No.

BASIC DESIGN STUDY REPORT
ON
THE PROJECT FOR IMPROVEMENT OF JOSINA MACHEL HOSPITAL
IN
THE REPUBLIC OF ANGOLA

March 2002

JAPAN INTERNATIONAL COOPERATION AGENCY

THE JOINT VENTURE BETWEEN

NIHON SEKKEI, INC.

AND

EARL CONSULTANTS INC.

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PREFACE

In response to a request from the Government of the Republic of Angola, the Government of Japan decided to conduct a basic design study on the Project for Improvement of Josina Machel Hospital and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Angola a study team from July 19th to August 14th, 2001.

The team held discussions with the officials concerned of the Government of Angola, 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 Angola 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 Republic of Angola for their close cooperation extended to the teams.

March 2002

Takao Kawakami
President
Japan International Cooperation Agency

March, 2002

Letter of Transmittal

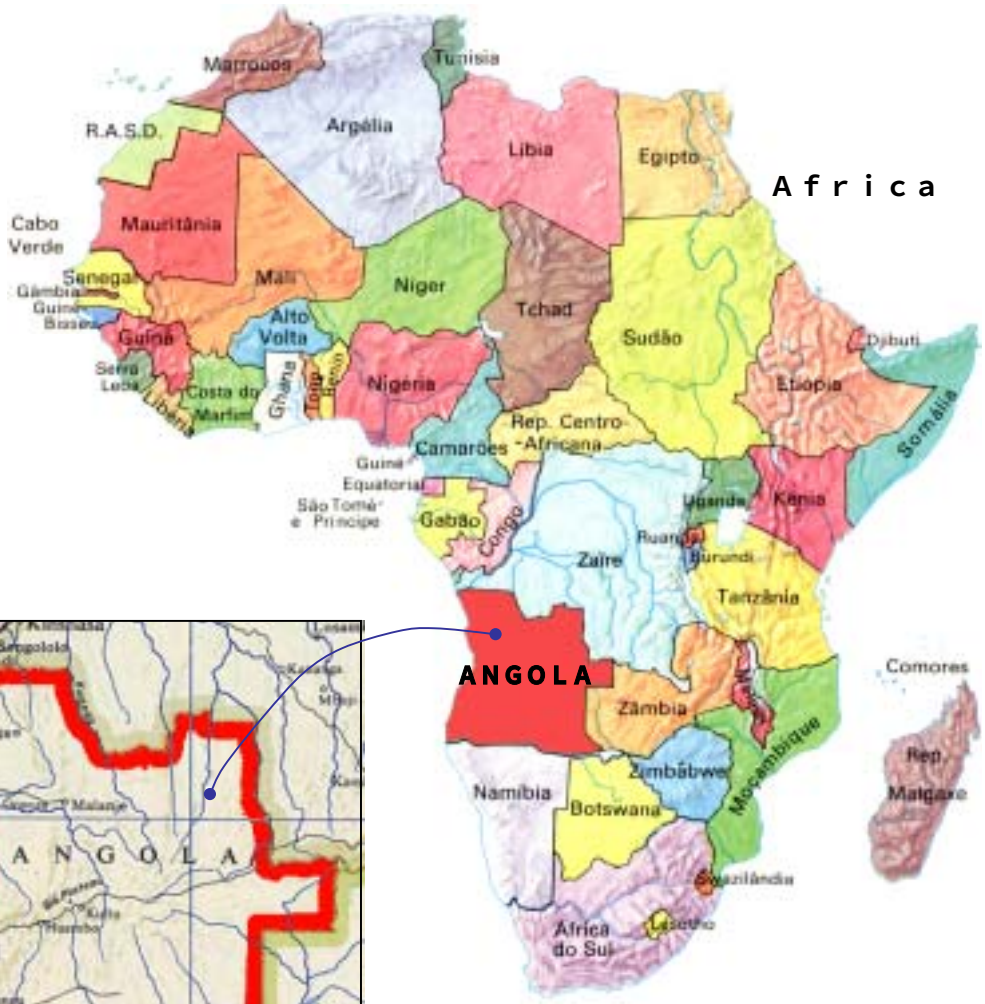
We are pleased to submit to you the basic design study report on the Project for Improvement of Josina Machel Hospital in the Republic of Angola.

This study was conducted by the joint venture between Nihon Sekkei, Inc. and Earl Consultants Inc., under a contract to JICA, during the period from July, 2001 to March, 2002. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Angola 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,

Ichiro Kanagawa
Project manager,
Basic design study team on
the Project for Improvement of Josina Machel Hospital
The joint venture between
Nihon Sekkei, Inc. and Earl Consultants Inc.



REPUBLIC OF ANGOLA

Luanda City Map

Perspective

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ABBREVIATIONS

BS	British Standard
CSSD	Central Supply and Sterilization Department
EDEL	Empresa de Distirbuocao de Electricidade.E.P.
E/N	Exchange of Notes
ENT	Ear Nose and Throat
EU	European Union
ICU	Intensive Care Unit
JASS	Japanese Architectural Standard Specification
JMH	Josina Machel Hospital
JIS	Japan Industrial Standard
Kz	Kwanza
MDF	Main Distribution Frame
PABX	Private Automatic Branch Exchange
US	United State of America

Summary

The Republic of Angola (hereinafter referred to as Angola) is located in the south-western coastal of African Continent (latitude of 6º ~ 17º South and longitude of 12º ~ 24º East). It has the area of 1,247,000 m^2, which is approximately 3.3 times the area of Japan. Except for the plain in the coastal area, 70% of the area is plateau above the altitude of 1,000m. Angola is divided into three climate zones: tropical in the north, sub-tropical in the south, and dry in the coastal area and near the Namibian border in the south. It has the population of 12,960,000 (1999, World Bank) with population growth rate of 3.1% (1992 ~ 98: World Bank). Major ethnic groups in the country are approximately Ovimbundu (40%) Mbundu (20%), Macongo (15%), and Chokwe (8%). The official language is Portuguese and Bantu languages are also widely used. Most of the population is Catholic.

Its capital is Luanda (population is approx. 3,500,000, Jan. 2000, by the government estimation), which is located on the coast in the north-western part of the country. The city is in the dry climate zone with annual precipitation of 300mm. The rainy season is from March to May.

Contact between Europe and Angola began in 1483 when Portuguese first arrived in Angola. The Portuguese started ruling the coastal area in the 16th century. Angola became an overseas province of Portugal in 1951. At about the same time, national movement had emerged and it won independence in 1975. A civil war broke out after the independence and the cycle of cease-fire mediated by foreign countries and UN and resumption of warfare has been repeated. Since major attack carried out by the government forces in 1999, the situations had been in favour of the government for a while. Since January 2000, the situations have remained deadlocked. However, the death of the leader of UNITA in the sweeping operation of the government forces in February 2002 is expected to bring about new development to the situations.

In Angola, per capita GDP is US$270 (1999: World Bank), which places Angola among the low-income countries. Major industries are agriculture (main produces: maize, beans, sugar, coffee beans and sisal) and rich natural resources, *e.g.* petroleum and diamonds. Main export partners are U.S.A., China and Taiwan and the main exports are petroleum and diamonds. Main import partners are Portugal, U.S.A. and South Africa.. and the main imports are raw materials, food and transportation equipment (2000: Trade Statistics).

The trade between Japan and Angola was worth 2.7 billion yens (2000: Trade Statistics). The main import goods from Japan were automobile (81%), machinery and its parts (13%) and steel (2.7%). Export to Japan was worth 300 million yen and the main products were petroleum (93%) and crabs (6%).

Due to the prolonged civil war, the Angolan economy is in dire situations. The economic growth rate of –10.0% (1990~97: World Bank) and the inflation rate of 329% (1999: Central

Bank) indicate severe economic conditions. Fifty-two percents of GDP of the nation is income from the sales of petroleum. Petroleum accounts for 87% of total export. Though the Angolan government put forward the policy to strengthen the relationship with Western countries by introducing mixed economy based on market economy in 1990 and has implemented Economic Recovery Plan, all the measures for economic recovery so far taken have ended in failure. Therefore, reduction of inflation and budgetary deficit, improvement of transparencies of finance and improvement of trade deficit are considered as the most important tasks at present.

Most of the medical/health-related indices of Angola are at low level. Infant mortality of 170 per 1,000 births (average of 105 in sub-Saharan African countries) and maternity mortality of 1,500 per 100,000 pregnancies (average of 96 in sub-Saharan African countries) place Angola near the bottom of the table among sub-Saharan African countries (UNDP/Human Development Report 1999).

Particularly, influx of more than 2 million displaced people into Luanda Province has brought about serious consequences on social environment. In the medical sector, 20 years of lack of sufficient maintenance of medical facilities have made medical facilities and equipment obsolete and deteriorated and shortage of medical supply caused by rapid inflation has made it impossible to carry out proper medical activities.

Under such circumstances, the Angolan government drew up its 'Five Year Health Development Plan (2000-2004).' In this plan, the priority is given to the improvement of core hospitals, and the plan for renovation of facilities of JMH and improvement of its equipment was drawn up. JMH is the oldest hospital in Angola built 120 years ago. In addition, its facilities are the largest in Angola and its equipment has been severely deteriorated. For these situations, the Angola government is only capable of repair and renovation of limited areas of the existing facilities. Since modernisation of the hospital was urgently required, the Angola side made a request for Japan's Grant Aid for the implementation of the Plan.

In response to the request, the Japanese government decided to conduct a survey for this Project, and JICA dispatched the Basic Design Study Team in July 2001. The team discussed with the Angolan authorities, surveyed relevant facilities, collected necessary data and surveyed the proposed construction site. Then, the team analysed the data in Japan and conducted the on-site explanation of the summaries of basic design and of the results of basic design study and the on-site survey in January 2002. Finally, the team prepared this basic design study.

The study has verified the necessity of the improvement and empowerment of JMH and drawn a conclusion that it is necessary to improve relevant infrastructures, reconstruct facilities, including Outpatient, Operation and Laboratory Departments, renovate the existing facilities and procure relevant equipment.

The proposed construction site is in the premises of JMH in Luanda. The summary of Josina Machel Hospital Improvement Project in Angola is as follow:

Responsible Authority : The Ministry of Health (MOH) of Angola
Implementing Agency : Josina Machel General Hospital (JMH)
Structure : Reinforced concrete structure with two stories above the ground and one underground story in part
Existing Facilities : 24,470m^2
Project Area : 25,034m^2
including facilities to be reconstructed (total floor area of 6,796m^2)
facilities to be renovated (total floor area of 8,178m^2)
areas of repair (total floor area of 10,060m^2)

Content of the Project:

Table S-1 Content of the Project

	First Phase: 12 months (Single fiscal year project)	Second Phase：19 months (Government bond project)
Construction of facilities	Renovation and Repair - ward –surgical(238 beds) 4,823m^2 Reconstruction of Infra-structure - road paving within compound - elevator - plumbing—water supply, sewerage and medical sewerage - power substation total 4,823m^2	Reconstruction 5,794m^2 - 5-operation theatres - central sterilisation and supply - radiology laboratory - ultra sound - emergency unit (internal medicine, surgery) - service corridor - mortuary - kitchen and laundry Renovation 6,520 m^2 - out patient dept. - administration office Repair 7,897 -ward—internal medicine 308 beds Reconstruction of Infra-structure - generator system - medical gas system total 20,211 m^2
Procurement of equipment		- Basic medical equipment for the facilities to be renovated and to be reconstructed as mentioned above
Soft Component	- Improvement of the technology for hospital management and for maintenance and management on medical equipment and facilities	- Improvement of the technology for hospital management and for maintenance and management on medical equipment and facilities

The total expenditure required for Angola side to this Project is estimated at 15.9million Kz. As to the duration of the Project, it is expected to take 12 and 19 months to complete the first phase (Single fiscal year project), including detailed design (preparation of tender documents), and the second phase (Government bond project), respectively.

The maintenance costs after the completion of the Project will be 18,208,528 Kwanza (Kz) per year according to our estimate. Its breakdowns are 15,708,524 Kz and 2,500,000 Kz for the maintenance of facilities and equipment, respectively. The maintenance costs for the facilities correspond to *approx.*11.8% of the total budget of JMH in 2000 and the maintenance costs for the equipment correspond to *approx.*10% of the procurement costs. Currently, Department of Equipment, Medicine and Maintenance of MOH is responsible for the maintenance of medical equipment. Actual maintenance works in JMH are being carried out by Pharmacy in Clinical Department.

MOH stated that it would definitely take necessary budgetary measures to cover the increase in maintenance and personnel costs because this project was essential to the improvement of medical services in Angola and it was also a presidential project.

Five new operation theatres will be constructed in this Project. One anaesthetist and 49 nurses are operating the theatres in addition to surgical doctors. Generally speaking one anaesthetist is too little for the size of the operation, and currently a senior nurse with training in anaesthesia is helping in anaesthesia in accordance with the regulation of Angola. MOH and JMH recognising the consequences, confirmed in the meeting that, by the time of the commencement of the Project, they were planning to assign another anaesthetist trained abroad to the hospital and that they were also planning to hire a foreign anaesthetist.

The following effects are expected as results of the implementation of this Project

(1) Improvement of the referral system

Due to the civil war, the population of Luanda Province has rapidly increased to 3.5 million. Improvement of the system of public health and medical services has failed to pace with this population growth. Improvement of primary care institutions is in progress with assistance from Japan, EU and other countries. As to the assistance to tertiary institutions, EU member countries and Japan (in the form of provision of equipment) have provided limited assistance for JMH, Américo Boavida Hospital and Lucrécia Paim Maternity Hospital.

However, the core facilities of JMH, which is the largest in Angola and is expected to be the centre of the referral system, have become obsolete and deteriorated in 120 years of its history.

This Project includes a plan for centralization of Emergency Units of Internal Medicine

and Surgery and installation of one minor operation room and treatment rooms in Emergency Department. Furthermore, reconstruction of the Diagnostic and Treatment Centre, which includes 5 operation theatres and radiological/ultrasonic diagnoses, and the improvement of medical equipment will improve JMH's functions as a tertiary medical institution.

When the improvement of JMH is achieved through the implementation of this Project, the referral system of Angola, which is in paralysed state, will be significantly improved.

(2) Improvement of relevant functions

In addition to the centralization of the departments, installation of the service corridor and lifts will improve the sanitary conditions and functionality of the entire existing buildings.

(3) Improvement of infrastructures, *e.g.* mechanical and electrical systems.

Renovation of badly deteriorated electrical, water supply and sewage system in the entire hospital will improve the infrastructures required for medical facilities, such as laboratories and operation theatres as well as toilets, shower rooms and lavatories, and result in the improvement of total sanitary conditions in the hospital significantly.

(4) Improvement of Outpatient Department by renovation

At present different specialities are sharing the same clinics. After the completion of this Project, each speciality will have its own clinic and more freedom in deciding days of consultation. Thus, each speciality will be able to increase consultation capacity, and will ease congestion in Out-patient Department.

(5) Preparation of the function as a training hospital.

JMH has a responsibility of a training hospital. However, due to lack of appropriate facilities, it is forced to have training for medical students (currently 40) in neighbouring National Paediatric Hospital. JMH will be able to fulfil the responsibility when the training facilities and programmes in the hospital have been prepared in this Project.

(6) Organisation and system of hospital management and maintenance

The following will be achieved through 'soft component'(technical assistance service by consultant) to be implemented in this Project.

1) After the completion of the construction of facilities in this Project, JMH is expected to prepare annual reports on its operation (numbers of outpatients and inpatients by diseases, average bed occupancy rate, average duration of hospitalisation, mortality, number of referred patients, etc.). If these reports were prepared, they would make it possible to grasp the conditions of operation of the target facilities and could be used

as references for the improvement of operation.

2) In co-operation with the start-up services provided by the suppliers of medical equipment, soft component will assist the maintenance team to learn effective use of the manuals and instructions and with efficient implementation of maintenance.

3) JMH will be able to prepare procurement plan for spare parts, equipment replacement plan, and to draw up mid- to long-term budgetary plans based on these data; data of all the equipment, such as date of procurement, frequencies of use and repair records.

It will be important for the implementation of this Project that the works of the Angola side are to be implemented at appropriate time. In the Project it is necessary to implement construction without interruption to or reduction of the functions even while relocating the functions of the hospital. Therefore, for the smooth implementation, Japan side will carry out renovation of facilities where the functions are to be relocated to.

For smooth and efficient construction and supply, additional measures in the following areas are requested.

(1) Establishment of Management System of Hospital Operation

In order to create a team which will lead the operation system of the hospital, seminars and training on techniques of rational and efficient operation and maintenance will be implemented as part of 'soft component' of this Project. In order to utilise the know-how taught thus acquired, it is requested that not only JMH but also MOH recognises its importance and maintain it.

(2) Establishment of Maintenance System of the Buildings

For the maintenance of facilities and equipment to be modernised in this Project, the Angola side has to increase the number of staff for mechanical, water supply, waste water and sanitary facilities and make effort to create a permanent maintenance team and operate it, taking full advantage of technical transfer to be implemented in 'soft component' of this Project

(3) Establishment of Maintenance System of Medical Equipment

For the maintenance of medical equipment, the Angola side will employ required personnel and implement the following in 'soft-component' of the maintenance of equipment of this Project.

- Construction of computerised inventory system of medical materials/equipment and spare parts
- Preparation of the maintenance procedure manual.

- Preparation of budgetary plan of maintenance

The Angola side will have to continue operating the system with its own effort after the completion of 'soft-component.'

(4) Preparation as a Training Hospital

Utilising seminars and other means of 'soft-component,' the Angola side will have to draw up its own educational/training plan and to train its personnel systematically.

(5) Establishment of the Referral System

The primary objective of this Project is improvement of JMH with the improvement of facilities and provision of medical equipment. In mid- to long-term, the referral system will be established in Angola when JMH's facilities have been improved to the level corresponding to the top referral hospital of the highest medical standard in Angola.

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(1) Background to the Request

Maintenance of medical facilities has been largely neglected for 20 years of civil war and subsequent rebuilding effort. Medical facilities and equipment have become old and deteriorated. Shortage of medical supply has made proper medical care impossible. The referral system of public medical institutions of the country and province is hardly functioning. Currently, relatively wealthy people choose to visit private hospitals for secondary and tertiary medical care, with the exception of few specialised treatments and the cases of emergency. These reflect the current conditions of medical services in Angola. Under such circumstances, improvement of the facilities of 27 Health Centres responsible for primary health care is under way with assistance from Japan ('Luanda Province Health Centre Equipment Improvement Project') and E.U. Thus, the medical system in Luanda Province has been gradually strengthened.

Meanwhile, since improvement of tertiary level is also indispensable for the improvement of the quality of medical care, the Angolan government has given the highest priority to the improvement of core hospitals in its 'Five Year Health Development Plan (2000 – 2004).' To achieve this objective, the Angolan government drew up a plan for renovation/reconstruction of the facilities of JMH, the largest general hospital in Angola, and improvement of its equipment. However, since large part of national budget is allocated to recovery effort from the civil war. Due to lack budget allocated to the health/medical sector, the Angolan government requested Grant Aid assistance to this Project to Japan.

Project Formation Study

The Project Formation Study Team was sent to Angola by Japanese Government in September/ October 2000. The objectives of the study were to investigate current situations and problems regarding improvement of core hospitals, training of medical staff, improvement of administrative services, etc., and to study possibilities of mid- to long-term cooperation to Angola in the said sector.

The study pointed out renovation of JMH's facilities and provision of required equipment as measures for the improvement of this core hospital. The study stated that the deteriorated conditions of the hospital, which was built 120 years ago and

designated as historical monument as mentioned below, especially many leaking spots in the roof, were adversely affecting the medical activities of the hospital. The study confirmed the necessity of overall renovation. Furthermore, the study suggested that, due to structural constraints of the existing buildings, it is necessary to rebuild core area of the hospital in order to make it a modern tertiary medical institution.

'Project for Improvement of Medical Equipments in Josina Machel Hospital' was implemented in JMH in 1996 with Japanese assistance. This project provided medical equipment to JMH, and the scope was limited to basic human needs.

(2) Renovation Plans of the Angola Side

Since 1996, three renovation plans of this hospital have been drawn up.

The first was the study on construction style and its preservation assisted by the Italian government.

The second was a plan drawn up by a consultant firm called Dar Al-Handasah commissioned by the Angolan Government. It included a rough renovation design consisted of construction of a corridor along the east side of the hospital.

In the third plan, the order documents for Outpatient (H) Block and the corridor were prepared based on the design of the second plan.

Having failed to source the budget for implementation of any of the three plans, the Angolan government made this request.

Though repair and renovation works were carried out in various areas of the hospital, they were only temporary measures, such as touch-up on leaking spots, painting on the peeled walls and mending partitions and doors. They could not include works on major problems, such as roof repair, water supply, toilet, sewerage and electric facilities.

(3) The Content of the Final Request

We discussed with Angola side and confirmed the contents of the final requests, which are shown in the table below.

Table 1-1 Content of the Final Request

	Content of the request of April 2001		Content of the final request	
Block	Usage	Name of room	Name of Room	Comments
A	Hospital Administration /Radiology/Pharmacy	Administrative rooms/Registry	Hospital Administration/ Pharmacy	
B/C East	Operation Department /ICU/CSSD	4 operation theatres	5 operation theatres	New building
			Emergency	New building
B West	Electrical Therapy Department	Electrical Therapy Room, etc.	Ward of surgery	
C West	Ward	Ward of surgery with 20 beds	Orthopaedic Surgery	
D East	Physical Therapy/Dialysis	Physical Therapy rooms/Dialysis room	Orthopaedic Surgery	
D West	Ward	Ward of surgery with 20 beds	Ward of surgery with 20 beds	
E East 1st floor	Central Laboratory	Laboratories	Ward of surgery	
E East Basement	Repair/Store		Repair/Store	
E West 1st floor	Ward	Ward of surgery with 20 beds	Ward of surgery with 20 beds	
E West Basement	Repair/Store		Repair/Store	
F East 1st floor	Medical Offices		Medical Offices	
F East Basement	Mortuary/Dissection		Mortuary/Dissecti on	
F West 1st floor	Medical Offices		Medical Offices	
F West Basement	Medical Offices		Medical Offices	
G	Ward	Ward of internal medicine with 240 beds	Ward of internal medicine with 240 beds	
H	Outpatient Department		Outpatient Dept./Laboratory	Re-construction
Others	Kitchen/Laundry		Kitchen/Laundry	Re-construction
	Corridor		Corridor	

1) The original request had a plan for Electrical Therapy Department in the west side of B Block. When we asked about the operation of the department, JMH confirmed that it intended to use the equipment for electrical therapy in the ward and that, therefore, there was no need to prepare large facilities for the department. JMH intends to use this side of the Block as wards of surgery and orthopaedic surgery, which were closely connected to Operation Department.

2) The original request included a plan for Physical Therapy Department in the east side of D Block. The plan has been altered just to prepare two small function recovery rooms to offer massage and simple function recovery training only to the inpatients of the hospital. There is no need for JMH to have facilities for intensive training since National Rehabilitation Centre located adjacent to JMH will provide such training.

3) The original request included a plan for Central Laboratory in the east side of E Block. However, JMH suggested to MOH that this location of Central Laboratory is too far from Outpatient and Emergency Departments. Therefore, the plan has been altered to locate Central Laboratory in Outpatient Block, where extension is planned. Part of the east side of F Block is currently used as medical offices. Medical offices are also located in the other parts of the hospital. In this Project, medical offices will be centralised in this area.

(4) Evaluation of the Content of Request (Construction Plan)

1) Corridors for patients and staff

The central corridor runs through the centre of each block of the hospital. As this corridor is the only passage connecting the blocks, the lines of movement of patients, visitors, staff and services are all concentrated on this corridor. Therefore, construction of a new corridor on the east side of the hospital was requested.

Since the construction of this corridor will enable separation of lines of movement of patients, staff, and services, such as linen and meals, of Emergency, Operation, Radiology, and Laboratory Departments from those using the central corridor, it is considered appropriate in the Project.

2) Lines of vertical movement

Elevation of land declines rapidly towards the back of the hospital. G Block has five stories since it stands on this area of low elevation, and it houses the largest number of beds. E and F Blocks have two stories. The lifts in G Block have been out of order for many years. At present, people transport patients and goods between stories using narrow slopes located outside the building.

Under such circumstances, installation of reliable lifts for transport of patients and goods is considered appropriate. Meanwhile, as a means of connecting 1 or 2 stories of Outpatient Department, Operation Department, Laboratory and service corridor, usage of slopes is considered reasonable. These slopes will enable transport by stretchers between these stories.

3) Operation Department

The final request includes construction of five operation theatres.

Operation Department is currently located in the west side of D Block. Renovation of interior facilities, such as air-conditioning system, is being carried out in this area. However, since air-conditioning ducts and main bodies are installed in the limited space between wards and since they are exposed outdoors without roofs, it is easily expected that sooner or later the equipment will develop malfunctions. On the section plan, the location of the department is far from Emergency Department and Laboratory. The movement of patients and of staff is through the same line of movement of general visitors.

To solve the problems, it is necessary to create the facilities of Operation Department by reconstruction of the east sides of B and C Blocks and the to build a new service corridor along the east ends of the wards buildings. This reconstruction will secure the line of movement of patients and enable direct connection to Outpatient and Emergency Departments and wards from Operation Department.

As to the number of operations, 5,472 operations out of 7,723 conducted in 2000 are minor operations, such as external wounds. Installation of one minor operation room and 2 treatment rooms in Emergency Department, for such minor operations will be sufficient. It is judged that the other serious cases can be fully operated in five operation theatres to be built in Operation Department.

For possible expansion of the functions in future, the design of this Project will give consideration to the facility of expansion and extension of the operation theatres.

4) ICU

The request included construction of new ICU. However after the discussions between the Team and the Angolan side, it was agreed that ICU building which is being constructed in the space between the west sides of C and D Blocks is sufficient for the purpose.

5) Emergency Department

Patients are being carried in to Surgical Emergency Unit from the entrance of H Block located on the side of the front of the hospital. Patients are being carried in to Emergency of Internal Medicine Unit from the fourth basement floor of G Block located on the southern end of the hospital facing to National Paediatric Hospital. These two Units are 300m apart and their locations are causing a serious problems for the patients. This problem is resulted from the fact that Outpatient Block has only a limited floor area. Only Surgical Emergency is using this limited space because of its high urgency. Under such circumstances, extension of the existing Outpatient Block is requested to accommodate two Emergency Units on the first basement floor of the block. Extension of Outpatient Block is considered appropriate because it will improve the functions of Emergency Department, the problematic situations resulted from complex placement of clinics of General and Specialised Outpatient Departments, and efficiency of services provided by doctors and other staff by making physical locations of Operation, Radiology and Laboratory Departments closer to Emergency Department.

6) Radiology Department

Radiology Department is currently operating under very dangerous condition. The department is located on both sides of a public corridor. The doors and walls are of material incapable of X-ray shielding. In addition, structure, of this building including underground structure appears to be aged and very fragile structures. Thus, there is need for overall renovation of this area including structural bodies. For these reasons, it is appropriate to plan relocation of the department to the 1st floor next to the Operation Department, which is to be constructed in the area of the east sides of B and C Blocks. The appropriateness of this relocation is also supported by the fact that RC wall of the new building

can be used for shielding, and, thus, the cost of relocation can be minimised. This relocation is considered ideal on the design because it will make Radiology Department closer to Emergency and Outpatient Departments and because there will be a few lines of movement passing through this area.

7) Outpatient Department

As the floor area of Outpatient Block is limited, general and specialised outpatient clinics are placed in complex patterns on its three stories. Since the central corridor has width of only 2.5 meters, there always is congestion in the corridor. Movement of patients and that of medical staff are obstructing each other and poor ventilation in the corridor is creating environmental and sanitary problems. For these reasons, it is appropriate to alter the locations of partitions in order to create waiting space and to facilitate transport of patients.

8) Laboratory Department

Laboratories are split in 3 laboratories.

While Central Laboratory is located on the third basement (-3)floor of G block at the southern end of the hospital, the other laboratories are located in Surgical Emergency and Internal Medicine Emergency Department. On-site survey showed that infrastructures (facilities, electricity, etc.) were in poor conditions in G block. Especially there is no water supply in this block, and people have to carry water from water tanks to the laboratories manually.

To solve the problem, Central Laboratory will be relocated to the Outpatient Block. With this relocation, Central Laboratory will be closer to Emergency, Outpatient and Operation Departments, and the Laboratories can work more closely. Although this relocation may leave some of the Wards farther away from the laboratories, new collection system of specimen shall make up the inconveniences.

9) Central Supply and Sterilisation Department

At present, each department has its own sterilisation facilities. Unspecified sanitary partitioning in each room, as well as deterioration of the facilities, is creating a sanitary problem. Furthermore, with the exception of a few high temperature sterilisation facilities in Operation and other departments, general

linen and contaminated goods are washed together in Laundry.

Under such circumstances, Central Supply and Sterilisation Department (CSSD) will be established right next to Operation Department. The department will have facilities capable of sterilising contaminated equipment and linen from the operation theatres and wards. Only general linen will be washed in Laundry to be relocated in G Block. Thus, establishment of CSSD is considered appropriate in this Project.

10) Medical Waste Incinerator

The incinerator provided in the previous Grant Aid is for general waste and not capable of incinerating medical waste. Therefore, the facility capable of incinerating medical waste was included in the Project. Since the site for incinerator is next to the public road, this Project will include fence and roof for the incinerators as well.

11) Mortuary

The building of mortuary is located on the slope on the west side of the wards. Because the building has been deteriorated and a narrow access road makes access to the building difficult, the Project will include renovation of the fourth basement (-4)floor of G Block into mortuary. This area will not only be easily accessible from the service corridor and lifts to be installed in this Project, but also convenient for the family and the transport to outside.

12) Pharmacy Department

In this hospital, pharmacy is providing services only to inpatients. Outpatients have to purchase medicine at pharmacies outside the hospital with doctors' prescriptions.

JMH has an idea of opening a pharmacy for the public in the area facing to the outside of the hospital. The request for preparation of this space is included in this Project. A space will be reserved for the pharmacy on the northern side of H Block.

13) Administration Department

Rooms of Administration Department are currently located in vacant spaces in A, H and F Blocks. Therefore, coordination within the department is difficult and patients and their family members are forced to move here and there. For these reasons, centralisation of this department was requested. This request is considered appropriate. From the viewpoint of the overall placement plan, A Block is considered as an appropriate place for the centralisation.

14) Education Department

As JMH is required to have functions of a training hospital, space and equipment are requested not only for practical training to young doctors but also for the improvement of techniques and knowledge of Angolan medical staff and for the training of nurses, technicians of various specialities, facility management technicians and other staff.

Minimally required rooms, facilities and equipment corresponding to the requirement of training programmes will be prepared in this Project.

15) Service Department

At present, kitchen and laundry are located in a building separate from the main blocks. As there is no path connecting this building to the other blocks, people cannot use carts to transport goods to and from this building.

This study revealed that, though Kitchen/Laundry Building was relatively new, rusting had been rapidly progressing on steel bars inside the slab of the building and that detaching of concrete from the lower edge of the slab was widely observed. These findings suggest that rusting may have also been progressing in the structural beams inside the building. Under such circumstances, it is appropriate to relocate kitchen and laundry to (-4) of G block. the generator room and electricity room on a vacant space adjacent to the current Kitchen/Laundry Building.

16) Improvement of Infrastructures

The study confirmed that the main pipe of 400mm diameter of water supply is running under the main road near JMH. In this Project there is necessity of lead-in works of water supply pipes to the site. The study also confirmed that, as

standard water supply pipes were those of PVC in Angola, the lead-in pipes were likely to be damaged during road construction. Under such circumstances, the Angola side requested to the Japan side to implement this work. The entire length of the lead-in pipes is estimated at *ca.* 500m.

Considering special requirement as a hospital, the Project includes installation of water receiving tanks in the premises of the hospital to supply water to the entire hospital. The study also confirmed that all the infrastructures in the hospital, including piping and wiring of electricity and facilities, have been deteriorated and are in dangerous state. Therefore, it is considered appropriate to renovate the entire infrastructures in this Project.

17) Preservation levels of each block

Table1-2 Preservation level of each block

Level	1 Preservation	2 Renovation	3 Rehabilitation	Comments
Area	A Block	B to E Blocks (west), Corridor, F Block	G and H Blocks	
Main structure	Reinforcement with RC or S structure in all the areas with structural problems or problems of preservation	Preservation of exterior walls Reinforcement with RC or S structure in the areas with structural problems	Utilise it rationally with coordination with the plan for new construction	To be based on the result of the survey of structural deterioration
Roof	Repair with the materials currently used (Tiles, corrugated sheets)	Replace to new tile (same design)	Same as in the left column	Necessity to confirm strength of tiles
Exterior wall	Preservative repair (Remove items added after original construction)	Repair (with the materials Current by used)	Same as in the left column	Necessity of deliberate planning of colouring
Doors	Repair all. The ones suffered too much deterioration will be replaced by the ones made from the same material.	Replacement of parts of doors to secure air- and water-tightness	Repair of the doors on the front Façade	
Interior floor	Preservation of the areas with original tiles. Damaged areas will be repaired with new materials. Interior will be renovated.	Renewal of all the floors according to the rehabilitation plan. Preservation of all the areas of the corridor where the original tiles are used.	Renewal of all the floors according to the construction plan	Levelling will be carried out in all the floors except corridors.
Interior wall	Partial repair of the original parts according to the preservative repair plan	Renewal of all the walls according to the rehabilitation plan.	Same as in the left column	To be planned with consideration to alterability
Content of on-site survey	Eye inspection: General appearance/internal appearance/finishing materials/doors/roofs Measurement: Major dimensions/level Structure: Structure and deterioration of 1F floor (to be checked underground)	Eye inspection: Same as in the left column Measurement: Same as in the left column Structure: Same as in the left column	Eye inspection: Same as in the left column Measurement: Same as in the left column Structure: Structural strength	The Angola side does not have data on major dimensions.
Comments	Plan based on 'Venice Convention' which is the global agreement on 'Preservation'	Same as in the left column	The front façade will be preserved.	

Preservation ···Keep in an National heritage in changed condition and re use internal space as is.

Renovation···Put back into Histrical good condition and provide advanced Hospital

Rehabilitation···Repair to maintain existing design appearance function and provide Hospital

(5) Evaluation of the Content of Request (Equipment Plan)

1) Additional Requests of Equipment

The departments listed below have submitted additional requests of equipment. These departments are fully operational and have proven capacities to operate the requested equipment. For these reasons, the additional requests are considered appropriate. Meanwhile, introduction of CT and X-Ray angiography systems is considered premature, considering the current capacity of operation of the recipient.

① Paediatric Surgery
② Ophthalmology
③ Otolaryngology
④ Internal Medicine
⑤ Neurosurgery
⑥ ICU
⑦ Equipment for dental technicians

2) Evaluation of the Timing or Procurement of Medical Equipment

There will be no problem regarding the provision of equipment to the departments currently in operation. On the other hand, provision to the planned departments as shown below will be carried out after it is confirmed that the recipient has secured personnel and budget for such departments.

Table 1-3 Future Evaluation of Medical Equipment

	Department	Future Plan	Comments
1	Blood Bank	To be established	
2	Endoscopy	To be established	
3	Urology	To be established	
4	Medical Equipment Maintenance (Under MOH)	To be established	
5	Central Laboratory		Poor operational record
6	Radiology		No doctor specialised in radiology

Chapter 2. Contents of the Project

Chapter 2. Contents of the Project

2-1 Basic Concept of the Project

(1) Overall Goal and Objectives of the Project

The infant mortality rate in Angola is 170 per 1,000 births (average in sub-Saharan Africa: 105/1,000) and the maternal mortality rate is 1,500 per 100,000 pregnancies (average in Sub-Saharan Africa: 979/100,000). These figures indicate that almost all the health and medical care indices in Angola are low, among the lowest in the area. Such poor conditions led MOH of the Republic of Angola to draw up and implement a provisionally health plan in 1996. The plan included measures for improvement of services at medical institutions, training of medical staff and measures to overcome with infectious/contagious diseases. Later the MOH laid out a 'Five Year Health Development Plan (2000-2004).' The plan aims at the improvement of medical services, both in quality and quantity, by giving highest priority to the improvement of the national hospitals, which are expected to play a central role in the provision of medical services. However, the government has been unable to implement the plan fully because of budgetary constraints.

Josina Machel Hospital (JMH), which is the target of the present Project, is the oldest, highest-ranking general hospital in the country. However, both its large-scale facilities and its equipment have deteriorated markedly with age. Priority has been given to the improvement of both hospital facilities and equipment, as it is hoped that this will contribute significantly toward the improvement of medical services, in both quality and quantity, not only in Luanda Province but also in the whole of Angola. This Project will not only improve the medical facilities of the hospital but also restore it to its role as the top referral hospital, a role the hospital is hardly fulfilling at present, and strengthen the referral system in Luanda Province.

(2) Basic Concept of the Project

The MOH has been undertaking its own project of partial renovation of the deteriorated facilities of JMH and replacement of some of its medical equipment. However, only partial renovation of the 120 year-old hospital has been attempted, and the hospital continues to deteriorate as a whole.

In order to restore the JMH, with the content of the entire project confirmed and the work to be carried out by the Japanese and Angolan sides respectively clarified as shown in the table below, the Project will rebuild, renovate and repair the entire hospital, and replace, expand and improve the equipment. The objective of the Project is to restore the function of the hospital and to make it a core institution within the medical system of Luanda Province.

Table 2-1 Scope of works for Japan and Angola

			Comments
Japanese side	Central Clinic/ Emergency Treatment Unit/ Radiology Department/ Service Department/ Improvement of Infrastructure	6,800 m^2	Reconstruction
	Outpatients Building/Administration Department/Some Wards (F Block)	8,150 m^2	Renovation
	Mainly Exterior of Wards	10,200 m^2	Repair
Angolan Side	ICU	530 m^2	Reconstruction
	Interior of Wards (Parts of D, E and F Blocks)	2,100 m^2	Renovation

The content of this Grant Aid Project to be implemented by the Japanese side is as follows:

1) Reconstruction of the facilities for central clinical functions, such as operations, radiological and ultra-sonograph etc., so as to restore the hospital's function as a tertiary referral institution.
2) Reconstruction to centralise the emergency facilities, which are currently scattered through the hospital.
3) Improvement of hygiene conditions and the functionality of all existing buildings

by the addition of horizontal and vertical lines of movement (service corridors, elevators etc.).

4) Improvement of the infrastructure needed for a medical institution through the renovation of deteriorated electrical, water supply, wastewater, air-conditioning, and ventilation systems.

5) Identification of equipment in the existing facilities and provision of the minimum needed equipment of which there is a shortage.

6) 'Soft component' assistance aimed at improving the operation and management of the hospital and the maintenance and management of its facilities and equipment.

2-2 Basic Design of the Requested Japanese Assistance

2-2-1 Design Policy

(1) Basic Policies

1) To design a project enabling the JMH, ranked the largest top-referral hospital in Angola, to restore its function as the core hospital in Luanda Province.

2) To clarify the scope of work to be undertaken by the Japanese and Angolan sides on the basis of a full understanding of the overall plan needed to strengthen the medical system in Angola (Five-year Health Development Plan of Angola). In working out the plan, the Angolan side shall maintain consistency with the Japanese implementation schedule and Project content.

3) To draw up detailed plans for the preservation and restoration of the exterior, interior and each part of the JMH, which is designated a 'Large Structure of Historical Value in Angola' by presidential decree. Also to proceed with close coordination with, confirmation from and permission from, the relevant

authorities within the Angolan government in order to bring out to the full the function of the hospital.

4) In the drawing up of facility and equipment plans, to design a project that will enable the JHM to sustain technical and financial self-reliance and growth, taking into account its current capacity of operation and maintenance (number of medical staff, level of medical technology, budget, capacity to maintain facilities and equipment, etc.).

5) Keeping in mind that this is a long-term assistance project, to draw up a plan for the implementation of assistance via 'soft components' so that the facilities and equipment are operated effectively and efficiently, looking into the possibilities of technical assistance from Japan and incorporating such possibilities, as necessary.

6) To give consideration to the environment of the surrounding area, including other institutions, buildings and residents.

(2) Policy toward the Natural Environment

1) Wind

Luanda is a port town facing onto the Atlantic Coast. The city usually has calm breezes, but rarely strong winds. The wind blows predominantly easterly, or off the land, during the night, and predominantly westerly, or from the ocean, during the daytime. JMH is located on a hill relatively close to the coast. As the axis of the buildings stretches approximately north-northwest to south-southeast, a design utilising the wind for natural ventilation shall be adopted.

2) Rain

The area of Luanda has a relatively dry climate, with annual precipitation of 425mm (1980). However, rainfall is concentrated in the months of March and April, with monthly precipitation then of 120~130 mm. During these months, heavy rain of 20~30mm per hour is experienced. The Project will give consideration to the drainage of rainwater within the premises, in order to prevent rain from blowing into the buildings. As the site is on high ground, there is no danger of flooding being caused by water coming in from outside.

3) Temperature and Humidity

There is a great difference in temperature between summer and winter. In the winter, it is comfortable during the daytime with temperatures of 22~24℃, and slightly chilly in the night. On the other hand, in the summer, the temperature usually reaches 26~29℃or more during the daytime and sometimes reaches as high as 34℃. Because humidity is high, at 70% or higher throughout the year, air-conditioning and mechanical ventilation systems shall be installed in rooms as applicable. As a general rule ceiling fans shall be installed in other rooms.

4) Sunlight

As Luanda is located at a latitude of 8 ºsouth, the sun's angle of elevation is high, and buildings are subjected to strong sunshine from directly above. Thus, the design will require plenty of consideration be given to good heat-insulation on the roofs and good ventilation under the roof space.

5) Earthquakes

The records of the Geological Survey Station of Angola show that there have been only a few earthquakes in and around Angola over the last 900 years. It

also shows that there was an earthquake off the Angolan coast recently. Such data suggest that there is very little possibility of earthquakes. Nevertheless, a design load corresponding to approximately one quarter of Japanese earthquake resistance standards shall be adopted in the design of the parts to be reconstructed. However, this standard shall not apply to parts undergoing preservation or renovation works, since the application of such standards would lead to an alteration of the outward appearance.

(3) Policy toward Social and Economical Conditions

In Luanda Province, where long-lasting civil war has led to a rapid increase in the urban population, it is an urgent task to increase the number of medical facilities and to improve the quality of medical services. Though Luanda Province has eight national hospitals responsible for tertiary medical care, two provincial and three district hospitals responsible for secondary care and 27 health centres responsible for primary care, the referral system for medical services is not functioning. Patients with minor ailments come straight to the JMH, the highest-ranked medical institution in the nation, without referral. Thus, the hospital has to restrict admittance.

The urgent task facing the JMH at present is restoration of the function of the hospital itself. In the long term, the JMH is expected to be restored to a state where it can accommodate 800 beds. Therefore, the Project will include measures to facilitate future expansion of Operation theatre and renovation of the Outpatient Section, Laboratories Section and Central Supply Unit, which make up the core of the hospital.

(4) Policy toward Conditions relating to Construction/Procurement, Special Industrial Conditions and Business Practices.

Until Independence in 1975, many construction works were carried out in Luanda Province, include of high-rise buildings. Since then, because of the intensification of the civil war, construction business became stagnant. The cease fire and subsequent lessening of the adverse effects of the civil war have led to a gradual increase in the number of construction works over the past two or three years. The unit cost of construction in Angola is exceptionally high among African countries, for the following reasons: 1. There are only a few subcontractors capable of large-scale construction. 2. Many of those subcontractors are local subsidiaries of Portuguese companies. When such subcontractors undertake projects of this scale one, quite a number of engineers have to be invited in from Portugal, which leads to extremely high personnel costs. 3. Most construction materials are imported goods with a high unit cost. Therefore, when selecting construction materials convenience of future repair and cost of maintenance shall be considered. In addition, efforts shall be made to minimise construction costs by the tax-exempt procurement of materials and equipment from Japan and third countries, making effective use of the Grant Aid system.

(5) Policy Concerning the Employment of Local Contractors

Because of the small size of the market, there are only four or five contractors capable of large-scale construction such as the present Project.

When implementing Japan’s Grant Aid, the Japanese contractor employs local contractors as subcontractors. Therefore, subcontractors for this Project shall be selected from among those few local contractors. The employment of local contractors facilitates the future maintenance of facilities and equipment, since these

contractors are familiar with the construction methods, materials and equipment best suited to the local climate and environment.

(6) Policy concerning the Implementing Institution's Capacity for Operation and Maintenance.

Most of the general doctors at the JMH were trained in Angola. Many of the specialist's doctors gained their medical education and experience in Europe and America, and some of the specialists are familiar with the operation of relatively highly sophisticated equipment. However, there are few people in the entire country capable of maintaining medical equipment, and their knowledge is at such a basic level that the repair of highly sophisticated equipment by local personnel only is not possible.

Therefore, equipment selected should be suited to the current technological level of the country.

At the same time, since the mechanical equipment to be procured in this Project is more sophisticated than the old systems currently used in the hospital, training will be needed to ensure their proper maintenance. Thus, the Project will include the implementation of a 'soft component' in the form of technical assistance to allow the proper maintenance of facilities and equipment. Furthermore, for the sake of proper operation after the completion of the Project, it will be necessary to establish a steering committee made up mostly of staff from the Angolan MOH and the hospital. The committee shall function as a system to maintain close coordination with, and to obtain confirmation from, the relevant government agencies.

(7) Policy Concerning the Establishment of Standards for Facilities and Equipment

1) Facility Plan

As there are no established standards for medical facilities in Angola, the standards for the hospital shall be determined by taking into consideration other tertiary medical institutions, such as the Américo Boavida General Hospital and the Lucrécia Paim Obstetric and Gynaecology Hospital, and the current level of the JMH.

2) Equipment Plan

The basic policy for the Equipment Plan is as follows:

① Basic equipment required for diagnosis and treatment in the JMH.

② Equipment corresponding to the technical level of the medical staff and capacity of the hospital to carry out maintenance of the equipment.

③ Equipment that does not cost very much more to operate and maintain than that currently in use.

④ For one year from the date of procurement, suppliers of the equipment shall provide spare parts under warranty. Therefore, there will be no need to purchase spare parts to replace initially faulty parts. The expendable supplies required for trial runs, operation and training when the equipment is handed over will be included in the plan.

(8) Policy Concerning Construction / Procurement Methods and Period of Construction

1) Policy Concerning Construction Methods

The western and northern sides of the JMH are designated a ‘Large Structure of Historical Value in Angola.’ Therefore, preservation and renovation will have to be carried out according to a faithful and meticulous plan on the basis of the

present state of the exterior appearance, interior appearance and other parts. Preservation and renovation work shall be implemented in close coordination with the relevant government agencies. So as not to hinder the activities of a working hospital special attention will be paid to the supervision of progress and safety management, and an appropriate personnel plan will be drawn up that takes into account the competence of contractors.

2) Policy Concerning Procurement Methods

Since only a limited amount of local construction material, such as cement and bricks, is available in Angola, most materials will have to be imported. In order to guarantee quality, performance and durability, materials and equipment that satisfy the standards of such countries as Portugal, the EU and BS shall be selected.

3) Policy Concerning the Construction Period.

After consideration of the implementation schedule, content and scale of the Project, it was decided that this Project should be implemented in two parts: Phase I, and Phase II.

Table 2-2 Two phases of the Project

Phase I	Phase II
・Due to the large scale of the project as a whole, initial priority shall be given to improvement of infrastructure, such as electricity and facilities.	・Construction of essential facilities, such as the Outpatients, Section, Central Consultation Section, Laboratories and Emergency Treatment Unit, and the installation of equipment shall be carried out.

2-2-2 Basic Plan

(1) Facility Components

Facility components covered by the Project are as follows.

Outpatients Department:	Outpatient clinics, Specialist clinics
Central Clinic:	Operation theatres, Recovery rooms
Emergency Treatment Unit:	Internal Medicine/Surgery consultation rooms, Treatment rooms, minor operating theatres, recovery and observation rooms, and emergency laboratory
Wards:	Toilets, plumbing in sluice, (interior work on wards to be done by Angolan side)
Laboratory Department:	Radiology (general, fluoroscopy), Ultrasonic, and CT scanner (planned) rooms; Pathology, Biochemistry, Haematology, and Bacteriology laboratories
Central Sterilisation and Supply Department:	CSSD, Laundry, Linen room, Stores
Administration Department:	Offices, Conference rooms
Maintenance Department:	Central Control Room, Electricity room, Machine rooms, Stores
Service Department:	Kitchen, Dining hall, Incinerator

Construction of the ICU Building by the Angolan side is now under way and is expected to be completed by Feb. 2002. Though this facility has some room for improvement, such as the environment of the rooms housing air-conditioning equipment and air-tightness in the space under the roof, the Design shall be consistent with this building in its overall structure.

Moderations have been made to the following functions as a result of the confirmation in the field survey of the contents of the request from Angolan side.

1) The original request was for the western part of B Block to be made into an Electrotherapy Department. However, JMH has confirmed that, as operation of the equipment of this department requires little space, it intends to use the extra

space as Surgical and Orthopaedic wards. These departments are closely linked with the Operating Department and do not have enough space.

2) The original request was for the eastern part of D Block to be made into a Physiotherapy Department. However, the function of this Department is similar to that of the neighbouring National Rehabilitation Centre. Thus, after clarifying the roles of these two institutions, JMH decided to prepare two small recovery rooms for massage and light rehabilitation training.

3) The plan to make the eastern part of E Block into the Laboratory Department has been discarded because of the distance from the Operating Department and the Emergency Treatment Unit. Instead, the Laboratory Department will be located in the Outpatients Building for which renovation is scheduled.

(2) Scale of Facilities

Floor areas of rooms were calculated taking the following into consideration: structural constraints and current state of the existing buildings; reference to the Japanese standards for floor areas in medical institutions (Design Materials of the Architectural Institute of Japan (AIJ) and others); layout of existing and to-be-procured equipment in each room; expected numbers of medical staff and patients.

The structure of the existing buildings, with the exception of G and H Blocks, is of masonry and since the layout of the structural walls may not be altered, the current partitions will remain mostly unchanged. In G and H Blocks, partitions must stand on the central lines between the columns, and the above-mentioned floor areas will be adjusted to meet those constraints.

Table 2-3 Floor Areas of Facilities

Department	Build-ing	Name of Room	Planned Area (㎡)	Remarks
Operating	B-C	Operating Theatre	209.7	6.8×6.2×5 rooms
		Anaesthesia Room	19.4	
		Recovery Room	63.1	2 rooms
		Nurses' Station	41.5	
		Anteroom	89.7	5 rooms+Preparatory
		Preparation Room	20.5	1 rooms
		Doctor's Room	21.8	
		Meeting Room	18.5	
		Staff Room	22.3	
		Staff Changing Room	83.7	1 each for male and female (2 stalls and 2 showers each)
		Corridor	164.3	
		Hall	88.3	
		Preparatory OT	43.0	Space only
	▽Subtotal, Operating		885.8	
Radiology	B-C	Radiology Room	84.7	3 rooms（Indirect:1; general:2）
		Ultrasonography Room	14.6	
		CT Scanner Room	28.1	Space only
		CT Control Room	19.2	
		Darkroom	15.6	
		Doctor's Room	15.5	
		Technician's Room	14.3	
		Reception	14.8	
		Toilet	16.0	
		Store	4.4	
		Corridor/Stairways	145.2	Including X-ray control space and workshop
	▽Subtotal, Radiology		372.4	
Emergency Treatment	B-C	Emergency, Internal Medicine		
		Reception/ Registration	6.6	
		Consultation room	54.0	3.1×5.8×3 rooms
		Treatment Room	17.8	
		Night Laboratory	53.6	
		Observation Room	194.3	1 each for male and female (10 beds); including toilet and nurse station
		Toilet	8.9	
		Emergency, Surgery		
		Reception/ Registration	21.2	
		Consultation room	60.8	3.1×6.4×3 rooms
		Treatment Room	145.8	
		Minor Operating theatre	29.8	4.0×7.5×1 rooms
		Recovery Room	23.2	
		Anteroom	147.5	
		Observation Room	165.9	1 each for male and female (10 beds); including toilet and nurse station
		Sluice	12.0	2 rooms
		Plaster	38.7	
		Area for Common Use		
		Staff Room	28.2	
		Staff Toilet	27.6	

Department	Build-ing	Name of Room	Planned Area (㎡)	Remarks
		Changing Room	20.2	Unisex（Toilet 1: shower 1）
		Corridor in front of Observation Rooms/ Stairways	148.5	
		Store	14.4	
	H	Changing Room	30.2	2 rooms
		Staff Room	30.2	
	▽Subtotal, Emergency		1.279.4	

Outpatients	H	Internal Medicine		
		Consultation Room	110.6	3.3×5.4×5 rooms（Current situation: 3 rooms）
		Treatment Room	22.1	
		Reception	11.7	
		Staff Room	15.3	
		Surgery		
		Consultation room	66.4	3.3×5.4×3 rooms (Current situation: 3 rooms)
		Treatment Room	22.1	1 room（Current situation: 2 rooms）
		Reception	9.6	
		Staff Room	12.6	
		Ear, Nose & Throat		
		Consultation Room	30.3	3.3×5.4×3 rooms（including 1 private room）
		Anechoic Chamber	15.1	4.2×4.2×1 room（Current situation: 1 room）
		Lecture Room	30.4	4.2×7.0×1 room
		Reception	15.3	
		Staff Room	15.6	
		Equipment Store	15.1	
		Ophthalmology		
		Consultation room	99.2	(Current situation: 163㎡ including consultation room, treatment room and darkroom)
		Darkroom	31.8	
		Reception	15.6	
		Staff Room	17.0	
		Equipment Store	21.7	
		Dentistry/Dental Surgery		
		Dental Clinic	84.6	Space for 5 dental chairs
		Dental Surgery Clinic	37.5	4.8×4.2×2 rooms（Current situation: 1 room）
		Technician’s Room	115.0	Including staff room
		X-ray Room	6.1	
		Darkroom	6.5	
		Reception	8.9	
		Staff Room	8.5	
		Equipment Store	32.7	
		Orthopaedics		
		Consultation Room	64.4	3.3×6.4×3 rooms (Current situation: Shared with Surgery Outpatients)
		Treatment Room	21.5	
		Reception	10.6	
		Staff Room	13.6	
		Neurology		
		Consultation Room	21.5	3.3×6.4×1 room (Current situation: consultation in ward)
		Treatment Room	21.5	3.3×6.4×1 room

Department	Build-ing	Name of Room	Planned Area (㎡)	Remarks
		Neurologist's Room	21.5	
		Reception	9.8	
		Staff Room	11.7	
		Dermatology		
		Consultation Room	42.9	3.3×6.4×2 rooms, 1 each for male and female (Current situation: Shared with Surgery Outpatients)
		Treatment Room	42.9	3.3×6.4×2 rooms, One for male and one for female
		Reception	9.8	
		Staff Room	11.6	
		Urology		
		Consultation Room	21.5	3.3×6.4×1 room. (Current situation: non-existent. A new permanent doctor is expected)
		Examination Room	22.3	Including toilet
		Treatment Room	22.3	3.3×6.4×1 room
		Reception	10.1	
		Staff Room	11.4	
		Administration		
		Reception	31.2	2 rooms
		Initial Consultation Room	30.0	
		Registration	14.9	
		Security Room	14.8	
		Night Room	14.5	
		Advisor's Room	16.6	4.8×3.3×1 room
		Office	49.0	2 rooms
		Central Control Room	18.0	
		Equipment Store	34.2	2 rooms
		Store	7.6	
	▽Subtotal, Outpatients		1.498.7	

Wards	BW	Ward	656.0	Including doctor's room, nurse station and staff rooms
		Toilet	44.0	
	CW	Ward	464.0	Including doctor's room, nurse station and staff rooms
		Toilet	78.0	
	DE	Ward	520.0	Including doctor's room, nurse station and staff rooms
		Toilet	31.0	
	EE	Ward	509.0	Including doctor's room, nurse station and staff rooms
		Toilet	47.0	
	EW	Ward	491.0	Including doctor's, nurse and staff rooms
		Toilet	111.0	
	F	Ward	615.0	Including doctor's room, nurse station and staff rooms
		Toilet	71.0	
	G	Ward	5.609.0	Including doctor's room, nurse station and staff rooms

Department	Build-ing	Name of Room	Planned Area (㎡)	Remarks
		Toilet	191.0	
	▽Subtotal, Wards		9.437,0	

CSSD	B-C	Central Supply Room	106.0	Including sterilisation room
		Linen Room	10.6	
		Post Room	103.3	
	▽Subtotal, CSSD		219.9	

Laboratories	H	Laboratory	265.3	9.9×6.4×4 rooms (Pathology, bacteriology, haematology and biochemistry)
		Technician's Room	22.2	3.3×6.4×1 room
		Specialist's Room	22.2	3.3×6.4×1 room
		Bottle Room	12.0	
		Reception	11.6	
		Staff Room	11.8	
		Store	22.1	
		Equipment Store	32.3	2 rooms
	▽Subtotal, Laboratories		399,4	

Blood Bank	H			
		Refrigerator	30.2	
		Store	15.1	
	▽Subtotal, Blood Bank		45.3	

Pharmacy	A	Pharmacy	45.2	
		Workshop	33.8	
		Pharmacist's Room	30.9	
		Head Pharmacist's Room	18.3	
		Preparation Room	11.4	
		Staff Room	23.4	
		Toilet	10.1	
		Store	11.5	
		Pharmacy Store	341.4	
		Ventilation Room	11.1	
		Corridor/Stairways	177.8	
	▽Subtotal, Pharmacy		715.0	

Training	A	Lecture Room	170.6	9.5×18.0×1 room（capacity: 120 people）
		Conference Room	68.0	2 rooms
		Staff Room	30.4	
		Office	56.0	
	▽Subtotal, Training		325.0	

Administ-ration	A	Conference Room	89.3	3 rooms
		Executive Director's Room	41.9	
		Secretary's Room	15.5	
		Manager's Room, Accounts	18.6	
		Accounts Office	123.3	

Department	Build-ing	Name of Room	Planned Area (㎡)	Remarks
		General Affairs Office	73.3	
		Manager's Room, General Affairs	24.2	
		Deputy Manager's Room, General Affairs	23.9	
		Cashier	43.8	
		Library	88.2	2 rooms
		Telephone Exchange	27.4	
		Toilet	16.4	
		Hot Water Supply Room	5.9	
		Office Stores	245.1	4 rooms
		Stores	65.4	3 rooms
		Stairways/Corridor/Hall	85.4	
	B-C	Machine Room	452.0	
	D	Store for Administration	412.4	
	E	Store for Administration	205.0	
	F			
	G	Shop	25.8	6.0×4.6×1 room
		Laundry	380.7	
		Dining Room	202.5	
		Kitchen	259.5	
		Lift Machine Room	15.4	
		Mortuary	83.4	2 room
	H	Outpatients Pharmacy	61.5	10.8×4.8×1room, including equipment store
	M/E			
		Incinerator	40.0	
		Machine Room	535.4	
	▽Subtotal, Administration		3661.0	

Common Areas		New Service Corridor	570.0	
		Existing Central Corridor	937.0	
		Slope	501.0	
		Lounge Hall/ Corridor/Toilet	4187.1	
	▽Subtotal, Common Areas		6195.1	

Total Area of Reconstruction	6796.0	
Total Area of Renovation	8178.0	
Total Area of Repair	10060.0	
▽Total	25034.0	

(3) Site Plan

JMH is designated a National historical monument under presidential decree 80/76. The northern and western sides of the hospital face the Rua do Congresso (one of the main streets of Luanda, running from the coast through the district where most of the government offices are located) and the Rua do Heróis, respectively. The northern front and western sides of the hospital provide access points for outpatients, visitors and administrative staff. The exterior of these two sides of the hospital is considered of great importance, and the preservation of the buildings is compulsory; therefore renovation and preservation shall be carried out in line with the guidelines for preservation. The eastern wings of B and C Blocks, to which no such restrictions apply, will be rebuilt into facilities for the Central Clinic and Emergency Treatment Units. A new service corridor shall be constructed to connect the Outpatients Building (H Block), Central Consultation, Emergency Treatment Units, wards and the Service Department. Emergency Treatment Units shall be located on the first basement floor below Central Clinics and connected to Central Clinics, Radiology, Outpatients and the Laboratory Department via the nearest slope. Access to the Emergency Treatment Units shall be via a new access road to be constructed leading from the street on the east side of the hospital. An entrance for the exclusive use of the Emergency Treatment Units shall be located on the east side of the first basement floor of the building, in order to separate the line of movement in and out of the Emergency Treatment Units from the movement of outpatients and visitors, who use the main entrance on the north side. The road to the Facility Maintenance and Service Departments and the Mortuary will split off from this new access road.

Fig. 2-4 JMH Site Plan

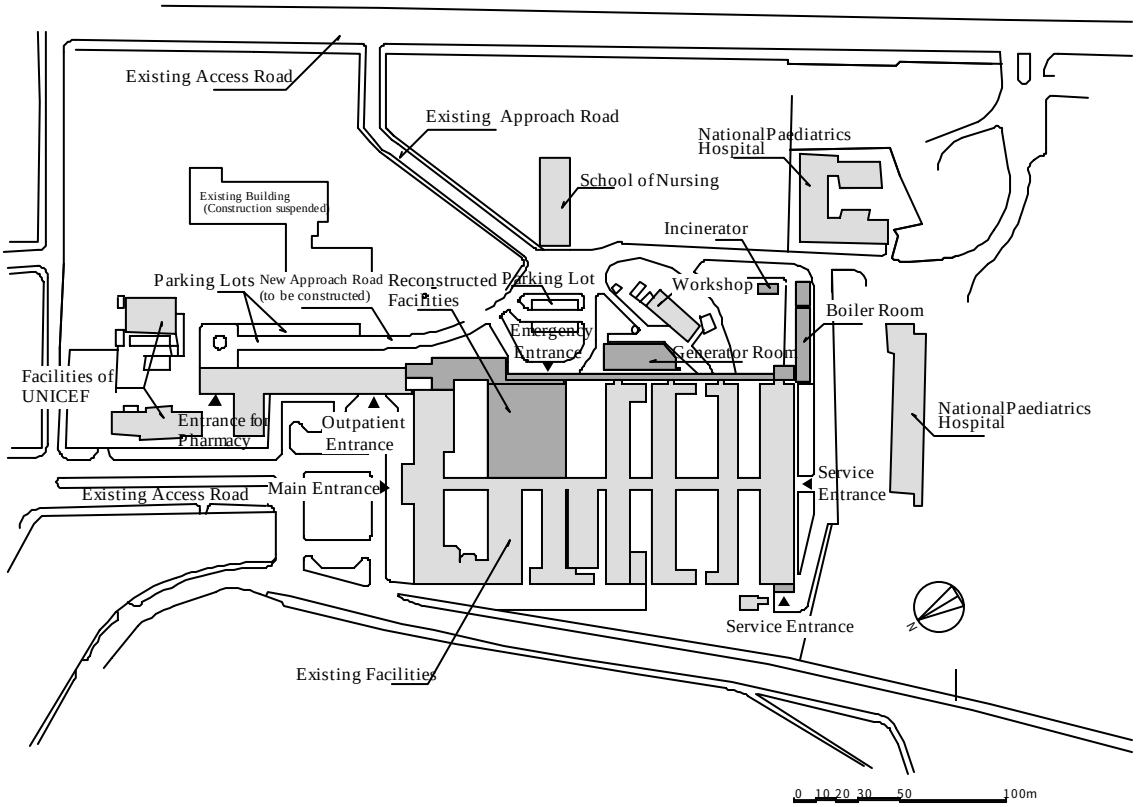


Table 2-5 Use of the Buildings

Building	Current Use	Use under This Project	Remarks
A - East	Radiology/ Administration	Pharmacy/ Training	Renovation
A - West	Administration/ Pharmacy	Administration	Renovation
B - East	Ward	Radiology/ Operation Theatre (0 floor), Emergency (-1 Floor)	Reconstruction
C - East	Ward		
B & C - West	Ward	Ward	Repair
ICU			Work by Angolan Side
D - East	Ward	Ward	Renovation
D - West	Operating	Ward	Interior renovation by Angolan Side
E – East & West	Ward	Ward	Renovation
F – East	Doctor's Rooms (0 floor), Ward (-1 floor)		Unchanged
F– West	Doctor's Rooms (0 floor), Vacant rooms (-1 floor)		Unchanged
G – all floors	Lifts (out of order)	Stairways/Lifts	Construction of emergency stairways and new lifts
G – 0 floor	Ward	Ward	Repair
G – -1 floor	Ward	Ward	Repair
G – -2 floor	Ward	Ward	Repair
G – -3 floor	Central Laboratory/Ward	Ward	Repair
G – -4 floor	Emergency; Internal Medicine	Laundry/Kitchen	Renovation

Building	Current Use	Use under This Project	Remarks
Existing Central Corridor	General/Service Corridor	General Corridor	Repair
Service Corridor	None	Service Corridor	New construction
H	Emergency; Surgery/ Outpatients; General and Specialist/ Administration/ National Blood Bank	Outpatient; General and Specialists/ JMH Blood Bank/ Laboratory	Renovation
Laundry/ Kitchen	CSSD/Kitchen	-	Relocated to G Block
Electricity Building	-	Electrical power supply/Generator system/ Medical Gas Supply	New Construction
Machine Building	-	Boilers/Water Supply/ Waste water system	New Construction
Incinerator	Incinerator without housing	Incinerator with housing	New Construction (Existing incinerator to be relocated)

(4) Architectural Plan

1) Floor Plan

The Outpatients clinics for internal medicine, surgery etc., shall be located on the ground floor of H Block. Each of eight Specialist clinics shall have its own rooms, covering the minimum space necessary, on the first basement, ground floor and first floor of the same building. The Laboratory Department shall be relocated from the third basement floor of G Block to the first floor of H Block. The Laboratory Department shall be connected to the Operations Department, Emergency Treatment Unit and wards by means of slopes and stairways, in order to provide more efficient lines of traffic. At present the hospital does not have an outpatients pharmacy, but space for an outpatients pharmacy shall be provided at the northern end of the ground floor of H Block, in which it is planned to install a tenant.

A Block is the most important part of the hospital in terms of it being a historical monument. The functions of the Administration Department, which are currently scattered through the hospital, shall be brought together in this building,

and a library to exhibit relics of the building as a historical monument shall also be set up in this building. The pharmacy for inpatients, which is currently located behind the Administrative Department, shall be transferred to a location facing the service corridor on the east side.

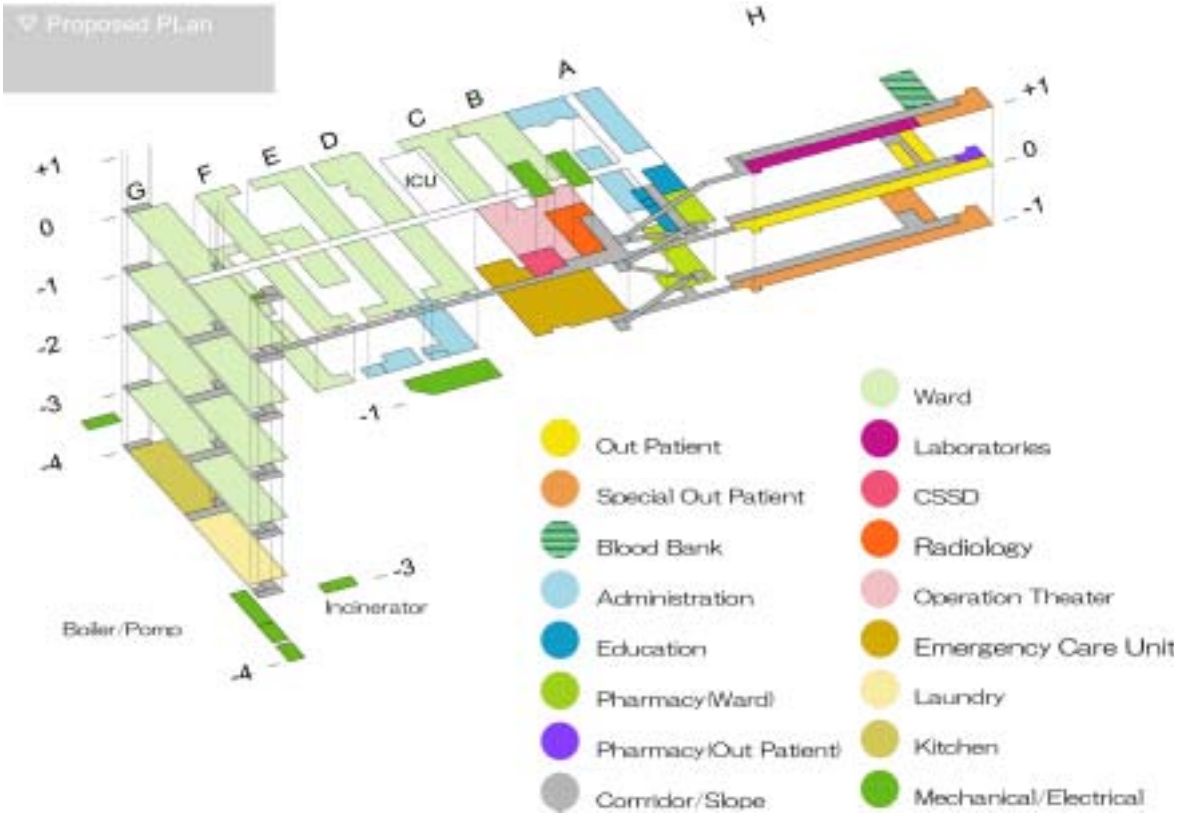
B Block and the eastern part of C Block shall become the most important part of the hospital, where the essential functions of the hospital, including the Central Consultation Section, Emergency Treatment Unit and Laboratory Department including the Radiology and Ultra sound rooms, shall be brought together here.

The Emergency Treatment Unit located on the first basement floor shall be directly accessible from outside. It shall also be connected, for ease of access, to the Operating Theatres and radiology rooms on the ground floor through the nearest slopes and stairways. Air-conditioning equipment for this area shall be installed in the ceiling and on part of the roof.

The Laundry and Kitchen Building located to the east of the existing buildings is relatively new, but the concrete has suffered marked deterioration. Moreover, it stands where the new access road to the Emergency Treatment Units is to be constructed. Therefore, the laundry and kitchen facilities shall be relocated to the fourth basement floor of G Block. This floor has an elevation of approximately. 5m, with easy access from outside. G Block is a five-storied building approximately. 100m long, but the only evacuation route is the central, unsectioned stairway, a very dangerous design for a public building. For this reason outdoor emergency stairways shall be installed on both east and west ends of the building.

A service corridor shall be constructed on the ground floor level along the east ends of the buildings. This will connect the Outpatients, Administration, Central Consultation, Emergency, Laboratory, Central Supply and Service Departments and wards in terms of lines of movement.

Fig. 2-6 Isometric Floor Plan



2) Elevation Plan

The preservation and renovation of the exterior design of the western and northern sides of the building facing the main streets of Rua do Congresso and Rua do Heróis shall be carried out. The Project shall also include works, mainly of preservation and renovation, on the courtyard, in particular from the area facing A and B Blocks to the central corridor, as this area is very important in terms of design. Thus, measures shall be taken to maintain the consistency of the exterior design through a spatial continuation of the reconstructed B Block and C Block and the service corridor and slope connecting them.

There is a need to adhere to the existing design of the courtyard facing the wards in B to E Blocks and the exterior walls and openings facing onto the central corridor.

The exterior and interior (with the exception of the west side of the first basement floor) of F Block were recently renovated and are in relatively good condition and therefore, will not be included in the present project.

The Angolan side has already started renovation of G Block partially, including the installation of aluminium sashes. Thus, the work to be undertaken by the Japanese side includes only the functionally necessary replacement of a minimum number of openings, and the painting of the exterior walls.

Preservation does not particularly concern the southern and western faces of the buildings, but the design of the existing buildings will be taken into consideration in the exterior design of the reconstructed buildings and the service corridor.

3) Sectional Plan

Attention will be given to the following points in the sectional plan of the buildings

① Floor elevations should be coordinated with those of the corresponding floors of the existing buildings.

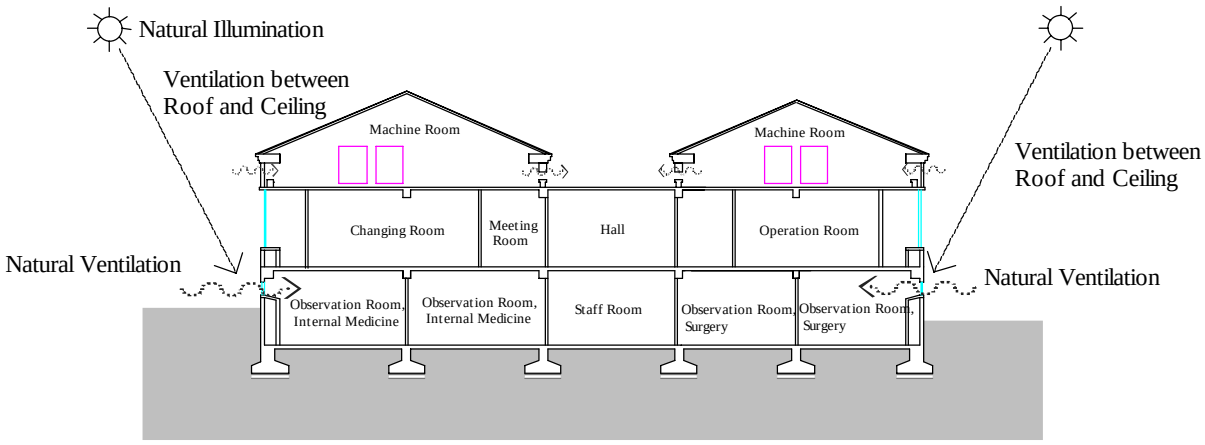
② To minimise underground excavation, underground parts of the existing buildings shall be utilised as much as possible.

A slope shall connect the ground floors of H Block and A Block because there is height difference of approximately 1m between them. Each of Blocks A to G has suffered different degrees of subsidence, so that the floor of the central

corridor is uneven, varying by as much as 50cm or more in places. However, from the preservation of point of view for the building, the current conditions shall be preserved.

The figure below shows the sectional plan of B and C Block where the Central Consultation Department, Emergency Treatment Unit and Laboratories, including radiology and Ultra-sonograph rooms, will be concentrated. The design will enable natural lighting and ventilation in the observation rooms on the first basement floor.

Fig. 2-7 Sectional Plan of Block B and C



4) Structural Plan

① Ground Conditions at the Construction Site

The results of the boring test, geological survey and measurement of relative height at the site revealed the following ground conditions at the sites where rebuilding and construction are to be carried out.

a) Most of the present buildings stand on cuttings.

b) Because of the unevenness of the ground, the base rock at F, G, and H Blocks always supports asymmetrical pressure equivalent to the weight of one storey.

c) As the N value for the design-bearing factor is roughly. 20, it is judged that in the case of buildings of two or three-storeys spread foundations pose no problem, so long as the buildings stand on the cuttings.

② Foundation Plan

The results of the geological survey on the allowable soil bearing capacity of the land indicate that spread foundations are the appropriate type of foundation for the building to be undertaken where B and C Blocks currently stand. Spread foundations were judged to be appropriate as the existing buildings are supported by spread foundations, and the pressure of the new building on the ground is not expected to be much greater than that of the existing buildings.

The ground where the service corridor on the east side of the buildings and the Energy Centre beside G Block are to be built is very uneven, and to the south (beside G Block) it is thought that there may be interference with the retaining walls and that there may have been a lot of banking carried out,

requiring a high degree of bearing capacity in a small area and including the capacity to hold up against collapse. Therefore, pile foundations will need to be used in the construction of the two structures. As PC piles are not commonly used locally, cast-in-place concrete piles will be used.

③ Structural Plan

・ Structural plan of buildings to be built or rebuilt

The structure of these buildings will for the most part be the rigid-frame structure of reinforced concrete commonly used in Angola. However, as concrete is expensive in Angola, making the provision of large quantities of concrete impractical, a reinforced concrete structure will be adopted for columns, beams, and parts of the floor where its use is structurally necessary. The remaining exterior and interior partition walls will be built of concrete blocks or bricks. The details of the renovation plans for each building are as follows.

Table 2-8 Renovation plans for each building

Building	Part	Roof	Roof slab	Floor	Structural Body	Remarks
A	West	Upkeep of status quo	Upkeep of status quo	Upkeep of status quo	Upkeep of status quo	
	East	Renovation of trusses on eastern edge, Repair of connecting fittings	-	Partial repair of floor on 0 floor	Partial repair of basement	Construction of wall on east side using hollow bricks
B	West	Status quo	Upkeep of status quo	Upkeep of status quo	Upkeep of status quo	
	East	Construction	Construction	Construction	Constructio n	
C	West	Upkeep of status quo	Upkeep of status quo	Upkeep of status quo	Upkeep of status quo	
	East	Construction	Construction	Construction	Constructio n	
D	West	Reinforcement of part of wooden trusses	Upkeep of status quo	Upkeep of status quo	Upkeep of status quo	
	East	Upkeep of status quo	Upkeep of status quo	Upkeep of status quo	Upkeep of status quo	
E	West	Upkeep of status quo	Upkeep of status quo	Upkeep of status quo	Upkeep of status quo	
	East	Repair of damaged rafters	Upkeep of status quo	Upkeep of status quo	Upkeep of status quo	

Building	Part	Roof	Roof slab	Floor	Structural Body	Remarks
F	Entire Block	Upkeep of status quo	Upkeep of status quo	Upkeep of status quo (all floors)	Upkeep of status quo	Walls on lower floors cannot be moved
G	Entire Block	Upkeep of status quo	Upkeep of status quo	Touch-up where reinforce-ment bars are exposed only	Upkeep of status quo	
H	Entire Block	Renovation of trusses on southern edge only	Upkeep of status quo	Upkeep of status quo (all floors)	Upkeep of status quo	Wall on south side to be constructed using hollow bricks

According to discussions with the Angolan Building authorities, Angola has no structural design standards of its own. In most cases, BS code or Portuguese standards will be used.

Design loads, etc., will be determined after discussions with the Angolan authorities. Rough outline is given below.

④ Design Loads

The design loads to be adopted in this Project will be calculated in accordance with the standards given below.

BS 8110 Structural Use of Concrete, 1985

BS CP3 Chapter 5 Part 2, 1972

Recommendations for loads on Building AIJ, 1993

a) Dead Load

The dead load will be calculated mainly on the basis of the weight of finishing materials and structural materials.

b) Live Load

In addition to the standards given above, the live load will be set as below, depending on the intended use of the room.

Table 2-9 Major Live Loads

Room	Live Load
Operating Theatre, Laboratory, Consultation room	2900 N/m^2
Radiology room	3500 N/m^2
Library and Store	5400 N/m^2
Corridor	1800 N/m^2

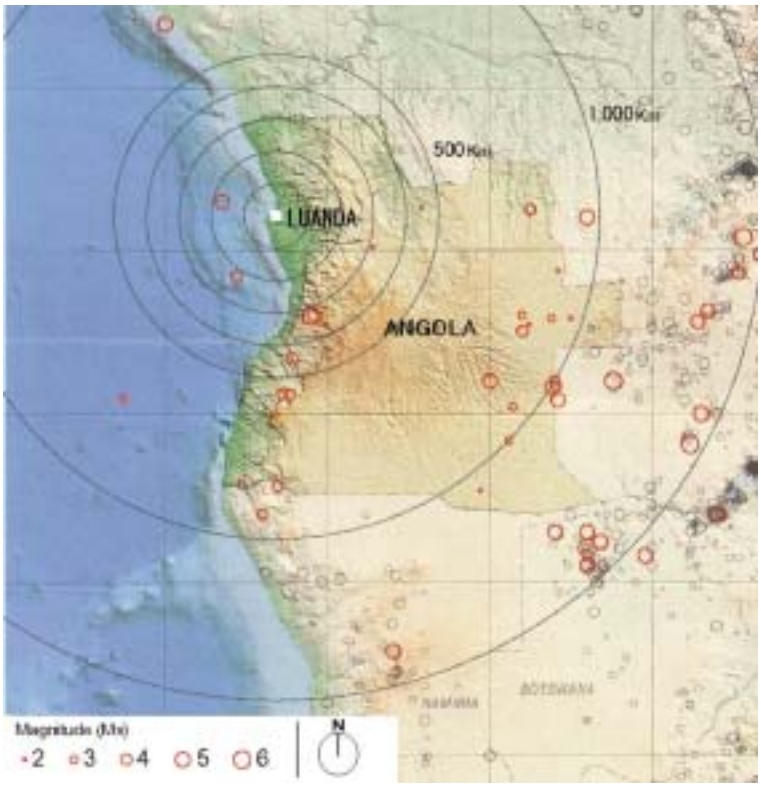
c) Wind Load

The wind load will be obtained from BS (CP3, Chap. 5 part 2), which is commonly used in Angola.

d) Seismic Load

In Angola, the seismic load is not given predominance as it is in Japan, and it is usually ignored in plans. Accordingly, under this project too, in principle no special consideration will be given to the seismic load. However, in order to avoid harmful vibration and deformation of the structure through the daily use of equipment, the plan will take into account one quarter of the seismic force used in Japanese design (acceleration of approx. 20~25 $cm/sec^{2,}$ corresponding to an earthquake of level 3 ~ 4 under the Earthquake Classification System of the Japan Meteorological Agency). (A map showing the occurrence of earthquakes in the southern part of Africa between 1071 and 1996 is attached for reference.)

Fig. 2-10 Map of Earthquake Occurrence



e) Structural Design Standards

Standard for Structural Calculation of Reinforced Concrete Structures, 1999, AIJ

Design Standard for Steel Structures, 1973, AIJ

Recommendations for Design of Building Foundations, 1988, AIJ

Structural Use of Concrete, 1985, BS8110

f) Materials to be Used and Strength of materials

Concrete: Plain concrete (Fc=24N/mm^2), in accordance with BS 8110.

Reinforcing bar: Deformed bars (SD295 fy=295 N/mm^{2,} SD345 fy=345 N/mm^2), in accordance with JIS G 3112.

5) Mechanical and Electrical Plan

The basic policy for the plan of JMH is as follows.

In view of the present state of things as described, all existing mechanical and electrical equipment, pipes and cables will be removed and replaced by new in accordance with the design.

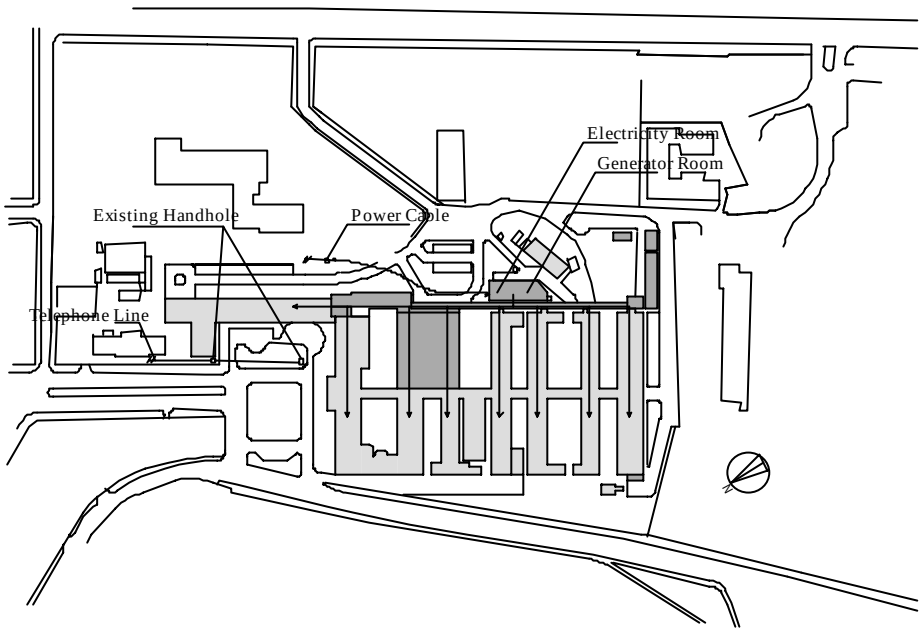
In order to guarantee uninterrupted operation of the hospital during the rebuilding, renovation and repair, a new Energy Centre will be constructed to house the Electricity, Generator and Boiler rooms.

Because of the importance of mechanical and electrical maintenance after completion of the construction, the Project will include the provision of the tools and measuring equipment required for maintenance.

As the maintenance staff has almost no understanding of English, the preparation of a Portuguese-language digest version of the operating and maintenance manuals will be considered.

① Electrical Plan

Fig. 2-11 JMH Power Line



a) Lifts

There is one lift in H Block and two in G Block. All of them are out of order in more than 20 years. As the equipment is old and dilapidated, and there is no local agent, the repair and reuse of these lifts is impossible.

b) Electric Power Supply Facilities

Electricity will be supplied from the nearest transformer substation of EDEL to the planned electricity room in JMH in the form of a three-phase, three-wire 15kV double circuit (loop system). As it is planned to raise the voltage to 24 (20) kV in the future, equipment with specifications to operate under both voltages will be selected.

The electric power required under this Project is estimated at 1,250 kVA. In order not to interrupt the power supply during maintenance, one transformer with a capacity of 1,250 kVA will be installed. Switchboards installed downstream of the transformers will enable power to be supplied independently to each load. The power will be supplied in the form of a three-phase, four-wire 380/220v supply, which is the standard in Angola. The results of the field survey revealed that electricity voltage for commercial use may be expected to fluctuate by as much as +15%. Therefore, to protect sophisticated equipment, such as medical equipment, automatic voltage regulators (AVRs) will need to be installed.

In Luanda city, power failures occur frequently and may last for hours. Therefore, in order to maintain the function of the medical facilities

during a power failure the plan will include the installation of two diesel generators capable of covering roughly half of the total load. The design of the Generator Room that will accommodate the generator equipment will incorporate appropriate sound insulation, soundproofing and vibration-proofing in order to minimise the effect on surrounding areas.

c) Lights, Power Sockets

Design luminance in the existing medical facilities in Angola is very low: approximately half what it is in Japan. This Project will set the luminance at approximately 60~70 % of the JIS standard. Fluorescent lights will be used mostly, because of their lighting efficiency. The plan will attempt to minimise running costs by the careful arrangement of switches.

The power sockets will mainly be of the earthed, two-round-pin type commonly used in Angola. Other types may be installed depending on the power requirement, capacity and connections of particular equipment.

In Operating Theatres, in consideration of patient safety, the sockets will be of the non-earthed cable type (with insulated transformer and shorting monitor / alarm).

d) Lightning Conductors and Farthing

To protect the facilities from lightning, lightning rods and rooftop conductors will be installed. Earths will be installed on medical equipment, electric power equipment and communication equipment in accordance with the requirements of the equipment/system.

e) Telephone System

A new lead-in telephone line will be brought in from the Angola Telecom trunk line under the Rua do Congresso to the north of the hospital, to the MD in the hospital. The capacity of the lead-in cable will be approximately. 50 lines, taking into account future plans.

As the number of phone lines needed in the planned facilities is 30 external lines and 400 extension lines, new telephone exchanges (PABX) will be installed in the hospital as and where needed. As is the case with Japan's Grant Aid in other countries, the cost of the installation of lead-in cables and connection fees will be borne by Angola. As the existing exchanges (Business phone main units) are not appropriate for this Project because of their small capacity, it will be requested that they be relocated to a smaller hospital at the expense of the Angolan side.

f) Paging Facility

The main unit of the paging facility will be installed in the Security Room of the planned facilities. This paging facility will be capable of paging doctors throughout the entire hospital, and broadcasting guidance on evacuation in an emergency.

Consideration will be given to the installation of independent paging systems at Reception in the Outpatients Department and at the pharmacy counter. The necessary audio-visual equipment will be installed in the large conference room and elsewhere.

g) Communal TV System

A set of communal aerials for UHF and BS broadcasts shall be installed in

the planned facilities. Rooms, such as management- and education/ training -related rooms, shall have connections to the aerials. One of the operation theatres shall be equipped with a general-purpose video camera with its holder. In order to utilize the tapes recorded by this camera for training of medical students and trainee doctors, equipments required for the playback of the tapes shall be installed in the lecture rooms and seminar rooms. In addition, installation of conduits and wires shall be considered in this project in order to make it possible for Angolan side to install closed-circuit TV equipments in each operation theatre in future.

h) Nurse-Call System

As a means of communication between nurse stations and wards, a system of simultaneous communication - the simplest form of intercom - will be installed in each ward. As a means of night time communication, a night time reception intercom will be installed between the entrance and the Security Room.

i) Automatic Fire Alarm System

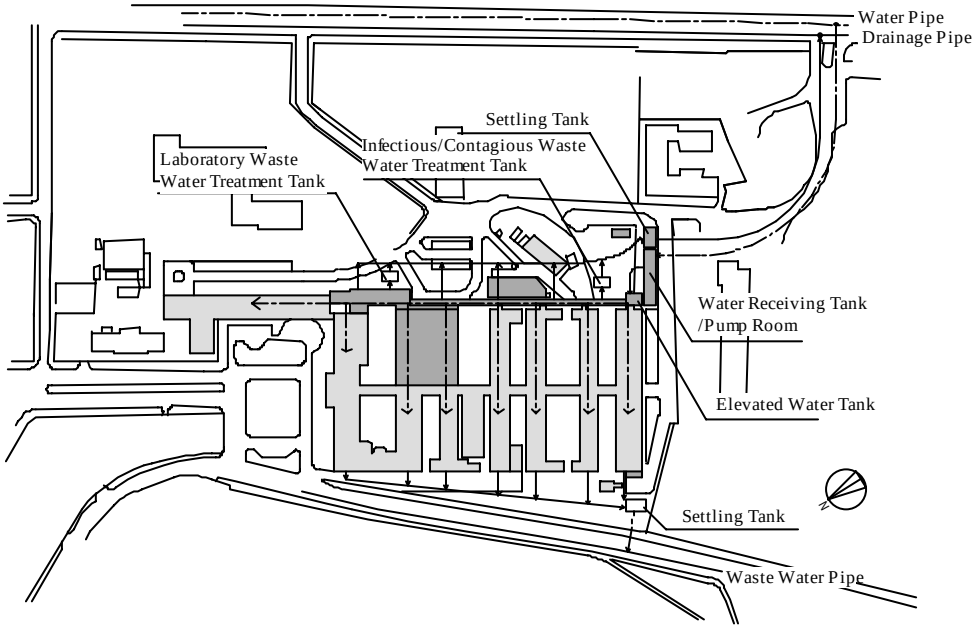
For the early detection of fire and to minimise damage caused by fire, automatic and manual fire alarm systems will be installed in essential rooms and wards, respectively. Gas leak alarm systems will be installed in places where combustible gas is used. For the installation of fire fighting equipment the fire laws of Angola will be strictly adhered to. For areas not covered by the law, the corresponding Japanese law will be referred to, with consideration given to local conditions.

j) Battery-operated Clocks

Battery-operated clocks will be installed in nurse stations, seminar rooms and offices.

② Mechanical Plan

Fig. 2-12 Mechanical Plan



a) Water Supply System

The volume of water supply required under the Project is estimated at 300m^3 per day. Water will be supplied through a lead-in pipe connected to the 40cm mains pipe running under Amílcar Cabral Avenue on the east side of the hospital. From the mains, the water pipe will run under the road in the National Paediatrics Hospital and empty into a receiving tank. Water in the receiving tank will be pumped up into an elevated tank, from where water will be supplied to each location by means of gravity. The receiving tank will be placed above ground, to prevent possible contamination. The capacity of the receiving tank will need to be large enough to hold one day's supply of water, taking into consideration

requests from the Water Supply Corporation as well as local conditions and modes of water supply.

b) Waste Water System

Waste water from the facilities will drain into settling and septic tanks to be newly installed on the east and west sides of the buildings respectively. From there the waste water will drain into the main sewer under Amílcar Cabral Avenue.

Infected/contagious wastewater will be sterilised before being drained into the settling and septic tanks. Wastewater from the laboratories will be neutralised before being drained into these same tanks.

Organic solvents will be collected in plastic containers and incinerated by JMH. Solutions containing heavy metals will also be collected in designated containers and disposed of by designated handlers.

Rain water will drain directly into the main sewers under Amílcar Cabral Avenue and Rua Do Heróis.

c) Hot Water Supply

The supply of hot water will be limited to the Operating Theatres, CSSD, laboratories, laundry, kitchen and shower rooms. Hot water will as a general rule be supplied by a centralised system: Water heated by steam will be distributed from the hot-water tank to the points of consumption.

In addition, separate hot water supply systems using electric water-heaters may be used where needed, depending on the location and times of use.

d) Plumbing System

In consideration of local custom, all toilet seats will be Western style. In addition, bidets and showers will also be installed in the toilets on the wards. Taps for cleaning the toilets will be installed. Simple wall-hung water supply equipment will be installed where large numbers of people are expected, e.g. waiting lounges. In view of their liability to break, as far as possible sanitary ceramics that are locally available will be selected, to facilitate maintenance.

e) Gas Supply System

Butane gas, which is in general use locally, will be used in the kitchens, pantry and laboratories. The gas will be supplied from from a cylinder assembly point.

f) Fire-Fighting System

Following discussions with the local fire department, fire-fighting water tanks and water outlets will be installed, and on each floor of the buildings indoor fireplugs, fire department plugs and fire extinguishers will be installed, as well as outdoor fire hydrants.

As a general rule, the installation of fire-fighting equipment will adhere to the fire laws of Angola. However, where there is no detailed installation standard, a decision will be made with reference to the Japanese Fire Services Act, and with consideration given to local conditions.

g) Medical Gas Supply System

The Project will adopt the central piping system for the supply of medical gases and suction, from the overall consideration of safety, facility of operation and maintenance, and the prevention of hospital-acquired infection basically.

The kinds of gases to be supplied are oxygen, compressed air and laughing gas. Suction and surplus gas exhaust systems will be installed. Rooms requiring gas outlets, as a general rule, are as given below:

Table 2-13 Medical Gas Supply

Number	Room	Oxygen	Suction	Compressed Air	Laughing Gas	Others
01	Operating Theatre	○	○	○	○	
02	Minor Operating Room	○	○	○	○	
03	Resuscitation room	○	○	○	○	
04	Recovery room	○	○	○		
05	Observation Room	○	○			
06	Emergency Treatment Room	○	○			
07	OPD Treatment room	○	○			
08	Ward B－E (3~6 beds)	○	○			
09	Ward F－G					Mobile type

h) Kitchen

The main kitchen will be fitted with cooking benches, rice cookers, stirring cauldrons, gas appliances, cupboards, prefab-type refrigerators and freezers, racks and sinks to provide meals for patients and also for hospital staff. Basic tableware, trays and trolleys will also be provided.

i) Laundry

The Project includes laundry facilities for hospital linen (to be used by inpatients, medical staff, workers, operations, CSSD, etc). Washing

machines, spin-dryers, tumble-dryers, irons, presses of various kinds, sheet rollers and simple trolleys will be provided.

j) Incinerator

The incinerator will have the capacity to dispose of all the infectious/contagious medical waste from the hospital. The capacity of the incinerator will be calculated on the basis of the volume of waste, including hypodermic needles, blood-stained gauze and clothes, organs from the operating theatre, organic solvents, etc.

JMH will take necessary arrangement of collection system to avoid Dioxin from the medical waste.

k) Air-conditioning and Ventilation System

- Basic Policy.

  Air-conditioning systems will be provided where there are a functional need, such as the Operation theatres, Minor operation rooms, Resuscitation and Recovery rooms, Laboratories, Pharmacies and some of the rooms. Ceiling fans will be installed in other rooms, and natural ventilation system will also be used as far as possible.

- Hot water supply

  As a source of heat, the Project will use steam boilers fuelled by oil, because the low price of oil will minimise running costs.

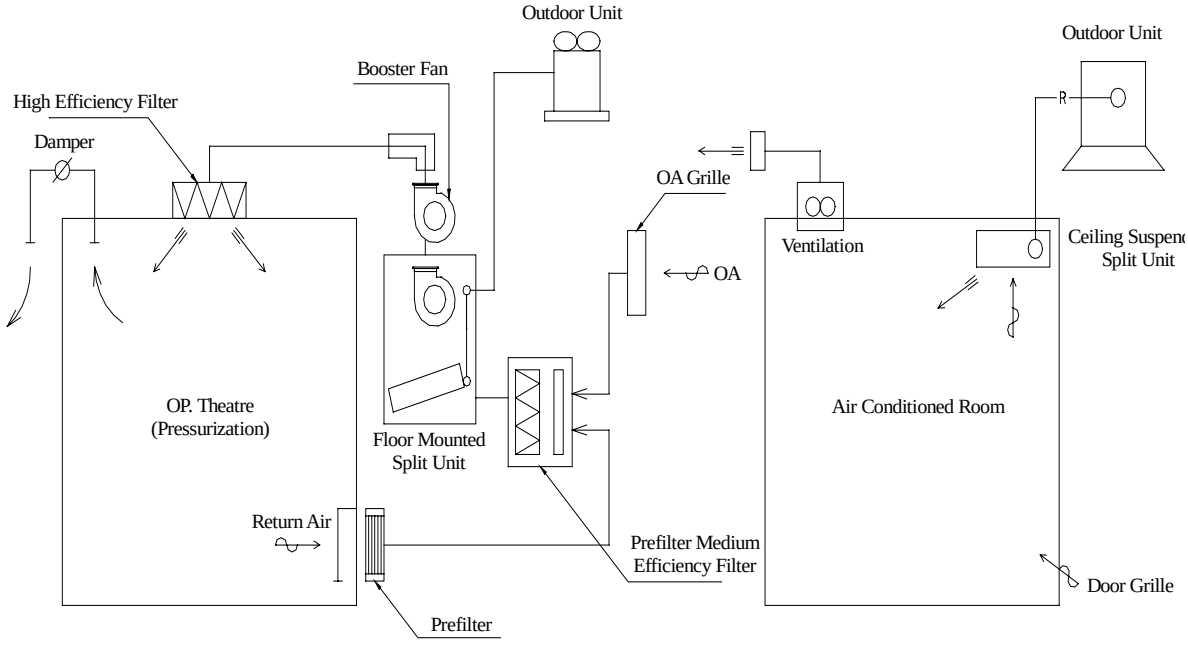
- Air-conditioning System

  As cleanliness is essential in the Operation Theatres etc., air-

conditioners with filters and ducts will be used in these areas. The only room to be equipped with high-performance filters will be the operating theatre for orthopaedic surgery. In other areas requiring air-conditioning, individual air-cooled air conditioners will be used.

Air-conditioning equipment and pipes will be installed exposed in order to maintain these machines easily.

Fig. 2-14 Diagram of Air-conditioning System



- Ventilation System

In the boiler and electricity rooms, kitchen and laundry, where the generation of large amounts of heat and odour is expected, an air intake / exhaust type system will be installed. In toilets, shower rooms, etc., an exhaust type system will be used .

6) Building Materials Plan

Building materials will be selected mainly from those commonly used in Angola and appropriate for the building methods, taking into account the ease of maintenance of the facilities.

Building materials, most of which are imported, must conform to EU, BS or Portuguese standards in accordance with the instructions of the person from the MOH who is directly in charge of the implementation of the Project. Therefore, it must be demonstrated that Japanese products, if they are to be used, do conform to those standards.

① Exterior Finish

a) Exterior Walls

Almost all of the exterior walls, with the exception of the parts to be built or rebuilt, are finished with plaster or trowel-finished mortar, and roller-painted. Therefore, durable finishing materials suitable for these bases will be used.

b) Roofs

The annual precipitation in Luanda is not high, at about 425mm (year 1980). However, the rainfall is concentrated in March and April and heavy rainfall is frequently experienced in these months. The older parts of the existing buildings are roofed with French tiles, but in recent years, Angolan tiles have generally been used. The structure beneath the roofing tiles differs from building to building: some have roof boards, others do not. Some have wooden roof trusses, while others have steel ones. The results of the survey suggest that most of the structures and

tiles are still usable, except for those that were damaged in the civil war.

c) Window Sashes

Because A Block is a building of historical note, as far as possible the existing wooden window sashes will be repaired and reused. The existing window sashes of Blocks B to E will be replaced by efficient, durable aluminium window sashes, since these buildings rely mainly on natural ventilation.

② Interior Finish

a) Floors

The same floor materials will be used where existing buildings are to be renovated. Existing conditions will be preserved as far as possible in A Block and the central corridor, which are structures to be preserved.

For the areas to be rebuilt, such as the Operating Department and the Emergency Treatment Unit, and the parts of the Outpatients Department that are to be renovated, long sheets will be used to finish the floors, as these sheets are hygienic and relatively easy to clean. Ceramic tiles will be used to finish the floors of other areas to be renovated, such as the Service Department, toilets in wards and sluice rooms.

b) Walls

On the walls of clinics, treatment rooms and corridors, which are likely to be stained, resin enamel paint will be applied to facilitate cleaning by wiping. On the walls of the other areas, taking into account the high temperatures and humidity of the indoor environment, antifungal resin

emulsion paint will be applied over a mortar base. Ceramic boards will be attached to the walls of the Operation Theatres. The walls of the Radiology Rooms will be of reinforced concrete and the doors, frames and windows will be lined with lead for shielding. The places likely to be knocked by stretchers, e.g. walls of corridors, other interior walls and corners of columns, will be equipped with stretcher guards, which will also double as handrails.

c) Ceilings

The ceilings of rooms where air-conditioning is required, e.g. the Operation and Radiology Departments, will be of double plasterboard as an aesthetic measure to improve air-conditioning efficiency and to prevent the blockage of ducts. Acoustic tiles will be used on the ceilings of most of the other rooms for easier maintenance of ceiling-mounted equipment.

d) Fittings

In general, wooden fittings will be used indoors. Steel doors will be used in rooms where sturdiness and sound insulation are required, e.g. the machine room and stores. Special functions are required for some fittings, for example X-ray shielding doors and windows in the Radiology Rooms. Protective kick plates will be fixed on the doors in areas of heavy traffic. Imported metal fittings will be used because of their durability and reliability, but these fittings will be such as can be maintained locally.

(5) Equipment Plan

1) Basic Policy for Equipment Plan

The equipment plan is drawn up in accordance with the following basic policies .

① Basic equipment required to make the most of the function of JMH, which is ranked as a tertiary medical care facility and training institution.

② Minimum equipment needed as a result of the renovation and reconstruction of the hospital implemented under the Project

③ Basic equipment urgently needed for basic medical consultations

④ Equipment for currently-functioning departments

⑤ Equipment operable by the current staff of JMH

⑥ Equipment that can be handled under the current maintenance system of JMH

2) Consideration of Requests from individual Departments

・ Surgical Operating Department

The plan includes replacement mainly of basic equipment, *e.g.* operating tables, operating lights, anaesthesia apparatus, etc., needed in the five operating theatres and recovery rooms of the Operation Department, which is to be in a new building.

・ Emergency Treatment Unit

The plan includes replacement mainly of basic equipment, *e.g.* Operation tables, Operation lights, Anaesthesia apparatus, etc., required in the operation room of the Emergency Treatment Unit in the same new building as Surgical Operating Department.

- Intensive Care Unit (I.C.U.)

  The plan includes replacement and replenishment of basic equipment, *e.g.* I.C.U. beds, bedside monitors, respirators, etc., needed in the I.C.U which is newly constructed by the Angola side.

- Central Sterilisation and Supply Department (C.S.S.D.)

  The plan includes replacement and introduction of basic equipment, *e.g.* high-pressure steam sterilisers, tube washers/dryers, dressing drums worktables, etc., needed in the C.S.S.D, which is to be in the new building.

- Medical Clinic

  The plan includes replacement and replenishment of basic equipment, *e.g.* examination tables, sphygmomanometers, instrument cabinets, etc., required in the consultation rooms and wards of the Internal Medicine Department, which is to be renovated in this Project.

- Surgical Clinic

  The plan includes replacement and replenishment of basic equipment, *e.g.* examination tables, sphygmomanometers, instrument cabinets, etc., needed in the consultation rooms and wards of the Surgical Department, which is to be renovated in this Project.

- Orthopaedics

  The plan includes replacement and replenishment of basic equipment, *e.g.* examination tables, gypsum dressing tables, plaster saws, air drills, instrument cabinets, etc., needed in the consultation rooms and wards of the

Orthopaedic Department, which is to be renovated in this Project.

- Neurosurgery

  Because of many operations for external head injury, fractured spinal column, cranial and spinal deformity and hernia, the plan includes replacement and replenishment of basic equipment, *e.g.* trephines, cranial traction sets, surgical instrument sets for neurosurgery, etc.

- Paediatric Surgery

  Because of the large number of cases requiring emergency treatment and/or hospitalisation for bone fracture, phlegmon, myositis, pyothorax, peritonitis, congenital deformity, etc., , the plan includes replacement and replenishment of basic equipment, *e.g.* surgical instruments for paediatric surgery, examination tables, suction units, mobile operating lights, instrument cabinets, etc.

- Otolaryngology (ENT)

  As the number of outpatients has been increasing (60~80/day), otolaryngology treatment units will be provide. The otoscopes and laryngeal mirrors for the education of interns and medical students will be provided.

- Ophthalmology

  Although there are many cases of cataract, operations for cataract and glaucoma cannot be preformed in the hospital because of the lack of instruments. Therefore, the plan includes the provision of basic operating

instruments for these operations. The plan also includes replacement and replenishment of basic equipment, *e.g.* ophthalmic refracting units, slit lamp microscopes, direct ophthalmoscopes, campimeters, synoptophores, etc.

- Dentistry/Dental Technology

  As four of the five existing dental units are too obsolete, the replacement of these four dental units is included in the plan, together with the replacement and replenishment of basic equipment, *e.g.* dental X-ray systems, ultrasonic scalers, dental instrument sets, tabletop autoclaves, etc. The plan also includes the provision of basic equipment for dental technicians, *e.g.* micro motors, model trimmers, articulators, air-compressors, etc.

- Urology

  As this department, which does not have any specialist doctor at the moment, does not satisfy the basic policy of the equipment selection, and the equipment may easily be obtained by Angola side by themselves, this department will not be included in the plan.

- Dermatology

  The plan includes the replacement and replenishment of basic equipment, *e.g.* examination tables, ointment tables, infrared ray lamps, ultraviolet ray lamps, etc.

- Endoscopy Department

  The plan will include the replacement of one gastric and one rectal endoscope, and the replacement and replenishment of a few basic equipment, *e.g.* an

endoscopic table and an endoscope cabinet.

(Radiology Department)

- CT Scan and Angiography

  These systems are rather sophisticated and difficult to maintain under present maintenance system in JMH. For this reason, they cannot be included in the plan.

- X-ray TV System

  As it is one of the most important and basic pieces of equipment in the department, and the present obsolete X-ray TV apparatus will be replaced.

- Ordinary X-ray Apparatus

  The ordinary X-ray apparatus is a basic equipment in the department, and the two existing obsolete pieces will be replaced.

- C-arm X-ray TV System

  This system was requested for surgical and orthopaedic examinations. The hospital has two sets, and one of them is presently out of order, which can be repaired. Therefore the plan will not include any additional equipment.

- Ultra-sonograph

  The Internal Medicine, Neurosurgery, ICU and Radiology Departments requested this equipment. The plan includes one set for Radiology Department, and it should be shared among these departments.

- Blood Bank

  The National Blood Bank Centre, which is an organisation separate from the JMH, is temporarily occupying part of the hospital facilities and operating as a blood bank. JMH wanted to relocate this institution and to set up its own blood bank. However it was confirmed there are no definite plans for relocation for time being, and JMH will continue to get the blood from the National Blood Bank Centre as before.

  Under this situation the plan will include a blood storage refrigerator and other equipment.

- Laboratory Department

  There are quite a few laboratory equipment unused in JMH, and it is expected that the use of these equipment properly will greatly restore the function of the department. Therefore, no equipment other than 2 microscopes for blood test replacing obsolete ones will be planned

- Other departments

  Management (Equipment Management / Drug Management)

  Because of the lack of an organized inventory system, there is no proper stock management of equipment, reagents or medicinal supplies. The plan will include the provision of personal computers and printers to enable the setting up of a stock management system.

- Education

  Though there is no Education Department in the hospital, the Otolaryngology Department is already undertaking the training of interns and medical

students. Therefore, the plan will include the provision of basic educational equipment, *e.g.* a video system for medical education, slide projectors, etc.

・ Transportation

At present the hospital has three ambulances, of which one is out of service and another is old. The third one was provided under Japan's Grant Aid in 1996 and is still in operation. The plan will include a replacement for the old ambulance. There was also a request for a minibus, but as this is not an urgent necessity, it will not be included in the plan.

・Medical Equipment Maintenance Department

With regard to this department, which is planned for the future, the plan for this Project will include the provision of the minimum tools needed for the maintenance of medical equipment, under the condition that the hospital employs the necessary personnel before tender is made for the equipment. If this condition is not met, the provision will be deleted from the plan.

The current plan does not include the provision of equipment for the maintenance of more specialised medical equipment, either electrical or mechanical. Instead it will be suggested to the recipient that a request for technical assistance or follow-up be made once the appropriate organisation (in terms of personnel and operating plans) has been put in place.

3) Use of Existing Equipment

The use of the equipment stored in the pharmacy store and elsewhere, which was procured under the1996 Japanese Grant Aid programme and from the presidential fund (electrocardiograph, defibrillator, X-ray film illuminators,

surgical operating sets, bedside monitors, infusion pumps, syringe pumps, oxygen tents, electrolyte analyzer, diagnostic sets, manual X-ray film developers, etc.) will be taken into account in adjusting the numbers for equipment covered by the present request.

4) Deliberation using Equipment Selection Criteria

The necessity and feasibility of the equipment requested were considered in line with the criteria given below. The results of the deliberation are given in Tabl1

① Equipment Indispensable to Basic Medical Services

These equipment falling into this category is considered necessary for basic medical service and should be of the specifications comparable to the corresponding existing equipment.

○: Equipment which should be replaced, supplemented or newly supplied

×: Equipment for which supply by the project is hardly justifiable for the following reasons:

- Its beneficial effect is low.
- It is procurable by the Angola side.
- The existing equipment corresponding to the requested equipment is still usable.
- Other equipment may be used for the intended purpose of the requested equipment.

② Equipment Fit for the Technical Level of the Hospital

The equipment should be fit for the technical levels of the doctors, nurses and medical technicians going to use it.

○:Equipment which could be used by present technical level

△:Equipment which could be used by the present staff if the staff is given a proper training at the time of procurement

③ Equipment Maintainable by JMH and MOH

The equipment should be maintainable by JMH and MOH.

○:Equipment which could be maintained by the present operation and maintenance system and cost

(Annual operation and maintenance cost being 500 thousand yen or less)

△:Equipment which requires a slightly higher operation and maintenance cost but within the means of the Angola side, though it may demand more effort

(Annual operation and maintenance cost being from 500 thousand to 100 thousand yen)

×:Equipment which requires a high operation and maintenance cost, making a substantial budget increase necessary

(Annual operation and maintenance cost being more than 100 thousand yen)

④ Overall Assessment

The results of overall assessment are indicated in the following two classes.

○:Equipment of which procurement by the project is justifiable

×:Equipment of which procurement should be outside the scope of the project

Table 2-15 Result of The Examination of Requested Equipment

No.	Item	Req. Q'ty	Ealuation												Overall Evaluat.	Plan Q'ty	Remark
			Principal for Priority						Principal for Exclusion								
			1	2	3	4	5	6	1	2	3	4	5	6			
A	**OPERATING DEPARTMENT**																
A-1	OPERATING LIGHT	8	○	○	○	○	○	○							○	**5**	Plan 5sets for Operation Theatre
A-2	OPERATING TABLE	3	○	○	○	○	○	○							○	**5**	Renew 5 set, 3 sets for General Operation, 2 for Orthopedic
A-3	OPERATING MICROSCOPE	3													×	**0**	Refer to 1 for Eye's, 1 for ENT/Neurosurgical
A-4	ANESTHESIA APPARATUS WITH VENTILATOR	3		○	○	○	○	○							○	**4**	Add 4 sets (Total number will be 5)
A-5	VENTILATOR	4									×				×	**0**	
A-6	ELECTROSURGICAL UNIT	5	○	○	○	○	○	○							○	**5**	One set for each Room
A-7	PATIENT MONITOR	9	○	○	○		○	○							○	**5**	Renew 3 set and provide New 2 set
A-8	LOW PRESSURE CONTINUOUS SUCTION UNIT	5	○	○	○		○	○							○	**5**	One set for each Room
A-9	RESUSCITATOR	8	○	○	○		○	○							○	**5**	One set for each Room
A-10	INSTRUMENT TROLLEY	4	○	○	○		○	○							○	**5**	One set for each Room
A-11	INSTRUMENT TRAY STAND	2	○	○	○		○	○							○	**2**	
A-12	MAYO'S INSTRUMENT STAND	20	○	○	○		○	○							○	**10**	Two set for each Room
A-13	DRESSING DRUM STAND	4	○	○	○		○	○							○	**5**	One set for each Room
A-14	KICK BUCKET	7	○	○	○	○	○	○							○	**5**	One set for each Room
A-15	BASIN WITH BASIN STAND	2									×	×			×	**0**	
A-16	FOOT STOOL	15	○	○	○		○	○							○	**5**	One set for each Room
A-17	REVOLVING STOOL	7	○	○	○	○	○	○							○	**5**	One set for each Room
A-18	MEDICAL REFRIGERATOR	1												△	×	**0**	Existing
A-19	BOILING STERILIZER	2									×	×			×	**0**	
A-20	INSTRUMENT CABINET	3	○	○	○	○	○	○							○	**5**	One set for each Room
A-21	X-RAY FILM ILLUMINATOR	5												△	×	**0**	Existing 5 sets will be used
A-22	SCRUB UP UNIT	3	○	○	○	○	○	○							○	**3**	Change to the equipment with Sterilizer
A-23	SOAP DISPENSER	6	○	○	○	○	○	○							×	**0**	Inclede in Scrub up unit
A-24	RECOVERY BED	6	○	○	○	○	○	○							○	**6**	Plan 6 for Recovery Room
A-25	PULSE OXIMETER	2	○	○	○		○	○						△	○	**1**	Existing 1 set will be used
B	**EMERGENCY TREATMENT ROOM**																
B-1-1	OPERATING LIGHT, MOBILE	1	○	○	○		○	○							○	**3**	Plan 3 for Emergency treatment
B-1-2	OPERATING LIGHT, CEILING		○	○	○		○	○							○	**1**	Plan 1 for Minor Operation Room
B-2	OPERATING TABLE	2	○	○	○		○	○							○	**1**	Plan 2 for Minor Operation Room
B-3-1	TREATMENT TABLE	5	○	○	○		○	○							○	**3**	Plan 3 for Emergency treatment
B-3-2	GYPSUM TABLE															**1**	Plan 1 for Orthopedic
B-4	ANESTHESIA APPARATUS WITH VENTILATOR	1									×					**1**	Plan 1 for Minor Operation Room
B-5	VENTI LATOR	3									×				○	**0**	
B-6	RESUSCITATOR	3	○	○	○		○	○							○	**1**	
B-7	MOBILE X-RAY UNIT	2	○	○	○		○	○							○	**1**	
B-8	PATIENT MONITOR	3	○	○	○		○	○							○	**1**	
B-9	DEFIBRILLATOR	1									×			△	×	**0**	Existing 1 set will be used
B-10	X-RAY FILM ILLUMINATOR	3									×			△	×	**0**	Existing 2 sets will be used
B-11	ENDOTRACHEAL SET	1	○	○	○		○	○							○	**1**	
B-12	OXYGEN TENT ADULT	4	○	○	○	○	○	○							○	**4**	
B-13	STRETCHER	4	○	○	○		○	○							○	**4**	
B-14	EMERGENCY CART	2	○	○	○		○	○							○	**4**	Plan 1 set for Minor Operation Room, 3 for Emergency treatment
B-15	AUTOCLAVE (TABLE TOP)	2	○	○	○		○	○							○	**1**	
B-16	INSTRUMENT CABINET	3	○	○	○		○	○							○	**2**	

No.	Item	Req. Q'ty	Ealuation												Overall Evaluat.	Plan Q'ty	Remark
			Principal for Priority						Principal for Exclusion								
			1	2	3	4	5	6	1	2	3	4	5	6			
C	I.C.U. ROOM																
C-1	PULSE OXIMETER	11	○	○	○		○	○							○	5	
C-2	PULSE OXIMETER	11	○	○	○		○	○							○	5	
C-3	BEDSIDE MONITOR	20	○	○	○		○	○						△	○	10	Necessary 16 sets. Provide 10 sets by Japan and 6 sets from Existing
C-4	BLOOD PRESSUR MONITOR	5									×				×	0	
C-5	CENTRAL MONITOR	1									×				×	0	
C-6	DIFIBRILLATOR	2									×				×	0	Existing 2 sets will be used
C-7	DIFIBRILLATOR, WITH MONITOR	1	○	○	○		○	○							○	1	
C-8	VENTILATOR, VOLUME	5	○	○	○		○	○							○	7	
C-9	VENTILATOR, PRESSURE	5									×				×	0	
C-10	PACEMAKER	4											×		×	0	
C-11	RESUSITATOR	1	○	○	○		○	○							○	1	
C-12	CARDIAC STIMULATER	1									×				×	0	
C-13	INFUSION PUMP	20	○	○	○		○	○						△	○	2	Existing 3 sets will be used
C-14	SYRINGE PUMP	20	○	○	○		○	○						△	×	0	Existing 5 sets will be used
C-15	FEEDING PUMP	4									×				×	0	Provide by Angola
C-16	ULTRASONIC NEBULIZER	4	○	○	○		○	○							○	2	
C-17	AIR MATTRESS	6	○	○			○	○							○	2	
C-18	AIR MATTRESS, WITH HEATER	2									×				×	0	
C-19	PHYSIOTHERAPY SYSTEM	1set									×				×	0	
C-20	RESUSITATION BAG (AMBU BAG)	22	○	○	○		○	○							○	5	Plan 5 sets for 20 Bed
C-21	SPHYGMOMANOMETER, WALL MOUNT TYPE	22	○	○	○		○	○							○	14	Plan 14 sets
C-22	OPERATING LIGHT, MOBILE STAND TYPE	2	○	○	○		○	○							○	2	The type without Battery
C-23	TABLE, ANESTHETIST'S	3	○	○	○		○	○							○	3	
C-24	INSTRUMENT TRAY STAND	3	○	○	○		○	○							○	3	
C-25	INSTRUMENT TRAY STAND, FOR THREE TRAYS	3	○	○	○		○	○							○	3	
C-26	I.C.U. BED	20	○	○	○	○	○	○								14	Plan 14 sets
C-27	BLOOD GAS ANALYSER	1								×					×	0	
C-28	SPIROMETER	1									×				×	0	
C-29	ULTRASOUND DIAGNOSIS SYSTEM	1									×				×	0	Refer to S-4
C-30	BLONCHO FIBERSCOPE WITH LIGHT SOURSE	1									×				×	0	
D	CENTRAL STERILISE SUPPLY DEPARTMENT																
D-1	HIGH PRESSURE STEAM STERILIZER	2	○	○	○		○	○							○	2	
D-2	ETHYLENE OXIDE GAS STERILIZER	2								×	×				×	0	
D-3	AUTOCLAVE VERTICAL	2									×				×	0	
D-4	AVTOCLAVE (TABLE TOP)	2									×				×	0	
D-5	ULTRASONIC CLEANER	2									×				×	0	
D-6	ANESTHETIC EQUIPMENT WASHER	3									×				×	0	
D-7	TUBE WASHER	2								×	×				×	0	
D-8	TUBE DRYER	2								×	×				×	0	
D-9	WORK TABLE (SIZE L)	2	○	○	○	○	○	○							○	2	
D-10	DRESSING DRUM	2	○	○	○	○	○	○							○	2	
D-11	DRESSING DRUM CABINET	2	○	○	○	○	○	○							○	2	
D-12	INSTRUMENT CABINET	2	○	○	○		○	○							○	1	
D-13	INSTRUMENT TROLLEY	2	○	○	○		○	○							○	2	
E	INTERNAL MEDICINE ; EXAMINING ROOM																
E-1	EXAMINATION LIGHT	3													×	0	Include in Building work
E-2	EXAMINATION TABLE	5	○	○	○		○	○							○	4	
E-3	CLOTHES BASKET	4									×	×			×	0	
E-4	X-RAY FILM ILLUMINATOR	3	○	○	○		○	○							○	1	
E-5	BASIN WITH BASIN STAND	4									×	×			×	0	
E-6	STETHOSCOPE	10										×			×	0	
E-7	SPHYGMOMANOMETER	10	○	○	○		○	○							○	4	
E-8	DOCTOR'S DESK & CHAIR	3	○	○	○		○	○							○	4	
E-9	PATIENT CHAIR	3	○	○	○		○	○							○	4	
F	INTERNAL MEDICINE ; TREATMENT ROOM																

No.	Item	Req. Q'ty	Ealuation												Overall Evaluat.	Plan Q'ty	Remark
			Principal for Priority						Principal for Exclusion								
			1	2	3	4	5	6	1	2	3	4	5	6			
F-1	EXAMINATION TABLE	2	○	○	○	○	○	○							○	2	
F-2	CLOTHES BASKET	1									×	×			×	0	
F-3	EXAMINATION LIGHT	1													×	0	Include in Building work
F-4	INFUSION PUMP	4									×				×	0	
F-5	COUNTER FOR DRESSING & INJECTION	2	○	○	○		○	○							○	1	
F-6	WASTE RECEPTACLE	2	○	○	○	○	○	○							○	1	
F-7	MEDICINE CABINET	3	○	○	○	○	○	○							○	1	
F-8	INSTRUMENT CABINET	2	○	○	○	○	○	○							○	1	
F-9	INSTRUMENT TROLLEY	2	○	○	○	○	○	○							○	2	
F-10	AUTOCLAVE (TABLE TOP)	1									×				×	0	
F-11	BOILING STERILIZER	2	○	○	○		○	○							○	1	
F-12	REFRIGERATOR	1									×	×			×	0	Provide by Angola
F-13	WEIGHING SCALE (ADULT)	1	○	○	○		○	○							○	1	
F-14	HEIGHT SCALE (ADULT)	1	○	○	○		○	○							○	1	
F-15	ELECTROCARDIOGRAPH (6 CHANNEL)	1									×				×	0	
F-16	EMERGENCY CART WITH DEFIBRILLATOR	1									×				×	0	
	INTERNAL MEDICINE ;																
F-17	STETHOSCOPE	5										×			×	0	Provide by Angola
F-18	SPHYGMOMANOMETER	5	○	○	○		○	○							○	5	To be used at the Ward
F-19	THERMOMETER, CLINICAL	20										×			×	0	
F-20	RESUSITATION BAG (AMBU BAG)	3	○	○	○		○	○							○	3	
F-21	DIFIBRILLATOR	2												△	×	0	Existing 1 set will be used
F-22	INFUSION PUMP, WITH STAND	3									×				×	0	
F-23	INFUSION PUMP, WITHOUT STAND	3									×				×	0	
F-24	ECG, WITH MONITOR	4												△	×	0	Existing 1 set will be used
F-25	ECG, 1/3-CHANNEL	2												△	×	0	Existing 2 sets will be used
F-26	ECG RECORDING PAPER	1年分											×		×	0	Provide by Angola
F-27	SUCTION UNIT, CABINET TYPE	3	○	○	○	○	○	○							○	3	
F-28	BLOOD GAS ANALYSER	1								×					×	0	
F-29	ELECTROLY ANALYSER	1									×				×	0	
F-30	RESUSCITATOR	2									×				×	0	
F-31	ULTRASOUND DIAGNOSIS SYSTEM (ECHO GRAPH)	1									×				×	0	Refer to S-4
G	**SURGERY ; EXAMINING ROOM**																
G-1	EXAMINATION LIGHT	5													×	0	Include in Building work
G-2	EXAMINATION TABLE	3	○	○	○	○	○	○							○	3	
G-3	CLOTHES BASKET	6									×	×			×	0	
G-4	X-RAY FILM ILLUMINATOR	2	○	○	○		○	○							○	2	
G-5	BASIN WITH BASIN STAND	6									×	×			×	0	
G-6	STETHOSCOPE	6									×	×			×	0	
G-7	SPHYGMOMANOMETER	6	○	○	○		○	○							○	3	
G-8	DOCTOR'S DESK & CHAIR	3	○	○	○	○	○	○							○	3	
G-9	PATIENT CHAIR	3	○	○	○	○	○	○							○	3	
H	**SURGERY ; TREATMENT ROOM**																
H-1	EXAMINATION TABLE	5	○	○	○	○	○	○							○	2	Plan 1 set for each Room
H-2	CLOTHES BASKET	6									×	×			×	0	
H-3	EXAMINATION LIGHT	2	○	○	○	○	○	○							○	2	Plan 2 sets for Treatment Room for Surgical clinic
H-4	COUNTER FOR DRESSING & INJECTION	3	○	○	○		○	○							○	1	
H-5	SURGICAL INSTRUMENT SET	4												△	×	0	Existing 4 sets will be used
H-6	WASTE RECEPTACLE	3	○	○	○	○	○	○							○	1	
H-7	INSTRUMENT CABINET	3	○	○	○	○	○	○							○	1	
H-8	TREATMENT CARRIAGE	3	○	○	○	○	○	○							○	2	
H-9	AUTOCLAVE (TABLE TOP)	1	○	○	○		○	○							○	1	
H-10	BOILING STERILIZER	3									×				×	0	
I	**ORTHOPEDICS ; EXAMINING ROOM**																
I-1	EXAMINATION LIGHT	6													×	0	Include in Building work
I-2	EXAMINATION TABLE	4	○	○	○	○	○	○							○	3	

No.	Item	Req. Q'ty	Ealuation												Overall Evaluat.	Plan Q'ty	Remark
			Principal for Priority						Principal for Exclusion								
			1	2	3	4	5	6	1	2	3	4	5	6			
I-3	CLOTHES BASKET	6									×	×			×	0	
I-4	X-RAY FILM ILLUMINATOR	3	○	○	○		○	○							○	3	
I-5	BASIN WITH BASIN STAND	3									×	×			×	0	
I-6	STETHOSCOPE	6									×	×			×	0	
I-7	SPHYGMOMANOMETER	6	○	○	○	○	○	○							○	3	
I-8	DOCTOR'S DESK & CHAIR	3	○	○	○	○	○	○							○	3	
I-9	PATIENT CHAIR	3	○	○	○	○	○	○							○	3	
J	ORTHOPEDICS ; TREATMENT ROOM																
J-1	EXAMINATION TABLE	3	○	○	○	○	○	○							○	2	1set for the Clinic and the other for Treatment
J-2	GYPSUM DRESSING TALBE	5	○	○	○	○	○	○							○	2	
J-3	CLOTHES BASKET	1									×	×			×	0	
J-4	PATIENT CHAIR	5	○	○	○	○	○	○							○	4	
J-5	COUNTER FOR DRESSING & INJECTION	1	○	○	○		○	○							○	1	
J-6	TRACTION UNIT	5	○	○	○	○	○	○							○	3	To be used at the Ward
J-7	X-RAY FILM ILLUMINATOR	1	○	○	○		○	○							○	1	
J-8	PLASTER SAW	4	○	○	○	○	○	○							○	2	
J-9	AIR DRILL	4									×				×	0	
J-10	RETRACTOR	2									×				×	0	
J-11	INSTRUMENT CABINET	1	○	○	○	○	○	○							○	1	
J-12	GYPSUM CABINET	1	○	○	○	○	○	○							○	1	
J-13	INSTRUMENT TROLLEY	1	○	○	○	○	○	○							○	1	
J-14	AUTOCLAVE (TABLE TOP)	1	○	○	○		○	○							○	1	
J-15	BOILING STERILIZER	1									×				×	0	
	Neuro Surgery :		OPD 6 patients per day,														
NS-1	CT scanner, whole body	1								×	×				×	0	Refer to S-01-01
NS-2	X-Ray system, Angiography	1								×	×				×	0	
NS-3	Urtrasound diagnosis system(Echo graph)	1							×						×	0	Refer to S-4
NS-4	Electroencephalograph(EEG)	1									×				×	0	
NS-5	EMG/Evoked potential measuring system	1							×						×	0	
NS-6	Bedside monitor	1									×				×	0	
NS-7	Surgical instrument, Cloward Set	1	○	○	○	○	○	○							○	1	
NS-8	Surgical instrument, Casper Set for Spine surgery	1	○	○	○	○	○	○							○	1	
NS-9	Surgical instrument, Micro-Neuro Surgery	1	○	○	○	○	○	○							○	1	
NS-10	Operating table, micro surgery, motor-powerd	1	○	○	○	○	○	○							○	1	
NS-11	Electric trepanator (Cranio Tome)	2	○	○	○	○	○	○							○	1	
NS-12	Material Para Fixaco, Osteosintese e Fusao da	1set											×		×	0	Provide by Angola
NS-13	Trocare (Cushing Trocares)	20	○	○	○	○	○	○							○	20	
NS-14	Electric drill	2	○	○	○	○	○	○							○	1	
NS-15	Cera Hemostatica	1											×		×	0	Provide by Angola
NS-16	Poliuretano												×		×	0	Provide by Angola
NS-17	Gelffoam												×		×	0	Provide by Angola
NS-18	Cotonoides												×		×	0	Provide by Angola
NS-19	Acrilico(Metil Acrilato Para Craneoplastia)												×		×	0	Provide by Angola
NS-20	Uni-shunt with reservoir kit	100 Anua											×		×	0	
NS-21	Truction Set, Cranial	2	○	○	○	○	○	○							○	2	
NS-22	Fixator	3	○	○	○	○	○	○							○	2	
NS-23	Stookey manometer	3											×		×	0	Provide by Angola
	Pediatric Surgery :																
PS-1	Surgical Instrument for Pediatric	1set	○	○	○		○	○							○	1	
PS-2	Operating Light, Minor ceiling type	1									×				×	0	Included in Operation Theatre
PS-3	Operating Light, Mobile stand type	1	○	○	○		○	○							○	1	
PS-4	Examination Light, Mobile stand type	3													×	0	Include in Building work
PS-5	Suction Unit, pressure	2									×				×	0	
PS-6	Suction Unit, walker mobiles	2	○	○	○	○	○	○							○	1	
PS-7	Suction Unit, Low pressure	2	○	○	○	○	○	○							○	1	
PS-8	Electro-Surgical Unit	1									×				×	0	

No.	Item	Req. Q'ty	Ealuation												Overall Evaluat.	Plan Q'ty	Remark
			Principal for Priority						Principal for Exclusion								
			1	2	3	4	5	6	1	2	3	4	5	6			
PS-9	Sigmoidscope for infant, Fiber	3									×				×	0	
PS-10	Sigmoidscope for infant, righit	3									×				×	0	
PS-11	Suction Biopsy set	1											×		×	0	Provide by Angola
PS-12	Sistema de drenagem toraxica	1											×		×	0	Provide by Angola
PS-13	Bougie set	1	○	○	○	○	○	○							○	1	
PS-14	Blood lancet	1set	○	○	○	○	○	○			×				×	0	
PS-15	Sphygmomanometer, pediatric	10	○	○	○		○	○							○	5	
PS-16	Sphygmomanometer for Oxygentherapy	4													×	0	Provide by Angola
PS-17	Thermometer, rectais	10									×				×	0	
PS-18	Thermometer, axilares	20									×				×	0	
PS-19	Resuscitation Bag	1	○	○	○	○	○	○							○	1	
PS-20	Sterilizer, Hot Air	1									×				×	0	
PS-21	Steam Sterilizer	1	○	○	○		○	○							○	1	
PS-22	Instrument dressing Table	2	○	○	○	○	○	○							○	2	
PS-23	Examination Table	4	○	○	○	○	○	○							○	3	
PS-24	Screen	6	○	○	○		○	○							○	6	
PS-25	Weighing Scale	2	○	○	○	○	○	○							○	2	
PS-26	Stretcher Trolly	2	○	○	○	○	○	○							○	2	
PS-27	Wheelchair, chaild	4	○	○	○		○	○							○	4	
PS-28	Medicine Cabinet	1	○	○	○	○	○	○							○	1	
PS-29	Instrument Cabinet	1	○	○	○	○	○	○							○	1	
PS-30	Cabinet for clothes	1									×				×	0	Provide by Angola
PS-31	Table for child	8									×				×	0	Provide by Angola
PS-32	Chair for child	32									×				×	0	Provide by Angola
PS-33	Book Cabinet	2									×				×	0	Provide by Angola
PS-34	Microwave	1									×				×	0	Provide by Angola
PS-35	Drug Refrigerator	1	○	○	○		○	○							○	1	
PS-36	Refrigerator for patient food	1									×				×	0	Include in the Kitchen to be done by Building work
PS-37	Refrigerator for staff food	1									×				×	0	Include in the Kitchen to be done by Building work
PS-38	Pediatric Surgical Incubator	2	○	○	○	○	○	○							○	2	
PS-39	Ultrasound Diagnosis System (Echo Scan)	1									×				×	0	Refer to S-4
PS-40	Cystoscope Rigid for child	1									×				×	0	
PS-41	Laparoscope	1									×				×	0	
PS-42	Aparelho para Mamomettria esficteriana	1									×				×	0	
PS-43	Inhalation Aparatas	1	○	○	○	○	○	○							○	1	
PS-44	Forearm Crutch	5	○	○	○	○	○	○							○	3	For children
PS-45	Forearm Crutch, Adjustable	5	○	○	○	○	○	○							○	3	For children
PS-46	Office Furniture	4									×	×			×	0	
PS-47	Sistema para arrumacao dos processos clinicos	1set									×		×		×	0	Provide by Angola
PS-48	Material gastavel:	1set									×		×		×	0	Provide by Angola
PS-49	Cateteres de desbridamento venoso de diferentes calibers: n.22, 20, 18, 16										×		×		×	0	Provide by Angola
PS-50	Sistema Port										×		×		×	0	Provide by Angola
PS-51	Drenos de Redon										×		×		×	0	Provide by Angola
PS-52	Drenos de Portovac ou similar										×		×		×	0	Provide by Angola
PS-53	Drenos de toraxicos										×		×		×	0	Provide by Angola
PS-54	Aparelho de Raios Laser	1									×				×	0	
PS-55	Dermatome, Electric	1									×				×	0	
PS-56	Dermatome, Manual	1	○	○	○		○	○							○	1	
PS-57	Infant Warmer	1	○	○	○		○	○							○	1	
PS-58	X-Ray Film Illminator	2	○	○	○		○	○							○	2	
PS-59	Diagnostic Light	2													×	0	Refer to PS-4
PS-60	Forceps Stand	5									×	×			×	0	
PS-61	Trocar, Ascites	3									×	×			×	0	
PS-62	Pulmonary Function Test System	1									×				×	0	
PS-63	Electrocardiograph	1									×				×	0	Use with Internal medicine
PS-64	Ligature Hook	5										×			×	0	

No.	Item	Req. Q'ty	Ealuation												Overall Evaluat.	Plan Q'ty	Remark
			Principal for Priority						Principal for Exclusion								
			1	2	3	4	5	6	1	2	3	4	5	6			
PS-65	Operating Instrument Set, Thyroidotomy	2									×				×	0	
PS-66	Operating Instrument Set, for Infant	1									×				×	0	Provide by Angola
PS-67	Operating Instrument Set, for Hand Surgery	2	○	○	○	○	○	○							○	1	
PS-68	Urological Examining & Treatment Table	1									×				×	0	
PS-69	Syring Infusion Pump	3	○	○	○	○	○	○							○	2	
PS-70	Walker	3	○	○	○	○	○	○							○	3	
PS-71	Laundry Cart	2									×	×			×	0	
PS-72	I.V. Hanger Stand	5	○	○	○	○	○	○							○	5	
PS-73	Examination table	1	○	○	○	○	○	○							○	1	
PS-74	Dobbins e Bill	1													×	0	Provide by Angola
K	**EAR, NOSE & THROAT**																
K-1	ENT TREATMENT UNIT	3	○	○	○	○	○	○							○	2	
K-2	ENT TREATMENT CHAIR	3	○	○	○	○	○	○							○	2	〃
K-3	MICRO HAND DRILL	2	○	○	○		○	○							○	1	
K-4	OTOSCOPE	15	○	○	○	○	○	○							○	10	
K-5	LARYNGEAL MIRROR	20	○	○	○	○	○	○							○	10	
K-6	BASIN WITH BASIN STAND	3										×			×	0	
K-7	X-RAY FILM ILLUMINATOR	1									×				×	0	
K-8	INSTRUMENT CABINET	2	○	○	○	○	○	○							○	2	
K-9	AUTOCLAVE (TABLE TOP)	2									×				×	0	
K-10	BOILING STERILIZER	1	○	○	○		○	○							○	1	
K-11	NEBULIZER APPARATUS	2	○	○	○	○	○	○							○	2	
K-12	DOCTOR'S DESK & CHAiR	6	○	○	○		○	○							○	4	Plan 4 number of Clinics
K-13	INFANT AUDIOMETER	1	○	○	○		○	○							○	1	
K-14	DOCTOR'S DESK & CHAIR	1													×	0	
K-15	Esophago Rigid scope with light sourse, for adult	1									×				×	0	Refer to K-23
K-16	Esophago Rigid scope with light sourse, for child	1													×	0	Refer to K-24
K-17	Operating Microscope, Binocular	1	○	○	○	○	○	○							○	1	Use with Eye and Nuerosurgery
K-18	Surgical Instrument for Ear Micro Surgery	1	○	○	○		○	○							○	1	
K-19	Head Mirror	4	○	○	○		○	○							○	4	
K-20	Head Mirror, with light	4	○	○	○		○	○							○	4	
K-21	Laryngo Fiberscope with light sourse, for adult	1									×				×	0	Refer to K-22
K-22	Laryngo Fiberscope with light sourse, for child	1	○	○	○		○	○							○	1	
K-23	Laryngo Rigid scope with light sourse, for adult	1									×				×	0	
K-24	Laryngo Rigid scope with light sourse, for child	1	○	○	○	○	○	○							○	1	Change from Esophago Rigid scope
K-25	ENT Surgery Training Microscope	1									×				×	0	
L	**OPHTHALMOLOGY**																
L-1	OPHTHALMIC REFRACTING UNIT	5(4)	○	○	○		○	○							○	4	Plan 5 number of Room
L-2	AUTOMATIC CHART PROJECTOR	5(4)													×	0	Refer to L-1
L-3	SIGHT TESTER	6(1)									×				×	0	
L-4	LENS METER	3	○	○	○	○	○	○							○	1	
L-5	REFRACTO METER	3									×				×	0	
L-6	SLIT LAMP MICROSCOPE	2(1)	○	○	○		○	○							○	2	
L-7	OPHTHALMOSCOPE, DIRECT	2	○	○	○	○	○	○							○	1	
L-8	OPHTHALMOSCOPE, INDIRECT	4(1)									×				×	0	
L-9	EXOPHTHALMOMETER	3(1)	○	○	○		○	○							○	1	
L-10	SYNOPTOPHORE	2	○	○	○		○	○							○	1	
L-11	HAND MAGNET	2	○	○	○		○	○							○	1	
L-12	PROJECTION PERIMETER	2	○	○	○	○	○	○							○	1	
L-13	KERATOMETER	2	○	○	○	○	○	○							○	1	
L-14	DOCTOR'S DESK & CHAIR	5	○	○	○		○	○							○	5	
L-15	GONIOSCOPE	1	○	○	○		○	○							○	1	
L-16	CIRURGICAL MICROSCOPE	1	○	○	○		○	○							○	1	
L-17	CATALACT SURGERY INSTRUMENT SET	3(1)	○	○	○		○	○							○	1	
L-18	EYE BASIC & EMERGENCY SURGICAL SET	2	○	○	○		○	○							○	1	
L-19	GLUCOMA SURGERY SET	2	○	○	○		○	○							○	1	

No.	Item	Req. Q'ty	Ealuation												Overall Evaluat.	Plan Q'ty	Remark
			Principal for Priority						Principal for Exclusion								
			1	2	3	4	5	6	1	2	3	4	5	6			
L-20	DITTO FOR RETINA	2	○	○	○		○	○							○	1	
L-21	DITTO FOR ESTRABISMO	2	○	○	○		○	○							○	1	
L-22	CAMPIMETER	2(1)									×				×	0	
L-23	Biometer (A-scan)	1									×				×	0	
L-24	Intra Ocular Lens (I.O.L.)	1											×		×	0	
L-25	Aspiration/ Irrigation Unit	5	○	○	○		○	○					×		×	0	Refer to L-19
L-26	Healon	1											×		×	0	
L-27	Suture with needle, 9/0, 10/0	1											×		×	0	
L-28	Viscoelastic Cannula	1											×		×	0	
L-29	Tonometer, Non-contact	1									×				×	0	
L-30	Tonometer, Appalanation	1	○	○	○		○	○							○	1	
L-31	Ultrasound Diagnosis System (A/B Scan)	1									×				×	0	
L-32	Angioscope	1									×				×	0	
L-33	Electro Retinography (E.R.G.)	1									×				○	0	
L-34	Auto refractometer	1	○	○	○	○	○	○							○	2	
L-35	Cross Cyrinder	1	○	○	○	○	○	○							○	1	
L-36	Needle, Retrobulbar	10	○	○	○	○	○	○							○	10	
L-37	Fundus Camera, Stereo	1									×				○	0	
M	DENTAL																
M-1	DENTAL CHAIR UNIT	5	○	○	○	○	○	○							○	4	Plan 4 table space
M-2	STOOL	5													×	0	Include in M-1
M-3	DENTAL X-RAY (INTERNAL)	5	○	○	○	○	○	○							○	1	
M-4	ULTRASONIC SCALER	5	○	○	○		○	○							○	2	
M-5	ASSORTED DENTAL INSTRUMENT SET	5	○	○	○	○	○	○							○	5	
M-6	LIGHT CURE APPARATUS	5	○	○	○		○	○							○	1	
M-7	AMALGAMATOR	5	○	○	○	○	○	○							○	2	
M-8	DENTAL MIXER	5	○	○	○	○	○	○							○	2	
M-9	AUTOCLAVE (TABLE TOP)	4	○	○	○		○	○							○	2	
M-10	BOILING STERILIZER	5									×				×	0	
M-11	INSTRUMENT CABINET	5	○	○	○	○	○	○							○	5	
M-12	FILING CABINET	1	○	○	○	○	○	○			×	×			×	0	
M-13	DOCTOR'S DESK & CHAIR	4	○	○	○	○	○	○							○	5	
M-14	Motores para acabamento e Mesas	9	○	○	○	○	○	○							○	2	Addition to Existing 4 sets
M-15	Brocas de todos os tipos	?	○	○	○	○	○	○							○	2	
M-16	Vibradores de Varios tipos	6	○	○	○	○	○	○							○	2	
M-17	Motores para recortar Modelos	5	○	○	○	○	○	○							○	2	
M-18	Articuladores de varios tipos	5	○	○	○	○	○	○							○	2	
M-19	Muplas Grandes e pequenas	16	○	○	○	○	○	○							○	2	
M-20	Motores para polir e suas escovas	5	○	○	○	○	○	○							○	2	
M-21	Arames ou fios para ganchos, 0709-25 rolos	25rol e											×		×	0	
M-22	Espatulas de toda marcas	1set	○	○	○	○	○	○							○	2set	
M-23	martelo de, borracha, madeira e de metal	1set	○	○	○	○	○	○							○	2set	
M-24	Bicos de muzem	9	○	○	○	○	○	○							○	2	
M-25	Rupoas (Roupas?)	9											×		×	0	
M-26	Prensas Hidraulicas	5	○	○	○	○	○	○							○	2	
M-27	Porta muplas	5	○	○	○	○	○	○							○	2	
M-28	Serrotes	25	○	○	○	○	○	○							○	2	
M-29	Formas de borracha para modelos	25	○	○	○	○	○	○							○	6	
M-30	Compressor de ar	5	○	○	○	○	○	○							○	2	
M-31	Necessitamos todos instrumentos e materiais	1set	○	○	○	○	○	○							○	2set	
M-32	Necessitamos todos materiais e instrumentos	1set	○	○	○	○	○	○							○	2set	
M-33	Necessitamos todos materiais e instrumentos	1set											×		×	0	
N	UROLOGY : EXAMINING ROOM																
N-1	EXAMINATION LIGHT	2							×			×			×	0	
N-2	EXAMINATION TABLE	2							×			×			×	0	
N-3	CLOTHES BASKET	2							×			×			×	0	

No.	Item	Req. Q'ty	Ealuation												Overall Evaluat.	Plan Q'ty	Remark
			Principal for Priority						Principal for Exclusion								
			1	2	3	4	5	6	1	2	3	4	5	6			
N-4	X-RAY FILM ILLUMINATOR	2							×			×			×	0	
N-5	BASIN WITH BASIN STAND	2							×			×			×	0	
N-6	STETHOSCOPE	5							×			×			×	0	
N-7	SPHYGMOMANOMETER	5							×			×			×	0	
N-8	DOCTOR'S DESK & CHAIR	3							×			×			×	0	
N-9	PATIENT CHAIR	3							×			×			×	0	
O	UROLOGY ; TREATMENT ROOM																
O-1	UROLOGICAL EXAMINATION TABLE	1							×			×			×	0	
O-2	UROLOGICAL INSTRUMENT SET	1							×			×			×	0	
O-3	CYSTO-URETHEROSCOPE	2							×			×			×	0	
O-4	ENDOSCOPIC LIGHT SOURCE	2							×			×			×	0	
O-5	EXAMINATION TABLE	1							×			×			×	0	
O-6	CLOTHES BASKET	1							×			×			×	0	
O-7	ENDOSCOPIC CABINET	1							×			×			×	0	
O-8	INSTRUMENT TROLLEY	1							×			×			×	0	
O-9	INSTRUMENT CABINET	1							×			×			×	0	
O-10	FOOT STOOL	1							×			×			×	0	
O-11	AUTOCLAVE (TABLE TOP)	1							×			×			×	0	
O-12	BOILING STERILIZER	1							×			×			×	0	
O-13	DOCTOR'S DESK & CHAIR	1							×			×			×	0	
P	DERMATOLOGY ; EXAMINATION ROOM																
P-1	EXAMINATION LIGHT	2													×	0	Include in Building work
P-2	EXAMINATION TABLE	2	○	○	○	○	○	○							○	2	
P-3	CLOTHES BASKET	2									×	×			×	0	
P-4	X-RAY FILM ILLUMINATOR	1									×	×			×	0	
P-5	BASIN WITH BASIN STAND	2									×	×			×	0	
P-6	STETHOSCOPE	5									×	×			×	0	
P-7	SPHYGMOMANOMETER	5	○	○	○	○	○	○							○	2	
P-8	DOCTOR'S DESK & CHAIR	2	○	○	○	○	○	○							○	2	
P-9	PATIENT CHAIR	2	○	○	○	○	○	○							○	2	
Q	DERMATOLOGY ; TREATMENT ROOM																
Q-1	EXAMINATION TABLE	1	○	○	○	○	○	○							○	1	Plan 1 set for each Clinic
Q-2	CLOTHES BASKET	1									×	×			×	0	
Q-3	EXAMINATION LIGHT	1													×	0	Include in Building work
Q-4	INFRARED RAY LAMP	2	○	○	○		○	○							○	1	
Q-1	ULTRAVIOLET RAY LAMP	2	○	○	○		○	○							○	1	
Q-2	SUN RAY LAMP	2									×				×	0	
Q-3	COUNTER FOR DRESSING & INJECTION	1									×				×	0	
Q-4	INSTRUMENT TRAY STAND	1	○	○	○		○	○							○	1	
Q-1	MEDICINE CABINET	1	○	○	○		○	○							○	1	
Q-2	INSTRUMENT CABINET	1	○	○	○		○	○							○	1	
Q-3	REFRIGERATOR	1									×				×	0	
Q-4	OINTMENT TABLE	1	○	○	○		○	○							○	1	
Q-1	AVTOCLAVE (TABLE TOP)	1									×				×	0	
Q-2	BOILING STERILIZER	1									×				×	0	
Q-3	ELECTROSURGICAL UNIT	1									×				×	0	
R	ENDOSCOPE ROOM																
R-1	ENDOSCOPIC TABLE	1													○	1	Confirmed the Doctor who is capable to use this Equipment
R-2	ENDOSCOPIC LIGHT SOURCE	1													○	2	
R-3	INSTRUMENT TROLLEY	1													○	1	
R-4	ENDOSCOPIC CABINET	1													○	1	
R-5	X-RAY FILM ILLUMINATOR	1							×						×	0	
R-6	GASTRO FIBERSCOPE	1													○	1	
R-7	ESOPHAGO SCOPE	1							×						×	0	
R-8	DUODENO FIBERSCOPE	1							×						×	0	
R-9	CHOLEDOCHO SCOPE	1							×						×	0	

No.	Item	Req. Q'ty	Ealuation												Overall Evaluat.	Plan Q'ty	Remark
			Principal for Priority						Principal for Exclusion								
			1	2	3	4	5	6	1	2	3	4	5	6			
R-10	COLONO FIBERSCOPE	1							×						×	0	
R-11	BRONCHO FIBERSCOPE	1							×						×	0	
R-12	NASOPHARYNGO FIBERSCOPE	1							×						×	0	Refer to K-24
R-13	LAPAROSCOPE WITH VIDEO SYSTEM	2							×						×	0	
R-14	SIGMOIDO SCOPE	1							×						×	0	
R-15	ARTHERO SCOPE	1							×						×	0	
R-16	THORACO SCOPE	1							×						×	0	
R-17	PROCTO SCOPE	1													○	1	
R-18	ENDOSCOPIC WASHER	1													○	1	
R-19	ULTRASONIC CLEANER	1							×						×	0	
R-20	AUTOCLAVE (TABLE TOP)	1							×						×	0	
R-21	DOCTOR'S DESK & CHAIR	1							×						×	0	
S	**RADIOLOGY DEPARTMENT**																
S-1	DIAGNOSTIC X-RAY APPARATUS	2	○	○	○	○	○	○							○	2	
S-1-1	CT SCAN	1								×					×	0	
S-2	DIAGNOSTIC X-RAY TV APPARATUS	1	○	○	○	○	○	○							○	1	
S-3	C-ARM X-RAY TV SYSTEM	1								×					×	0	
S-4	ULTRASOUND MACHINE	1	○	○	○		○	○							○	1	Plan 1 set for Cardiology, Internal Medicine and Neuro-surgical
S-5	AUTOMATIC FILM PROCESSOR	1	○	○	○	○	○	○							○	1	Existing 1 set will be used
S-6	MANUAL FILM DEVELOPMENT UNIT	1													×	0	Existing 2 sets will be used
S-7	X-RAY PRESERVING CABINET	2	○	○	○		○	○							○	1	
S-8	FILM LOADING DESK	1	○	○	○		○	○							○	1	
S-9	CHEST MEASURE CALIPER	1	○	○	○		○	○							○	1	
S-10	ANGULAR SCALE	1	○	○	○		○	○							○	1	
S-11	BARIUM CUP	10									×	×			×	0	
S-12	RADIOGRAPHIC STAND	2	○	○	○		○	○							○	2	
S-13	X-RAY FILM CASSETTE	30	○	○	○		○	○							○	1	
S-14	X-RAY FILM GRID	12	○	○	○		○	○							○	1	
S-15	DOSIMETER	2	○	○	○		○	○							○	2	
S-16	X-RAY PROCESSING TANK	2									×				×	0	
S-17	X-RAY FILM DRYER	2									×				×	0	
S-18	X-RAY FILM HANGER	30									×				×	0	
S-19	POLYETHYLENE BOTTLE	10										×			×	0	
S-20	DARK ROOM TIMER	1									×				×	0	
S-21	X-RAY FILM ILLUMINATOR	2	○	○	○		○	○							○	1	
S-22	PROTECTIVE CAP	3									×				×	0	
S-23	PROTECTIVE GLOVES	6	○	○	○		○	○							○	1	
S-24	PROTECTIVE APRON	2	○	○	○		○	○							○	1	
S-25	PREVENTION GLASSES	3									×				×	0	
S-26	PROTECTIVE FLOOR SCREEN	3									×				×	0	
S-27	FILM KEEPING SHELF	2	○	○	○		○	○							○	1	
T	**BLOOD BANK**																
T-1	BLOOD DONOR CHAIR	2							×			×			×	0	
T-2	BLOOD TAKING MACHINE	2							×			×			×	0	
T-3	ARM REST FOR BLOOD TAKING	2							×			×			×	0	
T-4	INSTRUMENT TROLLEY	2							×			×			×	0	
T-5	INSTRUMENT CABINET	2							×			×			×	0	
T-6	EXAMINATION TABLE	2							×			×			×	0	
T-7	REFRIGERATOR	1							×			×			×	0	
T-8	BLOOD BANK REFREGERATOR	2	○	○	○	○	○	○							○	2	Plan 2 sets for Operation Theatre and Emergency Unit
T-9	BLOOD GAS ANALYZER	1							×			×			×	0	
U	**LABORATORY**	: Existing equipments shall be re-used															
U-1	AUTOMATIC CHEMISTRY ANALYZER	2							×	×				×	×	0	
U-2	WATER DISTILLING APPARATUS	2							×	×				×	×	0	
U-3	REFRIGERATOR	1							×	×				×	×	0	
U-4	REFRIGERATED CENTRIFUGE	2							×	×				×	×	0	

No.	Item	Req. Q'ty	Ealuation												Overall Evaluat.	Plan Q'ty	Remark
			Principal for Priority						Principal for Exclusion								
			1	2	3	4	5	6	1	2	3	4	5	6			
U-5	WATER BATH	2							×	×				×	×	0	
U-6	BINOCULAR MICROSCOPE	5	○	○	○	○	○	○							○	2	Existing 2 sets will be used and plan new 2 sets by Japan
U-7	ANALYTICAL BALANCE	1							×	×				×	×	0	
U-8	SPECTRO PHOTOMETER	2							×	×				×	×	0	
U-9	FLAME PHOTOMETER	1							×	×				×	×	0	
U-10	CALCIUM METER	1							×	×				×	×	0	
U-11	BLOOD GAS ANALYZER	1							×	×				×	×	0	
U-12	ROTATOR	2							×	×				×	×	0	
U-13	MAGNETIC STIRRERS	5							×	×				×	×	0	
U-14	URINE ANALYZER	2							×	×				×	×	0	
U-15	BLOOD CELL COUNTER	2							×	×				×	×	0	
U-16	VISCOMETER	2							×	×				×	×	0	
U-17	BLOOD COAGULATION TEST INSTRUMENT	2							×	×				×	×	0	
U-18	BILIRUBINOMETER	1							×	×				×	×	0	
U-19	BUN ANALYZER	2							×	×				×	×	0	
V	LABORATORY ; BACTERIOLOGY																
V-1	REFRIGERATOR	1							×	×				×	×	0	
V-2	INCUBATOR	1							×	×				×	×	0	
V-3	CO2 INCUBATOR	1							×	×				×	×	0	
V-4	CLEAN BENCH	1							×	×				×	×	0	
V-5	BINOCULAR MICROSCOPE	2							×	×				×	×	0	
V-6	CENTRIFUGE (TABLE TOP)	2							×	×				×	×	0	
V-7	COUNTER BALANCE	2							×	×				×	×	0	
V-8	SHAKER	2							×	×				×	×	0	
V-9	HOMOGENIZER	1							×	×				×	×	0	
V-10	THERMO MIXER (SHAKING WATER BATH)	1							×	×				×	×	0	
X	X. LABORATORY : PATHOLOGY																
X-1	LABORATORY TABLE	1							×	×				×	×	0	
X-2	ANALYTICAL BALANCE	1							×	×				×	×	0	
X-3	AUTOMATIC SLIDE STAINER	1							×	×				×	×	0	
X-4	DEEP FREEZER	1							×	×				×	×	0	
X-5	FREEZING MICROTOME	1							×	×				×	×	0	
X-6	MICROTOME KNIFE SHARPENER	1							×	×				×	×	0	
X-7	VACUUM TISSUE PROCESSOR	1							×	×				×	×	0	
X-8	PARAFFIN OVEN	1							×	×				×	×	0	
X-9	REFRIGERATOR	1							×	×				×	×	0	
X-10	INCUBATOR	1							×	×				×	×	0	
Y	LABORATORY ; CENTREAL STERILIZE SUPLLY																
Y-1	ULTRASONIC CLEANER	1							×	×				×	×	0	
Z	LAUNDRY																
Z-1	WASHER EXTRACTOR	2	○	○	○	○	○	○							○	2	
Z-2	TUMBLER DRYER	2	○	○	○	○	○	○							○	2	
Z-3	WORK TABLE	6	○	○	○	○	○	○							○	5	
Z-4	LINEN TROLLEY	10	○	○	○		○	○							○	10	
	KITCHEN																
Z-5	GAS TILING PAN	2	○	○	○	○	○	○							○	2	
Z-6	STEAM JACKETED SOUE KETTLE	2	○	○	○		○	○							○	1	
Z-7	GAS OVEN RANGE	2	○	○	○		○	○							○	1	
Z-8	REFRIGERATOR	2									×	×			×	0	
Z-9	FREEZER	2	○	○	○		○	○							○	1	
Z-10	VEGETABLE CUTTER	2	○	○	○		○	○							○	1	
Z-11	GAS FRYER	2	○	○	○		○	○							○	1	
Z-12	FOOD CART	5	○	○	○		○	○							○	2	
Z-13	SHELF	4									×				×	0	
Z-14	SINK UNIT, DOUBLE TYPE	2	○	○	○		○	○							○	2	
Z-15	TRANSFER TROLLEY	2	○	○	○		○	○							○	2	
AA	OTHER EQUIPMENT																

No.	Item	Req. Q'ty	Ealuation												Overall Evaluat.	Plan Q'ty	Remark
			Principal for Priority						Principal for Exclusion								
			1	2	3	4	5	6	1	2	3	4	5	6			
AA-1	COPY MACHINE	2									×				×	0	
AA-2	COMPUTER WITH PRINTER	2	○	○	○		○	○							○	2	1 set for Facility maintenace and the other set for Statistician
AA-3	AUDIOVIDEO SYSTEM FOR MEDICAL USE	1	○	○	○		○	○							○	1	
AA-4	PROJECTOR WITH SCREEN	1	○	○	○		○	○							○	1	Plan for Seminer Room
AA-5	AMBULANCE	1									×				×	0	
AA-6	MINI BUS	1									×				×	0	
AA-7	MAINTENANCE EQUIPMENT FOR BUILDING	1 set	○	○	○		○	○							○	1 set	Include in Building work
AA-8	MAINTENANCE TOOL SET FOR MEDICAL EQUIPMENT	1set	○	○	○		○	○							○	1 set	Plan Minimum level of the set
AA-9	GENERAL FURNITURE	1 set	○	○	○		○	○							○	1 set	Include in Building work

2-2-3 Basic Design Drawing

Basic design drawings are attached in the following pages.

Table 2-16 List of Drawings

Number	Name of Drawing	Scale
1	Site Plan 1	1/1200
2	Site Plan 2	1/1200
3	Floor Plans of 2nd, 3rd and 4th Basement Floors	1/800
4	Floor Plan of 1st Basement Floor	1/800
5	Floor Plan of Ground Floor	1/800
6	Floor Plan of 1st Floor	1/800
7	Elevation	1/800
8	Section	1/800

The total floor area of the planned facilities is as follows.

Table 2-17 Floor Area of the Improvement Works (in m^2)

	Area to be Rebuilt	Area to be Renovated	Area to be Repaired	Total
1st Floor	724	1,051	0	1,775
Ground Floor	2,798	3,370	4,536	10,704
1st Basement Floor	2,557	2,307	2,815	7,679
2nd Basement Floor	157	0	1,396	1,553
3rd Basement Floor	315	0	1,313	1,628
4th Basement Floor	245	1,450	0	1,695
▽Sub-total	6,796	8,178	10,060	
▽Total				25,034
▽Total area to be worked		Including pilotis		25,337

Implementation Plan

Table 2-26 List of Proposed Equipment

ITEM NO.	DESCRIPTION	Q't
A	**OPERATING DEPARTMENT**	
A -1	OPERATING LIGHT	5
A -2	OPERATING TABLE	5
A -3	ANESTHESIA APPARATUS WITH VENTILATOR	4
A -4	ELECTROSURGICAL UNIT	5
A -5	PATIENT MONITOR	5
A -6	SUCTION UNIT	5
A -7	RESUSCITATOR	5
A -8	INSTRUMENT TROLLEY	5
A -9	INSTRUMENT TRAY STAND	2
A -10	MAYO'S INSTRUMENT STAND	10
A -11	DRESSING DRUM STAND	5
A -12	KICK BUCKET	5
A -13	FOOT STOOL	5
A -14	REVOLVING STOOL	5
A -15	INSTRUMENT CABINET	5
A -16	SCRUB UP UNIT	3
A -17	RECOVERY BED	6
A -18	PULSE OXIMETER	1
B	**EMERGENCY TREATMENT ROOM**	
B -1	OPERATING LIGHT, MOBILE	3
B -2	OPERATING LIGHT, CEILING	1
B -3	OPERATING TABLE	1
B -4	TREATMENT TABLE	3
B -5	GYPSUM TABLE	1
B -6	ANESTHESIA APPARATUS WITH VENTILATOR	1
B -7	RESUSCITATOR	1
B -8	MOBILE X-RAY UNIT	1
B -9	PATIENT MONITOR	1
B -10	ENDOTRACHEAL SET	1
B -11	OXYGEN TENT ADULT	4
B -12	STRETCHER	4
B -13	EMERGENCY CART	3
B -14	AUTOCLAVE (TABLE TOP)	1
B -15	INSTRUMENT CABINET	2
B -16	MEDICINE CABINET	2
B -17	DOCTOR'S DESK & CHAIR	3
B -18	OXYGEN TENT FOR CHILDREN	2
B -19	SUCTION UNIT	4
B -20	PEDIATRIC BED	4
B -21	RECOVERY BED	3
B -22	SYRINGE PUMP	4
C	**I.C.U. ROOM**	
C -1	PULSE OXIMETER	5
C -2	BEDSIDE MONITOR	10
C -3	DIFIBRILLATOR, WITH MONITOR	1
C -4	VENTILATOR, VOLUME	7
C -5	RESUSCITATOR	1

ITEM NO.	DESCRIPTION	Q't
C -15	I.C.U. BED	14
D	**CENTRAL STERILISE SUPPLY DEPARTMENT**	
D -1	HIGH PRESSURE STEAM STERILIZER	2
D -2		
D -3		
D -4	WORK TABLE (SIZE L)	2
D -5	DRESSING DRUM	2
D -6	DRESSING DRUM CABINET	2
D -7	INSTRUMENT CABINET	1
D -8	INSTRUMENT TROLLEY	2
E	**INTERNAL MEDICINE ; EXAMINING ROOM**	
E -1	EXAMINATION TABLE	4
E -2	X-RAY FILM ILLUMINATOR	1
E -3	SPHYGMOMANOMETER	4
E -4	DOCTOR'S DESK & CHAIR	4
E -5	PATIENT CHAIR	4
F	**INTERNAL MEDICINE ; TREATMENT ROOM**	
F -1	EXAMINATION TABLE	2
F -2	COUNTER FOR DRESSING & INJECTION	1
F -3	WASTE RECEPTACLE	1
F -4	MEDICINE CABINET	1
F -5	INSTRUMENT CABINET	1
F -6	lNSTRUMENT TROLLEY	2
F -7	BOILING STERILIZER	1
F -8	WEIGHING SCALE (ADULT)	1
F -9	HEIGHT SCALE (ADULT)	1
F -10	SPHYGMOMANOMETER	5
F -11	RESUSCITATION BAG	3
F -12	SUCTION UNIT, CABINET TYPE	3
G	**SURGERY ; EXAMINING ROOM**	
G -1	EXAMINATION TABLE	3
G -2	X-RAY FILM ILLUMINATOR	2
G -3	SPHYGMOMANOMETER	3
G -4	DOCTOR'S DESK & CHAIR	3
G -5	PATIENT CHAIR	3
H	**SURGERY ; TREATMENT ROOM**	
H -1	EXAMINATION TABLE	2
H -2	EXAMINATION LIGHT	2
H -3	COUNTER FOR DRESSING & INJECTION	1
H -4	WASTE RECEPTACLE	1
H -5	INSTRUMENT CABlNET	1
H -6	TREATMENT CARRIAGE	2
H -7	AUTOCLAVE (TABLE TOP)	1
I	**ORTHOPEDICS ; EXAMINING ROOM**	
I -1	EXAMINATION TABLE	3
I -2	X-RAY FILM ILLUMINATOR	3
I -3	SPHYGMOMANOMETER	3
I -4	DOCTOR'S DESK & CHAIR	3
I -5	PATIENT CHAIR	3
J	**ORTHOPEDICS ; TREATMENT ROOM**	
J -1	EXAMINATION TABLE	2
J -2	GYPSUM DRESSING TALBE	2
J -3	PATIENT CHAIR	4
J -4	COUNTER FOR DRESSING & INJECTION	1
J -5	TRACTION UNIT	3
J -6	X-RAY FILM ILLUMINATOR	1
J -7	PLASTER SAW	2
J -8	INSTRUMENT CABINET	1

ITEM NO.	DESCRIPTION	Q't
J -9	GYPSUM CABINET	1
J -10	INSTRUMENT TROLLEY	1
J -11	AUTOCLAVE (TABLE TOP)	1
NS	**NEURO SURGERY**	
NS-1	SURGICAL INSTRUMENT, CLOWARD SET	1
NS-2	SURGICAL INSTRUMENT, CASPER SET FOR SPINE SURGERY	1
NS-3	SURGICAL INSTRUMENT, MICRO-NEWRO SURGERY	1
NS-4	HEAD FRAME SET	1
NS-5	CRANIOTOMY SET	1
NS-6	TROCARE(CUSHING TROCARES)	20
NS-7	ELECTRIC DRILL	1
NS-8	TRUCTION SET, CRANIAL	2
NS-9	FIXATOR	2
NS-10		
PS	**PEDIATRIC SURGERY**	
PS-1	SURGICAL INSTRUMENT FOR PEDIATRIC	1
PS-2	OPERATING LIGHT, MOBILE STAND TYPE	1
PS-3	SUCTION UNIT, WALKER MOBILES	1
PS-3'	SUCTION UNIT, LOW PRESSURE	1
PS-4		
PS-5		
PS-6	BOUGIE SET	1
PS-7	SPHYGMOMANOMETER, PEDIATRIC	5
PS-8	RESUSCITATION BAG	1
PS-9	STEAM STERILIZER	1
PS-10	INSTRUMENT DRESSING TABLE	2
PS-11	EXAMINATION TABLE	3
PS-12	SCREEN	6
PS-13	WEIGHING SCALE	2
PS-14	STRETCHER TROLLY	2
PS-15	WHEELCHAIR, CHAILD	4
PS-16	MEDICINE CABINET	1
PS-17	INSTRUMENT CABINET	1
PS-18	DRUG REFRIGERATOR	1
PS-19	PEDIATRIC INCUBATOR	2
PS-20		
PS-21	RESUSCITATOR	1
PS-22	FOREARM CRUTCH	3
PS-23	CRUTCH,	3
PS-24	DERMATOME, MANUAL	1
PS-25	INFANT WARMER	1
PS-26	X-RAY FILM ILLMINATOR	2
PS-27	OPERATING INSTRUMENT SET, FOR HAND SURGERY	1
PS-28	SYRING INFUSION PUMP	2
PS-29	WALKER	3
PS-30	I.V. HANGER STAND	5
PS-31	EXAMINATION TABLE	1
K	**EAR, NOSE & THROAT**	
K -1	ENT TREATMENT UNIT	2
K -2	ENT TREATMENT CHAIR	2
K -3	MICRO HAND DRILL	1
K -4	OTOSCOPE	10
K -5	LARYNGEAL MIRROR	10
K -6	INSTRUMENT CABINET	2
K -7	BOILING STERILIZER	1
K -8	NEBULIZER APPARATUS	2
K -9	DOCTOR'S DESK & CHAiR	4
K -10	INFANT AUDIOMETER	1

ITEM NO.	DESCRIPTION	Q't
K -11	OPERATING MICROSCOPE, BINOCULAR	1
K -12	SURGICAL INSTRUMENT FOR EAR MICRO SURGERY	1
K -13	HEAD MIRROR	4
K -14	HEAD MIRROR, WITH LIGHT	4
K -15	LARYNGO FIBBERSCOPE WITH LIGHT SOURSE, FOR CHILD	1
K -16	LARYNGO RIGID SCOPE WITH LIGHT SOURSE, FOR CHILD	1
L	**OPHTHALMOLOGY**	
L -1	OPHTHALMIC REFRACTING UNIT	4
L -2	LENS METER	1
L -3	SLIT LAMP MICROSCOPE	2
L -4	OPHTHALMOSCOPE, DIRECT	1
L -5	EXOPHTHALMOMETER	1
L -6	SYNOPTOPHORE	1
L -7	TRIAL LENS SET	4
L -8	HAND MAGNET	1
L -9	PROJECTION PERIMETER	1
L -10	KERATOMETER	1
L -11	DOCTOR'S DESK & CHAIR	5
L -12	GONIOSCOPE	1
L -13	CIRURGICAL MICROSCOPE	1
L -14	CATALACT SURGERY INSTRUMENT SET	1
L -15	EYE BASIC & EMERGENCY SURGICAL SET	1
L -16	GLUCOMA SURGERY SET	1
L -17	SURGERY SET FOR RETINA	1
L -18	SURGERY SET FOR ESTRABISMO	1
L -19	TONOMETER, APPALANATION	1
L -20	AUTO REFRACTOMETER	2
L -21	CROSS CYRINDER	1
L -22	NEEDLE, RETROBULBAR	10
M	**DENTAL**	
M -1	DENTAL CHAIR UNIT	4
M -2	DENTAL X-RAY (INTERNAL)	1
M -3	ULTRASONIC SCALER	2
M -4	ASSORTED DENTAL INSTRUMENT SET	5
M -5	LIGHT CURE APPARATUS	1
M -6	AMALGAMATOR	2
M -7	DENTAL MIXER	2
M -8	AUTOCLAVE (TABLE TOP)	2
M -9	INSTRUMENT CABINET	5
M -10	DOCTOR'S DESK & CHAIR	5
M -11	MICROMOTOR FOR LABORATORY	2
M -12	BAR SET FOR LABORATORY	2
M -13	VIBRATOR	2
M -14	MODEL TRIMMER	2
M -15	ARTICULATOR	2
M -16	FLASK	2
M -17	LABORATORY ENGINE	2
M -18	SPATULA SET	2set
M -19	PORCELAIN INSTRUMENTS	2set
M -20	BUNSEN BURNER	2
M -21	FLASK PRESS	2
M -22	FLASK OPENER	2
M -23	PLASTER MODEL SAW	2
M -24	IMPRESSION TRAY	6
M -25	AIR COMPRESSOR	2
M -26	INSTRUMENTS FOR PROSTHETIC	2set
M -27	INSTRUMENTS FOR PORCELAIN	2set
P	**DERMATOLOGY ; EXAMINATION ROOM**	

ITEM NO.	DESCRIPTION	Q't
P -1	EXAMINATION TABLE	2
P -2	SPHYGMOMANOMETER	2
P -3	DOCTOR'S DESK & CHAIR	2
P -4	PATIENT CHAIR	2
Q	**DERMATOLOGY ; TREATMENT ROOM**	
Q -1	EXAMINATION TABLE	1
Q -2	INFRARED RAY LAMP	1
Q -3	ULTRAVIOLET RAY LAMP	1
Q -4	INSTRUMENT TRAY STAND	1
Q -5	MEDICINE CABINET	1
Q -6	INSTRUMENT CABINET	1
Q -7	OINTMENT TABLE	1
R	**ENDOSCOPE ROOM**	
R -1	ENDOSCOPIC TABLE	1
R -2	ENDOSCOPIC LIGHT SOURCE	2
R -3	INSTRUMENT TROLLEY	1
R -4	ENDOSCOPIC CABINET	1
R -5	GASTRO FIBERSCOPE	1
R -6	PROCTO SCOPE	1
R -7	ENDOSCOPIC WASHER	1
S	**RADIOLOGY DEPARTMENT**	
S -1	DIAGNOSTIC X-RAY APPARATUS	2
S -2	DIAGNOSTIC X-RAY TV APPARATUS	1
S -3	ULTRASOUND MACHINE	1
S -4	AUTOMATIC FILM PROCESSOR	1
S -5	X-RAY PRESERVING CABINET	1
S -6	FILM LOADING DESK	1
S -7	CHEST MEASURE CALIPER	1
S -8	ANGULAR SCALE	1
S -9	RADIOGRAPHIC STAND	2
S -10	X-RAY FILM CASSETTE	1
S -11	X-RAY FILM GRID	1
S -12	DOSIMETER	2
S -13	X-RAY FILM ILLUMINATOR	1
S -14	PROTECTIVE GLOVES	1
S -15	PROTECTIVE APRON	1
S -16	FILM KEEPING SHELF	1
T	**BLOOD BANK**	
T -1	BLOOD BANK REFREGERATOR	2
U	**LABORATORY**	
U -1	BINOCULAR MICROSCOPE	2
Z	**LAUNDRY**	
Z	**KITCHEN**	
AA	**OTHER EQUIPMENT**	
AA -1	COMPUTER WITH PRINTER	2
AA -2	AUDIOVIDEO SYSTEM FOR MEDICAL USE	1
AA -3	PROJECTOR WITH SCREEN	1
AA -4		
AA -5		
AA -6	MAINTENANCE TOOL SET FOR MEDICAL EQUIPMENT	1set
AA -7		
AA -8	SUCTION UNIT & RESUSCITATOR	5

2-2-4 Implementation Plan

2-2-4-1 Implementation Policy

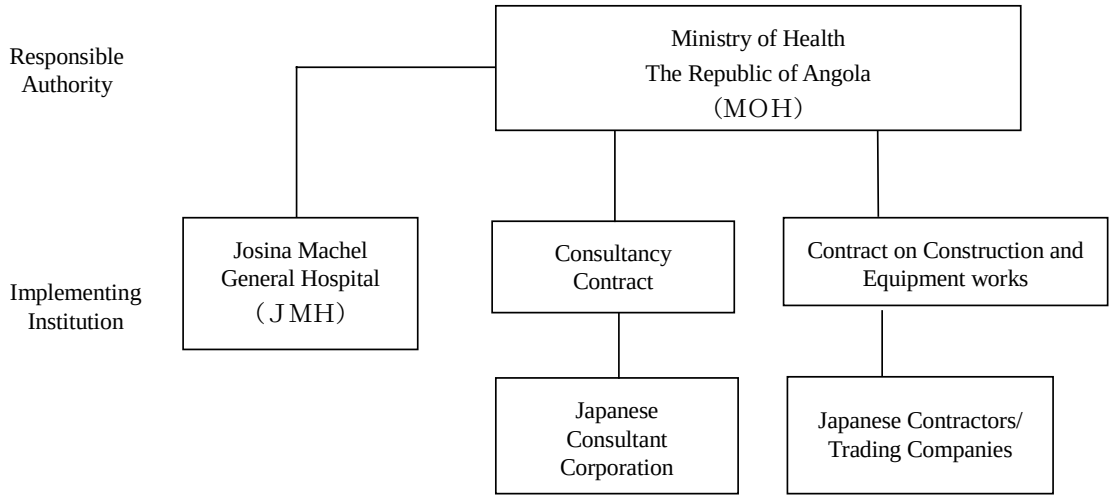
(1) Implementation/Procurement Policies

This Project of cooperation will be implemented in accordance with the system of Japan's Grant Aid, after its verification by the cabinet of Japanese Government and conclusion of E/N for the Project between Japan and Angola.

The Angolan authority responsible for this Project will be MOH and implementing institution will be JMH. The contracting party for The Angola side of this project will be MOH.

The relationships between the responsible authority, implementing institution and contractors are diagramed in the figure below.

Fig. 2-27 Organization for Implementation of the Project



(2) Consultant

After conclusion of E/N, MOH will conclude the consultancy contract with a Japanese consultant company regarding implementation designs and supervision of this Project and obtain verification of the contract from Japanese Government. In order to implement this Project smoothly, it is important to conclude the consultancy

contract as quickly as possible after the conclusion of E/N. After conclusion of the contract the consultant will prepare detailed design documents (tender documents) based on the report of the basic design survey with coordination with MOH and obtain their approval from MOH following the same procedure of approval as mentioned above. Based on these detailed design documents, the consultant will implement tender and supervision.

(3) Contractors

The works included in this Project consist of construction works of building and equipment works of procurement and installation equipment. The contractors of this Project will be selected from qualified Japanese corporations through open competitive tender with qualifying requirement.

MOH will conclude the contract of construction with the contractors thus selected and obtain its verification from Japanese government.

(4) Employment of Local Consultants

In addition to the Japanese supervisors dispatched by the consultant and stationed on site, local construction engineers with experience will be employed and make use of for the supervision of the Project. Though Portuguese is the official language of Angola, the engineers who speak English will be recruited.

As this Project of cooperation is to take place in a medical institution, works on mechanical and electrical facilities will become very important part of the Project. Therefore, local engineers with experience will be employed.

(5) Employment of Contractors and Dispatch of Engineers

The largest contractor in Angola has 3,000 employees, including 85 engineers, and undertakes construction worth ca.80 billion yens a year. The medium-sized

contractors have 400 to 1,000 employees, including 20 engineers, and undertake construction worth six to ten billion yens a year. Most of these contractors are local subsidiaries of small and medium-sized Portuguese contractors. Number of construction has been small for more than ten years. The local contractors have experience only in construction of small hospitals. Even the largest company has only a few engineers stationed in Angola. The contractors usually recruit and dispatch engineers required from Portugal after having been awarded contracts.

When implementing this Project, the Japanese contractor(s) will make use of these local contractors. Some local contractors certainly seem to have learned skills of supervision while they took part in Japan's ODA-related projects as subcontractors in the past. When making use of the local contractors in this Project, technical advices from and supervision by Japanese supervisors experienced in the relevant fields are indispensable, as the Project includes technically difficult works, such as construction of operation theatres which requires highly sophisticated quality control and repair on 120-year-old masonry structure which requires highly sophisticated techniques.

As this Project will involve reconstruction and renovation of the currently operating hospital, highly sophisticated construction techniques of the contractors will be required. Especially, for specialized works, e.g. those for medical gas supply, dispatch of specialists from Japan or other countries has to be considered.

2-2-4-2 Implementation Conditions

(1) Temporary Work Plan

The temporary work plan of this Project will be based on the following concepts.

1) Under the condition that the existing hospital remains in operation, the plan will enable the construction to be implemented without deterioration of the functions of the hospital.

2) In this Project, while the first phase consists of works mostly on infrastructure, e.g. electrical, water supply and waste water facilities, the second phase consists of facility construction, such as demolition of east sides of B and C Blocks, part of reconstruction, including Central Clinics, Emergency and Radiology Departments and the service corridor, and renovation and repair of the existing blocks, and medical equipment works required in these facilities. An integrated plan will be drawn up since each work takes place in wide areas of the existing buildings.

3) Since almost all the areas of the existing buildings are being utilized for the operation of the hospital, the Project will start with construction of facilities to relocate functions located in the existing buildings, in order to create space to implement each of the works, and the construction schedule will consist of chain relation-like procedures.

4) Route of movement for patients, tenders and visitors will be secured on the front of the hospital, on the side of H Block located on the eastern side where Outpatient and Emergency Departments are currently located, and on the southern side of G Block. The other areas will be enclosed with temporary fences as construction area.

5) To ensure the maximal activities of the hospital, the plan will include measures to minimize vibration and dust, such as deliberate partitioning with temporary fences and dustproof sheets/fences in the areas adjacent to the existing buildings.

6) Five entry/exit points (gates) will be installed on the temporary fences. Construction facilities and equipment, such as Site Office, Subcontractor’s Offices, work spaces and storage spaces of materials, suitable to the scale of the

Project will be placed.

(2) Procurement of Construction Materials

Local procurement is limited to cement, sand, gravel, bricks, and concrete blocks. Other materials will be imported from South Africa or Portugal.

It takes approximately one week for shipments to reach the port of Luanda from either Durban, South Africa, or from Lisbon, Portugal. Clearance and transportation to the site is expected to take four to five days.

(3) Construction Methods

A concrete rigid-frame structure will be adopted for new buildings and extensions. Roofs will be of tiles supported by trusses, and the walls will be of brick masonry structure.

Renovation of the existing buildings will include replacement of broken roof tiles, painting of the exterior and interior, installation of new partitions and installation of plumbing (toilets and shower rooms) in the wards.

(4) Special Construction Methods (Renovation of a historical monument)

The parts of A and H Blocks facing onto the rotary in front of the hospital, and the parts of A to E Blocks facing onto the road on the west side of the hospital, are designated a historical monument. Therefore, for the repair of these parts, a detailed design and implementation plan will be worked out in close consultation with the relevant section of the Ministries of Education of both countries, via the MOH. The points to be worked out include the method of repair and materials to be used.

2-2-4-3 Scope of Work

Table 2-28 : Works to be undertaken by each country

Scope of work to be borne by Japan side	Scope of work to be borne by Angola side
1. Facility construction (including built-in furniture) 2. Electrical works 3. Air-conditioning, plumbing, water supply and waste water systems, including lead-in works for water supply and waste water systems 4. Medical gas supply system 5. Landscaping Paving of roads within the grounds, parking areas as par indicated 6. Medical equipment	1. Necessary paperwork related to the historical monument, acquisition of other construction-related permissions/approvals. 2. Preparation of construction site, relocation of existing pipes and cables 3. Landscaping Gardening, planting, roads off the grounds 4. Lead-in and connection works Electricity and Telephone 5. Fixtures and equipment Window curtains, blinds, and general furniture 6. Others Relocation of existing equipment

In the implementation of this Project, the most important issue is the prompt acquisition of permissions/approvals by the Angola side. Another important issue is management of the schedule of the Project. Under this Project, departments accommodated in the existing buildings will be relocated and the facilities thus vacated will be demolished in order to create space for new facilities. Then other departments will be relocated to the new facilities and the space thus vacated will be renovated. Since the schedule of the Project is tight as mentioned above, delay in any part of the Project will adversely affect the progress of the entire Project. To avoid any delay, close coordination with the Angola side is essential. However, in order for the Japan side to commence building on the east side of B and C Blocks, it will be necessary to secure space for the equipment to be relocated and to demolish the Laundry/Kitchen building. In the cases of ordinary Grant Aids, this kind of work is the responsibility of the recipient. However, in this project, the work is of too large a scale for the recipient to bear the financial burden. In addition, the progress of this work is critical to the smooth implementation of the entire project. For these reasons, this work will be included in the work to be undertaken by the Japan side.

2-2-4-4 Construction Supervision

(1) Construction Supervision Plan

A Japanese consultant corporation will conclude a consultancy contract with the MOH of Angola, prepare detailed designs for this Project (preparation of tender documents, etc.) and implement tender and construction supervision of the Project.

The purpose of the construction supervision will be to guarantee proper implementation of the content of the construction contract, such as whether construction is being carried out in accordance with the design documents.

Especially, in this Project, it is necessary to carry out construction of different natures, i.e. reconstruction and renovation/repair of existing buildings, without interruption to the operating of the hospital. It is also necessary to implement the construction with meticulous confirmation of conformity of the works being carried out to the design documents, since repair of masonry structure of historical architecture is included in the Project. For these reasons, during the period of construction, in addition to the ability to guarantee the quality of works and to manage the schedule, the ability to coordinate with MOH, JMH and other parties involved in the Project will be particularly required.

(2) Assistance regarding tender and conclusion of contracts

To decide contractors of the construction and equipment works, the consultant will prepare tender documents and other documents required for the tender and carry out tender services, including invitation of tender, acceptance of application to participate in the tender, pre-qualification screening, briefing to tenderers, distribution of the tender documents, acceptance of applications and evaluation of the result of tender. The consultant will also give suggestions and assistance regarding conclusion of construction contract between the successful tenderers and MOH.

(3) Instruction and suggestions to, and coordination with, contractors

The consultant will examine the documents, such as construction schedule, construction plan, procurement plan of construction materials/equipment, procurement/installation plan of medical equipment, give instruction and suggestions to, and carry out coordination with the contractors.

(4) Inspection and approval of working drawings, shop drawings, etc.

The consultant will examine working drawings, shop drawings and other documents submitted by the contractors and give approval to them after giving necessary instruction.

(5) Confirmation and approval of construction materials/equipment and medical equipment

The consultant will confirm consistency between construction materials/equipment and medical equipment, which the contractors intend to procure and the content of the contract documents and give approval to their adoption.

(6) Site inspection

Depending on requirement, the consultant will witness inspection and examination of construction parts and medical equipment carried out at the manufacturers' factories, and confirm that they satisfy the quality and performance required in this Project.

(7) Reports on progress of construction work

The consultant will grasp the conditions of work schedule and construction site and report the progress of construction to the relevant authorities of both countries.

(8) Final inspection and trial runs

The consultant will conduct final inspection and trial runs of the structures, facilities attached to the structures and medical equipment, confirm that the performance described in the contract documents is guaranteed, and submit inspection report to the Angola side.

2-2-4-5 Procurement Plan

Construction Materials

Because this is a project to improve the facilities of a hospital, sturdy construction materials matching the function of the facilities will be selected and procured, with consideration given to ease of cleaning and maintenance. Procurement policy is as follows. Materials satisfying Portuguese or BS standards, which are the standards usually used in Angola, will be selected. However, for materials for which there are no standards, the selection will be made in accordance with JIS.

(1) Local Procurement

For the sake of ease of repair and maintenance after completion of the Project, materials available locally will be used as much as possible, after confirmation that quality and quantity of the available materials satisfy the requirements of this Project. Those imported materials that are readily available on the Angolan market (items always available, with no need for import procedures) will be considered to be local materials.

(2) Procurement by Importation

Materials that are not easily obtained locally, the quality of which does not satisfy the requirements of the Project, or the local availability of which is not stable, will be

imported from Japan or a third country. In such case, contractors will need to coordinate with the MOH, and to make arrangements to ensure that the formalities of importation and clearance, including tax-exemption, go smoothly.

Materials will be procured from Japan or a third country when the cost of procurement from Japan or a third country, including shipping and handling costs, is considerably less than the cost of local procurement.

(3) Transportation Plan

Materials procured from Japan will be shipped to the port of Luanda. Lorries will be used to transport the materials from the port to the construction site. Those materials susceptible to damage from shocks, humidity or high temperatures will be packed accordingly, to prevent such damage during transportation.

(4) Procurement Plan

In the table shown below, major construction materials to be used in the Project are classified into three groups: Local Procurement, Procurement from a third country (T.C.) and Procurement from Japan.

With a few exceptions, most of the important materials related to electrical and mechanical facilities will be procured either from a third country or from Japan.

Table 2-29 Procurement Plan for Main Construction Materials

(Construction work)

Type of work	Material	Procurement			Comments
		Local	T.C.	Japan	
Reinforced Concrete	Portland Cement	○			Local Procurement
	Fine Aggregate	○			Local Procurement
	Rough Aggregate	○			Local Procurement
	Deformed Bars		○	○	Items satisfying BS or JIS standard
	Framework		○		Imported
Structural steel work	Steel frame		○	○	Items satisfying BS or JIS standard
Masonry work	Bricks	○			Local Procurement
	Concrete Blocks	○			Local Procurement
Water-proofing	Bituminous Membrane Water-proofing		○	○	On site work using imported materials
	Film-coat Water-proofing		○	○	On site work using imported materials
Plastering	Cement Mortar		○	○	Cement to be imported
Tiling	Ceramic Tiles		○		
	Porcelain Tiles		○		
Stone	Stone		○		
	Terrazzo		○		
Wood	Timber		○		
	Laminated Timber		○		
	Plywood		○		
Metal	Light Ceiling Base		○		
	Expansion Joints		○		
	Decorative Fittings, Handrails		○	○	
	Roof Drain		○	○	
Metal	Curtain Rails for Wards		○		
Wooden fixtures	Doors, Doorframes		○		
Metal fixtures	Aluminium window sashes		○		
	Steel Fixtures		○		
	X-ray Shielding doors		○		
	Finishing Hardware		○		
Glass	Plain Glass		○		
	Glass Block		○		

Type of work	Material	Procurement			Comments
		Local	T.C.	Japan	
Painting	Interior Paint		○		
	Exterior Paint		○		
Interior	Plaster Boards		○		
	Asbestos Sound-absorbing Boards		○		
	Rock wool		○		
	Flexible Board		○		
Other work	Sinks, Medical Sinks		○		
	Wall cupboards		○		
	Signs		○	○	
Landscaping	Paving Material (asphalt)	○			
	Interlocking Blocks	○			
	Curb Stones	○			
	Flag Pole		○		
	Grating		○		

Table 2-30 Procurement Plan for Main Construction Materials

(Mechanical and electrical works)

Type of work	Material	Procurement			Comments
		Local	T.C.	Japan	
Mechanical	Air Conditioners		○	○	
	Ventilation equipment		○	○	Low-noise ceiling fans from Japan
	Air Inlets and Outlets	○	○	○	Japanese products for special use, *e.g.* for operating theatre.
	Filtres		○	○	Not available locally
	Ducts		○	○	Not available locally
	Pumps		○	○	Not available locally
	Septic Tanks	○		○	Japanese products for infectious and laboratory waste water
	Incinerator			○	
	Sanitary Equipment		○	○	Japanese products for special items
	Steel Pipes		○	○	Japanese pipes for medical gases
	PVC Pipes		○		
	Heat Insulation Materials		○		
	Fire-fighting Equipment		○		
	Medical Gases			○	
Electrical works	Transformers		○		
	Generators		○		
	Switch boards		○		
	Conduits		○		
	Boxes		○		
	Wires		○		
	Cable		○		
	Lights		○		
	Wiring apparatus		○		
	Telephone equipment		○		
	Paging equipment			○	
	Automatic Fire Alarms		○		
	TV Equipment			○	
	Nurse-call Equipment			○	
	Lightning Arrestor		○		
Lift	Lifts		○		

(5) Equipment Plan

1) Basic Policy for Procurement of Equipment

Under the present Project, medical equipment most beneficial to Angola will be selected, taking into consideration the local technical level and maintenance capacity. As a general rule only companies with agents in Angola or neighbouring countries who are capable of prompt maintenance will be considered as possible suppliers of equipment.

2) Procurement of Local Products

The present situation is that Angola relies on imports for its medical equipment. This means that at present there is very little possibility of procurement locally.

3) Procurement of Goods from Third Countries

In the procurement of goods from third countries, such factors will be taken into consideration as ease of procurement in Angola, arrangements with regard to repair and maintenance (including supply of spare parts and supplies), degree of familiarity and price. In view of the transportation costs involved, examination tables, beds, doctor's desks and chairs and chairs for patients, may be procured more economically from third countries than from Japan, and so as long as quality is taken into consideration this equipment may be procured from third countries.

4) Miscellaneous

Preference will be given to X-ray systems and high-pressure steam sterilisers that are provided with manuals in Portuguese or Spanish.

Table 2-31　Possible Procurement from Japan or from a third country

Equipment	Reason
Anaesthesia Apparatus, with respirator	・Spare parts and supplies may be more easily procured from a third country than from Japan ・Portuguese operating manuals are readily available for equipment from third countries.
Mobile X-ray System	
Table-top Autoclave	
Syringe Pump	
Pulse Oximeter	
Defibrillator, with monitor	
Respirator	
Infusion Pumps	
High-pressure Steam Steriliser	
Plaster Saws	
Head Frame set	
Craniotomy set	
Trocare	
Drills	
Fixator	
Syringe pumps	
Laryngo Rigid Scope with Light Source for Child	
Binocular Microscope for ENT Operations	
Microscope for Ophthalmic Surgery	
Diagnostic X-ray Apparatus	
Diagnostic X-ray TV System	
Ultrasonograph	
Automatic X-ray Film Developer	
Personal Computer, with Printer	
Projector, with Screen	
Recovery Bed	・Japanese products are more expensive than those from third countries because of shipping costs
Examination Table	
Doctors' Desk and Chair	
Paediatric Bed	
Chair for Patient	
Instrument Cabinet	
Medicine Cabinet	
Gypsum Cabinet	

2-2-4-6 Quality Control Plan

(1) Materials

- Cement
  Ordinary Portland cement will be used.
- Aggregate

1) Fine Aggregate

Crushed stones or sand will be used as fine aggregate. When using sand from the sea, the chloride ion content must be below the JASS 5 standard.

2) Coarse Aggregate

River gravel or crushed stones will be used as coarse aggregate. The maximum size of coarse aggregate should be 20mm.

- Admixture
  Standard AE water-reducing agent equivalent or equivalent will be used.
- Water
  Mains water or equivalent will be used. Recycled water as a general rule should not be used.

(2) Mix Proportion Plan

To achieve the required quality, the ratio of components will be determined by trial mixings. The required quality is for the strength of the structural concrete after 28 days to be equal to or above design standard strength, with reference to the following.

1) Water Content

AE water-reducing agent will be used appropriately to ensure a good workability with water content of 185kg/m^3 or less.

2) Cement Content

The cement content should be a minimum of 260kg/m^3 with the water/cement ratio as small as possible, with a maximum water/cement ratio of 65%.

3) Air Content

5.0% is taken as the standard.

4) Chloride Content

The chloride content, measured as the chloride ion content, should be 0.3kg/m^3 or less, taking into account the volume of chemical admixture.

Establishment of Mix Proportion Strength

In principle, the mix proportion strength will be set in line with JASS 5. The mix proportion strength is expressed as the compressive strength of normally cured samples after 28 days. The larger of the values calculated from the equations given below is regarded as the mix proportion strength of the sample. JASS 5 contains an item for temperature adjustment, but as there does not seem to be a large difference in temperature throughout the year in Angola, it has been decided that temperature adjustment may be omitted.

$F = Fc + 1.73\ \sigma$
$F = 0.85\ Fc + 3\ \sigma$

where

F: Mix proportion strength of concrete (N/mm^2)
Fc: Standard design strength of concrete (N/mm^2)
σ: Standard deviation of strength of concrete used (N/mm^2)

(3) Receipt of Concrete at the Site

When using ready-mixed concrete from a factory, it must be confirmed that the following points are conformed to.

1) The factory must have permanently-stationed engineers who have a thorough knowledge of concrete techniques.

2) The factory must be located close enough for it to take less than 120 minutes from the start of mixing till completion of casting when the temperature is below 25℃, or less than 90 minutes when the temperature is above 25℃.

3) The product must be of the quality required in this Project

(4) Quality Control for Concrete

1) System of Quality Control for concrete work

Quality control for concrete will conform to the procedures shown in the table below.

Table 2-32 Quality Control for Concrete Works

Process	Test Item	Control Items	Record Method
Supervision of concrete casting	Quality of fresh concrete	Slump test, Flow test, Air content, Concrete temperature, Chloride content	Concrete Casting Control Table
Supervision of sample curing	Ambient temperature	Average temperature	Temperature Control Table
	Temperature of curing water	Average water temperature	Temperature Control Table
Control of strength	Confirmation of strength at removal of formwork	Equal to or greater than required strength obtained from calculation	Strength Control Table
	Judgement of strength of structural concrete	Equal to or greater than required strength obtained from calculation	Strength Control Table

2) Test for Quality Control of Fresh Concrete

Pre-casting inspection and confirmation will be carried out for the items given in the table below.

Table 2-33 Quality Control Tests for Fresh Concrete

Test Item	Test Method	Timing / Frequency	Criterion of Judgement
Slump Value	JIS A 1101 Equivalent	Each batch	Tolerance of ±2.5cm
Slump Flow Value	JASS 5 T-503 Equivalent		Tolerance of ±7.5cm
Air Content	JIS A 1128 Equivalent		Tolerance of ±1.5 %
Temperature of concrete	Measurement by Thermometer		35℃ or below
Segregation	Visual Inspection		No segregation visible
Chloride Content	JASS 5 T-502 Equivalent	First Batch each Day	Chloride ion content of 0.3kg/m^3 or less

3) Control of Concrete Strength

Sampling methods and methods of curing used to test the strength of the concrete are summarised in the table below.

Table 2-34 Control of Concrete Strength

Purpose of Test		Confirmation of Strength of Structural Concrete	Confirmation of Strength at Removal of Formwork
Sampling	Sampling Method	JASS 5 T6-3 Equivalent, Samples Taken on Site	JASS 5 T6-3 Equivalent, Samples Taken on Site
	Frequency of Test	Every casting day and every $100m^3$ cast	Every casting day Normally twice a day, three samples each time
	Number of samples	Three each time	Three each time
	Form of sample	15cm Cube	15cm Cube
Curing of Samples	Method of curing	In curing water on site	In sealed condition on site
	Place of curing	On Site	On Site
Strength Test	Place of Test	At an official institution or on Site	At an official institution or on Site
	Witness to test	Design Supervisor	Design Supervisor

(5) Judgement and Confirmation of Concrete Strength

1) Judgement Standard for strength of structural concrete

$X_{28} \geqq \overline{F_C} + 3\ (N/mm^2)$

2) Judgement Standard for strength at removal of formwork.

$X \geqq \overline{F_N}\ (N/mm^2)$

2-2-4-7 Implementation Schedule

The implementation schedule of this Project after conclusion of the E/N is as shown in the attached table.

The schedule consists of detailed design work and tender by the consultant, construction by contractors and supervision by the consultant.

(1) Implementation Planning Work

The MOH and the Japanese consultant corporation will conclude a consultancy contract regarding implementation planning work (the preparation of tender documents) and supervision, and will obtain verification of the contract from the Japanese Government. The consultant will then prepare tender documents based on this Basic Design Study report in consultation with the MOH, and will obtain the approval of the MOH.

It is expected that the time taken to complete the Implementation Plan (preparation of tender documents) will be 4 months for Phase I and 2 months for Phase II.

(2) Tender

It is expected that the time taken for the tender will be two months for Phase I and 2 months for Phase II.

(3) Construction Work by Contractors and Supervision by Consultant

After conclusion of the construction contracts and verification of the contracts by the Japanese government, the contractors will commence construction work and the consultant will commence supervision.

The period of construction work is expected be 14 months for Phase I and 19 months for Phase II.

Considering the content and scale of the plan, this Project will be implemented in two phases, a single fiscal year and a Government Bond Project. The content of each phase is as shown in the table below.

Table 2-35 Content of Construction Work for Phase I and Phase II

	Phase 1: 12month (Single Fiscal Year)	Area (㎡)	Remarks
Building			
	B-West	700	
	C-West	542	
	D-East	963	
	E-East/West	1,363	
	Machine Building	403	
	Boilers/Water Supply	142	
	G-Lifts	—	
	G-Lifts/Stairways(Out side)	470	
	Service Corridor(South)	240	
	Oil Tank	—	
	Medical Waste Water Supply	—	
	Waste Water Supply	—	
	Electric Power	—	
Total		4,823	

	Phase 2: 19month (Government Bond)	Area (㎡)	Remarks
Building			
	A-East/West	2,291	
	BC-East	3,747	
	F-East/West	686	
	G	7,250	
	H	4,229	
	Main Corridor	937	
	Service Corridor(North)	330	
	Slope	501	
	G-Emargency Stairways	165	
	Incinerator	75	
	Generator System	—	
	Medical Gas Supply	—	
Total		20,211	

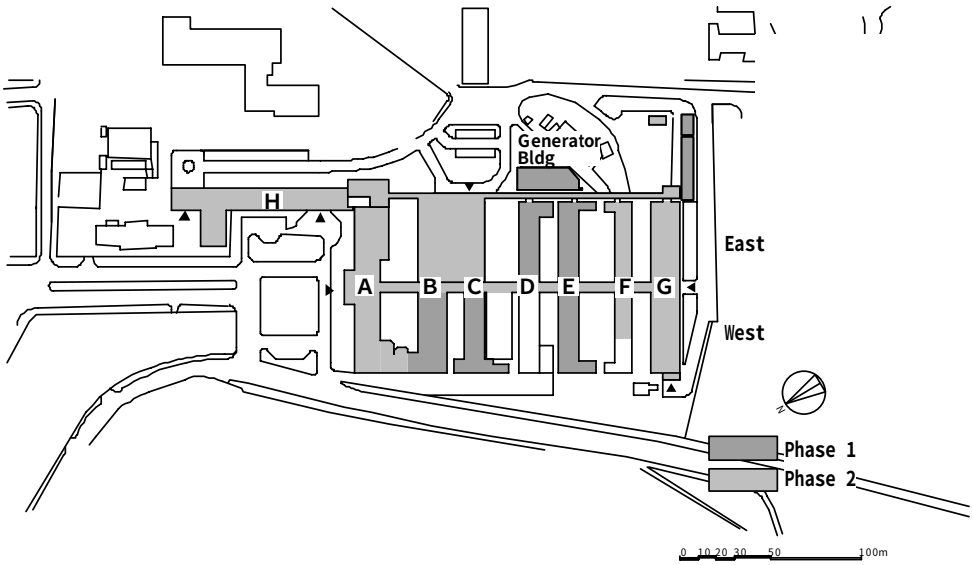


Table 2-36 Implementation Schedule

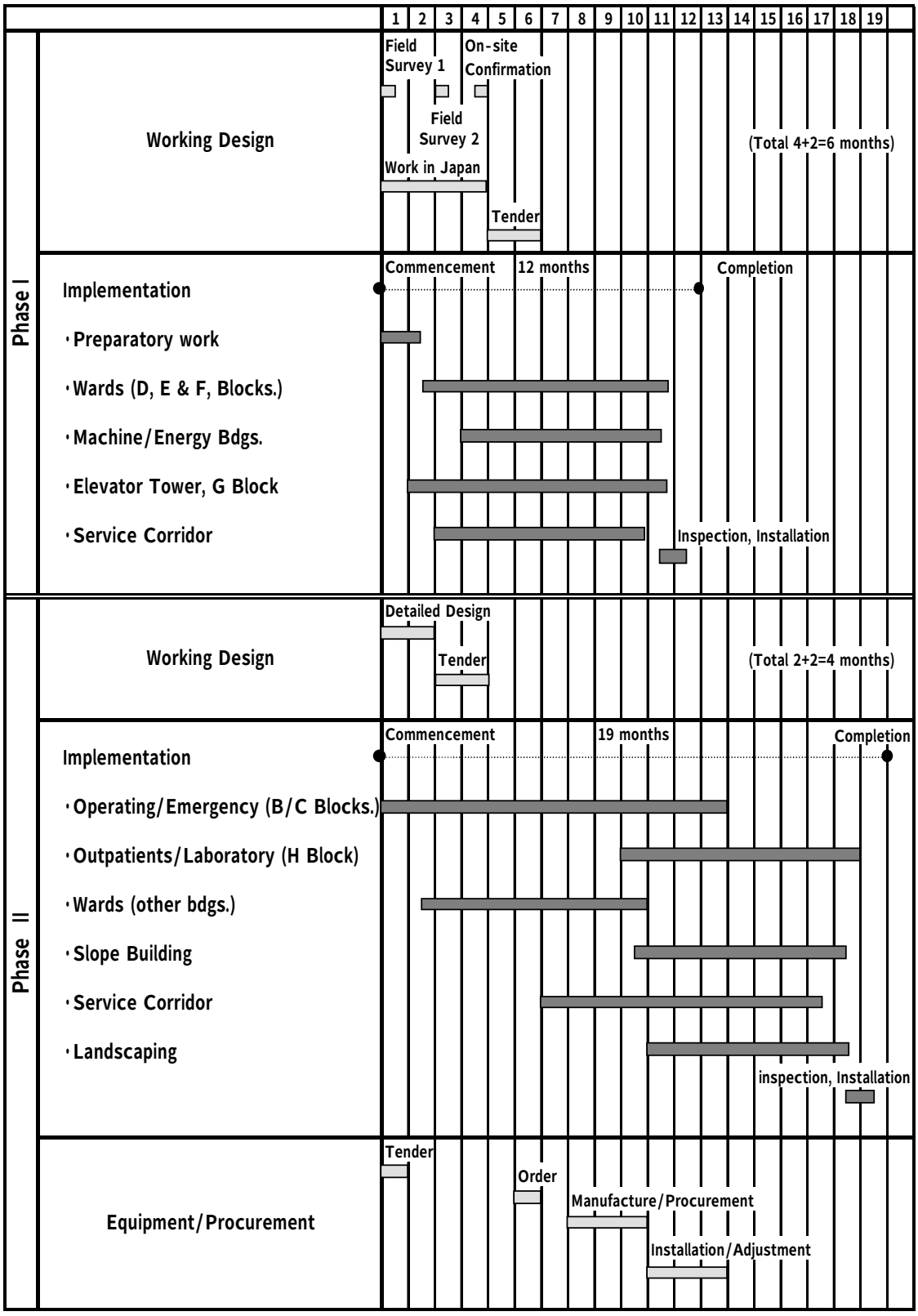


Fig. 2-37　Construction in each phase

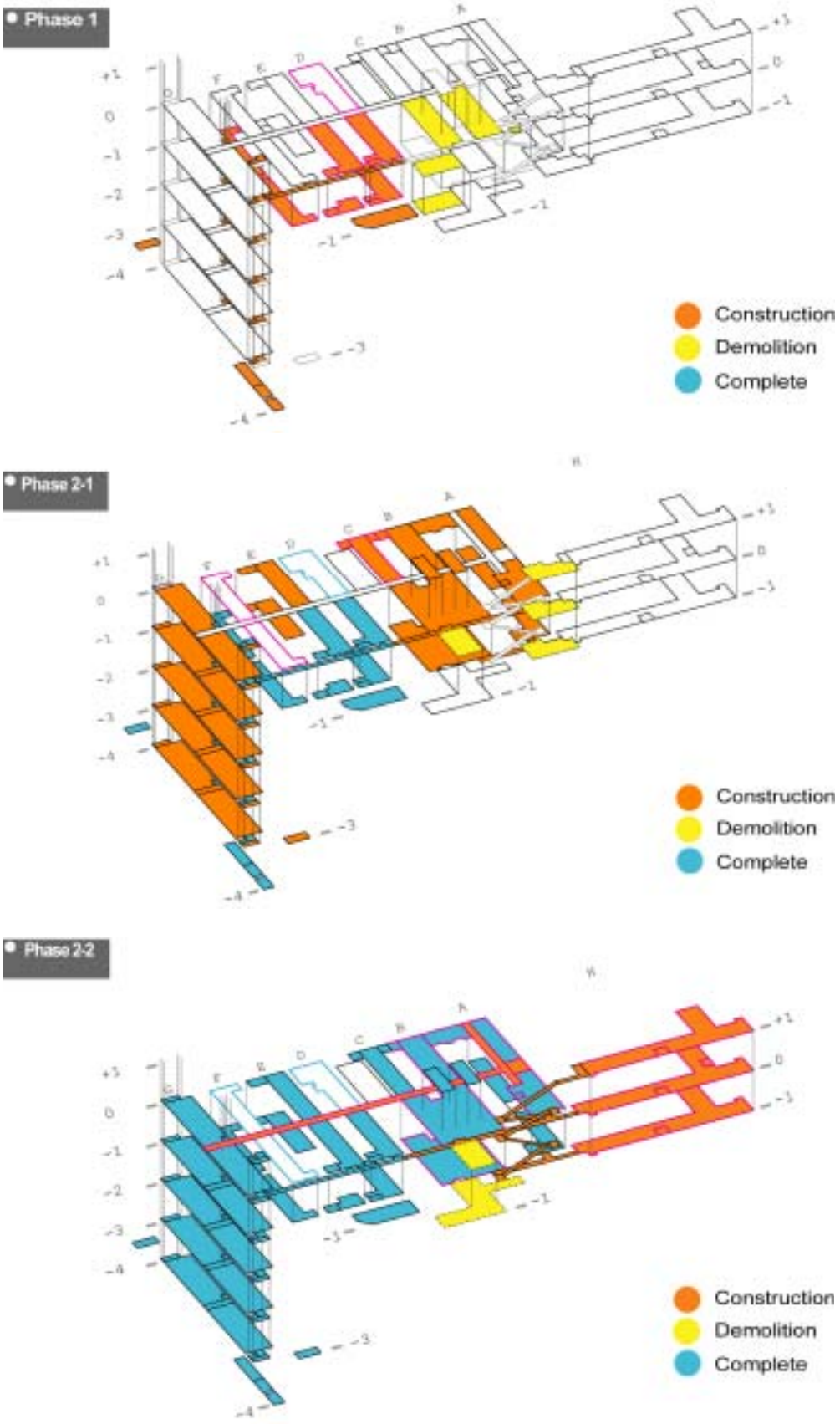
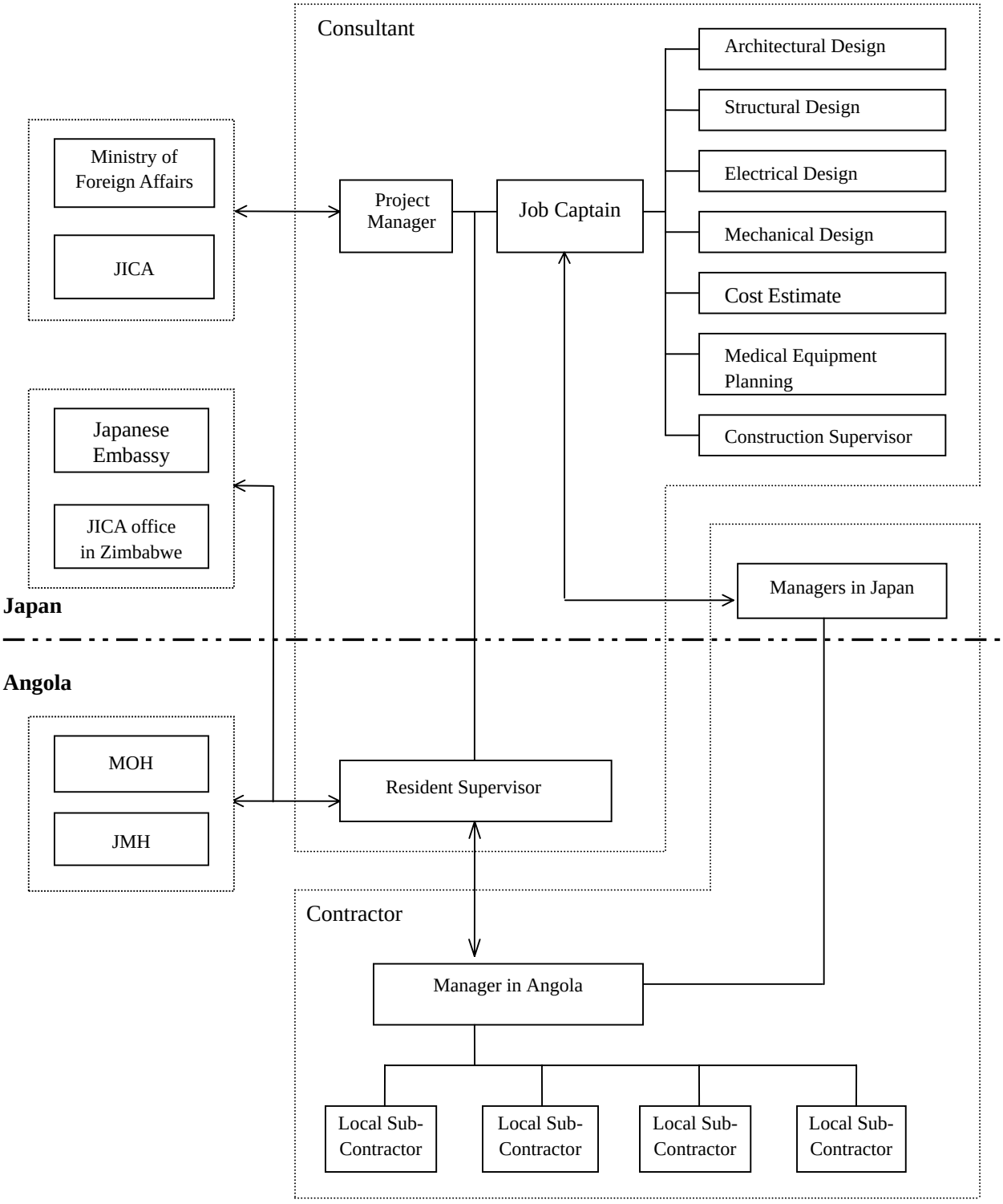


Fig. 2-38 Supervision System



2-3 Obligations of the Recipient Country

The main obligations of the Angola side are as follows.

(1) Exemption of all taxes relating to the Project

(2) The approvals and permissions needed for the building and construction work to be implemented under this Project, and the acquisition of applications and approvals for the renovation, reconstruction and partial demolition of the historical monument.

(3) Issuance of a Bank Arrangement (B/A) and Authorisation of Payment (A/P), and the payment of commissions for the same.

(4) Guarantees of prompt unloading at the port of landing, custom/duty free handling, clearing, and prompt transportation within Angola.

(5) Special consideration to Japanese nationals entering and staying in Angola for the purpose of fulfilling their duties in the provision of equipment and materials and implementation of the Project, in accordance with the attested contracts.

(6) Exemption from customs/duties and other taxes for Japanese nationals entering and staying in Angola for the purpose of fulfilling their duties in the provision of equipment and materials and implementation of the Project, in accordance with the attested contracts

(7) Budgetary measures for the efficient operation and management of the facilities constructed and the equipment procured under the Grant Aid programme.

(8) The demolition of existing structures on the planned construction site, and preparation of the site.

(9) Installation of lead-in electrical power supply lines, water supply pipes, waste water pipes and telephone lines to the planned construction site.

(10) The relocation and installation of equipment housed in existing buildings that is to be relocated to the planned facilities.

(11) The purchase and installation of general furniture

(12) Other necessary costs for items other than those to be procured under the Grant Aid programme.

Table 2-39 Notes on the Obligations of the Angola Side

1. Permissions/approvals relating to the designation of a historical monument – Bureau of Museums, Ministry of Education All other permissions/approvals relating to the Project 2. Preparation of the construction site Relocation or removal of existing underground and overhead pipes and cables in the planned construction site 3. External works Landscaping, planting, and access roads off the planned site 4. Lead-in of electrical and telephone lines 5. Furniture and fixtures Curtains (Curtain rails by Japan side), blinds, general furniture 6. Miscellaneous Relocation of equipment and furniture in existing buildings.

2-4 Project Operation Plan

(1) Maintenance of Hospital Facilities and Equipment

1) Maintenance/Management System

The maintenance and management of facilities and medical equipment can be broadly divided into two classifications; that which can be handled by JMH staff, and that which must be commissioned to specialist technicians outside the hospital. Though no highly-sophisticated facilities or equipment will be used under this Project, in view of the present capabilities of the hospital staff some maintenance work will need to be commissioned to technicians outside the hospital. Together with the implementation of the Project, there is a need to strengthen the current Facility and Equipment Maintenance Department and thus create a system of regular checks and record taking and a system to carry out temporary measures and simple repairs in an emergency.

JMH and the MOH are aware of the importance of this point, and there is an

urgent need for them to employ and train personnel, and to ensure a budget for this. Specifically, conceivable measures to enhance maintenance work qualitatively and quantitatively might be: The division of maintenance staff into three groups, namely facilities, medical equipment and management/ procurement. This third section would be responsible for the procurement of materials, equipment and spare parts, coordination between the other two sections, operating instruction and training, and the centralised management and storage of equipment and spare parts. The chief of each section should be a qualified engineer, and additional staff at the technician level should also be employed.

To this end, rooms for maintenance will be included in the facilities plan of the Project. Separate rooms for the maintenance of facilities and the maintenance of medical equipment will be provided. Consideration needs to be given to the cleanliness of the rooms when equipment is being repaired, as well as the need for air-conditioning. Almost all the present maintenance tools are too old to be of use, and this is a hindrance to maintenance work. Therefore, it is deemed appropriate for basic maintenance tools to be provided under the Project.

2) Training for the Maintenance and Management of Facilities and Equipment

Instruction manuals for facilities and equipment are normally provided just before the completion of construction and the handing-over of the facilities and equipment. However, in developing countries, the lack of personnel and low technical level means that the training of maintenance staff has to be conducted many times over an extended period of time. As the handling, operation and maintenance of the facilities and equipment to be provided under the Project will require additional basic knowledge and specialist skills, training in the operation

of equipment, detection of malfunction, and repair techniques will be given as far as possible from the construction stage through to the installation, adjustment and trial operation stage.

(2) Rough Estimate of Project Costs

1) Costs to be borne by the Angola side

Costs to be borne by the Angola side are as follows.

Table 2-40 Initial Costs to be borne by Angola side

Item	Cost Kz
1. Removal of existing facilities	2,500,000
2. Site preparation(Including replacement of pipes)	900,000
3. Gardening, planting, installation of gates and fences, parking areas	5,000,000
4. Lead-in of infrastructure	750,000
5. Furniture and fittings	6,250,000
6. Relocation and re-installation of existing equipment	500,000
Total	15,900,000 (63,600,000 thousand yen)

(3) Operating and Maintenance Costs

1) Maintenance Costs

Assuming that all equipment required under the Project is installed and operated at 100% capacity, annual maintenance costs for the first and subsequent years are estimated as follows.

Table 2-41 Estimated Maintenance Costs (in KZ: Kwanza)

Item	First year (2005)	Subsequent years	Comments
①Electricity	1,036,160	1,036,160	
②Telephone	137,700	137,700	
③Medical gas	7,898,064	7,898,064	
④Water Supply	1,512,000	1,512,000	
⑤Butane Gas	432,000	432,000	
⑥Fuel for Generator	1,782,000	1,782,000	
⑦Fuel for Incinerator	16,200	16,200	
⑧Laundry Detergent	86,400	86,400	

⑨Fuel for Boiler	1,080,000	1,080,000	
⑩Building Maintenance	0	1,728,000	
⑪Equipment Maintenance		2,500,000	
Total		18,208,524	
(US$)		910,426	US$1 = 20 KZ

① Electricity ・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・ 1,036,160 KZ/year

According to the supply regulations of the Angola Electricity Supply Corporation (EDEL), the following tariff is applicable to the hospital.

Standard charge : 0 KZ/kW/month (No standard charge at present)

Unit price : 0.6KZ/kWh

From the scale of the facilities and the types of equipment installed, the required capacity is estimated at 1,200kW. The average consumption of electricity is estimated at 60% of the contract capacity, or 720kW.

The annual cost is estimated as follows:

720kW×8h×25 days×12 months×0.06 KZ/kWh = 1,036,160 KZ/year

② Telephone ・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・138,000 KZ/year

Assuming telephone charges to be as is shown below, the annual cost of telephone usage is estimated according to the following equation.

460 KZ/day×25 days×12 months = 138,000KZ/year

③ Medical gas ・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・ 7,898,064 KZ/year

Medical gases used in the hospital are oxygen and laughing gas. The daily consumption of oxygen and laughing gas is estimated at 54,500 lit. and 5,000 lit. respectively.

Equations to estimate monthly usage:

Oxygen : 54,500 ÷ 7,000 lit./cylinder×30 days = 234 cylinders
Current Price 1,389KZ/cylinder

Laughing gas : 5,000 ÷ 7,000 lit. /cylinder×30 days = 22 cylinders
Current Price 15,143 KZ/cylinder

Thus monthly and annual costs will be as follows:

Oxygen : 1,389 KZ/cylinder×234 cylinders/month
= 325,026 KZ/month

Laughing gas : 15,143 KZ/cylinder×22 cylinders/months
= 333,146 KZ/month

Total monthly cost 658,172 KZ/month

Annual cost 658,172 KZ/month×12 months = 7,898,064 KZ/year

④ Water Supply ································· 1,512,000 KZ/year

Water consumption in the hospital is estimated at 600lit./bed/day, making a total of 300m^3/day (600 lit.×500 beds). Currently water supply charges are calculated according to volume consumed. Thus,

Monthly water consumption

300m^3/day×30 days per month = 9,000m^3/month

Monthly cost 14 KZ/m^3×9,000 m^3 = 126,000 KZ/month

Thus,

Annual cost 126,000 KZ/month×12 months = 1,512,000 KZ/year

⑤ Butane gas ···································· 432,000 KZ/year

Butane gas is used mainly in the kitchen and for equipment in the laboratories. Consumption in the kitchen, for rice cookers, gas cookers etc., is estimated at 60 kg / hour. Assuming that this equipment is used for 5 hours a day, daily consumption is estimated at 300 kg/day. The current price of butane gas is approximately. 4 KZ/kg.

Monthly consumption

300 kg/day×30 days/month = 9,000kg/month

Monthly cost 4 KZ/kg×9,000kg/month = 36,000 KZ/month

Thus,

Annual cost 36,000 KZ/month×12 months/year = 432,000 KZ/year

⑥ Fuel for Generator ····························· 1,782,000 KZ/year

It is assumed that power failures will occur 25 times/month and will last for 3 hours each time, (including operation for maintenance). The price of light oil is 3KZ/ lit.

Monthly consumption

550lit.×3 hours×30 times/month = 49,500 lit./month

Annual cost 3 KZ/ lit.×49,500 lit./month×12 months/year

= 1,782,000 KZ/year

⑦ Fuel for Incinerator ······························ 16,200 KZ/year

It is assumed that the incinerator will be used mainly for infected/contagious medical waste. The volume of such waste is estimated at 30 kg/day, and the incineration of this amount of waste is expected to consume15 lit. of oil. The price of oil is 3 KZ/ lit.

Monthly consumption 15 lit. /day×30 days/month = 450 lit./month

Monthly cost 3 KZ/ lit.×450 lit./month = 1,350 KZ/month

Thus

Annual cost 1,350 KZ/month × 12 months/year = 16,200 KZ/year

⑧ Laundry Detergent ····· 86,400 KZ/year

The amount of laundry is estimated at 50 kg/day, mainly from the Operating Department and the Central Sterilisation and Supply Unit, plus 300 kg/day of clothing from inpatients, doctors, midwives and nurses. Assuming detergent consumption to be 2% of the weight of laundry, daily consumption of detergent is estimated at 6 kg.

Monthly consumption 6 kg/day × 30 days/month = 180 kg/month

Monthly cost 40 KZ/kg × 180 kg/month = 7,200 KZ/month

Thus

Annual cost 7,200 KZ/month × 12 months/year = 86,400 KZ/year

⑨ Fuel for Boiler ····· 1,080,000 KZ/year

The boiler is used as a source of heat for the hot water supply, kitchen and laundry equipment, and autoclaves. Assuming hourly consumption of 200 lit./hour and daily usage of 5 hours, daily consumption is estimated at 1,000. lit. The price of oil is 3 KZ/ lit.

Monthly consumption 1,000 lit./day × 30 days/month = 30,000 lit./month

Monthly cost 3 KZ/ lit. × 30,000 lit./month = 90,000 KZ/month

Thus

Annual cost 90,000 KZ/month × 12 months/year = 1,080,000 KZ/year

⑩ Building Maintenance ····· 28,800 KZ/year

For both exterior and interior finishing, materials that are easy to maintain have been selected under the Project, to reduce the cost of maintaining the buildings. With reference to similar cases in Japan, the cost of maintenance, including repairs to the exterior and interior of the buildings, repair of roof water-proofing, purchase of spare parts for the electrical, water supply, waste water and air-conditioning systems, is estimated at 60 KZ/m^2/year. Thus,

Annual cost 60KZ/ m^2/year × 28,800 m^2 = 1,728,000 KZ/year

⑪ Medical Equipment Maintenance ・・・・・・・・・・・・・・・・・・・・ 2,500,000 KZ/year

The maintenance cost for the equipment provided under this Project is 2,500,000 KZ/year.

This figure includes maintenance contract fees, the cost of spare parts and the cost of reagents and supplies.

With regard to the equipment provided under the project, supplies for use during trial runs and spare parts needed in the first year have been budgeted for, but after the initial year the budgets given above will be required for the maintenance of the equipment.

2-5 Other Relevant Issues

Attention should be paid to the following points in the implementation of the Project.

(1) Confirmation that the content of work undertaken by the Angola side with relation to this Project is consistent with the content of the Project.

(2) The establishment of a committee made up of managers from the MOH and JMH, to facilitate the smooth implementation of the Project, and the establishment of a top-down system of project management.

(3) The promotion of the establishment of a working group (or subcommittee) made up of senior staff from JMH. The involvement of user representatives from the initial stages of design

(4) The employment of a sufficient number of qualified staff to actually maintain the facilities and equipment, and the implementation of training programmes for staff while construction is still under way.

(5) Confirmation that the MOH has secured a budget for the regular maintenance of the facilities and equipment.

(6) The working out of construction methods and a Temporary Facility Plan that will

minimise the effects of the construction work on medical activities and patients of the hospital: monitoring of the same.

(7) Confirmation of the works schedule and work procedures undertaken by the Angola side in step with the works of this Project: confirmation of appropriately-timed implementation in accordance with the budgetary system.

(8) 'Soft Component' Plan

1) Introduction of 'Soft Component' and Accompanying Tasks

This Project aims to substantially improve the medical services of JMH through the improvement of its facilities and equipments. However, the present system and organisation for the operation and maintenance of the facilities and equipment in JMH are extremely weak, and do not include staff with specialist education or training. Thus, when the facilities and equipment have been improved under the present Project, as things stand it cannot be expected that they will be properly operated and maintained. This being the case, the MOH and JMH must, as the project progresses, employ staff with the skills and abilities required in the relevant fields and carry out a systematic programme of education and training of both new and current staff so that by the time the Project is completed the necessary system and organisation are in place. The Japan side will for its part implement the 'soft-component' part of the Project by dispatching specialist consultants to give technical assistance to the MOH and JMH, after it has been confirmed that the personnel required in each field have been employed.

From the results of the basic design survey, areas considered to be in need of

‘soft-component’ assistance are as follows.

① Improvement of hospital administration and operating skills

② Improvement of skills for the maintenance and management of the hospital and its facilities in their entirety

③ Improvement of skills for the maintenance and management of medical equipment

2) Content and Outcome of the ‘Soft Component’

The Japan side will dispatch specialists in the relevant fields periodically in order to implement the ‘soft-component’ as the work progresses. The Japan side will also carry out the education and practical training of persons in charge and staff members in each section appointed by the MOH and JMH, either locally or in Japan, so that the system and organisation will be in place and ready to start operating at the time the facilities and equipment of the hospital commence operation. In addition, to make the assistance more effective, the ‘soft-component’ will be implemented for the maximum period of time within the duration of the E/N of this Project, the performance of the system and organisation will be monitored and any necessary follow-up assistance will be given.

① Improvement of Administrative and Operational Skills in the New Hospital

In order that the staff and persons in charge can undertake the efficient administration and operation of the hospital, the personnel required in each field will be appropriately posted, a system of responsibility allotment will be established and the acquisition of relevant skills will be sought through the introduction under the ‘soft-component’ of a structure for the smooth

operation of the hospital.

② Improvement of Skills for the Maintenance and Management of the Hospital and its Facilities in their Entirety

In order to train technicians responsible for the maintenance of the facilities of the JMH in their entirety, the MOH and JMH will employ personnel and post them appropriately from the construction stage of the project, and will raise the technical ability to maintain the facilities in their entirety through the implementation of education and practical training via the ‘soft-component’.

③ Improvement of Skills for the Maintenance of Medical Equipment

The MOH for its part needs to establish a system to enable the maintenance of equipment in the medical institutions of Angola. In order to accomplish this, maintenance staff will be recruited and their training carried out via the ‘soft-component’. Through training to a level that will enable them to deal appropriately with simple repairs of malfunctioning equipment, a system for the maintenance of equipment will be put in place at the same time as greater proficiency is attained.

For the users of the equipment, education and training will be carried out to improve the technical competence of the staff.

3) Details and scope of activities

Table 2-42 Soft Component Activities

Department	Technical Assistance from Japan	Outcome
Administration and Operation of the New Hospital	1) Establishment of system of responsibility of each Department in the running of the hospital 2) Drawing up of a proper facility maintenance plan and introduction of a system for efficient procurement related to facilities and equipment 3) Establishment of system for appropriate inventory management 4) Management of medical statistics at an international standard	・Management manual ・Statistical data ・Format for medical statistics ・Organisational diagram of Maintenance and Management Department
Maintenance and Management of Facilities in their Entirety	1) Suggestions regarding the acquisition of the necessary organisation, personnel and competence 2) Introduction of maintenance guidelines 3) Suggestions for improvement of operating efficiency 4) Practical training in maintenance work	・Equipment management ledger ・Maintenance records ・Repair request form ・Spare parts management system using PC
Maintenance and Management of Medical Equipment	1) Suggestions regarding the acquisition of the necessary organisation, personnel and competence 2) Introduction of maintenance guidelines 3) Suggestions for improvement of operating efficiency 4) Practical training in maintenance work	・Equipment management ledger ・Maintenance records ・Repair request form ・Spare parts management system using PC

4) Content of activities and their scales

Table 2-43 Schedule of Soft Component

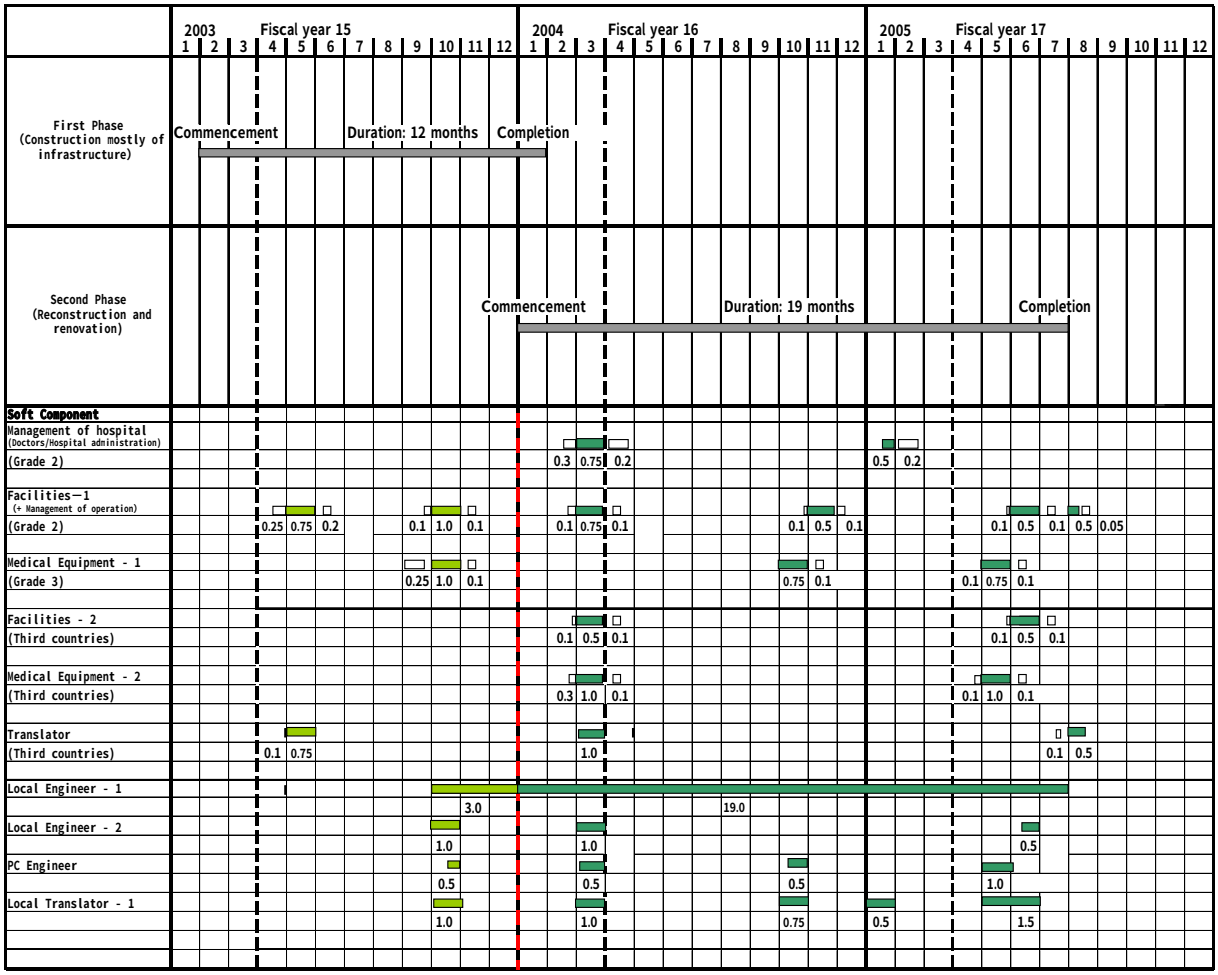
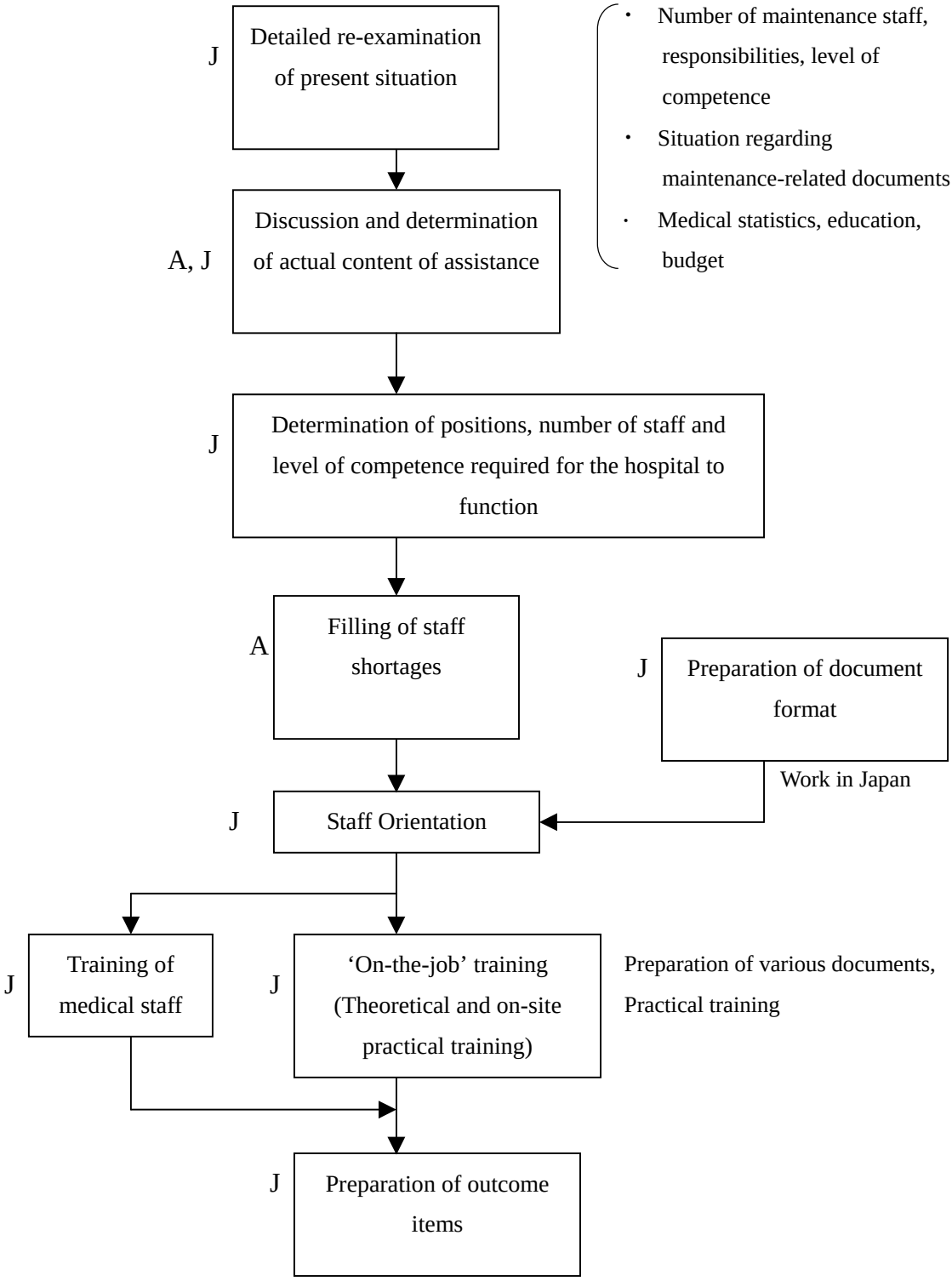


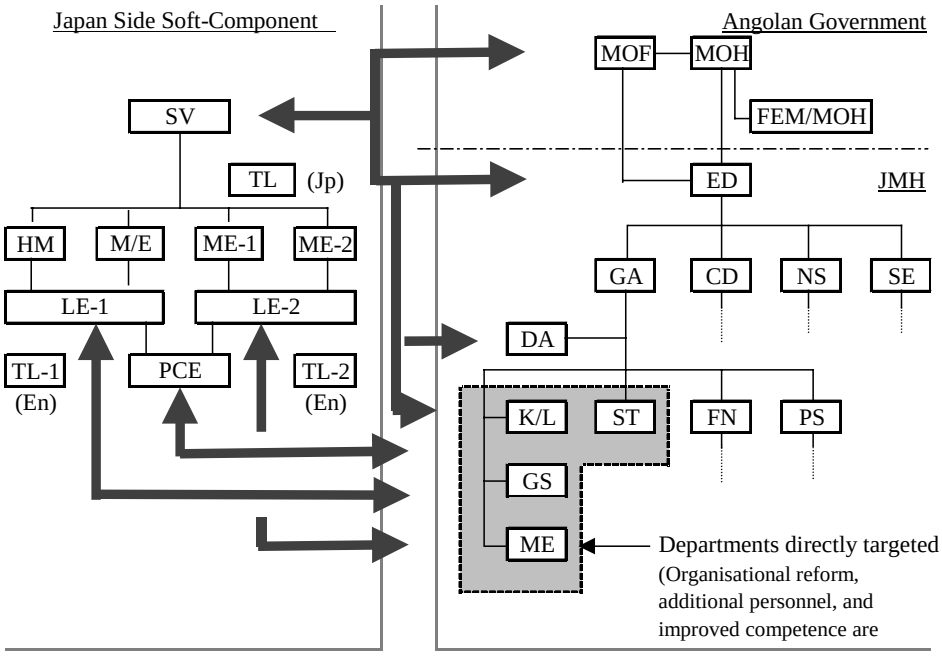
Table 2-44　Implementation Flow of ‘Soft-Component’



J : Japan side

A: Angola side

Fig. 2-45 Consultancy System involved in 'Soft-Component' (Draft)



Comments 1 The person in charge of hospital management shall be responsible for overall supervision. There shall be 5 Japanese consultants.

2 This team will work in coordination with the Grant Aid Consultant Design and Supervison team.

SV	Supervisor
HM	Hospital Management
M/E	Machine/Electricity
ME-1	Medical Equipment - 1
ME-2	Medical Equipment - 2
LE-1	Local Engineer - 1
LE-2	Local Engineer - 2
PCE	Computer Engineer
TL	Translator
TL-1	Translator - 1
TL-2	Translator - 2
Jp	Japanese
En	English

MOF	Ministry of Finance
MOH	Ministry of Health
FEM/MOH	Facility and Equipment Management, MOH
JMH	Josina Machel Hospital
ED	Executive Director
GA	Office of General Affairs
CD	Clinical Departments
NS	Department of Nursing
SE	Department of Science/Education
DA	Direcor of Administration
K/L	Kitchen/Laundry
GS	General Services
ME	Medical Equipment
ST	Statistics
FN	Finance
PS	Personnel

Chapter 3 Project Evaluation and Recommendations

Chapter 3. Project Evaluation and Recommendations

3-1 Project Effect

(1) Direct Effects

This Project will implement improvement of JMH's facilities and equipment and 'soft-component' of training and improvement of techniques to assist hospital operation.

In practice, construction of Central Clinic and Treatment Block and renovation of wards, Outpatient Block, etc. will be carried out. The environment in the hospital will be organised and improved, and facilities and medical equipment will be installed. These works will improve both sanitary and functional conditions in the hospital.

Furthermore, education and training in the areas of operation and management will be conducted in line with 'soft-component' and, as a consequence, not only techniques but also consciousness and motivation of the medical staff will be improved.

As a result of the improvement, quality, services and efficiency of medical activities and hospitalization functions of JMH will be improved

(2) Indirect Effects

Once the level of medical services in JMH has been improved, the last resort in the referral system in Angola, especially that of Luanda Province, will have been established.

Furthermore, the effects of improvement on medical technology and hospital operation and maintenance will be spread throughout the province and entire country through a training system.

Table 3-1 Project Effect

Current conditions and problems	Measures to be taken in this Project (Co-operative works included in the Project)	Effects of the Project/Degree of improvement
Direct effects		
1. Operation and management of the hospital are not properly done.	1. Education/training in 'soft component'	1. Preparation of forms for operation and maintenance, Establishment of rules, Collection and utilisation of data
2. Due to deterioration of the facilities of the hospital, only limited number of patients can be treated.	2. Reconstruction, renovation and repair of the entire facilities will be carried out.	2. To be considered as confirmed at the completion of the improvement of facilities.
3. Due to deterioration of the facilities, basic facilities of the buildings (toilets, sinks, showers, sewerage pipes, lifts, etc.) are not operational, which makes the hospital unsanitary and functionally paralysed.	3. Renovation of the entire facilities, especially those for water supply and waste water.	3. To be considered as confirmed at the completion of the works.
4. Due to shortage of medical equipment, examinations, diagnoses and treatment are not properly done.	4. This Project will provide basically required equipment. Training in how to use and maintain the equipment will be given at the explanation at the installation and in 'soft component.'	4. Organisation of a maintenance team and acquisition of techniques, Monitoring of the implementation of operation. (JMH)
Indirect effects		
5. Though there are many cases of emergencies, due to lack of credibility as a tertiary medical institution, the number of referred patients to the Outpatient Department is small.	5. Improvement of medical services in JMH by improvement of its facilities and equipment and establishment of JMH's position as a core of the referral system through education, training and public relation programmes.	5. Being an indirect effect, the effort by the Angola side will be expected.
6. Practically, the referral system in Luanda Province is not functioning. There are many patients who come to JMH for primary medical care.	6. Educate people in 'soft-component.' Public relation and education by the Angola side will be essential as is the case in 5.	6. Continuous effort by the Angola side will be expected.

3-2 Recommendations

Tasks to be borne by the Recipient Country

- Establishment of the Operation and Management Systems of the Hospital

  The current operation and management systems of this hospital are not suitable to manage such a large organisation. Thus, the techniques of rational and efficient operation and management will be transferred through the training and instruction given in 'soft component' of this Project. Most important element for the effective operation of JMH will be for General Director to utilise the new committee for the Improvement of JMH. It is also necessary for JMH and MOH to realise the responsibility for the utilisation of this know-how acquired through the implementation of this Project.

- Establishment of the Maintenance System of Buildings

  This Project will renew and modernise both facilities and equipment. However, if proper maintenance is not given to them, they will soon start developing malfunctions and being damaged and it is very likely that the situations will return to the same as before.

  Discussion with MOH revealed that MOH had realised the problems of the current system of maintenance in JMH and some expressed the need for maintenance tools on several occasions. It has been confirmed that the Angola side is well aware of the importance of the maintenance of facilities and equipment.

  This Project plans for a space for maintenance works in F Block and provision of maintenance tools. In addition, it is necessary for the Angola side to make effort to increase the number of staff for mechanical, sanitary facilities, water supply and sewerage. It is also necessary to establish and operate a permanent maintenance team, taking full advantage of technical transfer through 'soft component' of this Project.

- Establishment of the Maintenance System of Medical Equipment

  At present, JMH is ordering repairs of medical equipment to their respective agents whenever these equipments break down.

  At first, it is necessary to decide responsible section for the maintenance of equipment and its scope of responsibility. Secondly, it is necessary to employ necessary personnel. Then, the content and procedures of maintenance works will be determined as guidelines of maintenance in 'soft component.' Furthermore, seminars and training to the staff will be conducted as part of 'soft- component' in order to improve their capacities. In practice, the following will be implemented:

  ① Assistance in construction of computerised inventory system of medical equipment and spare parts.

  ② Assistance in preparation of maintenance procedure manuals

  ③ Assistance in preparation of budgetary plan of maintenance

  After the completion of 'soft component,' the Angola side will have to maintain the system independently.

- Preparation of the Functions as a Training Hospital

  The head of Otolaryngology Department is appointed as the head of Education Department. He is also a professor of Medicine in the University of Angola. He is currently training two trainee doctors in Otolaryngology Department and giving classes to 40 medical students every week.

  Led by the head of Education Department, JMH is drawing a plan for the system of education and training. As no concrete plan has been put forth, the study team urges the Angola side to draw up such a plan as soon as possible.

  It may be needless to point out that Angola side will has primary responsibility for the planning, while Japan side will give assistance in the form of 'soft component' and

Counter Part Training.

Angola side will have to draw up its own educational/training plan and to carry out systematic training of personnel.

- Establishment of the Referral System

  In order to establish the referral system, it is very important to establish the advanced referral hospitals as well as the primary level facilities. And at the same time, it is necessary to give instruction on appropriate usage of the referral system to medical staff and patients.

  The projects aiming at the improvement of primary medical institutions have already been launched. Half of the objective will have been achieved when these institutions have regained confidence of patients. When JMH, the highest ranked medical institution in Angola, is improved of its facilities and medical equipment by Japanese assistance in this Project, and the increase of necessary staff and training of the staff by the Angola side, the referral system will have been improved significantly..

- Budget Planning

  It is very important for MOH to establish the comprehensive budget planning, so that the increased budget for JMH do not squeeze the others function of the health sector.

Appendices

資料－1　調査団員氏名 (MEMBER LIST OF THE SURVEY TEAM)

NO.	氏名(NAME)	担当(ROLE)	所属(INSTITUTION)
1	福島　功 Mr. Isao HUKUSHIMA	総括/団長 Team Leader	外務省 経済協力局 無償資金協力部 課長補佐 Deputy Director, Grant Aid Division, Economic Cooperation Bureau Ministry of Foreign Affairs
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3	岩間敏之 Mr. Toshiyuki IWAMA	プロジェクト計画 Project Planning	国際協力事業団 無償資金協力部 業務二課 課長代理 Deputy Director, Second Project Management Division, Grant Aid Management Department, Japan International Cooperation Agency
4	武村勝将 Mr. Yoshimasa TAKEMURA	計画管理 Project Coordinator	国際協力事業団 無償資金協力部 業務二課 Second Project Management Division, Grant Aid Management Department, Japan International Cooperation Agency
5	金川一郎 Mr. Ichiro KANAGAWA	業務主任/建築計画 Project Manager/ Architectural Planner	(株)日本設計 Nihon Sekkei, Inc.
6	遠藤　建 Mr. Takeshi ENDO	建築設計 Architectural Designer	(株)日本設計 Nihon Sekkei, Inc.
7	石川修三 Mr. Shuzo ISHIKAWA	設備計画 Facilities and Utilities Planner	(株)日本設計 Nihon Sekkei, Inc.
8	前原　智 Mr. Satoshi MAEHARA	構造計画 Structural Engineer	(株)日本設計 Nihon Sekkei, Inc.
9	中山志〆松 Mr. Shimematsu NAKAYAMA	施工計画/積算 Construction Planning and Cost Planner	(株)日本設計 Nihon Sekkei, Inc.
10	五代儀和彦 Mr. Kazuhiko IYOGI	機材計画 Equipment Planner	(株) アールコンサルタント Earl Consultants Inc.
11	広部孝昌 Mr. Takamasa HIROBE	調達計画/積算 Procurement and Cost Planner	(株) アールコンサルタント Earl Consultants Inc.
12	村尾耕一 Mr. Koichi MURAO	医療体制調査 Medical System Surveyor	(株)日本設計 Nihon Sekkei, Inc. (Kyowa Engineering Consultants Co., Ltd.)
13	和田英子 Ms. Eiko WADA	ポルトガル語通訳 Interpreter(Portuguese)	(株)日本設計 Nihon Sekkei, Inc. (Techno Staff Co., Ltd.)
14	田原幸夫 Mr. Yukio TAHARA	保存計画 Planner for Preservation and Renovation of Historical Buildings	(株)日本設計 Nihon Sekkei, Inc. (Supporting Staff)

資料－1　調査団員氏名 (MEMBER LIST OF THE SURVEY TEAM)－概要説明

NO.	氏名(NAME)	担当(ROLE)	所属(INSTITUTION)
1	磯山武司 Mr. Takeshi ISOYAMA	総括/団長 Team Leader	外務省 経済協力局 無償資金協力部 課長補佐 Deputy Director, Grant Aid Division, Economic Cooperation Bureau Ministry of Foreign Affairs
2	三好知明 Dr. Chiaki MIYOSHI	技術参与 Technical Adviser	厚生労働省 国立国際医療センター 国際医療協力局 派遣協力第二課 Technical Official, Experts Service Division, Bureau of International Cooperation International Medical Center of Japan, Ministry of Health, Labour & Welfare
3	武村勝将 Mr. Yoshimasa TAKEMURA	計画管理 Project Coordinator	国際協力事業団 無償資金協力部 業務二課 Second Project Management Division, Grant Aid Management Department, Japan International Cooperation Agency
4	金川一郎 Mr. Ichiro KANAGAWA	業務主任/建築計画 Project Manager/ Architectural Planner	(株)日本設計 Nihon Sekkei, Inc.
5	遠藤　建 Mr. Takeshi ENDO	建築設計 Architectural Designer	(株)日本設計 Nihon Sekkei, Inc.
6	石川修三 Mr. Shuzo ISHIKAWA	設備計画 Facilities and Utilities Planner	(株)日本設計 Nihon Sekkei, Inc.
7	中山志〆松 Mr. Shimematsu NAKAYAMA	施工計画/積算 Construction Planning and Cost Planner	(株)日本設計 Nihon Sekkei, Inc.
8	五代儀和彦 Mr. Kazuhiko IYOGI	機材計画 Equipment Planner	(株) アールコンサルタント Earl Consultants Inc.
9	広部孝昌 Mr. Takamasa HIROBE	調達計画/積算 Procurement and Cost Planner	(株) アールコンサルタント Earl Consultants Inc.
10	古矢佳男 Mr. Yosio FURUYA	機材調査Ⅰ Equipment Investigation Ⅰ	(株) アールコンサルタント Earl Consultants Inc.
11	紺野平和 Mr. Yasukazu KONNO	機材調査Ⅱ Equipment Investigation Ⅱ	(株) アールコンサルタント Earl Consultants Inc.
12	松崎洋子 Ms. Yoko MATSUZAKI	ポルトガル語通訳 Interpreter(Portuguese)	(株)日本設計 Nihon Sekkei, Inc. (Techno Staff Co., Ltd.)

2 Survey Schedule

A：Team Leader **B**：Technical Adviser **C**：Project Planning **D**：Project Coordinator
a：Project Manager/Architectural Planner **b**：Architectural Designer
c：Facilities and Utilities Planner **d**：Structural Engineer
e：Construction Planning and Cost Planner
f：Equipment Planner **g**：Procurement and Cost Planner **h**：Medical System Surveyor
i：Interpreter(Portuguese) **j**：Planner for Preservation and Renovation of Historical Buildings(Supporting Staff)

Date		Activities	Survey Team													
			A	B	C	D	a	b	c	d	e	f	g	h	i	j
1	7/15(Sun)	Lv. Narita→Ar. Lisbon				○	○									
2	16(Mon)	Visa Acquisition, Lv. Lisbon→				○	○									
		Lv. Narita→Ar. Lisbon		○	○			○	○	○		○		○	○	○
3	17(Tue)	Ar. Harare Courtesy Call to Embassy of Japan Courtesy Call to JICA Zimbabwe Office				○	○									
		Visa Acquisition		○	○			○	○	○		○		○	○	○
4	18(Wed)	Lv. Harare→Ar. Johannesburg				○	○									
		L v. Lisbon→via Paris		○	○			○	○	○		○		○	○	○
		Lv. Narita→Ar. Lisbon	○													
5	19(Th)	Lv. Johannesburg→Ar. Luanda				○	○									
		Ar. Luanda Courtesy Call to MOH		○	○			○	○	○		○		○	○	○
		Courtesy Call to JMH Courtesy Call to Vice Ministry of MOH		○	○	○	○	○	○	○		○		○	○	○
		Visa Acquisition, Lv. Lisbon→	○													
6	20(Fri)	Ar. Luanda	○													
		MOH/Meeting Courtesy Call to Ministry of Exterior Relations	○	○	○	○	○	○	○	○		○		○	○	○
7	21(Sat)	Survey at JMH	○	○	○	○	○	○	○	○		○		○	○	○
8	22(Sun)	JMH/Meeting	○	○	○	○	○	○	○	○		○		○	○	○
9	23(Mon)	Courtesy Call to Americo Boavida Hospital	○	○	○	○	○	○	○	○		○		○	○	○
		Meeting with MOH on Minutes of Meeting	○	○	○	○	○	○	○	○		○		○	○	○
		Signing on Minutes of Meeting	○	○	○	○	○	○	○	○		○		○	○	○
10	24(Tue)	Courtesy Call to Lucrecia Paim Hospital	○	○	○	○	○	○	○	○		○		○	○	○
		Lv. Luanda→Ar. Johannesburg	○	○	○	○										
		MOH/Meeting					○	○	○	○		○		○	○	○
11	25(Wed)	Lv. Johannesburg→Ar. Harare Report to JICA Zimbabwe Office Report to Embassy of Japan	○	○	○	○										
		Survey on JMH					○	○	○	○		○		○	○	○
12	26(Th)	Lv. Harare→via Johannesburg	○	○	○	○										
		Survey on JMH					○	○	○	○		○		○	○	○
13	27(Fr)	Ar. Narita	○	○	○	○										
		JMH/Meeting					○	○	○	○		○		○	○	○
14	28(Sat)	Survey on JMH					○	○	○	○		○		○	○	
		Lv. Narita→ via Hong Kong									○		○			
		Lv. Luanda→Ar. Johannesburg														○

Date		Activities	Survey Team													
			A	B	C	D	a	b	c	d	e	f	g	h	i	j
15	29(Sun)	Team Meeting					○	○	○	○		○		○	○	
		Ar. Johannesburg									○		○			
		Lv. Johannesburg→via Hong Kong														○
16	30(Mon)	Site Survey at JMH and JMH/Meeting					○	○	○	○		○		○	○	
		Visa Acquisition, Market survey for Medical Equipment and Construction Materials in South Africa (1)									○		○			
		Ar. Narita														○
17	31(Tue)	Meeting with MOH・JMH Survey at JMH					○	○	○	○		○		○	○	
		Market survey for Medical Equipment and Construction Materials in South Africa (1)									○		○			
18	8/ 1(Wed)	MOH/Meeting JMH/Meeting					○	○	○	○		○		○	○	
		Market survey for Medical Equipment and Construction Materials in South Africa (1)									○		○			
19	2(Th)	WHO/Meeting JMH/Meeting					○	○		○		○		○	○	
		Meeting with Electric Power Company							○							
		Market survey for Medical Equipment and Construction Materials in South Africa (1)									○		○			
20	3(Fr)	Meeting with MOH・JMH JMH/Meeting					○	○	○	○		○		○	○	
		Meeting with Water Works Bureau,							○							
		Market survey for Medical Equipment and Construction Materials in South Africa (1) Visa Acquisition									○		○			
21	4(Sat)	Survey at JMH Team Meeting					○	○	○	○		○		○	○	
		Lv. Johannesburg→Ar. Luanda									○		○			
22	5(Sun)	JMH/Meeting Team Meeting					○	○	○	○	○	○	○	○	○	
23	6(Mon)	JMH/Meeting					○	○	○			○		○	○	
		Visit to Army Hospital					○							○	○	
		Market survey								○	○		○			
		Meeting with Water Works Bureau, Meeting with Sewage Water Works Bureau Meeting with Telephone Corporation, Meeting with Fire Defense Agency, Meeting with Meteorological Agency							○							
24	7(Tue)	JMH/Meeting,					○	○				○		○	○	
		Meeting with Ministry of Public and Urbanism						○		○	○					
		Market survey									○		○			
		Meeting with Water Works Bureau, Meeting with Sewage Works Bureau, Meeting with Company for the Cleaning and Sanitation Meeting with Fire Defense Agency, Market survey(M/E)							○							

Date		Activities	Survey Team													
			A	B	C	D	a	b	c	d	e	f	g	h	i	j
25	8(Wed)	JMH/Meeting,					○	○				○		○	○	
		Market survey								○	○		○			
		Meeting with Water Works Bureau, Meeting with Company for the Cleaning and Sanitation Survey on dumping ground, Meeting with Fire Defense Agency, Meeting with Meteorological Agency Market survey(M/E)							○							
26	9(Th)	JMH/Meeting					○	○				○		○	○	
		Market survey								○	○		○			
		Meeting with Water Works Bureau, Survey on Water Treatment Plant, Meeting with Fire Defense Agency, Meeting with Meteorological Agency, Market survey(M/E)							○							
27	10(Fri)	JMH/Meeting(Technical Memorandum)					○	○	○			○		○	○	
		Market survey								○	○		○			
		Meeting with Fire Defense Agency, Market survey(M/E)							○							
28	11(Sat)	JMH/Meeting(Technical Memorandum)					○	○	○	○	○	○		○	○	
		Lv. Luanda→Ar. Johannesburg											○			
29	12(Sun)	Survey on JMH					○	○	○					○		
		Team Meeting								○	○	○			○	
		Market survey for Medical Equipment and Construction Materials in South Africa (2)											○			
30	13(Mon)	JMH/Meeting Signing on Technical Memorandum					○	○	○	○	○	○		○	○	
		Market survey for Medical Equipment and Construction Materials in South Africa (2)											○			
31	14(Tue)	Lv. Luanda→Ar. Johannesburg					○	○	○	○	○	○		○	○	
		Market survey for Medical Equipment and Construction Materials in South Africa (2)											○			
32	15(Wed)	Lv .Johannesburg→Ar. Harare					○									
		Lv. Johannesburg→via Hong Kong												○		
		Market survey for Medical Equipment and Construction Materials in South Africa (2)						○	○	○	○	○	○		○	
33	16(Th)	Report to JICA Zimbabwe Office Report to Embassy of Japan					○									
		Ar. Narita												○		
		Market survey for Medical Equipment and Construction Materials in South Africa (2)						○	○	○	○	○	○		○	
34	17(Fri)	Lv. Harare→ Ar. Johannesburg					○									
		Market survey for Medical Equipment and Construction Materials in South Africa (2)						○	○	○	○	○	○		○	
35	18(Sat)	Lv. Johannesburg→via Hong Kong					○	○	○	○	○	○	○		○	
36	19(Sun)	Ar. Narita					○	○	○	○	○	○	○		○	

2-2 Draft Report Explanation Schedule

A：Team Leader **B**：Technical Adviser **C**：Project Coordinator
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c：Facilities and Utilities Planner **d**：Construction Planningand Cost Planner
e：Equipment Planner **f**：Procurement and Cost Planner **g**：Interpreter(Portuguese)
h：Architectural Designer (Supporting Staff) **i**：Equipment Survey (E) **j**：Equipment Survey (M)

Date		Activities	Survey Team												
			A	B	C	a	b	c	d	e	f	g	h	i	j
1	1/20(Sun)	Lv. Narita→Ar.Singapore, Lv. Singapore				○									
2	21(Mon)	Ar./Lv. Johannesburg→Ar. Harare				○									
		Courtesy Call to Embassy of Japan Courtesy Call to JICA Zimbabwe Office				○									
		Lv. Narita→Ar. Singapore, Lv. Singapore		○			○	○	○	○	○	○		○	○
3	22(Tue)	Lv. Harare→Ar. Johannesburg（Visa Acquisition）				○									
		Ar. Johannesburg（Visa Acquisition）		○			○	○	○	○	○	○		○	○
4	23(Wed)	Acquire		○		○	○	○	○	○	○	○		○	○
5	24(Thu)	Lv. Johannesburg→Ar. Luanda		○		○	○	○	○	○	○	○		○	○
6	25(Fri)	Courtesy Call to MOH/Meeting on Draft Report Explanation		○		○	○	○	○	○	○	○		○	○
		Meeting With MOH･JMH		○		○	○	○	○	○	○	○		○	○
7	26(Sat)	Survey on JMH		○		○	○	○	○	○	○	○		○	○
8	27(Sun)	Team Meeting		○		○	○	○	○	○	○	○		○	○
9	28(Mon)	Meeting With MOH･JMH		○		○	○	○	○	○	○	○		○	○
		Lv. Narita→Ar. Singapore, Lv. Singapore	○		○								○		
10	29(Tue)	Ar./Lv. Johannesburg→Ar. Luanda	○		○										
		Market survey in Luanda		○		○	○	○	○	○	○	○		○	○
		Ar. Johannesburg（Visa Application）											○		
11	30(Wed)	Courtesy Call to MOH	○	○	○	○	○	○	○	○	○	○		○	○
		JMH/Meeting	○	○	○	○	○	○	○	○	○	○		○	○
		（Visa Acquired）											○		
12	31(Thu)	JMH/Meeting	○	○	○	○	○	○	○	○	○	○		○	○
		Lv. Johannesburg→Ar. Luanda											○		
13	2/1(Fri)	JMH/Meeting（Work Shop）	○	○	○	○	○	○	○	○	○	○	○	○	○
14	2(Sat)	Visit to Lucresia Paim Hospital	○	○	○	○	○	○		○		○	○	○	○
		Lv. Luanda→Ar. Johannesburg							○		○				
15	3(Sun)	Team Meeting	○		○	○	○	○		○		○	○	○	○
		Lv. Johannesburg→via. Hong Kong		○											
		Market survey for Medical Equipment and Construction Materials in South Africa							○		○				
16	4(Mon)	Signing on Minutes of Meeting	○		○	○	○	○		○		○	○	○	○
		Ar. Narita		○											
		Survey on JMH	○		○	○	○	○		○		○	○	○	○
		Market survey for Medical Equipment and Construction Materials in South Africa							○		○				
17	5(Tue)	Lv. Luanda→Ar. Johannesburg	○		○									○	○
		JMH/Meeting				○	○	○		○		○	○		
		Lv. Johannesburg→via Hong Kong							○		○				
18	6(Wed)	Lv. Johannesburg→Ar. Harare	○		○									○	○
		Report to JICA Zimbabwe Office Report to Embassy of Japan	○		○										
		JMH/Meeting				○	○	○		○		○	○		
		Ar. Narita							○		○				
19	7(Thu)	Lv. Harare→Ar. Johannesburg	○		○									○	○
		JMH/Meeting				○	○	○		○		○	○		
20	8(Fri)	Lv. Johannesburg→via Hong Kong	○		○										
		JMH/Meeting				○	○	○		○		○	○		
21	9(Sat)	Ar. Narita Lv. Luanda→Ar. Johannesburg	○		○	○	○	○		○		○	○		
22	10(Sun)	Lv. Johannesburg→via Hong Kong					○	○		○		○	○		
		Lv. Johannesburg→Ar. Harare				○									
		Report to JICA Zimbabwe Office Report to Embassy of Japan				○									
23	11(Mon)	Ar. Narita					○	○		○		○	○		
		Lv. Harare→Ar. Johannesburg				○									
24	12(Tue)	Lv. Johannesburg→via Hong Kong				○									
25	13(Wed)	Ar. Narita				○									

3 List of Party Concerned in the Recipient Country

1-1.	Ministry of Exterior Relations	
	Mr. Manimo Simao	Japanese Desk
	Mr. Estevao Jai	Ditto
1-2.	Ministry of Health	
	Dr. Jose Vieira Dias Van-Dunem	Vice Ministry
	Dra. Natalia Do Espirito Santo	Vice Ministry
	Dr. Augusto Rosa Mateus Neto	Director of International Department
	Dr. Nzima Victor	Director of Planning Cabinet
	Dr. Adriano T. Goncalves	Director of Planning Department
	Dr. Daniel Antonio	Director of Medical Equipment Dept.
	Ms. Evlize Fresto	National Director of Human Resources
	Mr. Miguel Calucione	Head of Human Resources
	Ms. Maria Fernanda Pereira	Architect
1-3.	Josina Machel Hospital(JMH)	
	Dr. Kimfumu Antonio	General Director
	Mr. Manuel Antonio Calei	Director of Administration Department
	Mr. Alvaro Fuakatinua	Head of General Service
	Dr. Mayanda Inocente	Chief of Neuro Surgery Department
	Dr. Lungila Lukau, Lua-nzo	Chief of Medicine II
	Dr. Nguyeu Vaw Ton	Cardiologist, Medicine II
	Dr. Ana Perola Simbucupo Herculano da Cunha	Chief of Pediatric Surgery
	Dr. Moises Domingo	Chief of Orthopedics
	Dr. Mariana	Chief of Ophthalmology?
	Dr. Artur Carlos do Nascimento	Chief of ICU?
	Dr. Suzana	Chief of Anesthetics
1-4.	Americo Boavida Hospital	
	Dra. Maria Da Conceicao Pita	Director of Clinic
	Mr. Antonio Carlos	Director of Human Resources
1-5.	Lucresia Paim Hospital	
	Dr. Domingos Mpembee	General Director
	Dr. Miraldina Manuel	Director of Clinic
	Dr. Josefina De Almeida	Director of Nursing
	Ms. Mabuaka Pakiu	Superintendent of Emergency Area
1-6.	Ministry of Public and Urbanism	
	Mr. Antonio Goma	Vice Minister
1-7.	EDEL	
	Mr. Jose Paxe	Director of Operation
1-8.	ANGOLA TELECOM	
	Mr. Raul Afonso F. Ramalhoso	Director of Technical
1-9.	EPAL	
	Mr. Jose Ambriz	Joint Director of General

	Mr. Luvumbu Vita	Head of Project Division
	Mr. Nsulama Matadidi Antonio	Director of Distribution
	Ms. Lourdes Tito	Head of Quality Division
1-10.	Civil Engineering Dept. of Luanda	
	Mr. Virgilio Piedade	Head of Sewage Department
1-11.	Fire Defense Agency	
	Dr. Eugenio Laborinho	Commander of Fire in Angola
	Mr. Joao B. Ambrosio	Director of Commander office
	Mr. Caculo	Head of Prevention Department
1-12.	National Institute of Geology and Mines	
	Dra. Maria Victoria	Director
1-13.	National Institute of Hydro Meteorological and Geographical	
	Mr. Francisco Osvaldo	Head of Meteorological Department
1-14.	URBANA2000 (ELISAL＝EMPRESA DE LIMPEZA E SANEAMENTO DE LUANDA)	
	Mr. Victor M. da C. Diogo	Director General
2-1.	WHO	
	Dr. Pier Paolo Balladelli	Representante / Angola
	Dra. Balbina Ventura Felix	Epidemiologist
2-2.	AMDA International－Angola	
	Mr. Shunsuke Suzuki	