Basic Design Study

on

The Construction Project of The Children's Hospital

in

The Islamic Republic of Pakistan

September, 1982

JAPAN INTERNATIONAL COOPERATION AGENCY

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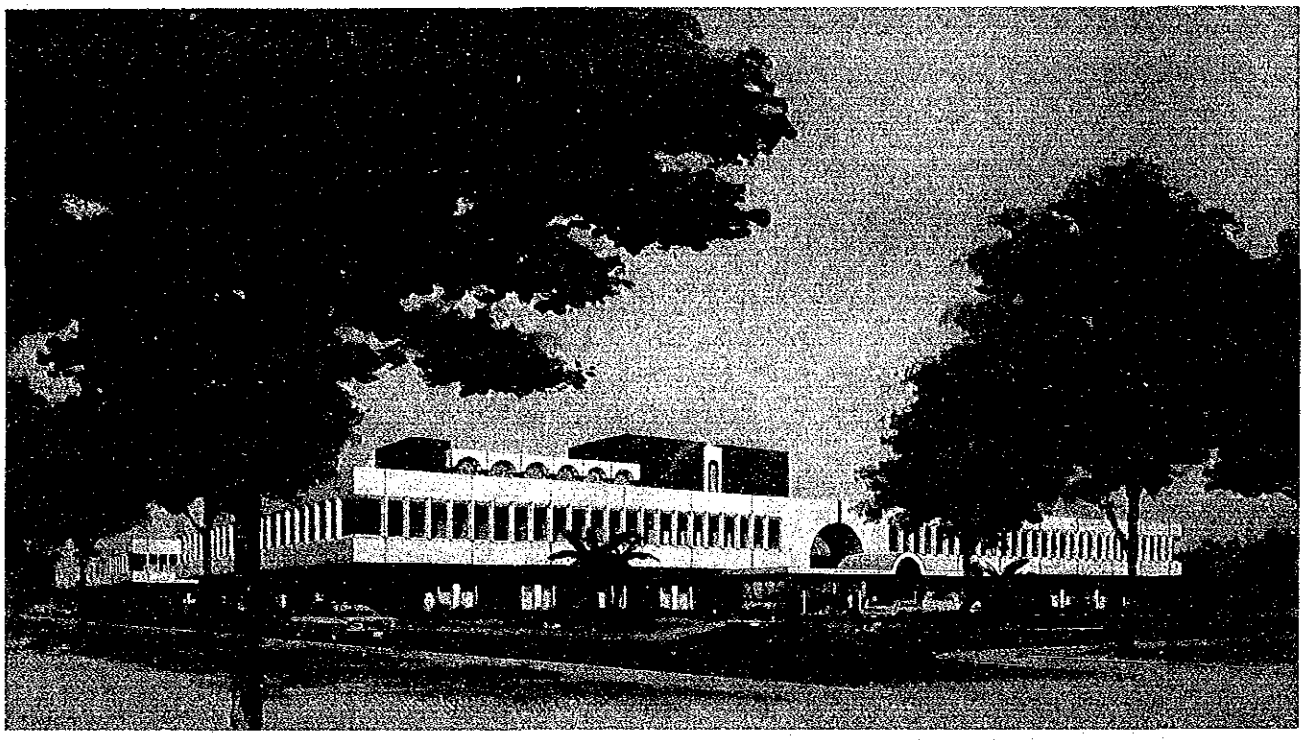


ISLAMABAD CHILDREN'S HOSPITAL.

PREFACE

In response to the request of the Government of the Islamic Republic of Pakistan, the Government of Japan decided to conduct a survey on the Construction Project of the Children's Hospital and entrusted the survey to the Japan International Cooperation Agency. The J I C A sent to Pakistan a survey team headed by Dr. Hirobumi NEMOTO, The Second Hospital Tokyo Women's Medical College from 24th April to 14th May, 1982.

The team had discussions with the officials concerned of the Government of Pakistan and conducted a field survey (in Islamabad). After the team returned to Japan, further studies were made and the present report has been prepared.

I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

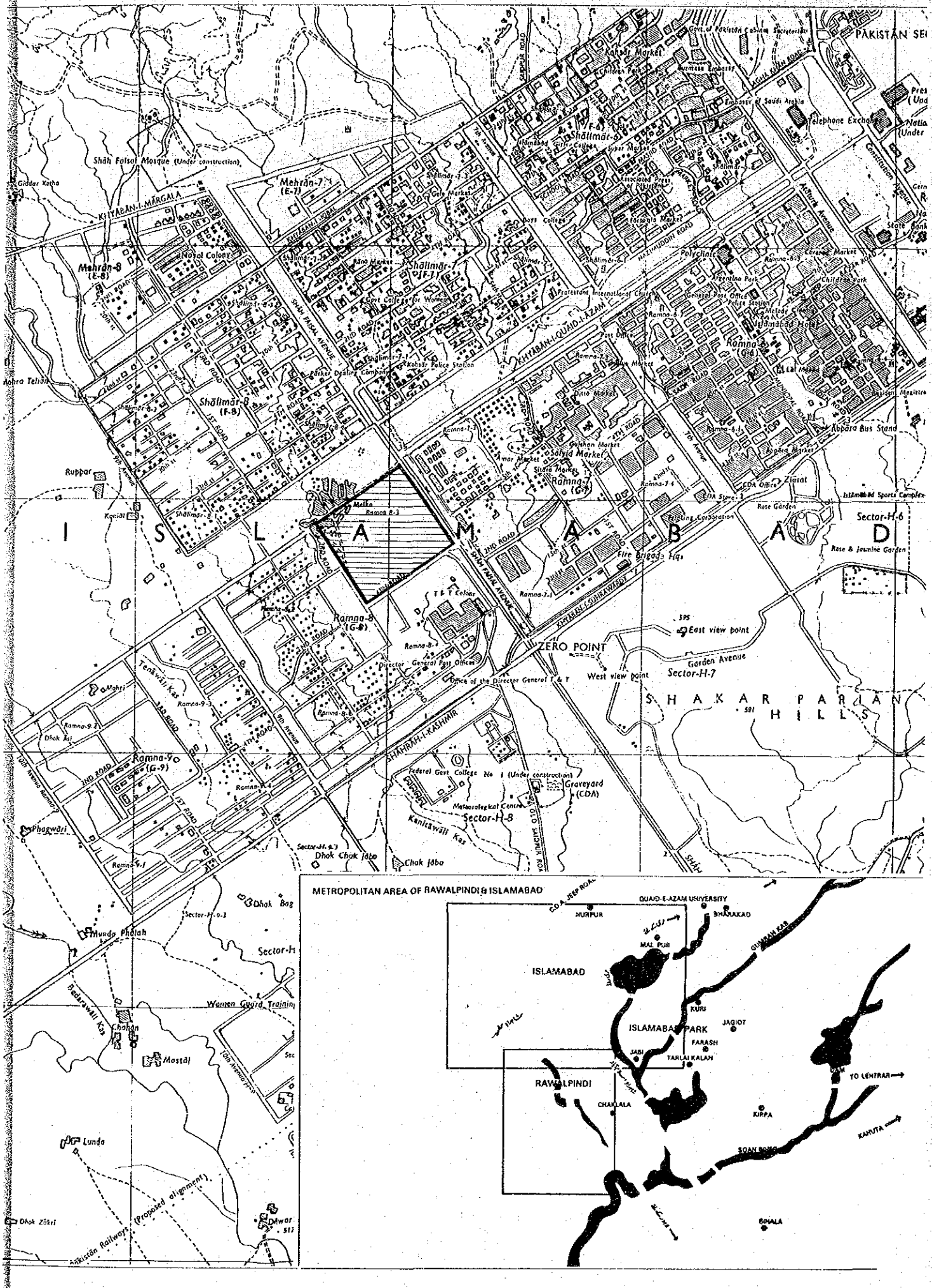
I wish to express my deep appreciation to the officials concerned of the Government of the Islamic Republic of Pakistan for their close cooperation extended to the team.

September, 1982

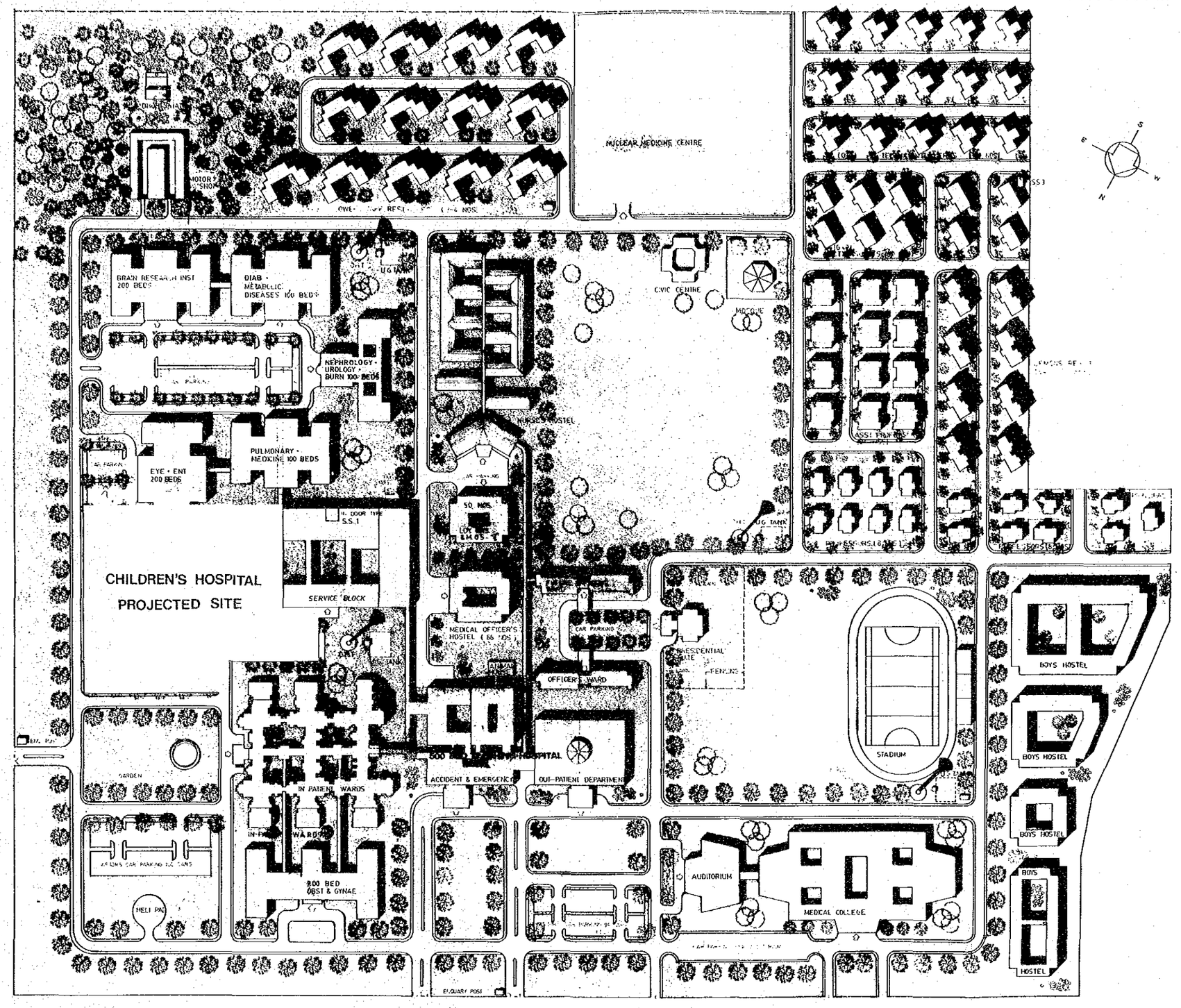
Keisuke Arita

Keisuke Arita
President
Japan International Cooperation Agency

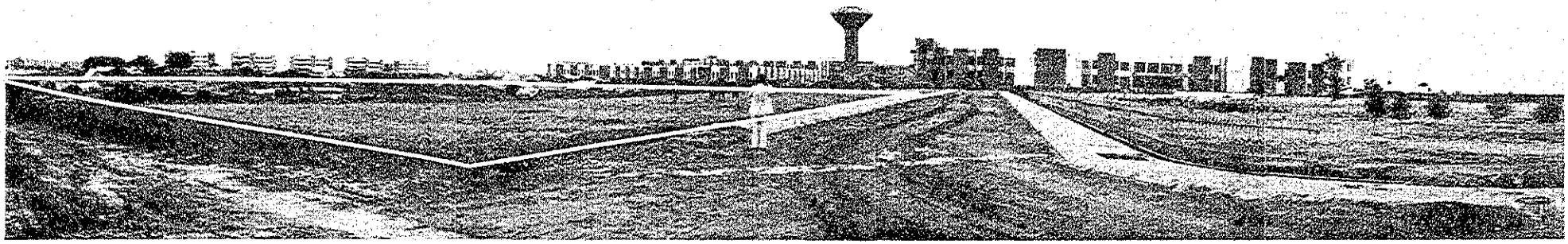
LOCATION MAP



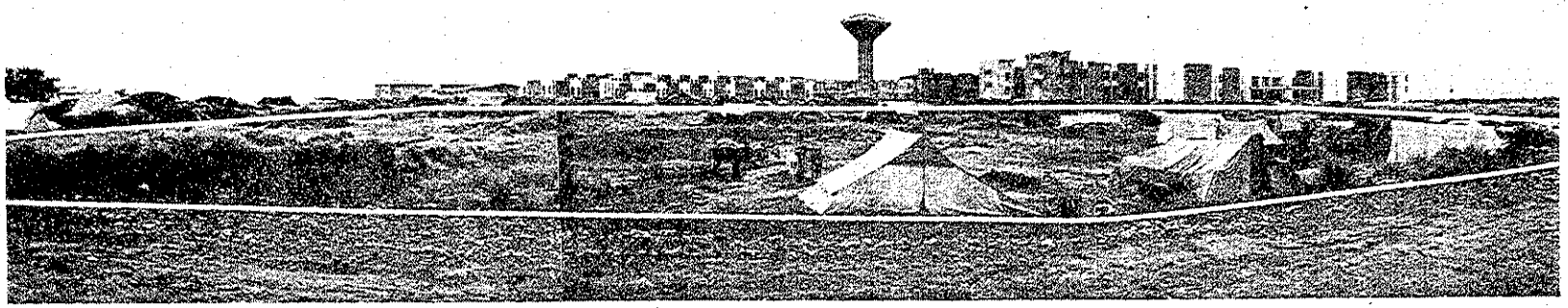
PROJECTED SITE – 1



MASTER PLAN FOR ISLAMABAD HOSPITAL COMPLEX



< View of Sonth Side from North Side >



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SUMMARY

SUMMARY

As part of the measures to improve the country's standard of medical care, the Islamic Republic of Pakistan has planned to construct a children's hospital inside the hospital complex in Islamabad with the aim of expanding the medical services for children and the training facilities for pediatricians. Pakistan has accordingly requested the Japanese Government for grant aid. In response, the Japanese Government despatched a preparatory survey team to Pakistan in November 1981 with through the Japan International Cooperation Agency (JICA) in order to ascertain the content of the request and to investigate the propriety of the aid proposal. Following the study report, the Japanese Government despatched a basic survey team to the country in April 1982.

The health and medical care administration in Pakistan has been principally undertaken under the responsibility of the provincial governments besides the Federal Capital and federally administered areas and the Public Health Bureau of the Federal government. Based on the measures to replenish primary medical care and to expand preventive medicine in local areas, the administration activities have been centered on training for medical practioners and the expansion of medical facilities. Among others, under the current situation in which infants and children have accounted for the majority of the total deaths in the country, the augmentation of pediatricians and medical facilities have become extremely urgent subjects for the administration to review.

The standard of medical care in Islamabad, the capital of the country, and neighbouring areas including Rawalpindi has been improved by an ad hoc measure to expand medical facilities following the rapid increase in the population. However, the facilities are not yet adequate for the great number of out-patients to receive sufficient medical treatment. In particular, the facilities in the clinical examination department, operating theatres and the equipment for ICUs etc. have been vastly inferior in terms of both quality and quantity. In addition, there has been a general shortage of doctors and nurses.

The Islamabad Hospital Complex aims at offering general medical services to citizens and governmental workers residing in the Islamabad area; at the same time it expected to provide an opportunity to carry out educational and research work for the training of medical practitioners. It was first conceived that when the city plan for Islamabad was drawn up the complex should become a large scale medical compound including such medical facilities as a teaching hospital accommodating 500 beds, a nuclear medical centre, a brain research institute, a children's hospital, also a medical college, a nursing college and residences for the staff. At present, the teaching hospital, the nuclear medical centre and staff accommodation are under construction, while construction work for the other facilities has not yet commenced. The children's hospital for which the request for grant aid has been made is designed to comprise a in-patient ward with approximately 200 beds and an out-patient ward which is capable of treating approximately 2,000 out-patients a day.

The children's hospital has been planned to be equipped with the minimum of hospital functions taking into consideration the current medical standards in Pakistan. On the other hand, it has been designed to supplement the facilities for temporary treatment centering on a filter clinic, which is more than, originally requested, since the flow of out-patients is expected to reach 2,000 per day there must not be contact between those who are seriously ill and those who have minor problems.

As regards the medical equipment, the number of highly sophisticated items have been limited as much as possible from the view point of maintenance and management.

Giving consideration to the request for facilities made by Pakistan, the study team undertook inspection tours of exsisting medical facilities, natural conditions, site conditions and the construction environment in the local areas. As a result of discussions with Pakistani officials, the group has drafted a basic plan outlining the scale of the facilities as shown below.

Proposed facilities

Out-patients ward: a record room, a filter clinic,

	a primary care room, an infusion room, health guidance room, protective inoculation room
Examination ward:	a specialized clinic, an X-ray room, a central examination room, an operating theatre
Patients ward:	a general ward, a post natal ward room, an ICU room, an isolation ward
Dimensions of the building	Two storied reinforced concrete building, approximately 12,000 m^2 of floor space

The establishment of the children's hospital will provide the first hospital specializing in pediatrics in Pakistan. Alongside the general hospital accommodating 500 beds, this hospital will form the nucleus of the projects planned for the complex. It will not only provide residents with medical facilities, but also offer a place to train medical practitioners. The necessity for the hospital has been therefore evaluated to be profound, and it has been considered to be a project of sufficient propriety to warrant the cooperation of the Japanese Government in providing grant aid for the construction of the hospital.

Chapter 1 Introduction

Chapter 1 Introduction

Construction work of the Islamabad Hospital Complex (hereinafter referred to as I.H.C.) is underway at present in Islamabad, the capital city of Pakistan. The complex comprises the 500 Bedded General Hospital being constructed by the Government of Pakistan and other related medical facilities with staff residences. A children's hospital with 200 beds is being planned for construction in the I.H.C. The Government of Pakistan had requested the Japanese Government a grant aid regarding the children's hospital construction project. At the request of the Government of Pakistan, the Japanese Government conducted a field survey through the Japan International Cooperation Agency from 24 April to 14 May, 1982.

The basic design survey team, following the results of the preliminary survey conducted in November 1981 for this children's hospital construction project, carried out a basic design field survey, the objective of which was a report on the basic design survey through the scrutiny and confirmation of details and the appropriateness of the requests of the Government of Pakistan and through the collection and analysis of information concerning the required function and size of the children's hospital. The report also investigated the site condition, the present condition of the infrastructure there, the situations in the construction industry, as well as information on provisions of the budget and the system of the Government of Pakistan for this construction project. The report aims at providing the information necessary for the execution of the Japanese Government's grant procedures.

To clarify the required conditions for the confirmation of the details of the basic design, the basic design survey team of the Japan International Cooperation Agency visited Pakistan from the end of April to the middle of May 1982, conducting a field survey as well as holding discussions.

The following are the main items investigated during the survey and the discussions:

(1) Confirmation on the details of the request by the Government

of Pakistan

(2) Investigation of the medical situation in and around the city of Islamabad

(3) Field survey of I.H.C.

(4) Discussion concerning the details & the size of the Children's Hospital facilities and the plan for medical equipment

(5) Investigations on the situation in the local construction industry

(6) Explanation concerning the mechanism of the Japanese grant aid programme

Scope of the work to be shared by both the Governments of Pakistan and Japan

Discussions over the provisions of the budget and the system of maintenance and management followed by the Government of Pakistan regarding this project

(7) Observation of similar medical facilities

As a result of the above, basically agreed matters were summarized in the Minutes of May 4 and signatures were exchanged between the representatives of the Government of Pakistan and the survey team.

The Minutes are shown in Appendix-I-4.

The itinerary and a list of the survey team members are shown in Appendix I-1, 2.

The survey results are outlined in Appendix I-6. The following are the outline of the main items investigated and discussed during the basic design survey.

(1) Discussions were held concerning the basic concepts of the project based upon the preliminary survey data, which showed the outline of the Children's Hospital construction project and the subsequent construction plans prepared by the Government of Pakistan.

(2) The construction site is located in the east side of the complex. As the lay of the land is irregular and depressed, other possible construction locations were examined. However, the location of the Children's Hospital and the land utilization had been determined in the master plan, and considering the inter-relationship with the plans of other facilities in the same complex, it was finally decided to select the originally projected site.

(3) Following the results of the discussions, the survey team formulated and presented the outline of the layout, floor plans and medical equipment plan, and further discussions were held.

After the discussions it was decided that the facilities be consisted of three main blocks, i.e., a clinical ward, general ward and isolation ward in a two storied building with a basement utilizing the lay of the land.

(4) Regarding the execution of the Children's Hospital construction project, the survey team explained to the officials concerned of the Government of Pakistan the mechanism and procedures of the grant aid offered by the Japanese Government, as well as the construction schedule, to clarify the scope of responsibility of the respective governments. Discussions were held further regarding administration, maintenance, management and the provision of a budget for the facilities after completion of construction.

(5) The survey team conducted various surveys on the construction materials and costs, the labour situation and transportation conditions. It also collected the material and information required to execute the construction project.

(6) The provision of infrastructure for the site is under the jurisdiction of the CDA (Capital Development Authority). Electricity, gas and water supplies are now available. It was confirmed that the provision of these necessary services shall be the responsibility of the Government of Pakistan.

The Government of Japan dispatched to Pakistan a basic design survey team, with Dr. Hirobumi Nemoto as the leader, from 16 July

to 25 July 1982, to present and to explain the basic design study draft report on the construction project of the Children's Hospital. The confirmation survey was conducted to obtain a basic agreement on the basic design study draft report after the required meetings and discussions.

As a result of the confirmation survey, basically agreed matters were summarized in the Minutes of July 21 and signatures were exchanged between the representatives of the Government of Pakistan and the survey team.

The Minutes are shown in Appendix I-5.

The itinerary and a list of the survey team members are shown in Appendix I-1, 2.

The survey result is outlined in Appendix I-7.

Chapter 2 Project Background

Chapter 2 Project Background

2-1 The Circumstances Surrounding Medical Facilities in Pakistan

The medical facilities modernization project included in the 5th 5-year Economic Development Plan (1978/79 - 82/83), currently being promoted by the Government of Pakistan, is aiming at the improvement of the people's living conditions. Included in this plan the upgrading of public health services constitutes one of the priority political goals of the country. The Government's Islamabad Hospital Complex construction project, currently underway occupies an important position in the national medical facilities modernization project.

The deterioration of public sanitation operations caused by the growth in population, necessity for mother-child health care measures in including medical care for premature babies, and the requirements for upgrading and expanding medical facilities and educational training and research facilities for medical students aimed at giving impartial and comprehensive medical care to all nationals may be mentioned as the background of the Government's efforts to accelerate the modernization of medical facilities. Under these circumstances, the Government has been promoting its 5-year medical care modernization programme with great zeal setting the follwoing primary targets.

(1) Optimum distribution of medical facilities

(2) Upgrading and expansion of medical facilities

(3) Modernization of urban medical facilities

(4) Education and training of the medical personnel required to upgrade and expand medical facilities

(5) Intensification of epidemic protection measures (malaria, T.B., poliomyelitis, diphtheria)

(6) Health Education for the general public

(7) Promotion and upgrading of medical research activities

(8) The qualitative improvement of the newly established facilities

(9) Intensification and promotion of primary health care services

(10) The reduction of the rate of maternal-child contraction of diseases and the mortality rate.

According to the census of 1981, the population of Pakistan stood at 83.78 million. This shows a rise of 28.28 % over the 1972 census and 148.3 % over the past 30 years. Since 1947, the crude death rate has declined from 30 to 12 per thousand due to the Government's efforts to extend medical and public health facilities while the crude birth rate has declined only from 50 to 41.8 per thousand owing to deep rooted social and cultural factors.

The main factor behind this remarkable population increase is the persistently high birth rate with the progressive decline of the mortality rate. The present infant mortality rate in Pakistan shows a very high ratio of 105 per thousand (Japan: 7.5 per thousand). The demand for medical treatment among the lower age group is high. The Government of Pakistan sets as its target the reduction of the infant mortality rate from 105 to 79 per thousand. Attention should be drawn to malnutrition as an underlying cause of the high death rate. Many cases of malnutrition are found to be due to the lack of calorie intake from proteins, which weakens resistence to infectious diseases and diarrhea, and which also leads to a high mortality rate.

The infant mortality rate by causes of death is given in Appendix III-3.

There was a considerable improvement in the condition of the health services in Pakistan between 1980 - 81, i.e., there was an increase of 9.5 per cent in the number of hospitals from 550 to 602 at the end of 1980. Maternity and child health centres received the special attention of the Government and their number also increased by 5.2 per cent from 772 to 812. The number of registered doctors increased by 7.5 per cent from 21,938 at the

end of 1979 to 23,594 at the end of 1980. There was some improvement in the number of nurses as well, showing an increase of 8.5 per cent from 8.382 at the end of 1979 to 9,098 at the end of 1980. The number of registered lady health visitors also increased by 4.6 per cent from 1,921 at the end of 1979 to 2,009 at the end of 1980. However, a prominent problems of an absolute shortage of medical facilities and personnel, both qualitative and quantitative, insufficient funds, or inadequate administration and management are still considered to remain fundamentally unaffected. The development of medical and health services and the development expenditure on the health sector are shown in Appendix III-1, 2. Appendix III-2 shows the projects regarding medical and health services in the 5-year Plan.

2-2 The Situation of Medical Facilities in and around Islamabad.

The medical facilities in and around the cities of Islamabad and Rawalpindi are also already at the limits of their capacities to cope with the increased *urban population and the expanding demand. The absolute number of facilities, personnel and equipment are wholly inadequate. Children's diseases within this area show a markedly different structure from that in Japan, viz., infectious diseases and cases of malnutrition account for a large proportion of the total cases, and while preventive medicine and medical knowledge are important in coping with these types of diseases, the medical facilities and the personnel required to carry out effective measures are insufficient. The estimated number of 2,000 out-patients per day visiting the projected hospital is based on the assumption that patients of all types ranging from those with a slight illness to those requiring intensive treatment will be using this hospital. The infant mortality ratio is very high in Pakistan as compared with Japan, and many of these deaths are expected to be prevented by the introduction of these modern medical facilities.

* population of Islamabad

1972: 70,000

1981: 210,000

2-3 Fiscal Situation

The construction of the Children's Hospital, which is one of the components of the Islamabad Hospital Complex, is an urgent task for the Government of Pakistan. The financial condition of Pakistan has a considerable influence on this construction project.

In the 60's, basic economic policies were based on two points, i.e., priority on consumption goods and the initiative of private capital, and considerable economic growth was achieved. However, after 1970, since the bulk of the economic activities were evidently concentrated and controlled by individual capital, and economic reform was executed to nationalize the strategic industries with a view to eliminating the concentration of economic potential, as a result of which economy became stagnanty due to the withholding of private capital due to anxiety about future trends in the economy as well as the inefficiency of the public sector.

Under these circumstances, the present Government has succeeded in establishing the nationalization policy for major main industries, at the same time it is aiming at promoting the efficient administration and management of the nationalized industries and enlarging private investment in these industries to achieve economic growth. Yet, the fiscal deficit is actually showing a trend toward an increase due to the increased Government development expenditure and so forth. The fiscal deficit during 1977/78 was approximately Rs. 14,700 million, which increase to Rs. 20,000 million in 1978/79. The deficit is covered by foreign economic assistance, the capital of the public enterprises and bank loans.

Also, in terms of the balance of payments, the deficit was $1.46 billion in 1977/78, which increased to $1.97 billion in 1978/79. The fiscal deficit caused by the decline of per capita productivity due to population growth is showing an increasing trend. On the other hand, there has been a continuous decline in foreign economic assistance. Net transfers which constituted 90 % of the

gross disbursements in 1964/65 dropped to 56 % in 1977/78, and to 50 % in 1979/80. In spite of the multilateral accord on debt relief to Pakistan for the 18 month period from January 15, 1980 to July 14, 1982, it further declined to 39 % in 1980/81.

In June 1981, aid worth $18.1 billion had been contracted, of which $4.2 billion were in the form of grants, and $13.5 billion in the form of loans. Of total assistance amounting to $18.1 billion, 58 per cent was in the form of project aid, while the remaining 42 per cent was in the form of non-project aid. Of the total non-project aid, 22 per cent was for non-food items, 11 per cent for food and 9 per cent to support the balance of payments. Pakistan has repaid $2.4 billion, leaving a net debt of $9 billion at the end of June 1981, from the total disbursements of loans and credits at that time.

Several factors are considered to be the causes of this high level of debt accumulation, i.e., a shift in the composition of aid from grant type assistance to loans and credits, inflation and recession in the developed market economies, etc., and domestic factors such as floods and poor harvests.

The Government of Pakistan is also in need of new foreign economic assistance contracts in order to execute the 5th 5-year Plan, which places the main emphasis on the execution of ongoing projects. On the other hand, the deteriorating balance of payments is in a serious state, and the Government's policy to curtail imports will not make the situation better in itself. Further reliance on external assistance, development funds and so forth, will be necessary.

Chapter 3 Site Condition

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The following is an outline of the site conditions as confirmed by the field survey.

3-1 Site Condition

(1) Location

The Islamabad Hospital Complex, the site for the Children's Hospital, was first conceived at the city planning stage of Islamabad. It is located at G-8/3, in the central part of the city, having an area of 55 ha adjacent to Nazimuddin Road and 8th Avenue. Access from all parts of the city and the city of Rawalpindi, with a great demand for medical services is easy.

The site is located in the east side of the complex. Land formation will be necessary for the purpose of construction as the topography exhibits considerable depressions.

The size of the site is adequate for the scale of this construction project. There is no particular fear of noise from the surrounding area as the buildings will be located at a sufficient distance from the main road. It is considered to be under good environmental site for the location of a hospital.

(2) Climate

The climate of Islamabad is hot from May to October with a temperature of over 40°C, although humidity is low and the heat is bearable in the shade, and not as harsh as in Lahore or Peshawar. The winter extends from November to February with the temperature dropping as low as 0°C, but not to freezing point. It is a city of considerable seasonal changes.

About two thirds of the annual rainfall is concentrated during the three months from July to September.

Detailed data is shown in Appendix II-1.

(3) Soil Condition of the Site

The soil at the site can be roughly calssified into sand, clay silt and silty clay layers containing gravel. The gradings of the sand and the gravel are not uniform and the layers are varied. It is considered to be a stable soil according to the results of the standard penetration test which showed medium relative density. A spread foundation will be the appropriate foundation method, as the projected buildings will be two-storied reinforced concrete structures. The same method has been applied to the 500 Bed Teaching Hospital presently under construction.

The data on soil survey of the site is given in Appendix II-2.

3-2 Present Condition of the Infrastructure

(1) Electric Power

1) The transmission of electric power for the Islamabad area is under the authority of the WAPDA (Water and Power Development Authority). 11 KV - single system of electricity will be supplied from the Islamabad Grid Station (transmission power: 30 MVA) of the WAPDA to the I.H.C. and the forecasted supply capacity is 10,000 KW. Construction work for the electricity supply is now underway, but the intake route is yet to be decided.

2) The I.H.C. is devided into 4 main zones, each one of which is to be installed with a transformer station. The voltage to be supplied to each building is stepped-down to 3 phase 400 V and single phase 230 V. The electric power supply for the projected Children's Hospital is derived from the transformer station in the Service Block, which was built to supply energy to the 500 Bed Teaching Hospital.

3) An emergency generator is planned to be installed in the Service Block as a countermeasure against electricity failures.

4) As there are generally considerable voltage fluctuations in the electricity supply route of Islamabad, it is planned to supply

a stable voltage, especially for the main items of medical equipment.

(2) Telephone System

A total number of 50 telephone circuits are to be extended by underground cable by the Pakistan Telegraph and Telephone Department; T & T), to the 500 Bed Teaching Hospital, the projected Children's Hospital and the Brain Research Institute. Extension routes and the allotment for each building have yet to be decided.

(3) Television and Radio Broadcasting

In the Islamabad area, the Government's TV and radio broadcasts can be received. TV broadcasting is in colour for 6 hours a day and the picture quality is fairly good.

(4) Water Supply

The water supply for Islamabad is under the jurisdiction of the WAPDA and the water source is the Rawal Lake Filtration Plant. The Simily Dam Filtration Plant and 2 tubewells in the I.H.C. are also under construction.

The I.H.C. is devided into 4 zones, each one of which is provided with a 100 thousand gallon underground storage tank and an overhead tank of 50 thousand gallons, which is approximately 30 m high. As water pipes are planned for the projected Children's Hospital, divergence of the feed water pipe is possible from several spots on the site.

(5) Drainage

A main sewage pipe (24" diameter) is installed around the site and is the responsibility of the WAPDA. There are no regulations regarding BOD, COC, and SS. There are no standard regulations either at present regarding heavy metals considered to be containing in the waste water of the biochemistry examination department.

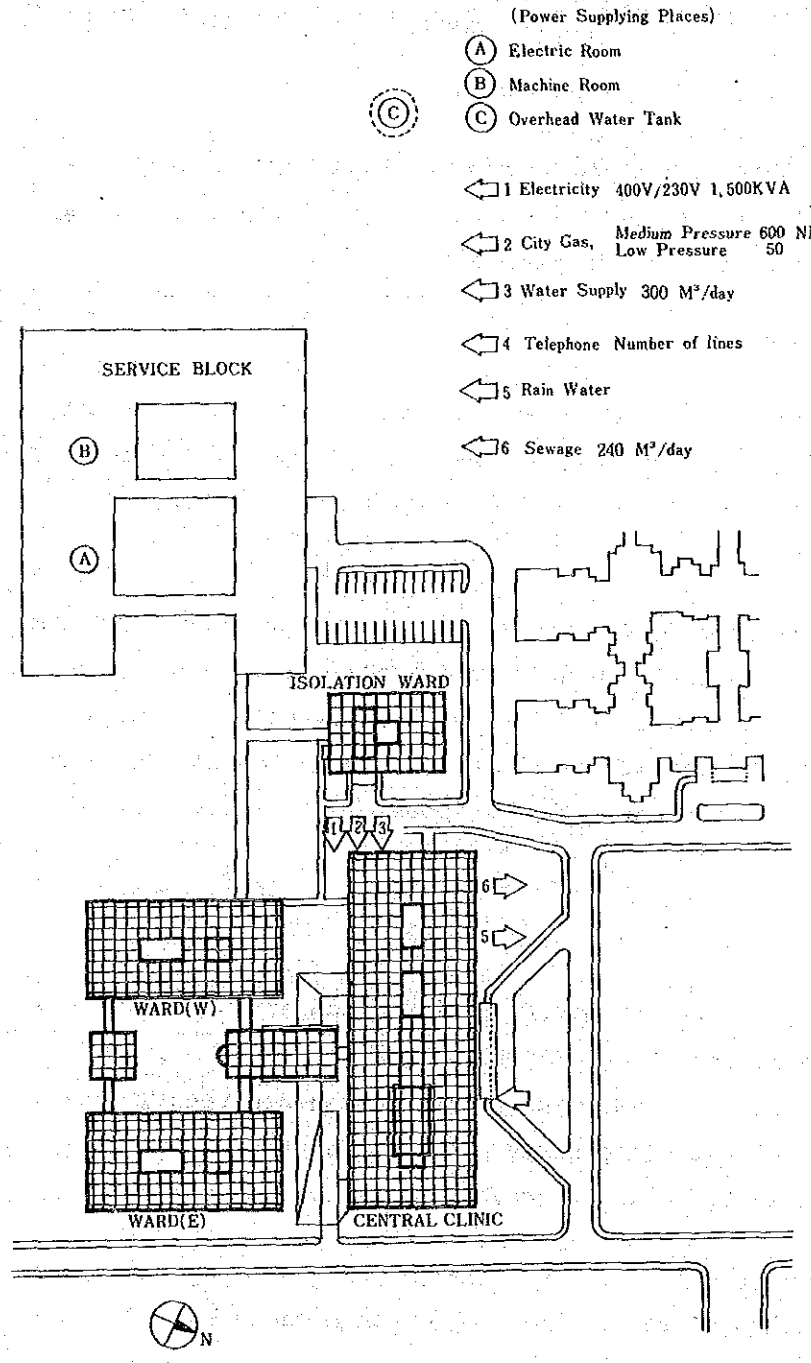
Rain water is channelled to the drainage pipe inside the I.H.C.

(6) City Gas

Sui Northern Gas Pipe Lines Ltd. supplies 2 million ft^3 per diem of natural gas, whose calorie is 1,000 BTU/ft^3 and the cost is very low.

The gas for the projected Children's Hospital is supplied from the Teaching Hospital inside the I.H.C.

Fig 3-2-1 Present Condition of Infrastructure



3-3 Construction Conditions

The following are the main points clarified by the survey team through the field survey.

3-3-1 Construction Materials, Cost and Labour

(1) Government controlled materials, such as cement, will be preferentially supplied for this project, promoted by the Government. However, construction materials not under Government control are in short supply with wide price fluctuations.

(2) There is a lack of modernization in construction equipment and machinery. Also, it is not easy to secure a sufficient supply of labour required on an annual basis because of the fasting month of Ramazan and the farmers' harvesting season.

(3) Labour efficiency can not fully be relied upon.

(4) According to the available data, it is estimated that construction costs have shown an annual average increase of about 15 ∿ 16% for the past 3 years.

3-3-2 Transportation Conditions

The following are the particulars cencerning the shipment of construction materials and equipment by marine transportation from Japan and inland transportation in Pakistan.

The transportation method for construction materials and equipment from Japan is as follows:

Japan (Ports of Yokohama, Nagoya, Kobe, etc.) → Port of Karachi → Customs Clearance → Islamabad

(1) The following are the names of the main shipping companies which have both regular and irregular transport services from Japanese ports to Karachi. Transportation by sea takes about 20 days.

1) Mitsui O.S.K. Lines, Ltd.
2) Kawasaki Kisen Kaisha Ltd.
3) Nippon Yusen Kabushiki Kaisha

(2) A report is required to be submitted to the Japanese Ministry of International Trade and Industry before clearance from Japan, including a list of imported goods in order to obtain the necessary permission from the concerned ministry of Pakistan. Approximately 7 days are necessary for customs clearance in Pakistan.

(3) The distance from Karachi Port to Islamabad is about 1,800 km and the means of transportation is by air, rail and by truck. Transportation by truck is most the appropriate means, as the cargo amounts to 2,000 t, is uneconomical to use the air route, and transportation by rail in Pakistan is not very reliable.

The following are the transportation companies:

1) Saleemsons Limited
2) Grobal Pakers and Morers Limited
3) Express Morers
4) National Logistic Cell

Chapter 4 The Substance of the Project

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4-1 Outline of the Islamabad Hospital Complex

(1) The construction plan for the Islamabad Hospital Complex was based on the need to cope with the expanding medical demand, following the increase of urban population in and around the capital city Islamabad.

The first design concept was planned for the site of the National Health Centre by a British consultant. The projected construction site was then altered following the instructions of the President to the present site, which offers better geographical conditions, and the plan was resumed in 1968 by the same consultant. However, the plan was not realized.

The Government of Pakistan again commenced the construction project of the Islamabad Hospital Complex in 1975, requesting the Capital Development Authority to draft the plan. At this request, the Capital Development Authority formulated the line plan of the wards and the main hospital, then the construction work of the wards was started in 1977 according to the line plan.

The Ministry of Health and Social Welfare requested advice on the project from experts of WHO, since the project had been commenced without the preparation of a master plan for the future development as medical facilities. Following this request, two WHO experts and the Pakistani consultants designated by the Ministry, through discussions concerning the function and the present and future medical requirements, submitted an outline of the master plan for the I.H.C. to the Ministry. It was then drafted by the Ministry in August 1978 and instructions were given to the Pakistani consultants to formulate the master plan of the I.H.C., comprising the following facilities:

1) 500 Bed Teaching Hospital including VIP Ward
2) 200 Bed Children's Hospital
3) 200 Bed Brain Research Institute
4) 75 Bed Nuclear Medical Centre
5) Housing for various categories of staff

(2) The Islamabad Hospital Complex is a comprehensive medical complex planned to render medical services in general to the citizens of Lslamabad, Rawalpindi and the neighbouring area, and to give diverse medical education to medical personnel and students, and at the same time will provide a research and training centre.

The projected Children's Hospital is completely independent medical facilities forming a component part of the complex, and it was planned to be integrated organically with the 500 Bed Teaching Hospital, designed as the core medical facilities of the complex.

The following are the main facilities presently planned for the complex:

1) 500 Bed Teaching Hospital
2) 200 Bed Children's Hospital
3) 200 Bed Brain Research Institute
4) Medical College
5) Auditorium
6) Boys' Hostel
7) Nuclear Medicine Centre
8) Male Doctors' Hostel
9) Lady Coctors' Hostel
10) Nurses' Hostel
11) Matron's Residence

4-2 Concept of the Children's Hospital

The projected Children's Hospital is a part of the Islamabad Hospital Complex that forms the heart of the national medical facility modernization programme, and its basic concept seeks to meet the growing requirements for pediatric medical treatment on one hand, and to serve as a teaching hospital to lead the effort toward raising the level of pediatric medical treatment in Pakistan, on the other. To establish the concrete guidelines for the materialization of these basic concepts by the Government of Pakistan, the basic design survey team studied the medical

situation, medical facilities, the people's medical and hygiene knowledge, living standards, and the situation in the construction industry in Pakistan.

The study revealed that the existing hospitals in Pakistan have considerably lower standards in terms of function, facilities, sanitary control, safety and accident prevention and building quality than those in Japan. In full consideration of the significance of the said project, the following basic design has been formulated by the basic design survey team.

The new Children's Hospital is to be planned as a medical facility which can serve as a model hospital for pediatric medical care in Pakistan, and represents a decisive departure from the status quo in hospital functions and facilities in Pakistan. In desiring concrete hospital facilities, a simple duplication of the facilities of Japanese hospitals is not sufficient because of the differences in the general level of medical care. The hospital must be provided with a basic hospital function and the facilities required of a pediatric hospital, based upon the actual situation in Pakistan.

4-2-1 Hospital Characteristics

In agreeing on the characteristics of the Children's Hospital, the basic design survey team held discussions regarding the basic concept presented by the Government of Pakistan. As a result, the concept lacked depth despite the falt that the proposed hospital was planned to deal with 2,000 outpatients per diem, at the same time to be a hospital specializing in pediatric care. With a basic idea of designing a hospital meeting the actual conditions in Pakistan, the hospital size and the details of the medical treatment to be provided were determined.

Under this confused situation with patients suffering from various symptoms (2,000/day), varying from slight to serious illness, coming to the hospital at the same time, it is virtually impossible for the hospital to take on a highly specialized function.

Moreover, at the present stage, pediatrics is not a specialized field in Pakistan as it is in Japan, Europe or in America. Pediatrics specialists are also in a state of acute shortage. To cope with such actual conditions in Pakistan, it was considered that the planning a hospital with emphasis on general medical treatment was most appropriate. With the highest priority being given to primary care services, the hospital will house a well equipped filter clinic and primary care unit. The hospital facilities are planned to meet fundamental requirements, and function as a teaching hospital as well, although they circumstances differ in character from the environment of specialized pediatrics treatment in Japan, Europe and in America.

The characteristics of the Children's Hospital are shown in the flow chart below.

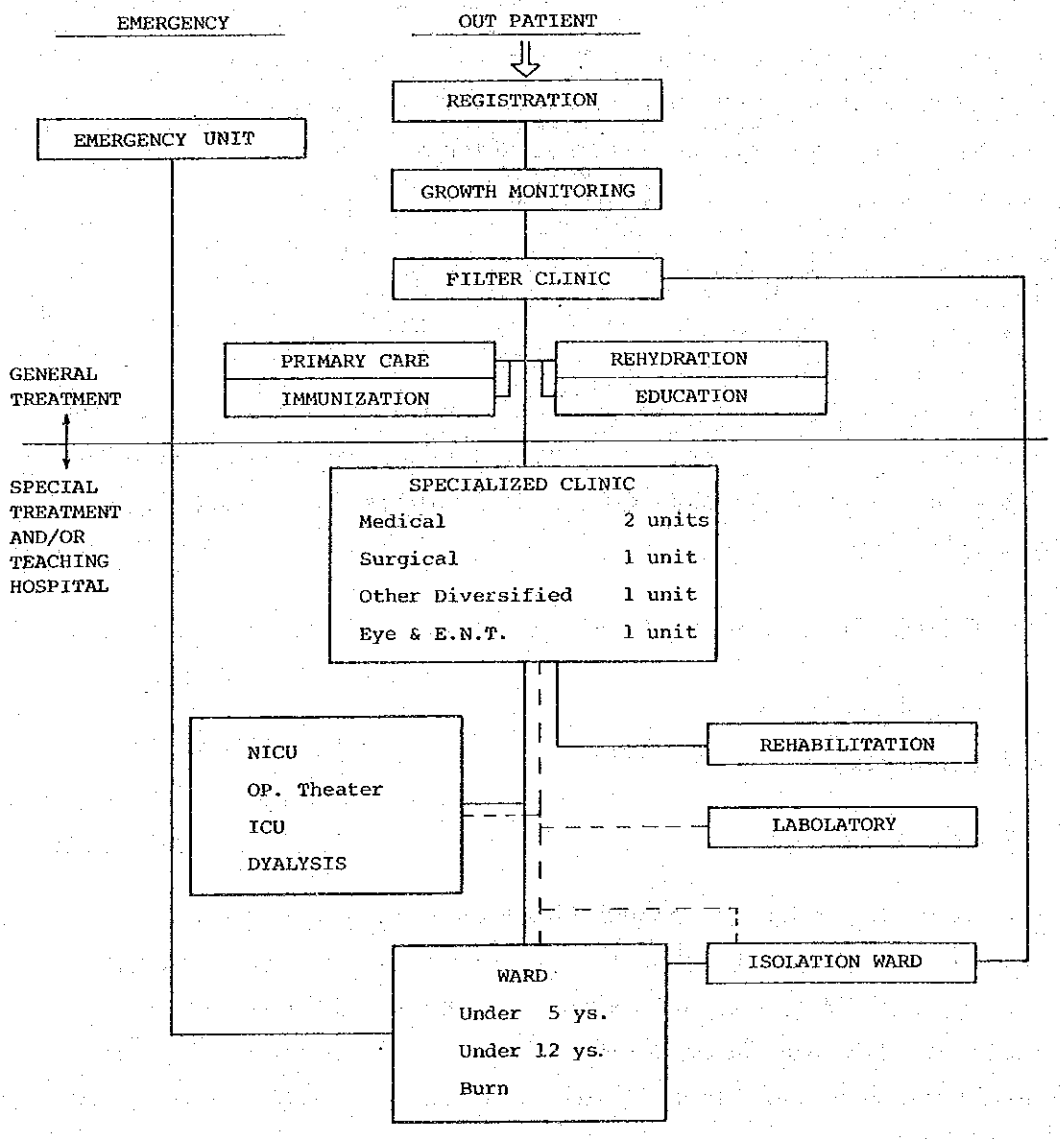
The outline of the flow chart is as follows:

(1) By filtering the incoming patients, separating the slightly ill from the seriously ill, at the filter clinic stage to sort out those who require specialized treatment and those who are to be sent home after simple treatment, the efficient reception of patients, estimated number of which is 2,000/day, can be realized.

(2) By fully equipping the primary care unit, those who are primarily in need of specialized outpatient treatment can be separated from those in the primary care unit in order that they be given adequate treatment.

(3) As there are very few cases under the present medical conditions in Pakistan of patients are informed beforehand being isolated. They usually arrive at the hospital as outpatients, they are then isolated. Because of such circumstances, isolation patients will take the route shown in the flow chart.

Fig 4-2-i Conceptional Flow Chart of Children's Hospital



4-2-2 Overall Size

On the basis of the site conditions, required function, budget size, and construction period, the projected Children's Hospital is planned to consist of a 2-storied clinic building with partial basement, a 2-storied general ward building, a single storied isolation ward building, and other buildings.

4-2-3 Planned Layout

In planning the building layout, the relative positional balance of the site shape and other facilities in the complex will be weighed carefully, and special attention will be given to the close connection with the Service Block.

4-2-4 Planned Division

The projected Children's Hospital will be mainly divided into the administration dept., the accident emergency dept., the inpatient ward, the central clinical dept., the service dept., and the education dept.

The details are given in 4-4-2.

4-3 Basic Design

4-3-1 Basic Principles

(1) This basic design for the Children's Hospital has been prepared in line with the basic principles agreed upon between the Ministry of Health and Social Welfare of Pakistan and the Japanese basic design survey team when the basic design field survey was conducted in April/May 1982 and the confirmation survey in July 1982.

(2) Meteorological, topographical, geographical and environmental conditions as well as the specific features of the facilities and

the actual conditions of the construction industry, including workmanship, have been fully considered in planning the facilities.

(3) A preliminary estimate for the cost of construction has been worked out on the basis of the results of the survey regarding the local material costs, labour costs, transportation costs and actual case studies in Pakistan.

(4) The probable period of construction was estimated based upon the local actual construction conditions and considering the Japanese Government's fiscal year.

(5) There being scope for work to be shared under the responsibility of the Government of Pakistan when proceeding this construction project, points directly related to construction of the facilities were referred to.

4-3-2 Design Principles

The basic design is based upon the following design principles.

(1) To design for easy use and maintenance in a manner compatible with the local actual conditions.

(2) Natural environmental conditions and other conditions are to be considered carefully at the design stage.

(3) The design should take into consideration local workmanship, techniques, materials and methods of construction to achieve an economical design.

(4) The design should consider other related facilities within the same complex.

(5) To utilize as much as possible the local construction materials and equipment.

(6) The design criteria shall conform to the Islamabad Building Regulation 1963 and other related codes and regulations of Pakistan. However, it shall conform to the Japanese codes and

regulations concerned, in cases where no applicable codes or regulations exist in Pakistan.

(7) The finishing grade of the buildings and planning for the building services equipment will basically comply with the specifications of the 500 Bed General Hospital, which is the main hospital in the complex.

4-3-3 Outline of Facilities

(1) Site

Sector G-8/3, 8th Avenue, Islamabad.

(2) Plan & Structure

1)	Central Clinic BLK	single-storied underground, 2-storied reinforced concrete
2)	Ward BLK	2-storied reinforced concrete
3)	Mother BLK	2-storied reinforced concrete
4)	Isolation Ward BLK	single-storied reinforced concrete
5)	Connecting Corridors	single-storied reinforced concrete
6)	Service BLK	single-storied underground, 2-storied reinforced concrete

(3) Total Floor Area (M^2)

BLOCK	BASEMENT FL.	GROUND FL.	1st FL.	P.H. FL.	TOTAL
Central Clinic BLK	1,161.3	2,452.8	2,402.4	108.0	6,124.8
Ward (E) BLK	-	996.0	996.0	36.0	2,028.0
Ward (W) BLK	-	996.0	996.0	36.0	2,028.0
Mother BLK	-	108.0	108.0	-	216.0
Isolation Ward BLK	-	594.0	-	81.0	675.0
Connecting Corridors	-	379.5	123.0	-	502.5
Service BLK	206.3	344.0	245.0	36.0	831.3
TOTAL	1,367.9	5,870.5	4,870.4	297.0	12,405.8

4-3-4 Basic Principles of Architectural Planning

(1) The block layout plan shall be coordinated with the overall plan of the I.H.C.

(2) The plan shall match the actual situation in Pakistan.

(3) The plan shall be practical with an outpatient clinical department and minimum specialized medical treatment services being provided at the same time.

(4) The natural environment and customs of the people shall be fully considered.

(5) The Central Supply Unit and the Examination Unit shall be provided with the minimum required functions, so as to avoid duplication with the 500 Bed Teaching Hospital.

(6) Among the necessary rooms, those which can be commonly used

will be so designated to avoid overlapping.

(7) By making the best use of natural air ventilation and lighting, overhead expenses shall be economized.

(8) Traffic lines shall be reduced as much as possible to design a concise floor plan.

(9) Consideration shall be given to the outpatients, whose estimated number is 2,000/day, to receive clinical examination efficiently.

(10) Requisite rooms shall have minimum size required.

4-3-5 Planning for Building Services

(1) The design should be compatible with local meteological conditions, local customs and mode of life. Simple operation of equipment, easy maintenance, and low running costs should be the basic considerations.

(2) In principle, standardized equipment and fixtures should be selected to facilitate replacement and exchange in case of future damage and deterioration.

(3) The design shall be in compliance with codes and regulations in Pakistan. However, in cases where there are no applicable codes or regulations, Japanese standards shall be referred to.

(4) Equipment and materials to be imported from Japan should comply with the JIS (Japanese Industrial Standard) and those to be purchased in Pakistan should comply with PIS (Pakistani Industrial Standard).

4-3-6 Principles of Structural Planning

According to the results of the field survey, the basic principles of structural planning have been defined as follows:

(1) Most of the buidlings in Pakistan are reinforced concrete

structures, the main structure of the Children's Hospital shall therefore also be of reinforced concrete.

(2) To realize flexible planning, rigid frames will be applied for the structure.

(3) The footing of the buildings shall be borne by a spread foundation.

(4) As the buildings of the Children's Hospital will be constructed ward by ward, the whole hospital is separated structurally on the plan. Therefore, each building will be independently designed if the structures are to cope with differential settlement, differences of seismic vibration and the effects of thermal stress.

(5) Locally available structural materials shall be utilized as much as possible.

(6) Regarding earthquake proof performance, no special consideration will be given to the design of the buildings, as no striking earthquakes have occurred in Islamabad in the past.

4-4 Basic Planning

4-4-1 Block Layout

Main transport facilities to the site are buses, taxis and privately owned cars. In Islamabad and its surrounding areas, cars are an important means of transport for the people. Access to the Children's Hospital is possible by car from the two roads on the east and the north sides, the east road being the main access route.

The Children's Hospital consists roughly of a clinical ward, general wards, an isolation ward and other related facilities. For this block layout, the front of the Children's Hospital, i.e., the entrance to the clinical ward is designed to face the square which is shares the approach to the wards of the Teaching Hospital. Two general wards are laid out to the north and south of this clinical ward with the mothers' area in between. Also, the related facilities composing lecture rooms, staff cafeteria and ramps are

located between the clinical ward and the general wards. The isolation ward is laid out a part from other facilities. These wards are linked one another by connecting corridors, which will function as the main traffic lines for people, goods and utilities.

4-4-2 Architectural Planning

(1) Planning for Outpatient Clinical Ward

1) General Outpatient Department

In the General Outpatient Department, the primary care unit will be designed on the first floor and the specialized outpatient clinical unit will be located on the second floor to efficiently receive a considerable number of outpatients, estimated to be about 2,000/day.

Outpatients are registered at the reception counter to go through the filter clinic. There will be 10 clinics, staffed by a doctor and nurse in each clinic, in order to provide diagnosis and simple treatment.

To treat a great number of outpatients efficiently, a central treatment room is designed with treatment facilities for cases of malnutrition and dehydration caused by diarrhea. 8 treatment beds for school children and 30 beds for therapy will be located in this ward, which will be the most frequently used ward under the present circumstances in Pakistan.

In the growth monitoring room weight and stature are measured and recorded. Maternal-child health education, guidance and immunization are also provided in one room.

Having the function of a health centre, it will be a ward of great significance, considering the actual situation in Pakistan.

Outpatients' waiting area is designed to face with each clinic in order to accommodate a great number of outpatients.

2) Specialized Outpatient Department

This department deals with only serious cases and those for whom more specialized treatment is required after diagnosis. Seven clinics including two special clinics will be provided. Classification of those according to the different medical fields is as follows:

a)	General internal medicine	2 rooms
b)	General surgery & plastic surgey	1 room
c)	Ophthalmology	1 room
d)	E.N.T. (otorhinolaryngology)	1 room
e)	Special clinic	2 rooms

3) Accident Emergency Department

Besides the ordinary first aid treatment activities, the Accident Emergency Department will deal with patients who come to the hospital after regular opening times (after 2:30 p.m.). The number of attendants coming to the hospital are far beyond that expected. Considering the actual conditions of the existing hospital facilities, the size and function shall be the minimum required.

Six beds, an operating room, treatment rooms, staff room and a room for attendants of patients will be provided in the Accident Emergency Department.

(2) Planning for Central Clinical Block

1) X-ray Rooms

These are only for the X-ray examination Dept. It has been located considering the ease of access from the outpatients ward. A general radiographing room and a remote control room will be provided.

2) Examination Rooms

Taking account of the use from the outpatient clinical department and inpatient wards, clinical pathology laboratory and physiological laboratory are designed around the centre of the clinical ward.

Main testing items in the clinical pathology laboratory are blood, urine, body fluid volume and cells, while the physiological laboratory deals with ECG, EMG, electroencephatograph and cardiac sound recording.

3) Operating Rooms

Two operating rooms will be provided to be laid out adjacent to I.C.U. to treat patients immediately after operation.

4) Sterilization Room

It is designed to supply sterilized materials for the operating rooms and I.C.U. Sterilized materials and medical preparations for other departments will be supplied from the central material room, the supply centre in the Service Block.

5) Dispensary

The dispensary for both inpatients and outpatients is designed in the outpatient clinical ward. The pharmacy in the Service Block will supply medicine and will function as a pharmaceutical department as well.

6) N.I.C.U. and I.C.U.

8 incubators, 20 cots, 2 isolation beds and 3 observation beds will be provided for premature and newborn babies. In order to guarantee the high standard of medical treatment concerning those children except newborn babies, 6 I.C.U. beds, 6 beds for burns, altogether 12 beds will be equipped in the I.C.U.

I.C.U. and the burn unit are not designed independently of each other in separate rooms, but are planned in the same room with distinction of beds to share the same facilities.

7) Blood Dialysis Room

A blood dialysis room for 3 beds will be designed in the outpatient clinical ward.

8) Physiotherapy Room

Physiotherapy room is laid out in the outpatient clinical ward with a gymnasium and a hydrotherapy room designed for rehabilitation of children. This does not have a comprehensive size and function as a rehabilitation department.

(3) Planning for the Administration Department

The administration department is the core of the hospital and is composed of the office, incharge of general affairs and admission & discharge of patients, medical superintendent's office, deputy medical superintendent's office, matron's office, managing staff offices, telephone exchange room, conference room and medical records room.

(4) Planning for Service Block

The machine room and electrical room are designed as service departments below the clinical ward. The staff cafeteria, kitchen, stall, barber's shop, central storage and autopsy room are also designed to be provided.

(5) Planning for Inpatient Ward

There shall be 8 nursing units in the inpatient wards, each single unit will consist of roughly 20 beds. One nurse station shall be for one nursing unit and one treatment room shall be provided for two nursing units. One nursing unit is basically consisted of single bed rooms and bed rooms with plural beds.

Considering that the direction of the wind in Islamabad is from the northeast and southwest most of the time, through the year, a courtyard has been designed in the floor plan of the inpatient ward in order to improve conditions for natural lighting and air ventilation for economizing overhead expenses.

Requisite rooms shall be commonly used for the purpose of efficient utilization of the area.

Owing to religious reasons, to avoid the east - west axis, the

direction of Mecca, location of beds shall be on a north - south axis.

Mothers' room, Play room, Linen room, Male toilet, Female toilet are designed on each floor. Mothers' rooms shall be provided according to the custom in Pakistan.

(6) Planning for Education Department

Professors' room, staff rooms, lecture rooms for students and interns will be provided on each floor of the inpatient ward.

(7) Planning for Isolation Ward

Isolation ward comprizes of 8 single rooms, 6 double rooms, altogether 20 beds which makes up 1 nursing unit. This ward is designed for patients with infectious diseases. Consequently, distinction between clean and soiled areas will be made clearly on the traffic lines. Those necessary rooms such as sterilizing room for linens, medical apparatus and tableware, a nurse station and a clinic will be provided.

4-4-3 Structural Planning

(1) Principles of Structural Design

According to the values of stress given by the frame analysis based upon the theory of elasticity, the structure shall be designed in accordance with the A.I.J. Standard for the Structural Calculation of Reinforced Concrete Structures (Architectural Institute of Japan), with CDA Building Regulations, 1963 and the British Standard Code as references.

Permissive stress for structural materials shall be specified referring to the standards of both Pakistan and Japan, considering the local workmanship and the uneven quality of local materials as well.

(2) Design Loads

Design loads, such as external force and loads on the buildings

are as follows:

1) Dead Loads

a)	Reinforced concrete	2.4 t/m^3
b)	Bricks	2.0 t/m^3

c) The weights of finishing materials and other materials shall be specified at the detailed design stage.

2) Live Loads

a)	Office	300 kg/m^2
b)	Meeting room	360 kg/m^2
c)	Library	500 kg/m^2
d)	Ward	180 kg/m^2
e)	Storage	400 kg/m^2
f)	Staircase	300 kg/m^2
g)	Machine room	400 kg/m^2

h) In cases where heavy machinery is loaded, the value shall be increased according to the situation.

3) Wind Loads

Wind loads are not considered particularly for this Children's Hospital, which is 2-stories above the ground and constructed of reinforced concrete.

4) Structural Materials

Major structural materials shall be specified as follows:

a)	Reinforcing bars:	Deformed reinforcing bar SD 30 (JIS)*
		* Japanese Industrial Standard
b)	Concrete:	Fc = 210 kg/cm^2 (at 4 weeks)
c)	Cement	Normal Portland Cement

4-4-4 Planning for Building Services

(1) Planning for the Electrical System