

Ministry of Health
The Islamic Republic of Pakistan

No. |

Basic Design Study Report
on
The Project for The Establishment
of
Maternal and Child Health Centre
in
The Islamic Republic of Pakistan

March 1996

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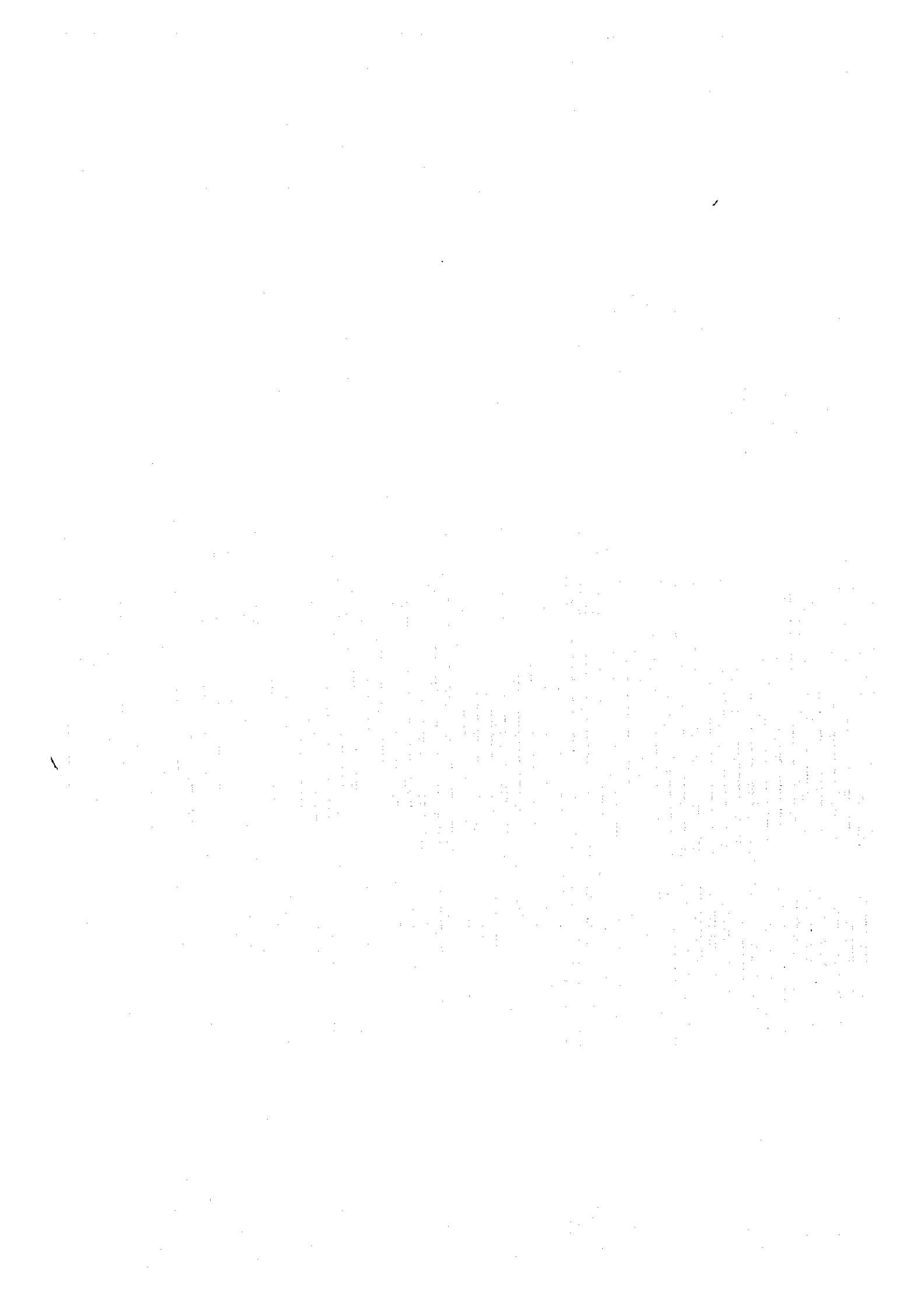
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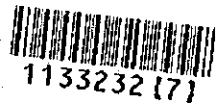
NIHON SEKKEI, INC.

Basic Design Study Report on The Project for The Establishment of Maternal and Child Health Centre in The Islamic Republic of Pakistan

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PREFACE

In response to a request from the Government the Islamic Republic of Pakistan the Government of Japan decided to conduct a basic design study on the Project for the Establishment of Maternal and Child Health Centre and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Pakistan a study team from December 4, 1995 to January 12, 1996.

The team held discussions with the officials concerned of the Government of Pakistan, and conducted a field study at the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to Pakistan in order to discuss a draft basic design, 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 Islamic Republic of Pakistan for their close cooperation extended to the teams.

March 1996



Kimio Fujita
President
Japan International Cooperation Agency

March 1996

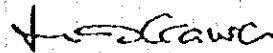
Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for the Establishment of Maternal and Child Health Centre in the Islamic Republic of Pakistan.

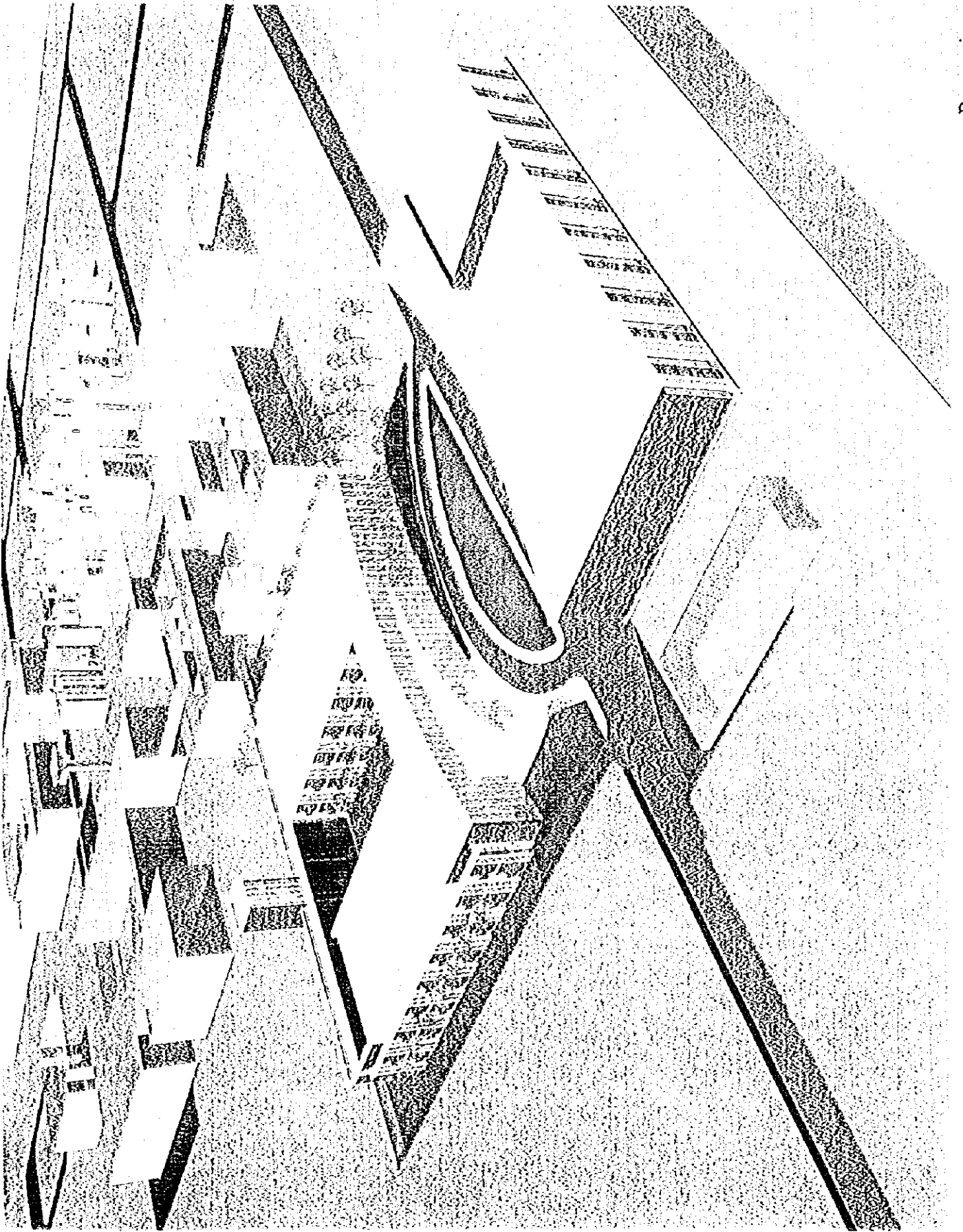
This study was conducted by Nihon Sekkei, Inc., under a contract to JICA, during the period from November 28, 1995 to March 29, 1996. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Pakistan and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

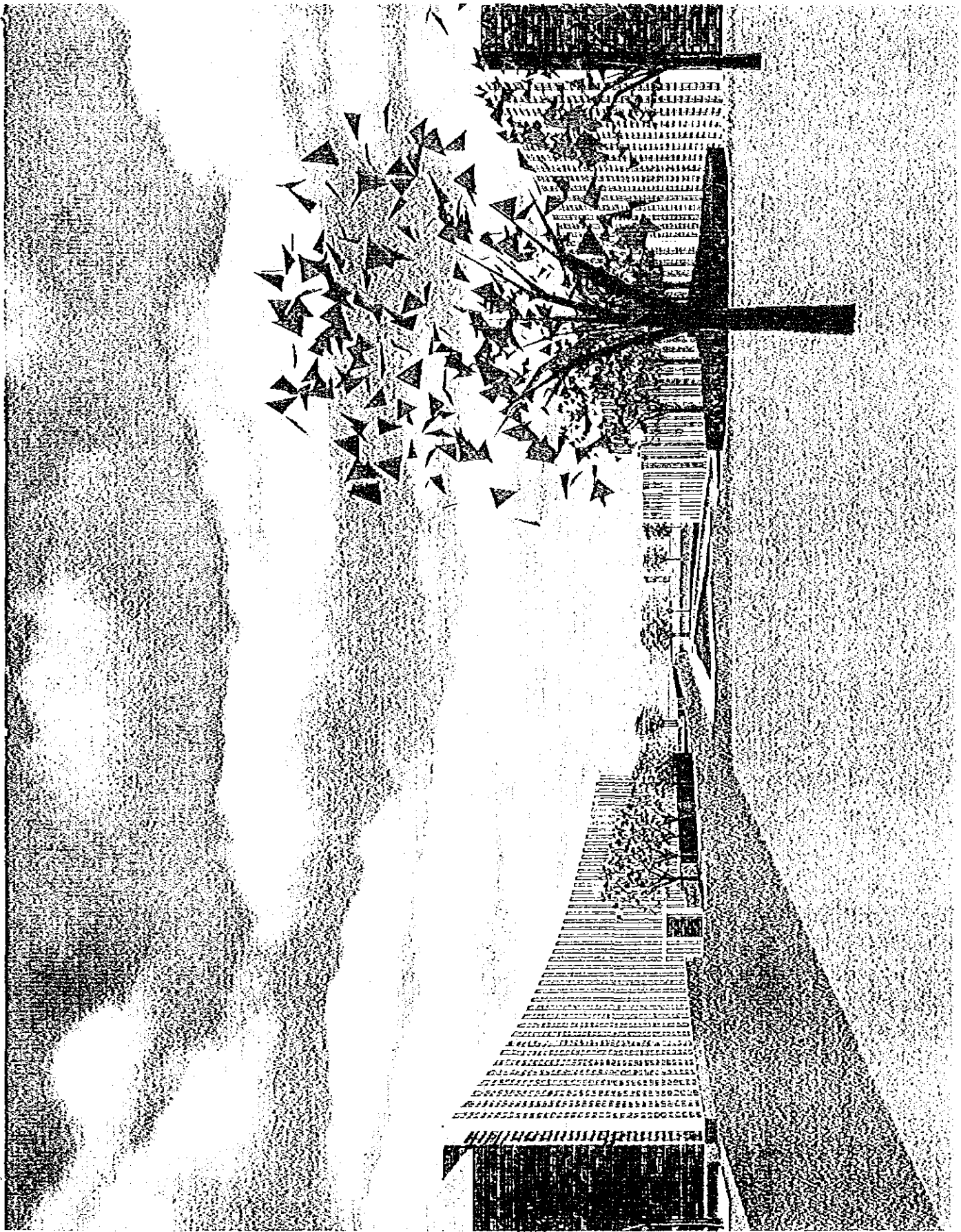
Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,



Masahiro Ikawa
Project Manager,
Basic Design Study Team on
The Project for the Establishment of
Maternal and Child Health Centre,
Nihon Sekkei, Inc.





Abbreviations

AP	:	Authorization to Pay
BA	:	Banking Arrangement
BHN	:	Basic Human Needs
BHU	:	Basic Health Unit
CDA	:	Capital Development Authority
CHW	:	Community Health Worker
DHQ	:	District Headquarter Hospital
DOH	:	Department of Health
EAD	:	Economic Affairs Division
EPA	:	Environmental Protection Agency
ICT	:	Islamabad Capital Territory
KESC	:	Karachi Electricity Supply Company
LHV	:	Lady Health Visitor
LHW	:	Lady Health Worker
MCH	:	Maternal and Child Health
MDF	:	Main Distributing Frame
NHW	:	National Health Worker
NWFP	:	North West Frontier Province
PABX	:	Private Auto Branch Exchange
PIMS	:	Pakistan Institute of Medical Sciences
RHC	:	Regional Health Centre
SAP	:	Social Action Program
SCMCHP	:	Steering Committee of Maternal and Child Health Project
SUI	:	Sui Northern Gas Pipe Ltd.
TBA	:	Traditional Birth Attendant
THQ	:	Tensile Headquarter Hospital
WAPDA	:	Water And Power Development Authority

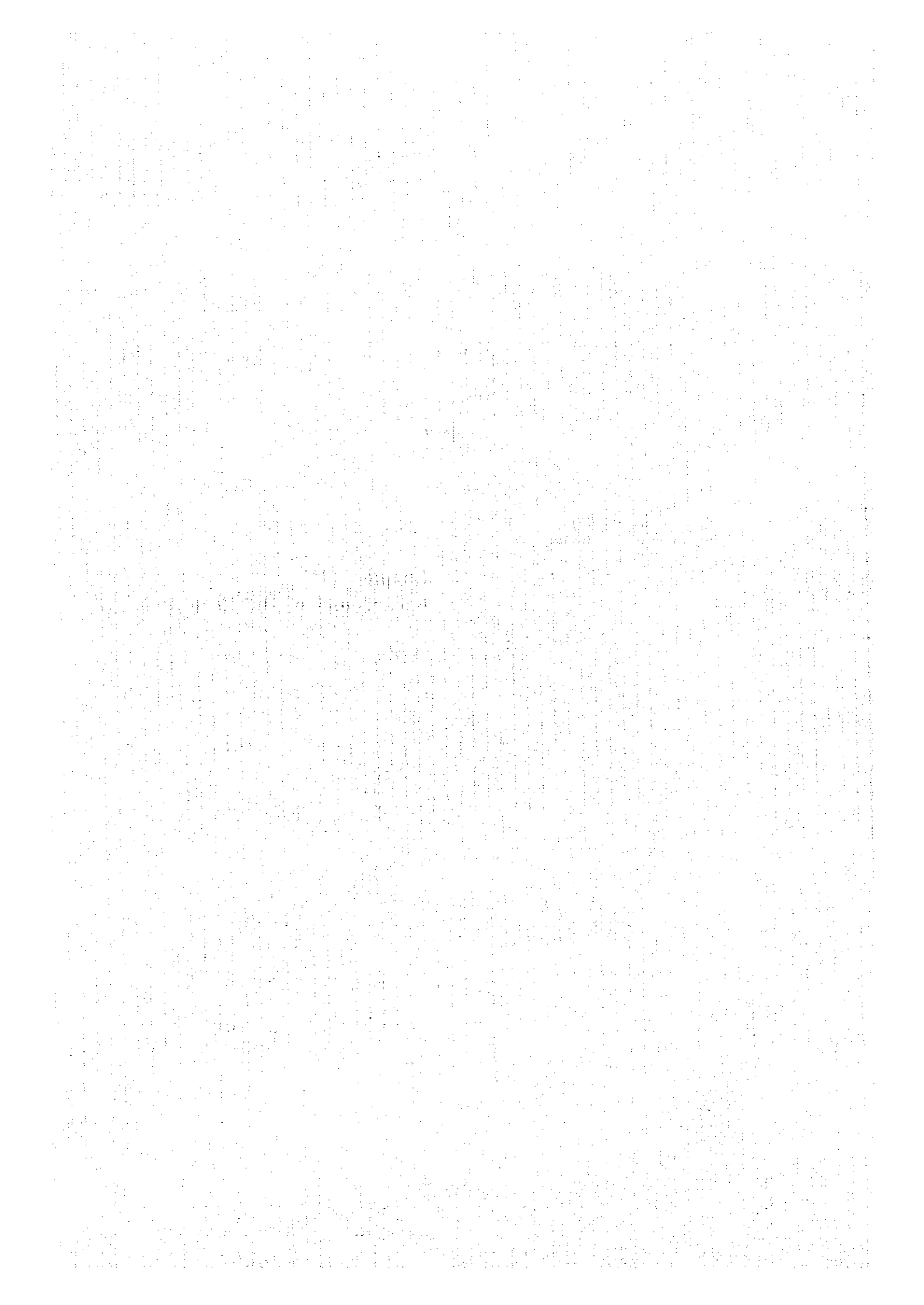
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Chapter 1
Background of the Project



CHAPTER 1 BACKGROUND OF THE PROJECT

Pakistan became independent of the UK in 1947 and formed a republic named the Islamic Republic of Pakistan. Its population, being 32,500,000 at the time of independence, is said to have reached 120,000,000. The Government of Pakistan expects that the population will have reached 141,000,000 by the year of 2,000, at an annual growth rate of 2.5% on the average. GNP per capita was 440 US dollars in 1994, with 24% of it being derived from agriculture (the agricultural population accounted for 47% of the total population). The nation has been suffering from constant trade deficits, budget deficits and high rates of inflation. The Government of Pakistan, having worked out policies for promoting economic liberalization and deregulation, with the intention of improving this situation, is now promoting adjustment of the country's economic structure for the purpose of rehabilitating its economy.

At the same time, the Government of Pakistan has implemented the Seventh and the Eighth Five-year National Development Plans (1988 - 1993 and 1993 - 1998, respectively) and formulated the Social Action Program (SAP, 1992 - 1998) which reinforces these plans, putting special importance on solving the problems of health, population, education and water supply under specific policies. In the areas of health and population, the government intends to eliminate gaps in medical services between urban and rural regions. In this respect, the government lays importance on the development of medical workers.

The area of health in the Islamic Republic of Pakistan is characterized by high mortality rates of expectant and nursing mothers (500:100,000) and infants (95:1,000), which are 83 times and 23 times higher than those in Japan. The fact that the general death rate is 1.6 times higher than in Japan shows poor medical services for mothers and children.

It is customary in Pakistan that medical services for women are provided by female medical workers including female doctors. Despite this, women's advance into social activities such as medical activity has been extremely limited. To cope with the situation, SAP requests the implementation of the following programs by 1998.

1. Education and training of 58,000 Traditional Birth Attendants (TBA)
2. Training of 33,000 Lady Health Workers (LHW)

The present conditions of obstetric services in Pakistan are that District Headquarter Hospitals (DHQ) which are expected to work as secondary medical care facilities cannot manage and give adequate medical treatment to high-risk pregnant women, due to insufficient manpower and inadequate medical equipment. The fact that DHQ does not play the proper role of referral hospitals results in the gravitation of patients into tertiary hospitals. It is necessary therefore to make the functions of DHQ substantial, for the purpose of causing the referral system to work effectively. The Government of Pakistan deems it urgently necessary to train doctors and nurses and to provide medical equipment. Generally in Pakistan, pregnant women mostly

give birth to their babies in their homes, not in specific delivery rooms but in living rooms or kitchens for instance, being assisted by TBA. Although the Government of Pakistan has been actively promoting the education and training of female medical workers (especially TBA) and encouraging their activity, it is difficult to instruct them sufficiently in care manipulation in primary medical care facilities institutions such as Basic Health Units (BHU), because these are not equipped with parturition facilities.

Meantime, the Government of Japan actively extended cooperation in the area of health and medical care, through Islamabad Children Hospital Project (1986 - 1993) etc., a project based on project-type technical cooperation, where the construction of facilities and the provision of medical equipment were carried out under the grant aid cooperation. In addition to this, the Government of Japan dispatched a basic study team for population and family planning from May to June 1993, gave recommendations to the persons concerned of the Government of Pakistan regarding improvement of maternity protection, and suggested the possibility of implementing a technical cooperation project lying importance on the human resourced development. As a consequence, the Government of Pakistan requested cooperation of Japan, regarding the construction of Maternal and Child Health Centre (the MCH Centre) in the premises of Pakistan Institute of Medical Sciences (PIMS) under grant aid cooperation, as developmental expansion of Islamabad Children Hospital Project, which was completed in June 1993, and the project-type technical cooperation as well.

Regarding the project-type technical cooperation in the requests, the contents were studied by short-term experts dispatched from Japan. Alongside this, the preliminary study team dispatched in October 1995 coordinated the contents of the project, with the basic policy of "putting importance on the development of human resources concerned with Safe Motherhood", for the purpose of developing and improving health activities for mothers and children for the broad-based benefit of the regional and rural people. In March 1996, the implementation consultation study team will be dispatched, and technical cooperation is scheduled to be commenced in the first half of 1996.

Under this project, the MCH Centre is newly constructed and related medical equipment are provided under the condition of the implementation of the above-mentioned project-type technical cooperation. The contents of the request are shown as follows.

Contents of the Request

Construction of Building	The MCH Centre Health Care Facility (OPD) Indoor Facility (Ward) Diagnostic Facility Delivery Facility Training and Residential Facility Administration Facility
	Midway House
Procurement of Equipment	The MCH Centre Basic Medical Equipment DHQ and Public Nurse School in Punjab province and NWFP Basic Medical Equipment and Medical Training Equipment

Chapter 2
Contents of the Project

CHAPTER 2 CONTENTS OF THE PROJECT

2-1 Objectives of the Project

The project aims to strengthen and promote safe motherhood / family and reproductive health through the following components.

1. The chief component of the project is to construct an obstetric institution as the core practical training centre for safe motherhood / family and reproductive health.
2. The second component is to procure a limited number of basic medical equipment or teaching materials to the district level hospitals or Public Health Nursing Schools in selected regions in Punjab, NWFP.

The project focuses on the human resource development among various health professionals from central to peripheral levels. Also, this will agree with the purpose of the Technical Cooperation Project which will be carried out in advance of the project.

In Pakistan, a majority of labor (up to 90%) are still carried out at home with a limited assistance of traditional birth attendants (TBA) or without any other health professionals. Although several measures, including construction of primary health care (PHC) facilities (BHU, RHC, etc.) and training of various health care providers (TBA, NHW, etc.), have been taken, it is not enough to meet the needs relating to safe motherhood.

The above-mentioned aim meets the policy of the Ministry of Health, the Government of the Islamic Republic of Pakistan who has promoted human resource development, especially in the field of PHC and the secondary level health care, in order to provide equal health/medical care services to the whole country.

The Project is also welcomed by the other donor agencies such as WHO, UNICEF, World Bank, etc., who have supported and implemented PHC in accordance with the Pakistan national health program relating with "Health for All by the year 2000".

Furthermore, this project may be expected to become one of the proper precedents in the field of safe motherhood / family and reproductive health in the future, not only in the whole of Pakistan, but also in other developing countries.

2-2 Basic Concept of the Project

(1) Policy of Cooperation

The Project is implemented in line with the following basic policies.

1. The Project is closely connected with and supplements the project-type technical cooperation for the safe motherhood in Pakistan.
2. The facilities are intended for education and training. They are not intended for satisfying the needs for medical services in the target area or the whole country.
3. The MCH Centre has a function as an obstetric teaching hospital. They are not intended for gynecology and pediatrics.
4. The MCH Centre are aimed at attaining appropriate levels of medical services in Pakistan. They are not intended for high levels of medical services.
5. The MCH Centre are intended for Punjab Province, NWFP and peripheral levels, not being limited to ICT.
6. It is planned that an income which can cover part of operation expenses (training expenses) will be produced by the introduction of the cost-sharing system.

(2) Study of the Content of the Request (Facilities)

The request for facilities concerns the construction of an obstetric teaching hospital, with importance being laid on "human resources development." The scale of each department is, therefore, decided by taking into consideration the Training Program proposed by PIMS.

1) Analysis of PIMS's Training Program

MCH Centre is basically used as facilities for training medical workers who will provide obstetrical services. PIMS has formulated its own training program as follows.

Figure/Table 2-1 Training Program by PIMS

Month	1	2	3	4	5	6	7	8	9	10	11	12	No. of Participants	
Course A	6weeks/course (No accommodation necessary)													
Course B	≡			≡			≡						10 × 3=30	30
Course C	≡				≡				≡				15 × 3=45	90
Course D			≡				≡				≡		15 × 3=45	90
Course E			≡				≡				≡		15 × 3=45	180
Course F	3days/course (No accommodation necessary)													
Course G	4days/course (No accommodation necessary)													
Course H	Optional course													
Course I			≡				≡				≡		15 × 3=45	90
No. of Bed	10	15	30	30	10	15	30	30	10	15	30	30	70.8 % occupancy	
No. of Rm.	10	15	15	15	10	15	15	15	10	15	15	15	91.7 % occupancy	

(Source: PIMS)

Types of Courses

- Course A : Safe motherhood for master trainers
- Course B : Safe motherhood for tutors
- Course C : Mother baby package for doctors
- Course D : Mother baby package for nurses
- Course E : Mother baby package for trained TBAs

Course F	:	Lactation management	for health owrkers
Course G	:	International Communication	for health owrkers
Course H	:	TBA training	for new TBAs
Course I	:	CHW	for CHWs (PM programme)

Nine (9) courses are provided in the proposed Training Program, namely, from Course A to Course I, whose contents mainly concern maternal and child health. These courses are intended for a very wide range of medical workers including professors and medical specialists as well as community health workers. In the above-mentioned training schedules, it is possible to hold Course D, E and I, which differ from the other courses in the number of training participants and the contents, overlapping with the other courses. Therefore, the number of participants becomes maximum, reaching 30.

2) Number of Accommodation for Trainees

Judging from the above mentioned training program, it is necessary to ensure lodgings which can accommodate a maximum of 30 training participants from the local medical institutions, in order to conduct training in the MCH Centre. As most of training participants are leading medical workers including professors and doctors, lodgings shall have 15 twin rooms. It is possible for a medical specialist such as a doctor to use one twin room alone, because the number of medical specialists who receive training is 15 at the maximum.

3) Number of High-risk Deliveries

It is important to instruct the training participants in treatment and nursing manipulations, according to their responsibilities, in cases of high-risk deliveries, in addition to cause them to be equipped with the ability to tell the difference between normal delivery and high-risk delivery. The basic idea is that one trainee can have clinical practice with at least one case of high-risk delivery even during the shortest course which lasts for two weeks. Thirty (30) cases of high-risk delivery are therefore necessary in two weeks.

Figure/Table 2-2 Number of Delivery at Islamabad Hospital
(2-day-consultation a week for out-patient)

Year	1992	1993	1994	Annual Average	Ratio
Normal Delivery	1,023	942	1,160	1,041	77%
Cesarean Section	80	178	289	182	13%
Others	115	122	148	128	10%
Total	1,227	1,242	1,597	1,355	100%

(Source: PIMS)

As shown in the above Figure/Table, cases of high-risk delivery and others including Cesarean section account for about 20% in Islamabad Hospital, PIMS. With this being taken into consideration, 150 cases of high-risk delivery ($30 \div 20\% = 150$) are needed, in order that trainees can have clinical practice with 30 cases of high-risk delivery in two weeks.

From the viewpoint of training, 300 cases of delivery are necessary in a month, or 3,600 cases in a year. In Islamabad Hospital, 1,600 cases of delivery took place in 1994, which were the result of medical consultation of two days per week.

The catchment area (ICT + Rawalpindi) of the MCH Centre has a population of about 3,700,000, with around 145,000 births taking place annually. According to the related development program for 1995, the rate of attended delivery was 35% in Pakistan. Hence, the number of cases of attended delivery can be estimated at about 50,750 ($145,000 \times 35\%$) in the catchment area of the MCH Centre.

Figure/Table 2-3 Number of Delivery in Major Hospital

Name of Hospital	Number of Delivery Per year
Federal Government Services Hospital	10,000
Rawalpindi General Hospital	7,200
Holly Family Hospital	6,000
PIMS	1,600
Total	24,800

The number of deliveries at major hospitals in the catchment area is around 25,000, which shows that there is a considerable demand for obstetrical institutions.

4) Number of Beds

According to WHO guideline, 25 beds are needed for 1,000 annual deliveries. Hence, the necessary number of beds for 3,600 deliveries is 90 ($3.6 \times 25 \text{ beds} = 90 \text{ beds}$). It is expected that a number of patients will visit the new hospital, as the crude birth rate is as high as about 41/1,000 in Pakistan. The requested number of 90 beds can be regarded as appropriate for providing medical care of a certain level in the MCH Centre, which is intended for clinical practice. Five (5) beds for high-risk patient and seven (7) beds for isolation patient are included.

5) Number of Paying Beds

In the Project, it is planned that, among the expenses for the operation of the MCH Centre, the expenses necessary for training are covered by earnings from the paying

beds. PIMS has requested 35 paying beds in 10 two-bed rooms (20 beds) and 15 single rooms (15 beds).

In the existing Paying Obstetrical Ward of Islamabad Hospital, the charge for a single room is 500 rupees a day, while that for a two-bed room is 250 rupees per person a day. (Although PIMS plans 1,000 rupees and 500 rupees, respectively, this report adopts the charges for the existing one.) On the basis of these charges, the following earnings can be expected from the paying beds, with the rate of occupancy being 70%.

Single room	
15 beds x 500 rupees x 365 days x 70% =	1,916,250 rupees
Two-bed room	
20 beds x 250 rupees x 365 days x 70% =	1,277,500 rupees
<hr/>	
Total	3,193,750 Re/year

An annual income of 3,193 thousand rupees can be expected.

The annual expense necessary for training is calculated as follows.

The analysis of the training schedule shows that the annual number of training participants · day is 10,000 in total. The annual expense necessary for training is calculated on the basis of this figure. The personnel expenses are, however, not included.

Figure/Table 2-4 Estimated Annual Training Expenses

Items	Expenses
Food	30Rs./P x 10,000 persons = 300,000
Accommodation	85Rs./P x 10,000 persons = 850,000 (Linen, Energy Fee)
Educational Material	1,500Rs./P x 500 persons = 750,000
Transportation	Bus 150Rs./P assuming 150Rs./P x 500 persons = 75,000
Day Allowance	Estimated in accordance with annual salary = 1,200,000
Total	3,175,000 Rps.

Based on the above, the annual training expenses are estimated at about 3,175 thousand rupees. This sum can be covered by the earning (3,193 thousand rupees) from the paying beds.

6) Number of Delivery Rooms

Assuming that the number of paying beds is thirty-five (35), 1,400 deliveries could take place there annually ($1,000 \times 35/25 = 1,400$), and annual deliveries in the MCH Centre total to 5,000 (about 14 in a day), together with 3,600 deliveries in these beds other than paying ones.

As the obstetric department of Islamabad Hospital is equipped with two (2) delivery tables for the annual number of deliveries of 1,500, it is decided that the MCH Centre be equipped with seven (7) delivery tables, and two (2) of them will be used for high-risk delivery. The necessary number of labour beds will be nine (9), and three (3) of them will be used for high-risk delivery.

One isolated delivery room will be provided for cases with infection.

7) Number of Operation Rooms

PIMS has requested four (4) operating rooms, namely two (2) general operating rooms, one (1) for infected patients, and one (1) for minor operations/family planning. The number of occurrences of operations is estimated at around 1,000 ($5,000 \text{ deliveries} \times 20\% = 1,000$) per year according to the data in the obstetric department of Islamabad Hospital in PIMS.

This means four (4) operations are carried out in a day on the average. This number is appropriate, in view of the fact that emergency and operations are expected and that the acceptance of referrals is taken into consideration.

Operation theatre must be as clean as possible. It is therefore necessary to provide a central supply and sterilization dept., for supplying clean operation instruments. In addition, attached facilities are needed from the viewpoint of the administration of the hospital, such as locker room, conference room, and equipment storeroom.

8) Number of Outpatients

Assuming that 5,000 cases of annual delivery is the standard, 5,000 pregnant women receive examination once in every four weeks from the time pregnancy becomes certain (the seventh week of pregnancy) until the 27th week, and further receive examination once in every two weeks on and after the 28th week. This means that one pregnant woman visits the MCH Centre at most 12 times.

The annual number of outpatients totals to 60,000 ($5,000 \text{ outpatients} \times 12 \text{ times} = 60,000$), and the daily number of outpatients can be estimated at about 200 ($60,000 \text{ outpatients} \div 299 \text{ days} = 200$) on the average.

Consultation Room

If 5,000 new outpatients visit the MCH Centre once, an average of 16.7 outpatients come daily ($5,000 \text{ outpatients} \div 299 \text{ days} = 16.7$). Assuming that high-risk pregnant women account for 20% of these outpatients, the number of them becomes 1,000 ($5,000 \text{ outpatients} \times 20\% = 1,000$), and they use the consultation room each time they visit the hospital (12 times in total). The consultation room is therefore used by an average of 36.7 outpatients every day ($1,000 \times 12 \text{ times} \div 299 \text{ days} = 36.7$). Assuming that 25 minutes is taken for examination and treatment for one outpatient, four (4) consultation rooms are necessary ($16.7 + 36.7 = 54 \text{ outpatients/day} \times 25 \text{ minutes} \div 360 \text{ minutes} = 3.75$)

Examination Room

With 16,000 ($11,000 + 5,000 = 16,000$) outpatients who use the consultation room according to the tentative calculation mentioned above being excluded from 60,000 outpatients visiting the MCH Centre annually, 44,000 outpatients use the examination room. This means that 147 outpatients ($44,000 \text{ outpatients} \div 299 \text{ days} = 147$) use it in a day. Assuming that 20 minutes is taken for examination for one outpatient, 8.16 booths become necessary ($147 \text{ outpatients/day} \times 20 \text{ minutes} \div 6 \text{ hours} = 8.16$). As one or two more booths are necessary for outpatients who visit the MCH Centre for medical examination/treatment other than regular examination or judgment of pregnancy, the requested number (10 booths) is considered appropriate.

9) Other services

It is indispensable for the MCH Centre to be equipped with not only a laundry and a kitchen but also power and machine room, storehouse, duty doctor room, maintenance room, and waterhouse, for the purpose of causing the hospital functions to work well.

A mortuary is necessary for stillborn babies and mothers who have died of child birth.

10) Midway House

"Midway house" refers to lodgings for patients and their family members from remote regions, waiting for the examination results and/or for hospitalization. According to custom in Pakistan, a female patient never visits a hospital alone, but is accompanied by a male family members such as her husband or father and more than one female relative of hers. The lodgings are necessary for these attendants.

The midway house planned in the Project is intended for patients and their family members from remote regions. It is especially for pregnant women for whom

delivery is impending and for high-risk pregnant women who visit the hospital for regular examination, as well as for their family members.

As there are 5,000 deliveries in a year, the daily number of patients visiting the hospital is 17 ($5,000 \text{ deliveries} \div 299 \text{ days} = 7 \text{ deliveries}$). The number of high-risk pregnant women visiting the hospital is 11,000 annually, resulting in a daily number of 37 patients ($11,000 \text{ patients} \div 299 \text{ days} = 37 \text{ patients}$), and four of 12 visits fall under regular examination which requires observation of the progress. They need lodgings for these four visits. Thirteen (13) patients therefore use the midway house daily ($37 \text{ patients} \times 4/12 \text{ visits} = 13 \text{ patients}$). The number of patients visiting the hospital becomes 30, which comprises 17 pregnant women visiting the hospital for examination. Those patients who live in Islamabad do not need lodgings account for 14% of the total patients. Except these outpatients, the number of pregnant women who need lodgings is 25 a day. As another 25 persons, i.e., attendants, need lodgings, the number of persons using the midway house becomes 50 ($25 \text{ persons} \times 2 = 50 \text{ persons}$). Lodgings shall therefore have accommodations for 50 persons.

11) Lecture Hall

On the premises of PIMS, Nursing College has an auditorium, and there is one in Islamabad Hospital.

In Nursing College, its auditorium is occupied for a longer time than before, as more students have been admitted to the college. It was used for five hours daily on the average (1994 - 1995). It seems therefore difficult to use it further for new programs. The auditorium of Islamabad Hospital was used for two hours to three hours daily on the average (1994 - 1995).

In the MCH Centre, which is an obstetrical hospital, it is planned that its lecture hall by used mainly for clinical lectures on child and maternal health and for the presentation of reports on obstetrical cases. In addition to these, monthly meetings with CHW are planned to be held in it, and lectures are planned for regional medical workers (at most 150 persons). The lecture hall is planned to be used for thus diversified purposes. Using the auditorium of Islamabad Hospital also for these purposes is rather difficult in terms of its size (less than 100 persons). The lecture hall (for 150 persons) shall therefore be necessary in the MCH Centre. The lecture hall can also be used as classroom.

Study of Requested Equipment (2)

Room etc.	Major Equipment Requested	Out of Scope		Addition	
		Equipment	Reason	Equipment	Reason
	ELISA Reader kit, HIV testing & HBsAg testing set				
OPD	Obstetric examining table, Obstetric examining unit, Examining table, Linear scan w/cart, Doppler fetal detector, Obstetric instruments set, Colposcope w/ camera, Operation laparoscope, family planning set	Colposcope w/ camera Operation laparoscope, family planning set	Deleted because this is not an obstetrical equipment	Clinical instruments, Bed w/ mattress	Indispensable for clinical training As OPD is independent of the Main Building, it is necessary for blood and urine testing
Labor Room	Labor bed w/mattres, Obstetric examining unit, Automatic infusion pump, Cardiotocography monitor, Doppler fetal detector, Linear scan w/ cart, Boiling sterilizer (desk type), Extonox provision through inhalation analgesin, Overbed table	Extonox provision through inhalation analgesin Overbed table Obstetrical examining unit	Extonox provision through inhalation analgesin is used to mitigate burdens of delivery artificially. As training does not concern painless delivery, the request for the equipment is deleted. Overhead tables are used at the time of having diets. The request for the equipment is deleted, because these are not used in labor room. Obstetrical examining unit does not use in Labor room.		
Delivery Room	Delivery table, Vacuum extractor, Doppler fetal detector, Infant warmer, Operating light,	Boiling sterilizer	The request for the equipment is deleted, because sterilization by boiling can be carried out in the Central Supply & Sterilization Depart-	Instruments cabinet, Refrigerator	Indispensable for the operation of the delivery rooms.

Study of Requested Equipment (3)

Room etc.	Major Equipment Requested	Out of Scope		Addition	
		Equipment	Reason	Equipment	Reason
	Cardiotocography monitor, Infant portable incubator, Infant laryngoscope and resuscitation set, Boiling sterilizer, Water sterilizer (washing hand), Autoclave (desk type)	Water sterilizer (washing hand)	ment (SSD) adjacent to this room. In an emergency, however, a desktop autoclave is used. This piece of equipment is installed by construction work.		
Operation Theatre	Obstetrical operation table, Aus-suction unit, Suction unit w/ floor stand, Operation light, (combination type) Anesthesia apparatus, Patient monitor w/ recorder & cart, Difibrillator w/stand, Laparoscope (for sterilization), Laparoscope (for operation), Boiling sterilizer, High pressure steam sterilizer (table top), Water sterilizer, (washing hand)	Boiling sterilizer, High pressure steam sterilizer (table top), Laparoscope, (for operation) Water sterilizer, (washing hand)	The request for a boiling sterilizer and an high pressure steam sterilizer is deleted, because a sterilization can be carried out in the CSSD adjacent to this room. The request for a laparoscope (for operation) is deleted, which is classified as a gynecological equipment. This equipment is installed by construction work.	Operation instruments set Infant warmer	Indispensable for the operation of the operation theatre.
Recovery Room	NIL			Bed with mattress, IV Pole, Instruments cabinet, Instruments Trolley	The irreducible minimum equipment for the recovery room.

Study of Requested Equipment (4)

Room etc.	Major Equipment Requested	Out of Scope		Addition	
		Equipment	Reason	Equipment	Reason
Ward	Bed w/mattress, Bedside cabinet, Overbed table, Doppler fetal, detector, Ultrasonic nebulizer w/stand, Linear scan w/cart,	Linear scan w/cart	Linear scan w/cart is installed in the examination and outpatient departments, and this can be used also by the personnel of the ward. The request for the equipment in this department is therefore deleted.	Baby bassinet with stand baby bedside cot, Instruments trolley, Prescription counter Ward instrument set, Obstetric examining table, Examination light	Indispensable for the operation of the ward.
Nursary Room	Incubator with trolleys, Baby bassinet with stand, Baby bedside cot, Phototherapy unit, Baby resuscitation set, Infant incubator Boiling sterilizer, Breast pump, Icterometer	<p>Infant incubator, Baby resuscitation set</p> <p>Boiling Sterilizer</p> <p>Breast pump</p> <p>Incubator with trolleys, Baby bassinet with stand</p> <p>Baby bedside cot</p>	<p>Infant incubator is used for NICU of the neighboring Children Hospital The request for the equipment for this department is therefore deleted.</p> <p>As sterilization is carried out in CSSD, the request for the equipment for this department is deleted.</p> <p>This equipment is considered unnecessary, because most mothers directly breast-feed their babies in Pakistan.</p> <p>Incubator with trolleys are unnecessary because premature babies are not taken care of in the MCH Centre.</p> <p>Baby bedside cot in wards will be used.</p>		

Study of Requested Equipment (5)

Room etc.	Major Equipment Requested	Out of Scope		Addition	
		Equipment	Reason	Equipment	Reason
Emergency Room	Obstetric examining table, Obstetric examining unit, Examining table, Suction unit, Stretcher, Emergency cart, Doppler fetal detector, Cardiotocography monitor	Cardiotocography monitor	Cardiotocography monitor is not a equipment for everyday use. When the use of it becomes necessary in the department, the personnel can use the ones installed in the labour room and delivery room. The request for the equipment for this department is therefore deleted.	Instruments cabinet, Bed w/ mattress, Cusco's vaginal speculum set, Examining light, Infant laryngoscope and resuscitation set, Difibrillator w/stand, Obstetric instruments set	Indispensable for the operation of the emergency room.
Pharmaceutical Room	NIL			Prescription counter, Medical refrigerator	The irreducible minimum equipment for the pharmaceutical room.
Training Dept.	Overhead projector, Slide projector, Screen, TV set, VTR set, Copy machine, Computer system w/ printer (training), Computer system (Ward, Labour, OPD), Dark room equipment, Vehicles	Computer system (Ward/Labor) Dark room equipment	Regarding the request for a computer system, a piping system is constructed for the rooms concerned, by construction work, and computers are installed for the outpatient and training departments only. Dark room equipment for photo development consists of those equipment which are used for slide making. As slides can be prepared through outside order, the request for the equipment is deleted.	Speaker system, Childbirth phantom, Uterine cervical model	The irreducible minimum equipment for the lecture hall

Study of Requested Equipment (6)

Room etc.	Major Equipment Requested	Out of Scope		Addition	
		Equipment	Reason	Equipment	Reason
For Maintenance	General purpose maintenance tool set, Electrical maintenance tool set, Electric tester, Ambulance	Ambulance	As obstetrical emergency patients in neighboring areas are conveyed to the MCH Centre in ambulances of hospitals of these areas, no ambulances are needed in the MCH Centre. The request for ambulances is therefore deleted.		
Sterilization Room (CSSD)	High pressure steam sterilizer, Laundry set, Kitchen set	Laundry set, Kitchen set	Installed by construction work	Ultrasonic cleaner, Instrument sterilizing tray, Forceps stand, Instrument carriage	Indispensable for the operation of the CSSD.
DHQ	Obstetric equipment			Delivery table, Linear scan w/cart, Doppler fetal detector, Operating light (stand type)	Basic obstetrical equipment
District Public Nursing School	Educational equipment			Childbirth phantom, Uterine cervical model	Basic training equipment

2-3 Basic Design

2-3-1 Design Concept

(1) Basic Policies

Basic policies for basic design are set as follows, with the special characteristics of the region and the local conditions being taken into consideration.

1) Policy Relevant to Natural Conditions

a. The proposed site, being located south of the Children Hospital within the premises of PIMS, is a lot ready for use. The site descends gently southward, with PIMS's circular road running north and south. These natural conditions shall be effectively used in basic design.

b. Winds

It does not blow hard throughout the year in Islamabad, with the average wind velocity being 0.85m/s (January) and 1.2m/s (July). The ground outside the building shall be sodded as much as possible, for the purpose of preventing clouds of sand caused by winds.

c. Islamabad has an annual precipitation of 1,100mm, but it has a great deal of rain in a short time in June, the rainy season. The openings (windows etc.) of the building shall be provided with louvers and/or eaves for keeping out rain. For the draining of rain water from the roof and on the premises drainage of sufficient capacity shall be planned. The drainage around the entrances and exits shall have a design which can prevent rain water from coming into the building.

d. Sunlight

Islamabad, being situated in 34° North Latitude, receives sunlight mostly from the south. For coping with strong sunlight in summer, roof insulation of improved performance shall be employed, the openings in the exterior wall shall be as small as possible, and louvers and/or eaves shall be attached, in order to minimize direct effects of solar radiation. The side which has a number of openings shall be kept from direct exposure to the afternoon sun whose insolation energy is great.

e. Climate

In Islamabad, which is subject to inland climate, temperature fluctuations in a year are considerable. The average temperature is 10°C in winter (January), while it is 30°C in summer (July), with the highest temperature reaching as high as 46°C. Air conditioners are necessary in winter for heating, as a general rule, and in summer for the cooling of main rooms. However, for consulting as comfortable dwelling space as possible in summer without depending on air conditioning, windows shall be as small as possible with a view to keeping out strong sunlight. It is also said that it is not advisable to conduct artificial

ventilation. As people know from experience that they feel quite cool in basements in summer, this fact shall be utilized in design.

2) *Policy Relevant to Social Conditions*

The Project is aimed at the construction of an institution for training regional medical workers who are concerned with the promotion of maternal health. The institution shall be, therefore equipped with the functions of a training institute, in addition to those of a hospital. As it is a social characteristic in Pakistan that patients visit hospitals with their family members as attendants, the waiting hall shall have larger space. Attention must be paid to the arrangement of facilities, with the purpose of adequately controlling visitors, including patients and their attendants, coming into rooms of the hospital without business.

3) *Policy Relevant to Construction Conditions*

Islamabad is an artificial city constructed under urban planning about 30 years ago. All construction plans relevant to the city require examination and approval by CDA. The Project is subjected to these, as a matter of course. In basic design, attention shall be paid to future plans concerning PIMS as whole and to the existing facilities, because the proposed site is located within PIMS, an extensive medical complex. Due architectural consideration shall be given to cooperation and the sharing of functions with the existing Children Hospital.

4) *Policy Regarding the Employment of Local Constructors and the Use of Local Materials*

With a view to ensuring easy maintenance of facilities after completion, local construction materials and local construction methods are adopted as much as possible. PIMS is equipped with high capability of maintenance, and adequate operation and maintenance can be expected if locally procurable expendable supplies and spare parts are used. Those materials not procurable in Pakistan shall be procured from third countries such as Singapore where there are established systems of maintenance by local agents, etc.

As locally procurable medical equipment are limited, those of Japanese make shall be employed, for which there are established systems of maintenance by local agents.

5) Policy Regarding Implementation Agency's Competence in Operation and Maintenance

With a view to reducing maintenance expenses, natural conditions shall be utilized in basic design as much as possible, without depending much on mechanical equipment. In the Project, air conditioning is necessary in winter for heating and in summer for cooling for surgical operation, delivery, and examination departments. Gas, which is available at comparatively low prices in Pakistan, shall be used as the heat source for air conditioning. Regarding those equipment which need larger maintenance expenses such as elevators, facilities which can dispense with such equipment shall be designed. For interior and exterior finishing, durable and weatherproof materials shall be used, with a view to reducing maintenance expenses as much as possible.

(2) Design Conditions

1) Components of Facilities

The Project concerns the construction of a two-storied (semi-basement structure for Ground Floor) OPD Building and a two storied (Partly basement) Main Building, which consists of the South Building and the North Building. The Main Building is equipped the indodor medical functions with service rooms such as a machine room and an electric power room, while a midway house is constructed beside the OPD Building for patients and their family members from remote regions.

2) Scale of Facilities

The scale of facilities shall be designed as follows, with the present functions and scale of PIMS being taken into consideration and on the basis of Japanese standard floor areas for medical facilities (documents compiled by the Architectural Institute of Japan, etc.) and layouts of necessary pieces of equipment.

Figure/Table 2-6 Basis of Floor Area for Rooms (1)

OPD Building (B.Fl.)

Room	Floor Area (m ²)	Criteria and/or Remarks
Reception/security	18.49	incl. emergency reception, security guard room
Waiting hall	634.72	incl. space for patient's family
Waiting room with Audiovisual aids	72.31	for 50 persons
Family planning 1	23.43	25m ² /person (incl. space for consultation and instruction)
Family planning 2	25.18	25m ² /person (incl. space for consultation and instruction)
Social welfare office	27.18	25m ² /person (incl. space for consultation and instruction)
Drug store (utility store)	40.44	pay medicine
Pharmacy	37.49	free medicine
Cafeteria	57.73	for staff
Resistration x 2	18.13	
Record room x 2	24.18	
Consulting room	24.18	25m ² /person (incl. space for instruction)
Immunization room	24.18	
Ultrasound room	24.18	
CTG room	24.18	
Sample collection room	36.27	2 urinal booths
Treatment room	18.13	3.0m x 4.5m = 13.5m ²
Clinical cubicle x 9	18.13	3.0m x 4.5m = 13.5m ²
Intermediate waiting room	60.45	
Conference room	36.27	2.0m ² /person, space for about 20 persons
Toilet (North (F))	22.02	3 private booths, 3 sinks
Toilet (North (M))	5.77	1 urinal, 1 private booth, 1 sink
Toilet (Staff (F))	14.96	3 private booths, 3 sinks
Toilet (Staff (M))	17.59	2 urinals, 1 private booth, 2 sinks
Toilet (South (F))	19.47	3 private booths, 3 sinks
Toilet (South (M))	5.77	1 urinal, 1 private booth, 1 sink
Storage	29.44	
Others	Common S.	
Sub-total	1,774.47	

Basis of Floor Area for Rooms (2)

OPD Building (G.Fl.)

Room	Floor Area (m ²)	Criteria and/or Remarks
Training Dept.		
Lecture room	180.28	1.3m ² /person, space for about 150 persons
Resource room	8.26	
Seminar room (L)	66.10	2.0m ² /person, space for about 30 persons
Seminar room (S)	54.08	2.0m ² /person, space for about 25 persons
Library	66.10	space for about 3,000 volumes + 25 seats
Education material preparation room	54.08	
Facilitator room	18.03	25m ² /person (incl. reception area)
Training coordinator room	22.34	25m ² /person (incl. reception area)
Support staff room	18.40	6.0m ² /person, space for 3 persons
Reception area	22.34	
Storage	15.02	
Toilet (F)	21.08	3 private booths, 3 sinks
Toilet (M)	21.08	3 urinals, 1 private booth, 3 sinks
Accommodation Dept.		
2-bed room	21.08	2 beds, with toilet/shower
Warden room	31.00	with bed room
Cafeteria	63.24	1.5m ² /person, for 40 seats
Kitchen	24.04	
Storage	21.08	
Toilet (F, M)	12.80	2 private booths, 2 sinks
Others	Common S.	
Sub-total	1,552.67	

Basis of Floor Area for Rooms (3)

Main Building (B.Fl. North Wing)

Room	Floor Area (m ²)	Criteria and/or Remarks
Pathology Dept.		
Pathology reception	24.18	
Pathologist room	21.70	25m ² /person (incl. reception area)
Pathology laboratory	86.80	
X-ray room	43.40	
X-ray operation room	12.40	
Development room	9.30	
Ultrasound room	21.70	
ECG room	21.70	
Blood bank	52.26	incl. blood sampling room and waiting room
Health worker lounge	43.40	1.5m ² /person, space for 30 seats
Toilet (F)	26.82	4 private booths, 4 sinks
Toilet (M)	19.37	3 urinals, 2 private booths, 3 sinks
A/C room x 2	43.40	
Mechanical room	271.12	for water reservoir, pump
Electrical room	43.40	
Medical gas room	21.70	
Others	Common S.	
Sub-total	1,131.71	

Main Building (B.Fl./G.Fl. Mechanical/Electrical Wing)

Room	Floor Area (m ²)	Criteria and/or Remarks
Generator room	62.40	
Boiler room	184.00	
Mortuary	56.00	for 6 bodies
Others	Common S.	
Sub-total	345.60	

Basis of Floor Area for Rooms (4)

Main Building (G.Fl. South Wing)

Room	Floor Area (m ²)	Criteria and/or Remarks
Emergency Dept.		
Emergency examination room	31.00	3.0m x 4.5m = 13.5m ²
Observation room	122.96	space for 10 beds
Nurse room	36.27	
Casualty medical officer room	15.87	25m ² /person (incl. reception area)
Duty room	10.20	
Waiting area for family	36.98	space for patient's family
Toilet (F)	9.07	2 private booths, 2 sinks
Toilet (M)	9.07	1 urinal, 1 private booth, 1 sink
Administrative Dept.		
Reception	18.13	
Toilet (F)	21.70	3 private booths, 3 sinks
Toilet (M)	21.70	3 urinals, 2 private booths, 3 sinks
Administration office	108.50	
Record room	21.70	
Nurse superintendent room	21.70	25m ² /person (incl. reception area)
Deputy director room	21.70	25m ² /person (incl. reception area)
Project room (L)	43.40	
Project room (S)	21.70	25m ² /person (incl. reception area)
Conference room	43.40	2.0m ² /person, space for about 20 persons
Kitchen	119.88	150 beds, 3 meals/day
Laundry	86.84	150 beds
Others	Common S.	
Sub-total	1,268.12	

Basis of Floor Area for Rooms (5)

Main Building (G.Fl. North Wing)

Room	Floor Area (m ²)	Criteria and/or Remarks
Delivery Dept.		
Normal labour room	39.94	space for 4 persons
Normal delivery room	28.52	2 delivery tables
High risk labour room	28.52	space for 4 persons
High risk delivery room	28.52	2 delivery tables
Eclampsia delivery room	18.30	1 delivery table
Isolation room	18.30	1 delivery table
Preparation room (Deliv.)	83.61	
Soiled utility	12.30	
Conference room	18.13	2.0m ² /person, space for about 10 persons
Nurse room	18.60	
Ante room	13.69	
Storage	6.14	
Operation Dept.		
Operation theater x 3	35.74	1 operation table each
Operation theater (Out-patient)	35.74	1 operation table
Preparation room (OP.)	88.54	
C.S.S.D.	54.72	
Supply corridor	39.96	
Utensil storage	7.99	
Soiled utility	11.07	
Anesthetist room	15.67	25m ² /person
Conference room	27.05	2.0m ² /person, space for about 12 persons
Nurse room	14.14	
Ante room	14.98	
Recovery room	72.08	10 beds
Changing room (1)	16.14	
Changing room (2)	17.29	
Duty room	9.79	
Waiting area for family	36.98	space for patient's family
Others	Common S.	
Sub-total	1,248.26	

Basis of Floor Area for Rooms (6)

Main Building (1st Fl. South Wing)

Room	Floor Area	Criteria and/or Remarks
High risk ward (beds) x 5	15.50	
Paying ward (2 beds) x 10	21.70	6.5m ² /bed x 2 beds = 13m ² with toilet/shower
Paying ward (1 bed) x 15	15.50	with toilet/shower
Nurse station x 2	24.18	
Nurse changing room	12.09	
Treatment room	18.13	
Consultant room x 2	9.70	
Conference room	24.18	
Doctor duty room	18.13	
Reception	6.20	
Pantry (1)	7.58	
Pantry (2)	9.07	
Mother's lounge	45.44	
Soiled utility	9.07	
Toilet	16.00	2 private booths, 2 sinks
Storage x 2	18.13	
Others	Common S.	
Sub-total	1,211.29	

Basis of Floor Area for Rooms (7)

Main Building (1st Fl. North Wing)

Room	Floor Area (m ²)	Criteria and/or Remarks
Antenatal bed room (6 beds) x 8	31.00	6.5m ² /bed x 6 beds = 39m ²
Postnatal bed room (6 beds) x 5	43.40	6.5m ² /bed x 1.2 x 6 beds = 42.31m ²
Isolation bed room (2 beds) x 3	15.50	6.5m ² /bed x 2 beds = 13.0m ²
Isolation bed room (1 bed)	15.50	
Nurse station x 2	18.13	
Nursery room	24.37	5 cots
Nurse changing room	11.90	
Treatment room	18.13	
Consultant room	9.07	
Conference room	24.37	2.0m ² /person, space for about 12 persons
Doctor duty room	18.13	
Pantry (East)	7.58	
Mother's lounge	45.44	
Toilet	16.00	2 private booths, 2 sinks
Toilet, shower room	36.27	3 private booths, 3 sinks
Storage	12.09	
Pantry (West)	6.04	
Others	Common S.	
Sub-total	1,211.29	

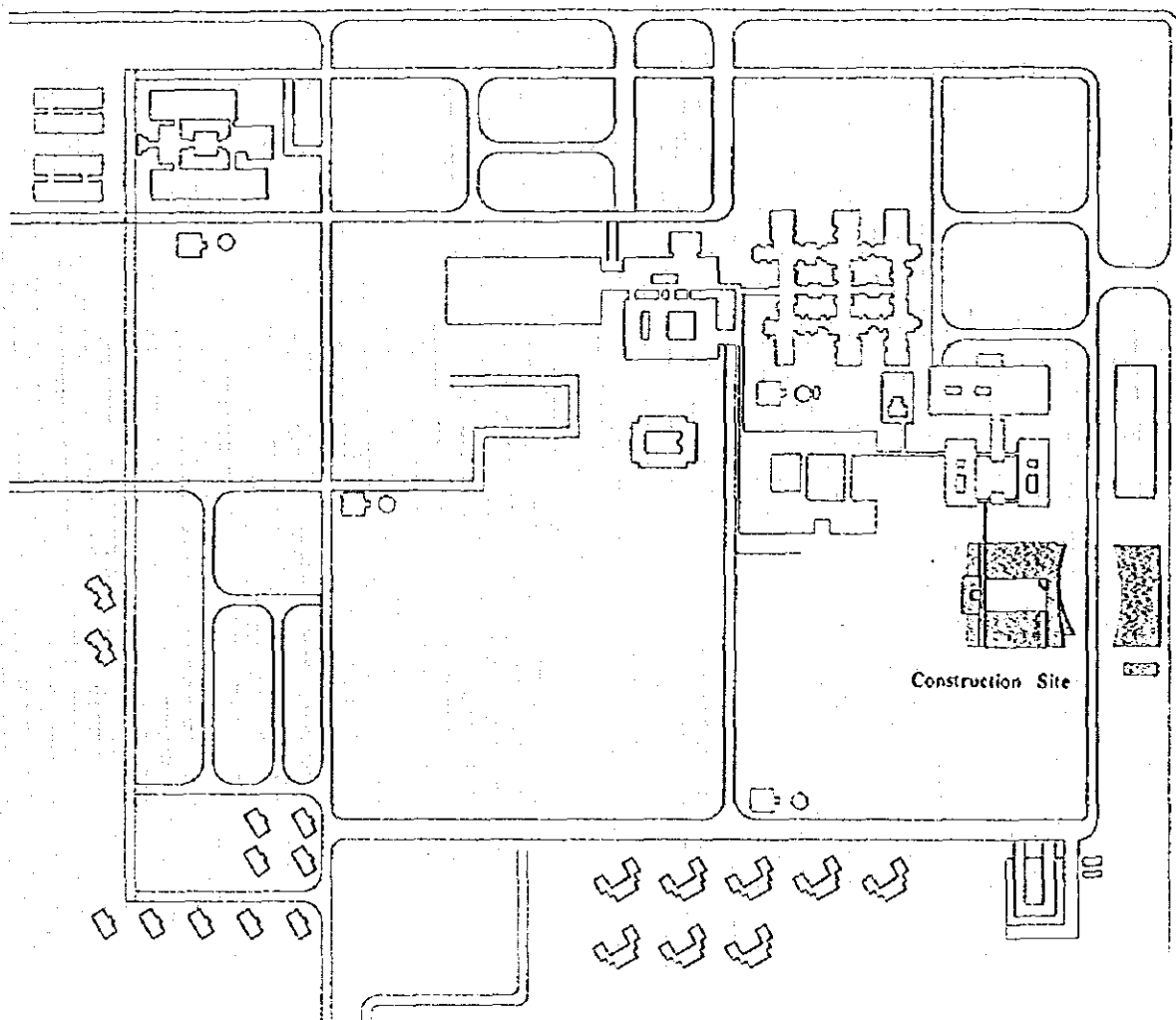
2-3-2 Basic Design

(1) Site and Layout Plan

1) Site Conditions

The proposed site is in the premises of PIMS, which is located in Islamabad G-8. This site, being adjacent to the south of the existing Children Hospital, has an area of 100 meters from north to south and 150 meters from east to west. The whole site gently declines southward, with the maximum difference of elevation being about two (2) meters from north to south. The PIMS's circular road (about 10 meters wide) runs north and south slightly in the east of the site, which divides the site into two lots.

Figure/Table 2-7 Construction Site



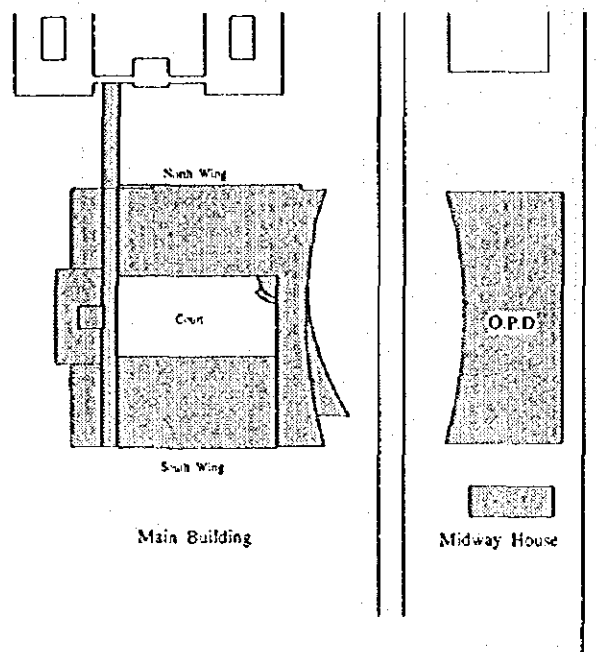
2) Layout Plan

As hospitals have complicated functions, it is important that various facilities be arranged efficiently and in connection with each other, without causing confusion. The Project is aimed at not the construction of an obstetrical hospital but the construction of training facilities for obstetrical workers. It is important therefore to give priority to the functions of a training institution.

In layout plan, attention needs to be paid to the special condition in Pakistan, namely, that outpatients are accompanied by their family members without exception. Especially obstetrical outpatients are accompanied by their fathers or husbands (and children, as well). As a result, the number of visitors to the outpatient department sometimes becomes several times the number of outpatients. In Pakistan, visitors to hospitals go in and out not only the outpatient department but also other departments freely, often interfering with the proper functioning of hospitals. With the purpose of eliminating troubles caused by their deeds, it seems most effective to separate the outpatient department from the other functions of a hospital (wards, operation theatre, etc.). In layout plan for the MCH Centre, therefore, the OPD Building shall be constructed in the eastern lot, for disconnecting it from the functions of the Main Building. This is important for controlling the path of flow of outpatients and their family members.

The midway house, i.e., lodgings for outpatients and their family members from remote regions waiting for examination results, shall be constructed independently to the south of the OPD Building, because it is operated under a different system.

Figure/Table 2-8 Conceptual Diagram of Layout Plan



In the MCH Centre, which is an obstetrical teaching hospital, the training department is closely connected with the OPD building functions. The major function of the MCH centre is a training activity. For the trainee of various levels from regional area, the accommodation shall be provided in the MCH centre. Being taken into consideration on both the proper management of medical activities and the privacy of trainee, the residential facility and training facility shall be located on the 1st floor of the OPD building with independent entrances for them. The main building shall be located in the west of the PIMS's circular road, independently of the OPD Building. Transverse walls shall be constructed on the east side and the west side of the building, in order to protect the openings such as windows from direct exposure to the afternoon sun, whose radiation is said to be largest in the day, with the purpose of avoiding adverse thermal effect of sunshine on the building. The Main Building shall consist of the North Building and the South building, which are of three-story structure, with a courtyard about 24 meters wide and 45 meters long between them with the natural conditions of the site and the scale of each department and the functional relationships being taken into consideration. It is recommended that, by utilizing the natural descent of the whole site toward the south, the floor level of the South Building be lower by half a story (two meters) than that of the North Building (it is called as skip floor). As a result, the South Building and the North Building are connected with each other by a slope with a difference of elevation of half a story. This is very effective where patients and materials are conveyed by man power.

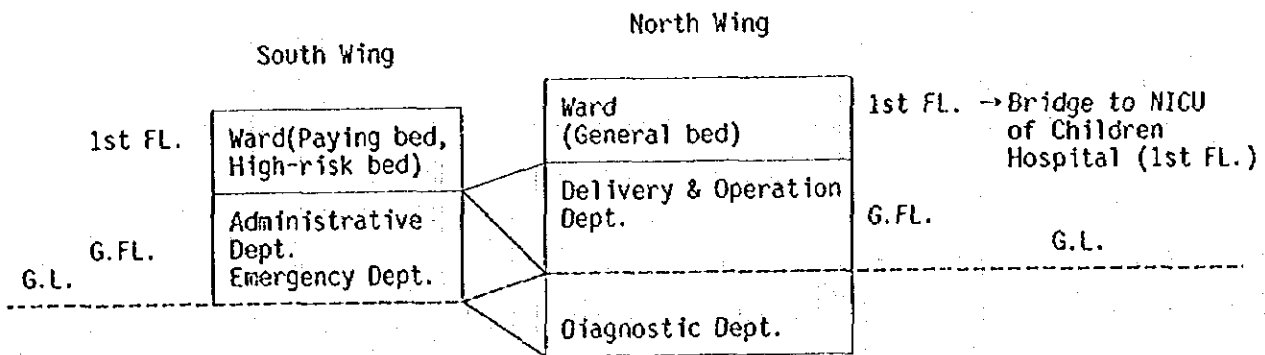
The boiler room, machine room, and power generator room, which are indispensable facilities, shall be prepared in another building, in consideration of noise and vibration produced by the working of the machine.

(2) Architectural Plan

1) Floor Plan

The ground floor of the South Building is provided with the administrative office and main entrance. An emergency entrance and emergency department consisting of examination room and observation room are also located on the same floor. This floor has a waiting hall of sufficient space fronting the courtyard, for family members of emergency patients.

Figure/Table 2-9 Functional Diagram of Main Building



The 1st floor of the South building is provided with 5 high-risk beds and 35 paying beds. The 1st floor of the North Building is provided with general ward with 85 beds, under two units of nursing.

The basement floor of the North Building has the examination department comprising X-ray room, pathology laboratory, blood bank, etc.

The ground floor of the North Building has the delivery & operation department, and central supply & sterilization room. A passage is constructed on the west of the building for connection with the existing Children Hospital, in consideration of cooperation with it (i.e., common use of NICU), so that movement from the delivery & operation department will be as short as possible.

(3) Section Plan

It is recommended that the OPD Building be a two-story building of as simple structure as possible, so that outpatients and their family members will feel comfortable there. The waiting hall, which requires large space in view of the present conditions in

hospitals in Pakistan, shall be six meters high, for the purpose of ensuring not only horizontally but also vertically sufficient space. Meantime, the floor level of the ground floor is planned to be about two meters lower than the ground level of semi-basement structure, It is expected that room temperatures will be kept lower in semi-basement structure than in ground structure during summer, through cool radiation caused by the exterior wall's being partly in contact with the ground. The sunken court is provided in front of the entrance, and a slope is constructed to facilitate the passage of wheelchairs and stretchers. In planning a sunken court, a problem is raised as to the prevention of rain water from coming into the building, but it can be solved by constructing a functional drain with more than one channel and of sufficient capacity.

The Main Building shall have a story height of four (4) meters, for ensuring sufficient air volume and thereby providing cool and comfortable living areas against very high temperatures during summer. Between the South Building and the North Building, there is a difference of elevation of half a story (two meters), as mentioned earlier, and two sloping corridors (one for patients, one for staff) are planned to be constructed on the east and the west, which facilitate the movement between the buildings. The South Building and the North Building each shall have a staircase on the transverse wall side east and west, for ordinary ascending and descending and for emergency evacuation.

(4) Structural Plan

1) Geometrical Investigation

According to the field investigations, the subsoil strata are almost same at three points of boreholes. The average subsoil strata is given in the following,

- 0.00 ~ 2.50m : Fairly plastic silty clay of soft consistency
- 2.50 ~ 6.00m : Fairly plastic medium to stiff silty clay of reddish brown color
- 6.00 ~ 7.50m : Fairly plastic reddish brown silty clay of medium consistency.
- 7.50 ~ 10.0m : Fairly plastic silty clay of stiff consistency

The water table was encountered from 9.4 to 9.6 meters depth from the G.L. In one of three, no ground water table was encountered. It will be no problem for excavating.

2) Foundation Plan

The foundations for this proposed structure are going to be the direct foundation, raft foundation and strip foundation. No consolidation will be occurred due to the pre-consolidation.

3) Structural Plan

The structural system for this proposed structure is going to be adopted the moment-rigid frame system.

4) Loadings

Loadings for this proposed structure shall be applied with considering the local condition and its usage.

a. Dead load

Dead load shall be determined by actual materials and finishings.

b. Live load

Live load is going to be determined with regulation of Pakistan and regulation of Japan. Typical live loads are shown as follows.

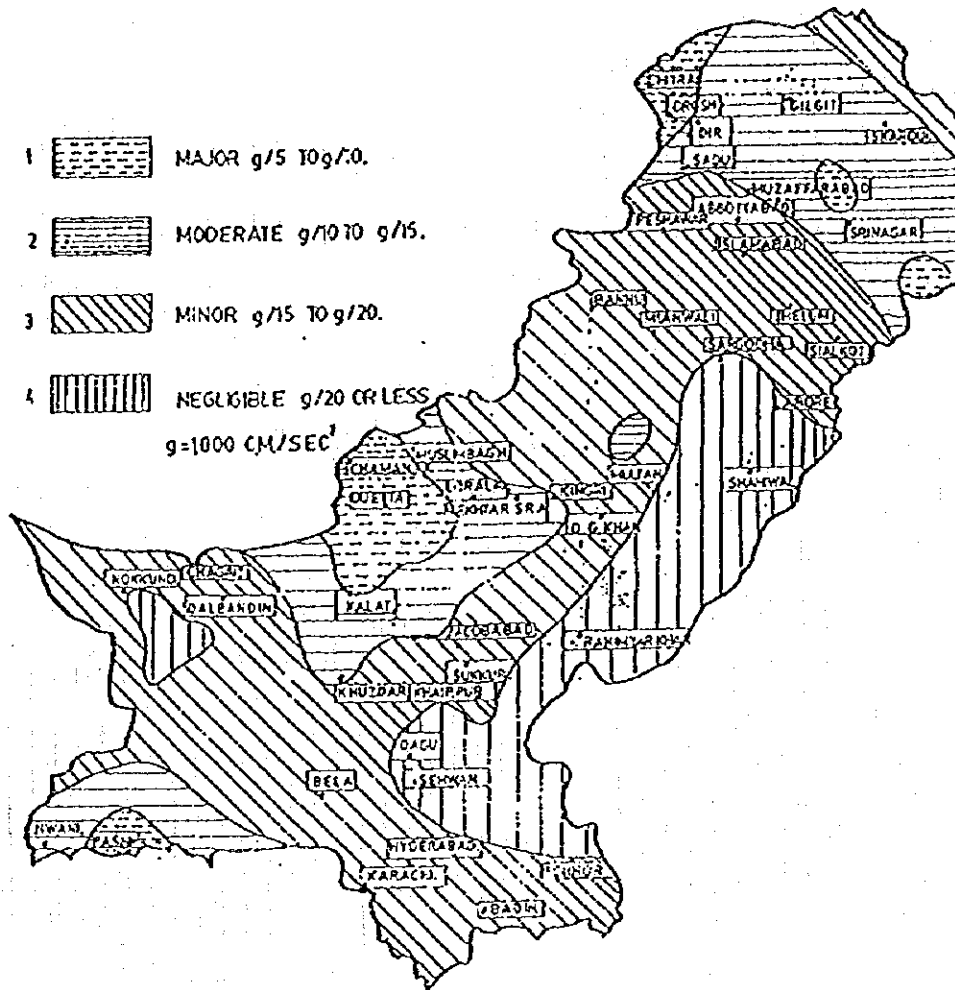
Figure/Table 2-10 Typical Live Load

Usage	Live load
Exam. Rm, Office	300 kg/m ²
Training Rm	300
Operation Theatre	300
Ward	180
Storage, Machine Rm	500
Roof	100

c. Seismic load

Seismic load is going to be determined by the following zoning.

Figure/Table 2-11 Seismic Zone Map in Pakistan



d. Wind load

Wind load shall be determined by regulation of Pakistan.

5) Material used

Material, which are going to be used, like concrete, reinforcement, brick and so on shall be obtained in Pakistan.

- Concrete : $F_c=210\text{kg/cm}^2$
- Steel deformation bar : $3,500\text{kg/cm}^2$
 $3,000\text{kg/cm}^2$
- Steel : $2,400\text{kg/cm}^2$

(5) Mechanical and Electrical Plan

Electrical Plan

1) Power Supply System

The facilities constructed under the Project are provided with electric power from the nearest electric power substation, which is one of the five substations in the PIMS premises, in three-phase, four-wire low voltage. In this substation, three transformers are installed (totaling to 4,500 KVA). As around 3,000 KVA of electric power is planned to be supplied to the existing facilities, it is possible to ensure the necessary amount of electric power (600 KW at the maximum), by installing an additional panel. A diesel generator of the necessary minimum capacity is installed as an emergency power source for the operation theatre, etc. Automatic voltage regulators (AVR) are installed for power sources for medical equipment, which have to control voltage fluctuations as much as possible.

PIMS is responsible for the remodeling of the substation and primary main wiring of the low-voltage distribution panel to be installed in the planned facilities.

2) Lighting and Socket Outlets System

Illuminance is decided on the basis of JIS, with the present conditions in Pakistan being taken into account. Fluorescent lamps, which are superior in efficiency, are used for light sources.

Socket outlets are of round, two-pin type with a grounding terminal and of round two-pin type without a grounding terminal, which are commonly used in Pakistan. Positions and specifications of outlets are decided according to types of power sources, capacity, connection methods of the pieces of equipment to be installed.

3) Lighting Protection and Ground System

Lightning rods and ridge conductors are installed for protecting the facilities from lightning. Pieces of medical equipment, power equipment and communications equipment are equipped with ground systems, as necessary.

4) Telephone System

Telephone installations are newly provided for the facilities to be constructed under the Project. Telephones are installed to the MDF in the existing Children Hospital from the main line on the south of the premises. The size of the incoming cable is of at least 100 circuits, with future expansion being taken into consideration.

For the circuit capacity needed for the facilities, the telephone exchange equipment (PABX) which is installed in the existing Children Hospital is expanded for common use in both facilities. The existing paging system is also expanded and improved for common use in both facilities.

PIMS is responsible for incoming cable laying up to the existing MDF within the Children Hospital, and bears the expenses for circuit connection.

5) Public Address System

Public address equipment is installed in a room of the facilities, for announcement throughout the facilities and emergency announcement, under centralized control. The auditorium is equipped with the necessary A/V system.

6) Master TV Antenna System

A television master antenna is installed within the facilities, and the necessary rooms are provided with outlets. The master antenna is of VHF · SHF.

7) Interphone

Nurse call are installed between the nurse stations and wards. Interphones are installed in the generator room, the machine room, etc., for liaison.

8) Automatic Fire Alarm

Automatic fire alarms are installed, for detecting a fire as early as possible and preventing the spread of damage. Gas leakage alarms are installed in those places where inflammable gases are used. As Pakistan does not have established standards, the Fire Services Act of Japan is referred to.

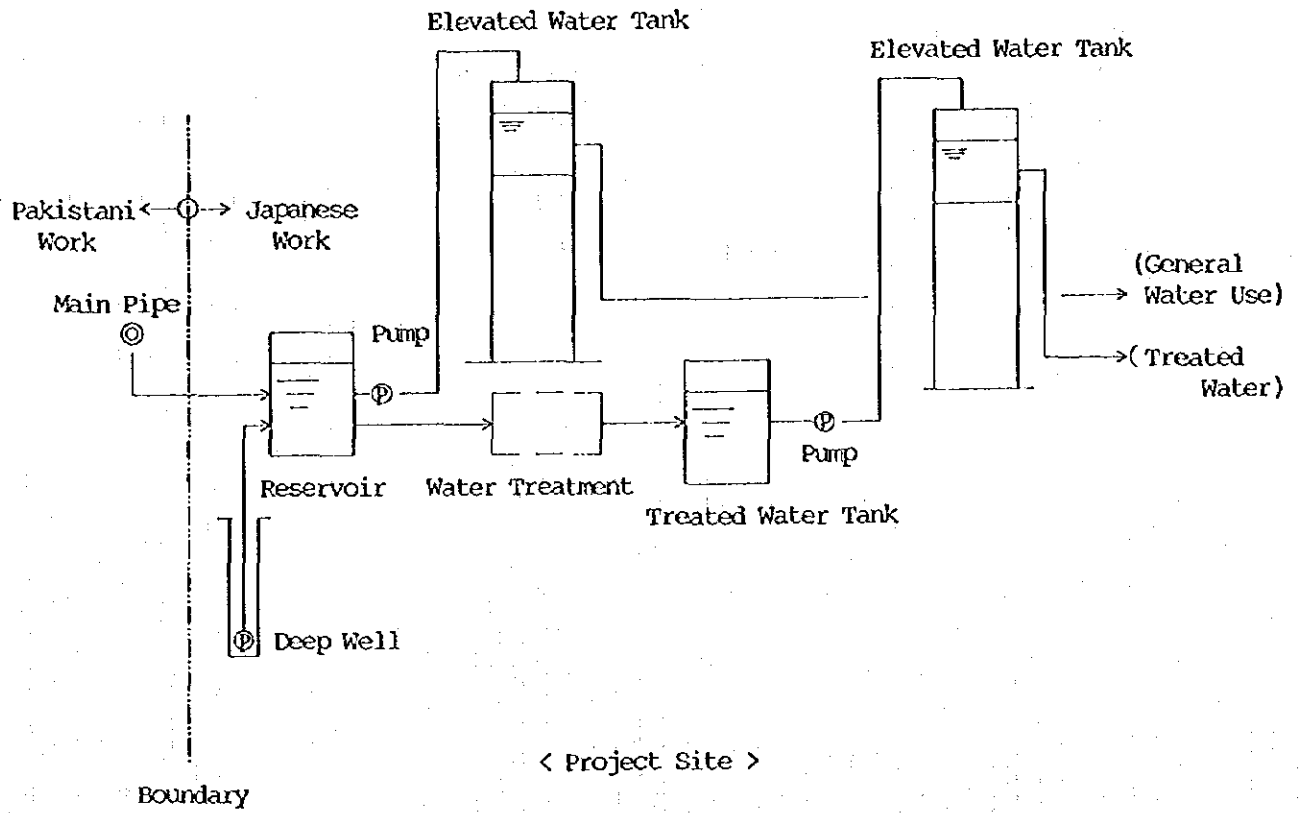
Mechanical Plan

1) Water Supply

City water and well water are used as water sources for the facilities, with the purpose of ensuring stable supplies of water, because water service in PIMS is in water shortage condition. City water is led from the nearest water main pipe, while well water is taken from well to be bored in the planned construction site. As there is no city water main laid in the neighborhood of the site, it is necessary to lay a branch up to the site (PIMS is responsible for this work). According to the existing data, wells are usually about 40 feet (about 120 meters) deep, so a well of about the same depth is bored in the site. Well water in the PIMS premises contains a great deal of calcium and evaporation residues, with high total hardness, according to the analysis data. It cannot be used without treatment for drinking water, pathological examination, boilers, and the cooling tower. Well water in the PIMS premises needs softening. It is, however, used without treatment for general use other than the abovementioned uses.

Water is stored in the receiving tank to be newly constructed, pumped to the elevated tank, and distributed to the necessary places under the gravity system. The receiving tank for treated water is constructed on the ground, with the purpose of preventing water contamination. The flow of water supply is shown as follows.

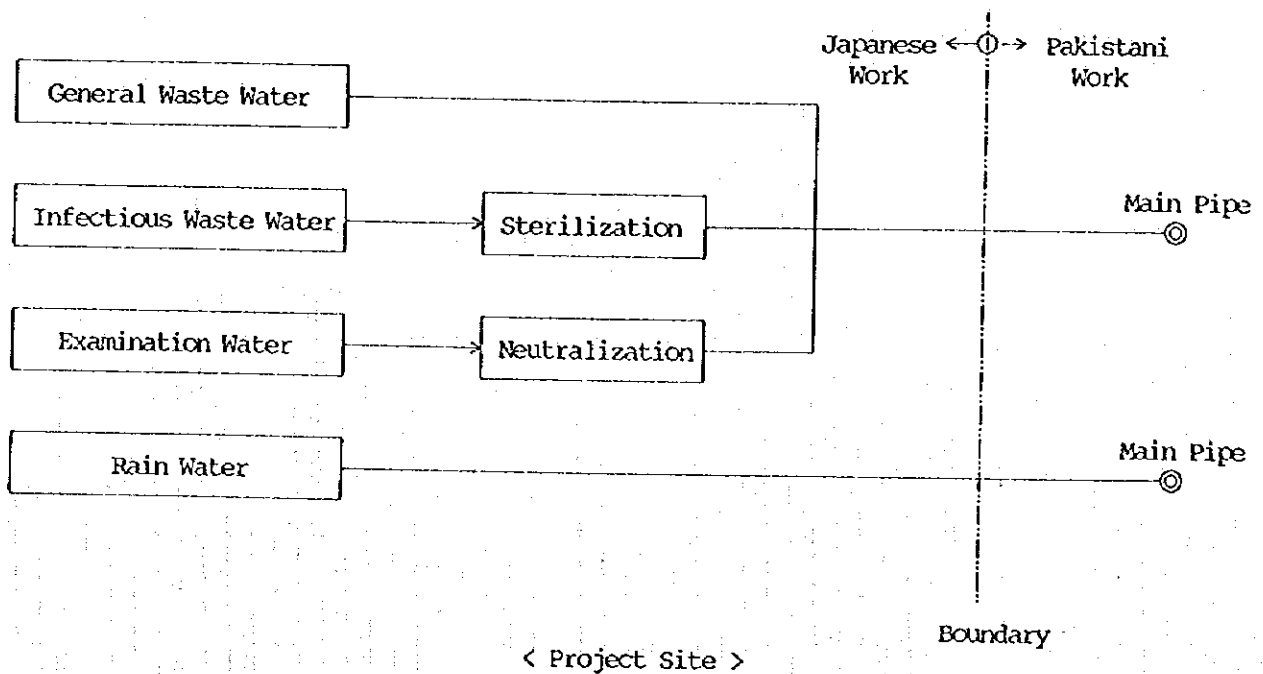
Figure/Table 2-12 Flow of Water Supply



2) Drainage

Waste water from everyday living is discharged directly to the draining main of the city. Waste water produced in medical services and that produced in medical examination are discharged directly to the city draining main, after disinfection and neutralization, respectively. Waste water containing organic solvents or heavy metals is stored in a container and subjected to adequate treatment. Rain water is discharged directly to the nearest draining main. The flow of waste water is shown as follows.

Figure/Table 2-13 Flow of Waste Water



3) Hot Water Supply

Hot water is supplied to operation theatre, delivery room, central supply and sterilization room, kitchen, shower room in the lodgings for trainees. Hot water is supplied, under the central system whose heat source is steam, from the hot water tank to the necessary places.

4) Sanitary Fixtures

Water closet in the public areas are of Asian style, while those in the private areas are of Western style. As pieces of sanitary fixtures are easily broken generally, those of local make are used as much as possible, for easy repairs.

5) Gas Installations

As a gas main has been laid along the premises main road which runs through the planned construction site north and south, a branch is laid here for the facilities. City gas is used for air conditioning, hot water supply, heat source for kitchen, and pathological examination. As gas is supplied in medium pressure, pressure reducing devices are installed in those places where low-pressure gas is used.

6) Fire-Protection System

As Pakistan has no established standards for fire-protection, systems commonly employed in the country are used. The facilities are equipped with indoor hydrants and fire extinguishers.

7) Medical Gases

The operation theatre, delivery room, and ward of the facilities are supplied with oxygen and nitrous oxide and equipped with suction apparatus. As a large quantity of oxygen is consumed, it is recommended that a liquefied oxygen tank be constructed, with the purpose of coping with the present transportation conditions in Pakistan. As nitrous oxide is not consumed in a large quantity, it is supplied from a cylinder under the central system.

8) Laundry

The facilities are equipped with a laundry for inpatients and staffs. As pieces of equipment such as washing machines, hydro extractor, dryer machine and presses are adopted to be often out of order due to frequent use, local products are employed, with the purpose of ensuring spare parts and repairs.

9) Kitchen

The facilities are equipped with a kitchen for trainees, staff members and inpatients. Most of the necessary kitchen equipment are of local make, such as ovens (Tandori) for baking "Nan", the staple food for the people of Pakistan.

10) Air Conditioning

a. Basic Idea

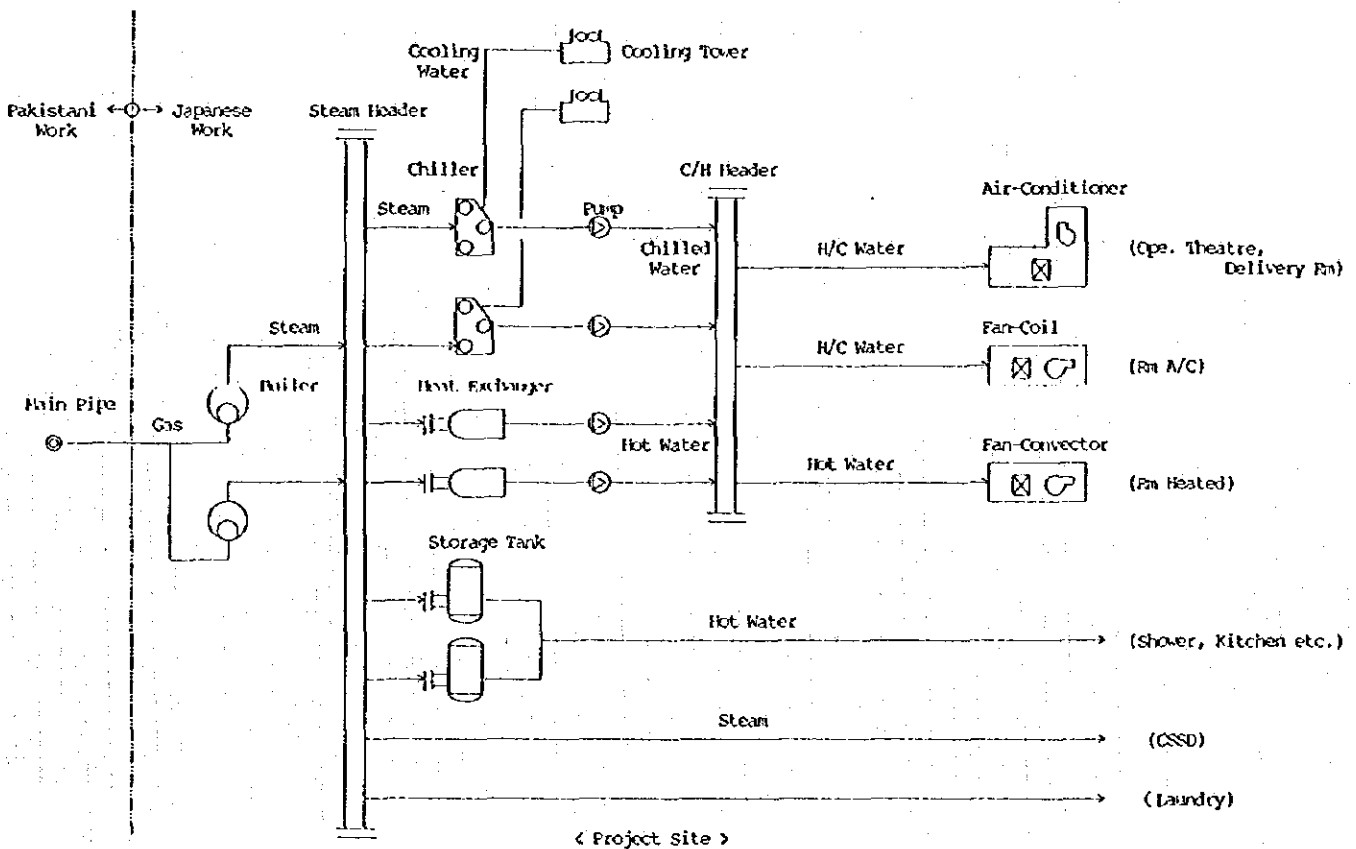
Comprehensive consideration is necessary in selecting those rooms which need air conditioning, for ensuring the necessary functions of a training hospital, with the meteorological conditions in Islamabad and the financial situation of PIMS being taken into account.

In the facilities, heating and cooling apparatuses are installed, as a general rule, in the operation theatre, delivery room, and examination room, where air conditioning is necessary in view of their functions. The paying ward are also provided with air conditioning.

b. Heat Source

For the heat source of air conditioning, gas is used which is much more inexpensive than electric power in running cost. As in the existing Children Hospital, the central system consisting of gas-burning boilers and absorption-type chiller is employed as the heat source. The flow of heat source is shown as follows.

Figure/Table 2-14 Flow of Heat Source



c. Air Conditioning

As operation theatre and delivery room need to be clean to a certain extent, air conditioning using higher-efficiency filters is employed in these rooms. For the other rooms, the fan coil unit system using cold and hot water is employed. In those rooms without air conditioning, ceiling fans are installed.

In the existing children Hospital, it is pointed out that maintenance is difficult because the fan coil units are concealed in ceilings. In the facilities to be constructed, therefore, apparatuses and pipes are exposed wherever possible.

d. Ventilating

As heat and offensive smells are produced in large quantities in the boiler room, electric power room, generator room and laundry, the mechanical air supply and exhaust system is employed. In the lavatories and shower rooms, the exhaust system is employed.

The kitchen is ventilated through a grease filter, because fat-containing combustion gas is produced in it.

(6) Building Materials Plan

Most of the building materials and building construction methods selected will be available in Pakistan.

1) Exterior Finishing Material

a. Exterior Wall

Exposed concrete and paint finishing (local method) will be adopted. The concrete block with air role will be installed on some exterior wall to protect from sun light.

b. Roof

Highly reliable asphalt waterproofing will be applied to the roof surface. To enhance the insulation properties at the top floor, the hollow tile will be installed on flat roof.

2) Interior Finishing Materials

a. Floors

The floors in the consulting rooms, treatment rooms, wards, corridors, and other rooms where there is a danger of contamination will be finished in ceramic tiles, which are easy to keep clean.

Ceramic tile and/or terrazzo (site work) floors will also be laid in rooms cleaned with water, e.g., toilets, showers, examination rooms, operation theaters, and scrub-down rooms.

b. Walls

The walls will be tiled from the floor to a height of about 1.5 meters in consulting rooms, treatment rooms, corridors, and other rooms where the walls could become contaminated. To guarantee that these walls can be wiped off easily, PVC plastic enamel paint will be applied above the tiles.

c. Ceilings

In some parts where overhead piping has been installed, ceilings will hide the piping, while the concrete ceilings in other rooms will simply be painted to prevent the propagation bacteria.

3) Fittings

Aluminum windows will be used as exterior fittings to protect the building from the heat and humidity of Pakistan. Most of the interior fittings will be made of wood. Doors in the operating area and other places where stretchers will be used will be steel to withstand the impact of the stretchers.

An overview of the above-mentioned construction methods are shown as follows.

Figure/Table 2-15 Building Material Plan

	Local method	Adopted method	Reasons
Roof	Asphalt water proofing, Hollow tile	Asphalt waterproofing, Hollow tile	Popular local method will be applied.
Exterior walls	Exposed concrete, Paint	Exposed concrete, Emulsion paint	High performance paint will be used to simplify maintenance.
Fittings	Aluminum, Wood	Aluminum, Wood Steel, Stainless steel	The exterior will, in principle, be aluminum. The interior will be mostly aluminum. Steel or stainless steel will be used wherever necessary.
Interior walls	Tile, Paint	Tile, Enamel paint	High performance paint will be used to simplify maintenance.
Flooring	Tile, Terrazzo	Tile, Terrazzo	Popular local method will be applied to simplify maintenance.
Ceilings	Paint, Rock wool sound-absorbent panels	Paint, Rock wool sound-absorbent panels	Board ceilings will be partly installed to hide pipes and protect the rooms from dust. Popular local method will be applied.

(7) Equipment Plan

1) Basic Guidelines

The medical equipment plan will be conducted in line with the following basic guidelines.

- a. It will be basic equipment needed to be an obstetric teaching hospital and to conduct training.
- b. The equipment will be appropriate for the facility to be constructed and suited to the technical capabilities of medical personnel.
- c. It will be equipment needed to implement the technical cooperation.
- d. The equipment will not require special chemical reagents or consumables difficult to obtain in Pakistan.
- e. The equipment will not be expensive to maintain, so that it will be feasible to operate and maintain them in Pakistan.
- f. It will be equipment which can be maintained by the maker's agents in Pakistan.

2) Range of Medical Equipment

Some of the medical equipment will use spare parts and consumable goods. To give Pakistan time to find sources for the consumable materials, quantity of spare parts and consumable goods will be decided depend on equipment specifications.

3) Training in the Operation of the Equipment

The need for training in the operation of each piece of equipment will be considered, and in cases where such training is deemed necessary, the actual users will be given training in the operation of the equipment when the equipment has been installed.

4) The specifications of Major equipment and planned equipment list are shown as follows.

Figure/ Table 2-16 Specifications of Major Equipment (1)

Equipment	Major specifications	Appropriateness of specifications
General Radiography System (500mA)	<ol style="list-style-type: none"> 1) X-ray table Bucky and table-top slide type 2) Stand Bucky-type 3) High voltage generator 150kV 500mA 4) X-ray tube 150kHU 	Installed in the X-ray room, this machine will be used to take simple X-ray photos of the patients entire bodies.
Portable X-ray Unit (125KV)	<ol style="list-style-type: none"> 1) Type: Inverter 2) Tube voltage: 125kV 3) mAs: 50 mAs 4) X-ray tube: 140kHU 5) Mobility: Manual type 6) Power source: Cord type 	The hospital staff will use this unit to take X-rays of seriously ill patients who can not be moved from their beds to the X-ray room. It can X-ray a patients entire body or parts of the body. A flatter voltage waveform can be obtained for application to the X-ray tube than with a conventional condenser type, clearer images can be obtained; and again since it does not use condensers, which have a limited lifetime this type rarely malfunctions because its main components are semiconductors. Models which must be pushed to various locations in the hospital by an X-ray technician are difficult to move if there are any level differences, even small ones, in the corridors. So a self-propelled type will be needed. Because the electric outlets in the wards may not always be in appropriate locations, a cordless model will be chosen.
Linear scan	<ol style="list-style-type: none"> 1) Diagnostic modes: B, M, B/M 2) Probes: Sector, Linear 3) Recording unit 	This machine will be used to check on the condition of the organs (fetus for this case) inside the body. Because it permits non-invasive examinations which place little burden on the patients and is easy to use, it is an extremely useful and effective device. Recording unit will be supplied for recording and analyze at diagnostic.
Spectrophotometer	<ol style="list-style-type: none"> 1) Wavelength range: 200,100nm 2) Wavelength display: 0.1nm 3) Wavelength accuracy: + -1.0nm 4) Monochromator slew rate: 6,000nm/min 	Used for measuring acids, enzymes, and protein contained in blood and urine. It is the most basic analytical apparatus used in the examination room.

Specification of Major Equipment (2)

Equipment	Major specifications	Appropriateness of specifications
Electrolyte Analyzer	<ol style="list-style-type: none"> 1) Sample: Blood, blood plasma, Serum, Urine 2) Range: Na: 80-200mmol/L K : 0.50-9.99mmol/L Cl: 50-200mmol/L 3) Urine: Na: 10-350mmol/L K : 5-250mmol/L Cl: 10-350mmol/L 	Used for measuring electrolytes in blood and urine. The use of a flame photometer is another method of electrolyte measurement, but large-scale apparatus is needed for using flames. The proposed equipment is therefore considered appropriate.
Blood Gas Analyzer	<ol style="list-style-type: none"> 1) Measure: pH, pCO₂ pO₂ 2) Range: pH, 6.00-8.00Ph 3) pCO₂: 5-250mmHg 4) pO₂: 0-700mmHg 	Used for measuring Ph, carbon dioxide and oxygen concentration in blood. This equipment gives an accurate understanding of the blood conditions of the patient. Measurement results make possible diagnoses of patients.
Cardiotocography (CTG) Monitor	<ol style="list-style-type: none"> 1) Measure: fetus heart, labor distress 2) Method: Pulse doppler Center frequency: 1.15MHz Heart are Counting rate: 50-210BPM Tocotransducer range: 0-100 Recording range: 30-210BPM 	Used in the labour and delivery room, for monitoring the neonate at childbirth and the conditions of the mother. For fetal heartbeat counting, the ultrasonic doppler method are adopted, which do not give much impact on the mother's body. For labour measurement, those types of equipment which allow the lateral method (which does not give much impact on the mother's body) are adopted. A recording device shall be attached, for recording measured values.
Patient Monitor	<ol style="list-style-type: none"> 1) Monitoring: ECG, Respiration, SpO₂, Blood pressure 2) Method: ECG, Respiration/3 electrode SpO₂, Pulse ray Blood pressure: Cuf 3) Cable connection 4) Recorder, cart 	Used in operation theatre and observation room, with the purpose of watching information from patients under or after operation and patients who are in serious condition. The equipment shall be of specifications which allow electrocardiography and measurement of respiration, epidemic oxygen concentration and blood pressure through wire. A recording device shall be attached, for recording measured values.

Specification of Major Equipment (3)

Equipment	Major specifications	Appropriateness of specifications
Difibrillator	<ol style="list-style-type: none"> 1) Output energy level: 3-360J 2) Paddle: External 3) ECG Function 4) Cart 	Used to bring the patient back to life. Although it is not used in everyday medical treatment, it becomes necessary in an emergency. The most basic function of electrocardiography shall be attached, with a stand for moving.
Anesthesia Apparatus	<ol style="list-style-type: none"> 1) Type: Oxygen and nitrous oxide manual flow volume control 2) Vaporizers: Flothane, Halothane 	This equipment is used to perform general anesthesia of a surgery patient with vaporized anesthetic. It will be the simplest available machine. The operator will manually control the oxygen and nitrous oxide flow volume. Two kinds of vaporizers will be included because in, physicians use either Flothane or Halothane, depending on the condition of the patient. Because operations of this facility are not so long, a manual type respirator will be sufficient.
High Pressure Steam Sterilizer	<ol style="list-style-type: none"> 1) Internal capacity: 200-250 liters 2) Door: Manual single swinging door 3) Operation: Automatic 	The pressurized steam sterilizer will be used to sterilize treatment and surgical equipment. They will have sufficient capacity to fully sterilize operation theatre's equipment, the type of equipment most often sterilized. The door will be a manually operated single swinging door. The equipment will be automatically programmed.
Obstetric Operation Table	<ol style="list-style-type: none"> 1) Vertical Adjustment method: Manual hydraulic pump 2) Incline adjustment: Manual 3) Accessories: Foot rests; screens; arm, body, shoulder, and knee supports 	Each table will be equipped with special accessories suited to its use by obstetric surgery patients. It will be the simplest available. The staff will raise and lower them with manual hydraulic pumps, and adjust their incline manually. It will be equipped with various accessories needed in operation theatre including the most important item, an anchor for the lithotomy position.
Electro Surgical Unit	<ol style="list-style-type: none"> 1) Method: Floating system 2) Output: Bipolar Cutting: 250-350W Coagulation: 100-120W 	Basic equipment for operation, being used for incision, hemostasis, and blood coagulation under operation. The floating type is adopted, which is commonly used in obstetrical operations. The monopole system is employed, which can well meet obstetrical operations. The outputs as mentioned in the left column are set for incision and blood coagulation.

Figure/Table 2-17 Equipment List (1)

No.	Name of Equipment	Qty
Radiology Dept.		
1	General Radiography System (500mA)	1
2	Mobile X-ray Unit (125kV)	1
3	X-ray Film Development Equipment	1
4	Film Illuminator (wall mounted, 4 films)	1
5	Radiology Instruments Set	1
6	Linear Scan w/Cart (curvilinear with vaginal)	1
Pathology Laboratory		
1	Spectrophotometer	1
2	Water Bath	1
3	Pipette Washer and Dryer	1
4	Clinical Rotator	1
5	Laboratory Autoclave	1
6	Drying Oven	1
7	Hot Air Sterilizer	1
8	Electronic Balance	1
9	Clinical Refractometer	1
10	Automatic Blood Cell Counter	1
11	Table Top Centrifuge	2
12	Hematocrit Centrifuge	1
13	Tolly Counter (manual type)	2
14	Incubator	1
15	Blood Bank Refrigerator	2
16	Auto Dispenser	1
17	Micropipets	4
18	Research Microscope (binocular)	3
19	Laboratory Center Table	2
20	Water Distilling Apparatus	2
21	Electrolyte Analyzer (Na, K, Cl)	1
22	Blood Sedimentation Set	1
23	Freezer (for - 30°C)	1
24	HIV Testing & HBsAg Testing Set (ELISA)	1
25	Digital Bilirubin Analyzer	1
26	Blood Gas Analyzer (pH, pO ₂ , pCO ₂)	1
27	Storage Cabinets	1

Equipment List (2)

No.	Name of Equipment	Qty
28	<i>Laboratory Instruments Set</i> Out-Patient Dept.	1
1	Obstetric Examining Table	4
2	Obstetric Examining Unit	4
3	Examining Table	10
4	<i>Linear Scan w/Cart (curvilinear with vaginal)</i>	1
5	Doppler Fetal Detector	7
6	Film Illuminator (desk type, 2 films)	6
7	Diagnostic Set	6
8	Sphygmomanometer (stand type)	14
9	Weighing Scale	2
10	Measuring Scale	1
11	Obstetric Instruments Set	2
12	Cusco's Vaginal Speculum set	4
13	Traube's Obstetric Stethoscope	14
14	Kotaka's Placenta Forceps set	4
15	Refrigerator	4
16	Instruments Cabinet	6
17	Stethoscope (dual type)	14
18	Electrocardiograph (3-ch type)	2
19	<i>Cardiotocography (CTG) Monitor</i>	2
20	Boiling Sterilizer (desk type)	6
21	Examining Light (stand type)	4
22	Clinical Instrument Set	4
23	Bed with Mattress Labor Room	5
1	Labor Bed w/Mattress	9
2	Automatic Infusion Pump	3
3	Cardiotocography (CTG) Monitor	2
4	IV Pole (stand type)	6
5	Oxygen Flowmeter w/Humidifier Bottle (for piping system)	3
6	Suction Bottle (for piping system)	1
7	Stethoscope (dual type)	6
8	Sphygmomanometer (stand type)	6
9	Doppler Fetal Detector	2

Equipment List (3)

No.	Name of Equipment	Qty
10	Linear Scan w/Cart	1
11	Boiling sterilizer (desk type)	2
Delivery Room		
1	Delivery Table	7
2	Vacuum Extractor	2
3	Doppler Fetal Detector	3
4	Infant Warmer	4
5	Infant Dressing/Treatment table	3
6	Infant Scale (automatic)	3
7	Operating Light (standing type)	7
8	Suction Unit w/Floor Stand	7
9	Normal Delivery Instrument Set	30
10	Cardiotocography (CTG) monitor	5
11	Instruments Trolley	7
12	Stretcher	2
13	Stethoscope (dual type)	7
14	Kick Bucket	7
15	IV Pole (stand type)	7
16	Infant Bath	4
17	Infant Portable Incubator	4
18	Wheelchair	2
19	Infant Laryngoscope and Resuscitation Set	3
20	Autoclave (desk type)	1
21	Instruments Cabinet	2
22	Refrigerator	1
Operation Theatre		
1	Obstetric Operation Table (oil-hydraulic foot pedals)	4
2	Aus-Suction Unit	2
3	Suction Unit w/Floor Stand	4
4	Infusion Pump	4
5	Operating Light (combination type)	4
6	Anesthesia Apparatus	4
7	Patient Monitor w/Recorder & Cart	4
8	Film Illuminator (wall mounted, 4 films)	4
9	Instruments Cabinet	4

Equipment List (4)

No.	Name of Equipment	Qty
10	Abortive Instruments Set	8
11	Cesarean Section Set	12
12	Refrigerator	2
13	Electro Surgical Unit	4
14	Stretcher	2
15	IV Pole (Stand type)	8
16	Laryngoscope Set	4
17	Difibrillator w/Stand	1
18	Hysterectomy Set (for abdomen)	4
19	Laparotomy Instrument Set (for abdominal surgery)	2
20	Resuscitator for Both Neonate and Adult	4
21	Laparoscope (for sterilization)	2
22	Vaginal Operation Set	4
23	Operation Instrument Set	4
24	Infant Warmer	1
Recovery Room		
1	Bed w/Mattress	10
2	IV Pole (stand type)	10
3	Instruments Cabinet	2
4	Instruments Trolley	2
Ward		
1	Bed w/Mattress	125
2	Bedside Cabinet	125
3	Doppler Fetal Detector	4
4	Ultrasonic Nebulizer w/Stand	4
5	Diagnostic Set	8
6	Film Illuminator (wall mounted, 2 films)	4
7	Stretcher	4
8	Suction Unit	4
9	Instruments Cabinet	8
10	Stethoscope (dual type)	12
11	Sphygmomanometer (desk type)	12
12	Overbed Table	125
13	Baby Bassinet w/Stand Baby Bedside Cot	62
14	Instruments Trolley	8

Equipment List (5)

No.	Name of Equipment	Qty
15	Prescription Counter	8
16	Ward Instrument Set	4
17	Obstetric Examining Table	1
18	Examination Light (stand type)	1
Nursery Room		
1	Phototherapy unit	2
2	Ictrometer	1
Mortuary		
1	Mortuary Refrigerator (2 bodies)	2
2	Mortuary cot	1
Emergency Room		
1	Obstetric Examining Table	2
2	Obstetric Examining Unit	2
3	Examining Table	2
4	Suction Unit	4
5	Film Illuminator (wall mounted, 2 films)	1
6	Diagnostic Set	5
7	Sphygmomanometer (desk type)	5
8	Stretcher	2
9	Refrigerator	1
10	Emergency Cart	2
11	Doppler Fetal Detector	1
12	Instruments Cabinet	2
13	Bed w/Mattress	10
14	Cusco's Vaginal Speculum Set	2
15	Examining Light (stand type)	2
16	Infant Laryngoscope and Resuscitation Set	1
17	Clinical Instrument Set	4
18	Difibrillator w/Stand	1
19	Obstetric Instrument Set	4
Pharmaceutical Room		
1	Prescription Counter	4
2	Medical Refrigerator	2
Training Dept.		
1	Overhead Projector	2

Equipment List (6)

No.	Name of Equipment	Qty
2	Slide Projector	1
3	TV Set	3
4	VTR Set	3
5	Copy Machine	2
6	Screen	2
7	Photographic Equipment Video Camera	1
8	Still Camera	1
9	Computer System w/Printer (training)	1
10	Computer System w/Printer (out-patient)	2
11	Vehicles	2
12	Childbirth Phantom	1
13	Uterine Cervical Model	1
14	Slide Projector Set	1
15	Speaker System	1
For Maintenance		
1	General Purpose Maintenance Tool Set	1
2	Electrical Maintenance Tool Set	1
3	Electric Tester	1
Sterilization Room (CSSD)		
1	High Pressure Steam Sterilizer	2
2	Ultrasonic Cleaner	1
3	Instrument Sterilizing Tray (L.M.S)	12
4	Cast (square, L.M.S)	12
5	Forceps Stand	12
6	Working Table	4
7	Instruments Carriage	2
8	Sterilizing Instruments Storage Cabinet	10
For in Provincial area		
District Head Quarter Hospital (DHQ)		
1	Delivery Table	2
2	Linear Scan w/Cart	2
3	Doppler Fetal Detector	2
4	Operating Light (stand type)	2
District Public Nursing School		
1	Childbirth Phantom	11
2	Uterine Cervical Model	11

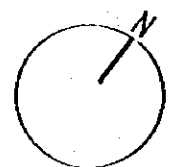
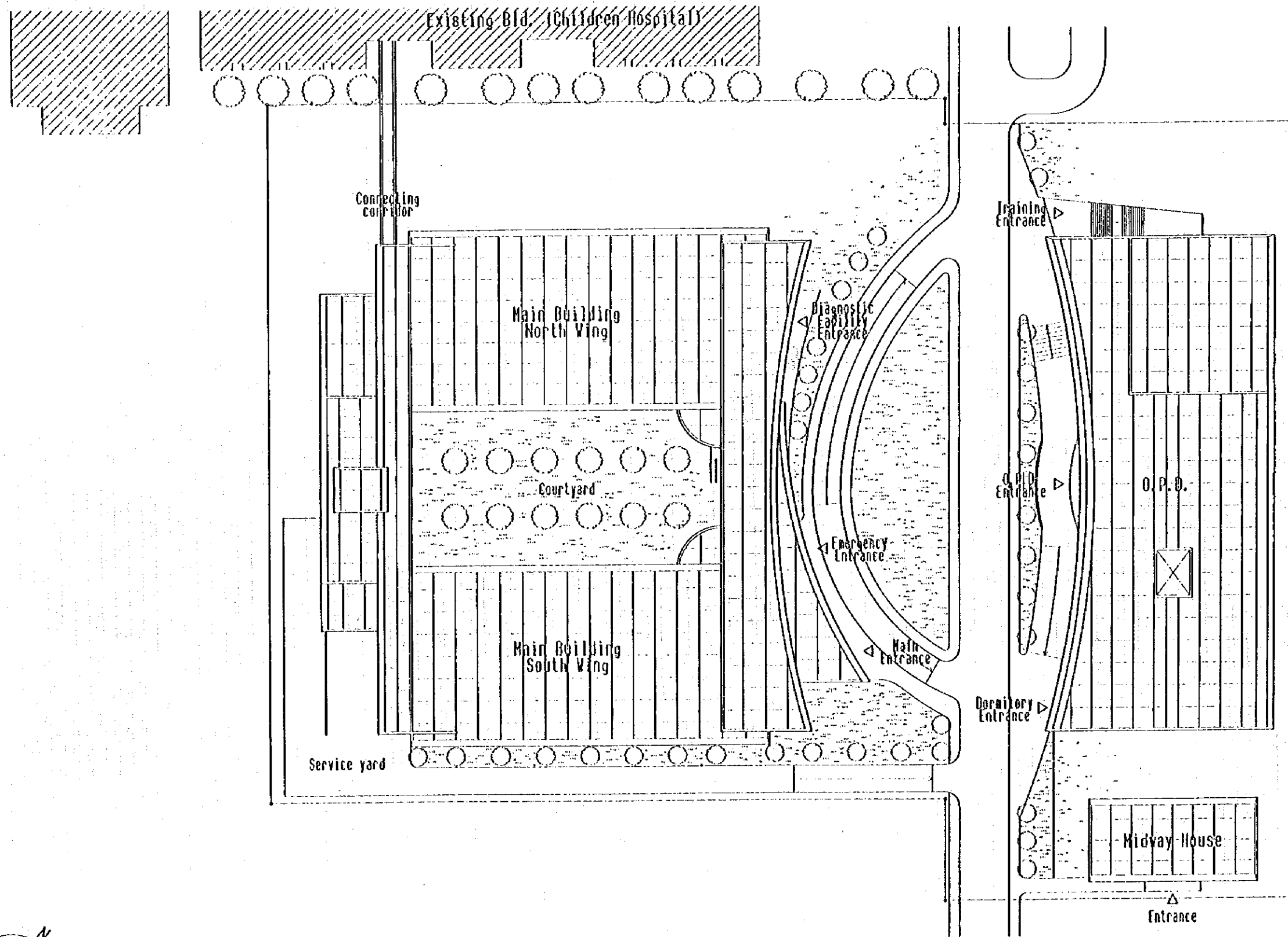
(8) Basic Design Drawings

Figure/Table 2-18 Floor Area

Name of Buildings	Floor Area	Each Building
OPD Building	1st F. 1,642 Ground F. 1,686 (Semi-basement)	3,327
Midway House		183
Main Building	2nd F. 1st F. Ground F. (Partly Basement)	7,086
Total		10,596m ²

Figure/Table 2-19 Drawing List

Name of Drawings	Scale
Site Plan of the MCH Centre	1/600
Ground Floor Plan	1/400
1st Floor Plan	1/400
Basement Floor Plan	1/400
Main Building Elevation - 1	1/300
Main Building Elevation - 2	1/300
OPD and Midway House Elevation	1/300
Section	1/300



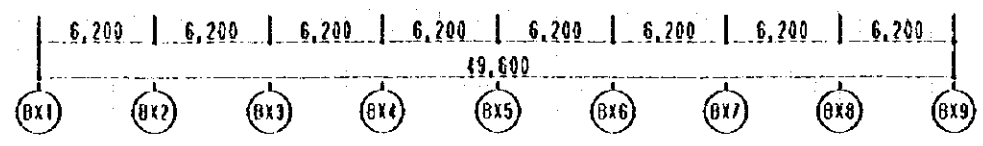
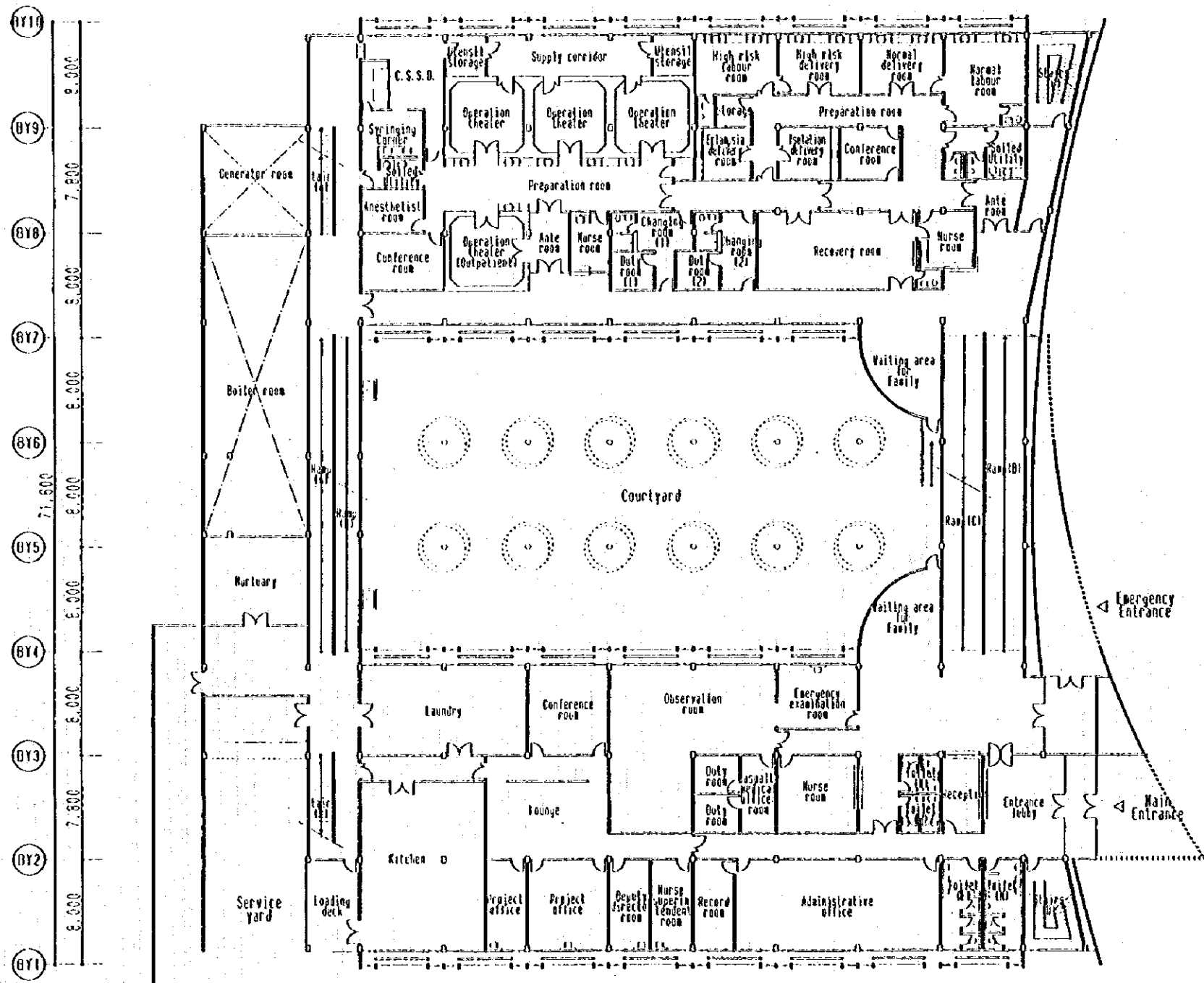
Maternal and Child Health Center
The Islamic Republic of Pakistan

SITE PLAN
1/600

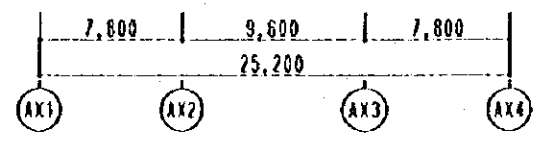
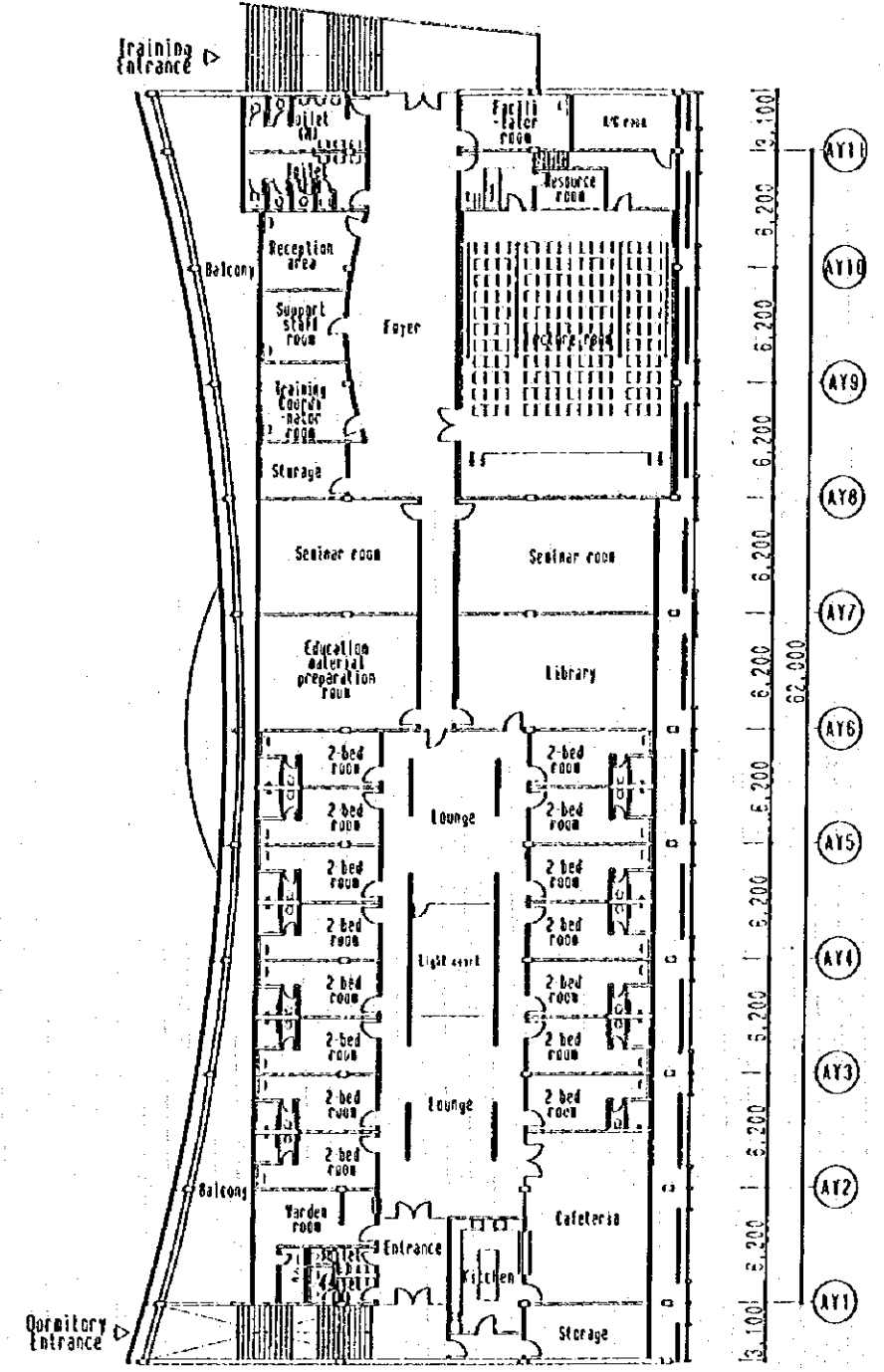




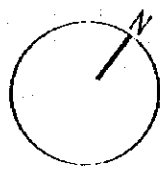




Main Building

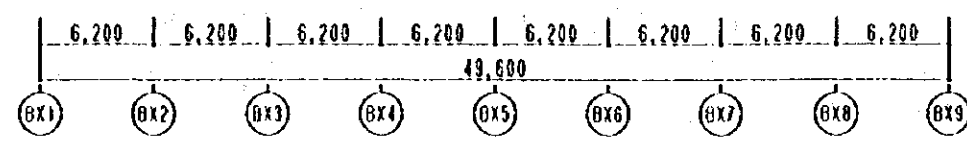
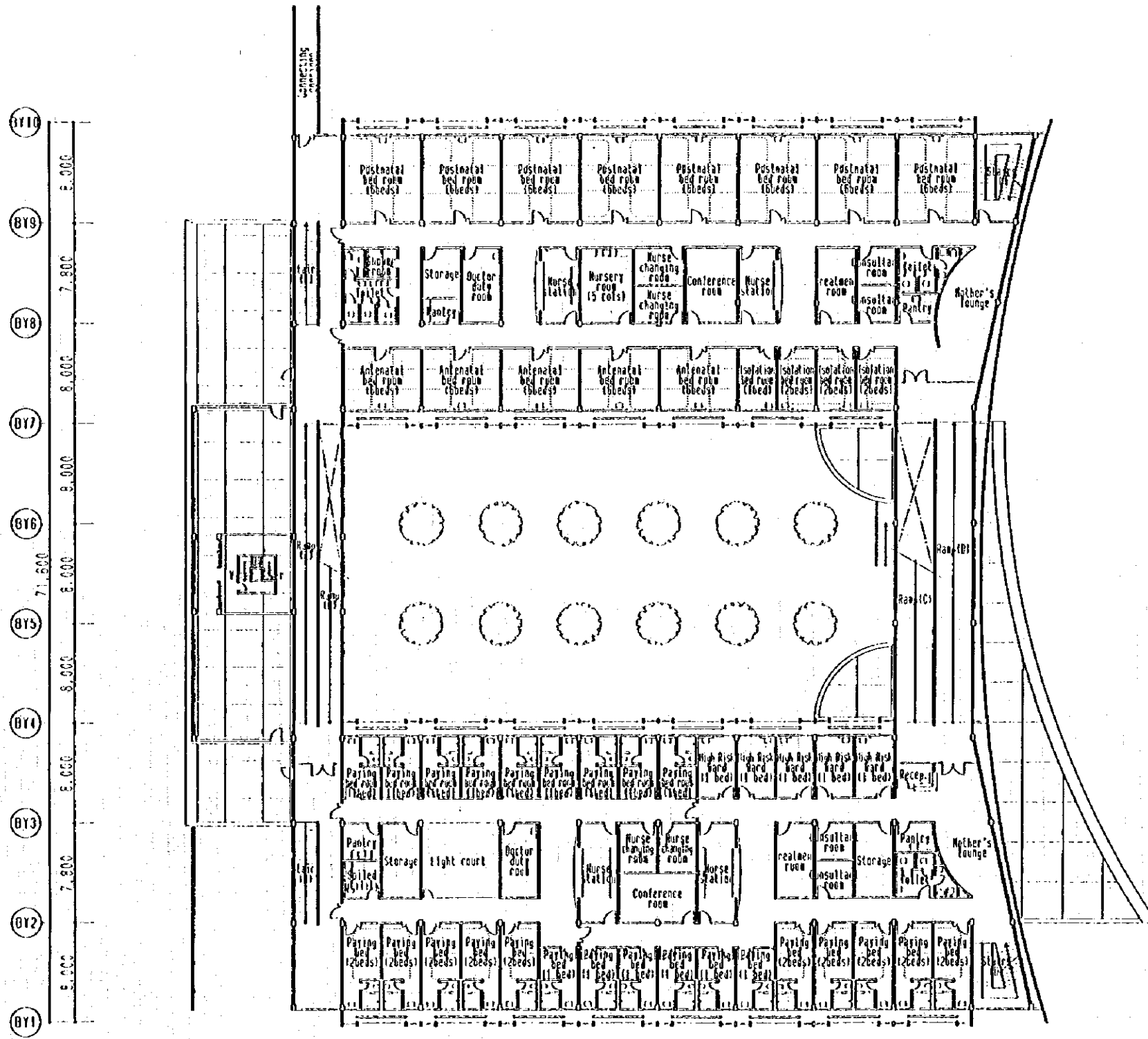


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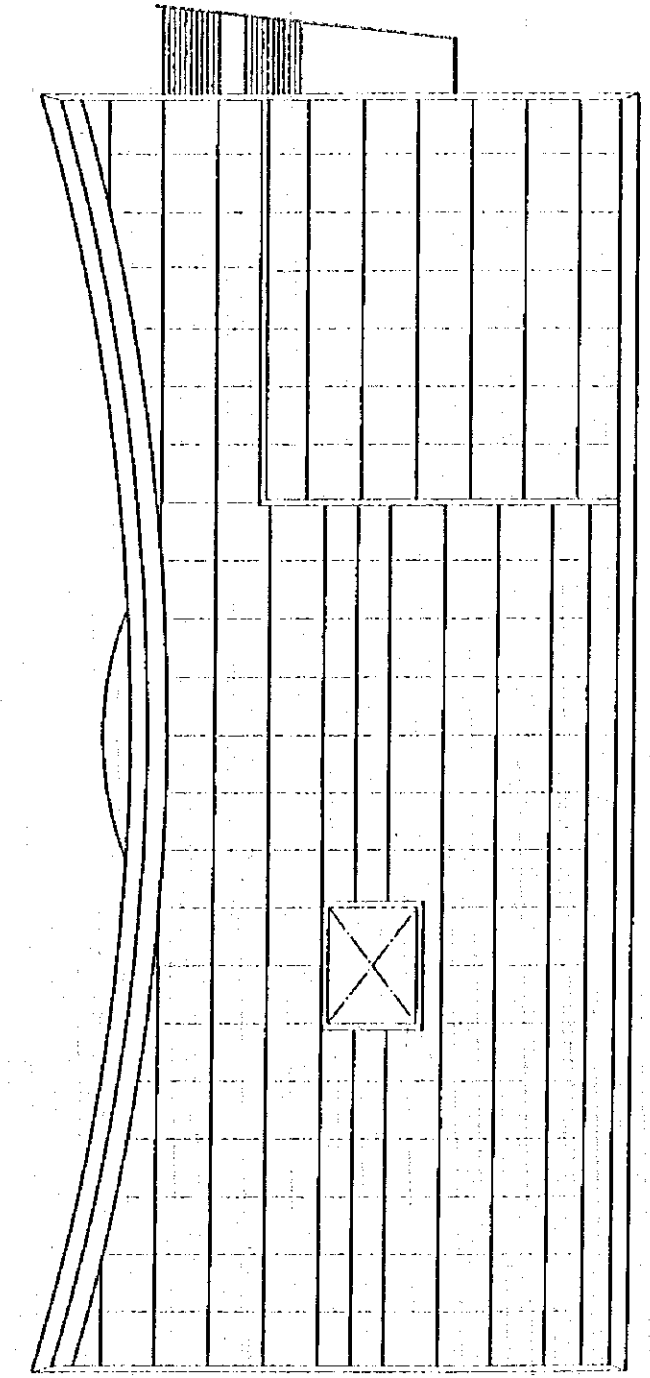


Maternal and Child Health Centre
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GF PLAN
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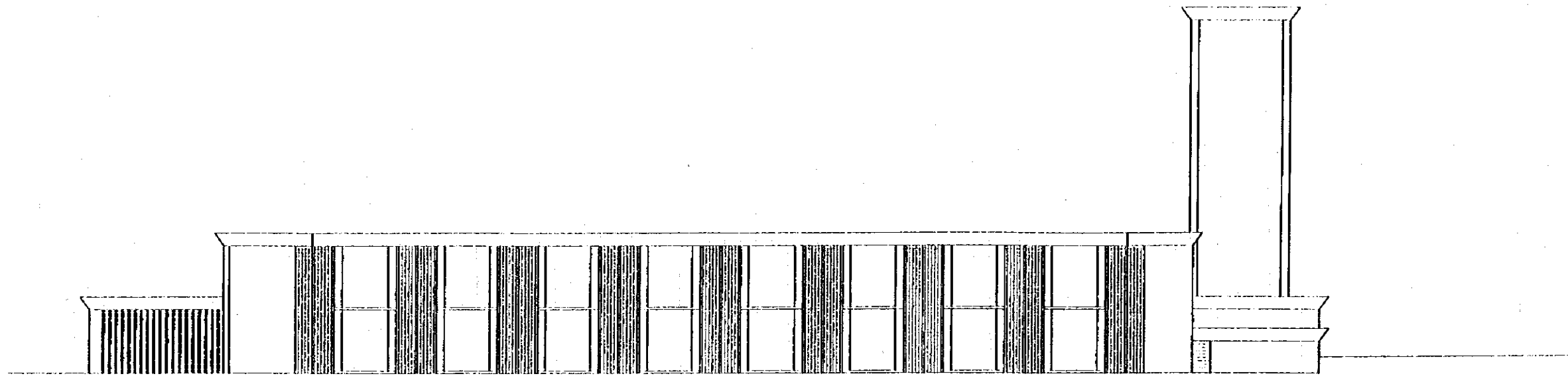


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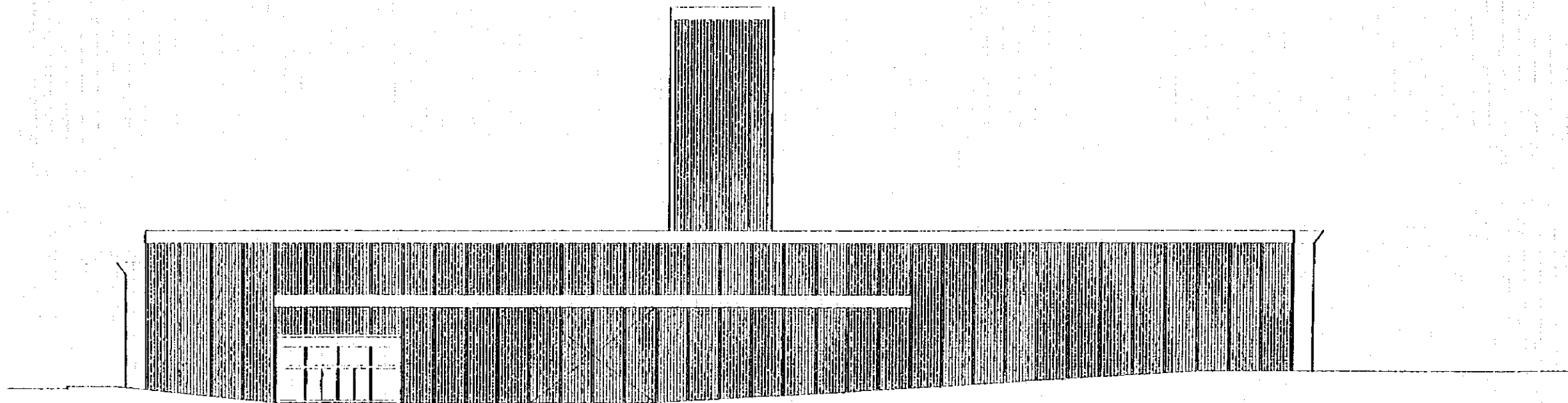


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Maternal and Child Health Centre 1F PLAN
 The Islamic Republic of Pakistan 1/400



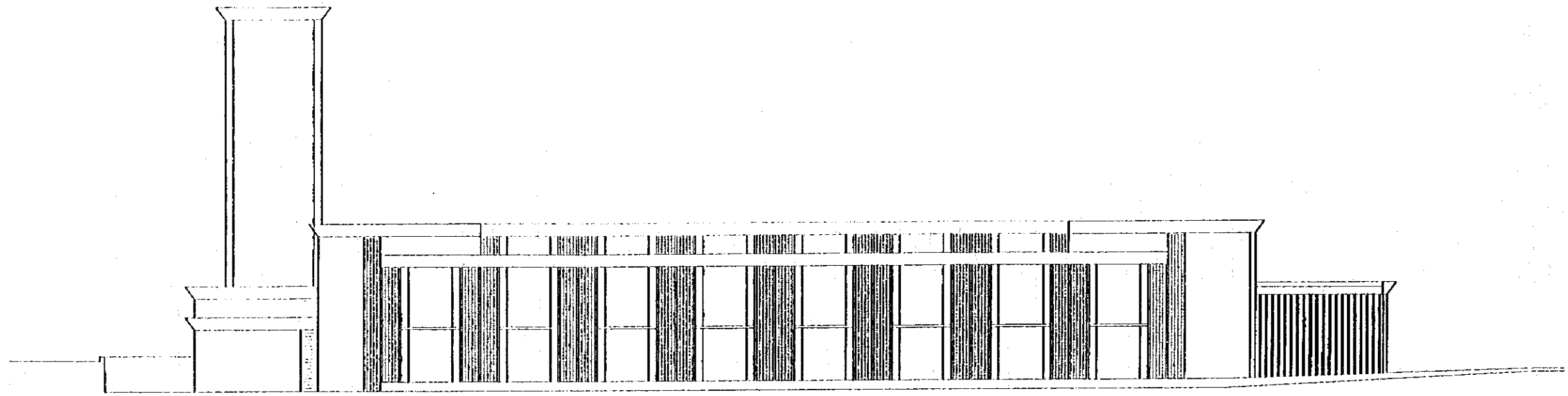
Main Bldg. NORTH ELEVATION



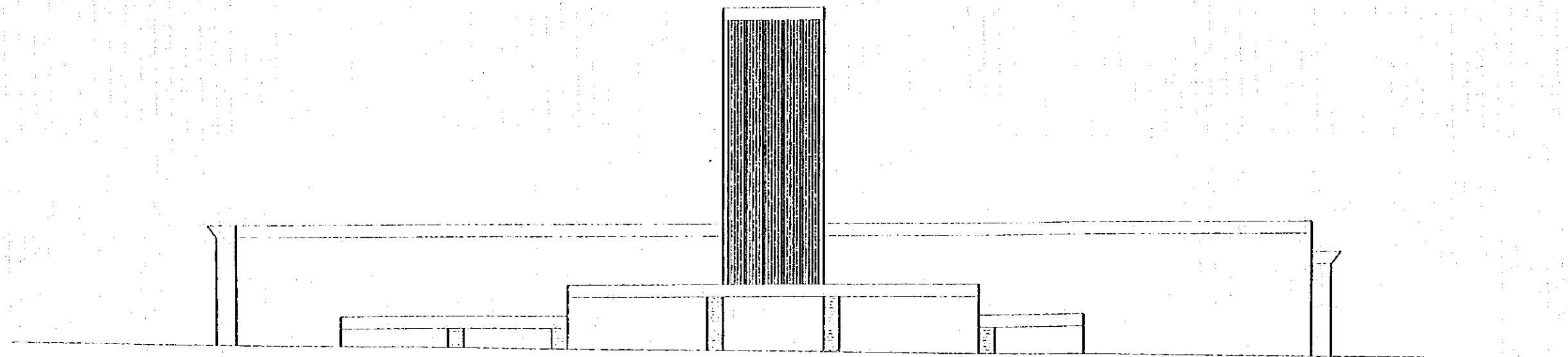
Main Bldg. EAST ELEVATION

Maternal and Child Health Centre
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Main Bld. ELEVATION-1
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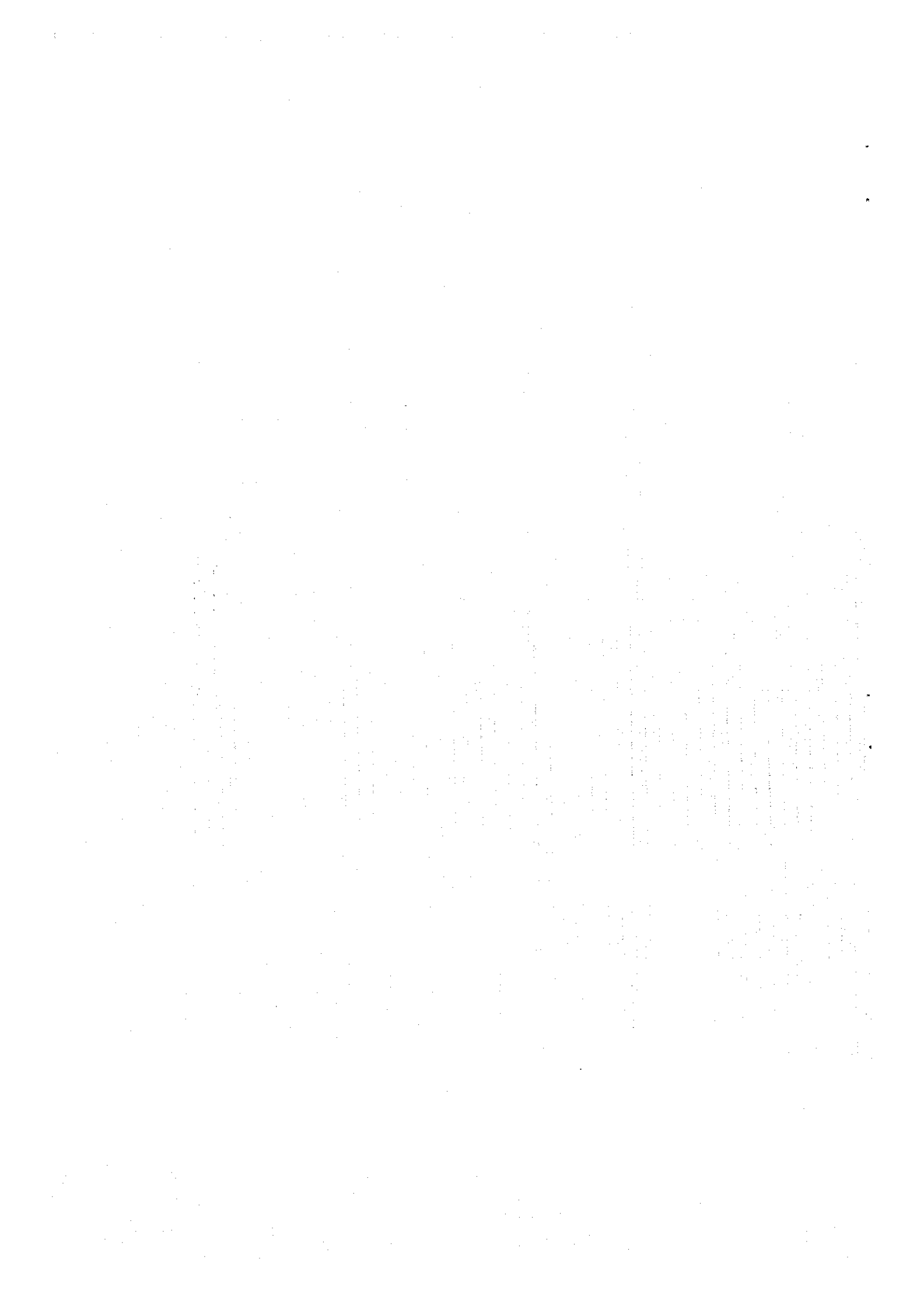
Main Bldg. SOUTH ELEVATION

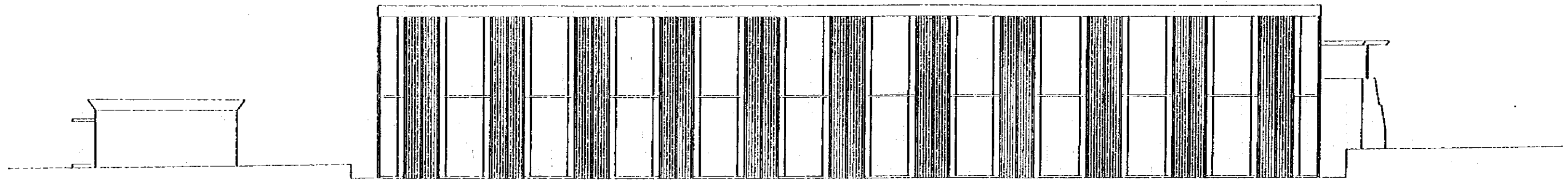


Main Bldg. WEST ELEVATION

Maternal and Child Health Centre
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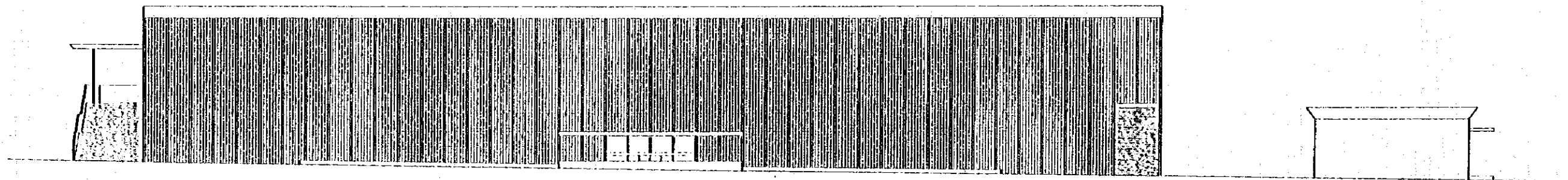
Main Bld. ELEVATION-2
1/300





Midway House EAST ELEVATION

O.P.D. EAST ELEVATION



O.P.D. WEST ELEVATION

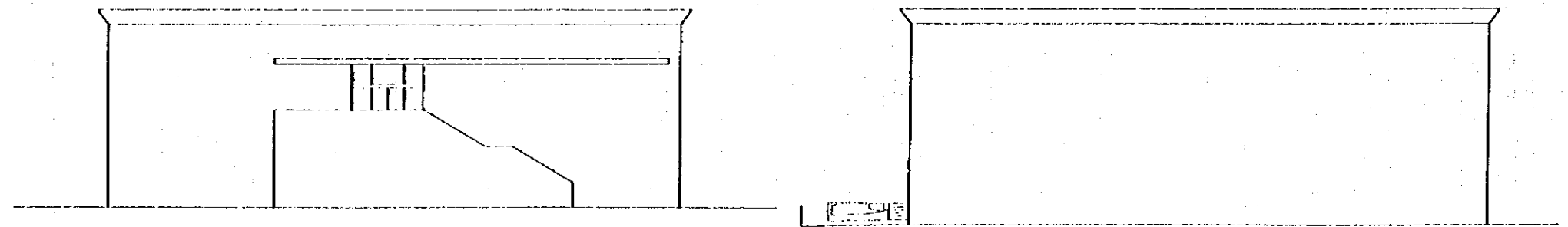
Midway House WEST ELEVATION



Midway House WEST ELEVATION



Midway House WEST ELEVATION

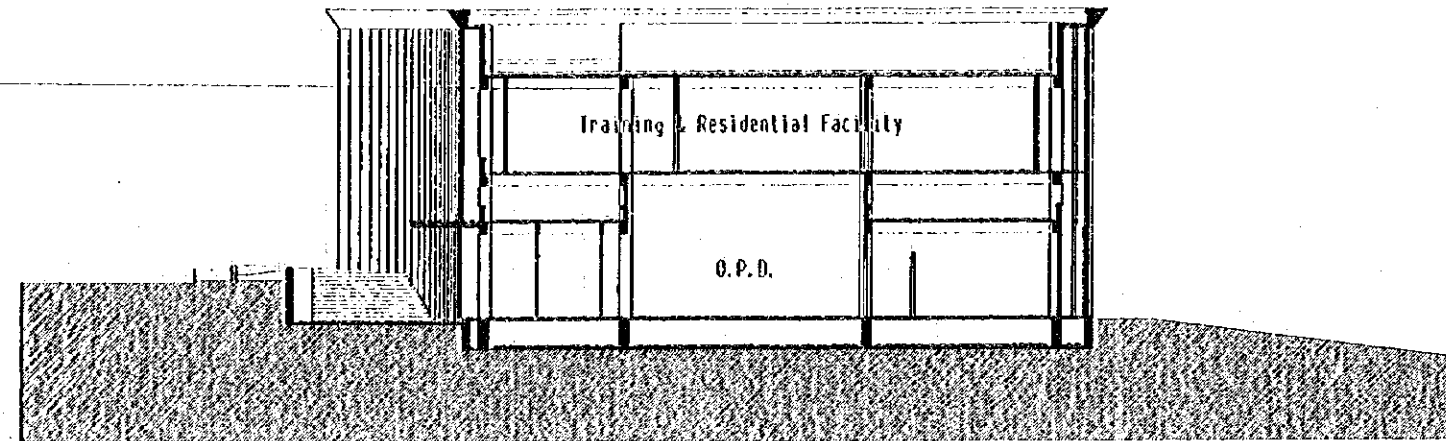


O.P.D. NORTH ELEVATION

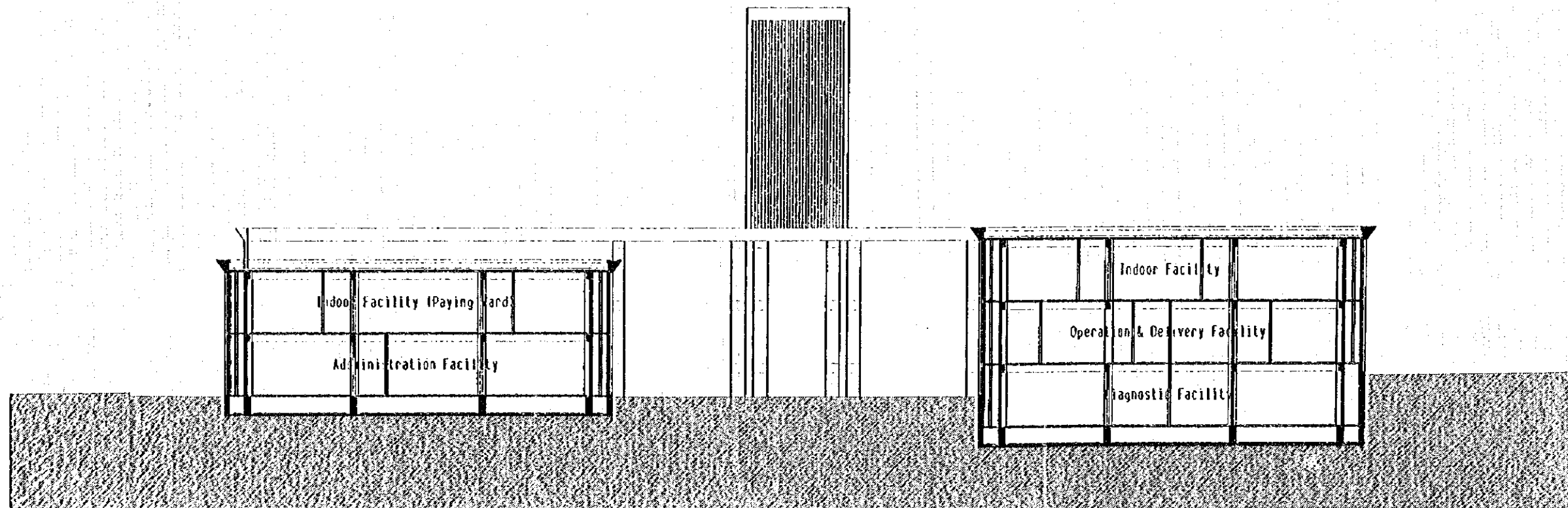
O.P.D. SOUTH ELEVATION

Maternal and Child Health Centre
in
The Islamic Republic of Pakistan

O.P.D., Midway House. ELEVATION
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SECTION of O.P.D. Building



SECTION of Main Building

Maternal and Child Health Centre
The Islamic Republic of Pakistan

SECTION
1/300

Chapter 3
Implementation Plan

CHAPTER 3 IMPLEMENTATION PLAN

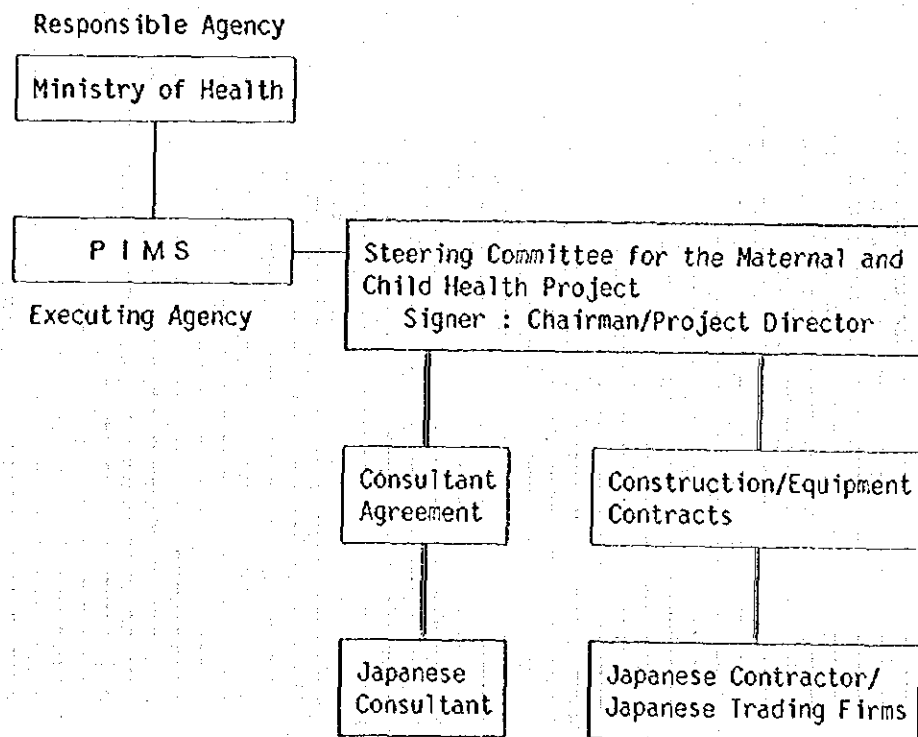
3-1 Implementation Plan

3-1-1 Implementation Concept

(1) Implementation Organization

The Project is implemented under the grant aid assistance of the Government of Japan, after Exchange of Notes (E/N) is signed concerning the Project, by the Governments of Japan and the Islamic Republic of Pakistan after Japanese Cabinet determination. The implementation organization of the Project is given below.

Figure/Table 3-1 Organization for Project Implementation



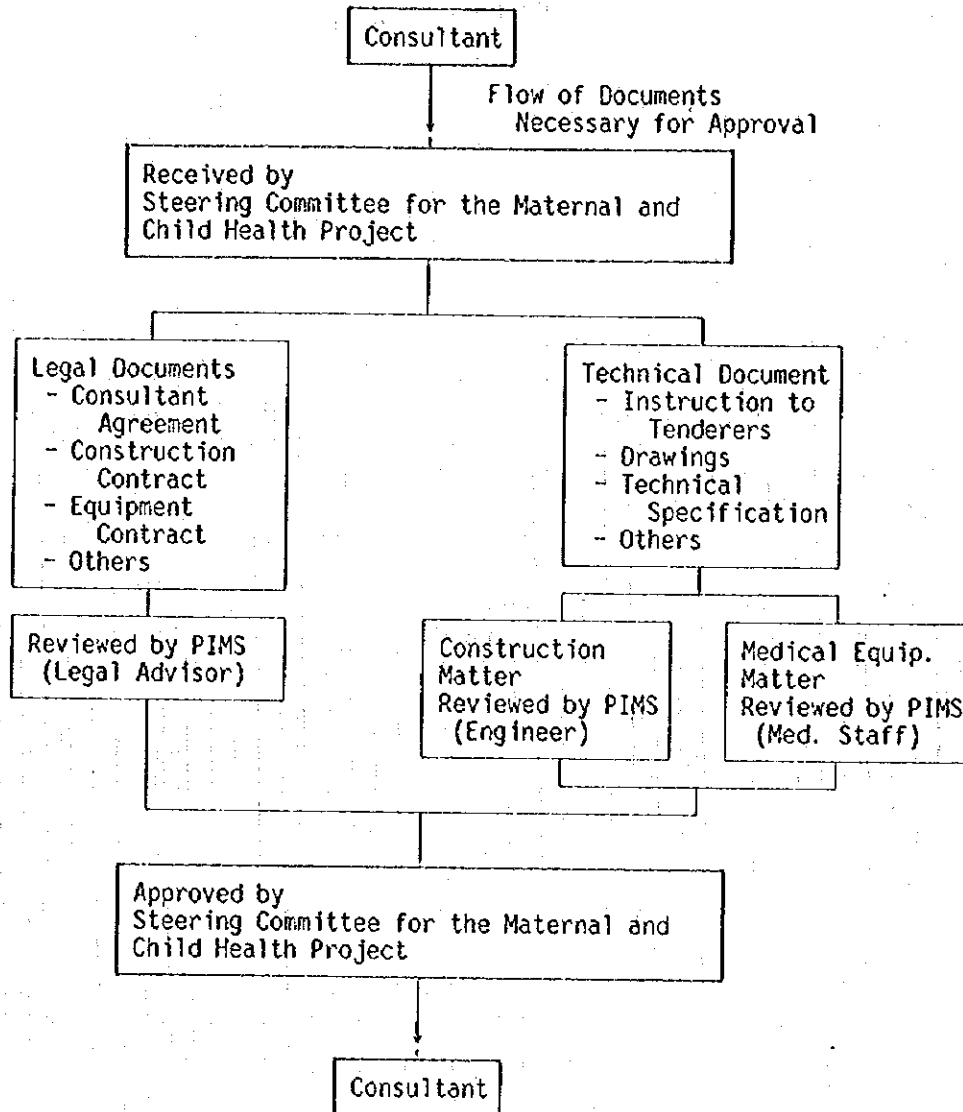
The Ministry of Health will remain the agency of the Islamic Republic of Pakistan responsible for the implementation of the Project. The executing agency is PIMS (Steering Committee of Maternal and Child Health Project). The contracting party on the Pakistani side, which is PIMS (SCMCHP), will sign a consultant agreement and construction contracts concerning the Project, and will perform the Pakistani scope of work.

Examination of the contents of tender documents (detailed design drawings, specifications, etc.) and inspection of construction work will be conducted by PIMS through SCMCHP and SCMCHP will finally make approval.

Contract-related documents in tender documents will be examined by legal advisor of PIMS and technical documents will be examined by doctor and engineer of PIMS, upon request from SCMCHP and SCMCHP will make approval.

These procedures are illustrated below.

Figure/Table 3-2 Procedure for Approval of Tender Document



(2) Consultant

After the E/N is signed PIMS (SCMCHP), concludes a consultant agreement with a consultant firm, which is a Japanese legal person, regarding detailed design and construction supervision and receives the verification of the contract from the Japanese government. For smooth implementation of the Project, it is important that a consultant agreement be concluded as soon as possible after the signing of the E/N. The consultant

firm prepares a document of detailed design, based on the Basic Design Study Report, upon consultation with PIMS (SCMCHP) after the conclusion of the agreement, and receives approval from SCMCHP. Tender and construction supervision will be conducted, based on the document of detailed design.

(3) Contractor

Construction work relevant to the Project includes construction work (building) and equipment work (procurement and installation). A contractor will be appointed from among qualified Japanese legal persons through the open competitive tender with restriction on tenderer's qualifications.

PIMS (SCMCHP) will conclude a contract on construction work with the successful tenderer, and receive verification of the contract on construction work from the Japanese government.

After that, the contractor will begin construction work, and carries out construction work in accordance with the contract.

(4) Local Consultants, Contractors and Dispatched Technical Experts

In Pakistan, it does not seem that contractors are equipped with high-level techniques and adequate capability of executing construction work. Columns and beams are constructed awry in many cases, and finishing materials are not very precise. Regarding construction management, workers in construction sites are sometime waiting for the arrival of construction materials, due to delay in placing orders for them. It cannot be said, therefore, that terms of works are strictly observed. In employing local contractors, it becomes necessary to make every effort to manage and instruct them. On the other hand, some of local consultants have received training abroad, being equipped with high levels of capability. Employing them will produce satisfactory results. Generally, contractors who are Japanese legal persons employ local contractors to execute construction work and equipment installation. Construction work according to local methods can be executed with no problem, if through instruction is given under careful management. As the Project basically concerns the construction of a teaching hospital for training purpose, it is necessary to dispatch technical experts from Japan, for the construction work of those parts for maintaining the quality as a hospital and those parts which need highly precise work such as electrical work. Specifically regarding waterproofing, X-ray shielding, electrical equipment, medical gas piping, and adjustment of building equipment, technical experts need to be dispatched from Japan.

3-1-2 Implementation Conditions

(1) Building Construction

In Pakistan, many construction projects are handled as split orders. Work ordered in this way separately is neither well coordinated nor properly supervised. But Pakistani contractors are not as technologically advanced as Japanese construction companies: they do not prepare temporary structure plans, they use little machinery, and because they are not in the habit of drawing up working drawings, the quality of their work is inconsistent. They also tend to treat building equipment as single units instead of as systems.

The construction company contracted to execute the building of the MCH Centre will be a Japanese firm that will employ Pakistani workers; however, because the local labor force can not provide the experienced workers required to operate the special equipment and employ the advanced technology to be used in the Project, specialists from Japan will have to provide technical guidance and oversee the construction work.

Main construction materials are available in the neighborhood of Islamabad. Regarding finishing materials, however, the market in Islamabad is small itself, with several wholesalers. It is necessary to procure them in Lahore or Karachi, and take into account the fact that it takes a delivery period of about one week for obtaining them from Lahore and about two weeks from Karachi. There is no problem in quantities of supply, but once a strike stopped the production of bricks. Regarding doors and windows as well as equipment and fixtures, which are imported from third countries, it is necessary to eliminate adverse effect on the term of works, by taking necessary measures including tax exemption in advance.

(2) Special Problems with the Execution

The site of the planned facility stands beside the Children Hospital in PIMS, so many patients will be coming and going beside the site. The temporary work must therefore be performed correctly and other necessary measures implemented to make sure that the flow of construction vehicles and workers does not interfere with the flow of persons entering and leaving the neighboring hospital. Steps must also be taken to minimize noise, vibration, and dust because of the proximity of the Children Hospital.

3-1-3 Scope of Works

So that construction will be implemented smoothly, it is necessary to specify the scope of works between Japanese and Pakistani sides. The contents of this are as follows.

Table/Figure 3-3 Scope of Works

Works to be born by Japanese side	Works to be born by Pakistani side
1. Building construction work, installation works of standard fix furnitures and fixtures, curtain (inside the ward).	1. Preparation of construction site for building and its readjustment, replacement of piping
2. Works for electrical system, power and main wiring system, lighting and socket outlet system, telephone and communication system, lightning protection system, and fire alarm system, expansion or replacement of PABX.	2. Gardening, tree · plating (exclude court yard) inside and outside of the Project site, and gate, road outside of the Project site.
3. Works for water supply facilities, drainage facilities, hotwater supply facilities, sanitary fixtures, fire protection facilities, gas facilities, air conditioning and ventilation facilities.	3. Lead-in works for each infrastructure such as electricity, water supply, telephone, drainage, gas.
4. Works for generator system, medical gas system, laundry system, kitchen system, well.	4. Furniture and utensils Curtain for windows (rail work will be done by Japanese side), blind, ordinary furnitures.
5. Gardening, tree · planting, (only court yard), outdoor lighting fixture, road inside the Project site.	
6. Procurement and installation of medical equipment.	

3-1-4 Consultant Supervision

PIMS (SCMCP) and the Japanese consultant will sign a consultant agreement, and the consultant will prepare the detailed design and supervise the works.

The Consultant supervisor will adopt an impartial stance so as to ensure that work is executed in strict accordance with the drawings and specifications and that the details of the construction contract are performed correctly. The supervisor, further, will provide guidance and advice to the contractors, and will coordinate their work in order to improve the quality of the finished building. As such, the consultant will carry out the tasks enumerated below.

1) **Assistance with the Tender and the Contract**

In order to select the contractors who will conduct the building construction work and the equipment installation work, the consultant will prepare the necessary tender documents, advertise the tender, accept requests to submit a tender, examine the qualifications of the applicants, hold meetings to explain the tender, distribute the tender documents, accept tender documents, evaluate the tenders, and carry out other tender-related tasks. The consultant will also provide advice concerning the construction contract between PIMS (SCMCP) and the contractor who submits the successful tender.

2) **Guiding and Advising the Contractors and Coordinating their Work**

The consultant will study the execution schedule, execution design, building construction material and facility procurement plans, the medical equipment procurement and installation plan, etc.; provide guidance and advice to the contractors; and coordinate their work.

3) **Inspection and Approval of the Working Drawings and Shop Drawings**

The consultant will inspect the working drawings and shop drawings submitted by the contractors, offer necessary instructions, and approve them.

4) **Confirmation and Approval of Construction Materials and Medical Equipment**

The consultant will confirm that the work contract documents conform to the list of construction materials and machinery and the medical equipment that the contractors wish to procure, and approve their procurement.

5) **Inspection of the work**

When necessary, the consultant will confirm that the required quality and performance standards are being achieved by conducting inspections at the factories where the building parts and medical equipment are manufactured and witnessing tests conducted at the construction site.

6) Reporting on the Progress of the Work

The consultant will keep track of the progress of the execution and conditions at the site, and issue reports to pertinent officials of both countries on the progress of the work.

7) Inspection of Completed Work and Trial Runs

The consultant will perform final inspections of the buildings, building facilities, and medical equipment, and conduct trial runs of the building facilities and medical equipment to confirm that they provide the performance specified in the contract documents, then submit final inspection documents to Pakistani side.

8) Execution Supervision System

In order to fulfill the duties described above, the consultant will, based on his assessment of the scale of the work and in accordance with the progress of the work, dispatch one resident supervisor, engineers and specialists to the site to take part in necessary consultations, to conduct inspections, and to provide guidance and coordination services. The consultant will set up an organization under which one specialist in building structures and one architect will be dispatched during the foundation and structural work; one architect, one mechanical engineer, one electrical engineer, and one medical equipment specialist will be sent to the site during the finishing work; and other experts dispatched whenever required. Back in Japan, the consultant will also assign experts in each relevant field to an organization that will keep in touch with and back up the experts sent to Pakistan. The consultant will also submit reports to concerned departments of the Governments of both countries concerning all necessary items related to the progress of the Project, payment procedures, and the completion and delivery of the completed work.

The organization within Japan and in Pakistan that will supervise the execution of the construction will be organized as shown in the following Figure/Table.

Figure/Table 3-4 Organization for Construction Supervision

