

5) Air-conditioning/ventilation

Separate-type air-cooled air conditioners, which are considered the most suitable in terms of the cost of maintenance and management, will be installed. The rooms to be air-conditioned are as shown in Table 3-9.

① Design condition of temperature/humidity

a. External air temperature/humidity conditions

Dry bulb temperature : 35.1°CDB

Relative humidity : 70%

(source: Bangladesh Meteorological Dept.)

b. Design-indoor temperature/humidity conditions

Dry bulb temperature : 26°CDB

Relative humidity : -

② Air-conditioning

The operation theater which requires clean air will be air-conditioned by single duct system using an air-cooled packaged type air conditioner. However, high standard air purifying system with hepafilter will not

be provided in consideration of maintenance.

Other rooms to be air-conditioned will be provided with air-cooled separate type air conditioners.

Table 2-8 Main Center

Air conditioning system	Room
Single duct system, air-cooled package type air conditioner	Operation theater
Individual air-cooled split type air conditioner	GFL Laboratories, Ultrasonograph room, X-ray room, Dark room 1FL Delivery room, Preparation room, O.T. hall, C.S.S., Ward rooms Superintendent room, Dy. Superintendent room 2FL Infant observation room, Nurse station, Infectious ward room 3FL Meeting room

③ Ventilation equipment

In principle, the rooms will be ventilated naturally but mechanical ventilators to discharge smells and heat will be installed in some rooms. A ceiling fan will be installed in the ward.

6) Plumbing plan

① Water supply system

A water main with a diameter of 150mm is laid along Azimpur road on the western side of the project site, to which a service pipe with a diameter of 100mm will be connected. Water from the service pipe will be first stored in a reservoir tank, and then will be pumped up to an elevated water tank on the roof. Water is supplied to each facility from the elevated water tank.

② Hot water supply equipment

Hot water will be supplied to each shower by means of an electric water heater.

③ Sewerage system

A sewer pipe with a diameter of 300mm is laid along Azimpur road on the western side of the project site, into which ordinary waste water from the building will be discharged. Rainwater will be discharged into the side ditch running along Azimpur road. Sewage and waste water will be combined into the same sewage line. Both the circuit ventilation system and the stack ventilation system will be used for ventilation.

④ Sanitary equipment

Sanitary fixtures shall be of the type to match the local customs.

⑤ Kitchen equipment

Gas ranges, sinks, cooking tables and refrigerators suited for use in preparation of meals for inpatients will be installed.

⑥ Fire extinguishing equipment

Since there is no official standard for the installation of fire extinguishing equipment in Bangladesh, indoor fire extinguishing equipment shall be in compliance with the Japanese standard.

⑦ City gas supply system

A gas main with a diameter of 50mm is laid along the road running along the southern side of the project site, to which a service pipe with a diameter of 25mm will be connected.

⑧ Medical gas supply system

Oxygen and vacuum system will be provided in each of the rooms as shown in Table 2-9.

Table 2-9 Medical Gas Supply

	Room	Medical Gas	
		O ₂	V
GF	Treatment rooms	○	○
1F	Operating theater	○	○
	Delivery room	○	○
	Labor room	○	○
3F	Observation bed room	○	○
All floor	Treatment room	○	○

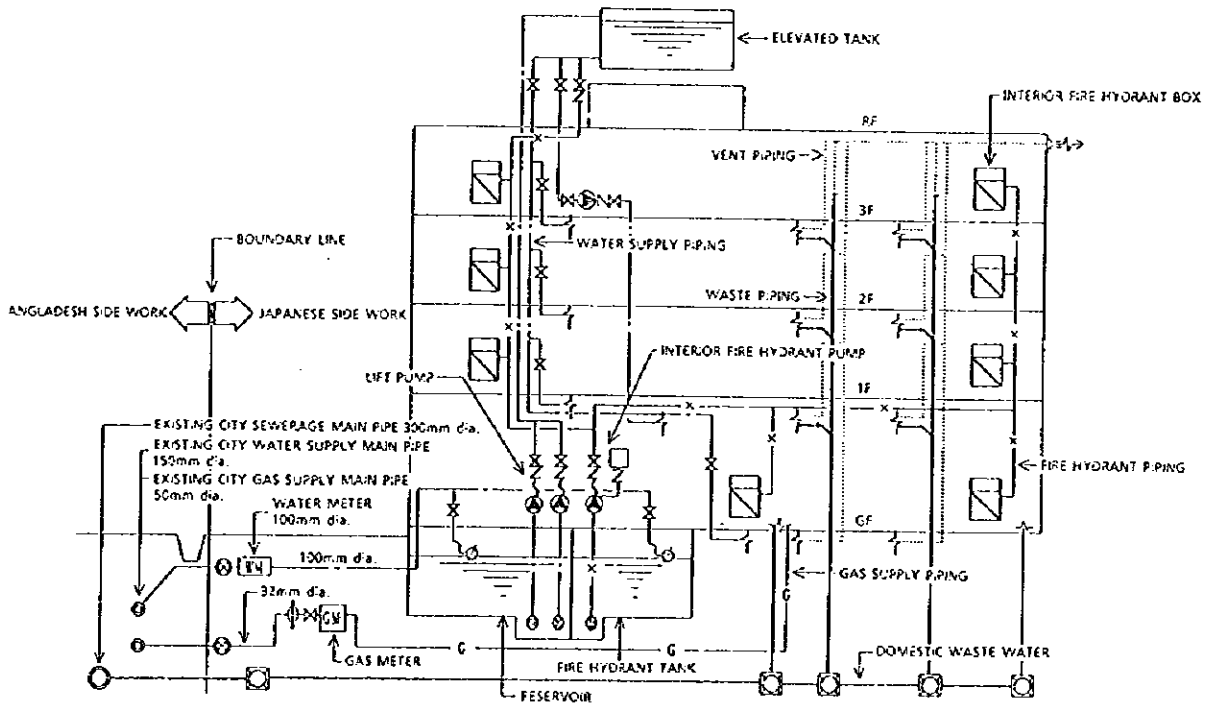


Fig. 2-6 Diagram of Water Supply, Fire Hydrant and Gas Supply System

7) Building materials plan

Building materials and construction methods shall be the ones which are widely used in Bangladesh to facilitate maintenance and management.

Table 2-10 Lists of construction materials

① Main Structural Materials

Portion	Material(s)	Remarks
Foundation, underground beam, floor slab, girder, beam	Reinforced concrete	Locally available but relatively expensive.
Exterior wall	Brick, reinforced concrete	Locally available.

② Exterior Finishing Materials

Portion	Material(s)	Remarks
Flat roof	Lime terracing	Local waterproofing method. Insulation performance is also high.
Exterior	Ceramic brick, sprayed tile	Ceramic brick is to be used since mold is inconspicuous on it. Texture paint to be applied on exposed concrete surface for prevention of mold.
Doors and windows	Aluminum window	Air tightness and durability are considered.
	Steel doors	Durability and ease of maintenance are considered.

③ Interior Finishing Materials

Room(s)	Floor	Wall	Ceiling	Remarks
Outpatient area, Office room	Terrazzo tile	Texture paint	Acoustic tile	Durability and sound absorption are considered.
O.T., Delivery room	In-situ terrazzo	Paint	Paint on calcium silicate board	Easy cleaning is considered.
Toilet, shower room, washroom	Ceramic tile	Ceramic tile	Paint on calcium silicate board	Humidity resistance is considered.

(3) Equipment Plan

Concept for selecting equipment is to strengthen basic equipment. Upon selection of equipment, consideration was made whether or not maintenance of the equipment as well as procurement of spare parts and consumables can be done in Bangladesh. Given below is an outline of the items of equipment selected for each section.

1) Outpatient section

Equipment are selected for the pharmacy, immunization, examination and treatment at the obstetrics, gynecology and pediatrics units. Selected equipment shall be basic in terms of technical level and hardness of maintenance in consideration of the grade of the existing equipment.

(Main items)

Diagnostic unit, Gynecological treatment table, Examining light, Pediatric diagnostic instrument tool, Obstetrical instrument set, Diathermy unit, Suction unit, Instrument trolley, Boiling Sterilizer chair, Height scale, Weight scale, Stethoscope, Fatal detector, Forceps, Staff's desk and chair.

2) Inpatient section

The necessary numbers of beds for the ward rooms of obstetric, gynecology and pediatric units are to be procured. The necessary number of cots for newborn babies are to be provided in the infant observation room. Gagged beds with two cranks are to be provided in the extra-charge-bed room to differentiate the rooms from free-bed rooms.

(Main items)

Patient's bed with mattress, Bedside cabinet, Storage cabinet, Film illuminator, Nurse table, Pediatric diagnostic instrument set, Obstetrical instrument set, Chart carrier, Doctor's chair, Flash light, Work table, Oxygen inhaler, Wash hand basin stand, Boiling sterilizer, Fatal detector, Instrument cabinet, Medicine refrigerator

3) Delivery/Operation Section

Basic items of equipment for use in delivery are to be procured. Range of equipment procured under this project shall cover caesarean sections

and tubectomy operation. For training purpose a delivery monitor device is included in the equipment plan. For the central sterilizing supply room, working tables, equipment shelves and washing machine will be procured.

(Main items)

Surgical instrument set, Operation table, Manual resuscitator, Shadowless light, Portable infant incubator, Suction unit for delivery, Anesthetic machine, Stretcher, Instrument trolley, Infant weighing scale, Fatal detector, Washing machine, High-pressure steam sterilizer, Work table

4) Laboratory section

Minimum necessary laboratory equipment for use in biochemical and haematological testing will be provided to function as the MCH service institute. And necessary equipment for operation of a blood bank, as well as cleaning and sterilizing equipment, are to be procured. However, in consideration of the activities conducted in MCHTI, which is not a hospital, only basic items of testing equipment are to be procured for easy maintenance. Therefore, items of laboratory equipment are limited to the testing of haemoglobin in blood, bilirubin, blood sugar, protein in urine and blood type. An item of ultrasonic diagnosis equipment shall be basic as well from the standpoint of maintenance and operation. An X-ray machine is also to be procured.

(Main items)

Colorimeter, Centrifuge, Microscope, Incubator, Water bath, Test tube stand, Water distiller, Spectrophotometer, Steam sterilizer, Blood bank refrigerator, Table for blood collection, Glass ware, Ultrasonic diagnostic unit, X-ray machine

5) Administration/Service Department

A set of cabinets, lockers, chairs, desks and the like is to be procured for this department. Personal computers with word processing and tabulating features are to be procured in order to facilitate the preparation and management of statistical data and documents. The ambulance and the microbus were deleted.

(Main items)

Storage cabinet, Locker, Doctor's chair, Doctor's table, File cabinet, Photocopier, Typewriter, Personal computer system

6) Training Department

Overhead projectors, slide projectors, TV sets and video cassette recorders are to be procured as the items of equipment for use in classroom. An epidiascope, several kinds of models for use in practical training and personal computer are added.

(Main items)

Storage cabinet, staff's chair, Staff's desk, Overhead projector, Slide projector, Video deck, TV monitor, Meeting table, Personal computer system

Shown below are the reasons for the addition and deletion of items of equipment to/from the original basic design as a result of the study for the implementation review of the project.

① Infant incubator

According to the statistics of MCHTI for 1991-96, there are about 50 premature births (within 36 weeks) and about 1,300 deliveries of babies weighing less than 2,500kg a year at MCHTI. In the past, most premature babies were taken to a nearby referral hospital. But at present, MCHTI

has settled a system to take care of premature babies unless those were born too prematurely. Therefore, necessity of additional incubators is high. At present, only one incubator is in use which was procured by MCHTI in 1994. It is used about 50 times a month. In view of the fact, it is considered appropriate to procure two additional incubators under this project. The incubators are also to be used in training.

② Photo-therapy unit

Two units of this equipment are to be procured since about 300 newborn babies are treated for jaundice a year at MCHTI. In light of the risk involved in the transportation of jaundiced newborn babies from MCHTI to nearby medical facilities where photo-therapy units are available, it is desirable that such newborn babies undergo early treatment at MCHTI. Since it usually takes three to four weeks to treat a patient, it is considered appropriate to procure two additional units of this equipment (the existing equipment is already superannuated). It will be possible to procure fluorescent tubes for use with this equipment in the country.

③ Nebulizer

The nebulizer is used not only to make it easy to remove phlegm stuck in the throat or the bronchi but also to treat respiratory diseases. In most cases, it is used to remove phlegm stuck in the throat of a newborn baby or infant who is unable to clear his or her throat. At present, a Chinese-made nebulizer, which was procured by MCHTI, is used at both outpatient and inpatient sections but is not sufficient. A total of four units of this equipment (three for use at inpatient section and one for use at outpatient section) are therefore to be procured under this project.

④ E.C.G. Machine

An E.C.G. Machine is to be procured under this project for testing of

patients who are to be put under general anaesthesia prior to undergoing tubectomy operation or caesarean section. It is desirable that E.C.G. testing be made of hypertension and complication patients even when they are to be put under local anaesthesia. It is also important to conduct an E.C.G. Machine testing of a patient who has come out of anaesthesia after the operation. The E.C.G. Machine is a new item requested by the Bangladeshi side but two physicians of MCHTI have knowledge to analyze and interpret data on the use of the equipment. There will be no problem with the cost of maintenance and operation of this equipment since expendables, such as paper and gel, cost about 10 Takas per test.

⑤ Ventilator for neonate

A ventilator is to be procured for treatment of newborn babies with disorders and premature babies who require long-term attendance. For continual supply of expendables and maintenance services, this item shall be procured from a manufacturer who has a distributor in Bangladesh. Since it will also be used for training, simulation model shall be attached.

⑥ Pulse Oximeter

The existing pulse oximeter was purchased by the Directorate of Family Planning together with an anaesthetizer. It is still used at the time of anaesthetization since no other equipment is available. As there is possibility that two surgical operations performed at the same time in two different operating theaters, an additional pulse oximeter is to be procured so that it may be used together with an anaesthetizer. To save the cost of its maintenance and operation, a reusable probe is to be procured.

⑦ X-ray Machine

Although the need to procure an X-ray machine was recognized at the time

of the original basic design, an X-ray machine was not included in this project on grounds that there was no engineer capable of operating this equipment, that the demand was not considered very high. As a result of the study for the implementation review of this project, however, it was confirmed that there has been, and will be, a significant increase in the demand for this equipment. In addition, it was decided to recruit an engineer to take charge of operation of this equipment and to charge a testing fee in an amount equal to the amount which patients pay for X-ray examinations they undergo at other medical facilities. Therefore, an X-ray machine is to be included in this project.

The main use of the X-ray machine is to presume the movement of the head of a fetus by measuring the size of mother's pelvis and thereby determine whether it is necessary to perform a caesarean section on her. It is also used to diagnose mothers' respiratory diseases such as asthma as part of testing of mothers' responses to general anaesthesia after the caesarean section. In addition, it is indispensable for early diagnosis of newborn babies' and infants' pneumonia. As regards the cost of its maintenance and operation, films cost about 15 Takas apiece and other expendables, such as development and fixing solutions, cost about 1,000 Takas a month. At present, those patients who need to be X-rayed have X-ray photos taken at nearby clinics and pay about 90 Takas for each X-ray photo. The MCHTI plans to charge about 50 Takas for each X-ray photo. It is also planned to hire a medical X-ray technician for operation of the X-ray machine.

⑧ Personal Computer and Photo Copier

The personal computer and the photo copier are indispensable for the streamlining of document management and the preparation of training materials. For this reason, a personal computer and a photo copier are

to be procured for each of the administration/service department and the training department. Since these items of equipment need periodical maintenance, they shall be the products of manufacturers who have reliable distributors in Bangladesh for their easy maintenance.

⑨ Teaching Materials for Family Planning

Phantoms for use in training in guidance on family planning, such as those for use in guidance on IUD insertion, vaginal examination and bimanual diagnosis, are to be procured. Five sets of these phantoms are to be procured so that four trainees may receive practical training simultaneously in a class of 20 trainees.

⑩ Incinerator

The conservancy department of the Municipal Corporation requires that medical waste be disposed of by each medical institution. For this reason, medical waste, including needles, is disposed of in a small primitive incinerator at MCHTI. It was decided, therefore, to procure an incinerator which can dispose all medical waste on the premises as measures against nosocomial infection and environmental disruption. The size of the incinerator should be such that it may be easy to operate and may require minimum labour and cost.

⑪ Epidiascope

The epidiascope is capable of projecting textbooks and other printed matter on the screen. It is therefore suited for lectures in which pictures and photos, as well as letters, are used. In addition to easy operation, procurement of consumables, such as halogen lamps, is easy at low costs in the country. It was decided to procure an epidiascope for the training department.

⑫ Microbus

The procurement of a microbus was included in the original basic design as a means of transportation of trainees and staff members from MCHTI to other training institutes and accommodation. As a result of the review of the original basic design, it was decided to exclude this item from the project for the reason that there is no strong need for it.

⑬ Ambulance

The procurement of an ambulance was included in the original basic design as a means of transportation of patients from MCHTI to other medical institutions. Since an ambulance was supplied by the Directorate of Family Planning in 1995, it was decided to exclude this item from the project.

⑭ Drier

Drier is not popularly used in Bangladesh. And this type of equipment requires considerable running cost. For these reasons, it was decided to exclude linen drier from the project.

Shown below are the uses of the main items of equipment to be procured under the project.

Table 2-11 Uses of the Main Items of Equipment

Item of equipment	Use
• <Medical equipment>	
• Film illuminator	Reading of X-ray photos
• X-ray machine	Diagnosis of the placenta conducted to determine the necessity of a Caesarean section, diagnosis of respiratory organs and diagnosis of a newborn baby's pneumonia
• Fatal detector	Detection of foetus heat sound
• Portable infant incubator	Transportation of a seriously ill newborn baby (baby weighing so light or premature baby) to other medical facility
• Incubator	Nursing of a premature baby who does not need to be taken to a referral hospital
• Ventilator for neonate	Helping a newborn baby with a disorder or weak premature baby to breathe normally
• Suction unit for delivery	Helping an expectant mother unable to give birth to a child because of insufficient labour or fatigue to give birth to a child
• Photo-therapy machine	Treatment of a newborn baby's jaundice (there are about 300 such cases a year at the training institute)
• Pulse oxymeter	Control of the patient's breathing at the time of anaesthesia (used together with an anaesthetizer)
• Operation table	Caesarean section or other surgical operation at the pediatrics and gynecology departments
• Delivery table	Delivery at the training departments
• Hand scrub unit	Washing of the surgeon's and the assistants' hands before a surgical operation
• Anesthetic machine	Provision of a mixture of oxygen and nitrous oxide prior to a surgical operation
• Delivery monitor	Measurement of the foetus heart rate and labour curves in the delivery room for early detection of a sudden change in the patient's condition
• High-pressure steam sterilizer	Sterilization of the operating equipment
• High speed centrifuge	Separation and refining of serums, blood cells, antigens and/or antigens from blood and urine
• Centrifuge	Pretreatment of samples
• Incubator	Cell culture and heating to promote antigen/antibody reactions
• Ultrasonic diagnostic unit	Obstetric diagnosis (number of babies, forms and sizes of prenatal babies, presentation, measurement of biparietal diameters of prenatal babies' heads, foetus heartbeat, prenatal babies' safety) and gynecological diagnosis (womb, ovary tumour, malformation, abdominal dropsy and ovulation)
• Blood bank refrigerator	Preservation of blood transfusion
<Administration/ Training equipment>	
• Personal computer	For streamlining of document management and preparation of training materials
• VCR/Monitor	Used for maternal class as well as training
• Incinerator	Disposing medical wastes

Necessary equipment for this project are listed in the following table.

Table 2-12 Equipment List

No.	Equipment	Q' ty
	<Outpatient Section>	
A-1	COLLIN Vaginal speculum (Small, Medium, Large, 1 each/set)	14 sets
A-2	CUSCOS Vaginal speculum (Small, Medium, Large, 1 each/set)	14 sets
A-3	SIMS Vaginal speculum (Small, Medium, Large, 1 each/set)	14 sets
A-4	Sponge forceps(2.7cm)	23 pcs.
A-5	Sponge container(ϕ 7.5×H5.5cm)	23 pcs.
A-6	Forceps jar(ϕ 9.0×H14.5cm)	7 pcs.
A-7	Film illuminator (For 2 films, 14"×17")	8 units
A-8	Stretcher(L1,900×W570×H800mm)	2 units
A-9	Tray (Small, Medium, Large, 1 each/set)	11 sets
A-10	Forceps (Non-tooth type)	11 pcs.
A-11	Waste receptacle(20 lit.)	16 pcs.
A-12	Head mirror (80mm dia.)	8 pcs.
A-13	Instrument trolley(W750×D450×H750mm)	15 units
A-14	Instrument tray (Small, Medium, Large, 1 each/set)	16 sets
A-15	Suction unit(200W/3,000cc)	4 units
A-16	Suction unit (750mmHg)	1 unit
A-17	Sphygmomanometer (Aneroid type)	13 pcs.
A-18	Obstetrical instrument set (Including pelvimeter)	2 sets
A-19	Oxygen inhaler(500 lit.)	2 units
A-20	Hemostatic forceps(14.5cm)	10 pcs.
A-21	Boiling sterilizer(1,000W)	8 units
A-22	Wheel chair (For adult)	1 unit
A-23	Wash hand basin stand(L350×W350×H800mm)	6 units
A-24	Manual resuscitator (Silicone made)	2 pcs.
A-25	Pediatric diagnostic instrument set (Percussion hammer, etc.)	4 sets
A-26	Sterilizing drum(ϕ 27×H18cm)	14 pcs.
A-27	Diagnostic unit (With light)	3 units
A-28	Examining table (For OBS/GYN)	5 units
A-29	Gynecological treatment table (Bench type)	9 units
A-30	Examining light (Single bulb)	9 units
A-31	Height scale(1,000-2,000mm)	7 units
A-32	Tongue depressor (Brass made)	6 pcs.
A-33	Thermometer tray (With thermometer)	8 sets
A-34	Weighing scale(10-100Kg)	8 units
A-35	Stethoscope (For doctor)	13 pcs.
A-36	Fatal detector (Doppler method type)	5 units

No.	Equipment	Q' ty
A-37	Irrigator stand (With casters)	5 units
A-38	Diathermy unit (For GYN)	2 units
A-39	Emesis basin (Small, Medium, Large, 1 each/set)	32 sets
A-40	Dressing jar(ϕ 360×H240mm)	2 pcs.
A-41	Cotton jar(ϕ 180×H200mm)	9 pcs.
A-42	Medicine cabinet(W1,100×D600×H1,700mm)	5 units
A-43	Medicine refrigerator (A)(160 lit.)	1 unit
A-44	Medicine refrigerator (B)(350 lit.)	1 unit
A-45	Table for audio visual equipment(W700×D300×H800mm)	1 unit
A-46	File cabinet(W450×D600×H1,500mm)	2 units
A-47	Locker (For 1 person)	1 unit
A-48	Doctor's chair (Steel/resin made)	12 units
A-49	Doctor's desk (Steel/resin made, W1,100×D700×H700mm)	12 units
A-50	Patient's stool (Steel/resin made)	18 units
A-51	Instrument cabinet(W1,100×D600×H1,700mm)	4 units
A-52	Work table for lecture(W1,800×D900×H700mm)	1 unit
A-53	Bench for participants(W1,700×D550×H710mm)	20 units
A-54	Notice board (Cork face)	3 units
A-55	Lecturer's desk and chair (Steel/resin)	1 set
A-56	Blackboard (A) (Wall mount type)	1 unit
A-57	Blackboard (B) (With casters)	1 unit
A-58	Work table(W1,800×D900×H700mm)	9 units
A-59	Storage cabinet (A) (W1,000×D600×H1,700mm)	2 units
A-60	Staff's chair(W460×D550×H750/850mm)	7 units
A-61	Staff's desk(W1,200×D700×H700mm)	7 units
A-62	Bench(W1,500×D610×H660/380mm)	50 units
A-63	Step(Single step, W270×L370×H180mm)	5 units
A-64	Bookshelf(W880×D400×H1,850mm)	1 unit
A-65	Visitor's chair(W650×D540×H750mm)	2 units
A-66	Sink unit(W940×D750×H800mm)	16 units
A-67	Overhead projector(A4 size, 650W)	1 unit
A-68	Screen (Ceiling type)	1 unit
A-69	Slide projector(24V, 250W)	1 unit
A-70	Video deck (Multi system)	1 unit
A-71	TV Monitor (29 inch)	1 unit
A-72	Blackout curtain (Narrow type)	6 sets
A-73	Flash light (Krypton bulb)	8 pcs.
A-74	Cloth basket(W500×D300×H700mm)	13 pcs.

No.	Equipment	Q' ty
A-75	Wall clock (A) (Battery operated type)	13 units
A-76	Nebulizer (Ultra sonic type)	1 unit
A-77	E.C.G. machine (Single channel)	1 unit
	<Laboratory Section>	
B-1	Glass ware (Cover glass, beaker, test tube, etc.)	2 sets
B-2	Colorimeter (Direct reading method)	1 unit
B-3	Hemoglobin meter (Cyanogen hemoglobin method)	2 units
B-4	High speed centrifuge (Floor type)	1 unit
B-5	Centrifuge (Table-top type)	1 unit
B-6	Hematocrit centrifuge (For capillary tube)	1 unit
B-7	Waste receptacle (20 lit.)	2 pcs.
B-8	Precision balances (3,000g~0.1mg)	4 units
B-9	Blood bank refrigerator (-5°C~10°C)	1 unit
B-10	Microscope (4X/10X/40X/100X)	4 units
B-11	Incubator (37±1°C)	1 unit
B-12	Water bath (+5°C~99°C)	2 units
B-13	Table for blood collection (Stainless steel made)	2 units
B-14	Test tube stand (Stainless steel made)	4 units
B-15	Pipette washer (Water pressure method)	2 units
B-16	Water distiller (10 lit./hour)	1 unit
B-17	Gynecological treatment table (Bench type)	3 units
B-18	Ultrasonic diagnostic unit (Linear, convex scanning method)	2 units
B-19	Titolator (Glass made)	2 pcs.
B-20	Standard hemometer, Sahli (Manual operation type)	2 sets
B-21	Spectrophotometer (Manual operation type)	2 units
B-22	Medicine refrigerator (B) (350 lit.)	2 units
B-23	Steam sterilizer (Vertical type)	1 unit
B-24	Doctor's chair (Steel/resin made)	2 units
B-25	Doctor's desk (Steel/resin made, W1,100×D700×H700mm)	2 units
B-26	Patient's stool (Steel/resin made)	2 units
B-27	Stool (Steel/resin made)	13 units
B-28	Work desk (W1,800×D900×H700mm)	2 units
B-29	Equipment table (W1,600×D900×H700mm)	11 units
B-30	Laboratory table (Island type, W2,400×D1,500×H800mm)	1 unit
B-31	Sink unit (W940×D750×H800mm)	3 units
B-32	Cloth basket (W500×D300×H700mm)	3 units
B-33	Wall clock (Battery operated)	3 units

No.	Equipment	Q'ty
B-34	X-ray machine (500mA, conventional type)	1 unit
B-35	Dark room set (Developing vat, darkroom lamp, etc.)	1 set
	<Administration/Service Department>	
C-1	Sofa set (Sofa, arm chair, center table)	2 sets
C-2	File cabinet (W450×D600×H1,500mm)	3 units
C-3	Locker (For 1 person)	7 units
C-4	Wire shelf (W900×D600×H1,800mm)	11 units
C-5	Doctor's chair (Steel/resin made)	3 units
C-6	Doctor's desk (Steel/resin made, W1,100×D700×H700mm)	3 units
C-7	Reading chair (Steel/resin made)	20 units
C-8	Reading table (Steel/resin made, W1,800×D900×H700mm)	5 units
C-9	Officer's chair (Steel/resin made)	3 units
C-10	Officer's desk (W1,200×D700×H700mm)	3 units
C-11	Stool (Steel/resin made)	7 units
C-12	Work desk (W1,800×D900×H700mm)	6 units
C-13	Storage cabinet (A) (W1,000×D600×H1,700mm)	2 units
C-14	Storage cabinet (B) (W1,760×D400×H1,850mm)	19 units
C-15	File cabinet (W900×D450×H1,800mm)	7 units
C-16	Senior officer's chair (W725×D680×H1,140mm)	2 units
C-17	Senior officer's desk (W1,800×D800×H700mm)	2 units
C-18	Staff's chair (W460×D550×H750/850mm)	19 units
C-19	Staff's desk (W1,200×D700×H700mm)	19 units
C-20	Visitor's chair (W650×D540×H750mm)	18 units
C-21	Typewriter (Bengali)	1 unit
C-22	Typewriter (English)	1 unit
C-23	Personal computer system (16MB RAM, Hard disk 500MB, with Printer)	1 set
C-24	Photocopier (Max. size, A3)	1 unit
C-25	Linen cart (W900×D600×H730mm)	2 units
C-26	Washing machine (Capacity, 3.5Kg)	2 units
	<Medical Staff Section>	
D-1	Sofa set (Sofa, arm chair, center table)	1 set
D-2	Locker (For 1 person)	5 units
D-3	Locker (For 2 persons)	2 units
D-4	Reading chair (Steel/resin made)	16 units
D-5	Reading table (Steel/resin made, W1,800×D900×H700mm)	4 units
D-6	Meeting chair (Steel/resin made)	20 units

No.	Equipment	Q' ty
D-7	Meeting table(W1,500×D800×H700mm)	3 units
D-8	Officer's chair (Steel/resin made)	9 units
D-9	Officer's desk(W1,200×D700×H700mm)	9 units
D-10	Storage shelf(W1,100×D600×H1,700mm)	14 units
D-11	Book stack(W940×D360×H1,970mm)	7 units
D-12	Book self(W880×D400×H1,850mm)	14 units
D-13	Visitor's chair(W650×D540×H750mm)	18 units
	<Delivery/operation Section>	
E-1	Sponge forceps(2.7cm)	4 pcs.
E-2	Sponge container(φ7.5×H5.5cm)	4 pcs.
E-3	Catheter tray (Small, Medium, Large, 1 each/set)	4 sets
E-4	Forceps jar(φ9.0×H14.5cm)	1 pc.
E-5	Film illuminator (For 2 films, 14"×17")	3 units
E-6	Stretcher(L1,900×W570×H800mm)	2 units
E-7	Chart carrier (W950×D320×H970mm)	1 unit
E-8	Tray (Small, Medium, Large, 1 each/set)	1 set
E-9	Forceps (Non-tooth type)	1 pc.
E-10	Waste receptacle(20 lit.)	9 units
E-11	Surgical instrument set (Including caesarean operation)	6 sets
E-12	Instrument trolley(W750×D450×H750mm)	11 units
E-13	Instrument cabinet (Built-in type)	2 units
E-14	Instrument tray (Small, Medium, Large, 1 each/set)	8 sets
E-15	Storage rack(W900×D360×H1,700mm)	3 units
E-16	Suction unit(200W/3,000cc)	4 units
E-17	Suction unit (750mmHg)	1 unit
E-18	Sphygmomanometer(0-300mmHg)	10 units
E-19	High-pressure steam sterilizer (With steam generator)	2 units
E-20	Obstetrical instrument set (Including pelvimeter)	2 sets
E-21	Oxygen inhaler(500 lit.)	7 units
E-22	Hemostatic forceps(14.5cm)	8 pcs.
E-23	Boiling sterilizer(1,000W)	3 units
E-24	Wheel chair (For adult)	1 unit
E-25	Wheel chair (For child)	2 units
E-26	Operation table (Manual drive)	2 units
E-27	Operation chair (For operator)	4 units
E-28	Wash hand basin stand(L350×W350×H800mm)	1 unit
E-29	Hand scrub unit (For 1 person)	2 units

No.	Equipment	Q'ty
E-30	Manual resuscitator (Silicone made)	3 units
E-31	Pediatric surgical instrument set (Including sterilizing container)	4 sets
E-32	Sterilizing drum($\phi 27 \times H18cm$)	25 pcs.
E-33	Infant weighing scale(Max. 20Kg)	2 units
E-34	Thermometer tray (With thermometer)	2 sets
E-35	Weighing scale(10-100Kg)	1 unit
E-36	Stethoscope (For doctor)	8 pcs.
E-37	Fatal detector (Doppler method type)	1 unit
E-38	Irrigator stand (With casters)	9 units
E-39	Urine bottle rack(W1,100 \times D300 \times H1,400mm)	1 unit
E-40	Emesis basin (Small, Medium, Large, 1 each/set)	11 sets
E-41	Portable infant incubator (With oxygen cylinder)	2 units
E-42	Delivery monitor (2 channels, Doppler)	1 unit
E-43	Suction unit for delivery(750mmHg)	2 units
E-44	Delivery instrument set (Obstetric forceps, etc.)	3 sets
E-45	Delivery table (Manual drive)	4 units
E-46	Anesthetic machine (With halothane vaporizer)	2 units
E-47	Shadowless light (4 bulbs)	6 units
E-48	Dressing jar($\phi 360 \times H240mm$)	10 pcs.
E-49	Cotton jar($\phi 180 \times H200mm$)	16 pcs.
E-50	Medicine cabinet(W1,100 \times D600 \times H1,700mm)	1 unit
E-51	Medicine refrigerator (A)(160 lit.)	2 units
E-52	Nurse table(W1,800 \times D900 \times H700mm)	2 units
E-53	Nurse chair(Steel made)	2 units
E-54	Locker (For 1 person)	2 units
E-55	Locker (For 6 persons)	4 units
E-56	Patient's bed with mattress(W1,100 \times L2,000 \times H600/1,200mm)	6 sets
E-57	Bedside cabinet(W460 \times D470 \times H700mm)	6 units
E-58	Stool (Steel/resin made)	1 unit
E-59	Instrument cabinet(W1,100 \times D600 \times H1,700mm)	9 units
E-60	Work table(W1,800 \times D900 \times H700mm)	10 units
E-61	Work desk(W1,800 \times D900 \times H700mm)	5 units
E-62	Storage shelf(W1,100 \times D600 \times H1,700mm)	3 units
E-63	Storage cabinet (B)(W1,760 \times D400 \times H1,850mm)	1 unit
E-64	Duty's bed(W1,970 \times D930 \times H700mm)	1 unit
E-65	File cabinet(W900 \times D450 \times H1,800mm)	1 unit
E-66	Staff's chair(W460 \times D550 \times H750/850mm)	1 unit
E-67	Staff's desk(W1,200 \times D700 \times H700mm)	1 unit

No.	Equipment	Q' ty
E-68	Step (Single step, W270×L370×H180mm)	6 units
E-69	Visitor's chair(W650×D540×H750mm)	2 units
E-70	Sink unit(W940×D750×H800mm)	4 units
E-71	Bathing tub(W800×D750×H200mm)	1 unit
E-72	Sink unit for bathing(W800×D750×H800mm)	1 unit
E-73	Linen cart(W900×D600×H730mm)	2 units
E-74	Flash light (Krypton bulb)	2 pcs.
E-75	Ice cube machine(25Kg/day)	1 unit
E-76	Washing machine (Capacity, 3.5Kg)	2 units
E-77	Wall clock (A)(Battery operated type)	3 units
E-78	Wall clock (B) (For operation theater)	2 units
E-79	Nebulizer (Ultra sonic type)	3 units
E-80	Pulse oxymeter (indirect method)	1 unit
	<Inpatient Section>	
F-1	Sponge forceps(2.7cm)	12 pcs.
F-2	Sponge container(φ7.5×H5.5cm)	12 pcs.
F-3	Chart cabinet(W950×D600×H2,100mm)	30 units
F-4	Forceps jar(φ9.0×H14.5cm)	6 pcs.
F-5	Gadged bed with mattress (2-crank type)	20 sets
F-6	Film illuminator (For 2 films, 14"×17")	2 units
F-7	Chart carrier (W950×D320×H970mm)	2 units
F-8	Tray (Small, Medium, Large, 1 each/set)	2 sets
F-9	Forceps (Non-tooth type)	2 pcs.
F-10	Waste receptacle(20 lit.)	2 units
F-11	Instrument trolley(W750×D450×H750mm)	1 unit
F-12	Instrument tray (Small, Medium, Large, 1 each/set)	4 sets
F-13	Suction unit(200W/3,000cc)	2 units
F-14	Sphygmomanometer(0-300mmHg)	8 units
F-15	Obstetrical instrument set (Including pelvimeter)	4 sets
F-16	Oxygen inhaler(500 lit.)	4 units
F-17	Hemostatic forceps(14.5cm)	4 pcs.
F-18	Boiling sterilizer(1,000W)	2 units
F-19	Wheel chair (For adult)	2 units
F-20	Wash hand basin stand(L350×W350×H800mm)	2 units
F-21	Pediatric diagnostic instrument set (Including percussion hammer)	2 sets
F-22	Sterilizing drum(φ27×H18cm)	4 pcs.
F-23	Gynecological treatment table (Bench type)	2 units

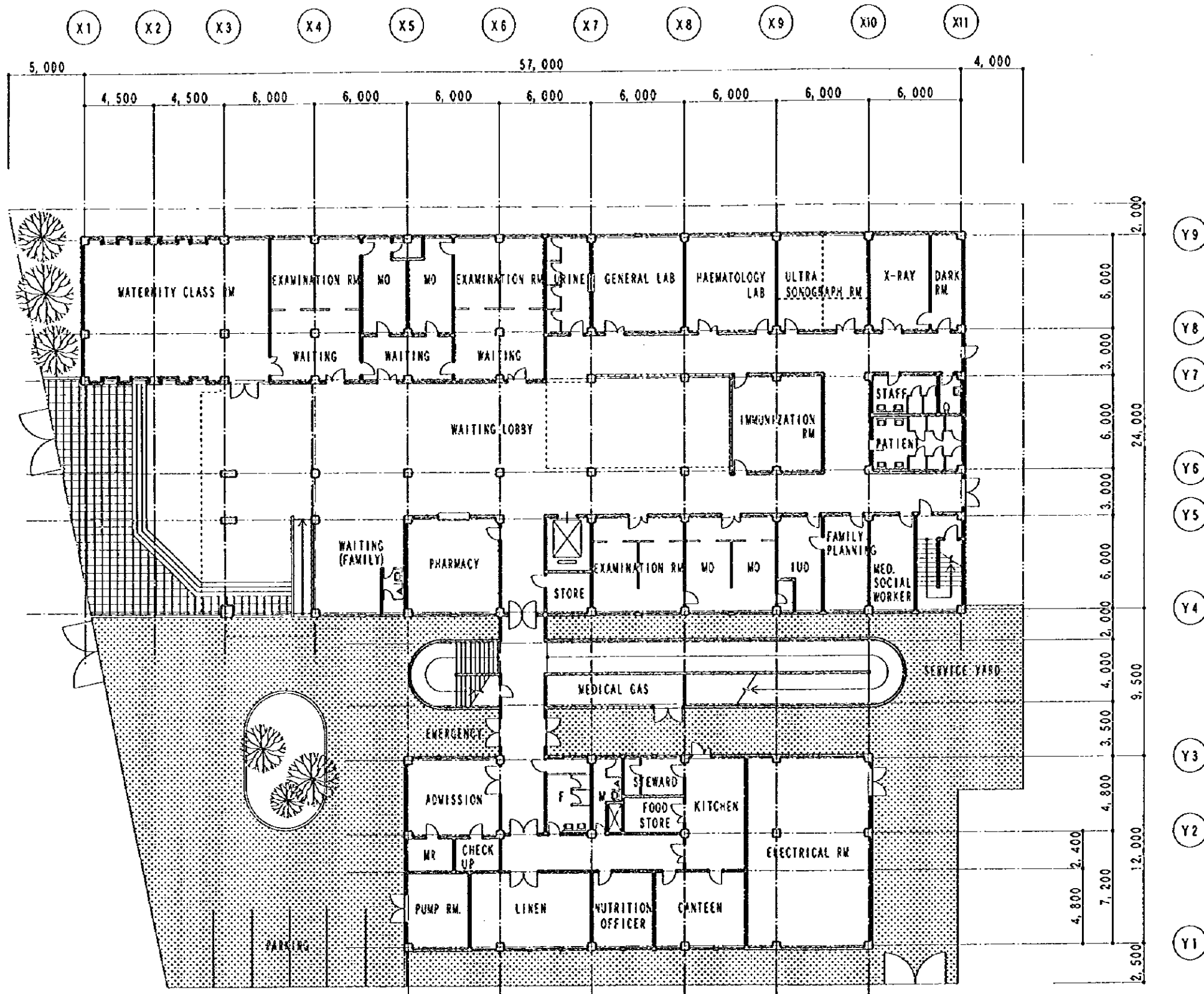
No.	Equipment	Q' ty
F-24	Thermometer tray (With thermometer)	4 sets
F-25	Weighing scale(10-100Kg)	2 units
F-26	Stethoscope (For doctor)	8 pcs.
F-27	Fatal detector (Doppler method type)	2 units
F-28	Irrigator stand (With casters)	10 units
F-29	Urine bottle rack(W1,100×D300×H1,400mm)	3 units
F-30	Emesis basin (Small, Medium, Large, 1 each/set)	10 sets
F-31	Cotton jar(φ180×H200mm)	8 pcs.
F-32	Medicine cabinet(W1,100×D600×H1,700mm)	2 units
F-33	Medicine refrigerator (A)(160 lit.)	2 units
F-34	Nurse table(W1,800×D900×H700mm)	6 units
F-35	Nurse chair (Steel made)	14 units
F-36	Locker (For 2 persons)	1 unit
F-37	Locker (For 4 persons)	4 units
F-38	Locker (For 6 persons)	1 unit
F-39	Wire shelf(W900×D600×H1,800mm)	30 units
F-40	Doctor's chair (Steel/resin made)	2 units
F-41	Doctor's desk (Steel/resin made, W1,100×D700×H700mm)	2 units
F-42	Meeting chair (Steel/resin made)	13 units
F-43	Meeting table(W1,500×D800×H700mm)	2 units
F-44	Patient's bed with mattress(W1,100×L2,000×H600/1,200mm)	127 sets
F-45	Bedside cabinet (W460×D470×H700mm)	147 units
F-46	Instrument cabinet (W1,100×D600×H1,700mm)	3 units
F-47	Work table(W1,800×D900×H700mm)	9 units
F-48	Storage cabinet (A) (W1,000×D600×H1,700mm)	3 units
F-49	Duty's bed(W1,970×D930×H700mm)	3 units
F-50	Staff's chair(W460×D550×H750/850mm)	2 units
F-51	Staff's desk(W1,200×D700×H700mm)	2 units
F-52	Infant bed with mattress(W800×D430×H850mm)	16 sets
F-53	Bench(W1,500×D610×H660/380mm)	24 units
F-54	Book self(W880×D400×H1,850mm)	2 units
F-55	Sink unit(W940×D750×H800mm)	3 units
F-56	Typewriter (Bengali)	1 unit
F-57	Typewriter (English)	1 unit
F-58	Linen cart(W900×D600×H730mm)	7 units
F-59	Flash light (Krypton bulb)	6 pcs.
F-60	Ice cube machine(25Kg/day)	2 units
F-61	Wall clock (A)(Battery operated type)	3 units

No.	Equipment	Q' ty
F-62	Incubator (For infant)	2 units
F-63	Photo-therapy machine (With aggregative indicator)	2 units
F-64	Ventilator for neonate (With ventilator and safety device)	1 unit
	<Training Department>	
G-1	COLLIN Vaginal speculum (Small, Medium, Large, 1 each/set)	1 set
G-2	CUSCOS Vaginal speculum (Small, Medium, Large, 1 each/set)	1 set
G-3	SIMS Vaginal speculum (Small, Medium, Large, 1 each/set)	1 set
G-4	Sponge forceps(2.7cm)	1 pc.
G-5	Sponge container(ϕ 7.5×H5.5cm)	1 pc.
G-6	Film illuminator (For 2 films, 14"×17")	1 unit
G-7	Tray (Small, Medium, Large, 1 each/set)	1 set
G-8	Forceps (Non-tooth type)	1 pc.
G-9	Head mirror (80mm dia.)	1 pc.
G-10	Instrument trolley(W750×D450×H750mm)	1 unit
G-11	Sphygmomanometer(0-300mmHg)	5 units
G-12	Sphygmomanometer (Aneroid type)	5 units
G-13	Obstetrical instrument set (Including pelvimeter)	1 set
G-14	Oxygen inhaler(500 lit.)	1 unit
G-15	Hemostatic forceps(14.5cm)	2 pcs.
G-16	Practical human body model (Adult)	1 unit
G-17	Practical pregnant model (Birth process)	1 unit
G-18	Wash hand basin stand(L350×W350×H800mm)	1 unit
G-19	Manual resuscitator (Silicone made)	1 pc.
G-20	Sterilizing drum(ϕ 27×H18cm)	1 pc.
G-21	Thermometer tray (With thermometer)	1 set
G-22	Weighing scale(10-100Kg)	1 unit
G-23	Stethoscope (For doctor)	5 pcs.
G-24	Fatal detector (Doppler method type)	1 unit
G-25	Irrigator stand (With casters)	1 unit
G-26	Pregnancy model (Childbirth simulator)	1 unit
G-27	Emesis basin (Small, Medium, Large, 1 each/set)	1 set
G-28	Delivery monitor (2 channels, Doppler)	1 unit
G-29	Delivery table (Manual drive)	1 unit
G-30	Cotton jar(ϕ 180×H200mm)	1 pc.
G-31	Table for audio visual equipment(W700×D300×H800mm)	1 unit
G-32	Locker (For 1 person)	2 units
G-33	Wire shelf(W900×D600×H1,800mm)	12 units

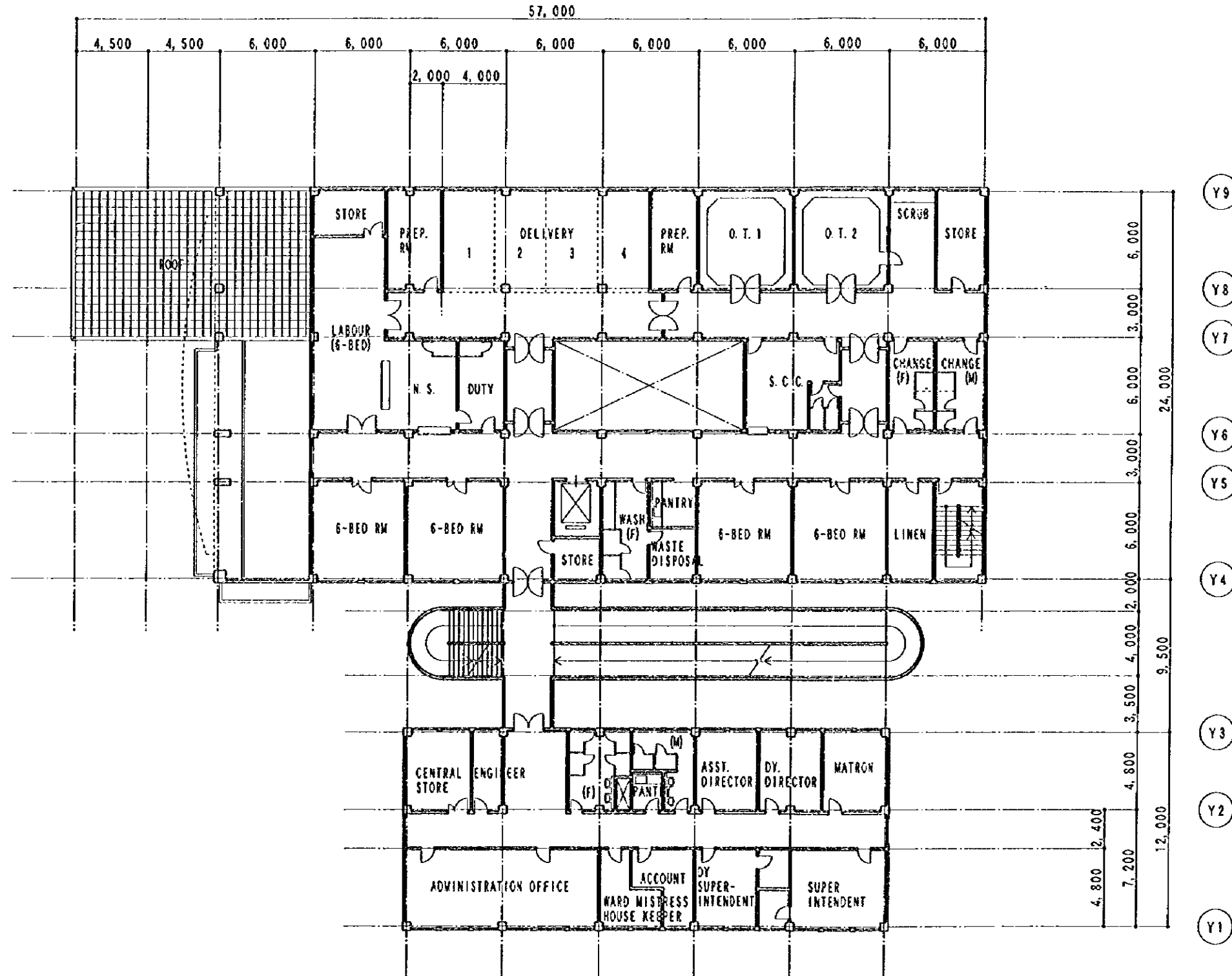
No.	Equipment	Q' ty
G-34	Trainee's chair with board (Steel/resin made)	20 units
G-35	Meeting chair (Steel/resin made)	13 units
G-36	Meeting table(W1,500×D800×H700mm)	2 units
G-37	Notice board (Cork face)	4 units
G-38	Lecturer's chair (Steel/resin made)	3 units
G-39	Lecturer's desk(W1,000×D500×H700mm)	3 units
G-40	Blackboard (A) (Wall mount type)	3 units
G-41	Blackboard (B) (With casters)	3 units
G-42	Storage cabinet (B)(W1,760×D400×H1,850mm)	2 units
G-43	File cabinet(W900×D450×H1,800mm)	2 units
G-44	Staff's chair(W460×D550×H750/850mm)	2 units
G-45	Staff's desk(W1200×D700×H700mm)	2 units
G-46	Visitor's chair(W650×D540×H750mm)	4 units
G-47	Overhead projector (A4 size, 650W)	1 unit
G-48	Screen (Ceiling type)	1 unit
G-49	Slide projector(24V, 250W)	1 unit
G-50	Personal computer system(16MB RAM, Hard disk 500MB, with Printer)	1 set
G-51	Video deck (Multi system)	1 unit
G-52	Photocopier (Max. A3 size)	1 unit
G-53	TV monitor (29 inch)	1 unit
G-54	Blackout curtain (Narrow type)	2 sets
G-55	Blackout curtain (Wide type)	2 sets
G-56	Teaching materials for family planning (Training for introducing IUD)	5 sets
G-57	Epidiascope (Stage size, 280×280mm)	1 unit
G-58	Simulation doll for intubation (Silicone made)	1 unit
	<Others>	
H-1	Carrying cart (Hand cart)	2 units
H-2	Serving wagon(1,200×600×900mm)	6 units
H-3	Incinerator(Capacity, 60Kg/hour)	1 unit

(4) Basic Design Drawings

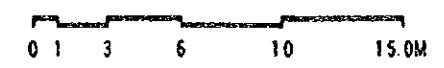
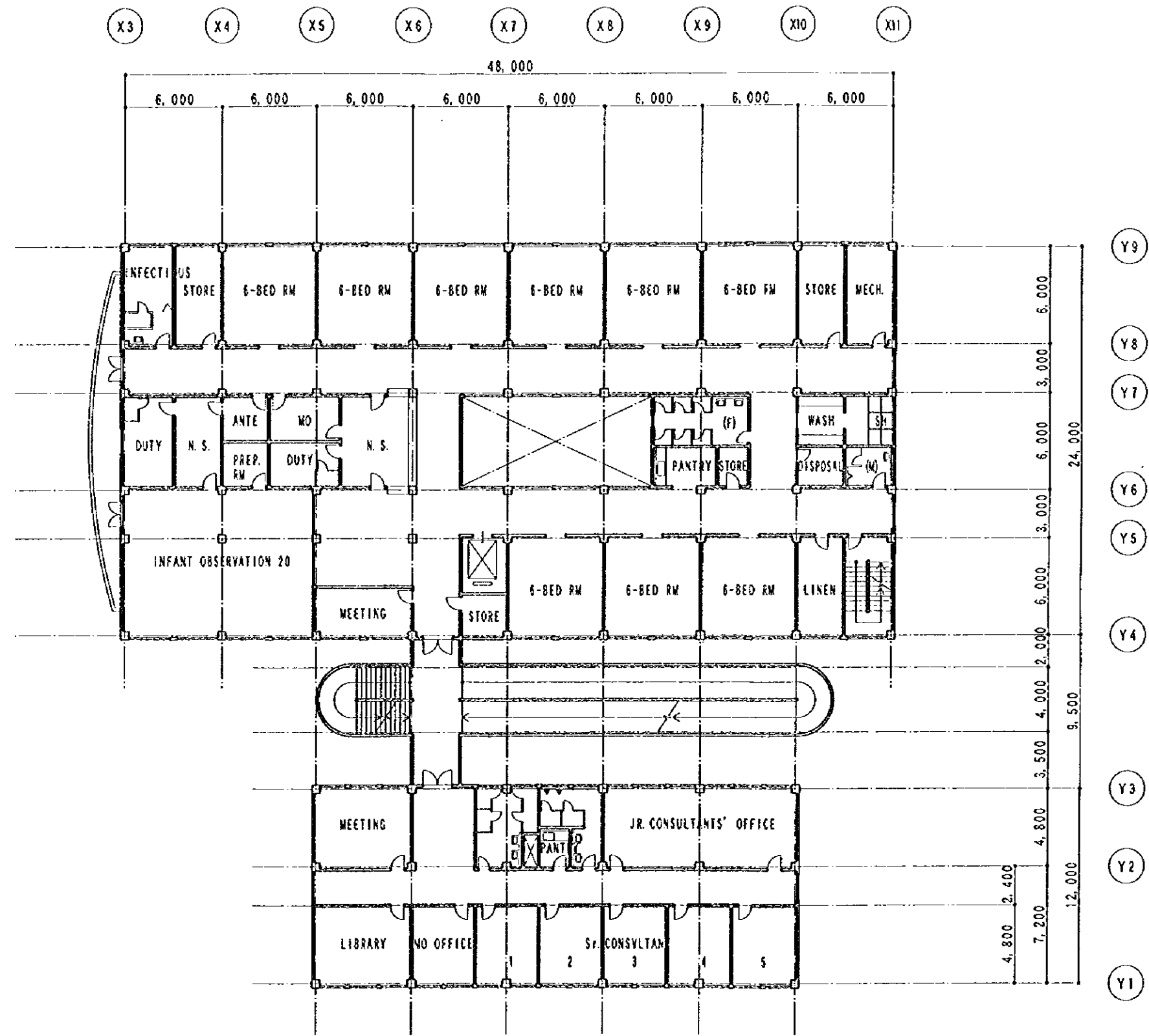
1. Ground Floor Plan	1:300
2. First Floor Plan	1:300
3. Second Floor Plan	1:300
4. Third Floor Plan	1:300
5. Elevation	1:300
6. Elevation Section	1:300

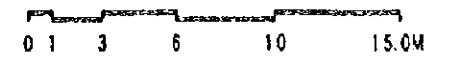
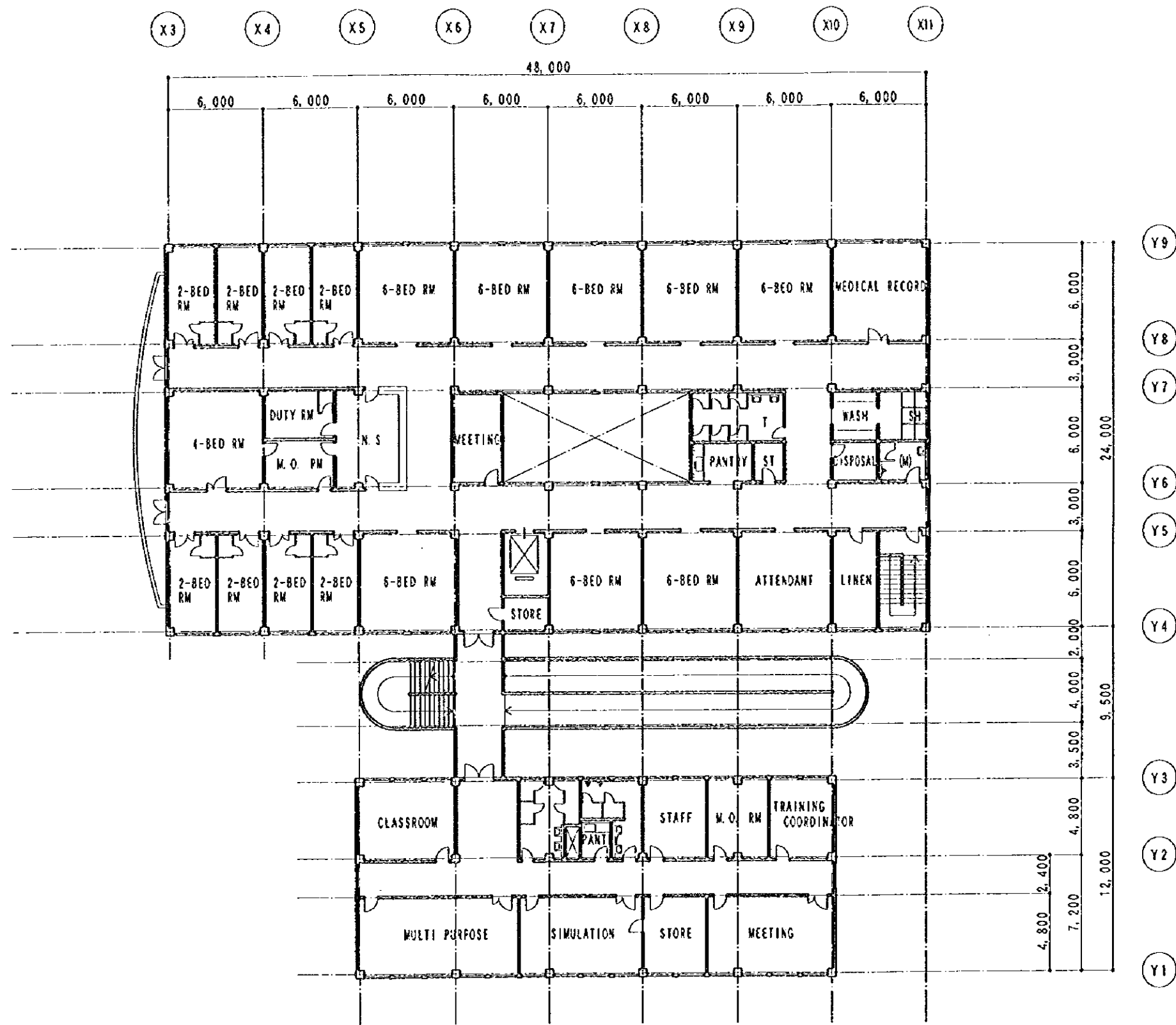


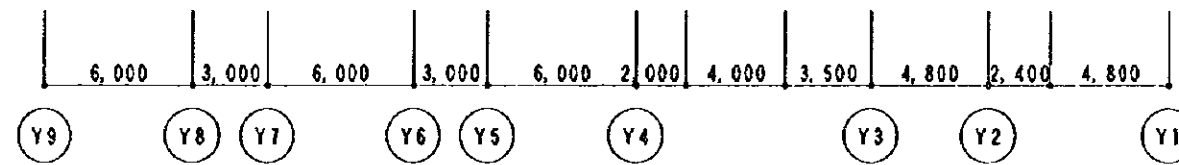
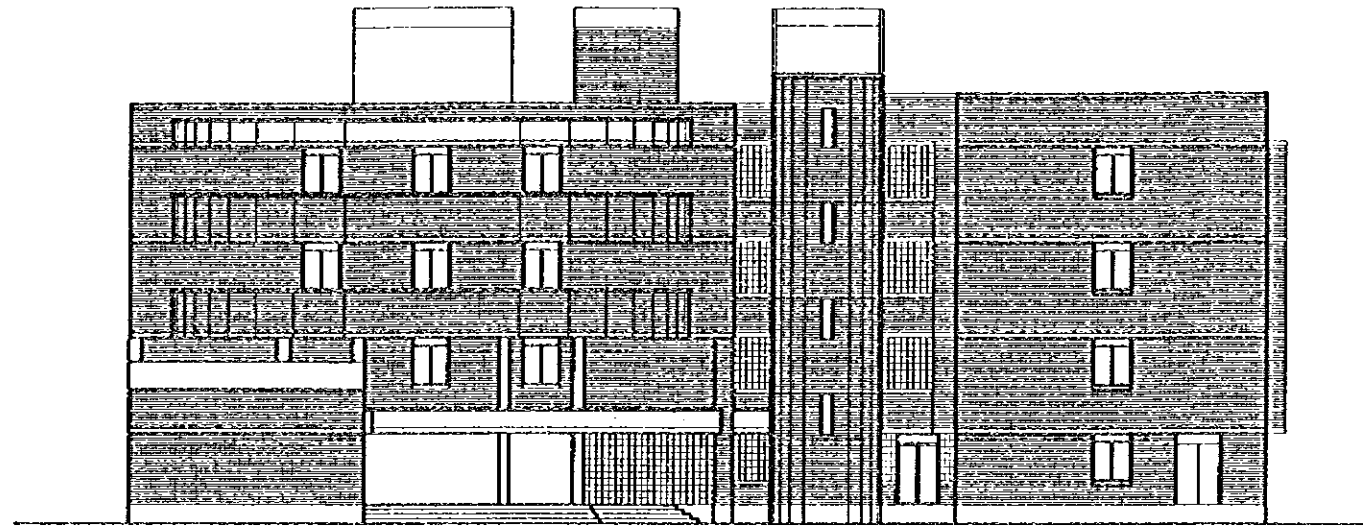
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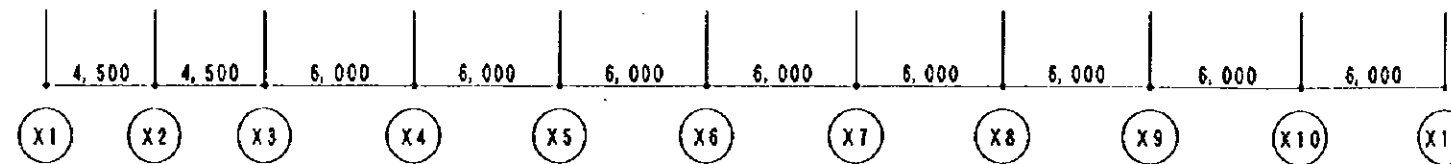
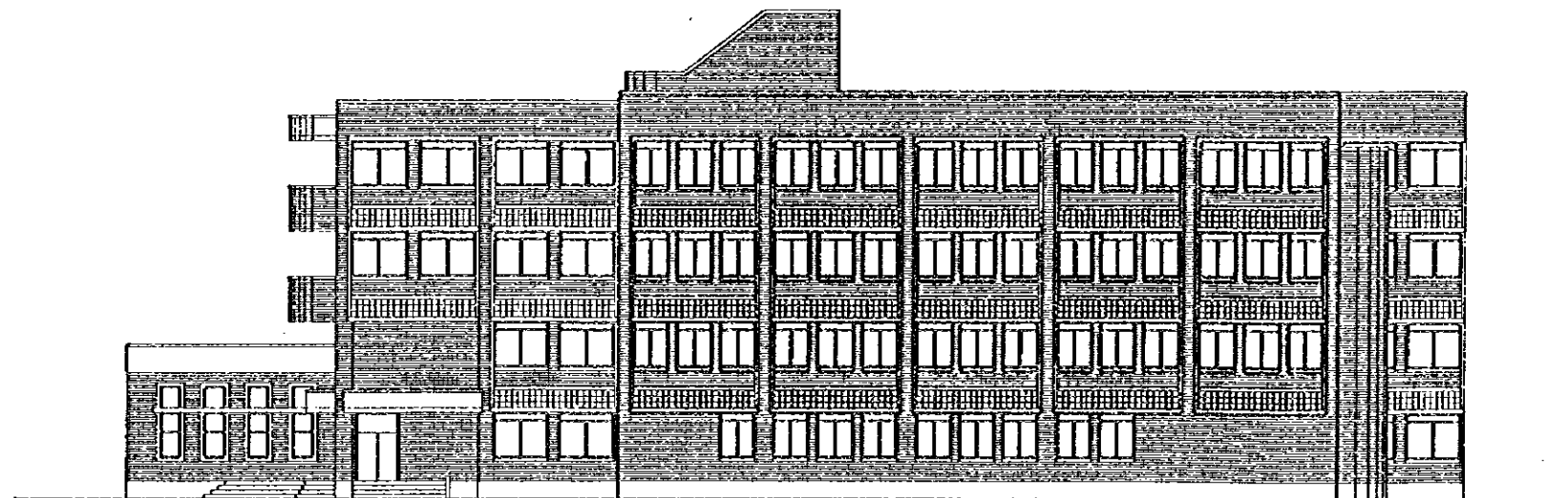
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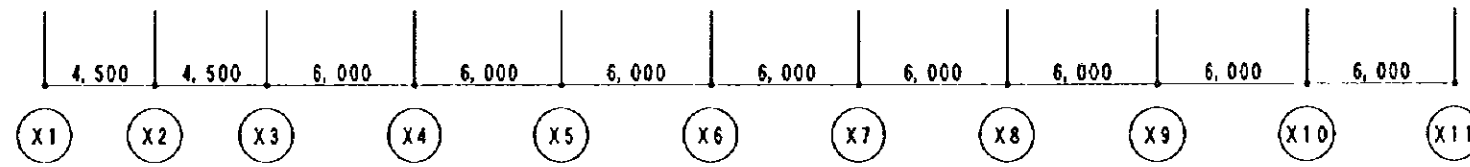
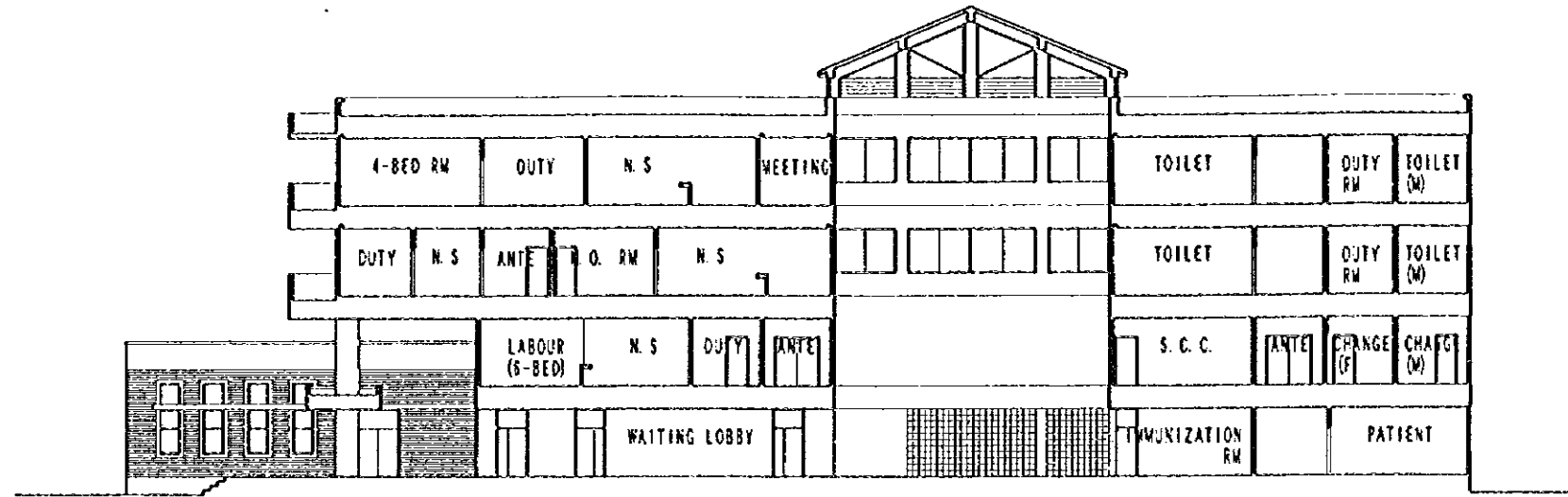


WEST ELEVATION

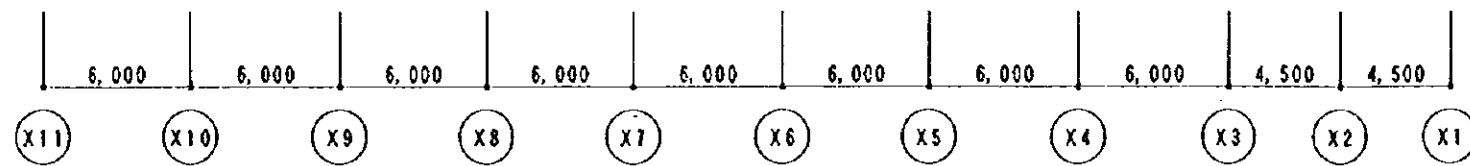
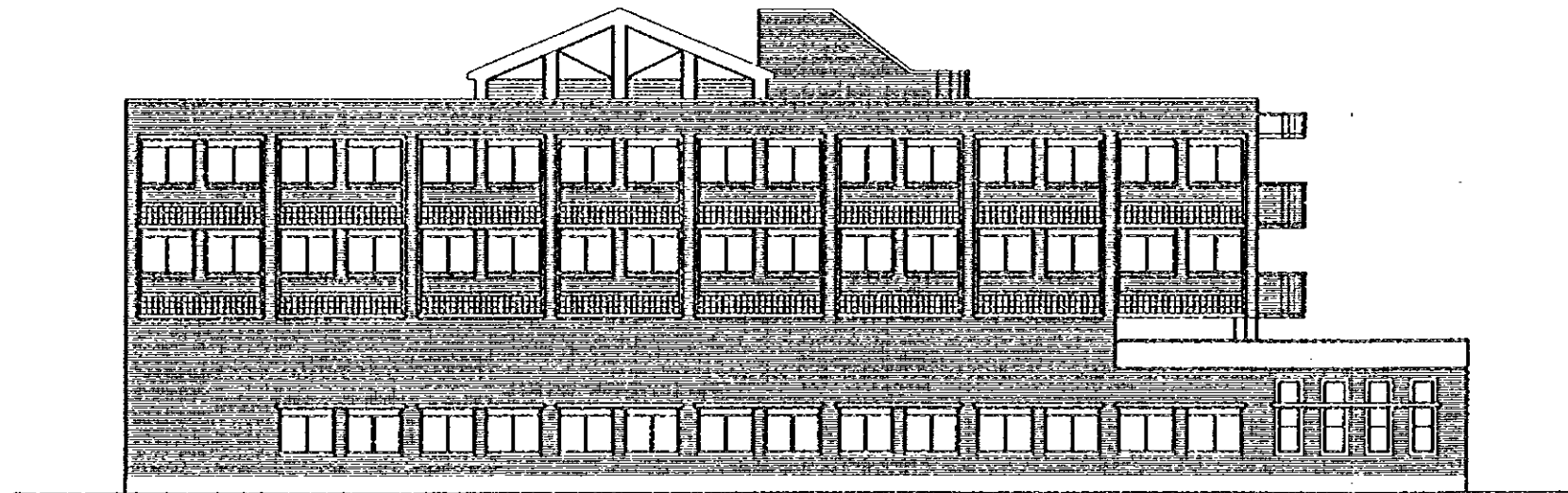


SOUTH ELEVATION





SECTION



NORTH ELEVATION

