Ministry of Health
The Republic of Uganda

PREPARATORY SURVEY REPORT
ON
THE PROJECT FOR THE REHABILITATION
OF
HOSPITALS AND SUPPLY OF MEDICAL EQUIPMENT
IN THE CENTRAL REGION OF UGANDA
IN
THE REPUBLIC OF UGANDA

September 2009

JAPAN INTERNATIONAL COOPERATION AGENCY

THE CONSORTIUM OF
NIHON SEKKEI, INC. / EARL CONSULTANTS, INC.

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PREFACE

In response to a request from the Government of the Republic of Uganda, the Government of Japan decided to conduct a preparatory survey (basic design) on the Project for the Rehabilitation of Hospitals and Supply of Medical Equipment in the Central Region of Uganda and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Uganda a preparatory survey (basic design) team from March 3rd to March 31st, 2009.

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

September 2009

Yoshihisa Ueda
Vice President
Japan International Cooperation Agency

September 2009

Letter of Transmittal

We are pleased to submit to you the preparatory survey (basic design) report on the Project for the Rehabilitation of Hospitals and Supply of Medical Equipment in the Central Region of Uganda in the Republic of Uganda.

This survey was conducted by the Consortium of Nihon Sekkei, Inc. and EARL Consultants, Inc. under a contract to JICA, during the period from February to September 2009. In conducting the survey, we have examined the feasibility and rationale of the project with due consideration to the present situation of Uganda and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

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

Very truly yours,

Masahiro Ikawa
Project Manager

Preparatory Survey (Basic Design) Team on
the Project for the Rehabilitation of Hospitals and Supply of Medical Equipment
in the Central Region of Uganda

The Consortium of Nihon Sekkei, Inc. and EARL Consultants, Inc.

Summary

1. Introduction

The Republic of Uganda (hereinafter, referred to as "Uganda") is a country under republicanism surrounded by Congo, Kenya, Tanzania, and Sudan in eastern Africa. Uganda became independent from Great Britain in 1962 and adopted republicanism in 1963. It covers 241,000 km^2, which is about 2/3 the area of Japan, and has a population of about 32.7 million (2008). The country's per capita GNI (Gross National Income) is US$370 (2008).

2. Background of the Project

The level of healthcare in Uganda, similar to those of neighboring countries in eastern Africa, is among the worst in the world. This is shown by the two main healthcare indices of a maternal death rate of 550 against 0.1 million births (2005) and an infant death rate of 79 against 1,000 births (2005). Uganda is also an area where infectious diseases such as malaria, tuberculosis, measles, and HIV/AIDS prevail, and Uganda has also had cases of Ebola hemorrhagic fever.

To improve such circumstances, the Ugandan Government formulated the "Healthcare Sector Strategy Plan (Phase I: 2001 to 2005, Phase II: 2006 to 2010)" and adopted measures such as the promotion of free medical services, enhanced access by increasing medical facilities, and enhanced service delivery, targeting from the community level to the provincial level. Thanks to these measures, outcomes were obtained to a certain extent, such as the fact that the access rate to a nearby medical facility within 5 km was improved from 49% of the total population (1999) to 72% (2004). Conversely however, in regional referral hospitals and those which act as secondary medical facilities, the facilities have become obsolete and the medical equipment and materials are insufficient, which has prevented local residents from receiving sufficient medical services. In addition, the population growth rate is also high at 3.2% per year, hence the demand for medical services is expected to increase further in the future.

Under such circumstances, the Ugandan Government, following the project for the Eastern region, requested the Japanese government to implement a grant aid project for the improvement of medical facilities and equipment in the Central Region. The objective was to enhance the hospital functions and the quality of the medical services they provide by improving the facilities and equipment and thereby improving the local medical referral system. Four hospitals which represent the central facilities for healthcare and medical services in the region were to be improved by renovating their facilities and equipment, and four other hospitals were to receive improvement of their equipment. The counterpart area of the Plan is the central region of Uganda , which is a populous area located in the vicinity of the national capital, Kampala. Although the area has significant needs for healthcare and medical services, the facilities and equipment in the region have become very rundown and unable to provide proper healthcare and medical services.

Based on the request, the government of Japan sent a team to Uganda from November 2 to 26, 2008 to confirm the appropriateness and the contents of the request and determine the appropriate scope of the project. It was confirmed by the study that the project would contribute significantly to the improvement of the regional health structure and confirmed the effectiveness of the project. The study further recommended that project facilities should incorporate consolidation and centralization of functions insofar as possible for the effective and efficient operation of medical activities.

In response, the Japanese Government determined the implementation of the preparatory study and the Japan International Cooperation Agency (JICA) dispatched a preparatory study team in March 2009. The study team engaged in conferences with relevant individuals in Uganda, studied the relevant facilities, collected the necessary references, and studied the sites for which construction was planned. Thereafter, the team conducted an analysis of the above items in Japan and held an explanatory meeting on-site for the basic design summary in August 2009, following which the team prepared this preparatory study report.

3. Results of the Preparatory Study and Contents of the Project

Based on the study and the priorities placed by the Uganda side, the scope of the cooperation project was limited to facilities for which the need for improvement was confirmed and meeting the criteria of; 1."facilities for which the direct improvement of the secondary medical services would be expected", 2."facilities which require a relatively high level of construction technology", 3."priority for hospitals requiring both the construction of facilities and the procurement of equipment ".

Finally, Masaka Regional Referral Hospital and Mubende General Hospital (which was upgraded to Regional Referral status in July 2009), were determined as the two target hospitals with high effectiveness of assistance from project scale.

Thereby, it was concluded that it would be necessary for Masaka Regional Referral Hospital to receive the new facilities for the outpatient and casualty building, the operation theatre and laboratory building, and related facilities, and Mubende Regional Referral Hospital to receive the outpatient and operation theatre building, the casualty and obstetric building, a male ward, and related facilities. The procurement of the medical equipment which would be necessary for the newly constructed sections were also included.

The following is the outline of the “Project for the Rehabilitation of Hospitals and Supply of Medical Equipment in the Central Region of Uganda in the Republic of Uganda”.

4. Implementation Schedule and Cost Estimate

Responsible Agency: The Ministry of Health, the Government of Uganda

Implementing Agency: Health Infrastructure Div, Clinical Services, Ministry of Health (Masaka Regional Referral Hospital and Mubende Regional Referral)

Entire project period: Approximately 21 months, including the detailed design and tender period

Planned construction site: sites in Masaka and Mubende cities

Building structure: Reinforced concrete structure (New construction)

Content of the Project:

Outline of the Cooperation Project for Masaka Regional Referral Hospital

Project Component			Contents of the Facility
Main Building	OPD/Casualty Building (2 stories / 2,208.3 ㎡)	Ground Floor	O.P.D.：Surgical Casualty Dept.：1 Minor Operation Room, Material Sterilization Room
		First Floor	O.P.D.：General OPD(Male/Female Consultation, Paediatric) Specialised Medical(common)
	OP Theatre/ Laboratory Building (2 stories / 1,625.9 ㎡)	Ground Floor	Operation Dept.：3 Operation Theatres, 1 Minor Operation Room, Material Sterilization Room
		First Floor	Pharmacy Laboratory: Hematological / Physiological / Pathological Examinations Lecture Room
	Toilet Building (2 stories /132.5 ㎡)	Ground Floor First Floor	Toilet for outpatients, Toilet for staff, Toilet for persons with disabilities
	Total 3966.7m^2		
Related Facilities (1 storey/ 186.0 ㎡)		Electric Room （ 75.0 ㎡）	Electric Room Power Receiving Room, Generator Room
		Elevated Water Tank（111.0 ㎡）	
Medical Equipment		Provision for OPD/Casualty Building and Operation/Lab. Building	

Outline of the Cooperation Project for Mubende Regional Referral Hospital

<table>
<tr><th colspan="3">Project Component</th><th>Contents of the Facility</th></tr>
<tr><td rowspan="6">Main Building</td><td rowspan="2">Casualty /Maternity Building
(2 stories /
1,707.0 m²)</td><td>Ground Floor</td><td>O.P.D.：Surgical
Casualty Dept.：1 Minor Operation Room, Material Sterilization Room</td></tr>
<tr><td>First Floor</td><td>Maternity Dept.：Delivery, Prenatal Room, Postnatal Room</td></tr>
<tr><td rowspan="2">O.P.D/ Operation Theatre Building
(2 stories /
1,960.0 m²)</td><td>Ground Floor</td><td>O.P.D.： General OPD(Male/Female Consultation, Paediatric) Specialised Medical(common)
Pharmacy
Laboratory: Hematological / Physiological / Pathological Examinations</td></tr>
<tr><td>First Floor</td><td>Operation Dept.：2 Operation Theatres, Material Sterilization Room
O.P.D.：Special Clinics(Dental, E.N.T., Ophthalmological)</td></tr>
<tr><td>Toilet Building
(2 stories /132.5 m²)</td><td>Ground Floor
First Floor</td><td>Toilet for outpatients, Toilet for staff,
Toilet for persons with disabilities</td></tr>
<tr><td colspan="3">Total 3799.5m²</td></tr>
<tr><td colspan="2">Male Ward
(1 storey / 467.7 m²)</td><td>Ground Floor</td><td>Ward Room, Treatment Room</td></tr>
<tr><td colspan="2" rowspan="3">Related Facilities
(1 store/ 178.8 m²)</td><td>Electric Room
(75.0 m²)</td><td>Electric Room
Power Receiving Room, Generator Room</td></tr>
<tr><td>Elevated Water Tank (103.8 m²)</td><td rowspan="2"></td></tr>
<tr><td>Septic Tank (27.0 m²), Percolation Trench (500.0m²)</td></tr>
<tr><td colspan="2">Medical Equipment</td><td colspan="2">Provision of necessary equipment for Casualty /Maternity Building, O.P.D/ Operation Building, Male Ward</td></tr>
</table>

5. Project Benefits and Justification

Although the healthcare funding by donor countries in the Ugandan health care budget fluctuates depending on the year, the annual healthcare-related budget shows a steady increase. In particular, its growth in the immediate preceding period, from 2006/2007 to 2007/2008, was remarkable at 14.31% in comparison to a total budget amount of 277 billion Ush Uganda Shilling) in 2007/2008. Although general hospitals receive their budget from the provincial health offices, the budget for regional referral hospital are directly provided by the Ministry of Healthcare, and the budgets for the operation of the Masaka and Mubende Hospitals were allocated from the same budget provision. Regional referral hospitals are also staffed with financial officers and are judged to have good budget management capabilities.

- The total budget for the operation of the Masaka Regional Referral Hospital (2007/2008) was about 2,434 million Ush annually. The increase in the maintenance cost of the counterpart facility is estimated as 252 million Ush. Because the current maintenance cost of the counterpart facility is estimated at about 131 million Ush, the net increase due to the Project is about 121 million Ush, which corresponds to about 5% of the budget for the entire hospital operation.

- The total budget for the operation of the Mubende Regional Referral Hospital (2007/2008) was about 1,160 million Ush annually. The increase in the maintenance cost of the counterpart facility is estimated as 215 million Ush. Because the current maintenance cost of the counterpart facility is estimated at about 68 million Ush, the net increase due to the Project is about 147 million Ush. This

corresponds to 13% of the budget for the operation of the entire hospital. In addition, an increase in personnel expenses of about 109 million Ush is anticipated.

The Ministry of Healthcare has adopted the following budget measures, through which it is deemed possible to cope with the increased maintenance cost of the target hospitals.

- A portion of the increase in income of the medical fees will be allocated for maintenance at Masaka Regional Referral Hospital.

- It was announced that an additional budget would be allocated for the Mubende Regional Referral Hospital, associated with the promotion of the hospital to a regional referral hospital. The average budget of the 13 existing regional referral hospitals in fiscal 2008/2009 was about 2.2 billion Ush, which corresponds to an amount almost double the current budget of Mubende RHH. It has been announced that in accordance with the progress of the Project, increase in staff members at the hospital and the addition of extra budgets will be implemented on a stepwise basis to a level equivalent to that of other regional referral hospitals.

Based on the above, the budget for the maintenance of the plan has been secured, hence the operation and maintenance plan can be considered appropriate.

The following direct effects are anticipated when this project (the cooperation project by the Japanese side and the components to be borne by the Uganda government) is implemented.

Masaka Regional Referral Hospital

・Improvement of medical service function by consolidating the outpatient medical treatment function and Central Medical Treatment Function

The outpatient medical treatment function and the central medical treatment function are obsolete and are currently distributed throughout the premises of the hospital. By consolidating these functions into the medical treatment building to be newly built, efficiency and service functions are expected to improve.

As the indices of the above improvement, number of operations and the number of outpatients will be increased (2,491 operations/year] and 252,969 outpatients/year respectively for 2007/2008).

Mubende Regional Referral Hospital

・Improvement of Medical Service Function by Consolidating Outpatient Medical Treatment Function and Central Medical Treatment Function

The outpatient medical treatment function and the central medical treatment function are obsolete and are currently dispersed throughout the premises of the hospital. By consolidating these functions and the specialized outpatient medical treatment function required for a regional referral hospital into the medical treatment building to be newly built, further improvement of efficiency and service functions are expected.

By adjusting the hospital to the appropriate scale in relation to the number of workers and patients, indices such as the number of operations, the number of outpatients, and the number of deliveries will be increased, which are respectively 2,021 [deliveries/year], 1,213 [operations/year], and 83,620 [outpatients/year] for 2007/2008. The number of inpatients at 8,064 [inpatients/year] will also be increased because the male ward of the hospital will be improved.

・Improvement of the Emergency Medical Treatment Function

Mubende Regional Referral Hospital provides emergency medical services in a part of the surgery ward and the medical service capacity of the casualty department is insufficient. The casualty

department will be placed adjacent to the new surgery department to be built and also have an excellent relationship with the operation theatres. When it is completed under the Project, it will be possible to provide immediate and efficient medical services for emergency patients in serious condition and the number of emergency patients at the hospital is expected to increase.

・Improvement of Secondary Medical Services Provided in Mubende Regional Referral Hospital

The Mubende Regional Referral Hospital was promoted from a general hospital to a regional referral hospital in July 2009. The necessary function as a secondary medical service facility will be enriched by enhancing functions such as specialized outpatient medical treatment departments (the ophthalmology and otolaryngology departments) which a regional referral hospital should have.

Masaka Regional Referral Hospital and Mubende Regional Referral Hospital

・Enhanced Maintenance of Medical Equipment and Material

The following points will be improved by technical guidance under the soft component scheme.

-The maintenance and management system will be enhanced to implement regular scheduled maintenance and management activities will be arranged at target hospitals.
- The abilities of the medical personnel handling the equipment and the material in the counterpart hospital will be improved.

The following indirect effects are expected following the implementation of the Project:

・Improvement of Secondary Medical Services as a Referral Hospital

Masaka Regional Referral Hospital was originally positioned as a referral hospital which accepted patients from the general hospitals in the vicinity. However, because its facility and equipment were insufficient, patients originally accepted by the Masaka Regional Referral Hospital were directly transported to higher-rated hospitals in Kampala. In the future, Masaka Regional Referral Hospital will again be able to provide proper secondary medical services for its catchment area as a referral hospital through the implementation of the Project.

Mubende Regional Referral Hospital was promoted from a general hospital to a regional referral hospital and the functions necessary for a regional referral hospital will be arranged by the Project. Therefore, it will be possible for the hospital to provide proper secondary medical services as a referral hospital for the target population distributed over a wide area.

・Improvement of medical services for approximately 2.55million people in the catchment area

Masaka RHH and Mubende RHH will provide improved medical services for the approximate 2.55 million beneficiaries of the catchment area requiring secondary medical services beyond their respective districts.

・Improvement of Healthcare indices of Uganda

The provision of appropriately scaled hospital facilities for the Central Region will promote the improvement of healthcare indices such as infant and maternal mortality of Uganda.

Based on the above, it is affirmed that the implementation of the project under Japanese Grant Aid scheme is highly significant and its appropriateness and necessity are both extremely high.

In order to facilitate the smooth and effective operation of the two regional referral hospitals which will be improved by the Project and thus to allow the above direct and indirect effects to be realized, the following items must additionally be arranged and improved.

(1) Arrangements must be made for the sustained use of the facility and equipment in good condition by securing the required budget for their proper operation and maintenance, and providing sufficient training for the medical staff members for the facilities which will be newly constructed under the cooperation project,.

(2) By securing a budget to cover the cost of the repair and maintenance of the medical equipment, sudden equipment failures can be quickly remedied, thereby minimizing any degradation in the medical services. Furthermore, in order to cope smoothly with equipment expected to reach the end of their service life in the future, it is necessary to plan for a reserve fund to purchase new equipment.

(3) In order for the sustainable development of the hospitals based on sound management to be realized, it is important to formulate proper financial and budgetary plans and always maintain good knowledge of the financial situation and to reflect the results thereof in the operations of the hospitals for further improvement.

(4) Technical guidance under the soft component system are planned to improve the maintenance system of the hospitals. Therefore, in addition to the maintenance staff members in charge of the medical equipment at the two hospitals, the relevant personnel in the maintenance department of the Ministry of Healthcare must also be scheduled to attend training courses during the technical guidance period. The selection of lecturers to provide technical guidance is also a key point.

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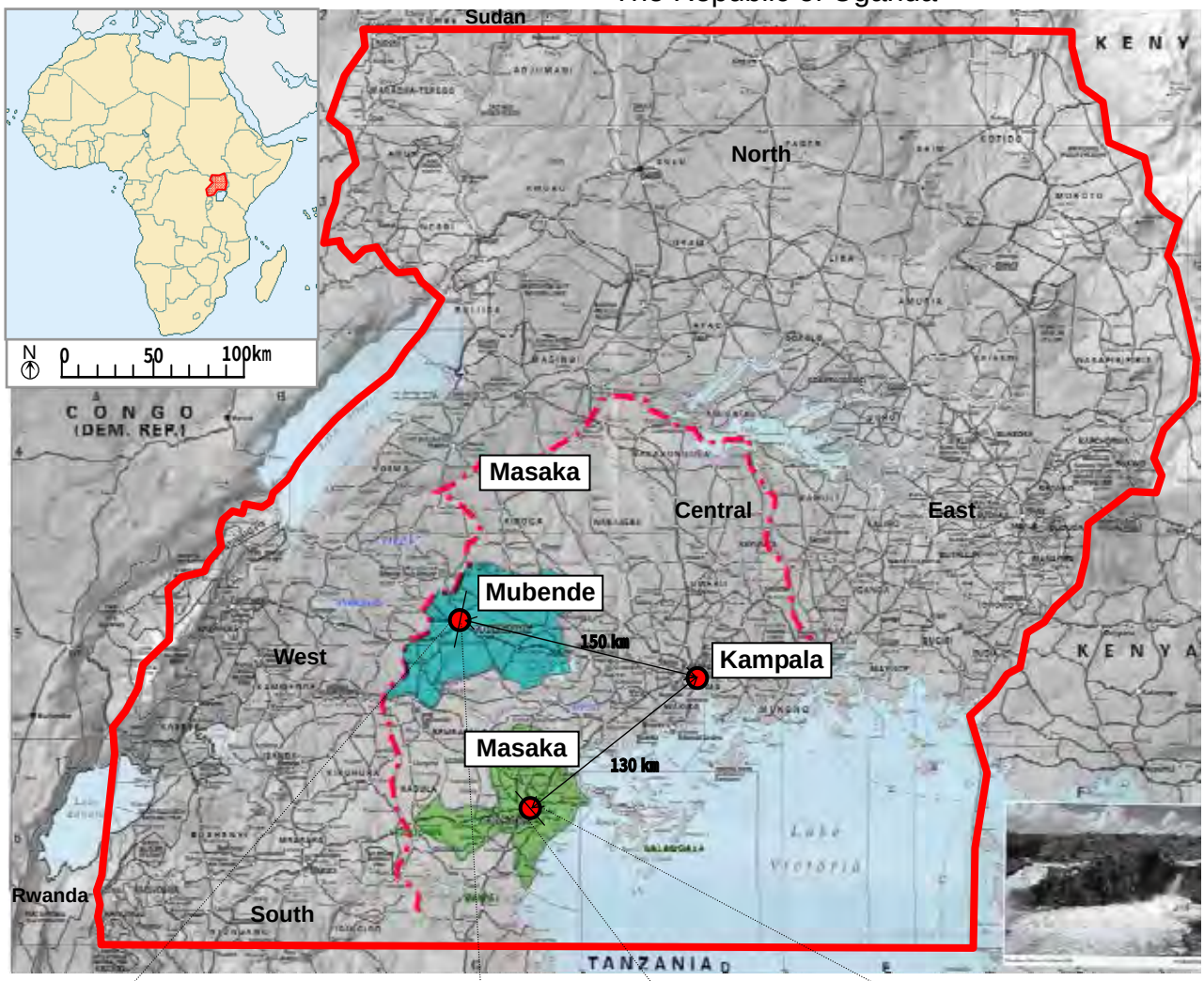
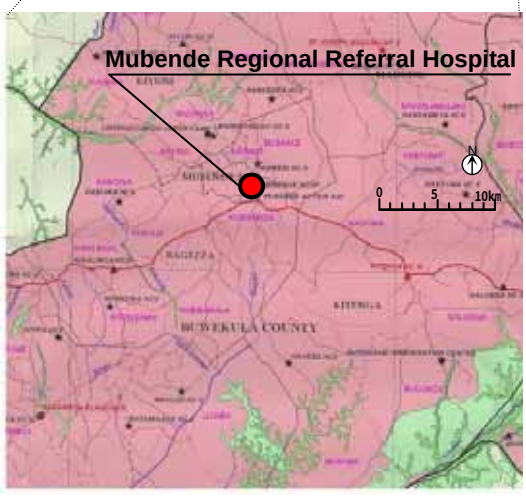
Location Map

The Republic of Uganda





Project Site

Perspective (Masaka Regional Referral Hospital)

Perspective (Mubende Regional Referral Hospital))

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ABBREVIATIONS

A/P	Authorization to Pay
AfDB	African Development Bank
AIDS	Acquired Immunodeficiency Syndrome
B/A	Banking Arrangement
BS	British Standard
DANIDA	Danish International Development Assistance
E/N	Exchange of Notes
EU	European Union
G/A	Grant Agreement
GAVI	The Global Alliance for Vaccines and Immunization
GDP	Gross Domestic Product
GH	General Hospital
GNI	Gross National Income
HC	Health Centre
HIV	Human Immunodeficiency Virus
HSSP	Health Sector Strategic Plan
IMF	International Monetary Fund
JASS	Japanese Architectural Standard Specification
JICA	Japan International Cooperation Agency
JIS	Japan Industrial Standard
MMR	Maternity Mortality Rate
MOH	Ministry of Health
NGO	Non-Governmental Organizations
NRH	National Referral Hospital
NWSC	National Water and Sewarage Corporation
ODA	Official Development Assistance
PEAP	Poverty Eradication Action Plan
RCT	Randomized Controlled Trial
RRH	Regional Referral Hospital
UNDP	United Nations Fund Development Program
UNFPA	United Nations Fund for Population Activities
UNICEF	United Nations Children's Fund
UNMHCP	Uganda National Minimum Health Care Package
US	Uganda Standard
VAT	Value Added Tax
VCT	Voluntary Counselling and Testing
WB	World Bank
WFP	World Food Programme
WHO	World Health Organization

Chapter 1. Background of the Project

CHAPTER 1. BACKGROUND OF THE PROJECT

The Republic of Uganda (hereinafter, referred to as "Uganda") is a country under republicanism surrounded by Congo, Kenya, Tanzania, and Sudan in eastern Africa. Uganda became independent from Great Britain in 1962 and adopted republicanism in 1963. It covers 241,000 km^2, which is about 2/3 the area of Japan, and has a population of about 32.7 million (2008). The country's GNI (Gross National Income) per person is US$280 (2005).

The level of healthcare in Uganda, similar to those of neighboring countries in eastern Africa, is among the worst in the world. This is shown by the two of the main healthcare indices of maternal death rate of 550 against 0.1 million births (2005) and an infant death rate of 79 against 1,000 births (2005). Uganda is also an area where infectious diseases such as malaria, tuberculosis, measles, and HIV/AIDS prevail, and Uganda has also had cases of Ebola hemorrhagic fever.

To improve such circumstances, the Ugandan Government formulated the "Healthcare Sector Strategy Plan (Phase I: 2001 to 2005, Phase II: 2006 to 2010)" and adopted measures such as the promotion of free medical services, enhanced access by increasing medical facilities, and enhanced service delivery, targeting the community level up to the provincial level. Thanks to these measures, some achievements were obtained, such as the fact that the access rate to a nearby medical facility within 5 km was improved from 49% of the total population (1999) to 72% (2004). Conversely however, in regional referral hospitals and those which act as secondary medical facilities, the facilities have become obsolete and the medical equipment and materials insufficient, which have prevented local residents from receiving sufficient medical services. In addition, the population growth rate is also high at 3.2% per year, hence the demand for medical services are expected to increase further in the future.

Under such circumstances, the Ugandan Government, following the project for the Eastern region, requested the Japanese government to implement a grant aid project for the improvement of medical facilities and equipment in the Central Region. The objective was to enhance the hospital functions and improving the quality of the medical services they provide by improving the facilities and equipment and thereby improving the local medical referral system. Four hospitals which represent the central facilities for healthcare and medical services were to be improved by renovating their facilities and equipment, and four other hospitals were to receive improvement of their equipment. The counterpart area of the Plan is the central region of Uganda , which is a populous area located in the vicinity of the national capital, Kampala. Although the area has significant needs for healthcare and medical services, the facilities and equipment in the region have become very rundown and unable to provide proper healthcare and medical services.

Based on the request, the government of Japan sent a team to Uganda from November 2 to 26, 2008 to confirm the appropriateness and contents of the request and determine the appropriate scope of the project. It was confirmed by the study that the project would contribute significantly to the improvement of regional health structure and confirmed the effectiveness of the project. The study further recommended that project facilities should incorporate consolidation and centralization of functions insofar as possible for the effective and efficient operation of medical activities.

Summary of the requested components after the Preparatory Study (Preliminary Study) are shown in Table 1-1

Table 1-1 Final Request for Preparatory Study (Preliminary Study)

Final Request for Preparatory Study (Preliminary Study) (November 2008)					
Facilities and Equipment	Priority	A	A	A－	B
	Target Hospital	Masaka RRH	Mubende GH	Mityana GH	Entebbe GH
	Com-ponent	1. Operation theatre 2. OPD 3. Maternity and Gynaecology 4. Female Ward 5. Generator Room 6. Morgue Equipment for Medical activities	1. Operation theatre 2. Maternity delivery unit 3. OPD, Casualty, Administration department 4. Male Ward 5. Water supply, Sewage 6. Incinerator Equipment for Medical activities	1. OPD, Casualty, Administration dept 2. Operation theatre 3. Pediatrics dept. 4. Generator 5. Water supply & sewage 6. Morgue Equipment for Medical activities	1. Operation theatre 2. OPD dept. Equipment for Medical activities
Equipment only	Priority	B－	B－	B－	B－
	Target Hospital	Gombe GH (98 items)	Nakaseke GH (147 items)	Kayunga GH (156 items)	Kawolo GH (97 items)

In response, the Japanese Government determined the implementation of the preparatory study and the Japan International Cooperation Agency (JICA) dispatched a preparatory study team in March 2009. The study team engaged in conferences with relevant individuals in Uganda, studied the relevant facilities, collected the necessary references, and studied the sites for which construction was planned. Thereafter, the team conducted an analysis of the above items in Japan and held an explanatory meeting on-site for the basic design summary in August 2009, following which the team prepared this preparatory study report.

The facilities in the present Project reflect the recommendations of the Preparatory Study (Preliminary Study) and integrate the OPD, Operation Theatre and Casualty departments.

Chapter 2. Contents of the Project

CHAPTER 2. CONTENTS OF THE PROJECT

2-1 Basic Concept of the Project

(1) Overall goal and project objective

The government of the Republic of Uganda (hereinafter referred to as 'Uganda') has formulated the Health Sector Strategic Plan (HSSP) (HSSP I, from 2001 to 2005 and HSSP II, from 2006 to 2010) in which the government made efforts, among others, to establish a free medical care system throughout the country, to improve the rate of access to medical facilities by increasing their numbers, and to strengthen the delivery of medical services all the way from the community level to the district level. These efforts have produced certain tangible outcomes, such as an increase in the ratio of the population having access to a medical facility within a distance of 5 km from 49% (1999) to 72% (2004). On the other hand, Regional Referral Hospitals and General Hospitals, which are secondary medical facilities, are now suffering from obsolescence and a lack of medical facilities and medical equipment. The secondary facilities have become unable to provide proper medical services for some diseases and injuries and people are having difficulty receiving proper medical care.

Against this background, various donors, some who have close relations with Uganda historically such as UK, international organizations, and the EU, extend a variety of assistance to Uganda to help resolve these problems. The Infrastructure Division of the Ministry of Health coordinates assistance from various countries to avoid duplication. Uganda's medical service facilities form a network with two National Referral Hospitals in Kampala, the capital city, at the top, eleven regional referral hospitals as high-level secondary medical facilities, General Hospitals at the next lower secondary level, and health centres from 1st to 4th grades at the bottom, respectively corresponding to tertiary, secondary, and primary health care facilities. Overall insufficient staffing, obsolescence of medical facilities, and insufficient provision of medical equipment constitute some of the factors hindering efficient improvement of medical service delivery.

This project aims as direct output, by implementation under the Japanese Grant Aid scheme, to enable Masaka Regional Referral Hospital (Masaka RRH) and Mubende Regional Referral Hospital (Mubende RRH) to function properly as high-level medical facilities. It thereby aims to provide the people in the Central Region of Uganda with proper medical and healthcare service as regional core hospitals through the delivery of local secondary medical services and also provide emergency medical services in disaster and emergency situations.

(2) Outline of the project

This project aims to enhance the function of medical service in the Central Region of Uganda by improving its secondary medical facilities. The original request from the government of Uganda requested improvement of the facilities and provision of equipment to four hospitals and provision of equipment to another four hospitals. Responding to the request, the government of Japan dispatched a preparatory study (Basic Design) team to confirm the situation, study the appropriateness of this project and promotion of its implementation.

The preparatory study (Basic Design) analysed the result of the field survey, and after discussions with the Ministry of Health of Uganda, reduced the request down to two hospitals, considering the scale of this assistance and the possibility of assistance from other donors.

In order to achieve the above objectives, the Project will construct new facilities and procure equipment at the two project hospitals and also implement Soft Component assistance for equipment maintenance and appropriate operations. It is expected that this will enable the effective use of equipment and conduction of medical activities. Within this framework, the assistance project will construct the OPD/Casualty building and Operation Theatre at Masaka RHH and the OPD/Casualty building, Emergency/Maternity Department and Male Ward at Mubende RHH along with the ancillary facilities and procure the equipment required for the new facilities.

The outline of the project for Japanese assistance is shown in Tables 2-1 and 2-2.

Table 2-1 Outline of the project for Masaka RRH

Project Component			Contents of the Facility
Main Building	OPD/Casualty Building (2 stories / 2,208.3 ㎡)	Ground Floor	O.P.D.：Surgical Casualty Dept.：1 Minor Operation Room, Material Sterilization Room
		First Floor	O.P.D.：General OPD(Medical, Paediatric) Specialised Medical (common)
	OP Theatre/ Laboratory Building (2 stories / 1,625.9 ㎡)	Ground Floor	Operation Dept.：3 Operation Theatres, 1 Minor Operation Room, Material Sterilization Room
		First Floor	Pharmacy Laboratory: Hematological / Physiological / Pathological Examinations Lecture room
	Toilet Building (2 stories /132.5 ㎡)	Ground Floor First Floor	Toilet for outpatients, Toilet for staff, Toilet for persons with disabilities
	Total 3966.7m^2		
Related Facilities (1 storey/ 186.0 ㎡)		Electric Room (75.0 ㎡)	Electric room Power receiving room, Generator room
		Elevated Water Tank (111.0 ㎡)	
Medical Equipment		Provision for OPD/Casualty Building and Operation/Lab. Building	

Table 2-2 Outline of the project for Mubende RRH

Project Component			Contents of the Facility
Main Building	Casualty /Maternity Building (2 stories / 1,707.0 ㎡)	Ground Floor	O.P.D.：Surgical Casualty Dept.：1 Minor Operation Room, Material Sterilization Room
		First Floor	Maternity Dept.：Delivery, Prenatal Room, Postnatal Room
	O.P.D/ OP Theatre Building (2 stories / 1,960.0 ㎡)	Ground Floor	O.P.D.： General OPD(Medical, Paediatric) Specialised Medical (common) Pharmacy Laboratory: Hematological / Physiological / Pathological Examinations
		First Floor	Operation Dept.：2 Operation Theatres, Material Sterilization Room O.P.D.：Special Clinics(Dental, E.N.T., Ophthalmological)
	Toilet Building (2 stories /132.5 ㎡)	Ground Floor First Floor	Toilet for outpatients, Toilet for staff, Toilet for persons with disabilities
	Total 3799.5m^2		
Male Ward (1 storey / 467.7 ㎡)		Ground Floor	Ward room、Treatment room
Related Facilities (1 storey/ 178.8 ㎡)		Electric Room (75.0 ㎡)	Electric room Power receiving room, Generator room
		Elevated Water Tank (103.8 ㎡)	
		Septic Tank (27.0㎡), Percolation Trench (500.0㎡)	
Medical Equipment		Provision of necessary equipment for Casualty /Maternity Building, O.P.D/ Operation Building, Male Ward	

2-2 Outline Design of the Japanese Assistance

2-2-1 Design Policy

(1) Basic policy

① Strengthening of the hospital function

The objective of the present plan is to strengthen the hospital functions of both Masaka RHH and Mubende RHH hospitals to the essential levels required of secondary medical facilities in order to promote the improvement of the referral system.

At Masaka RHH, the present dispersed functional layout of the OPD, Casualty, Operation Theatre and Examination Laboratories will be consolidated to increase the efficiency of hospital activities.

At Mubende RHH, the additional medical functions for OPD, Casualty, Operation Theatre, Examination Laboratories, Maternity Department and Male Ward required due to its being raised in status to regional referral hospital are to be complemented to improve hospital activities.

② Facility Master Plan

In the initial stage of developing facility improvement plans for both hospitals, zoning plans by hospital function (the facility master plan) was established. The facility master plan sets out a future vision for the hospitals. Renewal and expansion of the facilities and equipment was conducted based on this facility master plan. This provides the framework for the project to redress the present state of disorder in which the facilities have been implemented ever since their commissioning. This will enable the effective and sustainable management of the hospitals.

③ Determination of the scale or size of the planned facilities

The scale or size of the planned facilities of both hospitals will be determined based on present and past performance data on diagnosis and treatment, and also consider forecast population increases in the subject areas and the numbers of medical and healthcare professionals at both hospitals.

④ Height of the buildings

The buildings will be two stories in height to effectively utilize the limited available site area of the hospitals with minimum adverse effect on the medical services (except for the Male Ward of the Mubende RHH, which will be one story in height because the building is relatively small). Ramps will be used for vertical movement so that elevators or similar facilities, which require maintenance costs, will not be necessary.

⑤ Hospital facilities that enable continuous medical activities in case of disaster

This project will adopt Ugandan standards for earthquake resistance and wind resistance. The structure of the hospital facilities will be designed to allow the facilities to provide continuous medical activities without disruption in case of natural disasters(particularly rain season and earthquake) taking into consideration Uganda's natural conditions.

⑥ Measures to prevent nosocomial and community infections

The facilities will be planned to avoid crossing of circulations of patients and those of medical and healthcare professionals and others to minimize nosocomial infection.

⑦ Environmental considerations

The sewage treatment system will be designed in compliance with Uganda standards to the prevent environmental contamination in the surroundings communities at both hospitals.

⑧ Technical and fiscal sustainability

The facility plan and equipment plan will be limited to the technical and fiscal sustainability of the hospitals, based on their managerial capabilities (number of medical and healthcare professionals, their technical levels, financial affordability, state of procurement of consumables and replacement parts, etc.) The construction materials are to be selected with preference to those meeting the criteria for sturdiness, low maintenance requirements, local availability, and ease of replacement or repair.

⑨ Construction plan enabling the provision of sustainable medical services

The existing facilities of both hospitals need to be demolished under the obligation of the Uganda side to secure the construction sites prior to starting construction of the project facilities. The medical services carried out in the medical facilities to be demolished need to be continuously provided during the construction period. Therefore, these facilities, together with their functions, are planned to be relocated, temporarily or permanently, to existing facilities, including those now under construction.

⑩ Equipment plan

The project will provide such equipment as will be needed by the planned facilities of this project for providing the secondary level medical services and also to supplement existing equipment considered to be insufficient due to the expansion of the functions.

⑪ Equipment to be excluded

The equipment for the facilities excluded from this project are also excluded. Existing equipment which can still be utilised properly are excluded from the procurement list and will be transferred to new facilities.

⑫ Soft components (Technical Assistance)

JICA's soft component system will be used to implement technical instructions to effectively utilise the equipment provided and to strengthen maintenance and management activities including establishment of re-training plan, formation of equipment maintenance system for the project facilities,. ,

⑬ Role as an teaching hospital

Masaka RRH is a teaching hospital attached to a medical school and due consideration will be given to facilitating training activities.

⑭ Activities of other donors

The project will be fully informed of the state of activities of other donors and will be careful that assistance provided by this project does not duplicate any activities of other donors.

(2) Policy toward natural conditions

1) Temperature and humidity

The monthly mean maximum temperatures at Masaka and Mubende range from 25°C to 28°C, and the temperature never exceeds 30°C. Air conditioners will not be installed in general. The facilities will be designed to allow ample natural airflow to realise sufficient ventilation. However, air conditioners will be installed in such rooms that require a high degree of cleanliness as operation theatres or rooms that accommodate expensive equipment such as X-ray equipment.

2) Precipitation

Both Masaka and Mubende have rainfall throughout the year. The rainfall peaks in March and September in Masaka, and in April and October in Mubende. The annual precipitation is less than that of Japan.

Data on hourly maximum precipitation are not available, but daily maximum does not exceed 100 mm. Determination of the amount of rainwater runoff from the roof and exterior drainage capacity will follow more rigorous Japanese standards for the selection of standpipes for rainwater drainage to allow a good margin of safety.

3) Sunlight and ultraviolet rays

Since the project sites are located on the equator and at high altitudes, the solar ultraviolet rays are intense. Accordingly, materials for portions of the exterior finishing material exposed to direct sunlight will be selected for resistance to deterioration.

4) Disaster record

Uganda does not suffer from serious wind damage or flood damage. Neither the Central Region nor Western Region suffers from such disasters. The structural designs of the buildings will comply with the standards of Uganda's Building Design Standard for seismic force and wind pressure. According to this standard, the probability of earthquakes tends to become higher to the west in Uganda.

(3) Policy toward socioeconomic conditions

The GDP growth rate of Uganda was 10.8% and 7.9% in 2006 and 2007, respectively. The GDP growth rate of 2008 is yet to be announced. The consumer price index rose by 7.2%, 6.1%, and 12.0% in 2006, 2007, and 2008, respectively. It rose by 0.7% from January to February this year. The per capita GNI is 370 US dollars.

According to documents issued by the Uganda Bureau of Statistics, construction costs rose by about 11% to 12% during the period from 2006 to 2007, and it rose further by about 15% during the period from 2007 to 2008. 2008 saw significant rise in international prices for raw materials such as iron ore, coking coal, and crude oil and is thought to be one of the factors that contributed to the significant rise in construction costs in 2008. The prices of manufactured goods are expected to see further rises. Although the overall price trend shows a slight rising tendency, some believe that rates of increase in GDP and the consumer price index will decline.

Electric power supply is not stable. This factor will be considered in the formulation of an implementation schedule for construction works.

(4) Policy toward construction business conditions

The business climate of the construction industry is not bad at present. Most construction works are private investment projects. A number of buildings under construction are seen in Kampala, the capital city. However, buildings under construction are rarely seen in Masaka and Mubende, where the planned construction sites are situated and the business climate is not good. In the urban area of Kampala, twenty story or taller buildings are seen. Around the construction sites, common residences are mostly single story, and even commercial buildings are only four stories high.

The labour situation has an excess in total working population exceeding demand, and most of the workers are simple unskilled labourers. Skilled workers are in significantly short supply in terms of both quality and number. Their skill levels are not as high as equivalent workers in advanced countries.

(5) Policy toward particular business conditions and trade practices

Cutting down trees in natural forests has been banned in Uganda; however, timber is domestically procurable by compensatory tree planting. Timber-processing skills are not of a high level and sufficient care must be exercised in the selection of locally produced wooden fittings and other wood products.

Cars run on the left-hand side of the road, as is the case in Japan. Trucks and such public passenger vehicles as buses are legally required to be equipped with a speed governor that limits the top speed of a car from exceeding 80 km/hour. Estimation of the time required for transportation of facilities and equipment will consider such regulations.

(6) Policy toward employing local contractors

It is required to file an application with a registry to conduct construction business in Uganda, but is not necessary to be registered with the Ministry of Works, Housing and Communications.

Currently, a total of sixty-nine companies are registered with the Uganda National Association of Building and Civil Engineering Contractors (UNABCEC). Member companies are not categorised by trade such as architecture or civil but are classified by sales amount in five ranks, A*, A, B, C, and D. Companies of A* rank are the largest companies. Bulletins published by UNABCEC do not indicate data on capital, assets, numbers of employees, past performance, or yearly contract amounts of member companies.

There are some local construction companies that have experience in construction works associated with Japanese ODA projects. These companies are all classified as A* or A rank companies by UNABECEC.

It is said that there are about three large local construction companies in Uganda, one with European capital and the other two with Indian capital. The construction costs of the company with European capital are said to be higher than those of the companies with Indian capital. There is no company with Japanese capital, but some Japanese companies have local business offices or liaison offices in Uganda. They mainly receive contracts for ODA works. The technical level of Ugandan construction companies are still lower than advanced countries. Therefore, the direct management of Japanese engineers is essential if local companies are employed as subcontractors of Japanese enterprises. These Japanese engineers will conduct detailed examinations of construction processes, quality management, and safety management as well as providing technical instruction. The labour pool of construction workers is relatively abundant. However, skilled workers may be in short supply depending upon the trade. The project will consider as necessary the use of skilled expatriate workers from third countries.

This project is to construct hospital facilities and the degree of difficulty of construction work is relatively high. Under the Japanese Grant Aid scheme, a Japanese construction contractor will employ local contractors as subcontractors to carry out construction work. The subcontractors will be large-scale local companies with higher construction capabilities falling under Rank A* or A.

(7) Policy toward implementing the agency’s management and maintenance ability

1) Facility plan

Masaka RRH and Mubende RHH have both been in service for about eighty years since they were commissioned. During this long period, hospital facilities have been added and modified one after another. Masaka RRH has about thirty buildings and Mubende RHH, about twenty buildings. Many of them were built between 1930 and 1950. Some of these structures are seriously deteriorated.

At present, four people are in charge of maintenance of facilities in Masaka RRH and one person in Mubende RHH. Masaka RRH maintains its facilities relatively well. However, Mubende RHH needs re-enforcement of its maintenance staff and capacity building so that the maintenance organization functions properly.

In planning this project, the most important issue is ease of maintenance and reduction of running costs. Facilities and equipment of the proper quality will be selected, and they should be locally procurable to the extent possible.

2) Equipment plan

Masaka RRH assigns one engineer as leader and two assistant engineers to maintenance of equipment. The maintenance division does not practice regular maintenance management such as periodic maintenance inspections or repair of failed equipment. Equipment that are technically difficult to maintain such as diagnostic imaging equipment are managed under maintenance and management contracts between the Ministry of Health and equipment agents to provide repair services in case of equipment failure.

The expense for maintenance of equipment is covered by the budget provided by the Ministry of Health. The average annual expenditure for the past three years is about 27 million Ush (about 1,330 thousand Yen) for Masaka RRH and 11 million Ush (about 550 thousand Yen) for Mubende RHH, spent for purchase of replacement parts, etc. Masaka RRH is larger in scale than Mubende RHH and its maintenance expense is larger than that of Mubende RHH. Maintenance costs are forecast to rise for both hospitals when the project facilities are implemented. Masaka RRH plans to cover the incremental maintenance cost by increases in medical fee collection. By contrast, Mubende RHH cannot expect a significant increase in medical fee income because it is located in an area where the ratio of people belonging to the poorer strata is high. It is therefore planned to upgrade Mubende RHH from the present status of General Hospital to Regional Referral Hospital to allow a concomitant increase in allocation of the health budget that will cover the incremental management cost.

The performance of all planned equipment will match the services provided by each medical department using the equipment concerned. Equipment specifications will take into consideration for equipment for which replacement parts and consumables are procurable in the domestic market. This will reduce the increase in maintenance cost to the extent possible. Preference will also be given to such equipment that is extensively used in Uganda for the sake of ease of maintenance and operation.

(8) Policy toward setting of grades for facilities and equipment.

1) Facility plan

The designs of the hospital buildings will comply with the provisions of the following standards in use in Uganda applicable to hospital facilities, etc. The facility plan will incorporate environmental consideration, prevention of nosocomial infection, caring for those with disabilities, and ability to cope with disaster.

- Public Health Act.
- Structural Design Guide Lines (Draft, 2004)
- Seismic Code Practice for Structural Designs-U319

The organisation and functions of similar medical facilities in Uganda will also be referred to in setting the grade for each department and each room commensurate with their performance requirements in order to develop a facility plan that will maximise cost-effectiveness.

2) Equipment plan

The project plans to improve medical services by providing new and additional equipment that are required for the expansion and improvement of the diagnosis and treatment services at the hospitals through facility augmentation. The grade of each item of equipment will be set to be commensurate with the skill levels of the medical and healthcare professionals and services required of each department and also so as to not significantly increase the maintenance budgets of the hospitals.

(9) Policy toward methods of construction, procurement and construction period

1) Policy toward method of construction

Locally common construction methods will be preferentially adopted for the building foundation and structural frame works and works of similar nature. However, Japanese construction standards will be referred to for such components as window fittings, which are liable to have functional problems, insufficient sturdiness, or insufficient air tightness,.

2) Policy toward method of procurement

Uganda is basically an agricultural country, with coffee, tea, and fishery products as its main products. Uganda produces very few manufactured goods. Uganda depends almost entirely on import for the supply of manufactured goods (construction materials) such as cement, bricks, masonry materials, roof tiles, and deformed bars, mainly from Kenya, South Africa, China, India, and European countries. To facilitate maintenance after equipment procurement, construction materials will be procured locally to the extent possible. In such cases, the quality and amount to be supplied will be carefully confirmed so that the construction schedule is not adversely affected.

Because Uganda is a land-locked country, materials, facilities, and equipment imported from Japan and third countries will be transported by sea to the Port of Mombasa, Kenya, a neighbouring country. The goods will then be transported over land by vehicle to each site, via Nairobi and Kampala. Goods from Kenya will be transported over land from point of procurement.

The trunk roads in Kenya used for the land transportation are paved. However, pavements are noticeably deteriorated on certain portions, and the goods will be subjected to significant shock and vibration in route. Some of the equipment must be securely packed to withstand possible damage from shock, high humidity and high temperature.

Most equipment is basic and easy to maintain. They will be generally procured from Japan. However, procurement of third-country products will be studied for certain equipment, such as those to be installed in the operation theatres, partly because they require local agents for maintenance and also to avoid hindering competition for fair tender by limiting the procurement to Japanese products.

3) Policy toward construction period

Due the project content and scale of the requested Japanese assistance, it is considered better to implement the construction over a period of more than one year.

The construction sites are both situated in the hospital premises. Furthermore, provision and improvement of various infrastructure facilities will be implemented as part of Uganda's obligation. Therefore, it is important that all concerned persons thoroughly understand and confirm with each other the construction implementation schedule so that progress in the construction of the planned facilities is not hindered. It is also important that the construction work be well planned so as not to hinder the routine medical services of the hospitals during the construction period.

2-2-2 Basic plan (Construction Plan / Equipment Plan)

2-2-2-1 Overall Project Description (Study of the Request)

(1) Transition of the Contents of the Request

The transition in the contents and scope of the request are illustrated in Figure 2-1.

Priority	Initial Request (Request) (July, 2006)	Preparatory Study Final Request (November, 2008)
	Target facility & component	
A	Masaka RHH	
	1.Operation theatre 2.OPD, Casualty department 3.Female Ward 4.Maternity delivery unit 5.Generator Room Equipment for Medical activities	1.Operation theatre 2.OPD department 3.Maternity delivery unit 4.Female Ward 5.Generator Room 6.Morgue Equipment for Medical activities
A	Mubende GH	
	1.Operation theatre 2.OPD, Casualty department 3.Female Ward 4.Male Ward 5.Generator Room Equipment for Medical activities	1.Operation theatre 2. Maternity delivery unit 3.OPD, Casualty, Administration department 4.Male Ward 5.Water supply, Sewage 6.Incinerator Equipment for Medical activities
A－	Mityana GH	
	1.Operation theatre 2.OPD,Casualty, X-ray dept 3.Pediatrics dept. 4.Morgue 5.Generator Room Equipment for Medical activities	1.OPD, Casualty, Administration dept 2.Operation theatre 3.Pediatrics dept. 4. Generator 5. Water supply & sewage 6.Morgue Equipment for Medical activities
B	Entebbe GH	
	1.Operation theatre 2.OPD,Casualty, X-ray dept 3.Pediatrics dept. 4.Morgue 5.Generator Room Equipment for Medical activities	1.Operation department 2.OPD dept. Equipment for Medical activities
B-Equip-ment only	Gombe GH	
	Nakaseke GH	
	Kayunga GH	
	Kawolo GH	

Priority	Final Request (March 2009)
	Target facility & component
1	Masaka RHH
	OPD & casualty dept. Examination dept. Operation Theatre & sterilization dept. Dentistry Generator Water supply & Sewage Equipment required for above target facilities
1	Mubende GH
	OPD & casualty dept. Examination dept. Operation Theatre & Sterilization dept. Dentistry Maternity dept. & delivery unit Male ward Generator Water supply & Sewage Equipment required for above target facilities
2	Mityana GH
	OPD, Casualty, Administration dept Examination dept. Operation Theatre & Sterilization dept. Dentistry Generator Water supply & Sewage Equipment required for above target facilities

Final Scope
Target facility & component
Masaka RHH
OPD & casualty dept. Examination dept. Operation Theatre & Sterilization dept. Generator Water supply & Sewage Equipment required for above target facilities
Mubende RHH
OPD & casualty dept. Examination dept. Operation Theatre & Sterilization dept. Dentistry, ENT & Ophthalmology Maternity dept. & delivery unit Male ward Generator Water supply & Sewage Equipment required for above target facilities

Analysis in Japan Stage
-Mityana GH was confirmed to receive assistance from another donor .
-The importance and effectiveness of improving RHH functions is high for strengthening referral structure.
-RHH receive budget directly from MOH and have staff for accounts. They are judged to have good budget management capabilities.
Target hospitals are reduced to two for above reasons。

Criteria for reduction (Preparatory Study (Basic Design stage)
- priority for hospitals with both facility and equipment request
- priority for facilities requiring advanced technology
- Facilities with expected direct benefit for improvement of secondary medical services
- scale of cooperation

Figure 2-1 Reduction of Scope of Request

1) Facility plan

① Contents of the initial request

The initial request of November 24, 2008 consisted of assistance to four hospitals for facility improvement and equipment provision and to another four hospitals for equipment provision, or in other words, to eight hospitals for their major facilities' functions, as is shown in Table 2-3.

Table 2-3 The initial request

Request for facilities and equipment		Request for equipment	
Priority	**Hospital**	**Priority***	**Hospital**
A	**Masaka RRH**	**Facilities prioritized over equipment**	**Gombe GH**
A	**Mubende GH**		**Nakaseke GH**
A－	**Mityana GH**		**Kayunga GH**
B	**Entebbe GH**		**Kawolo GH**

*Note: Facility renovation has priority over equipment provision.

② Contents of the final request confirmed by Preparatory Study

The Preparatory Study was conducted from March 2 to April 2, 2009. Comprehensive discussions were held between the preparatory study team (hereinafter referred to as "the Team") and the Uganda side to confirm the contents of the final request mainly on the following points.

- Centralisation and integrated design of diagnosis/treatment and laboratory functions.
- Rational strengthening of hospital functions, including prevention of nosocomial infections.
- Facilities expected to have direct effects on improvement of medical service
- Prioritisation of improvement of the facilities that require high levels of construction technology, such as the outpatient building and the central diagnosis and treatment building
- Prioritisation of hospitals for which both facility construction and equipment procurement are implemented
- Prioritisation of hospitals that are generally lagging behind in improvement of medical services
- Effective use of existing facilities

The eight hospitals listed in the initial request were all recognised as needing assistance as confirmed by the previous preliminary study. Actual numbers of patients visiting these hospitals were examined based on the field study results, and the expected scale of works was compared with those hospitals in the Eastern Region to which Japan extended assistance in the past. It was found that the scale of the project would substantially exceed the project scale initially contemplated. Accordingly, it was decided to significantly reduce the scope of assistance. In line with this decision, Entebbe Hospital, whose hospital functions have already been strengthened to a certain extent, and four hospitals requesting only equipment provision were removed from the request based on necessity and project scale. The four hospitals have low priority accorded by Uganda side and can also expect assistance from other donors.

Finally, it was concluded that improvement was necessary for diagnosis and treatment department (general outpatient department, casualty department, and operation theatre) of Masaka RRH and for diagnosis and treatment department (general outpatient department, casualty department, and operation theatre), Maternity department, and male ward of Mubende RHH. It was judged best if the X-ray department were improved as part of the project in consideration of integration and improvement in efficiency of

medical activities. . However, it was removed from the scope because the X-ray department was already under improvement by another donor, and demarcation of responsibility would become unclear if the equipment concerned were relocated. It was decided that diagnosis and treatment department (general outpatient department, casualty department, and operation theatre) of Mityana General Hospital (Mityana GH) would remain in the final request; . However, the final decision on this hospital will be made in consideration of the entire project scale.

2) Equipment plan

① Details of the equipment plan.

The discussion on the equipment plan was based on the selection for suitable device for procurement from the standard medical device lists of Uganda and the equipment selection criteria (Table 2-4) which was limited to the range from the high priority level (A) in the preparatory survey. As a result of the discussions, the final requested equipment list was attached to Minutes of Discussions(M/D). The equipment plan was further refined based on the analysis in Japan which reflected the site investigation.

② Basic policy of equipment selection

Equipment selection is conducted based upon equipment selection criteria shown in the following Table 2-4.
The equipment in the equipment listed in the preliminary study report which were to be installed in facilities or departments eliminated from project scope were also excluded from final list.

Table 2-4 Equipment selection criteria

Urgency	To focus equipment procurement to highly prioritised departments and facilities
Uganda side Obligation	Uganda side obligation for easily procured equipment and instruments.
Technical Capability	To select equipment that can be operated at present technical skill levels
Sustainability	To select equipment that are sustainable in maintenance and operation.

Contents of Final Requests agreed with Uganda on this study is shown in the Table 2-5. (as mentioned in Minutes of Discussion of March 19, 2009)

Table 2-5 Final Requests

Target Hospital	Masaka RRH	Mubende RHH	Mityana GH
Priority of sites	A	A	A-
Required facilities	・OPD& Casualty Department ・Examination Department ・Operating & Material Sterilization Room ・Dentistry ・Generator ・Water supply & Sewerage system	・OPD& Casualty Department ・Examination Department ・Operating & Material Sterilization Room ・Dentistry ・Maternity& Delivery Unit ・Male ward ・Generator ・Water supply & Sewerage system	・OPD& Casualty Department ・Examination Department ・Operating & Material Sterilization Room ・Dentistry ・Generator ・Water supply & Sewerage system

Target Hospital	Masaka RRH	Mubende RHH	Mityana GH
Required equipment	Operation theatre OPD Casualty Maternity and Gynaecology Female ward Dental Orthopaedics Laboratory Physiotherapy	Operation theatre OPD Laboratory General ward Maternity ward Dental Ante Neonatal room Pharmacy	Operation theatre OPD Laboratory Dental Antenatal /Neonatal room Pharmacy X-ray room

(2) Facility plan

1) Analysis on the necessity and relevance of the contents of the request for facilities

The results of the study on the final request by the Uganda side were as explained below. At commencement of the analysis in Japan based on the Preparatory Study in Uganda, it was confirmed that improvement of Mityana GH would be conducted with the cooperation of another donor and hence the hospital was eliminated from the scope of this project.

Masaka RRH

a) Background to cooperation

① Background for inclusion of Masaka RRH in the requested Japanese assistance

As part of its efforts in the HSSP I (2001 to 2005) and HSSP II (2006 to 2010), the government of Uganda has promoted the establishment of a free medical care system throughout the country, improvement of the rate of access to medical facilities by increasing their numbers, and strengthening of the delivery of medical services from the community level to the district level, among other measures.

There are two national referral hospitals in the Central Region. However, Masaka RRH is the only regional referral hospital in the Central Region. Also, Masaka District is the district with the third largest population after Wakiso District, close to Kampala, the capital city, and Mukono District. Masaka RRH is important in this region since the hospital has to receive patents from hospitals within its catchment area in the referral system instituted under Uganda's medical system. In addition, Masaka RRH has the function of a training hospital for medical students. The inclusion of Masaka RHH in the scope of the project is justified.

② Delay in facility improvement during a long period of medical activities

Masaka RRH by itself has made efforts towards fiscal independence, as exemplified by its private wards, unlike ordinary wards of this country that do not charge fees. The hospital as a whole is comparatively well maintained but the operation theatre was built in 1955 and a building built in 1956 is used for the diagnosis and treatment of general outpatients. The small operation theatre is closed because of serious deterioration. Overall, the hospital's facilities and equipment are conspicuously obsolescent.

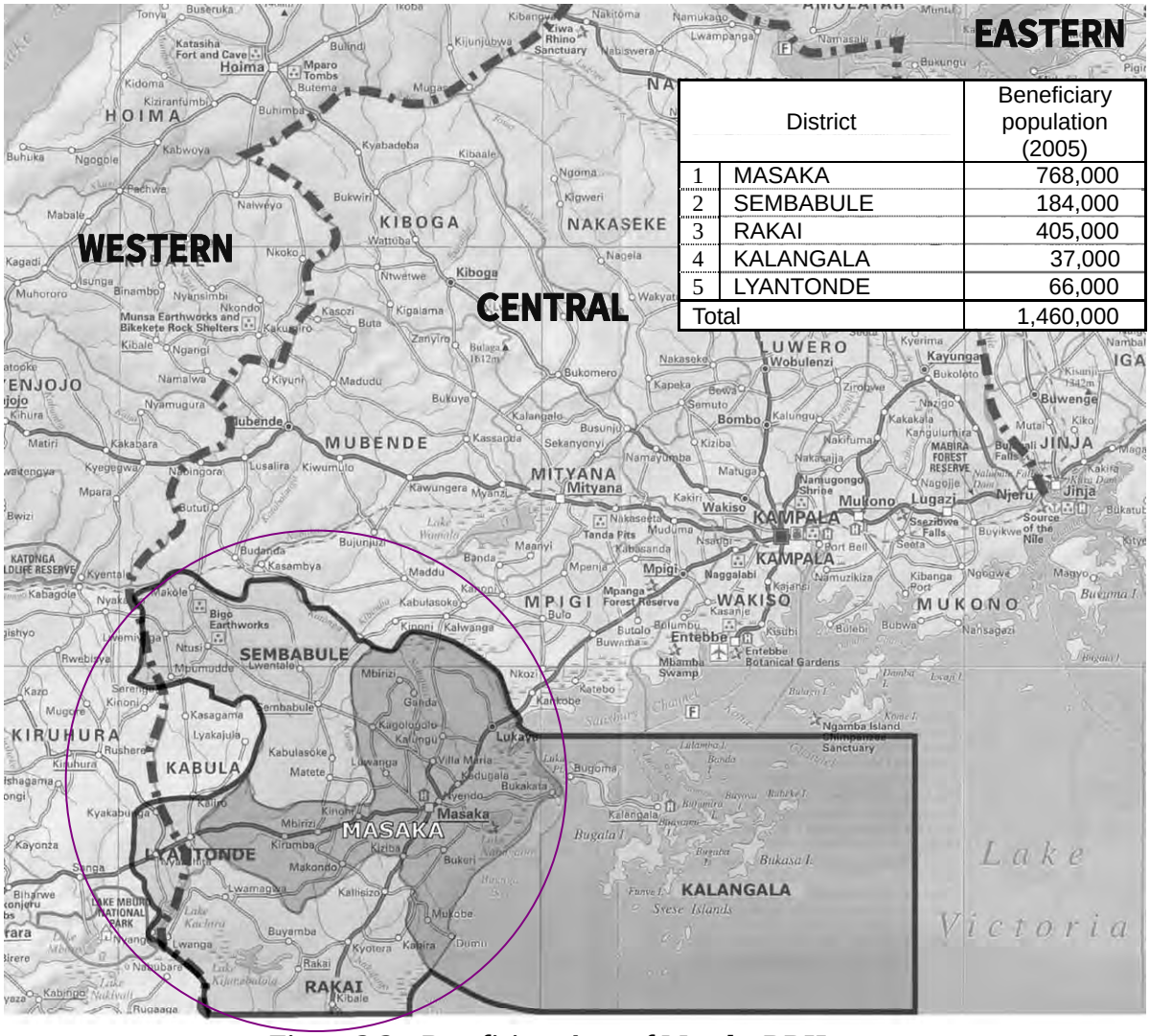
The deterioration and obsolescence has created a number of problems with the necessary functions of the hospital, such as those listed below. These items require urgent improvement.

- Reduction in level of medical services due to distance between the outpatient department and the central diagnosis and treatment department and to large differences in floor level resulting from the difference in elevation in the site
- Risks of nosocomial infections and medical accidents that may result from crossing of circulation of patients and those of medical staff and supplies.
- Negative impacts on surrounding environment by untreated medical wastewater discharge

- Increased physical and mental burdens on patients resulting from insufficient floor area for diagnosis and treatment rooms and wards (long outdoor waiting times, lack of beds, etc.)
- Insufficient ventilation and lighting, lack of privacy and poor indoor environment due to deterioration and outmoded planning of fifty to sixty year old buildings
- Insufficient consultation rooms and examination rooms compared with the number of medical and healthcare professionals

③ Role as a regional referral hospital covering neighbouring districts

Masaka RRH, situated in Masaka District, is a secondary level medical facility. The interview survey indicates that the beneficiary population of the hospital is about 1.5 million people living in four neighbouring districts in addition to Masaka District, as shown in the Figure 2-2 below. The number of patients stood at about 250 thousand a year, which is far too large for the scale of the present hospital facilities. Central Province has two national hospitals in the capital, Mulago National Hospital and Butabika Hospital. Nevertheless, Masaka RRH plays an important role as the only regional referral hospital in this area.



	District	Beneficiary population (2005)
1	MASAKA	768,000
2	SEMBABULE	184,000
3	RAKAI	405,000
4	KALANGALA	37,000
5	LYANTONDE	66,000
Total		1,460,000

Figure 2-2 Beneficiary Area of Masaka RRH

b) Study on the necessity and relevance

① After discussion on the requested items, it was reconfirmed that the top priority would be given to construction of facilities and equipment procurement of the operation department and the outpatient department, including the casualty department, and it was further agreed that relatively simple buildings such as wards would be constructed by the Uganda side. Furthermore, it was agreed that these departments would be improved in an integrated manner and it was also confirmed that close connection between the new and existing facilities was important.

② The 'planned construction site in the hospital premises' selected at the stage of preliminary study is at a distance from the existing facilities. If the buildings for the outpatient department, the casualty department, and the operation department are built on the planned construction site, the relations with the existing facilities would be strained, raising concerns that the overall medical functions would eventually decline. The Team conducted an onsite investigation of the hospital premises with the medical superintendent and other key persons, and consequently agreed with the Uganda side that existing buildings would be demolished to the minimum but required extent to prepare a construction site for the new buildings at a location that will permit strengthening of functional integration with the existing facilities such as wards.

③ At the preliminary study stage, the existing outpatient building was to be modified by the Uganda side to accommodate the casualty department. In this case, the casualty department would be located separately from the outpatient department and the operation theatre. It was judged that incorporating the casualty department as part of the outpatient department would be the proper solution. It should be noted that the initial request by the Uganda side treats the casualty department as a part of the outpatient department.

④ The hospital has already commenced implementation of rehabilitation of the delivery room in the Maternity department. It was confirmed that the hospital would start rehabilitation of the existing maternity ward in a consecutive phase. Accordingly, it was agreed to eliminate the requested maternity ward from the project scope.

⑤ The dentistry department was included in the initial request. The existing dentistry department, although relatively small, operates in another building. It was agreed in the technical memorandum that the dentistry department would be removed from the scope as it is less urgent and lower on the priority list compared with other departments.

Mubende RHH

a) Background to cooperation

① Background for inclusion of Mubende RHH in the requested Japanese assistance

As explained concerning Masaka RRH, the government of Uganda promotes improvement of medical facilities in its effort in healthcare and medical service improvement. Mubende RHH has been upgraded from a general hospital to a regional referral hospital, effective from July 2009. Regional referral hospitals are specified to have special diagnosis and treatment departments such as an otolaryngology department and ophthalmology department, in addition to the general diagnosis and treatment departments required of district hospitals. . However, Mubende RHH does not have these special diagnosis and treatment departments at present and does not meet the standard for a regional referral hospital. Therefore, facilities for the planned otolaryngology department and ophthalmology department are required.

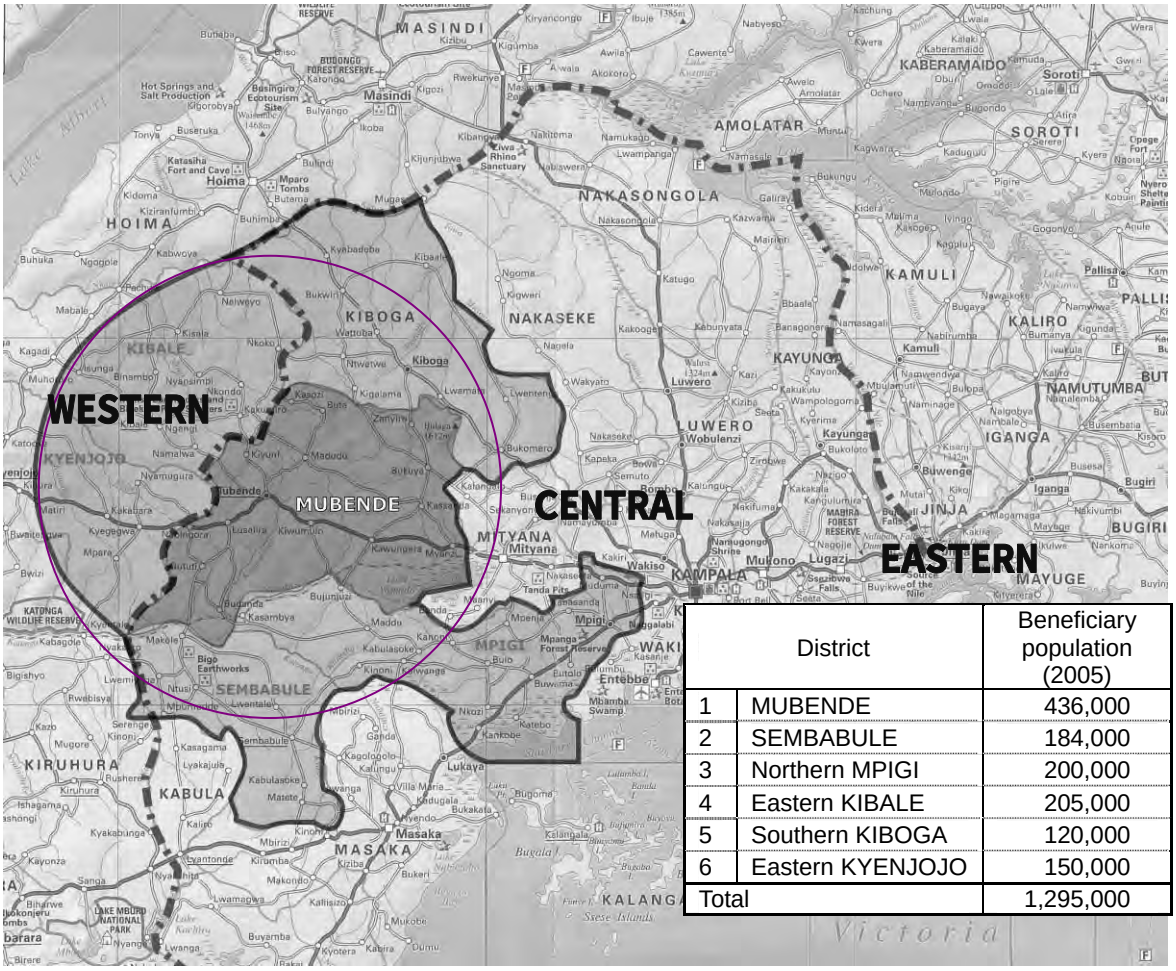
② Delay in facility improvement during a long period of medical activities

Most buildings of Mubende RHH were built in the 1930s and are seriously deteriorated. Equipment are also noticeably obsolescent and the facilities have very limited space. The hospital has a number of problems with its necessary functions as a regional referral hospital such as those listed below. These items urgently need improvement.

- Decline in the level of medical services due to separation of the outpatient department from the central diagnosis and treatment department
- Risks of nosocomial infections that may result from crossing of traffic lines of patients and those of medical staff and supplies, as well as medical accidents.
- Negative impacts on surrounding environments by untreated medical wastewater discharge
- Increased physical and mental burdens on patients resulting from insufficient floor area for diagnosis and treatment rooms and wards (long outdoor waiting times, lack of beds, etc.)
- Insufficient ventilation and lighting, lack of privacy and poor indoor environment due to close spacing between buildings, deterioration and outmoded planning of buildings which are seventy years and older

③ Improvement of casualty diagnosis and treatment services to cope with increasing traffic accidents

The trunk road that runs from Kampala, the capital city, to neighbouring Congo passes though the Mubende area. Traffic accidents occur frequently in this area on the trunk road. Mityana General Hospital (Mityana GH), a hospital in the neighbouring district (see Figure 2-2), does not have a casualty diagnosis and treatment department for emergency casualty care. Casualty patients in this area are transported either to the capital city area or to Mubende RHH. Even with its importance for casualty care, Mubende RHH has only one room where casualty diagnosis and treatment can be performed and is unable to deliver sufficient medical service to casualty patients.



	District	Beneficiary population (2005)
1	MUBENDE	436,000
2	SEMBABULE	184,000
3	Northern MPIGI	200,000
4	Eastern KIBALE	205,000
5	Southern KIBOGA	120,000
6	Eastern KYENJOJO	150,000
Total		1,295,000

Figure 2-3 Beneficiary Area of Mubende RHH

b) Study on the necessity and relevance

① The order of priority by division in Mubende RHH is similar to that of Masaka RRH, except that the maternity ward (including the delivery function) has a higher priority over the outpatient building. The onsite field study confirmed a state of congestion in the existing Maternity department, which clarified this difference in the priority. The construction site is secured at a place adjacent to an existing hospital facility (within the hospital site), and this construction site is judged to be the best for strengthening the hospital functions.

② The numbers of outpatients visiting Mubende RHH and medical and healthcare professionals (including medical doctors) are much lower than those of Masaka RRH. Although Mubende RHH is being upgraded in July 2009, a rapid increase in the number of medical doctors would be difficult to achieve. The Uganda side requested the same level of input as that to Masaka RRH; . However, the concerned facility capacities should be determined based on verifiable factors such as past numbers of outpatients and the present rate of population growth. However, it is also important that the facility plan should have provisions for future expansion of facilities to accommodate increases in the numbers of patients and medical professionals associated with the upgrading of the hospital.

③ Study on the maternity department

- Necessity of the maternity department

  The goals set in HSSP II, the plan of the Ministry of Health preceding this project are a important aspect of the considerations for the maternity department facilities. An important objective of this plan is to raise the rate of deliveries at medical facilities to 50% from the present 25%. The Poverty Eradication Action Plan (PEAP) has also set goals to be achieved by 2009 in the healthcare sector including

a reduction in the maternity mortality rate (MMR) from 506 per 100,000 births. to 354 The hospital should address these issues by expanding its ability to accommodate patients by such means as increasing capacity to deal with Maternity outpatients, expansion of its functions for prevention of maternal deaths, and intensification of its ability to perform obstetrics surgeries.
The Maternity departments at Masaka RHH and Mubende RHH have undergone a number of expansions and modifications over time, and the floor plans have become quite confused. In addition, asbestos is used in the existing maternity department roofs. Based on these factors, continued use of these wards are not recommended.

- Relationship between the maternity department and the operation department
  It is very important in the daily operations of the hospital that various rooms of the maternity department have close collaboration with the operation theatre, because caesarean operations account for most of the operations performed in the hospital. It is therefore important that the rooms related to delivery would be laid out at a location where close collaboration with the operation department is possible.

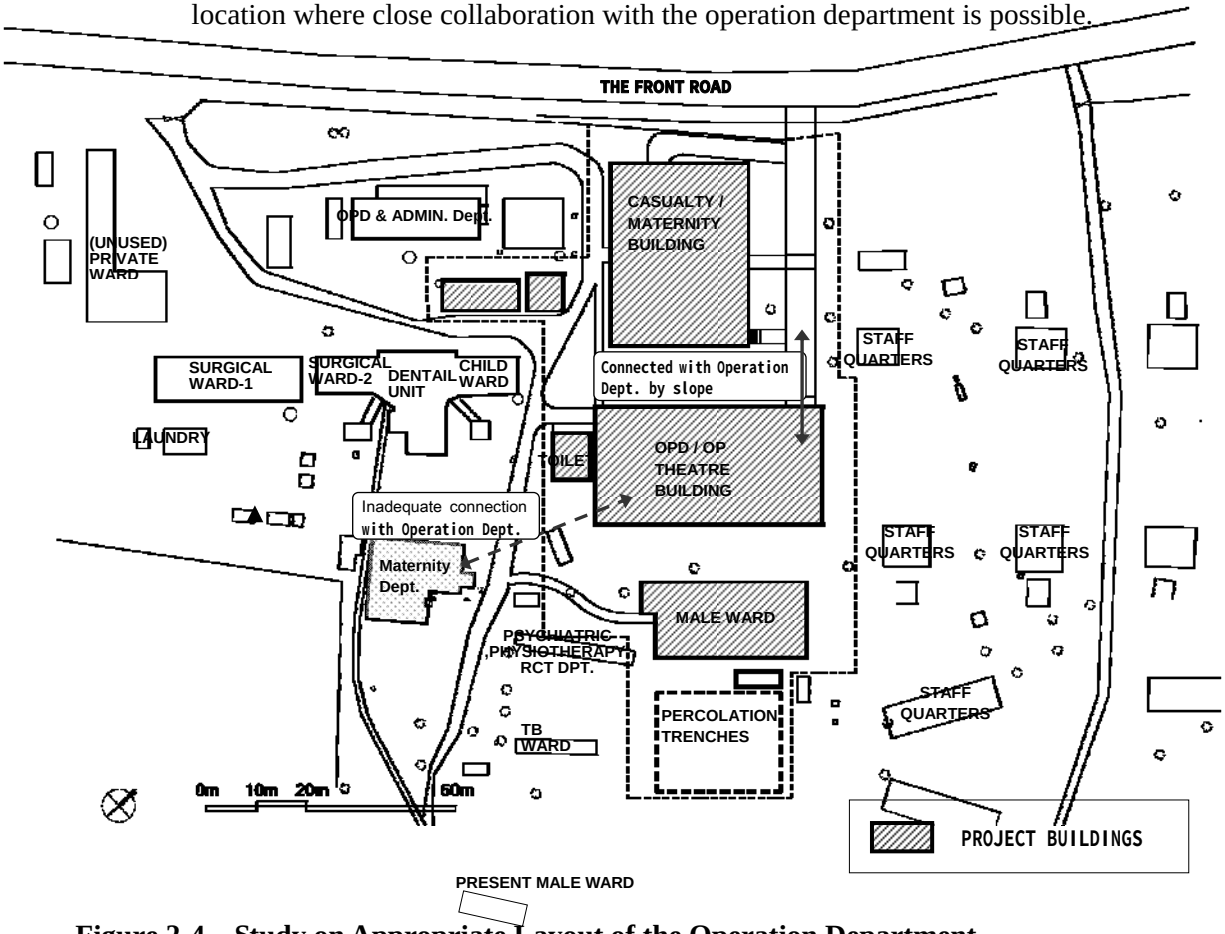


Figure 2-4 Study on Appropriate Layout of the Operation Department and the Maternity Department in Mubende RHH

④ Relevance of the male ward
The present male ward is located at the most rearward area of the hospital premises, remote from the facilities for diagnosis and treatment. The building was first built to accommodate family members of patients attending to the patients and is now being temporarily used as the male ward.
Construction of a male ward will permit the building now in use as a temporarily male ward to be used for its intended use as accommodation for family members. Therefore, construction of a male ward is considered relevant to this project.
Conversion of the existing maternity ward into a male ward is not recommendable

because the roof contains asbestos as mentioned before and the deteriorated condition have rendered the building inappropriate for ward use.

2) Result of the study on facility request

① Masaka RRH

Although the hospital needs overall improvement and renewal of its facilities and equipment for the reasons mentioned above, the necessity and relevance of Japan's Grant Aid scheme was reviewed to define the scope of the project based on criteria of 'facilities that are expected to have direct effects upon medical service improvement', 'facilities that require a relatively high level of construction technology', and 'improvement of regional healthcare and medical service networks'. The diagnosis and treatment department (including the general outpatient diagnosis and treatment department, special outpatient diagnosis and treatment department, casualty diagnosis and treatment department, and operation theatre) is judged appropriate to be included in the scope of assistance.

② Mubende RHH

As is the case with Masaka RRH, improvement of the diagnosis and treatment department is included in the scope of assistance for the reasons explained above. In addition, the Maternity department and the male ward are included in the scope of assistance.

The otolaryngology department, and ophthalmology department which are necessary associated with the upgrading of the hospital and the dentistry department are included in the scope.

Table 2-6 Result of study for facilities

Result of study for facilities			
Masaka RRH		Mubende RHH	
Priority	Department / Sectors	Priority	Department / Sectors
A	**Operation Department**/ -Operation theatre - Material Sterilization Room	A	**Operation Department**/ -Operation theatre -Material Sterilization Room
A	**OPD（General ・Specialised・Laboratory）/ Casualty）** -Medical -Paediatric -Surgery (Orthopaedics) - Laboratory: （Physiological / Pathological ） -Pharmacy -Record	A	**OPD（General ・Specialised・Laboratory）/ Casualty）** -Medical -Paediatric -Surgery (Orthopaedics) -Dentistry -E.N.T -Ophthalmology - Laboratory: （Physiological / Pathological ） -Pharmacy -Record
A	**Infrastructure**/ （for only new facilities） -Water supply and Sewerage system -Generator	A	**Maternity** -Delivery Unit
		A	**Ward** -Male Ward
			Infrastructure/ （only for new facilities） -Water supply and Sewerage system -Generator

In Masaka RRH, two buildings, namely the mental health unit and the private ward, are being implemented with assistance from other donors. In Mubende RHH, ADB is implementing construction of a mental health unit, and a private ward is being implemented by local government funds. In addition, the World Bank plans to construct staff quarters. These plans do not duplicate the plans to be implemented by this project. There is no need for study or coordination to avoid duplication.

(3) Equipment Plan

1) Summary of equipment planning

The summary of equipment plan in the project hospitals (Masaka RRH and Mubende RHH) is as follows.

Masaka RRH

a) OPD (Ground floor)
There are equipment requests for physiotherapy and occupational therapy room, but except for examination couch which will be immediately needed after operation of the new department, the other requests are excluded from this project because the existing equipment can be transferred and missing equipment can be procured by the Uganda side.

b) OPD (ground floor)
Diagnostic equipment sets, x-ray viewers, examination lights and examination couches will be provided for the examination room and dressing room (male, female, paediatrics and specialised medical) on the second floor of the OPD ward, in order to expand basic diagnosis and treatment services.

c) Casualty (1st floor)
Resuscitator and pulse oxymeter etc. will be provided to the resuscitation room for heart lung resuscitation. Operating table, operating light and suction unit and other minor equipment will be provided to minor Operation theatre, for emergency treatment like stop bleeding, suturing injured site etc. And for clinic, infant warmer will be provided for keeping neonates warming besides examination light and couch, etc.

d) Dental clinic
After analysis in Japan, procurement for this department is excluded because the existing equipment are sufficient for operation.

e) Pharmacy (1st floor)
Procurement of electric balance to weigh drugs, water distillation unit necessary for preparation of internal medicine and other minor equipment are to be provided.

f) Laboratory (1st floor)
This laboratory is equipped to examine microorganisms, parasites, biochemistry and blood samples, etc. Most of the equipment to be used are in operation and can be transferred to the new facility. However, microscope and centrifuge are missing and will be provided. The refrigerator for preservation of blood, which lacks sufficient capacity, and the examination couch for blood collection procedure in the transfusion department of the laboratory are to be supplemented.

g) Operating Department (ground floor)
General operation table, electrosurgical unit, pulse oxymeter, suction unit and ceiling light will be provided in two of three Operation theatres to perform major operations under general anaesthesia. The remaining room will be provided with orthopaedic table with the same equipment as for above Operation theatre to respond to the increasing demand for orthopaedic surgery due to the increase of traffic accidents. Operating instruments to supplement those lacking, including obstetric set for caesarean section and induced abortion, and general surgery set will be provided. One defibrillator unit for the Operation theatre will be deployed in consideration for the contents and scales of operations. The requested C armed x-ray machine is a necessary device for orthopaedic operations and is included in the project. Vertical autoclave machine, which is in wide use in Uganda, and supplemental portable autoclave will be provided for sterilization of operation instruments and linen. Procurement of stand operating light and operating table, etc are planned for the minor Operation theatre located next to the major theatres. Recovery bed for post operative

recovery from anaesthetic surgery will be provided in the recovery room. Water sterilizer will be provided to sterilize water used for hand washing to prevent nosocomial infections.

Mubende RHH

a) OPD (ground floor)
Diagnostic equipment sets, x-ray viewers, examination lights and examination couches will be provided for the examination room and dressing room (male, female, paediatrics and specialised medical) on the first floor of OPD ward, in order to expand basic diagnosis and treatment services.

b) Pharmacy (ground floor)
Procurement of electric balance to weigh drugs, water distillation unit necessary for preparation of internal medicine and other minor equipment are to be provided.

c) Laboratory (ground floor)
This laboratory is equipped to examine microorganisms, parasites, biochemistry and blood samples, etc. Most of the equipment to be used are in operation and can be transferred to the new facility. However, microscope and centrifuge are missing and will be provided. The refrigerator for preservation of blood, which lacks sufficient capacity, and the examination couch for blood collection procedure in the transfusion department of the laboratory are to be supplemented.

d) OPD (ground floor)
Examination light and minor surgery set are to be provided for surgery consulting room. Examination couch will be provided for physiotherapy/occupational therapy room. Other equipment are excluded because Uganda side can transfer existing equipment or procure by self-reliant effort.

e) Casualty (ground floor)
Resuscitation table etc will be provided for heart lung resuscitation in the Resuscitation room. Operating table, operating light and suction unit, etc will be provided in minor Operation theatre, for emergency treatment like stop bleeding, suturing injuries and the like. Infant warmer will be provided for maintaining body heat and treatment of neonates.

f) Operation Department (1st floor)
General operation table, electrosurgical unit, pulse oxymeter, suction unit and ceiling light will be provided in the two Operation theatres to perform major operations under general anaesthesia. Obstetrics set, which lack sufficient numbers to meet large demand for operations and general surgery set are to be supplemented. Vertical autoclave machine, which is in wide use in Uganda, and supplemental portable autoclave will be provided for sterilization of operation instruments and linen. Recovery bed for post operative recovery from anaesthetic surgery will be provided in the recovery room. Water sterilizer will be provided to sterilize water used for hand washing to prevent nosocomial infections.

g) Special clinics (1st floor)
Examination light and couch will be provided for Eye/ENT consulting rooms,. Operating light for cataract surgery will be provided for assumed mobile medical services by specialist doctors. The diagnosis equipment is assumed to be carried by the specialists or procured by Uganda side.

h) Dental clinic (1st floor)
Dental chair/unit which lack sufficient numbers to meet service demand is to be provided
Dental x-ray unit, which is needed for diagnosis will also be provided.

i) Maternity (1st floor)
Height adjustable obstetric bed to reduce burden on expecting mothers during delivery are to be provided in ante labour and recovery rooms. Delivery instrument set, delivery bed, operating light for night time, etc will be provided for delivery room. Treatment equipment such as infant warmer, incubator and suction unit will be provided for the nursery room,.

j) Male ward
Hospital beds are to be provided as the ward equipment for inpatients. Examination couches are to be provided in treatment rooms. The patient-beds with backrest function for medical treatment are to be provided as the project hospital attends to comparatively severe cases as a secondary medical institution. As there are a large number of the beds and the specified grade is for medical treatment, the cost is judged to be too high for Uganda to bear, and exceeds the range of self-reliance. Therefore, it is judged appropriate to include the beds in this project.

Study of relevant particulars

a) The subject departments of equipment procurement
After the site investigation and discussions with the Uganda side, the subject departments in the target hospitals have been confirmed to be limited to the following which contribute to the improvement of medicals services.

1) OPD ; Laboratory, Pharmacy etc,
2) Casualty department; Minor Operation theatre, Treatment room, Recovery room
3) Operating department; Operation theatre, sterilizing room etc,
4) Maternity department ; Delivery room ,Recovery room, Nursery room etc,.

b) Policy as a result of the site investigation
The site investigations confirmed that each department can not adequately carry out required functions. The study also found that a large part of the deficient function was due to the lack of needed fundamental equipment. Therefore, in the medical equipment plan, priority is given to the selection of fundamental equipment and equipment lacking sufficient numbers required for each department to realize their functions.

c） Policy on the local infrastructure situation
Based upon the site investigation on the local infrastructure situation, it was found that the water quality is hard with low water-pressure. Power supply voltage fluctuations at both hospitals is large and over-current situation occurs frequently. Installation of a voltage stabilizer (AVR) is planned for the equipments (inspection equipment etc.) which are susceptible to damage form voltage fluctuations. The autoclave equipment is susceptible to water pressure fluctuation and water quality. A water softening machine will be attached and a system to manually pour the softened water into the sterilization equipment without a connection to the water-supply pipe is adopted.

d） Reflection of the opinion of Department of Health and JICA specialist
During discussions with staff engineers in charge of operation and maintenance in the Infrastructure Division of MOH and the technical expert of Japanese technical cooperation project, the lessons from past projects were reviewed. It was decided to reflect these in this project. The important matters are as follows.

Table 2-7 Lessons from past projects

Equipment No・Name	Problems	Response to this project
1-8：Electro surgical unit	The sterilization of the hand switch cannot be performed by the current autoclave device.	The foot switches only are to be specified
1-14、1-15：Operating light	The battery is special and cannot be obtained in Uganda. In addition, the imports are expensive and difficult to purchase.	The storage battery will be specified to 12V allowing general-purpose battery (for cars) for use as replacement parts, enabling its use in Uganda.
	The electric bulb is a sealed type and cannot be obtained locally. In addition, the imported bulbs are expensive and difficult to purchase.	To use 12V electric bulb (Dr. Fischer) which can be obtained domestically.
1-22：Anaesthesia machine with ventilator	With high frequency of power failure, operations are often interrupted.	UPS is added to equipment component.
2-36：Delivery bed	Some types of beds break easily because of not being suited with Ugandan's size.	The quality of steel materials, thickness, etc. should be specified considering the typical body size of Ugandans.

2) Revision of equipment plan after analysis in Japan

The requested equipment plan prepared during the field survey was revised as follows after analysis in Japan.

Table 2-8 Revised Final Request list of Major items after analysis in Japan

1. Masaka RRH

Department	Item No・Description	Content of revision	Reason
Recovery room after OP	1-21: Recovery bed	addition	Needed to renew and supplement the existing equipment. Large numbers required exceed Uganda side resources.
Casualty	1-26：Examination light	addition	To renew existing defunct lighting equipment for night time treatment and deliveries.
Casualty	1-35：X-ray viewer	addition	To supplement existing numbers to requirements.
Dental clinic	1-46～52：Dental chair/unit	deletion	Not needed because the existing facility and equipment can be used.
OPD	1-61：Examination light	addition	Needed to secure proper lighting
OPD	1-62：X-ray viewer	addition	To supplement existing numbers to requirements.

2. Mubende RHH

Department	Item No・Description	Content of revise	Reason
Operation Theatre	2-31: X-ray viewer	addition	To supplement existing numbers to requirements.
Recovery room	2-35:Recovery bed	addition	Needed to renew and supplement existing beds. The requirement is large and exceeds the financial capability of Uganda side.
Maternity delivery room	2-38:Operating light, stand	addition	Needed to renew existing defunct lighting equipment for night time treatment and deliveries.
Maternity ward	2-47:Obstetric bed	addition	Needed to renew and supplement existing beds and with adjustable height to reduce burden on expecting mothers. The requirement is large and exceeds the financial capability of Uganda side.
Male ward	2-49:Bedside cabinet	deletion	The article is furniture. Furniture procurement is obligation of Uganda-side.
	2-51: Examination Light	addition	Needed to obtain proper illumination for treatment

3) Equipment Analysis

Equipment selection is conducted based upon equipment selection criteria shown in Table 2-9.When all the criteria are satisfied, the equipment will be selected as planned equipment. The examination result is shown in Table2-10.

Table 2-9 Equipment Analysis and Results

Judgement：○Passed, ×Failed

Criteria：①Emergency ②Obligation ③Technical level ④Maintenance

*1：Final requested equipment list No.

＊1	Equipment no.	Description	Existing no.	Requested no	Criteria ①	②	③	④	Judgment	Priority	Location	Purpose replace	supplement	newly	Planned no.
	1.	Masaka RRH													
	(1)	Operation Theatre													
1	1-1	Operating table, general	2	2	○	○	○	○	○	A	Operation theatre (2,3)	2	0	0	2
2	1-2	Operating table, orthopaedic	0	1	○	○	○	○	○	A	Operation theatre (1)	0	0	1	1
3	1-3	Operating table	1	1	○	○	○	○	○	A	Minor Operation theatre(1)	1	0	0	1
4	1-4	Stretcher	1	1	○	○	○	○	○	A	Operating hall	1	0	0	1
5	1-5	Suction unit, large	2	5	○	○	○	○	○	A	Operation theatre(1～3、Minor Operation theatre)	2	3	0	5
6	1-6	Suction unit, small	1	2	○	○	○	○	○	A	Operation theatre (1,2)	1	1	0	2
7	1-7	C arm X-ray machine	0	1	×	○	○	○	×	A	-	0	0	0	0
8	1-8	Electrosurgical unit	1	3	○	○	○	○	○	A	Operation theatre (1～3)	1	2	0	3
9	1-9	Laryngoscope set	1	3	○	○	○	○	○	A	Operation theatre (1～3)	1	2	0	3
10	1-10	Laparotomy set	2	3	○	○	○	○	○	A	Sterilized store	2	1	0	3
11	1-11	Caesarean section set	3	3	○	○	○	○	○	A	Sterilized store	3	0	0	3
17	1-12	X-ray viewers	1	3	○	○	○	○	○	A	Operation theatre (1～3)	1	2	0	3
23	1-13	Dermatology set	0	1	○	○	○	○	○	A	Storage-1	0	0	1	1
26	1-14	Operating light, ceiling	2	3	○	○	○	○	○	A	Operation theatre (1～3)	2	1	0	3
27	1-15	Operating light, stand	0	1	○	○	○	○	○	A	Minor Operation theatre (1)	0	0	1	1
28	1-16	Hand washing water sterilizer	1	1	○	○	○	○	○	A	Operating hall	1	0	0	1

＊1	Equipment no.	Description	Existing no.	Requested no	Criteria				Judgment	Priority	Location	Purpose			Planned no.
					①	②	③	④				replace	supplement	newly	
29	1-17	Autoclave, vertical	3	3	○	○	○	○	○	A	Sterilizing room	3	0	0	3
30	1-18	Autoclave, portable	2	2	○	○	○	○	○	A	Sterilizing room	2	0	0	2
35	1-19	Pulse oxymeter	2	3	○	○	○	○	○	A	Operation theatre (1～3)	2	1	0	3
36	1-20	Defibrillator	0	1	○	○	○	○	○	A	Storage-1	0	0	1	1
-	1-21	Recovery bed	0	5	○	○	○	○	○	A	Recovery room	1	4	0	5
40	1-22	Anaesthesia machine with ventilator	2	3	○	○	○	○	○	A	Operation theatre (1～3)	2	1	0	3
41	1-23	Resuscitator, adult	2	5	○	○	○	○	○	A	Storage-1	2	3	0	5
	(2)	Casualty													
44	1-24	Stretcher	2	2	○	○	○	○	○	A	Stretcher bay	2	0	0	2
48	1-25	Examination couch	0	1	○	○	○	○	○	A	Clinic	0	0	1	1
-	1-26	Examination light	0	1	○	○	○	○	○	A	Clinic	0	0	1	1
47	1-27	Autoclave, portable	1	1	○	○	○	○	○	A	Sterilizing room	1	0	0	1
3	1-28	Operating table, general	0	1	○	○	○	○	○	A	Minor Operation theatre (2)	0	0	1	1
27	1-29	Operating light, stand	0	1	○	○	○	○	○	A	Minor Operation theatre (2)	0	0	1	1
48	1-30	Examination couch	0	1	○	○	○	○	○	A	Physiotherapy	1	0	0	1
48	1-31	Examination couch	0	1	○	○	○	○	○	A	Plaster room	1	0	0	1
174	1-32	Infant warmer	0	1	○	○	○	○	○	A	Clinic	0	0	1	1
48	1-33	Examination couch	0	1	○	○	○	○	○	A	-	0	0	0	0
177	1-34	Direct ophthalmoscope	0	2	○	○	○	○	○	A	Clinic	0	0	2	1
-	1-35	X-ray viewer	0	2	○	○	○	○	○	A	Clinic	0	0	1	1
48	1-36	Examination couch	1	4	○	○	○	○	○	A	Resuscitation room	1	3	0	4
54	1-37	Suction unit, large	1	2	○	○	○	○	○	A	Minor Operation theatre (2)、Resuscitation room	1	2	0	3
55	1-38	Suction unit, manual	0	2	○	○	○	○	○	A	—	0	0	0	0
56	1-39	Nebulizer	0	2	○	○	○	○	○	A	Resuscitation room	0	0	2	2
57	1-40	Resuscitator, paediatrics	1	2	○	○	○	○	○	A	Resuscitation room	1	1	0	2
58	1-41	Resuscitator, adult	1	2	○	○	○	○	○	A	Resuscitation room	1	1	0	2
59	1-42	Pulse oxymeter	0	1	○	○	○	○	○	A	Resuscitation room	0	0	1	1
69	1-43	Defibrillator	0	1	○	○	○	○	○	A	Resuscitation room	0	0	1	1
	(3)	Dental clinic													
70	1-46	Compressor for dental units	0	1	×	○	○	○	×	A	—	0	0	0	0
71	1-47	Dental chair/unit	0	1	×	○	○	○	×	A	—	0	0	0	0
72	1-48	Optical resin stiffening device	0	1	×	○	○	○	×	A	—	0	0	0	0
73	1-49	Dental X-ray unit	0	1	×	○	○	○	×	A	—	0	0	0	0
74	1-50	Ultrasound scalar	0	1	×	○	○	○	×	A	—	0	0	0	0
76	1-51	Electric drill for dental	0	1	×	○	○	○	×	A	—	0	0	0	0
77	1-52	Suction unit	0	1	×	○	○	○	×	A	—	0	0	0	0
	(4)	Laboratory													
97	1-53	Haematocrit centrifuge	0	1	○	○	○	○	○	A	Haematology	0	1	0	1
98	1-54	Automatic pipettes	0	1	○	○	○	○	○	A	Haematology	0	1	0	1
99	1-55	Centrifuge	0	1	○	○	○	○	○	A	Haematology	0	1	0	1
106	1-56	Blood transfusion fridge	0	1	○	○	○	○	○	A	Blood bank	0	1	0	1
109	1-57	Microscope	0	1	○	○	○	○	○	A	Blood bank	0	1	0	1
	(5)	OPD													
151	1-58	Nebulizer	0	3	○	○	○	○	○	A	Treatment dressing room(Paediatrics, female, male ward)	0	0	3	3
155/163	1-59	Diagnostic equipment set	2	8	○	○	○	○	○	A	Consultation room (paediatrics, female, male, specialist, surgery)	2	7	0	11
159	1-60	Examination couch	0	8	○	○	○	○	○	A	Consultation room (paediatrics, female, male, specialists) ,Blood collecting room	0	0	12	12
-	1-61	Examination light	0	8	○	○	○	○	○	A	Consulting room (paediatrics, female, male, specialists)	0	0	11	11
-	1-62	X-ray viewer	0	8	○	○	○	○	○	A	Consulting room (paediatrics, female, male, specialists)	0	0	11	11

＊1	Equipment no.	Description	Existing no.	Requested no	Criteria				Judgment	Priority	Location	Purpose			Planned no.
					①	②	③	④				replace	supplement	newly	
171	1-63	Examination couch	0	8	○	○	○	○	○	A	Consulting room (paediatrics, female, male, specialists) , Treatment room, Physiotherapy, Plaster room	0	0	12	12
172	1-64	Stretcher	0	1	○	○	○	○	○	A	Move to Emergency	0	0	0	0
173	1-65	Autoclave	0	1	○	○	○	○	○	A	Move to Emergency	0	0	0	0
174	1-66	Infant warmer	0	1	○	○	○	○	○	A	Move to Emergency	0	0	0	0
182	1－71	Electric balance	0	1	○	○	○	○	○	A	Pharmacy	0	0	1	1
183	1－72	Distillation unit	1	1	○	○	○	○	○	A	Pharmacy	1	0	0	1
	2.	Mubende RHH													
	(1)	OPD													
1	2-1	Diagnostic equipment set	0	8	○	○	○	○	○	A	Male, Female, Paediatrics, Specialis	0	0	4	4
2	2-2	Minor surgery set	2	2	○	○	○	○	○	A	Male, Female, Paediatrics	2	0	0	2
3	2-3	Examination light	0	14	○	○	○	○	○	A	Male, Female, Paediatrics, Specialist consulting room, Eye/ENT	0	0	7	7
4	2-4	Examination couch	0	24	○	○	○	○	○	A	Male, Female, Paediatrics, Physics, Eye/ENT, Plaster room, Occupational therapy room, Physiotherapy room, Resuscitation room, Clinic	0	0	31	31
5	2-5	X-ray viewer	0	10	○	○	○	○	○	A	Male, Female, Paediatrics	0	0	5	5
6	2-6	Stretcher	1	1	○	○	○	○	○	A	Emergency OPD	1	0	0	1
	(2)	Casualty (Minor Operation theatre)													
14	2-7	Operating light, stand	0	1	○	○	○	○	○	A	Minor Operation theatre, Eye surgery room	0	0	2	2
15	2-8	Operating table, general	0	1	○	○	○	○	○	A	Minor Operation theatre	0	0	1	1
16	2-9	Suction unit, large	0	1	○	○	○	○	○	A	Minor Operation theatre, Resuscitation room	0	0	3	3
18	2-10	Resuscitator, adult	0	1	○	○	○	○	○	A	Minor Operation theatre	0	1	0	1
19	2-11	Resuscitator, paediatrics	0	1	○	○	○	○	○	A	Minor Operation theatre	0	1	0	1
	(3)	Dental clinic													
28	2-12	Dental X-ray machine	0	1	○	○	○	○	○	A	Dental X-ray room	0	0	1	1
29	2-13	Dental chair/unit	0	2	○	○	○	○	○	A	Dental treatment room	0	1	0	1
	(4)	Laboratory													
30	2-14	Centrifuge	0	1	○	○	○	○	○	A	Haematology	0	1	0	1
31	2-15	Centrifuge, Haematocrit	0	1	○	○	○	○	○	A	Haematology	0	1	0	1
32	2-16	Coloriometer	1	1	○	○	○	○	○	A	Biochemistry	1	0	0	1
33	2-17	Distillation unit	1	1	○	○	○	○	○	A	Biochemistry	1	0	0	1
36	2-18	Microscope	0	1	○	○	○	○	○	A	Parasitology	0	1	0	1
	(5)	Medicine													
42	2-19	Electric balance	1	1	○	○	○	○	○	A	Pharmacy	1	0	0	1
43	2-20	Drug refrigerator	0	1	○	○	○	○	○	A	Medicine store	0	1	0	1
	(6)	Operation department													
45	2-21	Autoclave, portable	1	2	○	○	○	○	○	A	Sterilizing room	1	2	0	3
46	2-22	Autoclave, vertical	2	2	○	○	○	○	○	A	Sterilizing room	2	0	0	2
48	2-23	Anaesthesia machine with ventilator	0	2	○	○	○	○	○	A	Operation theatre (1,2)	0	0	2	2
50	2-24	Pulse oxymeter	0	2	○	○	○	○	○	A	Operation theatre (1,2)	0	0	2	2
51	2-25	Operating light, ceiling	0	2	○	○	○	○	○	A	Operation theatre (1,2)	0	0	2	2
52	2-26	Operating light, stand	0	1	○	○	○	○	○	A	－	0	0	0	0

＊1	Equipment no.	Description	Existing no.	Requested no	Criteria				Judgment	Priority	Location	Purpose			Planned no.
					①	②	③	④				replace	supplement	newly	
53	2-27	Operating table, general	1	2	○	○	○	○	○	A	Operation theatre (1,2)	1	1	0	2
54	2-28	Suction unit, large	1	2	○	○	○	○	○	A	Operation theatre (1,2)	1	1	0	2
59	2-29	Instrument set, general surgery	3	3	○	○	○	○	○	A	Sterilized store	3	0	0	3
60	2-30	Instrument set, obstetric	3	3	○	○	○	○	○	A	Sterilized store	3	0	0	3
-	2-31	X-ray viewer	1	2	○	○	○	○	○	A	Operation theatre (1,2)	2	0	0	2
62	2-32	Laryngoscope set adult paediatrics	2	2	○	○	○	○	○	A	Operation theatre (1,2)	2	0	0	2
65	2-33	Resuscitator, paediatrics	1	1	○	○	○	○	○	A	Operation theatre (1,2)	1	0	0	1
66	2-34	Resuscitator, adult	1	1	○	○	○	○	○	A	Operation theatre (1,2)	1	0	0	1
-	2-35	Recovery bed	4	4	○	○	○	○	○	—	Recovery room	4	0	0	4
68	2-36	Hand washing water sterilizer	1	1	○	○	○	○	○	A	Operating hall	1	0	0	1
	(7)	Maternity													
81	2-37	Delivery bed	2	3	○	○	○	○	○	A	Delivery room	2	1	0	3
-	2-38	Operating light, stand	1	1	○	○	○	○	○	-	Delivery room	1	0	0	1
82	2-39	Suction unit, large	1	2	○	○	○	○	○	A	Delivery room	1	1	0	2
82	2-40	Suction unit, low pressure	1	2	○	○	○	○	○	-	Delivery room	1	1	0	2
83	2-41	Infant warmer	0	1	○	○	○	○	○	A	Nursery	0	0	1	1
84	2-42	Incubator	0	1	○	○	○	○	○	A	Nursery	0	0	1	1
87	2-43	Resuscitator, adult	1	1	○	○	○	○	○	A	Delivery room	1	0	0	1
88	2-44	Resuscitator, paediatrics	1	1	○	○	○	○	○	A	Nursery	0	0	0	1
91	2-45	Instrument set, delivery	3	3	○	○	○	○	○	A	Sterilized store	3	0	0	3
92	2-46	Ob/Gy examination table	1	1	○	○	○	○	○	A	Examination room	1	0	0	1
-	2-47	Obstetric bed	16	30	○	○	○	○	○	A	Labour & recovery room	16	14	0	30
	(8)	Male ward													
78	2-48	Patient bed	5	37	○	○	○	○	○	-	Ward、private room	5	32	0	37
79	2-49	Bedside cabinet	5	37	○	×	○	○	×	-	Ward、private room	0	0	0	0
80	2-50	Examination couch	0	1	○	○	○	○	○	-	Treatment room	0	0	1	1
-	2-51	Examination light	0	1	○	○	○	○	○	-	Treatment room	0	0	1	1

2-2-2-2 Site Plan

(1) Masaka RRH

1) Shape of the site and ground condition

The hospital site is a large piece of land with an area of approximately 8 hectares and situated on a sharp downward slope in the southeast to northwest direction, facing a road on the southeast. There is a maximum 30-metre difference of elevation in the whole site. The area set aside for building construction has an elevation difference of about 4 metres.

The results of boring tests indicate that the ground consists of cohesive soil layers and sandy clay layers to a depth of about GL-10 m, exhibiting a compacted texture.

2) Surrounding environment and state of infrastructure

The Masaka RRH is situated to the north of the centre of Masaka City. The main road facing the main gate of the hospital is a busy road. The Nurse Training School is situated adjacent to the main gate.

Electric power produced by hydroelectric facilities is supplied to the Masaka Area by Umeme (an electric power company of Uganda). Electric power supply is not stable, with power failure occurring about four times a month, each lasting about 12 hours.

There is a water purification plant that takes water from the River Nabajuzi. Water is stored in an elevated storage tank with a capacity of approximately 300m^3 on a hill higher than the project area. Water is supplied to the project site by the gravity flow system. A sufficient amount of water is secured throughout the year. The results of interviews have also confirmed that there has been no interruption of the water supply.

There is no storm water drainage network for wastewater and storm drainage discharge, only a sewage system. There is a wastewater treatment pond managed and operated by the National Water and Sewerage Corporation (NWSC) situated at a location three kilometres from the site.

The city collects and treats the solid garbage only as municipal waste. The hospital does not use this system but separately collects its own solid waste and medical waste and incinerates them in fields at different locations, and buries the ashes in the hospital premises.

The city gas system is not available. Propane (LPG) or firewood is commonly used as cooking fuel.

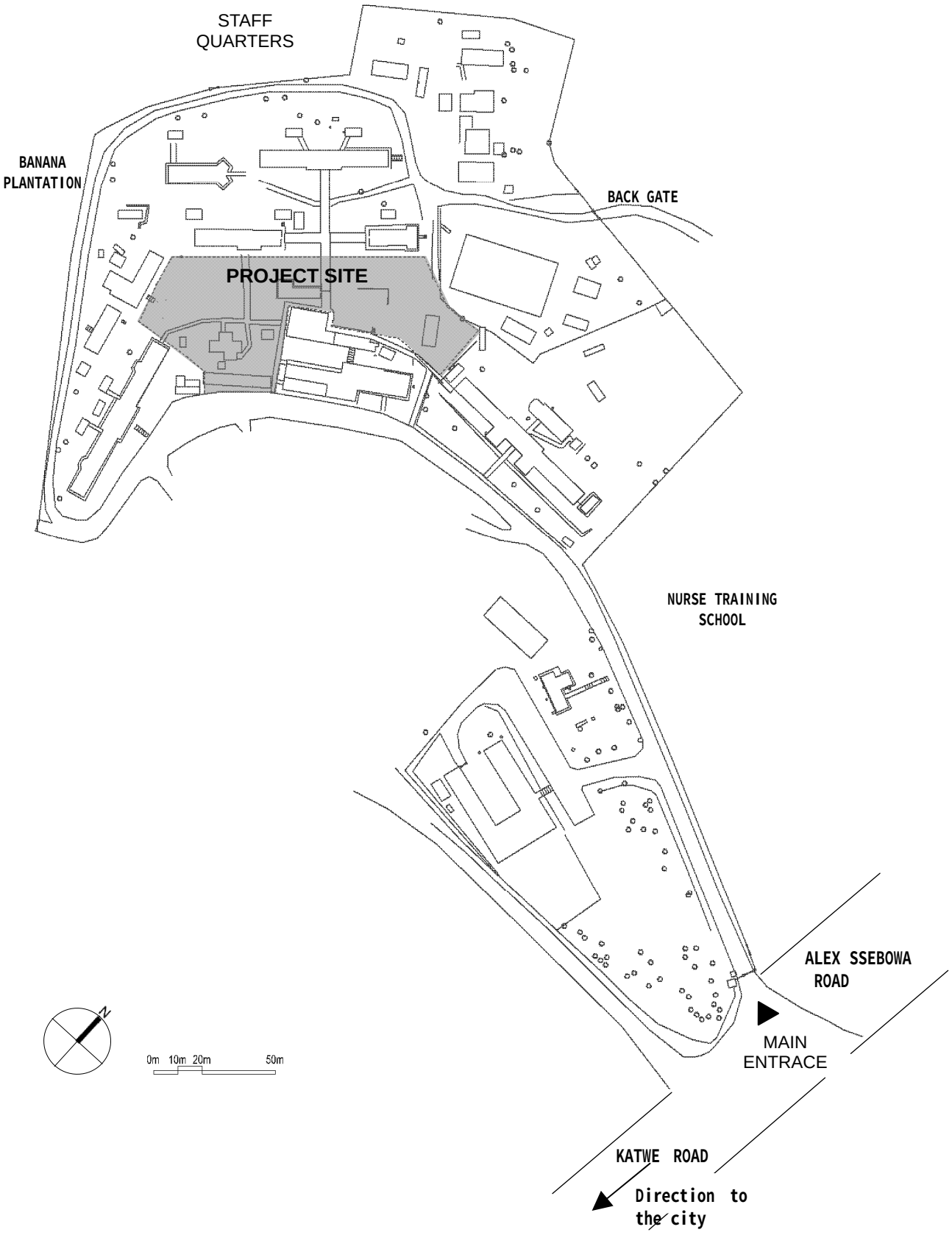


Figure 2-5 Surrounding Environment of Construction Site

3) Land use plan

First, the Team and the Ministry of Health jointly developed a master plan for improvement of the Masaka RRH, based on the results of analysis of the conditions of the existing facilities and the requested draft plan. Based on this master plan, layouts of the planned facilities were determined. The major items that the layout plan considered are listed below.

(1) Improvement of efficiency of circulation and medical services
→ Integration of the Outpatient Department and the Central Diagnosis and Treatment Department

(2) Continual provision of medical services
→ Formulation of facility rebuilding plan that permits continual provision of medical services during the construction period

(3) Securing of proper facility capacities
→ Calculation of numbers of rooms from the present numbers of patients with some allowances for population increase

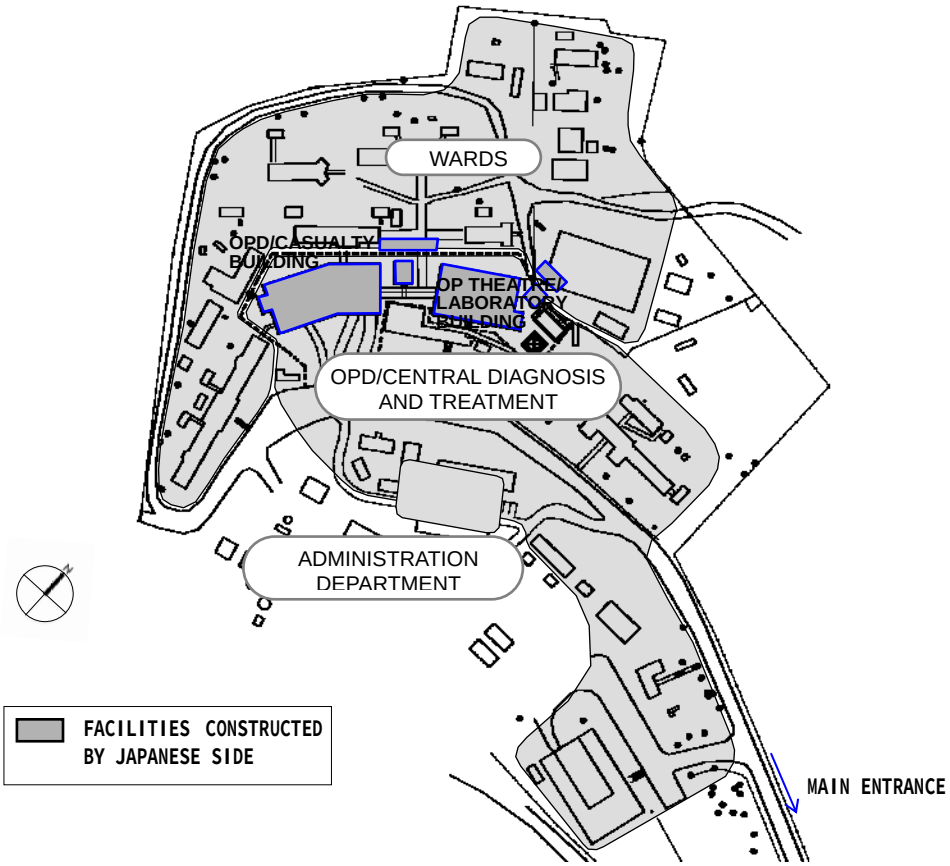


Figure 2-6 Relation between the Master Plan for Rehabilitation of the Masaka RRH and the Present Cooperation Project

4) Facility layout plan

The subjects of this project are the Outpatient Department (General OPD, Casualty) and the Central Diagnosis and Treatment Department (Operation Theatre, Laboratory). These facilities will be laid out in a space created by demolishing the deteriorated existing buildings; namely, the Minor theatre, Surgery OPD, Blood Bank, Toilet, etc. The construction site is situated at the back of the existing General Outpatient Department, Main

theatre and is in a location easily accessible from the Maternity Unit , the wards, and the existing X-ray department, the latter of which will remain. The new building will be constructed in parallel with and bent to match the contours of the sloping site to gain structural efficiency in the layout.

The departments concerned are laid out in two buildings to help prevent nosocomial infection, the OPD/Casualty Building and the OP Theatre/Laboratory Building. The two buildings are connected by ramps to promote smooth collaboration among the departments concerned. Also, bridges are installed from the front hospital road to the ground floor and the first floor of the OPD/Casualty Building to enhance the convenience of the patients.

There is no public parking site in the hospital premises. There is projected to be an increasing number of patients coming to the hospital by car. After completion of this project, it is recommended for the Uganda side to construct a parking lot on the site of the existing General Outpatient Department and the Main Theatre by demolishing them after their functions have been transferred to the new facilities. The electric room that will house the emergency generator will be planned at a location along the hospital road leading to the back gate to facilitate fuel supply and other maintenance activity, and where it is also easy to install the electric cables. The elevated water tank for water supply will be located at a place close to the electric room and preferably at a location with high elevation.

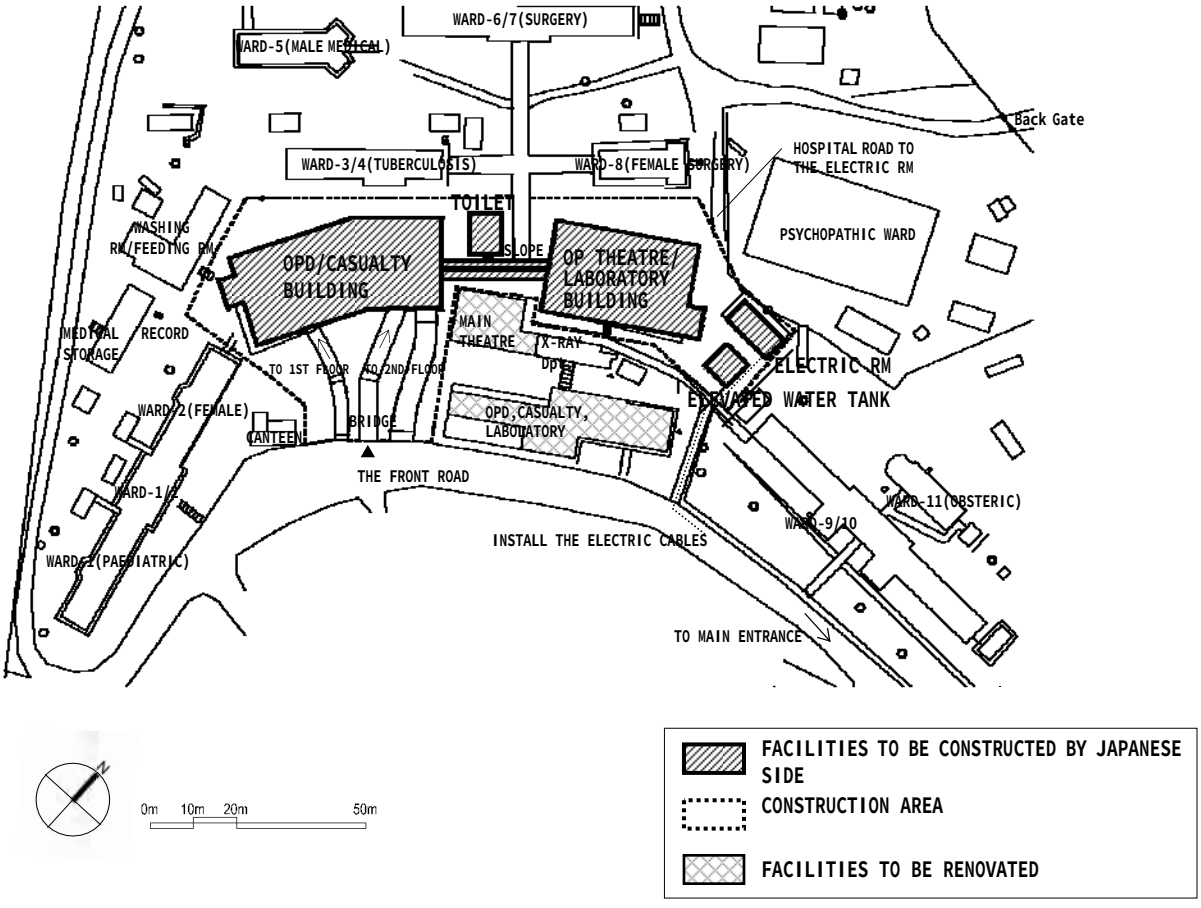


Figure 2-7 Existing facilities and the layout plan of the project facilities of the Masaka RRH

(2) Mubende RRH

1) Shape of the site and ground

The approximately 4.4-hectare site faces the road on its north-western side. The site has a gentle downward gradient from northwest to southeast, with a maximum difference in elevation of about 10 metres.

The results of boring tests indicate that the ground consists of clayey layers and sandy clay layers to a depth of about GL-12 m, exhibiting a compacted texture.

2) Surrounding environment and state of infrastructure

The Mubende RRH is situated to the east of Mubende City. There is a school just opposite on the front road. The surrounding area around the hospital is relatively quiet. Mubende is on the trunk road from Kampala, the capital city, to neighbouring Congo, and a number of traffic accidents occur in this area.

As is the case with the Masaka Area, electric power from hydroelectric facilities is supplied to the Mubende Area by Umeme (an electric power company of Uganda). This site also does not have a stable electric power supply with power failure occurring about twice a month each lasting about four to five hours. .

There is a water purification plant that takes water from rivers and deep wells. Water is stored in an elevated storage tank with a capacity of about $100m^3$ on a hill higher than the project site. Water is supplied to the project site by the gravity flow system. The results of interview surveys confirm that no interruption in water supply has occurred, as is the case with the Masaka Area.

There is no storm water drainage network or sewage network. There is no plan to develop either of them.

The city collects and treats the solid municipal waste, but the hospital does not use this system. It separately collects its own solid waste and medical waste and incinerates them at fields in different locations, and buries the ashes in the hospital premises.

The city gas system is not available. Propane (LPG) or firewood is commonly used as cooking fuel.

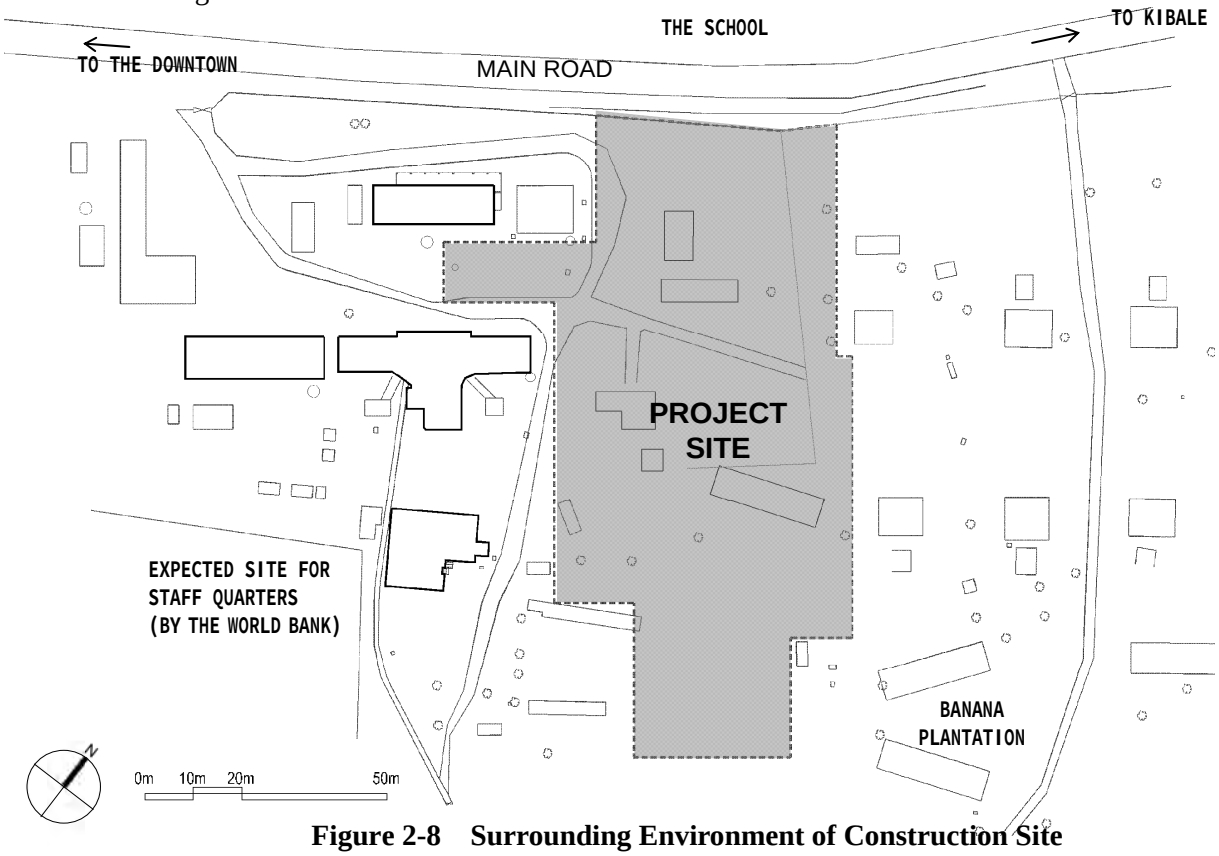


Figure 2-8 Surrounding Environment of Construction Site

3) Land use plan

The layout of the existing facilities of the Mubende RRH lacks a clear zoning plan and has the Administration / Laboratory department, Casualty/ Surgery/Outpatient department, Operation/wards departments and Maternity department are laid out discontinuously from the northwest main gate to the southeast along an internal road. As was mentioned before for the Masaka RRH Hospital, a master plan for improvement of the Mubende RHH was developed based on the results of analysis of the above layout of the existing facilities and the requested draft plan. Based on this master plan, layouts of the planned facilities were determined. The major items that the layout plan considered are listed below.

(1) Improvement of efficiency of circulation and medical services
   -> Integration of the Outpatient Department, the Central Diagnosis and Treatment Department and the Maternity Department
(2) Continual provision of medical services
   -> Formulation of facility rebuilding plan that permits continual provision of medical services during the construction period
(3) Securing of proper facility capacities
   -> Calculation of numbers of rooms from the present numbers of patients

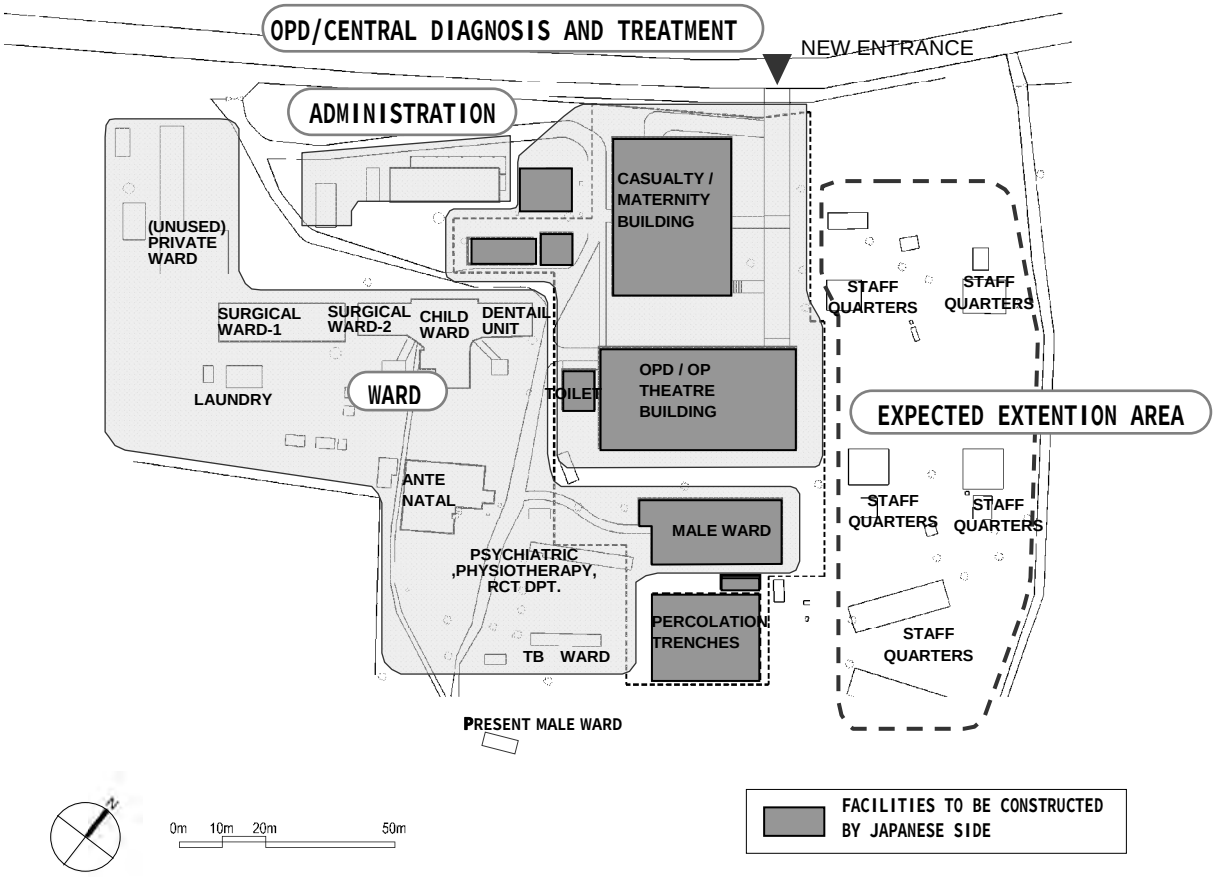


Figure 2-9 Relation between the Master Plan for Rehabilitation of the Mubende RHH and the Present Cooperation Project

4) Facility layout plan

The subjects of this project are the Outpatient Department (General OPD, Special Clinics, Casualty), Central Diagnosis and Treatment Department (Operation theatres, Laboratory, Maternity) and Male ward. It has been confirmed that a continuous site may be secured at a location between the staff quarters area on the north-western side of the hospital premises and the existing hospital building area to the southwest of the staff quarters area. The facilities of this project are therefore planned to be constructed on that site. Presently, there are a Record / Workshop, Community department, a temporary parking area, and a temporary kitchen on the planned site. It has been confirmed with the Ministry of Health that these facilities may be relocated or demolished.

The major facilities in the project are the Central Diagnosis and Treatment Department. These facilities constitute the central functions of the hospital and should be well integrated. The plan calls for construction of a new gate at the front road and a straight approach road from the gate, which become the main road of the entire hospital.

To prevent nosocomial infection, departments are laid out in two buildings, the OPD/ OP Theatre Building and the Casualty /Maternity Building. The construction site extends far back into the site from the frontal road on the north-west on a downward slope to the south. These two main facilities were laid out in an L shape, to give the buildings the appearance of frontality and unity and at the same time to realise structural requirements. The spacing between the two buildings will be wide enough to allow close connections with the ward functions and play the role of the main plaza of the entire hospital in the future.

The male ward will be placed to the south of the OPD/ OP Theatre Building to be close to the ward area specified by the developed master plan. The electric room which houses such equipment as the emergency generator is planned to be located to the south of the existing X-ray department, in consideration of power supply to the new buildings and cable laying from the front road. The elevated water tank for water supply will be placed next to the new electric room, considering the elevation difference from the planned facilities and convenience of maintenance.

The existing buildings that will become vacant as a result of relocation of facilities and equipment after completion of this project will be used as ward or Administration Department after rehabilitation by the Uganda side.

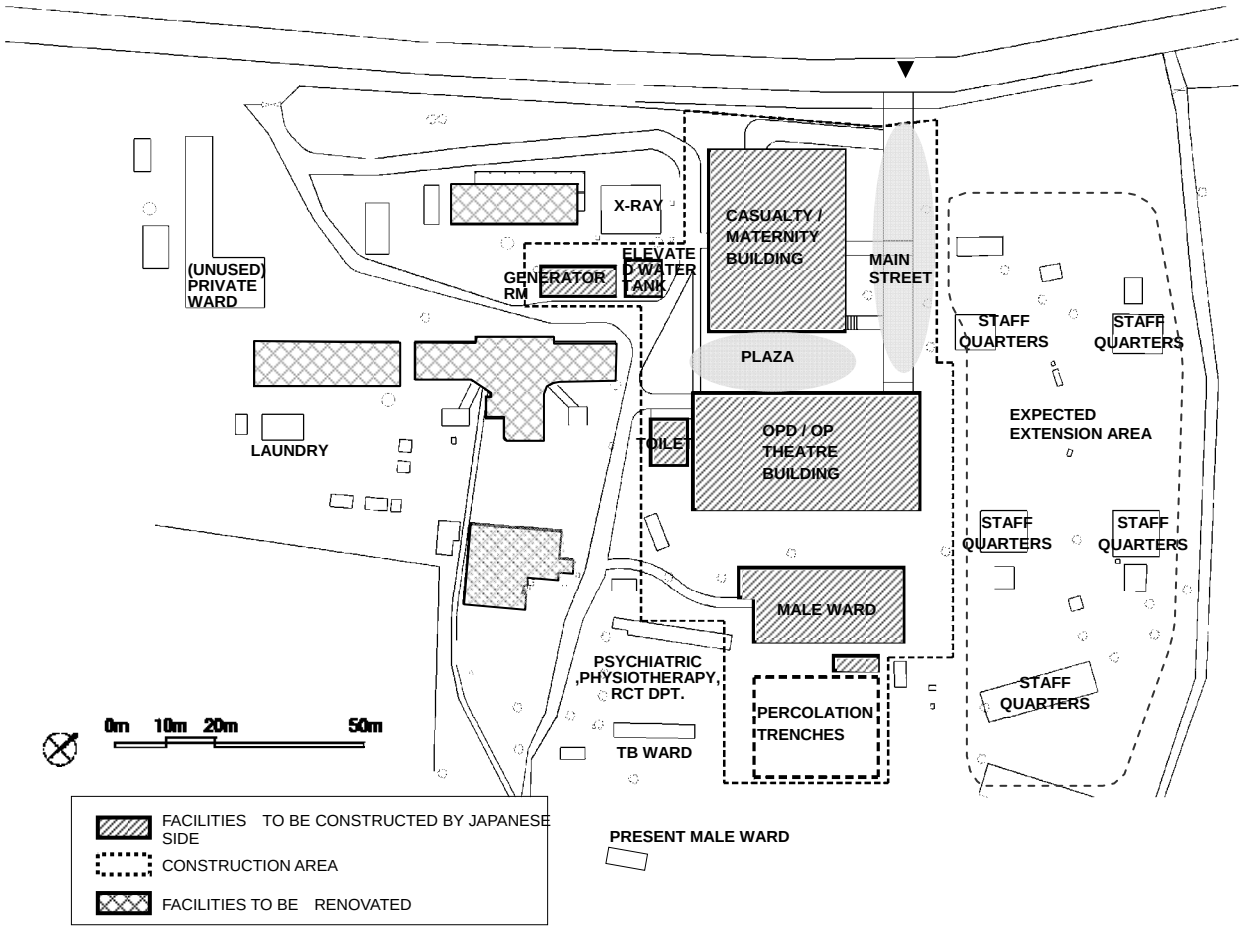


Figure 2-10 Existing facilities and the layout plan of the project facilities of the Mubende RRH

2-2-2-3 Facility Plan

Ⅰ Architectural Plan

(1) Design conditions for facility capacity planning

The number of rooms of each department subject to the design is determined using the assumptions explained below based on the number of patients forecast for 2017, or five years after completion and commissioning of this project. The number of patients in 2017 is forecast based on the past data (number of patients or number of operations, for example) of both hospitals and on the rate of population increase in Uganda.

1) Forecast of population and number of patients of the central region of Uganda

The number of patients may be considered to increase in proportion to the population. As a first step, the population of the central region of Uganda for 2017 is forecast and the rate of population increase is calculated. According to the Ministry of Health of Uganda, the forecast rate of population increase for the future is 3.2%. Therefore, the population in 2017 is forecast as shown in the table below. The rate of population increase increased 1.33 fold from 2008. This number is also used to forecast the number of patients.

Table 2-10 Forecast Population of the central region of Uganda

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Actual population	6,617,702	6,840,719	7,085,069									
Expected population				7,340,344	7,575,235	7,817,643	8,067,807	8,325,977	8,592,408	8,867,365	9,151,121	9,434,877
Actual Increase per year	3.37%	3.57%	3.60%									
Expected Increase per year				3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	
Increase compared to 2008			1.00	1.04	1.07	1.10	1.14	1.18	1.21	1.25	1.29	1.33

2) Assumptions for the medical activities for both two hospitals

[1] Annual working day

The medical service activities of the outpatient diagnosis and treatment department and the central diagnosis and treatment department except for the surgery outpatient department and the special outpatient department are performed every day including Saturdays and Sundays.

The annual working days for various departments and divisions are as shown below.

[Outpatient diagnosis and treatment department]

Outpatient department (medical ,paediatrics)	24 hours a day, 365 days a year (concentrated in 10 hours a day)
Outpatient department (surgery ,specialised medical)	8 hours a day, 260 days a year
Casualty department (only surgery)	24 hours a day, 365 days a year

[Central diagnosis and treatment department]

Physiological and pathological Examination department	260 days
Maternity department	365 days
Operation department	
Emergency operation	365 days (4 times/room, day)
Obstetric operation	365 days (4 times/room, day)

[2] Opening hours of the outpatient diagnosis and treatment department and central diagnosis and treatment department

The surgery sector, specialised medical sector and the examination department are open for eight hours encompassing the morning time and the afternoon time except for Saturdays and Sundays. Other departments are open 24 hours a day, 365 days a year.

[3] Clinical hours of the diagnosis and treatment departments

Clinical hours, treatment hours, and convalescing bed hours after operation or delivery are shown in the tables concerned to determine the required numbers on later pages.

(2) Facility plan of Masaka RRH

1) Study by department

[1] Number of patients

Table 2-11~13 show the trends in the number of outpatients and in the number of various examinations over a three-year period from 2005/2006 to 2007/2008.

- Outpatient department

A malaria epidemic occurred in 2006/2007, and the number of outpatients in the period reached 260 thousand. In 2007/08, though the malaria epidemic was on the decline, the number of outpatients showed an overall increasing trend. Therefore, the average number of outpatients over the three-year period from 2005/2006 to 2007/2008 is used for calculating the required spaces of the departments concerned.

Table 2-11 Number of Patients for the Outpatient Department

		2005/06	2006/07	2007/08	Last 3 years Average
Total No. of Out-patients		194,267	261,275	252,969	236,483
Rate of increase			34.5%	-3.2%	
1	Medical	140,026	182,732	155,441	159,400
2	Paediatric	920	1,506	2,036	1,487
3	Surgical				
	General	5,851	779	8,136	4,922
	Psychotherapy	915	962	925	934
	Occupational Therapy	88	0	0	88
-	Dental	7,859	8,787	8,309	8,318
-	Eye/ENT	9,455	12,560	11,020	11,012
-	Obstetric/Gynaecology	23,222	45,922	58,106	42,417
-	Mental	5,931	7,709	7,788	7,143
-	Private	-	318	1,208	763

(Source: interview survey)

- Casualty (surgery) department

  Casualty department in Uganda handles the emergency medical surgery service. Therefore, the required spaces of the casualty department is calculated from the number of patients injured in accidents.

  As is the case with the outpatient diagnosis and treatment department, the average number over a period of three years from 2005/2006 to 2007/2008 is calculated.

Table 2-12 Number of Patients for the Casualty

		2005/06	2006/07	2007/08	Last 3 years Average
1	Accident case	2138	2707	2,792	2546
	Rate of increase		26.6%	3.1%	

(Source: interview survey)

- Examination department (Physiological and pathological)

  The number of cases of physiological and pathological examination used for determining the required spaces of this department is the average number over a period of three years from 2005/2006 to 2007/2008, as is the case with the outpatient diagnosis and treatment department.

Table 2-13 Number of Physiological / Pathological Examinations

	Laboratory Examination	2005/06	2006/07	2007/08	Last 3 years Average
1	Laboratory test Haematology Biochemistry Parasitology	15,864	24,348	24,051	21,421
2	Micro-Biology Bacteriology (TB)	872	557	600	676
3	Blood Bank (blood type)	2,634	1,914	1,960	2,169

(Source: interview survey)

- Operation department

  Although the small operation theatre in the minor operation theatre is not usable because of facility failures, Masaka RRH performs about 2,400 major operations and about 6,000 minor operations a year. The number of operations used for determining the required space of this department is the average number over a period of three years from 2005/2006 to 2007/2008, as is the case with the outpatient diagnosis and treatment department.

Table 2-14 Number of Operations

		2005/06	2006/07	2007/08	Last 3 years Average
1	Major Operation	2072	2489	2,491	2351
	Rate of increase		20.1%	0.1%	
2	Minor Operation	6052	6281	6,172	6168
	Rate of increase		3.8%	-1.7%	

(Source: interview survey)

[2] Required space calculation

Based on the above design conditions, the size and numbers of various rooms of Masaka RRH within the scope of this project is calculated.

- Outpatient department

Average No. of daily patients （p/day）=Annual No. of Out-patients(p/year) ÷Annual working day(day/year）

Expected No. of daily patients on 2017 （p/day）= Average No. of daily patients(p/day)×Rate of increasing population

Maximum No. of daily patients per room（p/day * room）=

Opening hour（min/day）÷Average of consultation time(min*room/p)

Required No. of consultation rooms(room)=

Expected No. of daily patients on 2017（p/day）÷Maximum No. of daily patients per room（p/day * room）

Table 2-15 Required Number of Various Rooms for the Outpatient

			Annual No. of Out-patients （p/year）	Annual working day （day/year）	Opening hour （min/day）	Average No. of daily patients （p/day）	Rate of increasing population	Expected No. of daily patients on 2017 （p/day）	Consultation room				Existing No. of consultation rooms / desks (room)
									Average of consultation time(※2) (min*room/p)	Maximum No. of daily patients per room （p/day * room）	Required No. of consultation rooms(room)	No. of rooms(room)	
			A	B	C	D=A/B	E	F=D*E	G	H=C/G	I=F/H		
Masaka	1	Medical inc. casualty	159,400	365	600	436.71	1.33	581.55	8	75	7.75	8	5
	2	Paediatric inc. casualty	1,487(※1)	365	600	4.07	1.33	5.43	8	75	0.07	1	1
	3	Surgical											
		General	4,922	260	480	18.93	1.33	25.21	20	24	1.05	2	2
		Psychotherapy	934	260	480	3.59	1.33	4.78	20	24	0.20	1	
		Occupational Therapy	88	260	480	0.34	1.33	0.45	20	24	0.02	1	
	TOTAL		175,149			495.64		660.02				13	8

(*1) It may be noted that the number of patients of the paediatrics department is disproportionately small compared with those of other departments or other hospitals. Judging from the fact that the diagnosis rooms of the paediatrics sector and the medical sector are not separated in the present outpatient department, patients of the paediatrics sector are conceivably counted partly among those of the medical sector. Also, the general medical sector and the specialised medical sector are not clearly separated. Given the fact that the data are of this nature, a total of nine diagnosis rooms are planned for the general medical sector, the paediatrics sector, and the specialised medical sector

(*2) Average time spent on one patient in one room (source: interview survey)

- Casualty (surgery) department

Average No. of daily patients（p/day）= Annual No. of Casualty-patients (p/year）÷Annual working day（day/year）

Expected No. of daily patients on 2017（p/day）＝

Average No. of daily patients（p/day）× Rate of increasing population

Maximum No. of daily patients per room(p/day*room)＝ Opening hour（min/day）÷Average of Observation time （min*room/p）

Required No. of Triage, Clinic, and Resuscitation room (room)=

Expected No. of daily patients on 2017（p/day）÷ Maximum No. of daily patients per room (p/day*room)

Table 2-16 Required Number of Various Rooms for the Casualty (Surgical)

Masaka	Annual No. of Casualty-patients (p/year)	Annual working day (day/year)	Opening hour (min/day)	Average No. of daily patients (p/day)	Rate of increasing population	Expected No. of daily patients on 2017 (p/day)	Triage				Clinic				Resuscitation room			
							Average of filtering time(*3) (min*room/p)	maximum No. of daily patients per room(p/day*room)	Required No. of Triage(room)	No. of rooms (room)	Average of diagnosis and treatment time(*3) (min*room/p)	maximum No. of daily patients per room(p/day*room)	Required No. of Clinic (room)	No. of rooms (room)	Average of recovery time(*3) (min*room/p)	maximum No. of daily patients per room(p/day*room)	Required No. of Resuscitation rooms(room)	No. of rooms (room)
	A	B	C	D=A/B	E	F=D*E	G	H=C/G	I=F/H		J	K=C/J	L=F/K		M	N=C/M	O=F/N	
	2,546	365	1,440	6.97	1.33	9.29	20	72	0.13	1	120	12	0.77	1	480	3	3.10	4

(*3) Average time spent on one patient in one room or on one bed for diagnosis or treatment (source: interview survey)

Currently, the casualty (surgery) department has one consultation room and two treatment rooms, and one of the latter is also used as a resuscitation room.

- Operation department

Average No. of daily Operations / Patients (p/day) =
Annual No. of Operations / Patients (p/year) ÷Annual working day (day/year)

Expected No. of daily Operations / Patients on 2017 (p/day) =
Average No. of daily Operations / Patients (p/day) ×Rate of increasing population

Required No. of Theatre=
Expected No. of daily Operations / Patients on 2017 (p/day) ÷Maximum No. of daily Operations (p/day*room)

Required No. of Recovery beds=
Expected No. of daily Operations / Patients on 2017 (p/day) ×Average of Recovery time (day*bed/p)

Table 2-17 Required Numbers of Various Rooms for the Operation Theatre

Masaka		Annual No. of Operations / Patients (p/year)	Annual working day (day/year)	Average No. of daily Operations / Patients (p/day)	Rate of increasing population	Expected No. of daily Operations / Patients on 2017 (p/day)	Major Theatre			Minor Theatre			Recovery		
							Maximum No. of daily Operations (*4) (p/day*room)	Required No. of Theatre(room)	No. of Theatres(room)	Maximum No. of daily Operations (*4) (p/day*room)	Required No. of Theatre(room)	No. of Theatres(room)	Average of Recovery time (*5)(day*bed/p)	Required No. of Recovery beds(bed)	No. of beds(bed)
		A	B	C=A/B	D	E=C*D	F	G=E/F		F	G=E*F		H	I=E*H	
	Major Theatre	2,351	365	6.44	1.33	8.58	4	2.14	3.00	-	-	-	0.5	4.29	5.00
	Minor Theatre	6,168	365	16.90	1.33	22.50	-	-	-	20	1.13	2.00	-	-	-

(*4) Number of operations per operation theatre per day (source: interview survey)

(*5) Average convalescing time per bed per person (source: interview survey)

Currently, there is one major operation theatre, one minor operation theatre, and one recovery room in the operation building, and one minor operation theatre in the casualty building.

2) Required floor area

From the required numbers of rooms of different categories calculated as indicated above, the floor area required for the architectural planning is calculated. In determining the area of a given room for the requested Japanese assistance, the present state of existing facilities will be considered, and the standards for medical facilities in use in Uganda as well as Japan's floor area standards for medical facilities (design materials, etc. of the Architectural Institute of Japan) will be referred to.

Further, in determining the floor area, a comprehensive approach will be taken, taking into account such factors as layout of the medical equipment intended for the subject room and numbers of patients and medical staff to work in the room.

Table 2-18 Floor Area of Each Room of the Subject Facility

OPD/CASUALTY BUILDING 1F

DEPARTMENT	SECTOR	ROOM	FLOOR AREA(m^2)	DIMENSION(m)
OUTPATIENT	SURGERY	Physiotherapy RM	18.0	3.0 × 6.0
		Occupational Therapy RM	36.0	6.0 × 6.0
		Plaster RM	18.0	3.0 × 6.0
		Treatment / Dressing RM	24.0	6.0 × 4.0
		Cons.-1	12.0	3.0 × 4.0
		Cons.-2	12.0	3.0 × 4.0
		Corridor	24.0	2.0 × 12.0
		Medical Record Storage	18.0	3.0 × 6.0
		Office-1	18.0	3.0 × 6.0
		Waiting Space-1	144.0	6.0 × 24.0
		Waiting Space-2	36.0	6.0 × 6.0
		Balcony	6.7	6.0 × 1.1
		Reception	36.0	6.0 × 6.0
		Storage-1	9.0	3.0 × 3.0
		Storage-2	9.0	3.0 × 3.0
		Storage-3	9.0	3.0 × 3.0
		Storage-4	9.0	3.0 × 3.0
		SUBTOTAL	438.7 (m^2)	
CASUALTY		hall	102.1	6.0 × 17.0
		Minor OP	30.3	6.0 × 5.0
		Sluice RM	8.1	3.0 × 2.7
		Sterilization RM	8.1	3.0 × 2.7
		Triage RM	27.0	4.5 × 6.0
		X-Ray STORAGE	18.0	3.0 × 6.0
		Clinic	27.0	4.5 × 6.0
		Resuscitation RM	53.3	6.0 × 8.9
		MPS	2.9	1.4 × 2.0
		Nurse Station	8.5	2.4 × 3.6
		Office-2	18.0	3.0 × 6.0
		Duty RM	18.0	3.0 × 6.0
		Ambulance Dropoff	77.2	6.5 × 12.0
		Ambulance Parking	38.6	6.5 × 6.0
		SUBTOTAL	437.1 (m^2)	
OTHERS		Exterior Corridor-1	148.5	3.3 × 45.0
		SUBTOTAL	148.5 (m^2)	
		1ST FLOOR TOTAL	1024.3 (m^2)	

OPD/CASUALTY BUILDING 2F

DEPARTMENT	SECTOR	ROOM	FLOOR AREA(m^2)	DIMENSION(m)
OUTPATIENT	MALE	Cons.-1	12.0	3.0 × 4.0
		Cons.-2	12.0	3.0 × 4.0
		Treatment / Dressing RM-1	24.0	8.0 × 3.0
		Corridor-1	24.0	3.0 × 8.0
	SPECIALISED MEDICAL	Cons.-3	12.0	3.0 × 4.0
		Cons.-4	12.0	3.0 × 4.0
		Cons.-9	12.0	3.0 × 4.0
		Treatment / Dressing RM-2	24.0	8.0 × 3.0
		Treatment / Dressing RM-5	12.0	3.0 × 4.0
		Corridor-2	24.0	3.0 × 8.0
		Corridor-5	18.0	3.0 × 6.0
	PAEDIATRIC	Cons.-5	12.0	3.0 × 4.0
		Cons.-6	12.0	3.0 × 4.0
		Treatment / Dressing RM-3	24.0	8.0 × 3.0
		Corridor-3	24.0	3.0 × 8.0
	FEMALE	Cons.-7	12.0	3.0 × 4.0
		Cons.-8	12.0	3.0 × 4.0
		Treatment / Dressing RM-4	24.0	8.0 × 3.0
		Corridor-4	18.0	3.0 × 6.0
		Treatment RM	54.1	6.0 × 9.0
		Nurse RM	18.0	3.0 × 6.0
		Office	36.0	6.0 × 6.0
		Medical Record Storage	10.3	1.5 × 6.9
		Waiting Space-1	269.1	6.0 × 44.9
		Waiting Space-2	36.2	6.0 × 6.0
		Balcony	6.7	6.0 × 1.1
		Reception Space	41.7	7.0 × 6.0
		Storage	16.2	3.0 × 5.4
		SUBTOTAL	812.3 (m^2)	
OTHER		Exterior Corridor-1	38.8	2.0 × 19.4
		Exterior Corridor-2	170.7	3.8 × 45.0
		Exterior Corridor-3	60.0	3.0 × 20.0
		Exterior Ramp	102.2	4.2 × 24.6
		SUBTOTAL	371.7 (m^2)	
		2ND FLOOR TOTAL	1184.0 (m^2)	
		OPD/CASUALTY BUILDING TOTAL FLOOR AREA	2208.3 (m^2)	

OP THEATRE/LABORATORY BUILDING 1F

DEPARTMENT	SECTOR	ROOM	FLOOR AREA(m2)	DIMENSION(m)
OPERATION		Theatre-1	42.0	6.0 × 7.0
		Theatre-2	42.0	6.0 × 7.0
		Theatre-3	42.0	6.0 × 7.0
		Sluice RM	18.6	3.1 × 6.0
		Washing RM	18.0	3.0 × 6.0
		Sterilization RM	18.0	3.0 × 6.0
		Sterilization Storage	27.0	4.5 × 6.0
		Minor OP	27.0	4.5 × 6.0
		Recovery	51.6	6.0 × 8.6
		Ante RM	16.0	4.0 × 4.0
		Changing RM-1	12.2	3.0 × 4.1
		Changing RM-2	11.8	3.0 × 3.9
		Doctor RM	18.0	3.0 × 6.0
		Staff RM	15.5	3.0 × 5.2
		Meeting Space	16.9	4.5 × 3.8
		Nurse Station	8.8	2.4 × 3.7
		OP Hall	121.3	6.0 × 20.2
		Storage-1	10.4	3.0 × 3.5
		Shower RM-1	1.9	1.5 × 1.3
		Shower RM-2	1.9	1.5 × 1.3
		WC-1	2.5	1.5 × 1.6
		Slop Sink	3.0	1.5 × 2.0
		SUBTOTAL	526.4 (m^2)	
OTHER		Exterior Corridor-1	39.0	2.0 × 19.5
		Exterior Corridor-2	138.3	3.3 × 41.9
		Exterior Corridor-3	43.7	2.2 × 19.5
		Toilet Building 1F	66.2	7.2 × 9.2
		SUBTOTAL	287.2 (m^2)	
		1ST FLOOR TOTAL	813.6 (m^2)	

OP THEATRE/LABORATORY BUILDING 2F

PHARMACY		Pharmacy Office	18.0	3.0 × 6.0
		Medicine Storage	27.0	4.5 × 6.0
		Dispensary	18.0	3.0 × 6.0
		Waiting Space	45.0	6.0 × 7.5
		SUBTOTAL	108.0 (m^2)	
LABOLATORY		Laboratory-1	81.0	6.0 × 13.5
		Laboratory-2	9.0	3.0 × 3.0
		Laboratory-3	7.0	3.0 × 2.3
		Collection RM-1	9.0	3.0 × 3.0
		Collection RM-2	27.0	6.0 × 4.5
		Blood Collection RM	6.5	3.0 × 2.2
		Blood Bank	27.0	4.5 × 6.0
		Hall	108.0	6.0 × 18.0
		Office	18.0	3.0 × 6.0
		Storage-1	4.5	1.5 × 3.0
		Storage-2	4.5	1.5 × 3.0
		SUBTOTAL	301.5 (m^2)	
OTHER		Lecture RM	63.0	6.0 × 10.5
		Fan RM	10.8	1.8 × 6.0
		Exterior Corridor-1	54.4	3.0 × 18.1
		Exterior Corridor-2	170.6	4.1 × 41.9
		Exterior Corridor-3	50.2	2.8 × 18.1
		Ramp	120.2	4.7 × 25.6
		Toilet Building 2F	66.2	7.2 × 9.2
		SUBTOTAL	535.3 (m^2)	
		2ND FLOOR TOTAL	944.8 (m^2)	
		OP THEATRE/LABORATORY BUILDING TOTAL FLOOR AREA	1758.4 (m^2)	

MAIN BUILDING TOTAL FLOOR AREA	3966.7 (m^2)

RELATED FACILITIES

Electric RM	75.0	12.5 × 6.0
Elevated Water Tank	111.0	7.5 × 14.8
TOTAL FLOOR AREA	186.0 (m^2)	

MASAKA TOTAL FLOOR AREA	4152.7 (m^2)

3) Facility configuration (function)

The facility configuration of this plan is as shown below.

Table 2-19 Facility Configurations of the Divisions within the Scope of this Project

Building／Floor		Configuration
OPD/Casualty Building	Ground Floor	Casualty Dept. OPD(Surgical)
	First Floor	OPD(General OPD [Male, Female, Paediatric], Specialised Medical)
OP Theatre/Laboratory Building	Ground Floor	Operation Dept.
	First Floor	Laboratory, Pharmacy, Lecture Room
Toilet Building	Ground &First Floor	Toilet for outpatients, Toilet for staff, Toilet for disabilities
Related Facilities		Electric Room , Elevated Water Tank

4) Floor planning

The hospital building is designed as two parts, the OPD/Casualty building and the OP Theatre/Laboratory building, to prevent nosocomial infection in the operation department. Toilets are installed exclusively in a space between the two buildings to minimise the effects of offensive odours on rooms inside the buildings. The buildings will be two storied for better use of land. Ramps are used instead of elevators that require high maintenance costs.

Of the six planned zonings, the casualty department is placed on the ground floor where ambulances arrive. The operation department is placed next to the casualty department so that serious patients may be quickly transferred to the operation department. Patients who are not in a serious condition are transferred to the surgery sector of outpatient department placed opposite the operation department. The two buildings, to be built on ground of different levels, are connected with ramps, and the hospital buildings are connected with the hospital roads by ramped bridges; these ramps will facilitate movement from the casualty department and the ward to the operation department, and from the outpatient department and the ward to the dispensary on different floors. The roofed exterior corridors connecting different departments may be effectively used as waiting spaces for the outpatient department or the dispensary, to rationalise service circulations between various departments, to facilitate evacuation, or as maintenance spaces for facilities and equipment. The exterior corridor of the first floor is designed to be wide to serve as waiting spaces for patients' family members, because the first floor accommodates a large number of patients. Such design of the first-floor exterior corridor, together with the layout plan, forms a shape in the floor planning that encircles the front entrance.

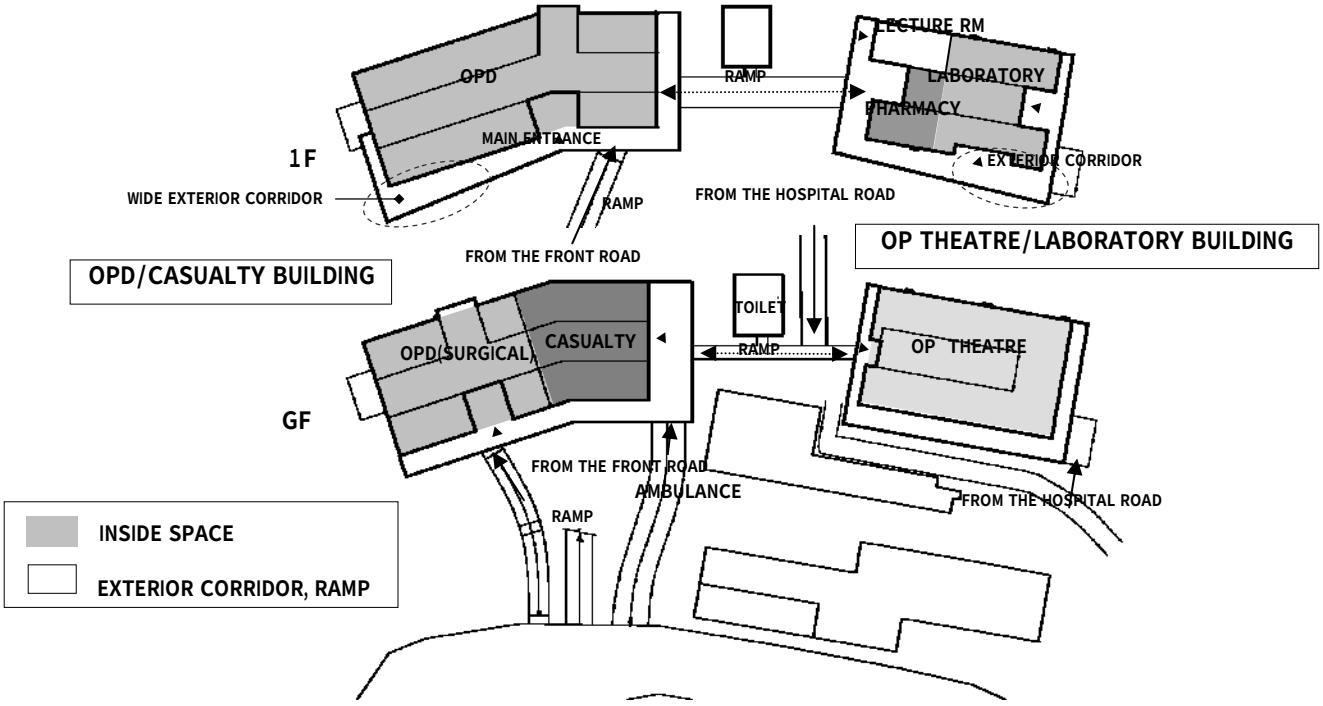


Figure 2-11 Facility Floor Planning

- Planning of the outpatient department

  (the general outpatient sector and the specialized medical sector)

In compliance with the custom of Uganda that patients finish the reception procedure outdoors and proceed to the waiting spaces in the hospital, the 'central hallway' layout is adopted for the outpatient department. The central hallway plays the role of a waiting space. The floor layout forms a clear four layer structure, with the central hallway(interior waiting space) in the centre, consultation room, diagnosis rooms and treatment rooms on both sides of the central hallway and exterior waiting space. The reception desk is located at the centre of the outpatient building, a short walk from the point at which one reaches the first floor via the bridge from the front road. From the reception desk, patients can move easily to anywhere they want to go.

The outpatient department consists of four sectors: the male outpatient sector, female outpatient sector, the paediatrics department, and the specialised medical sector. Each sector has its own consultation room(s) and treatment room(s), with circulations provided for the doctors and nurses on the window sides, so as to separate their circulations from those of the patients and to facilitate rapid treatment that requires cooperation among these different sectors. The paediatrics department is laid out separately from other sectors to avoid contact with them to help prevent nosocomial infections.

Since a large number of patients are expected to visit, the exterior corridor, in addition to the waiting space in front of each department, may be used as a waiting space for patients and their family members. The exterior corridor is connected with the dispensary (pharmacy) by a ramp, which facilitate the circulations of patients after diagnosis.

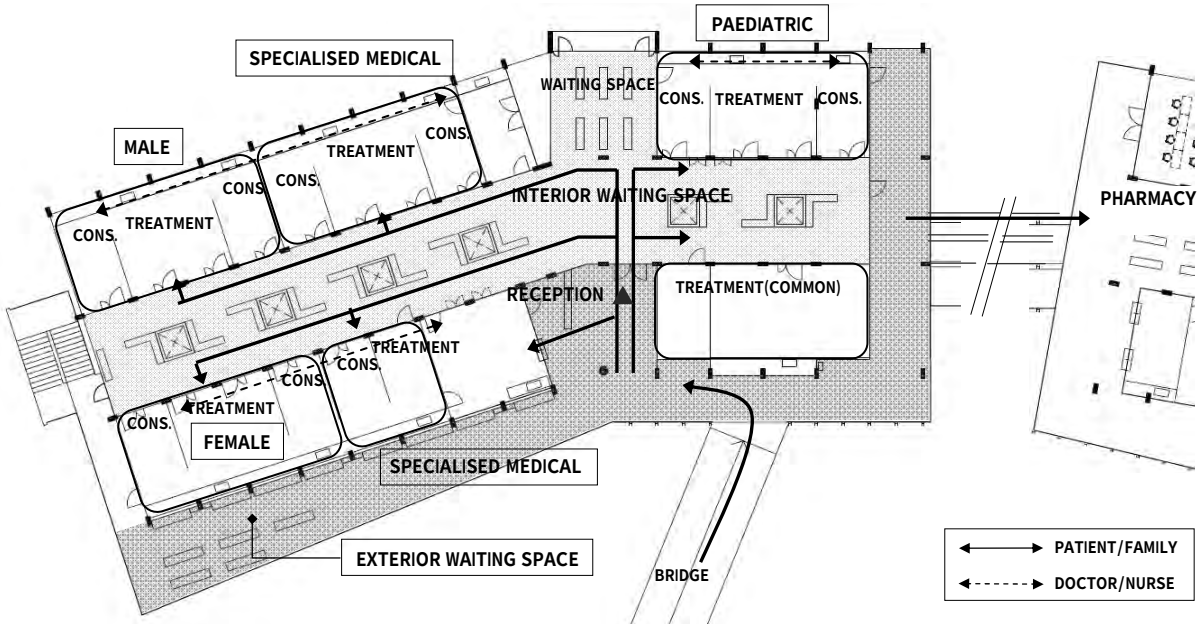


Figure 2-12 First Floor of the OPD/Casualty Building: Outpatient Department

- Planning of the casualty department

  In Uganda, the casualty departments are emergency surgeries open 24 hours a day. Therefore, the casualty department is placed at a location close to the hospital front road on the ground floor of the OPD/Casualty Building to facilitate ambulance access. The department has an entrance to be used exclusively for patients in serious conditions arriving by ambulance. After having been cleaned by shower at the entrance, the patients are divided by triage into those needing clinical treatment and those requiring the small operation theatre. The resuscitation room, where patients stay after treatment, is located at a place easily observable from the nurse station to allow monitoring of the condition of the patients. A ramp that connects the casualty department with the operation department of the OP Theatre/Laboratory building helps quickly transfer patients in serious conditions to the operation department.

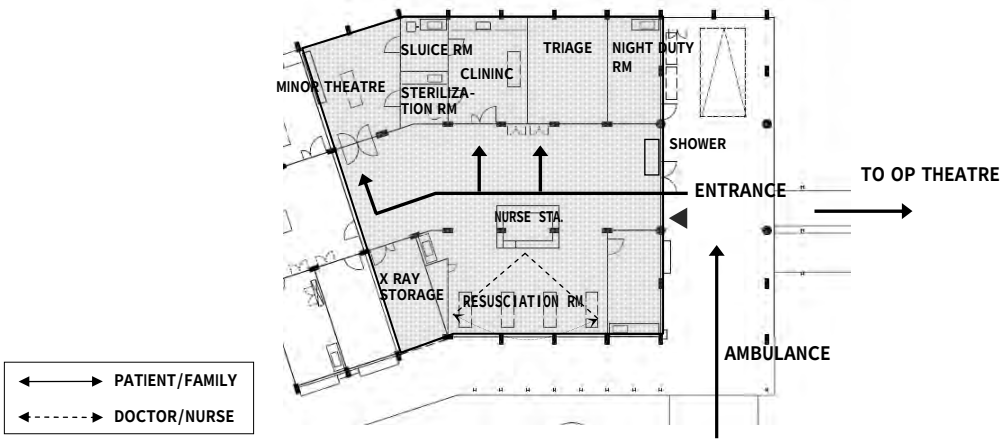


Figure 2-13 Ground Floor of the OPD/Casualty Building: Casualty Department

- Planning of the examination department

  The examination department conducts physiological and pathological examinations and consists of laboratories, sample collection rooms, a blood collection room, and a blood bank. Patients go directly from the exterior corridor to the blood collection room and collection room-1 or collection room-2. Waiting spaces are provided in front of these rooms. Collection room-1 is used exclusively by tuberculosis patients, a provision to prevent expansion of tuberculosis infection. For urine sampling, the toilet for patients situated between the OPD/Casualty building and the OP Theatre/Laboratory building is used.

  The medical staff members move around various rooms via the hall, and their circulations are thus separated from those of the patients. The separation of circulations not only improves operation efficiency but also helps prevent unauthorized persons from entering the medicine depository or the laboratories. The X-ray department, which would normally be a part of the examination department, is not included in the scope of the project, because the existing X-ray facility will continue to be used.

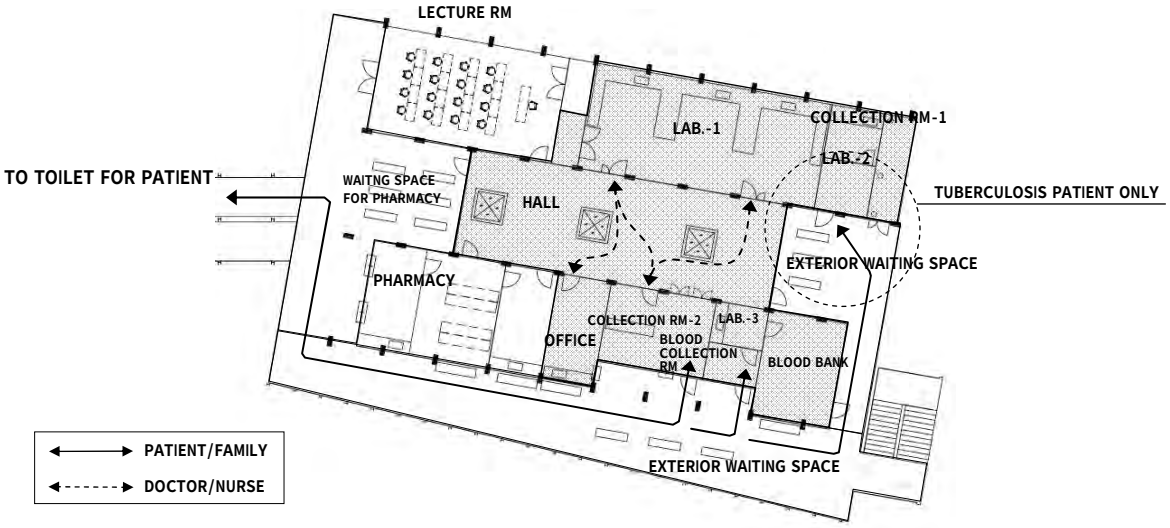


Figure 2-14 First Floor of the OPD/Casualty Building, Examination Department

- Planning of the operation department
  The operation department consists of three major operation theatres, one minor operation theatre, a recovery room, a sterilisation room, and a staff room. To ensure prevention of nosocomial infections, a corridor behind theatres exclusively used for transportation of exposed postoperative equipment and materials is provided to make a clear demarcation of the clean zone and contaminated zone. The recovery room is located in the centre of the operation department, a place easily observable from the nurse station, designed to permit postoperative patients to stay for a maximum of six hours, equivalent to the maximum time required for recovery from anaesthesia. Patients in convalescing beds are returned to the ward depending upon their condition.

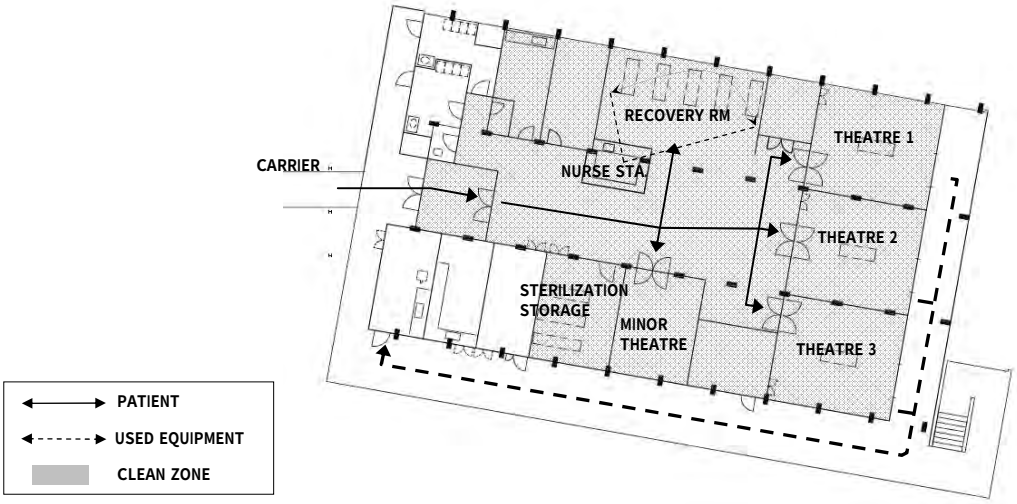


Figure 2-15 Ground Floor of the OP Theatre/Laboratory Building, Operation Department

5) Elevation design (shape, exterior finishing material)

The buildings will be of a rigid-frame concrete structure, the structure commonly used locally, with concrete block external walls. Both will be finished with cement mortar substrate and painted. Gabled roofs of corrugated galvanized steel sheets will be adopted for economy and ease of construction. The protruding length of eaves varies according to the width of the exterior corridor underneath, thereby realising an elevation design whereby the entire building appears to focus on the front entrance.

The external wall will have vertical pipe spaces (PS) for piping to facilitate maintenance. The elevation design is based on the window arrangement for openings for the maximum available widths of the wall, excluding portions for PS and washbasin counters indoors. However, high side windows are also adopted for rooms that do not require much light, such as the recovery room.

6) Section planning

The slab-to-slab height is set at 3.8 meters, considering the required ceiling heights of various rooms and spaces for pipes for water supply and drainage. The height of the ground floor of the OP Theatre/Laboratory building will be 4.0 meters, considering air-conditioning and medical equipment installed in this portion of the building.

Rooms other than operation theatres are generally not equipped with air conditioners and require natural ventilation. The roof will be equipped with top lights that function as a ventilation tower in internal waiting space areas. The floors of the ground floor and the first floor have openings for ventilation. The louvers of the fanlights installed on the upper portions of room partitions are normally kept open. These arrangements are planned to facilitate natural air movement through rooms up out of the roof. Also, taking advantage of the topography, openings are provided on the floor of the indoor waiting space so that the cool air that lies low to the ground may be induced to enter the building.

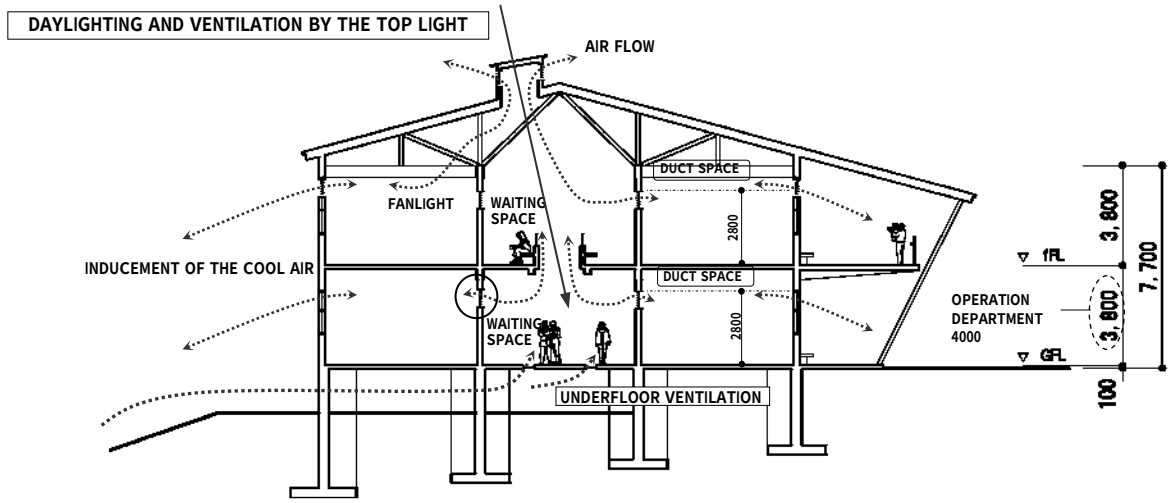


Figure 2-16 Cross-section of the Outpatient-Casualty Building

(3) Facility plan of Mubende RHH

1) Study by department

The data for Mubende RHH are not entirely sufficient for 2005/2006. Regarding items for which data are available, data over a period of three years from 2005/2006 to 2007/2008 are adopted so that more accurate and reliable data may be used, as is the case with Masaka RRH. Regarding items for which older data are not available, data over a two-year period from 2006/2007 to 2007/2008 are adopted.

[1] Number of patients

Table 2-20~25 shows the trends in the number of outpatients and number of various examinations conducted over a two-year period from 2006/2007 to 2007/2008 or a three -year period from 2005/2006 to 2007/2008

- Outpatient department

The 2005/2006 data collected at the site were insufficient; therefore, the average number over a two-year period from 2006/2007 to 2007/2008 is used for calculating the required space.

Table 2-20 Number of Patients for the Outpatient Department

		2006/07	2007/08	Last 2years Average
Total No. of Out-patients		78,967	83,620	81,294
Rate of increase			5.9%	
1	Medical	58,624	58,864	58,744
2	Paediatric	9,993	8,620	9,307
3	Surgical (general)	2,832	7,106	4,969
4	Dental	5,672	6,771	6,222
5	Gynaecology	1,846	2,259	2,053

- Casualty (surgery) department

As is the case with the outpatient department, the average number from a two-year period from 2006/2007 to 2007/2008 is used.

Table 2-21 Number of Patients for the Casualty

		2006/07	2007/08	Last 2years Average
1	Accident case	1,803	3,883	2843
Rate of increase			115.4%	

- Examination department (Physiological and pathological)

The 2005/2006 data collected at the site were insufficient. The number used for determining the required space of this department is the average number of cases for physiological and pathological examination over a two-year period from 2006/2007 to 2007/2008

Table 2-22 Number of Physiological/Pathological Examinations

Laboratory Examination		2006/7	2007/8	Last 2years Average
1	Laboratory test Haematology Biochemistry Parasitology	4,538	3,364	3,951
2	Micro-Biology Bacteriology (TB) Bacteriology(Culture)	1,416	1,645	1530.5
3	Other	13,311	15,715	14,513
TOTAL		19,265	20,724	19,994.5

- Operation department

  Mubende RHH currently has only one operation theatre. The number of operations in 2007/2008 decreased from that of 2006/2007. This was caused by training leave by a medical doctor of the gynaecology department and the hospital became unable to conduct operations for gynaecology-related diseases such as fibroid of the uterus. The doctor is expected to return to the hospital after completion of the training. Since the data for 2005/2006 are insufficient, the average number over a period of two years from 2006/2007 to 2007/2008 is used for calculating the required space.

Table 2-23 Number of Operations

		2006/07	2007/08	Last 2years Average
1	Major Operation	2,655	1,213	1934
Rate of increase			-54.3%	
2	Minor Operation	5,318	5,252	5285
Rate of increase			-1.2%	

- Maternity department

  The number of deliveries used for calculating the required space of this department is the average number over a period of three years from 2005/2006 to 2007/2008, as is the case with the physiological and pathological examination department.

Table 2-24 Number of Delivery

Delivery		2005/6	2006/7	2007/8	Last 3years Average
1	Normal delivery	515	897	1,045	
2	Caesarean section	890	782	963	
3	Vacuum extracted	2	5	10	
4	Premature deliveries	4	7	3	
Total No. of Delivery		1,411	1,691	2,021	1,708
Rate of increase			19.8%	19.5%	
-	Maternal death	9	19	96	
-	Stillbirth	106	133	140	

Table 2-25 Number of Admission Patients

		Number of inpatients			Last 2years Average
		2005/06	2006/07	2007/08	
1	Male ward	1,072	1,179	1,279	1,177
2	Maternity ward	1,535	1,840	2,259	1,878
-	Female ward	1,223	1,710	2,214	
-	Paediatrics ward	2,714	2,496	2,060	
-	Tuberculosis ward	163	237	252	
	Total	6,707	7,462	8,064	

[2] Calculation of required spaces

Based on the above design parameters, the required spaces of various rooms of Mubende RHH within the scope of this project is calculated.

・ Outpatient department

Average No. of daily patients (p/day) = Annual No. of Out-patients (p/year) ÷ Annual working day (day/year)

Expected No. of daily patients on 2017 (p/day) = Average No. of daily patients (p/day) ×Rate of increasing population

Maximum No. of daily patients per room (p/day * room) = Opening hour (min/day) ÷ Average of consultation time (min*room/p)

Required No. of consultation rooms (room) = Expected No. of daily patients on 2017 (p/day) ÷ Maximum No. of daily patients per room (p/day * room)

Table 2-26 Required Number of Various Rooms for the Outpatient

			Annual No. of Out-patients (p/year)	Annual working day (day/year)	Opening hour (min/day)	Average No. of daily patients (p/day)	Rate of increasing population	Expected No. of daily patients on 2017 (p/day)	Consultation room				Existing No. of consultation rooms / desks
									Average of consultation time (*6) (min*room/p)	maximum No. of daily patients per room (p/day * room)	Required No. of consultation rooms (room)	No. of rooms	
			A	B	C	D=A/B	E	F=D*E	G	H=C/G	I=F/H		
Mubende	1	Medical inc. casualty	58,744	365	600	160.94	1.33	214.32	8	75	2.86	3	3
	2	Paediatric inc. casualty	9,307	365	600	25.50	1.33	33.95	8	75	0.45	1	
	3	Surgical	4,969	260	480	19.11	1.33	25.45	20	24	1.06	2	1
	4	Gynaecology	2,053	260	480	7.89	1.33	10.51	15	32	0.33	1	1
	5	Dental	6,222	260	480	23.93	1.33	31.86	17	28	1.13	2	1
	TOTAL		81,294			237.37		316.10				9	6

(*6) Average time spent on one patient in one room (source: interview survey)

Currently, the medical sector and the specialized medical sector are not clearly separated. Therefore, a total of three consultation rooms are planned for both sectors.

・ Casualty (surgery) department

Average No. of daily patients（p/day）= Annual No. of Casualty-patients(p/year）÷Annual working day（day/year）
Expected No. of daily patients on 2017（p/day）＝
Average No. of daily patients（p/day）× Rate of increasing population
Maximum No. of daily patients per room(p/day*room)＝ Opening hour（min/day）÷Average of Observation time（min*room/p）
Required No. of consultation rooms(room)＝
Expected No. of daily patients on 2017（p/day）÷ Maximum No. of daily patients per room (p/day*room)

Table 2-27 Required Number of Various Rooms for the Casualty(Surgical)

Mubende	Annual No. of Casualty-patients （p/year）	Annual working day （day/year）	Opening hour （min/day）	Average No. of daily patients （p/day）	Rate of increasing population	Expected No. of daily patients on 2017 （p/day）	Triage				Clinic				Resuscitation room			
							Average of Filtering time(*7) (min*room/p)	maximum No. of daily patients per room	Required No. of Triage	No. of rooms	Average of Diagnosis & Treatment time(*7) (min*room/p)	maximum No. of daily patients per room	Required No. of Clinic	No. of rooms	Average of Recovery time(*7) (min*room/p)	maximum No. of daily patients per room	Required No. of Resuscitation rooms	No. of rooms
	A	B	C	D=A/B	E	F=D*E	G	H=C/G	I=F/H		J	K=C/J	L=F/K		M	N=C/M	O=F/N	
	2,843	365	1,440	7.79	1.33	10.37	20	72	0.14	1	120	12	0.86	1	480	3	3.46	4

(*7) Average time spent on one patient in one room or one bed for diagnosis or treatment (source: interview survey)

Currently, the casualty department has one diagnosis room but no resuscitation room in the surgical ward. To facilitate diagnosis and treatment, a resuscitation room is essential.

・ Operation department

Average No. of daily Operations / Patients（p/day）＝Annual No. of Operations / Patients（p/year）÷Annual working day（day/year）
Expected No. of daily Operations / Patients on 2017（p/day）＝
Average No. of daily Operations / Patients（p/day）×Rate of increasing population
Required No. of Theatre(room)＝
Expected No. of daily Operations / Patients on 2017（p/day）÷Maximum No. of daily Operations（p/day*room）
Required No. of Recovery beds(bed)＝
Expected No. of daily Operations / Patients on 2017（p/day）×Average of Recovery time (day*bed/p)

Table 2-28 Required Number of Various Rooms for the Operation department

Mubende		Annual No. of Operations / Patients（p/year）	Annual working day（day/year）	Average No. of daily Operations / Patients（p/day）	Rate of increasing population	Expected No. of daily Operations / Patients on 2017（p/day）	Major Theatre			Minor Theatre			Recovery		
							Maximum No. of daily Operations (*8) (p/day*room)	Required No. of Theatre(room)	No. of Theatres(room)	Maximum No. of daily Operations (*8) (p/day*room)	Required No. of Theatre(room)	No. of Theatres(room)	Average of Recovery time（*9) (day*bed/p)	Required No. of Recovery beds（p/day）	No. of beds(bed)
		A	B	C=A/B	D	E=C*D	F	G=E*F		F	G=E*F		H	I=E*H	
	Major Theatre	1,934	365	5.30	1.33	7.06	4	1.76	2.00	-	-	-	0.5	3.53	4.00
	Minor Theatre	5,285	365	14.48	1.33	19.28	-	-	-	20	0.96	1.00	-	-	-

(*8) Number of operations per operation theatre per day (source: interview survey)
(*9) Average convalescing time per bed per person (source: interview survey)

Currently, the operation department has one operation theatre and no recovery room. The department is obliged to transfer post-operative patients to the ward immediately after an operation.

- Maternity department

The project will provide rooms related to delivery, including a labour room, delivery room, and recovery room for the maternity department. The required spaces of the prenatal room and the postnatal room is calculated in the tables for the ward department

Average No. of daily Deliveries（p/day）＝Annual No. of Deliveries（p/year）÷ Annual working day（day/year）

Expected No. of daily patients on 2017（p/day）＝Average No. of daily Deliveries（p/day）×Rate of increasing population

Required No. of Delivery beds(bed)＝Expected No. of daily patients on 2017（p/day）÷ Maximum No. of daily Deliveries (p/day*bed)

Table 2-29 Required Number of Various Rooms for the Maternity department

	Annual No. of Deliveries（p/year）	Annual working day（day/year）	Average No. of daily Deliveries（p/day）	Rate of increasing population	Expected No. of daily patients on 2017（p/day）	Delivery		
						Maximum No. of daily Deliveries (*10) (p/day*bed)	Required No. of Delivery beds(bed)	No. of beds(bed)
	A	B	C=A/B	D	E=C*D	H	I=E/H	
Mubende	1,708	365	4.68	1.33	6.23	3	2.08	3

(*10) Number of deliveries per obstetrical bed per day (source: interview survey)

・ Ward department

Annual No. of Admission days(day/year) ＝ Annual No. of Inpatients(p/year)×Average No. of Admission days(day/p)

Expected No. of Admission days on 2017(day/year)＝Annual No. of Admission days(day/year)×Rate of increasing population

Expected No. of Admission days(day/year) [Bed occupancy rate :90%]＝Expected No. of Admission days on 2017(day/year)÷90%

Required no. of beds(bed)＝Expected No. of Admission days(day) [Bed occupancy rate :90%]÷365 日

Table 2-30 Required Number of Beds for the Ward Department

Mubende		Annual No. of Inpatients(p/year)	Average No. of Admission days(day/p)	Annual No. of Admission days(day/year)	Rate of increasing population	Expected No. of Admission days on 2017(day/year)	Expected No. of Admission days(day/year) Bed occupancy rate 90%	Required No. of beds(bed)	Planning no. of beds(bed) Total	Planning no. of beds(bed) BOR*	Existing No. of beds(bed) Total	Existing No. of beds(bed) BOR*	BOR* on 2017
		A	B	C=A*B	D	E=C*D	F＝E/90%	G=F/365					
1	Male ward	1,177	7.40	8,707	1.33	11595	12,884	35.30	36	88.2%	32	74.5%	99.3%
2	Maternity ward	1,878	3.90	7,324	1.33	9753	10,837	29.69	30	89.1%	25	80.3%	106.9%

*: BOR= Bed Occupancy Ratio

For the Maternity department it is planned that a total of 30 beds are provided in the prenatal room and the postnatal room.

2) Required floor area

The floor area requirements for the architectural planning at Mubende RHH will be determined from the required numbers of rooms of different categories calculated in a similar manner as Masaka RRH. In determining the area of a given room for the requested Japanese assistance the present state of existing facilities will be considered, and the standards for medical facilities in use in Uganda as well as Japan's floor area standards for medical facilities (design materials, etc. of the Architectural Institute of Japan) will be referred to.

Further, in determining the floor area, a comprehensive approach will be taken, taking into account such factors as layout of the medical equipment intended for the subject room, numbers of patients, and number of medical staff in charge.

Table 2-31 Floor Area of Each Room of the Subject Facility

CASUALTY/MATERNITY BUILDING 1F

DEPARTMENT	SECTOR	ROOM	FLOOR AREA(m²)	DIMENSION(m)
CASUALTY		X-Ray RM	18.0	3.0 × 6.0
		Resuscitation RM	50.6	6.0 × 8.4
		Clinic	19.8	3.3 × 6.0
		Office-2	18.0	3.0 × 6.0
		Triage RM	25.2	4.2 × 6.0
		Sterilization RM	9.0	3.0 × 3.0
		Sluice RM	9.0	3.0 × 3.0
		Minor OP	27.0	6.0 × 4.5
		Nurse Station	7.2	2.4 × 3.0
		Hall	104.3	6.0 × 17.4
		Ambulance Parking	32.4	6.0 × 5.4
		PS、EPS2	3.6	3.0 × 1.2
		SUBTOTAL	324.0 (m²)	
OUTPATIENT	SURGERY	Occupational therapy RM /Physiotherapy RM	18.0	3.0 × 6.0
		Treatment/Dressing-1	12.0	3.0 × 4.0
		Office-1	18.0	3.0 × 6.0
		Medical Record Storage	18.0	3.0 × 6.0
		Plaster RM	18.0	3.0 × 6.0
		Cons.-1	12.0	3.0 × 4.0
		Cons.-2	12.0	3.0 × 4.0
		Corridor	18.0	2.0 × 9.0
		Waiting Space	72.0	6.0 × 12.0
		SUBTOTAL	198.0 (m²)	
OTHER		Exterior Corridor-1	138.6	3.3 × 42.0
		Exterior Corridor-2	120.0	6.0 × 20.0
		Exterior Corridor-3	81.0	3.0 × 27.0
		SUBTOTAL	339.6 (m²)	
1ST FLOOR TOTAL			861.6 (m²)	

CASUALTY/MATERNITY BUILDING 2F

DEPARTMENT	SECTOR	ROOM	FLOOR AREA(m2)	DIMENSION(m)
MATERNITY		Sluice RM	18.0	3.0 × 6.0
		Exam RM	12.0	3.0 × 4.0
		Delivery-1	12.0	3.0 × 4.0
		Delivery-2	12.0	3.0 × 4.0
		Delivery-3	12.0	3.0 × 4.0
		Corridor	24.0	2.0 × 12.0
		Sterilizing RM	18.0	3.0 × 6.0
		Shower RM-1	2.2	1.2 × 1.8
		Shower RM-2	2.2	1.2 × 1.8
		Labour RM	90.0	6.0 × 15.0
		Recovery RM	90.7	6.0 × 15.1
		Nursery RM	18.0	3.0 × 6.0
		Nurse Station	8.8	2.4 × 3.7
		Hall	135.5	6.0 × 22.6
		Duty RM	8.1	2.7 × 3.0
		Office	24.3	3.3 × 7.4
		Storage-1	2.2	1.2 × 1.8
		PS、EPS2	3.6	3.3 × 1.1
		WC-1	2.3	1.5 × 1.5
		WC-2	2.3	1.5 × 1.5
		SUBTOTAL	498.1 (m²)	
OTHER		Exterior Corridor-1	98.7	3.3 × 29.9
		Exterior Corridor-2	86.3	4.2 × 20.5
		Ramp	138.6	4.2 × 33.0
		Bridge	23.7	2.1 × 11.3
		SUBTOTAL	347.3 (m²)	
2ND FLOOR TOTAL			845.4 (m²)	
CASUALTY/MATERNITY BUILDING TOTAL FLOOR			1707.0 (m²)	

OUTPATIENT/OP THEATRE BUILDING 1F

DEPARTMENT	SECTOR	ROOM	FLOOR AREA(m²)	DIMENSION(m)
LABOLATORY		Collection Area	18.0	3.0 × 6.0
		Blood Bank	9.0	3.0 × 3.0
		LAB-1	72.0	6.0 × 12.0
		LAB-2	9.0	3.0 × 3.0
		SUBTOTAL	108.0 (m²)	
PHARMACY		Dispensary	9.0	3.0 × 3.0
		Medicine Storage	18.0	3.0 × 6.0
		SUBTOTAL	27.0 (m²)	
OUTPATIENT	PAEDIATRIC	Cons.-1	12.0	3.0 × 4.0
		Treatment RM-1	12.0	3.0 × 4.0
		Dressing RM-1	12.0	3.0 × 4.0
		Corridor-1	18.0	2.0 × 9.0
	FEMALE	Cons.-2	12.0	3.0 × 4.0
		Treatment RM-2	12.0	3.0 × 4.0
		Dressing RM-2	12.0	3.0 × 4.0
		Corridor-2	18.0	2.0 × 9.0
	MALE	Cons.-3	12.0	3.0 × 4.0
		Treatment RM-3	12.0	3.0 × 4.0
		Dressing RM-3	12.0	3.0 × 4.0
		Corridor-3	18.0	2.0 × 9.0
	SPECIALISED MEDICAL	Cons.-4	12.0	3.0 × 4.0
		Treatment RM-4	12.0	3.0 × 4.0
		Dressing RM-4	12.0	3.0 × 4.0
		Corridor-4	18.0	2.0 × 9.0
		Office	30.2	6.0 × 5.0
		Entrance Hall	36.0	6.0 × 6.0
		Waiting Space	216.0	6.0 × 36.0
		EPS、MDF PABX	5.9	3.0 × 2.0
		Record RM	9.0	3.0 × 3.0
		SUBTOTAL	513.0 (m²)	
OTHER		Fan RM	18.0	3.0 × 6.0
		Exterior Corridor-1	108.0	6.0 × 18.0
		Exterior Corridor-2	225.0	5.0 × 45.0
		Exterior Corridor-3	36.0	3.0 × 12.0
		Exterior Corridor-4	16.4	2.0 × 8.2
		Toilet Building 1F	66.2	7.2 × 9.2
		SUBTOTAL	469.6 (m²)	
1ST FLOOR TOTAL			1117.6 (m²)	

OUTPATIENT/OP THEATRE BUILDING 2F

DEPARTMENT	SECTOR	ROOM	FLOOR AREA(m²)	DIMENSION(m)
OUTPATIENT	E.N.T/OPHTHALMOLOGY	Cons. -1	12.0	3.0 × 4.0
		Cons. -2	12.0	3.0 × 4.0
		Treatment RM	12.0	3.0 × 4.0
		Corridor	18.0	2.0 × 9.0
		Ophthalmology Theatre	12.0	3.0 × 4.0
		E.N.T/Ophthalmology Office	18.0	3.0 × 6.0
		Dental Clinic	36.0	6.0 × 6.0
		Dental Office	18.0	3.0 × 6.0
		Dental LAB.	9.0	3.0 × 3.0
		E-Ray RM	9.0	3.0 × 3.0
		Waiting Space	75.3	6.0 × 12.6
		Storage-1	6.0	3.0 × 2.0
		SUBTOTAL	237.3 (m²)	
OPERATION		Theatre-1	36.0	6.0 × 6.0
		Theatre-2	36.0	6.0 × 6.0
		Recovery RM	50.5	6.0 × 8.4
		Staff RM	18.0	3.0 × 6.0
		Doctor RM	14.7	3.0 × 4.9
		Changing RM-1	11.7	3.0 × 3.9
		Changing RM-2	11.7	3.0 × 3.9
		Shower RM-1	1.8	1.5 × 1.2
		Shower RM-2	1.8	1.5 × 1.2
		WC	1.9	1.5 × 1.3
		Slop Sink	1.9	1.5 × 1.3
		Ante RM	11.7	3.0 × 3.9
		Sluice RM	18.0	3.0 × 6.0
		Washing RM	18.0	3.0 × 6.0
		Sterilization RM	18.0	3.0 × 6.0
		Sterilization Storage	18.0	3.0 × 6.0
		OP Hall	114.6	6.0 × 19.1
		Nurse Station	8.5	2.4 × 3.6
		Storage-2	3.3	1.7 × 2.0
		SUBTOTAL	396.0 (m²)	
OTHER		Exterior Corridor-1	57.8	3.2 × 18.0
		Exterior Corridor-2	146.3	3.3 × 45.0
		Corridor	54.0	3.0 × 18.0
		Exterior Corridor-4	17.3	2.1 × 8.2
		Toilet Building 2F	66.2	7.2 × 9.2
		SUBTOTAL	341.6 (m²)	
2ND FLOOR TOTAL			974.9 (m²)	
OUTPATIENT/OPERATION BUILDING TOTAL FLOOR AREA			2092.5 (m²)	

MAIN BUILDING TOTAL FLOOR AREA	3799.5 (m²)

MALE WARD

WARD		RM-1	36.0	6.0 × 6.0
		RM-2	36.0	6.0 × 6.0
		RM-3	36.0	6.0 × 6.0
		RM-4	36.0	6.0 × 6.0
		RM-5	36.0	6.0 × 6.0
		RM-6	36.0	6.0 × 6.0
		Dressing RM	18.0	3.0 × 6.0
		Bed RM	14.9	3.0 × 5.0
		WC	1.5	1.2 × 1.3
		Shower	1.6	1.3 × 1.3
		NS	18.0	6.0 × 3.0
		Staff RM	9.9	3.3 × 3.0
		Sluice RM	8.1	2.7 × 3.0
		Family Space	18.0	3.0 × 6.0
		Corridor	105.0	2.7 × 39.0
		WC	22.7	3.8 × 6.0
		Washing RM	22.7	3.8 × 6.0
		Shower RM	11.3	3.8 × 3.0
		TOTAL	467.7 (m²)	

RELATED FACILITIES

Electric RM	75.0	12.5 × 6.0
Elevated Water Tank	103.8	7.0 × 14.8
TOTAL	178.8 (m²)	

MUBENDE TOTAL FLOOR AREA	4446.0 (m²)

3) Facility configuration (function)

The facility configuration of this plan is as shown below.

Table 2-32 Facility Configurations of the Sectors within the Scope of this Project

Building／Floor		Configuration
OPD/OP Theatre Building	Ground Floor	OPD（General OPD[Male, Female, Paediatric], Specialised Medical, Pharmacy
	First Floor	Operation Dept., OPD（Special Clinics）
Casualty /Maternity Building	Ground Floor	Casualty Dept., OPD（Surgical）
	First Floor	Maternity Dept.
Toilet Building	Ground Floor& First Floor	Toilet for outpatients, Toilet for staff, Toilet for disabilities
Male Ward	Ground Floor	36 beds、Treatment room
Related Facilities		Electric Room, Elevated Water Tank, Septic Tank, Percolation Trenches

4) Floor planning

The hospital building is designed as two parts, the Casualty/Maternity building and OPD/Operation Theatre building, to prevent nosocomial infection in the operation department, as is the case with Masaka RRH. The buildings will be two storied for effective use of the land. Ramps are used instead of elevators that require high maintenance costs.

The casualty department is placed on the ground floor on the side facing the road so that ambulances may easily approach through the newly installed gate. The operation department expects patients from the casualty department and the maternity department. It is located at a place easily accessible by wheelchair or stretcher via the ramp from these departments. The hospital roads are also connected with these ramps to facilitate transportation of patients from the wards. The outpatient department is placed in a building seen straight from the road, with the general outpatient department, examination department, and dispensary located on the ground floor, and the special clinics placed on the first floor. The surgery department is placed next to the casualty department to facilitate collaboration between the two, and is located at the side near the general outpatient department to promote concentration of outpatient medical services. Exterior corridors are provided on the front sides of both floors of the two buildings. The exterior corridors serve as waiting spaces for the outpatient department and the dispensary, as circulations connecting various departments, evacuation roads, and as spaces for maintenance works of facilities and equipment.

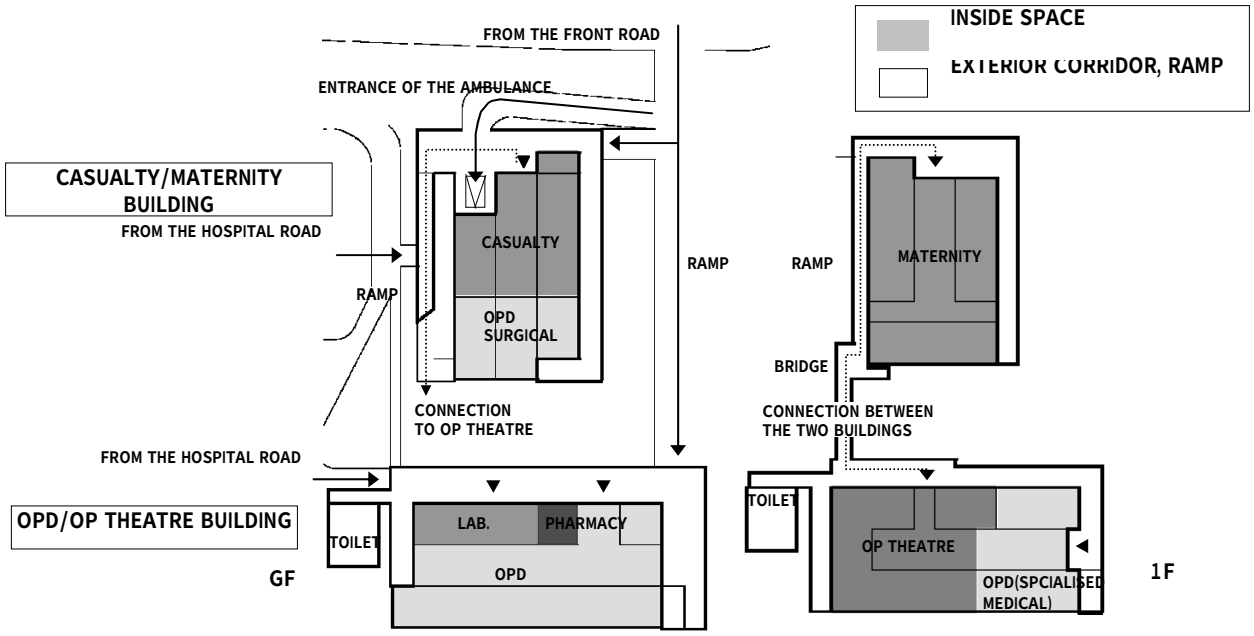


Figure 2-17 Facility Planning

- Planning of the outpatient department (general outpatient department, special clinics ,)
  As is the case with Masaka RRH, the floors constitute a four layer composition, with an exterior waiting space, and the consultation, dressing, and treatment facilities on both sides of the central hallway, the latter serving the roles of internal waiting space and connecting space. The outpatient department consists of the male outpatient section, female outpatient section, paediatrics department, and the specialised medical section on the ground floor, and the ENT department, ophthalmology department, and dentistry department on the first floor, for a total of seven sectors.
  Each sector has its own consultation room, dressing room, and treatment room. A circulation space for doctors and nurses is provided on the window side of these rooms. This is separated from the circulation space for patients, to expedite treatments that require cooperation of different departments. The paediatrics department is isolated from other departments to avoid nosocomial infections. The reception desk is located facing the approach from the front road to facilitate smooth movement of patients. Since a large number of patients are expected to come from the outpatient department, the dispensary and the examination department are located near the reception and a wider roofed exterior space is planned.

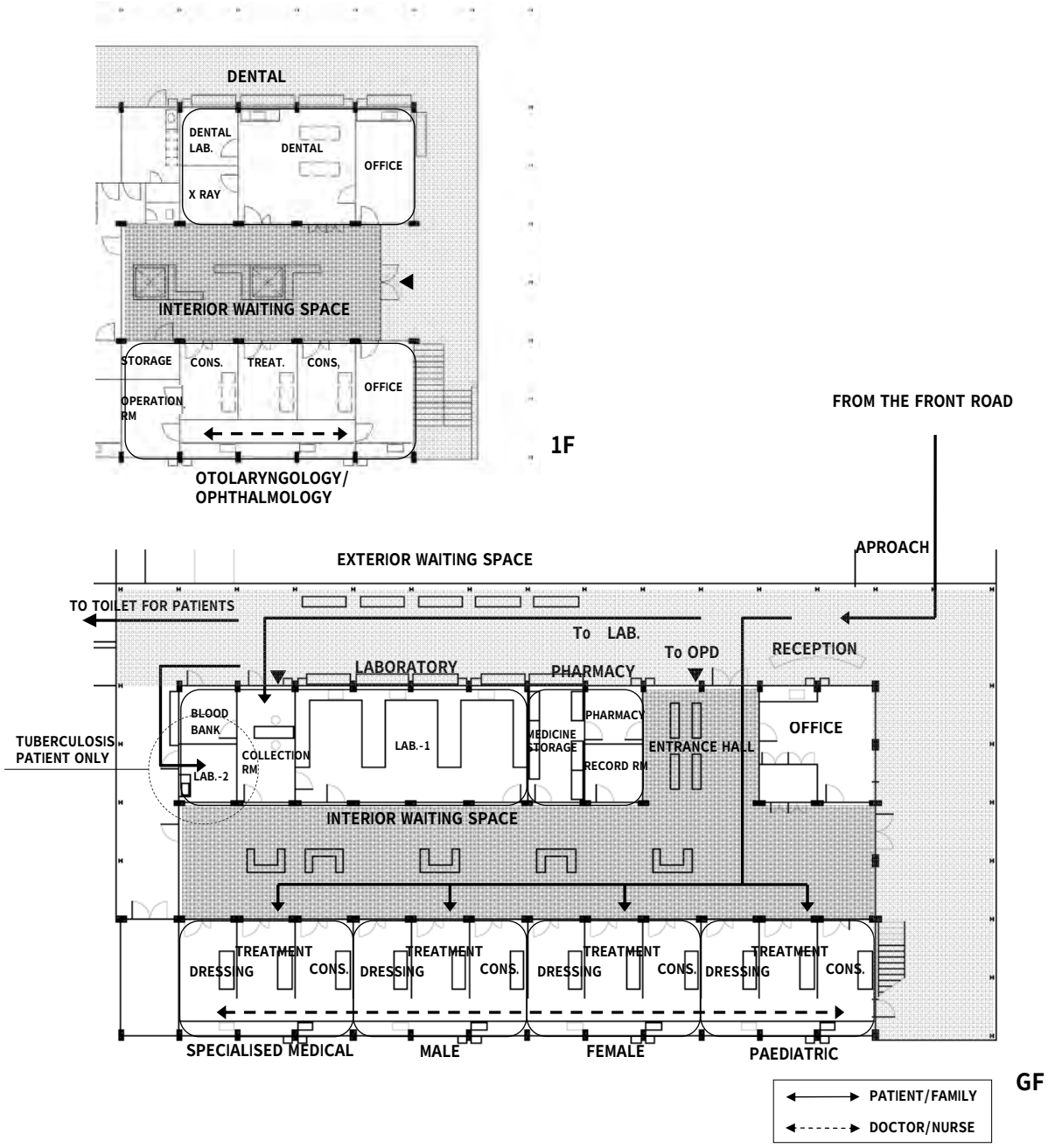


Figure 2-18 Ground Floor and First Floor of the Outpatient/OP Theatre Building: OPD, Examination Department

- Planning of the examination department

The examination department consists of the laboratories, a collection room, and a blood bank. The laboratories provide for physiological and pathological examinations. As is the case with Masaka RRH, patients can directly access the collection room from the exterior corridor. For urine collection, the toilets for patients next to the outpatient building are used. The X-ray department, which would normally be an element of the examination department, is not included in the project, because the existing radiography room will continue to be used.

- Planning of the casualty department

  The casualty department is located close to the front road on the ground floor of the Casualty/Maternity building. The room layout is similar to that of Masaka RRH. The department has an entrance exclusively for patients in serious conditions brought here, which is connected to a covered ramp to transport the patients quickly to the operation department without being exposed to the weather.

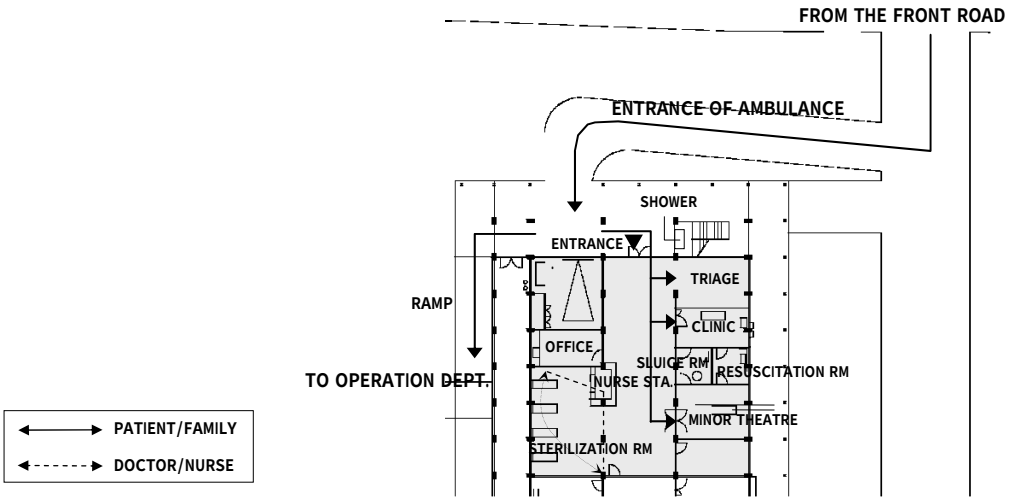


Figure 2-19 Ground Floor of the Casualty/Maternity Building: Casualty Department

- Planning of the operation department

  The operation department consists of two major operation theatres, one recovery room, one sterilisation room, one staff quarter, and other minor rooms. An exclusive corridor is provided behind the operation theatres for transporting postoperative exposed equipment and materials to clearly separate the clean zone from the contaminated zone and prevent nosocomial infection,. The recovery room is located at a place easy to observe from the nurse station and can accommodate postoperative patients for a maximum of six hours as necessary for patients to recover from anaesthesia. Patients in the convalescing beds are returned to the ward depending upon their condition.

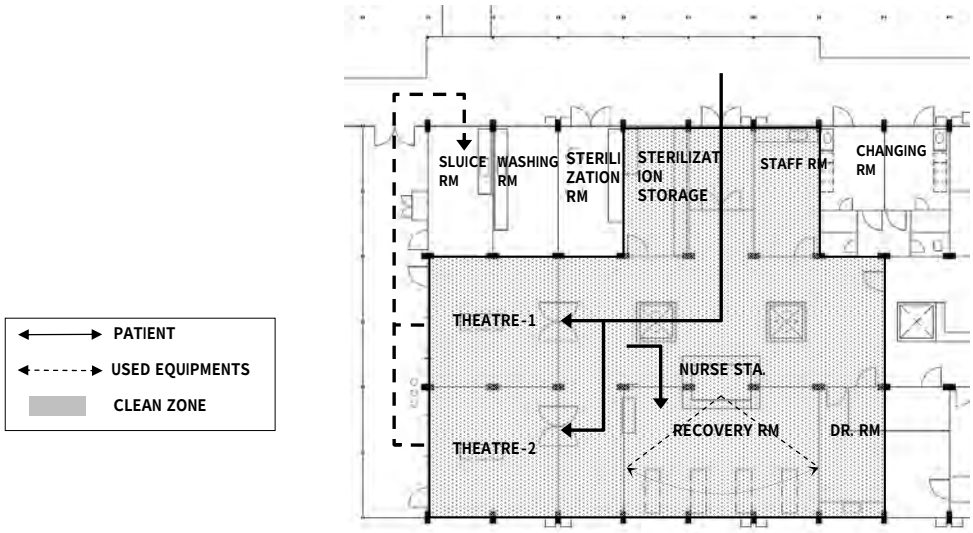


Figure 2-20 First Floor of the OPD/OP Theatre Building, Operation Department

- Planning of the Maternity department

  The project plans a labour room, delivery rooms, a recovery room, and a nursery room related to delivery. The antenatal ward and postpartum ward required before and after delivery will be provided by the Uganda side by modification of existing wards.

  The layout of rooms is designed to facilitate smooth movement from the labour room and delivery room to the convalescing bed, with these rooms arranged to surround the nurse station. There are three delivery rooms, and a circulation space for the doctors and nurses is provided on the window side. Also, the delivery rooms are connected with the sterilisation room, to minimize cross contamination of preoperative and postoperative equipment and materials. The labour room, recovery room, and nursery room are glassed in to permit observation from the nurses' station. Pregnant women who need an obstetrics operation are taken to the operation department in the neighbouring building by the ramp.

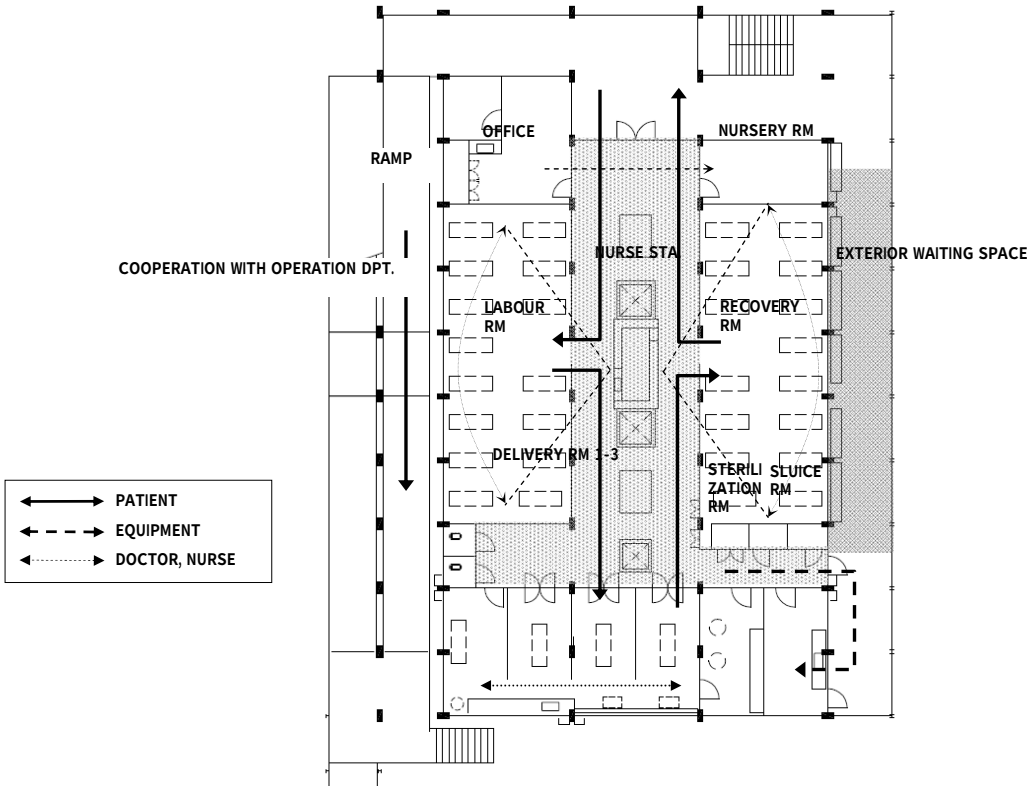


Figure 2-21 Ground Floor of the Casualty/Maternity Building, Maternity Department

5) Elevation design and exterior finishing material

Both the structure and finishing of the buildings of Mubende RHH facilities are similar to the elevation plan of Masaka RRH. Exterior waiting spaces are provided facing the approach road; masonry structures of perforated blocks and louvers are installed in this portion of the exterior waiting spaces to shield patients brought to the casualty department and the maternity department from easterly and westerly sunlight and also to protect them from being seen by unrelated people.

6) Sectional planning

As is the case with Masaka RRH, the slab-to-slab height is set at 3.8 meters, considering the required ceiling heights of various rooms and spaces for pipes for water supply and drainage. In the case of Mubende RHH, the operation theatres are on the first floor, and the air-conditioning and medical equipment may be partly placed in the space beneath the roof. Therefore, the same height of 3.8 meters can be adopted for the operation department .

Top lights, functioning as ventilation towers, are placed above the waiting spaces, to make the central hallway brighter and more comfortable that would otherwise tend to be dark and damp. Also, the louvers of the fanlights installed in the upper portions of room partitions are normally kept open. These arrangements are planned to facilitate natural air movement through the rooms up out of the roof.

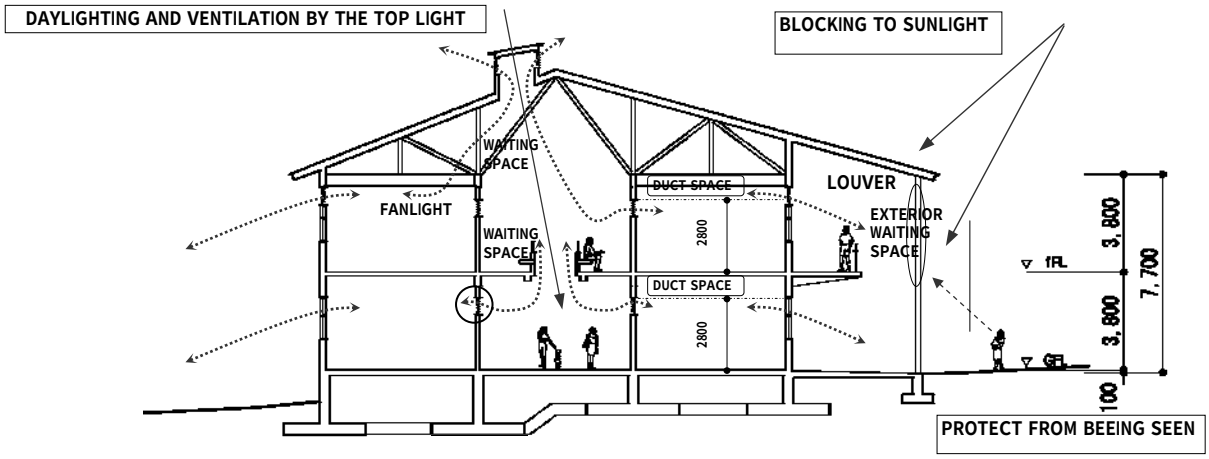


Figure 2-22 Cross-section of the Casualty/Maternity Building

Ⅱ Structural plan

(1) Basic policy

Although there are a ready-mixed concrete plant in Kampala City, Uganda, which can deliver ready-mixed concrete to places within a radius of 20 km from the plant, both construction sites are outside the radius of 20km from the plant. Therefore, concrete must be mixed at the construction sites.

Photo: On going Construction Site, Masaka RRH

Photo: Field Concrete Mixing, Aggregate Stockyard

The following basic policy is established based on the result of the field study conducted in Uganda.

1) The construction plan should give due consideration to the local construction business conditions and local construction technologies.
2) The structural plan should be a rational one, complying with the local design standards.
3) Sufficient precaution should be taken for the prevention of deflections, vibrations, etc., which may result from long term loads, to prevent occurrence of structural problem of buildings after long use.

(2) Structural plan

In Uganda, one-storied buildings are mostly of brick masonry with a lintel at the top of openings. Two-storied or taller buildings are mostly of a rigid frame structure with reinforced concrete columns and beams, one column about every 10 m^2, with brick masonry forming walls between the columns. The project adopts the above construction methods, while considering earthquake resistance. Two- or three-storied buildings are mostly built on direct foundations. Based on the result of ground surveys, direct foundations are also adopted for this project.

The brick walls are about 23 cm thick; therefore, use of columns and beams of about 23 cm-side square or rectangular cross sections will be economical in the construction work, by reducing consumption of formwork boards.

Locally, gabled roofs are common with steel-frame or wood-frame truss structures placed directly on walls and beams. Concrete slab roofs are not common. It is also common for roof slopes to extend outside to let their rims serve as eaves so as to use the spaces underneath as a waiting space or corridor. The roofs of the planned structure will also be steel-frame truss structures.

(3) Ground and foundation structure

The ground surveys conducted at three locations at the planned sites confirmed the ground conditions. From the results of the soil tests, the allowable bearing power (from the standard penetration test (SPT) and dynamic cone penetrometer (DCP)) of Masaka RRH and Mubende RHH sites are set as follows.

Table 2-33 Result of Ground Survey

Site	Depth (m)	Standard Penetration test SPT (kN/m²)	Dynamic Cone Penetrometer DCP(kN/m²)	Allowable Bearing Capacity (kN/m²)
Masaka RRH	1.0	123～700	112～392	120
	2.0	180～516	101～500	
Mubende RRH	1.0	56～79	116～336	70
	2.0	67～112	61～246	

Both construction sites are slopes; therefore, the foundation depth will be 1.25 meters deep from the present ground level.
The foundations will be direct foundations, with independent footing foundations for Masaka RRH and continuous footing foundations for Mubende RRH.

(4) Design load

Design loads, such as dead loads, live loads, seismic loads, and wind loads, will are set based on the Seismic Code of Practices for Structural Designs - U319 (2003) and the Structural Design Guide Lines (Draft2004) of Uganda.

1) Dead loads

Dead loads are calculated from the weights of the structural materials and finishing materials and the equipment, pipes, ducts, and others fixed to the building.

2) Live loads

Determination of design live loads refers to the numbers indicated in the Structural Design Guide Lines (Draft2004), and should not be lower than the number corrected by the load conditions according to the BS Standards. Thus, live loads are set reflecting the real conditions of the buildings. The live loads of main rooms are shown in the table below.

Table 2-34 Live Load in Main Rooms

Room Nome	Live Load (N/m²)	Notes
Wards ,Washroom, Toilet	2,000	Uganda Standard
X-ray room, Operation Theatre	5,000	Uganda Standard
Office, Consultation Room, Treatment Room	3,500	Uganda Standard
Corridor, Stairs	4,000	Uganda Standard
Balcony	4,000	Uganda Standard
Assembly Room, Lecture room	5,000	Uganda Standard
Drive Way, Parking	7,500	Uganda Standard
Machine Room （Incl. Machine Weight）	7,500	Uganda Standard (Heavy Machines to be separate)
Storage	6,500	Uganda Standard
Flat Roof	1,500	Uganda Standard（ 0°≦slope≦10°）
Sloped Roof	500	Uganda Standard（10°＜slope≦30°）

3) Seismic loads

According to the Seismic Code of Practices for Structural Designs - U319 (2003), seismic loads are given by the equation shown below.

$Cd = C \cdot Z \cdot I \cdot K$

where

- Cd: horizontal shearing force at ground level
- C: shear modulus (= 0.08: basic seismic coefficient)
- Z: seismic zoning coefficient (= 1.0 for Mubende, ZONE-1)
  (= 0.8 for Mityana, Masaka, ZONE-2)
  (= 0.7 for Entebbe, ZONE-3)
- I: building importance factor (= 1.5, hospital)
- K: structure's specific coefficient (= 1.0 for the rigid frame, = 2.0 for rigid frame + brick masonry)

4) Wind loads

According to the Structural Design Guide Lines (Draft2004), wind loads are given by the equation shown below, where the design wind speed is the statistical average wind speed for the areas concerned. The design wind speed for this project is set at 38 m/s for both sites.

$F = Cf \bullet q \bullet Ac$

$q = K \bullet Vx^2$

where

- Vx: design wind speed (m/s)
- V: reference wind speed (= 38 m/s, minimum value for the BS Standards)
- F: wind force (N)
- K: coefficient concerning altitude (= 0.53, H = 1,000 m)
- Cf: coefficient of wind force
- q: design wind speed pressure (= 765 N/m^2)

(5) Combination of different loads

The combinations of different loads are as shown below.

1.3DL + 1.6LL
0.8(1.3DL + 1.6LL + 1.6W)
0.9DL + 1.3W
DL + LL + E *1)
0.7DL + E *1)
DL + 1.3LL + 1.25E *2)
0.9DL + 1.25E *2)

*1) In case the Working Stress Method is used according to the Uganda standards
*2) In case the Limit State Method is used according to the Uganda standards

The combinations of loads and design methods can be based either on the Working Stress Method or on the Limit State Method. The method that enables a more economical design will be adopted.

(6) Structural materials

Structural materials produced domestically are generally used. However, use of structural materials is planned as shown below, in consideration of such factors as their availability, quality, and workability.

Concrete

Kind:	plain concrete
Strength:	F_0 = 30 N/mm^2 (by Cubic test)
Aggregate:	The coarse aggregate should be crushed stones; the fine aggregate should be river sand, pit sand, and fine sand and should conform to BS882.

Reinforcing bar

Mild Steel Bar: D6, D10, D12

High Yield Steel Bar: D16, D20, D25

Ⅱ Building Systems Plan

(1) Power Supply systems

1) Electric power supply system

The main cable for electric power supply to the planned facilities of this project will be tapped from Umeme's (Ugandan electric distribution company) 11-kV transmission lines to the transformers to be installed by the Japan side in the planned sites. The received electric power is stepped down to 415V/240V 50 Hz by step-down transformers and distributed by circuits of three phase/four line cables to where electric power is needed.

The electric power required by the project facilities are estimated be to from 100 to 200 kVA at both Masaka RRH and Mubende RHH. Connection of high-voltage primary circuits in the electric rooms will be the responsibility of the Uganda side. The Japan side will install necessary transformers, trunk cables, switchboards, main breaker boards for receiving and distribution beyond the main power panels, and cables to the existing panels.

Since the voltage fluctuation of commercial electric power is large, installation of automatic voltage regulators (AVRs) will be studied for facilities and equipment susceptible to voltage fluctuations.

Power failures happen several times a month in Uganda. Given this situation of electric power supply in Uganda, installation of a diesel-driven generator as an emergency power source is essential for both hospitals. The supply of emergency electric power will be limited to equipment that cannot be allowed to stop even when commercial electric power fails, air conditioners and ventilation fans of operation theatres, wall power outlets for lighting and similar usages. The capacities of emergency power generators will be minimised to meet the essential needs of the hospitals only. The generators will be specified for enclosed designs, with fuel supplied by service tanks. As an environmental consideration to the surrounding area, proper sound insulation and facilities to reduce noise and vibration will be provided.

The blood banks use power generated by solar cell and battery systems installed locally. The refrigerators to be provided by this project are large in capacity and the solar cell battery system would become too large if the present system were continued. Therefore, the refrigerators will be switched to the in-house generator circuit system.

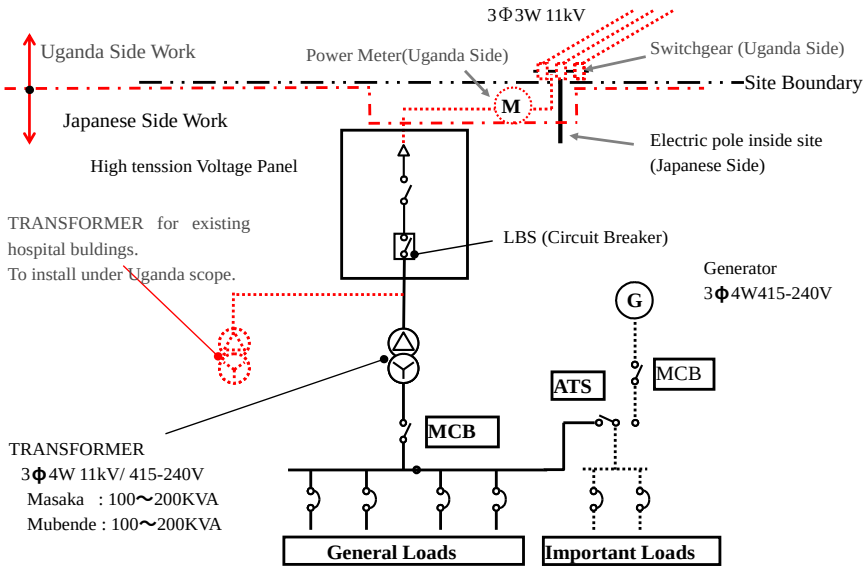


Figure 2-23 Schematic Diagram of Receiving and Transforming Facilities

2) Power outlet for lighting

The design illuminance is set at about 60% to 70% of the JIS standards (500 lx). As light sources, fluorescent lamps with good illumination efficiency which are commonly used locally are planned for most fixtures. Lighting zoning will be kept small to minimise lighting costs.

Wall power outlets will conform to the types generally used in Uganda. Their specifications and locations will be decided considering such factors as type of power source, capacity, connection method of the facility, and equipment to be connected.

3) Lightning arrester and grounding device

To protect the facilities from lightning, a lightning rod and roof conductors will be installed. Medical equipment, electrical facilities, and communication facilities will be equipped with a grounding device as indicated by their specifications.

4) Telephone system

For both hospitals, Uganda Telecom has already laid an aerial trunk cable drawn from the front road of the site to the MDF (Main Distribution Frame) room in the existing PABX (Private Automatic Branch Exchange), or telephone exchange room. The line capacity required is estimated to be the maximum 5 outside lines plus 50 to 100 inside lines (0.02 lines per m^2 of the building). The existing PABXs do not have capacity allowance for the future, and new PABXs will be installed.

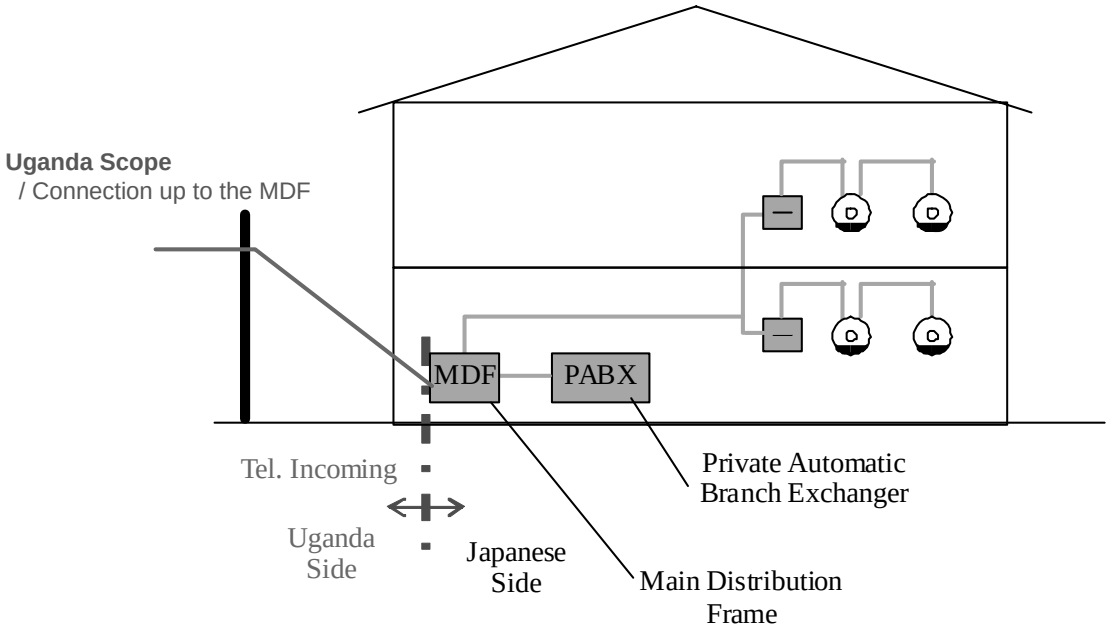


Figure 2-24 Schematic Diagram of Telephone Infrastructure

5) Public address system

A public address system will be installed in both hospitals to enable paging of doctors from the central controls rooms and to conduct escape guidance, etc. in case of fire.

Individual calling systems will be installed in waiting spaces, etc. to page patients.

6) Interphone system

Rooms such as operation theatres where communication between inside and outside the room is necessary will be quipped with a two-way interphone system.

7) Automatic fire alarm system

An automatic fire alarm system will be installed according to the rules and standards of Uganda. Also, emergency exit indicators are installed. These are provided for the facilities within the scope of this project.

8) Television common antenna system

Television sets and antennas will be installed by the hospitals. The Japan side will install empty cable piping systems.

9) Cable piping for information network

To build the information networks, cable pipes and boxes will be installed from the electric shaft of each floor at points where installation of information network instruments is necessary.

(2) Mechanical Building Systems Plan

1) Water supply system

Both hospitals of this project will use city water. The water-receiving tanks should have a capacity equivalent to two days' consumption in compliance with the standard presented by the Ministry of Health and also based on the result of meetings with the Infrastructure Division of the Ministry of Health (refer to Tables 2-35 and 2-36 for estimation of water consumption). Due to doubts concerning the water pressure of the city water mains at point of supply, it was decided to receive water in reservoir tanks at ground level after which the water is pumped up to elevated tanks. The water is their supplied to each point of use by gravity flow.

The water tanks will be steel tanks adopted by the National Water Service Company (NWSC) of Uganda and will be locally maintainable.

The water supply facilities in the project sites will be within the scope of the requested Japanese cooperation. However, the construction works and installation of facilities and equipment necessary for tap lines from the city water mains to the site borders and installation of the meters concerned fall under the obligation of the Uganda side.

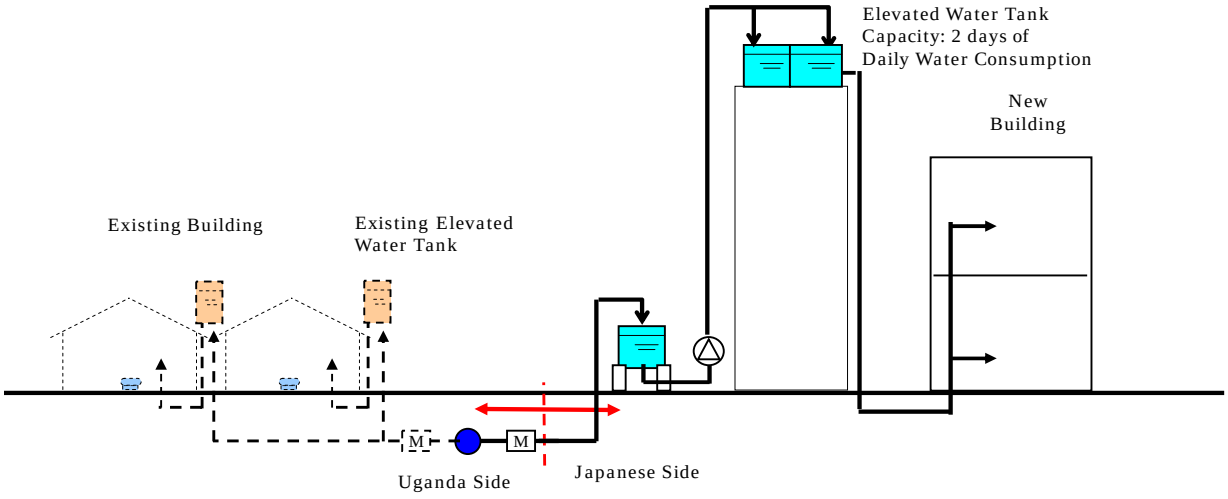


Figure 2-25 Schematic Diagram of the Water Supply System

Table 2-35 Water Consumption at Masaka RRH

	Calculation Conditions			Water Consumption	
	Person/ day	%	person	L/day person	m^3/day
Outpatient	701	100%	701	20	14.0
Attendance for Outpatient	701	80%	561	20	11.2
Doctor and Staffs	217	80%	174	80	13.9
Inpatient		100%		150	
Attendance for Inpatient		80%		20	
Total					39.1

Table 2-36 Water Consumption at Mubende RRH

	Calculation Conditions			Water Consumption	
	Person/ day	%	Person/ day	%	Person/ day
Outpatient	418	100%	418	20	8.4
Attendance for Outpatient	418	80%	334	20	6.7
Doctor and Staffs	76	80%	61	80	4.9
Inpatient	100	100%	100	150	15.0
Attendance for Inpatient	100	80%	80	20	1.6
Total					36.5

2) Wastewater Sewerage Systems

The area around Masaka RRH is equipped with a public sewerage system, and the general wastewater (foul wastewater and miscellaneous wastewater) of Masaka RRH is discharged to the city's sewer main via the hospital's sewer pipe. Likewise, sewer pipes from the newly installed facilities will be connected with the city's sewer main.

By contrast, the area around Mubende RHH does not have a public sewerage system. Therefore, wastewater produced by the project facilities will be treated in a septic tank and discharged to percolation trenches.

It is planned that special wastewater, related with examinations or of an infectious nature will be first neutralised and sterilised, and then pH adjusted so that the wastewater complies with the effluent water standards of Uganda, and finally discharged with the general wastewater or allowed to percolate.

There is no outlet to discharge rain water. It is planned that permeation pits and retention tanks be installed to ameliorate the impact of rain water discharge on the surroundings of the buildings.

The wastewater facilities, including the wastewater treatment facilities, to be installed in the project sites fall under the responsibility of the Japan side.

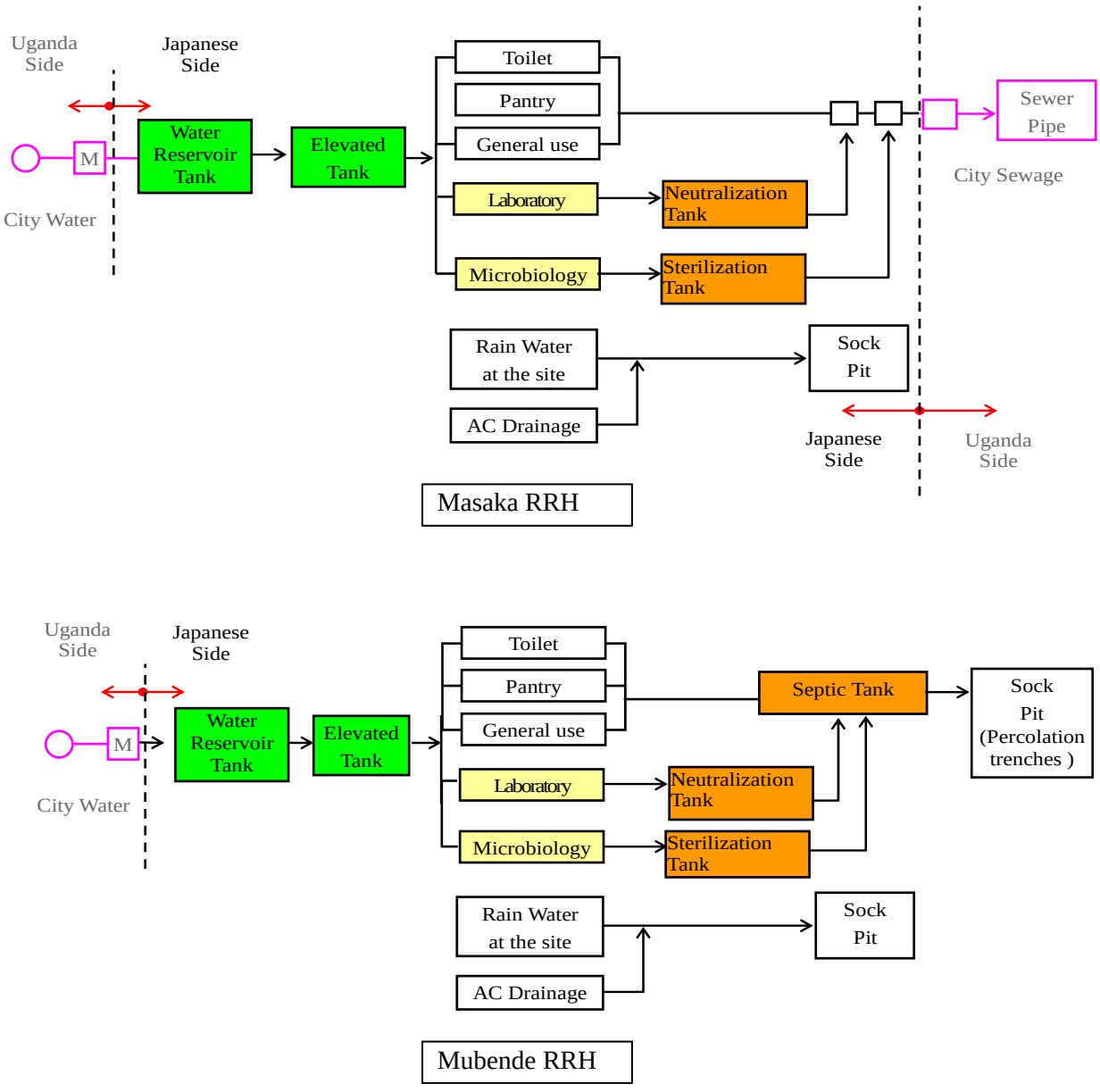


Figure 2-26 Flow of Water Supply and Drainage

3) Hot water supply system

Hot water is supplied in general by independent electric hot water supply units at individual places where hot water is needed, such as shower rooms, wash stands, and washing rooms.

4) Sanitary fixture

The hospital staff will use Western-style water closet bowls, while patients and the general public will use Asian squatting-type toilets. The equipment for flushing the bowls or toilets will be the tank-type equipment commonly used locally. If such tanks are placed low, some users place their hands on them to support their bodies. Consequently, many of the flushing units yield to repeated loads of people's body weights and break. Therefore, the units will be placed high and reinforced so that they do not easily break.

As a result of interview surveys, urinals of the tiled gutter type, commonly used locally, will be adopted. The flushing unit will be either of a tank or a valve type, and provisions will be made so that they do not break easily.

In case a wash stand or sink is installed in a clean area, the faucet should be equipped with an elbow faucet as a means to prevent nosocomial infections. The showers will be generally of the wall-mounted type, instead of the hand-held type for better durability.

5) Fire fighting facility

As a result of discussions with the Infrastructure Division of the Ministry of Health, the fire fighting facilities and equipment of this project will have hydrants directly connected with the city main pipes, and 9-kg foam fire extinguishers will be provided.

6) Medical gas facility

A new medical gas system will be provided for the project facilities for both hospitals. The medical gas deemed necessary is oxygen only, with outlets provided indoors and gas cylinders placed outdoors. The manifolds for oxygen supply will be simple ones easy to maintain, and are installed separately for each individual medical gas supply system.

7) Waste treatment facility

Both hospitals conduct sorted collection of solid waste and medical waste, incinerate them at different places within the hospital premises, and bury the ashes. At the time of field study, the standards for incinerators of Uganda were still in the process of formulation, and the incinerator was dropped from the list of requested items.

8) Air-conditioning facility

General rooms will be designed to allow ample natural draft to realise sufficient ventilation. Air-conditioning facilities will be installed in such rooms that truly require air conditioning such as operation theatres or radiography rooms, as a result of discussion with the Ministry of Health. The air-conditioning system will be the independent type, as commonly used locally.

Ⅱ Construction Material Plan

The most important criterion in the selection of the construction materials is ease of maintenance; therefore, materials and construction methods firmly established in Uganda will be the first candidates for selection. The basic considerations in the selection of materials common to Masaka RRH and Mubende RRH are the following.

(1) Exterior finishing material

① Roof

Locally procurable corrugated galvanised steel sheets will be used for roofing to facilitate maintenance, which will become increasingly important as the building ages. Maintenance of the roof is important to prevent rainwater leaks in particular, which will accelerate deterioration of the building. The roofs will be sloped roofs, with a gradient of 15 degrees or more, to let rainwater run off easily. The corrugated steel sheets are lined on the inner surfaces with a heat-insulating material to enhance the heat-shielding effect of the roof, reducing the rise in room air temperature.

② External wall

Again for easy maintenance, the external walls of the buildings will be concrete block masonry walls, a wall structure common in Uganda. For finishing, cement mortar is applied on the concrete blocks as a substrate and painted. A paint that will expand and contract with cracks that may develop later on the wall will be selected to prevent deterioration of the buildings.

(2) Interior finishing material

① Floor

The floors of the outpatient department building, various control rooms, wards, and other areas frequently visited by patients are finished in easy to clean and durable ceramic tile or terrazzo polished in place.

The floors of rooms that require a high degree of cleanliness, such as the operation theatre and delivery room, are finished with easy to clean and maintain polyvinyl chloride sheet to facilitate prevention of nosocomial infections.

② Internal wall

Walls that are liable to be contaminated with hazardous substances, such as those of operation theatres, are finished with tiles to facilitate cleaning by wiping. Interior surfaces of other rooms are finished with paint on a cement mortar substrate.

Rooms that are exposed to radiation have reinforced concrete walls, or are shielded by a lead material.

The walls of hallways and rooms and the projecting corners of columns that stretchers or carts can hit are equipped with stretcher guards or corner guards, for protection or also serving as a handrail.

③ Ceiling

The ceilings of rooms that require a high degree of cleanliness, such as the operation theatre or delivery room, are lined with calcium silicate boards and painted, for ease of cleaning and maintenance.

The ceilings of other rooms, which also require cleanliness but not to the above extent, such as laboratory or sterilisation rooms, are lined with mineral fibre decorative acoustic panels.

The ceilings of ordinary rooms, such as office rooms or diagnosis rooms and waiting space, are direct finish on mortar to slab.

④ Fixture etc.

external window frames will be aluminium sashes for their weather-durability. The operation theatres and delivery rooms, which require durable and easy-to-clean fittings, are equipped with stainless steel doors and frames.

Internal door and window frames for ordinary rooms will be light gage steel. Steel door frames are adopted for the machine rooms for their sound-insulating property and durability. Rooms that need protection against radiation, such as the X-ray room, are equipped with a fitting lined with lead.

Table 3-37 below summarises the exterior finishing materials and their related construction methods.

Table 2-37 Finishing Material and Installation Method

Building element	Local method (including the existing buildings)	Method adopted	Reason for adopting the method
Roof	Sloped roof (Corrugated galvanised steel sheets)	Sloped roof (Corrugated galvanised steel sheets)	Maintenance is easy.
External wall	Paint finishing , with cement mortar substrate	Paint finishing , with cement mortar substrate	The method is commonly used locally and local people are skilled in maintaining this structure.
Floor	Terrazzo in situ Ceramic tile	Terrazzo in situ Ceramic tile	The materials are commonly used locally and easy to maintain and clean.
		PVC sheet	This is used as a measure to prevent nosocomial infection.
Internal wall	Ceramic tile Paint	Ceramic tile Paint	These materials are commonly used locally, and are relatively easy to maintain.
Ceiling	Paint Mineral fibre decorative acoustic panel.	Paint Mineral fibre decorative acoustic panel.	These materials are commonly used locally, and are relatively easy to maintain.
Window & Door Fixtures	Aluminium Steel	Aluminium	Aluminium window sashes are common locally and have good weather durability.
	Wood Doors Stainless Steel Doors	Light gauge steel doors	Good durability and operability. Easy to maintain by regular painting. For internal doors.
		Steel doors	Good sound proofing characteristics. For machinery room doors
		Stainless steel doors	Durable and easy to keep clean. For main entrances and doors to operation rooms

(3) Facility and equipment for construction

The usable lives of equipment for building systems range from 10 to 15 years, considerably shorter than the construction materials. Therefore, selection of such equipment must be made so as to facilitate maintenance, including renewals, by the Uganda side after these equipment have been handed over to the Uganda side. Therefore, to the extent possible, these equipment will be procured locally, or from third countries with demonstrated performance, while ensuring acceptable levels of quality.

2-2-2-4 Equipment Plan

(1) Overall plan

1) The scope of the plan

In this project, the equipment plan focuses on the sites of new facilities.

2) The surrounding conditions for the equipment instalment

In regard to the equipment which is influenced by voltage fluctuation exceeding ±20% should we consider the addition of the automatic voltage regulator (AVR).
Since the quality of water has a characteristic of hard and turbidity and seasonally, the water pressure is not enough for the proper function of the equipment, the circumference equipment such as filter, water distillator, pressure pump should be considered.

3) The purpose of the equipment

The purpose of the equipment procurement in this project is to assist the second or third level medical services which will be provided in new facilities by procuring necessary equipment.

4) Places to be equipped

In Masaka RRH, OPD, Operating theatre, Emergency room is the scope of the procurement. And in Mubende RRH, Obstetrics, Male ward in addition to OPD, Operating theatre, Emergency room is to be equipped.

(2) Planned equipment

Equipment list (plan), the specification and use of the major equipment which will be procured in this project are as follows.

Table 2-38 Equipment List

Item NO	Description	Plan QTY
1.	Masaka RRH	
(1)	Operating theatre	
(1)-1	Operating room (1～3)	
1-1	Operating table, general	2
1-2	Operating table, orthopaedics	1
1-5	Suction unit, large	3
1-6	Suction unit, small	2
1-7	C-arm X-ray unit	1
1-8	Electrosurgical unit	3
1-9	Laryngoscope	3
1-12	X-ray viewer (double)	3
1-14	Operating light, ceiling	3
1-19	Pulse oxymeter	3
1-21	Anaesthesia machine with ventilator	3
(1)－2	Minor operating room (1)	
1-3	Operating table, general	1
1-5	Suction unit, large	1
1-15	Operating light, stand	1
(1)－3	Sterilization room	
1-16	Autoclave, vertical	3
1-17	Autoclave, portable	2
(1)－4	Storage－1	
1-19	Defibrillator	1
1-22	Resuscitators (Adult／Paediatrics)	5
1-13	Dermatology set	1
(1)－5	Sterilized store	
1-10	Laparotomy set	3
1-11	Caesarean section set	3
(1)－6	Recovery room	
1-21	Recovery bed	5
(1)－7	Operating hall／Scrub corner	
1-4	Stretcher	1
1-16	Hand washing water sterilizer	1
(2)	Casualty	
(2)－1	Minor operating room(2)	
1-5	Suction unit, large	1
1-28	Operating table, general	1
1-29	Operating light, stand	1
(2)－2	Clinic	
1-25	Examination couch	1
1-26	Examination light	1
1-32	Infant warmer	1
1-34	Direct ophthalmoscope	1
1-35	X-ray viewer (single)	1

Item NO	Description	Plan QTY
(2)-3	Resuscitation room	
1-36	Examination couch	4
1-38	Suction unit, large	2
1-39	Nebulizer	2
1-40	Resuscitator (paediatrics)	2
1-41	Resuscitator (adult)	2
1-42	Pulse oxymeter	1
1-43	Defibrillator	1
(2)－4	Stretcher bay	
1-24	Stretcher	2
(2)－5	Sterilization room	
1-27	Autoclave, portable	1
(3)	OPD	
(3)－1	Consulting rooms (Male, Female, Specialists, Paediatrics, Surgery)	
1-59	Diagnostic equipment set	11
1-60	Examination couch	11
1-61	Examination light	11
1-62	X-ray viewer (single)	11
(3)－2	Treatment dressing room	
1-58	Nebulizer	3
1-63	Examination couch	6
(3)－3	Physiotherapy	
1-63	Examination couch	1
(3)－4	Treatment room	
1-63	Examination couch	4
(3)－5	Plaster room	
1-63	Examination couch	1
(3)－6	Pharmacy	
1-71	Electric balance	1
1-72	Distillation unit	1
(3)－7	Laboratory (Parasitology・Biochemistry・Haematology)	
1-53	Haematocrit centrifuge	1
1-54	Automatic pipettes	1
1-55	Centrifuge	1
(3)－9	Blood bank	
1-56	Blood transfusion fridge	1
1-57	Microscope	1
1-60	Examination couch	1

Item NO	Description	Plan QTY
2.	Mubende RRH	
(1)	OPD	
(1)－1	Consulting rooms (Paediatrics, Male, Female, Specialists, Surgery)	
2-1	Diagnostic equipment set	6
2-2	Minor surgery set	2
2-3	Examination light	6
2-4	Examination couch	6
2-5	X-ray viewer (single)	6
(1)－2	Treatment room	
2-4	Examination couch	4
(1)－3	Treatment room	
2-4	Examination couch	4
(1)－4	Treatment dressing room	
2-4	Examination couch	1
(1)－5	Physiotherapy/Occupational therapy room	
2-4	Examination couch	1
(1)－6	Plaster room	
2-4	Examination couch	1
(1)－7	Dental clinic	
2-12	Dental X-ray unit	1
2-13	Dental chair/unit	1
(1)－8	Eye/ENT consulting room	
2-3	Examination light	1
2-4	Examination couch	1
(1)－9	Eye/ENT treatment room-2	
2-4	Examination couch	1
(1)－10	Eye/ENT treatment room-2	
2-4	Examination couch	1
(1)－11	Eye/ENT operating room	
2-7	Operating light, stand	1
2-4	Examination couch	1
(1)－12	Pharmacy	
2-19	Electric balance	1
(1)－13	Medicine store	
2-20	Drug refrigerator	1
(1)－14	Laboratory (Parasitology, Biochemistry, Haematology)	
2-14	Centrifuge	1
2-15	Haematcrit centrifuge	1
2-16	Coloriometer	1
2-17	Distillation unit	1
2-18	Microscope	1
(1)－15	Blood bank	
2-4	Examination couch	1
(2)	Casualty	
(2)－1	Minor operating room	
2-7	Operating light, stand	1
2-8	Operating table. General	1
2-9	Suction unit, large	1
2-10	Resuscitator (adult)	1
2-11	Resuscitator (paediatrics)	1
(2)－2	Resuscitation room	
2-4	Examination couch	4
2-9	Suction unit, large	2

Item NO	Description	Plan QTY
(2)－3	Stretcher bay	
2-6	Stretcher	1
(2)－4	Clinic	
2-4	Examination couch	1
(2)－5	Sterilizing room	
2-21	Autoclave, portable	1
(3)	Operating theatre	
(3)－1	Major operating Theatre	
2-23	Anaesthesia machine with ventilator	2
2-24	Pulse oxymeter	2
2-25	Operating light, ceiling	2
2-31	X-ray viewer (double)	2
2-27	Operating table, general	2
2-28	Suction unit, large	2
2-32	Laryngoscope	2
2-33	Resuscitator (paediatrics)	1
2-34	Resuscitator (adult)	1
(3)－2	Sterilization Room	
2-21	Autoclave, portable	2
2-22	Autoclave, vertical	2
(3)－3	Sterilized store	
2-29	Instrument set, general surgery	3
2-30	Instrument set, obstetrics	3
2-45	Instrument set, delivery	3
(3)－4	Recovery room	
2-35	Recovery bed	4
(3)－5	Operating hall/Scrub corner	
2-36	Hand washing water sterilizer	1
(4)	Obstetrics	
(4)－1	Ante natal room	
2-47	Obstetric bed	15
(4)－2	Recovery room	
2-47	Obstetric bed	15
(4)－3	Examination room	
2-46	Ob/Gy examination table	1
(4)－4	Delivery room	
2-37	Delivery bed	3
2-38	Operating light, stand	1
2-39	Suction unit, large	2
2-40	Suction unit, low pressure	2
2-43	Resuscitator (adult)	1
(4)－5	Nursery	
2-41	Infant warmer	1
2-42	Incubator	1
2-44	Resuscitator (paediatrics)	1
(5)	Male ward	
(5)－1	Ward	
2-48	Patient bed	37
(5)－2	Treatment room	
2-50	Examination couch	1
2-51	Examination light	1

Table 2-39 Specifications of Major Equipment

Item no.	Equipment Name	Qty	Specifications	Use
1-7	Electro surgical units	3	- Equipped with assorted electrode & safety devices -Function：cutting, coagulation, bipolar	For incision and coagulation to minimize bleeding mainly used in surgery operation.
1-13 2-25	Operating light, ceilings	5	-Ceiling type、Twin light (main＋sub) -Light source：Main;≧100,000Lux,sub;≧75,000Lux -Scope adjustment：manual	To secure necessary light for operations
1-21 2-23	Anaesthesia machines with ventilator	2	–Gas Supply: O_2 and air –Vaporizer: Halothane –Tidal Volume：≧100 - 900 mls –Respiration：≧6 – 40times/min	For use in operation required general anaesthesia
2-13	Dental chair/unit	1	–Components：dental chair (with patient chair, treatment light),compressor, doctor chair –Dental chair：electrically adjustable: up down, back rest. –Light source： Halogen, ≧15,000 lux	For dental treatment
2-46	Obstetric beds	30	-Materials: Flame；Steel, Mattress; Polyurethane -Caster：with opposite angle stopper, height and back rest adjustable	For obstetrics ward
2-47	Patient beds	37	-Materials: Flame；Steel, Mattress; Polyurethane -Caster：with opposite angle stopper, height adjustable	For male ward
1-1 2-27	Operating tables, general	5	-Operation：oil pressure pump only, or oil pressure pump and handle together. -Position：Tredelenburg, Reverse Tredelenburg, Lateral tils, Back section(to head, or to foot), Leg section (to foot), Table top rotation.	For operations in operating theatre
1-2	Operating table, Orthopaedic	1	-Operation：oil pressure pump only, or oil pressure pump and handle together. -Position：Tredelenburg, Reverse Tredelenburg, Lateral tils, Back section(to head, or to foot), Leg section (to foot), Table top rotation. -with orthopaedic surgery kits	For use in operations of orthopaedics
1-15 2-35	Hand washing water sterilizers	2	-Type： 2 sinks or 1 sink for 2 persons -Material ： Stainless steel -Flow rate： ≧4 litters/min	For operators to wash hands prior to operations
2-41	Incubator	1	-Type: manual or manual &servo control -Temperatures：≧ 25 - 37 ^oC -Skin temperature control：≧35 - 37 ^oC-Oxygen supply system provided	To nurse a premature baby under the environment of proper oxygenation, humidity, temperatures.

2-2-3 Basic Design Drawings

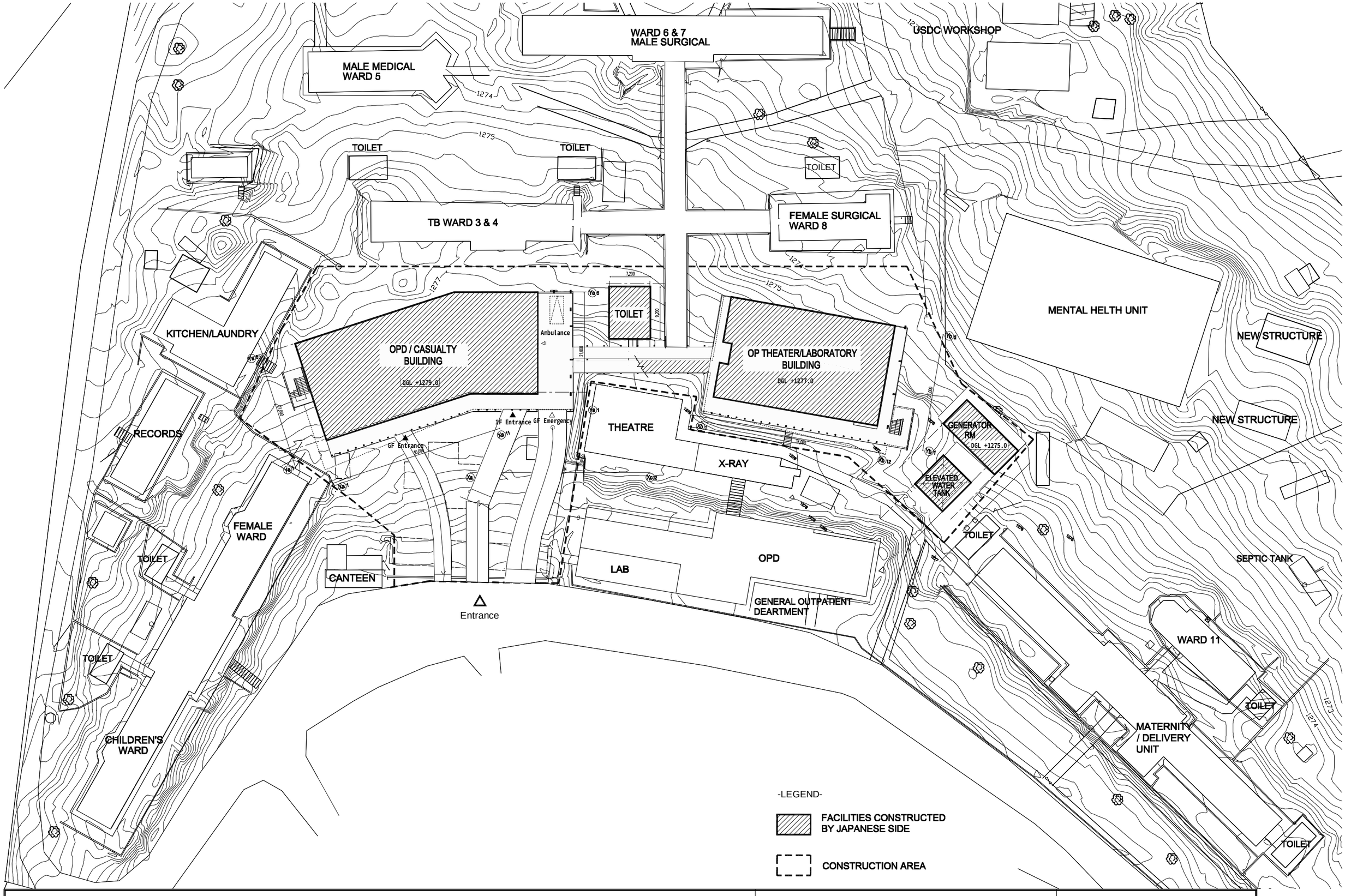
Table 2-40 List of drawings

Masaka Regional Referral Hospital

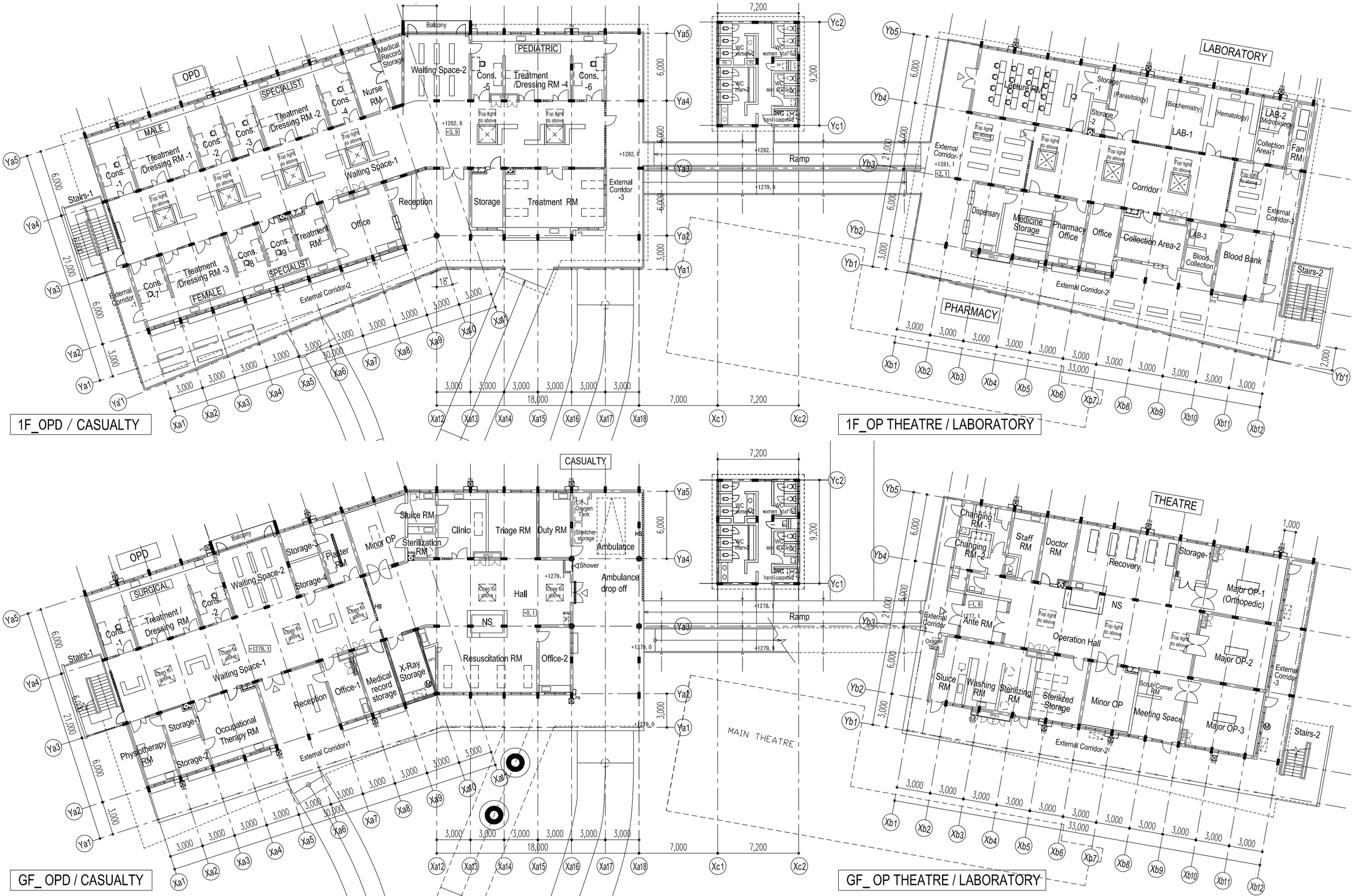
	Facilities	Drawing	Scale	Page
1	OPD/Casualty Building, OP theatre /Laboratory Building	Site Plan	1/600	81
2		1st Floor Plan,2nd Floor Plan	1/300	83
3		Roof Plan	1/300	85
4		Elevation	1/300	87
5		Section	1/300	89

Mubende Regional Referral Hospital

	Facilities	Drawing	Scale	Page
1	OPD/OP theatre Building, Casualty/Maternity Building	Site Plan	1/600	91
2		1st Floor Plan,2nd Floor Plan	1/300	93
3		Roof Plan	1/300	95
4		Elevation	1/300	97
5		Section	1/300	99
6	Male ward	1st Floor Plan, Roof Plan, Elevation , Section	1/300	101



The Project for the Rehabilitation of Hospitals and Supply of Medical Equipment in the Central Region in Uganda	**MASAKA** REGIONAL REFERRAL HOSPITAL	SITE PLAN 1/600



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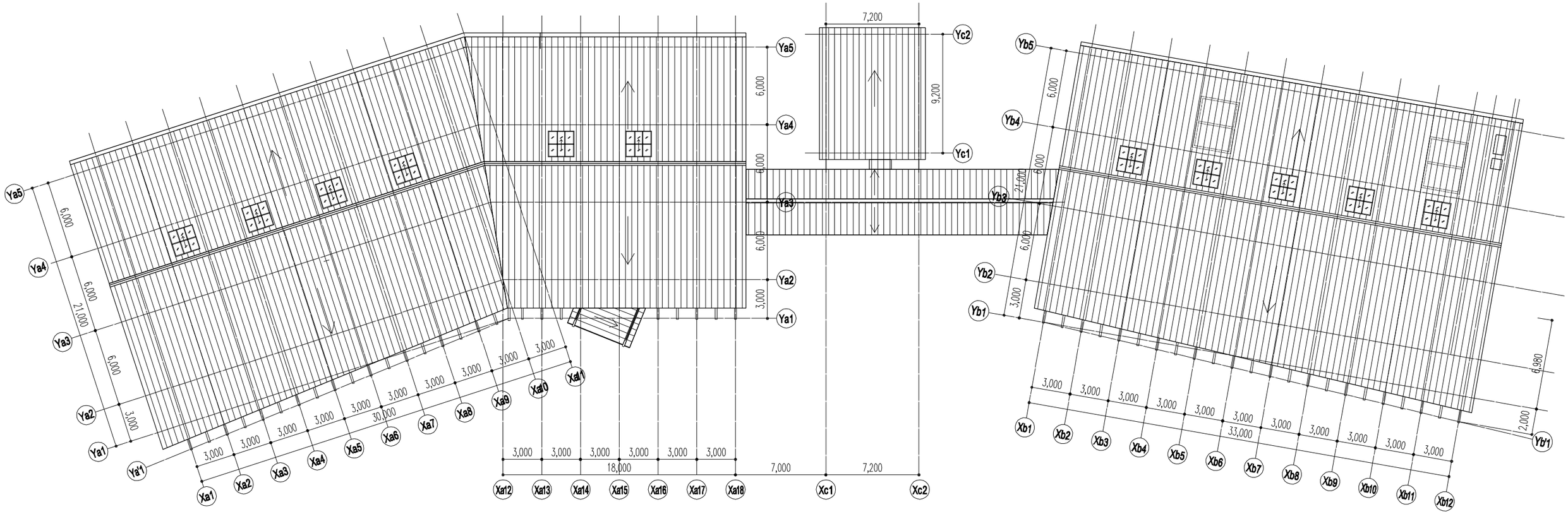
MASAKA
REGIONAL REFERRAL HOSPITAL

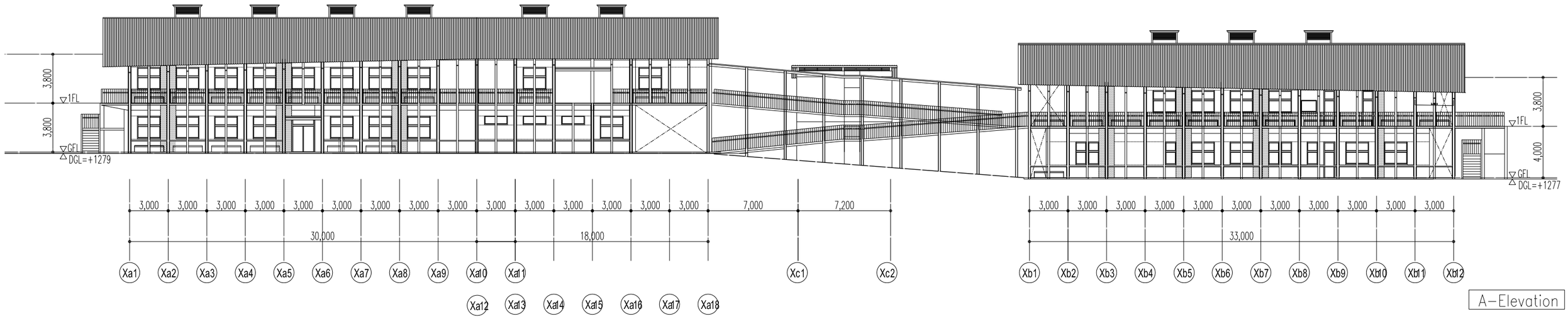
PLAN

1/300



The Project for the Rehabilitation of Hospitals and Supply of Medical Equipment in the Central Region in Uganda	**MASAKA** REGIONAL REFERRAL HOSPITAL	**ROOF PLAN** 1/300

N



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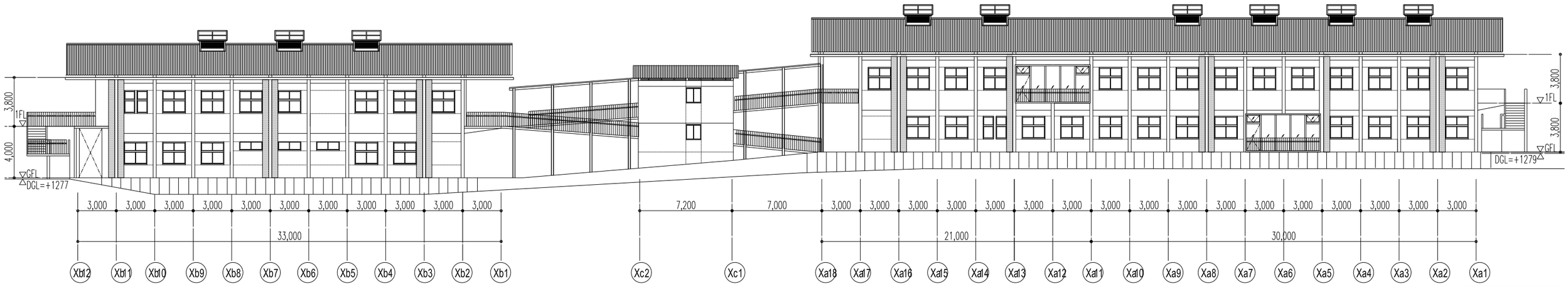

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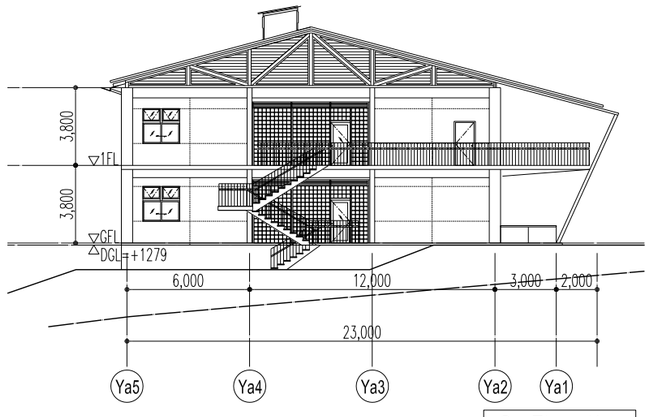

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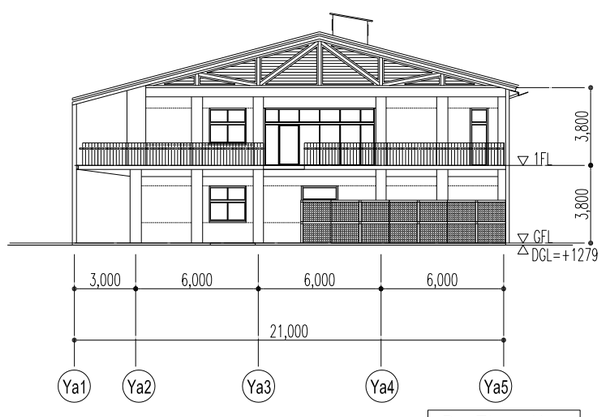

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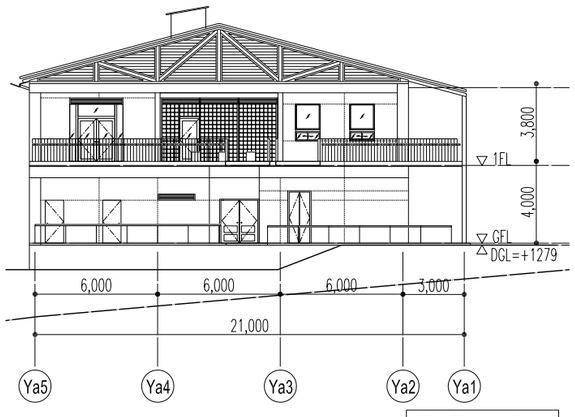
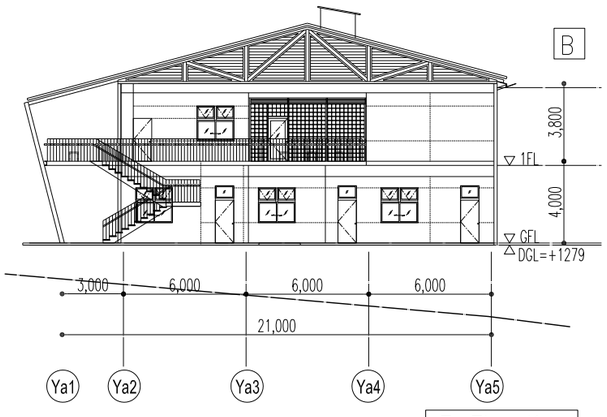
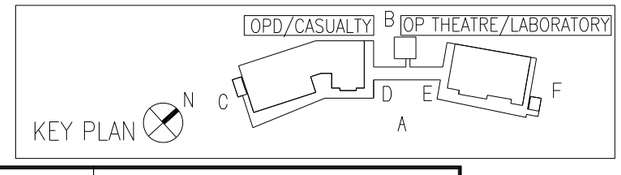


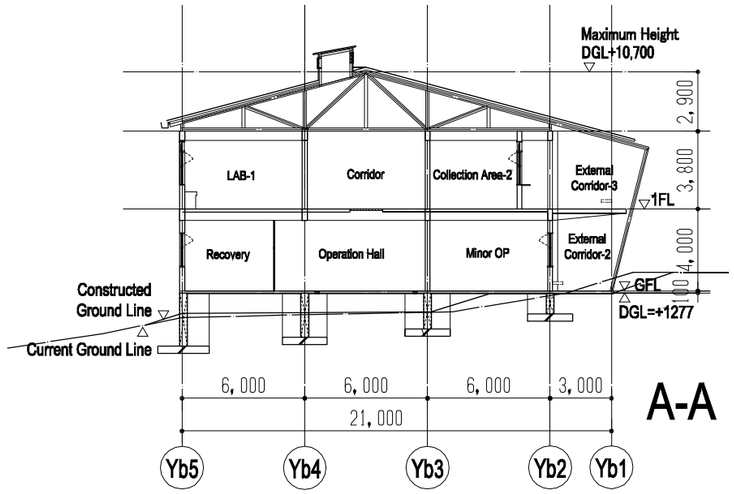
E–Elevation



F–Elevation



The Project for the Rehabilitation of Hospitals and Supply of Medical Equipment in the Central Region in Uganda	**MASAKA** REGIONAL REFERRAL HOSPITAL	ELEVATION 1/300



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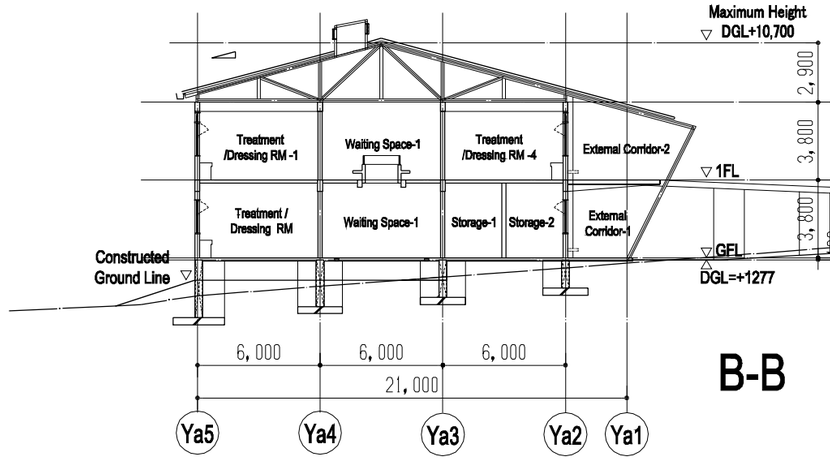
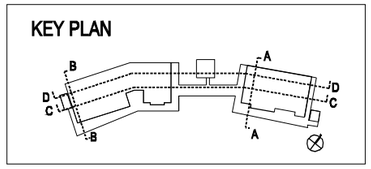
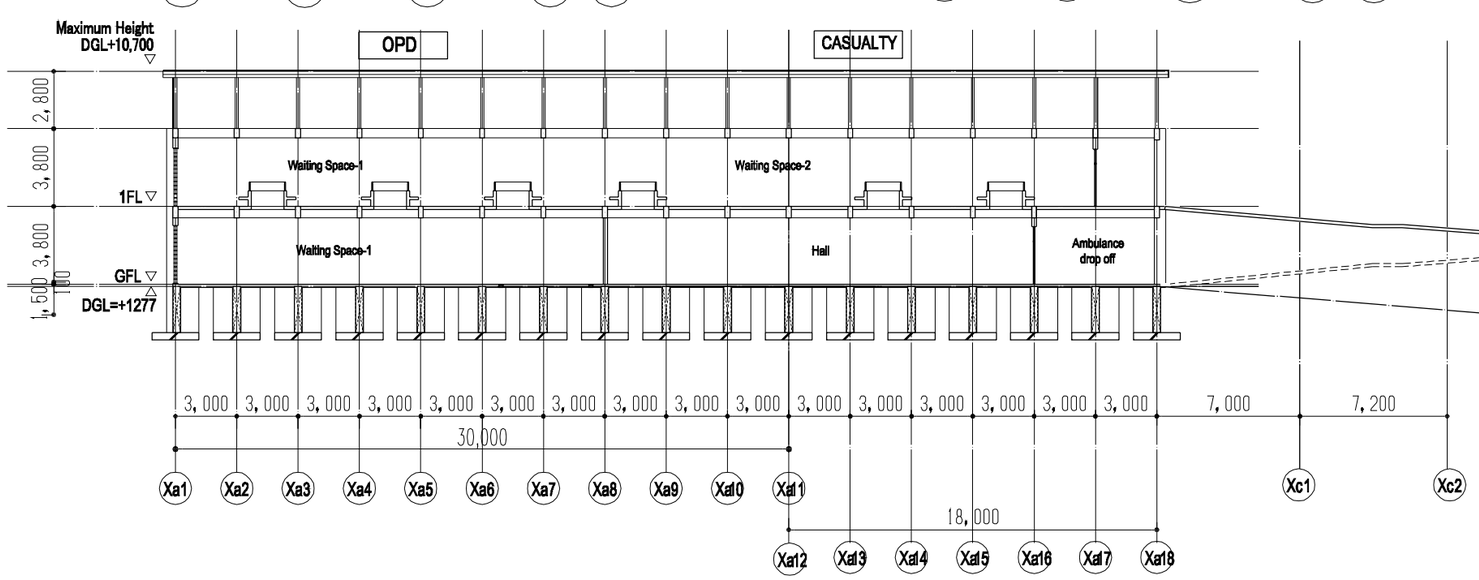
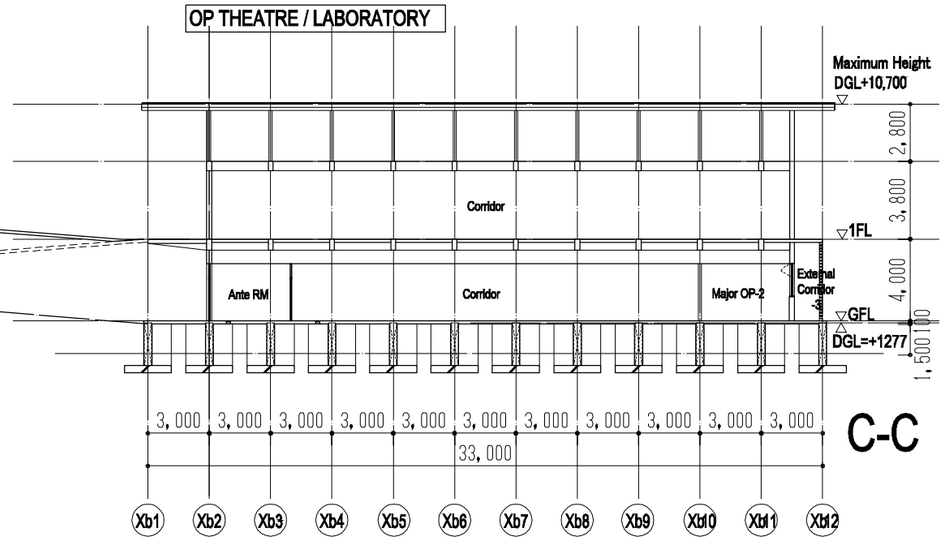


B-B







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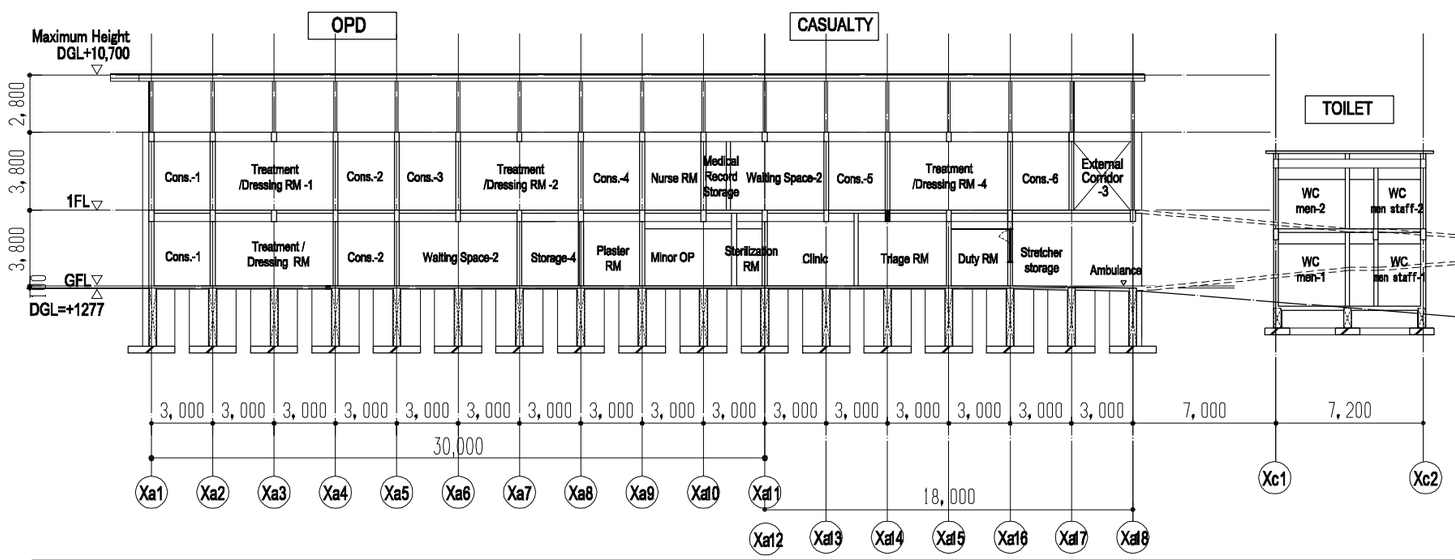
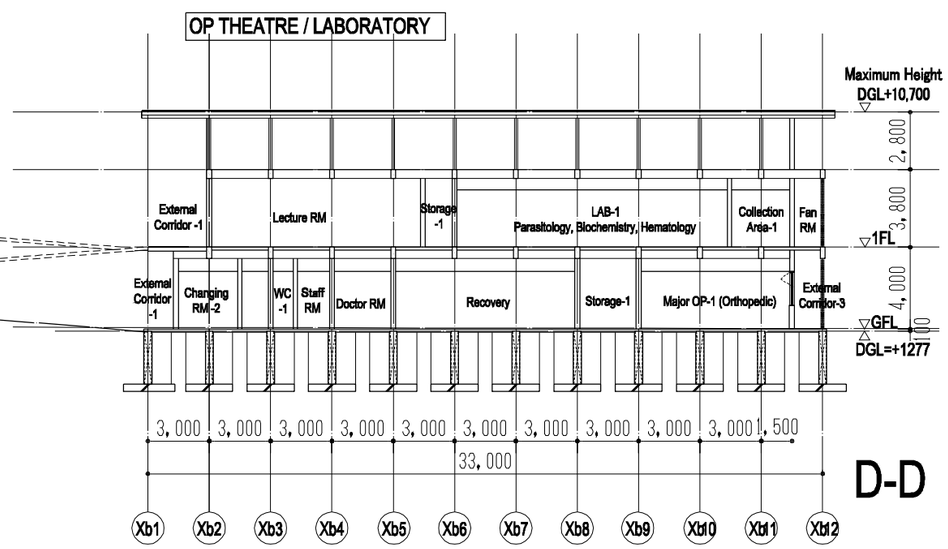




D-D

The Project for the Rehabilitation of Hospitals and Supply of Medical Equipment in the Central Region in Uganda	**MASAKA** REGIONAL REFERRAL HOSPITAL	断面図 1/300

MAIN GATE

TOILETS

W.T.

TOILETS

(UNUSED)
PRIVATE WARD

BLDG.
MAIN STORE

TOILETS

ADMINISTRATION BLDG. /
OUTPATIENT DEPT.

PHARMACY

DEP.
X-RAY

W.T.

ELEC'L. POST

GENERATOR RM

ELEVATED
WATER
TANK

SURGICAL
WARD - 1

CASUALTY

W.T.

TOILETS

LAUNDRY

GENERATOR RM.

GENERATOR RM.

TOILETS

TOILETS

SURGICAL
WARD - 2

DENTAL
UNIT

CHILD
WARD

W.T.

TOILETS

THEATRE

TOILETS

TOILETS

CLINIC
ANTE NATAL

M C H

KIOSK

PSYCHIATRIC
,PHYSIOTHERAPY,RCT DPT.

WARD TB

TOILETS

Ambulance Entrance

External Corridor-2

1F Maternity Entrance

Ambulance

External
Corridor-3

CASUALTY / MATERNITY
BUILDING

DGL +1293.5

External
Corridor-1

Casualty Entrance

External Corridor-2

OPD Entrance

Reception

TOILET

OPD / OP THEATER
BUILDING

DGL +1291.6

GPD
Entrance

OPD
Entrance

KIOSK

GF Entrance

MALE WARD

DGL +1289.6

SEPTIC TANK

TOILETS

PERCOLATION TRENCHES

TOILETS

STAFF
QUARTERS

STAFF
QUARTERS

STAFF
QUARTERS

STAFF
QUARTERS

STAFF QUARTERS

STAFF QUARTERS

TOILETS

TOILETS

-LEGEND-

FACILITIES CONSTRUCTED
BY JAPANESE SIDE

CONSTRUCTION AREA

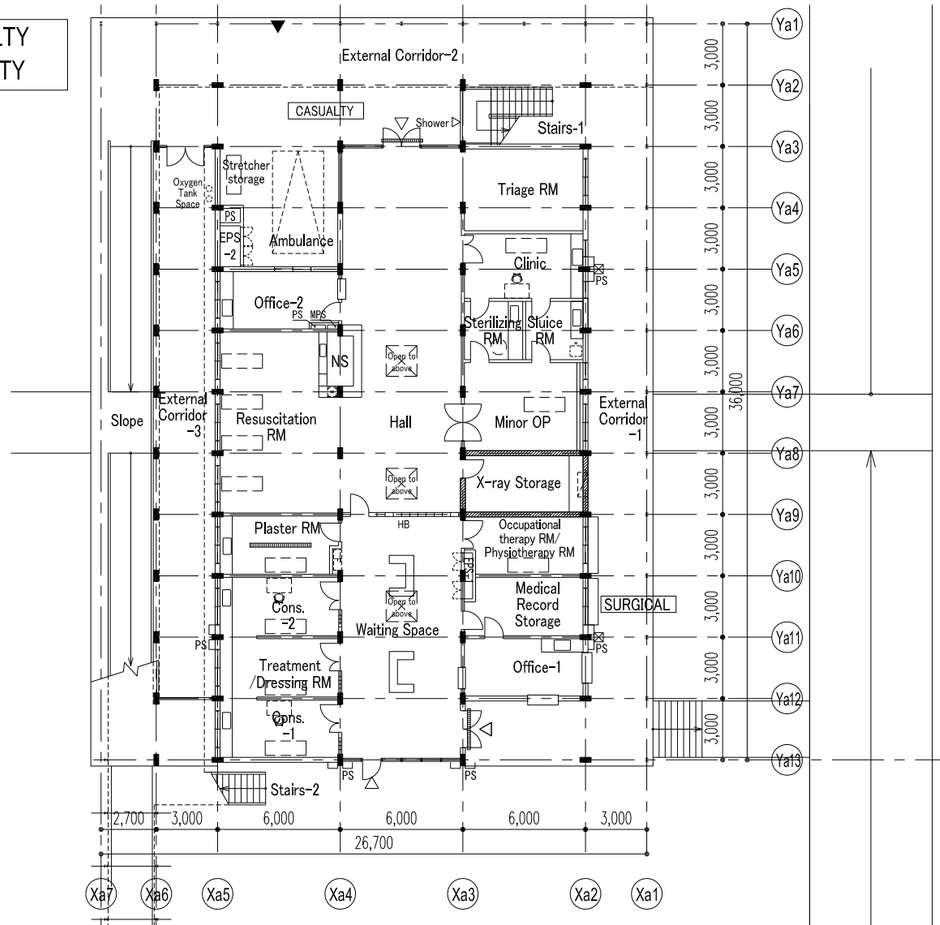
The Project for the Rehabilitation of Hospitals and Supply of Medical Equipment in the Central Region in Uganda

MUBENDE
REGIONAL REFERRAL
HOSPITAL

SITE PLAN

1/600

GF_CASUALTY / MATERNITY



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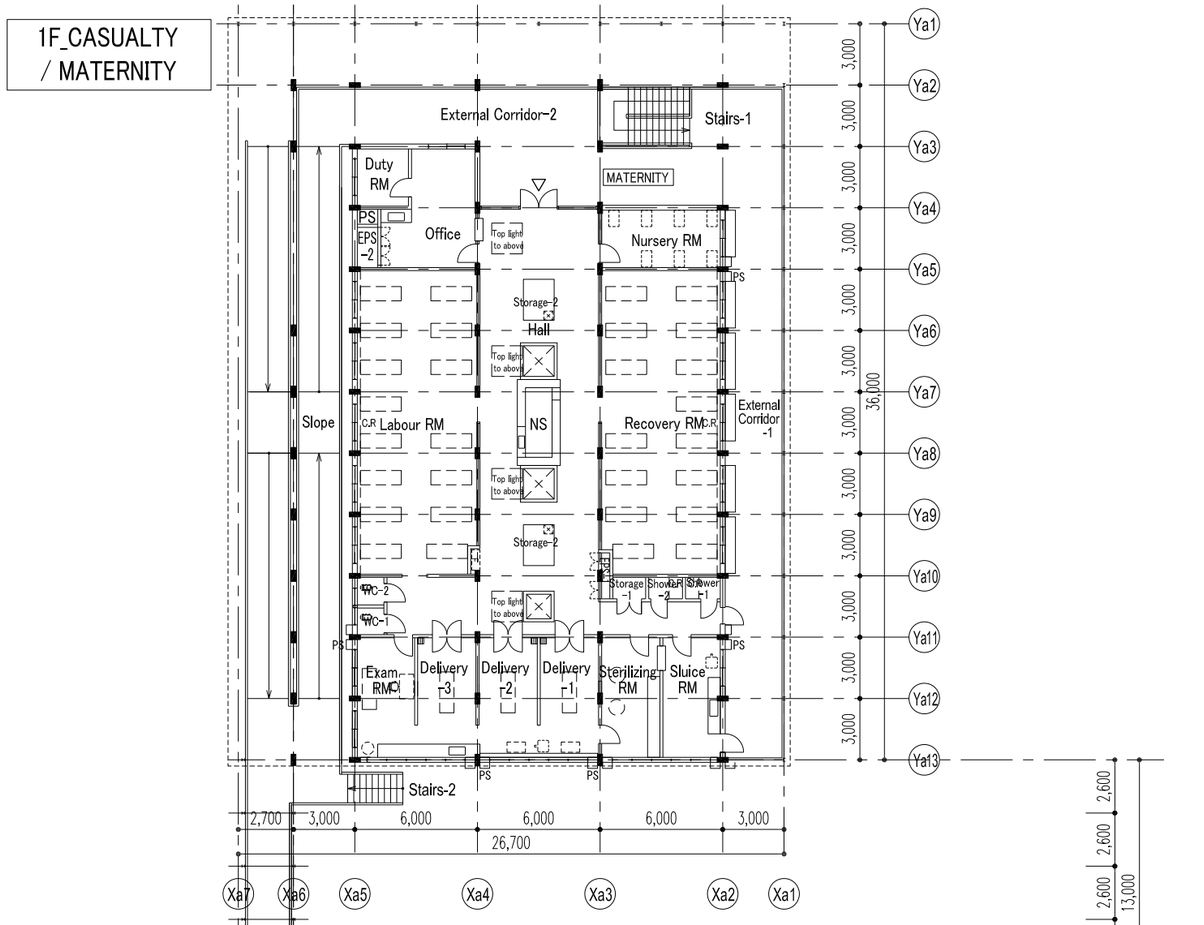
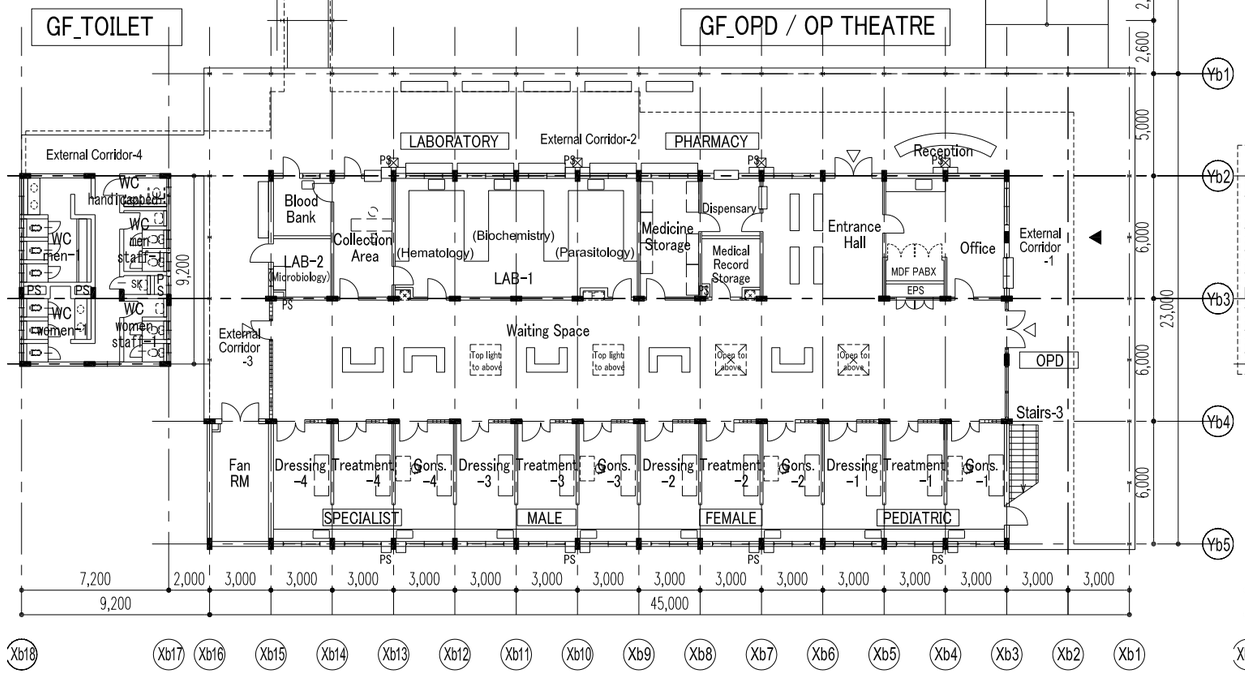


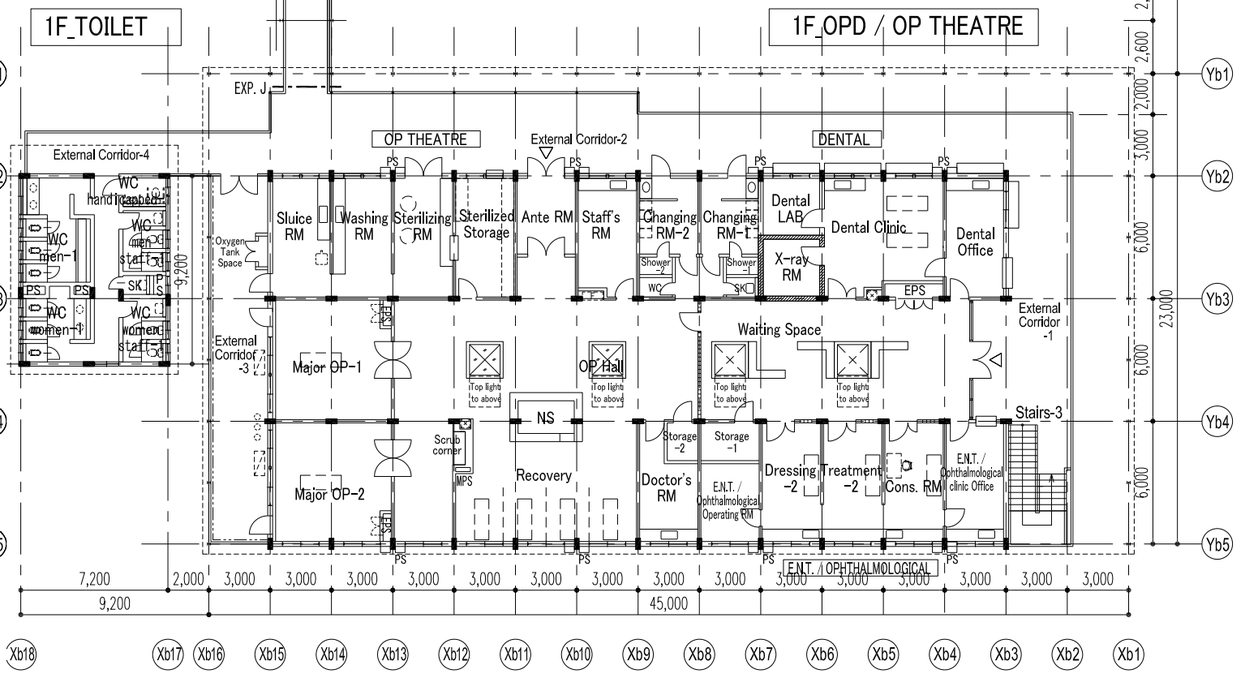
GF_TOILET

GF_OPD / OP THEATRE



1F_TOILET

1F_OPD / OP THEATRE



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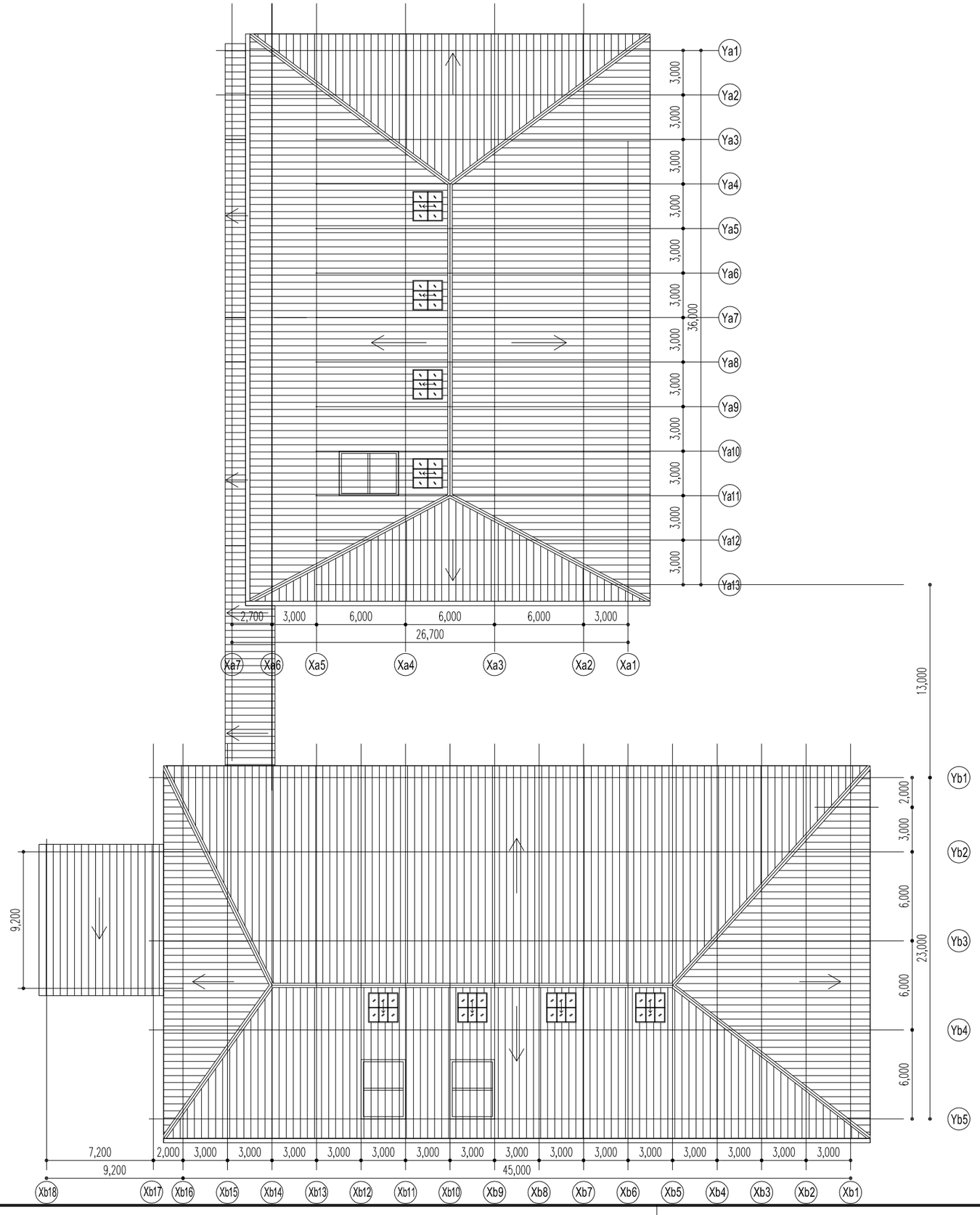
MUBENDE
REGIONAL REFERRAL HOSPITAL

PLAN

1/300



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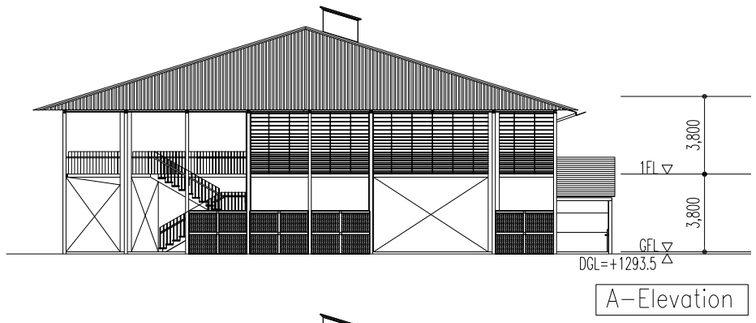
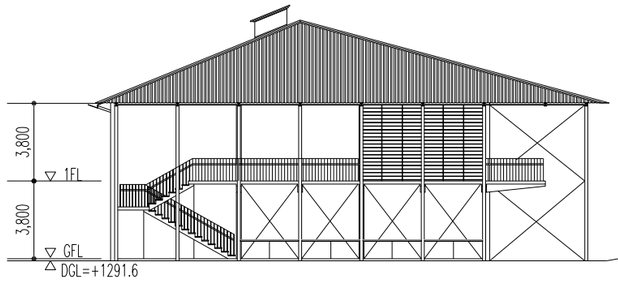
REGIONAL REFERRAL HOSPITAL

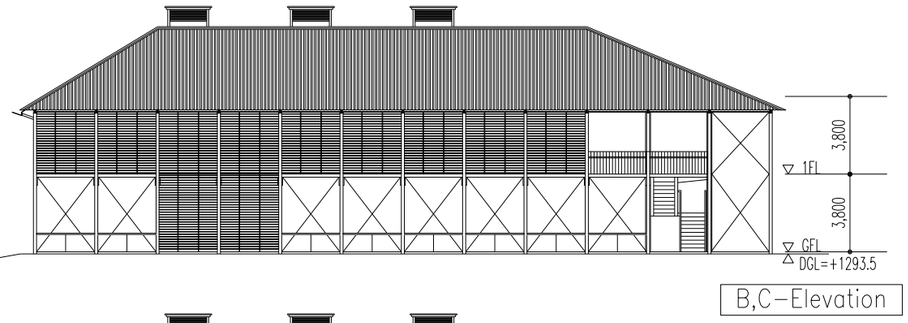
ROOF PLAN

1/300

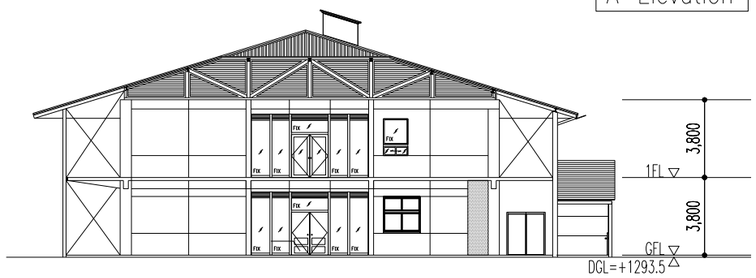


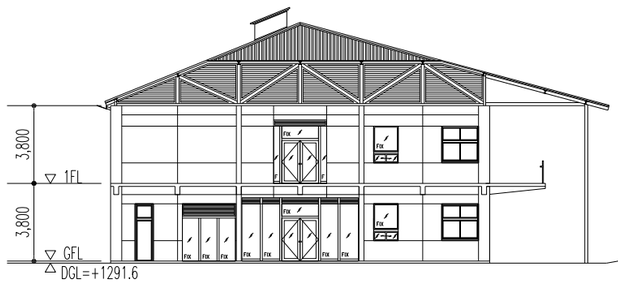
A–Elevation

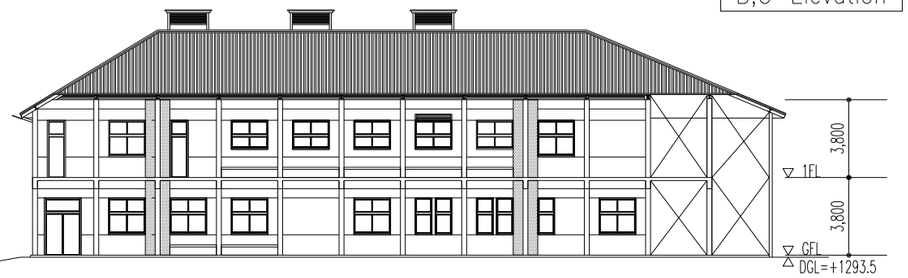


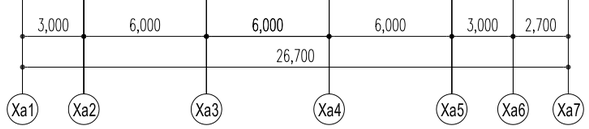


B,C–Elevation









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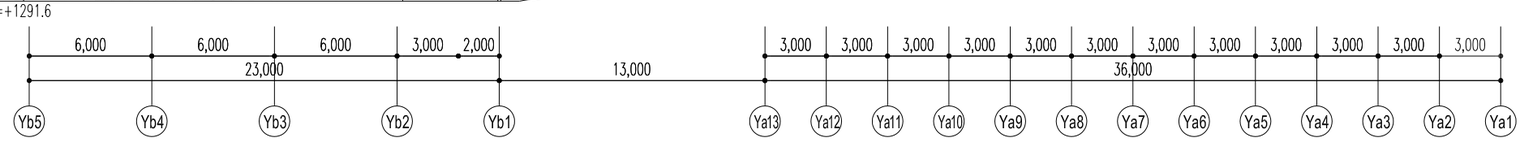

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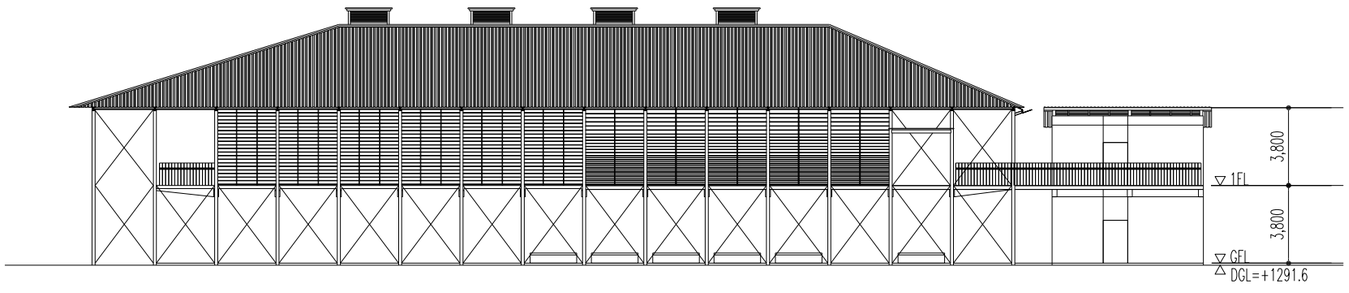

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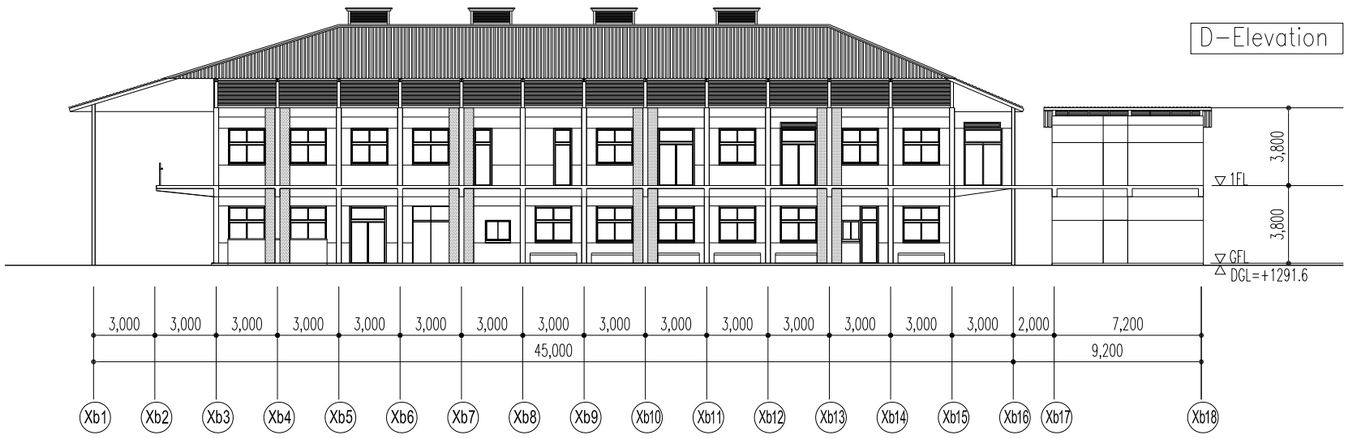
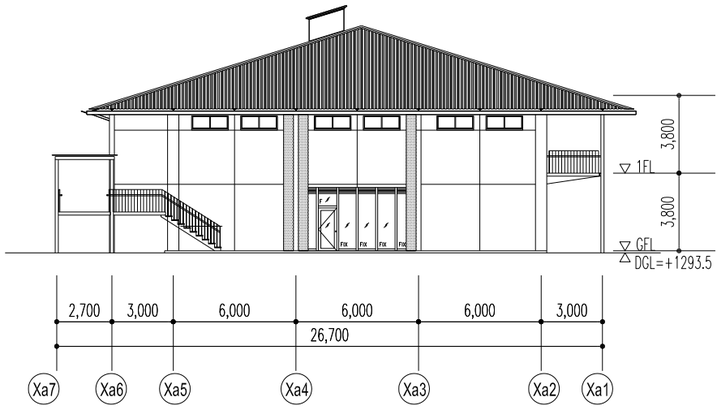
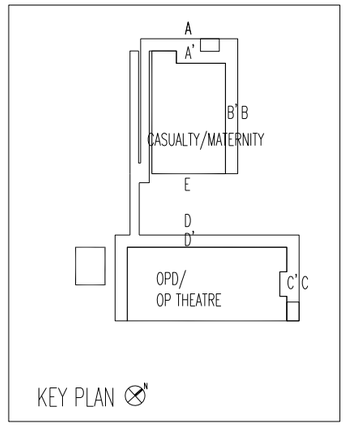


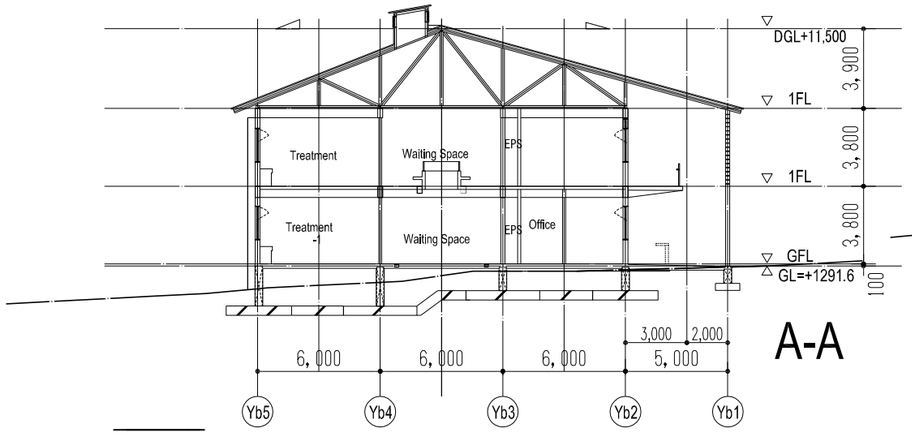
D'–Elevation



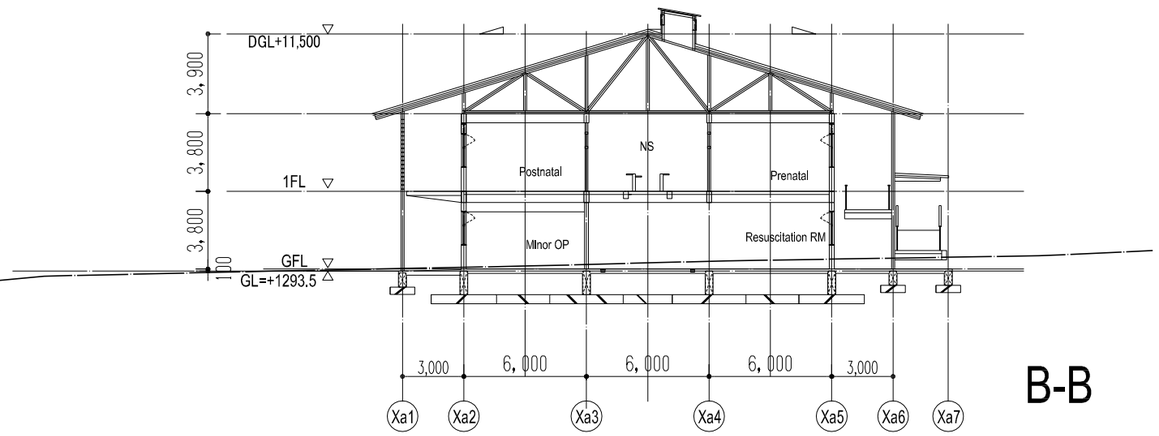
E–Elevation



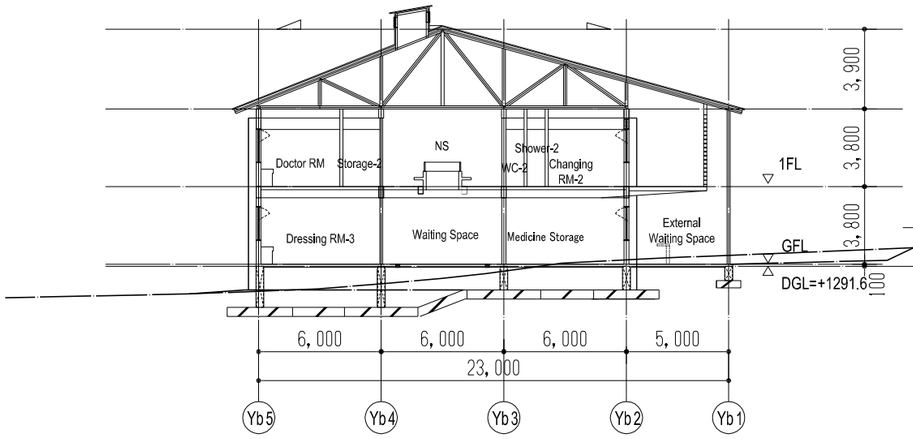
The Project for the Rehabilitation of Hospitals and Supply of Medical Equipment in the Central Region in Uganda	**MUBENDE** REGIONAL REFERRAL HOSPITAL	ELEVATION 1/300

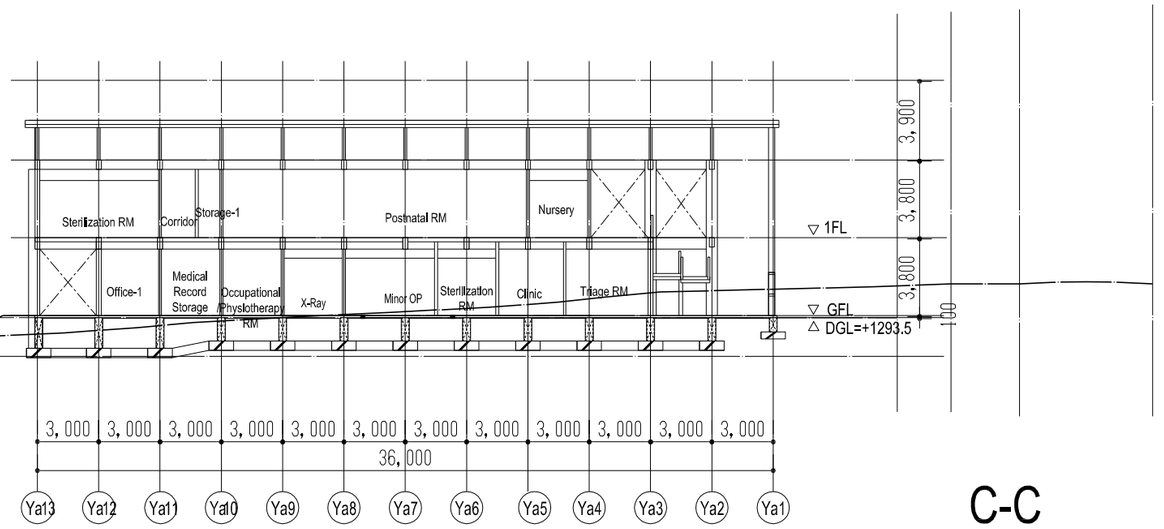


A-A



B-B





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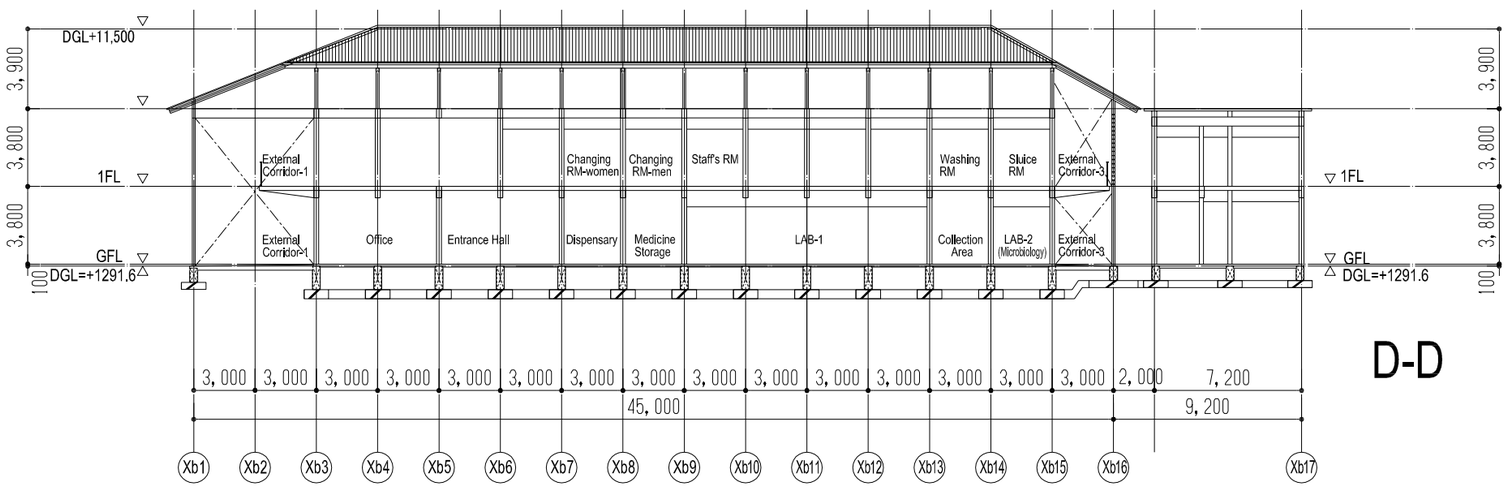

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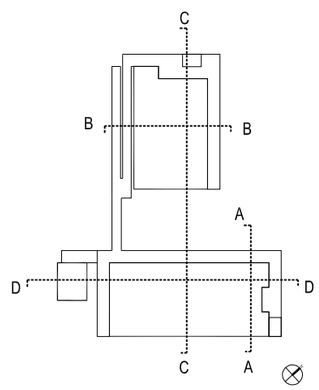
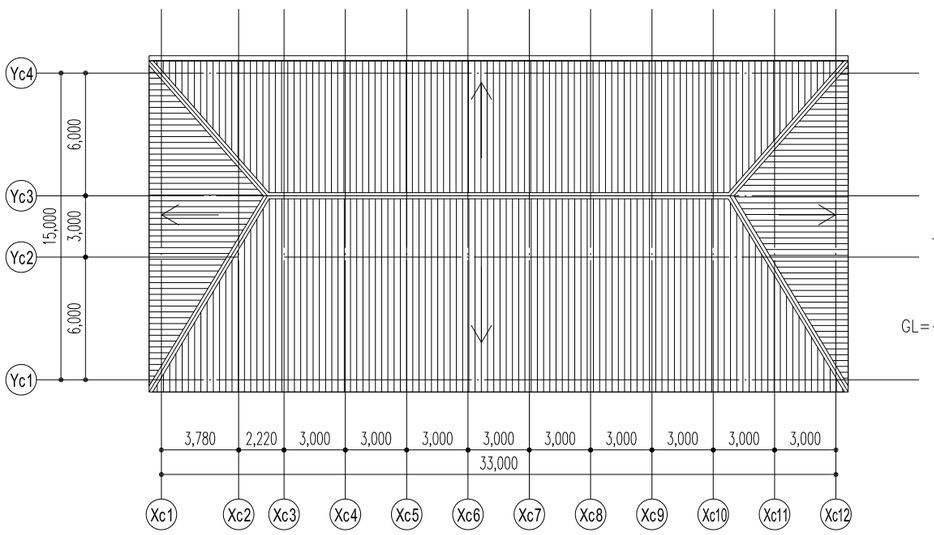
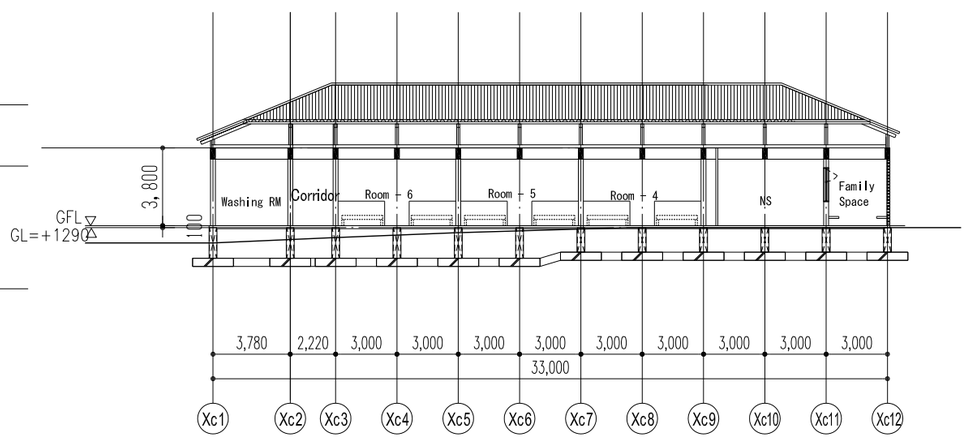
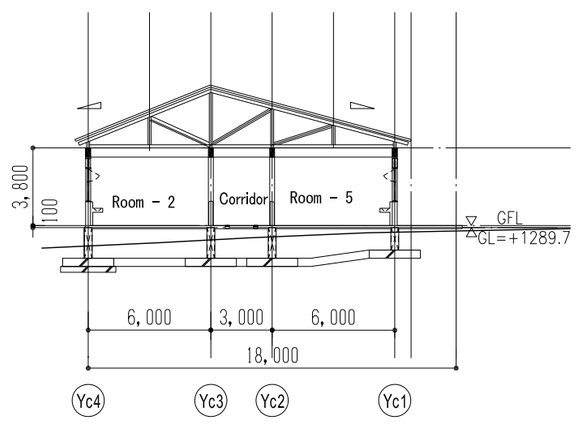
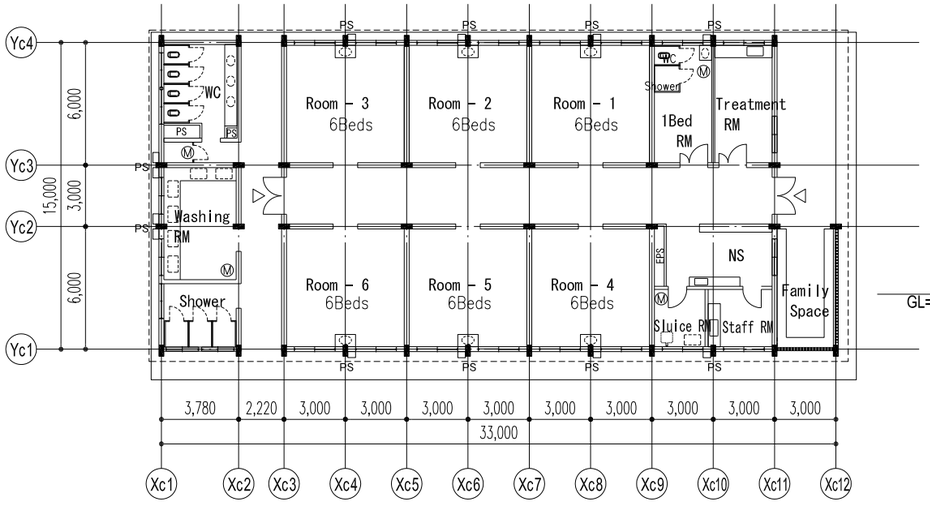


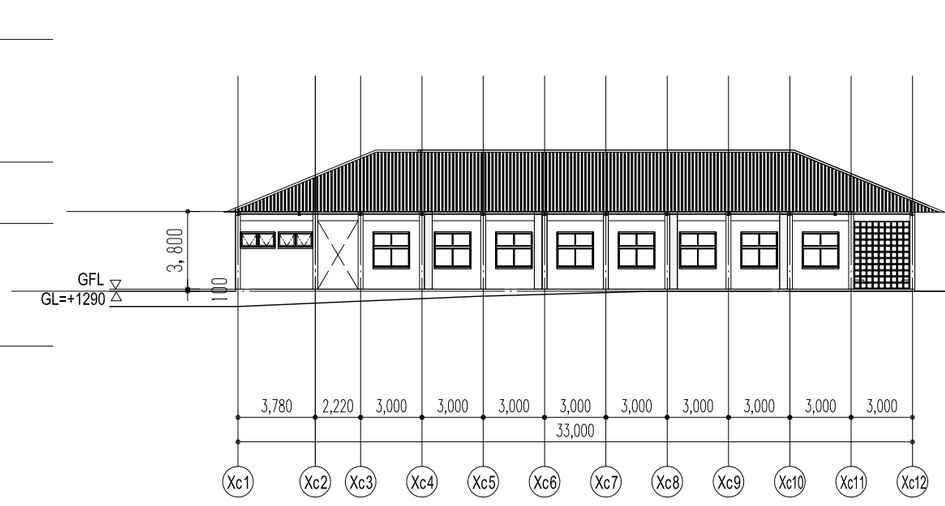
The Project for the Rehabilitation of Hospitals and Supply of Medical Equipment in the Central Region in Uganda	**MUBENDE** REGIONAL REFERRAL HOSPITAL	SECTION 1/300

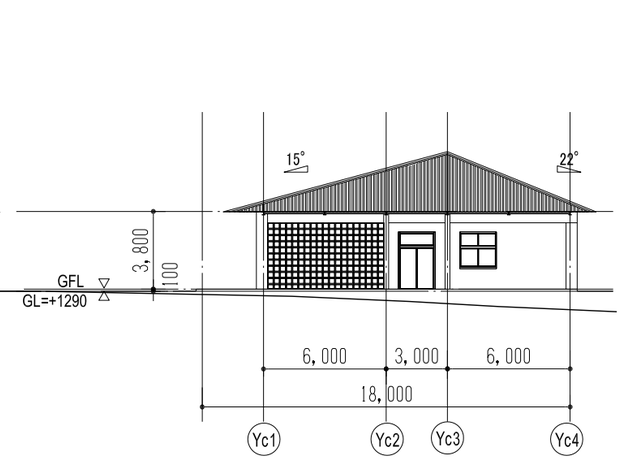


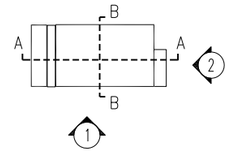












The Project for the Rehabilitation of Hospitals and Supply of Medical Equipment in the Central Region in Uganda	**MUBENDE - MALE WARD** REGIONAL REFERRAL HOSPITAL	MALE WARD 1/300

2-2-4 Implementation Plan

2-2-4-1 Implementation Policy

(1) Organisation for project implementation

This project will be implemented according to Japanese Grant Aid Scheme. After approval by the cabinet of the government of Japan, an exchange of notes (E/N) will be concluded between the governments of Uganda and Japan, after which the grant agreement (G/A) regarding the project will be signed between the government of Uganda and the Japanese International Cooperation Agency (JICA)

The organisation responsible is Ministry of Health and the implementing agency for this project is the Health Infrastructure Division of the Ministry of Health, respectively, of the government of Uganda. The contracting party of the Uganda side is the Ministry of Health, which will conclude the consulting contract with the consultant, as well as the construction and equipment procurement contracts with the selected contractors. The Ministry of Health and the two target hospitals will also implement construction of the portions of this project that are the obligation of the Uganda side.

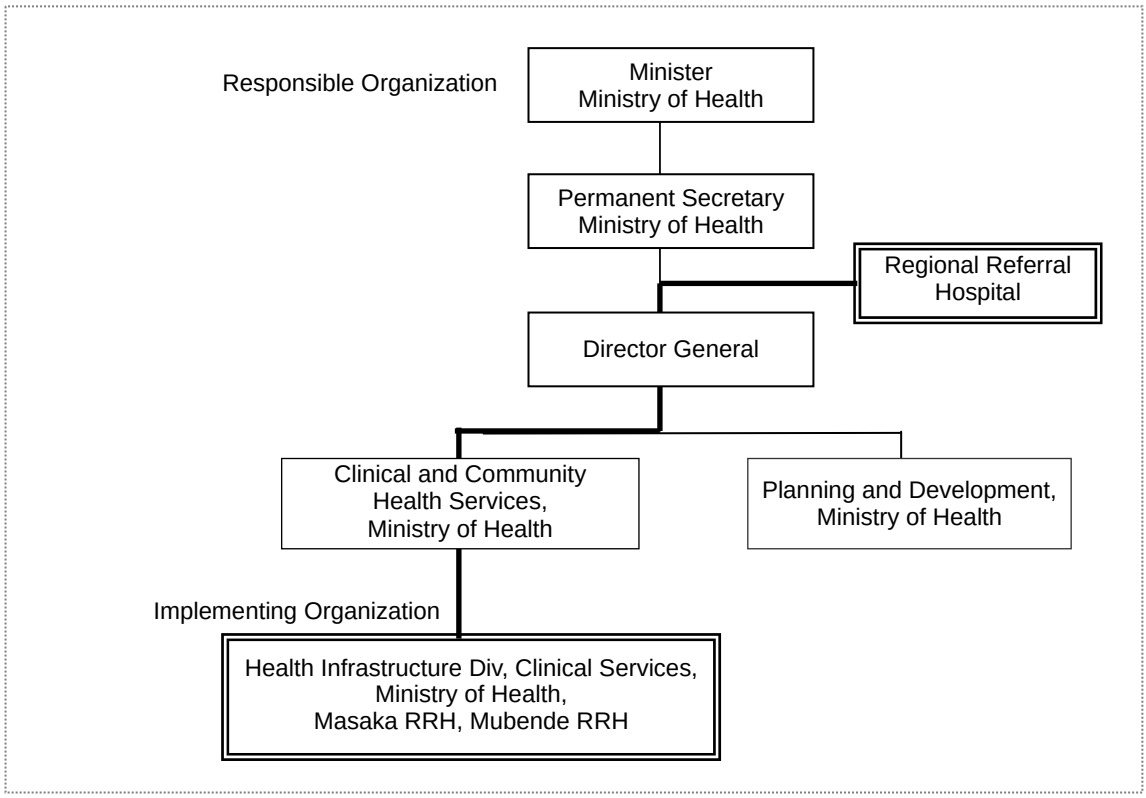


Figure 2-27 Relation among Project Executing Organizations

(2) Consultant

After the exchange of notes and the grant agreement have been concluded, the Ministry of Health will conclude contracts on detailed design and consultant supervision with a consultant company registered in Japan. The contracts with the consultant company become effective on verification of the contracts by JICA. In order to implement this project smoothly, it is important that the consulting contract be concluded as quickly as possible after the grant agreement has been concluded. The consultant company, after the contracts have been approved, will prepare the tender documents (detailed design drawings, specification documents, etc.) based on this basic design study report, in consultation with the Ministry of Health, for approval by the Uganda side

according to the above-mentioned procedure for approval. The tender work and the consultant supervision will be executed according to the contents of the tender documents.

(3) Order for construction work and equipment procurement

The construction work for this requested Japanese assistance consists of the “construction work of facilities” and “procurement work” in the latter of which the medical equipment are procured, installed, and test operated. Eligible candidates for the contracts are limited to Japanese juridical persons meeting certain qualifications. The contractor will be selected by general competitive bidding following pre-qualification.
The Ministry of Health will conclude a contract with each of the contractors for construction and medical equipment procurement duly selected by bidding, and will receive verification of the contract documents from JICA. Thereafter, the contractor for construction and medical equipment procurement will each begin their respective works in cooperation with each other without delay, and will complete their works according to the contracts.

(4) Commissioning of local consultants

Since the project adopts local construction methods, the project will retain local architectural engineers for supervision of the construction works, to work with the Japanese manager stationed locally. Since this requested Japanese assistance concerns medical facilities, the project has more works on mechanical and electrical building systems than ordinary building projects. Many areas of the buildings require a very high degree of cleanliness, and will require the employment of experienced facility engineers.

(5) Commissioning of local building engineers and dispatch of Japanese professional specialists

The Ugandan construction industry has three major construction companies. However, very few official data indicating the scale of these companies are available.
Large-scale construction works used to be mostly public works projects or ODA projects. Recently, private-sector construction works are increasing. The ratio of architectural works is generally larger than that of civil works such as road or bridge construction. There is no local construction company with Japanese capital but some local construction companies have worked as sub-contractors for architectural works related to Japanese ODA. The main contractor, a company registered in Japan, needs to employ local building engineers under the supervision of the Japanese engineers to conduct detailed examinations of the construction work, quality and safety management of the project implementation, and also to realise technology transfer to these local engineers.
This requested Japanese assistance represents the latest medical facilities to Uganda and involves construction work of such rooms as operation theatres and laboratories, which require relatively high levels of quality control. Therefore, technical instruction and construction management by experienced Japanese professional specialists in this particular field are indispensable. The project plans to dispatch professional specialists from Japan in such special fields as medical equipment for operation theatres.

2-2-4-2 Implementation Conditions

(1) Temporary work plan

The planned construction sites for the project facilities at both Masaka RRH and Mubende RHH are both sloping land in the hospitals premises.
The proposed site of Masaka RRH is situated at the centre of the hospital premises, and does not face the public road and the construction work will use the internal hospital roads. A temporary gate exclusively for construction purposes will be prepared near the construction site to avoid use of the front gate by construction works. Although the construction site faces the public road at Mubende RHH, the construction work will not use the main gate either. A temporary construction gate will be prepared by removing a portion of the bush fence along the public road. It is comparatively easier to bring in construction materials at Mubende RHH than at Masaka RRH. Both hospitals are the same in that the safety of the patients and visitors coming to and leaving the hospital must be secured. For both hospitals, the hoardings of the construction sites will be of corrugated galvanised steel sheets to protect third persons from accidents, and for guarding and security reasons. A temporary construction office, construction shed, construction material stockyard, and assembly yard will be located near the construction site.

(2) Procurement of construction materials

Both in Masaka and Mubende Cities, hardware shops deal with building materials including cement, but on a small scale. Accordingly, the construction materials needed for this project will be procured mostly in Kampala, the capital city, and transported by road to the construction sites in Masaka and Mubende.
In Kampala, there are a number of agents dealing in imported products for construction and building materials, and procurement should be rather easy here. These products are mostly imported from neighbouring countries, notably Kenya and also South Africa, Turkey, European countries, and Southeast Asian countries. From Kampala, these products are regularly marketed further throughout Uganda.
Procurement of Japan-made materials and equipment for this project is a disadvantage not only in cost but also in construction schedule control and maintenance, because of the very long distance of transportation. Procurement from Japan will be limited to such construction materials and equipment as special hospital facilities.

(3) Special construction method

There is only one ready-mixed concrete plant in Uganda, and the plant is located too far away from both construction sites. Concrete will be mixed on the construction sites by rotary mixer and poured, or alternatively, so-called job-mixed concrete will be used. Depending upon the scale of work, mixed concrete will be poured by such means as hand buckets relayed by persons standing in lines, by cart, or buckets lifted by crane. The amounts of concrete that can be poured in a day are limited. Accordingly, the construction schedules should have some allowances.
In Uganda, it is common in forming building frames to use a two-step casting method in which concrete is first cast for the columns to the height of beams and then cast beams and slabs. Local construction companies are accustomed to this method but not to the monolithic pouring method where concrete is cast to form columns, beams, and slabs as one unit, as common in Japan. Accordingly, this requested Japanese assistance will adopt the two-step casting method.
An anti-termite measure will be applied to the buildings after excavation of soil up to the planes where the floors as fixed.

(4) Equipment procurement

Installation of certain medical equipment — installation of anchor bolts to fix surgical lamps on the ceiling or installation of water supply and drainage facilities for dental chairs in the dentistry department, for example—will require collaboration with the building construction work. The consultant should make adjustment to the works between equipment supplier and building contractor and provide proper instructions to them. Installation of equipments should be conducted in a manner so as not to interfere with the daily activities of the hospitals. The portion of the project that falls under the obligation of the Uganda side includes procurement of simple equipment, medical furniture for example, and relocation of the existing equipment. To execute such works smoothly, close coordination with the hospitals, by means of meetings and detailed discussions, will be needed for deciding the time and schedule of the procurement and relocation works.

2-2-4-3 Scope of Works

To implement this cooperation project, works of Uganda side and Japanese are defined as shown below.

Masaka Regional Referral Hospital

Table 2-41 Works of Uganda Side and Japanese Side (Masaka Regional referral Hospital)

Japanese side work	Uganda side work
	Securing of the construction site
	Application for building certification and acquisition of approval thereof
	Site preparation, removal of the existing facilities, etc. 1) Removal of the existing foundations from the site 2) Removal of the existing facilities from the site 3) Removal of the existing power cable passing the site, and reinstallation 4) Removal of the telephone cable passing the site, and reinstallation 5) Removal of the existing water supply pipe passing the site, and reinstallation 6) Removal of the existing wastewater pipe passing the site, and reinstallation
	Construction of gate and fences surrounding the site
	Construction of parking lot 1) Parking lots outside the site
Construction of road 1) Roads within the site	Construction of road 1) Roads outside the site
Exterior construction work in the site 1) Pavement in the building surroundings and inner courts, outdoor lighting facilities, roadside gutters for storm water discharge	Exterior construction work in the site 1) Planting
Building construction 1) Architectural construction works Including built-in furniture and medical curtains 2) Electric facility installation Electric power supply system, lighting and wall power outlet systems, lightning arrester and grounding device, telephone system, hospital speaker system, interphone system, automatic fire alarms , PC network piping(only piping) 3) Mechanical Building Systems construction work Water supply system, wastewater system, hot water supply system, sanitary fixtures, fire fighting facility, air conditioning facility, ventilation facility 4) Special Systems Emergency power generator facility, medical gas facility, wastewater treatment facility,	
Supply and discharge facility for electric power, telephone, water, wastewater, and other supply facilities 1) Electric power a. Wiring work within the site b. Main breaker and high-voltage transformers c. Piping for lead-in cable, including manholes and hand holes, from the site boundary to the main breaker d. Low-voltage wiring to the existing main power panels	Supply and discharge facility for electric power, telephone, water, wastewater, and other supply facilities 1) Electric power a. Installation of a high-voltage lead-in cable to the main breaker of the building and other necessary works (eg. Installation of electric pole and hand holes outside the project area) b. Transformer in future plans c. Modification works within and outside the existing buildings

Japanese side work	Uganda side work
2) Water supply a. Water supply facilities within the site: water tank, cistern tower, water supply facilities to the new buildings	2) Water supply a. Branching from city's waterworks system and lead-in to the site (incl. Installation of meter) b. Modification works within and outside the existing buildings
3) Wastewater a. Wastewater facilities within the site	3) Wastewater a. Wastewater facilities outside the site (Incl. connecting trench) b. Modification works within and outside the existing buildings
4) Telephone a. Installation of lead-in cables to the new buildings	4) Telephone a. Installation of lead-in cables to the MDFs (PABXs) of the new buildings and other necessary works (cf. Installation of electric pole outside the site and the hand holes) b. Modification works within and outside the existing buildings
5) Furniture and equipment a. Curtain rail b. Business (medical) furniture, built-in furniture c. Provision and installation of medical equipment	5) Furniture and equipment a. Curtain, blind b. General furniture c. Removal and reinstallation of the existing facilities

Mubende Regional Referral Hospital

Table 2-42 Works of Uganda Side and Japanese Side (Mubende Regional Referral Hospital)

Japanese side work	Uganda side work
	Securing of the construction site
	Application for building certification and acquisition of approval thereof
	Site preparation, removal of the existing facilities, etc.
	1) Removal of the existing foundations from the site 2) Removal of the existing facilities from the site 3) Removal of the existing power cable passing the site, and reinstallation 4) Removal of the telephone cable passing through the site and reinstallation 5) Removal of the existing water supply pipe passing the site and reinstallation 6) Removal of the existing wastewater pipe passing through the site and reinstallation
	Construction of gate and fences surrounding the site
Construction of road 1) Roads within the site	Construction of road 1) Roads outside the site
Exterior construction work in the site 1) Pavement in the building surroundings and inner courts, outdoor lighting facilities, roadside gutters for storm water discharge	Exterior construction work in the site 1) Planting
Building construction 1) Architectural construction works Including built-in furniture and medical curtains 2) Electric facility installation Electric power supply system, lighting and wall power outlet systems, lightning arrester and grounding device, telephone system, hospital speaker system, interphone system, automatic fire alarms, PC network piping(only piping)	

Japanese side work	Uganda side work
3) Mechanical Building Systems construction work Water supply system, wastewater system, hot water supply system, sanitary fixtures, fire fighting facility, air conditioning facility, ventilation facility	
4) Special Systems Emergency power generation facility, medical gas facility, wastewater treatment facility	
Supply and discharge facility for electric power, telephone, water, wastewater, and other supply facilities 1) Electric power a. Wiring work within the site b. Main breaker and high-voltage transformers c. Piping for lead-in cable, including manholes and hand holes, from the site boundary to the main breaker d. Low-voltage wiring to the existing main power panels 2) Water supply a. Water supply facilities within the site: water tank, cistern tower, water supply facilities to the new buildings 3) Wastewater a. Wastewater facilities within the site 4) Telephone a. Installation of lead-in cables to the new buildings 5) Furniture and equipment a. Curtain rail b. Business (medical) furniture, built-in furniture c. Provision and installation of medical equipment	Supply and discharge facility for electric power, telephone, water, wastewater, and other supply facilities 1) Electric power a. Installation of a new low-voltage lead-in cable to the main breaker of the building and other necessary works (eg. Installation of electric pole outside the site and the hand holes) b. Transformer for future plans c. Modification works within and outside the existing buildings 2) Water supply a. Branching of water from city's waterworks system and lead-in piping to the site (incl. Installation of meter) b. Modification works within and outside the existing buildings 3) Wastewater a. Modification works within and outside the existing buildings 4) Telephone a. Installation of lead-in cables to the MDFs of the existing buildings and other necessary works (cf. Installation of electric pole outside the site and the hand holes) b. Modification works within and outside the existing buildings 5) Furniture and equipment a. Curtain, blind b. General furniture c. Removal and reinstallation of the existing facilities

One of the factors essential for the smooth implementation of this project is schedule control between various construction works for buildings, electric and mechanical facilities and installation works of facilities and equipment. Persons concerned either with the construction or with the installation should have a good understanding of the conditions and details necessary for installation of medical equipment, and should coordinate their respective schedules.

Also, the works of Uganda side obligation -- removal of the existing buildings, infrastructure construction and improvement, exterior construction works – require to be implemented in timely manner. It is therefore very important that both Uganda side and the Japanese side confirm state of progress of the other party's work. It has been confirmed with the Uganda side that the construction and improvement of infrastructure (electric power, water supply, etc.) will have been completed by the time the construction of this project starts. Nevertheless, detailed discussions will be done at the time of draft report presentation, and others, so that the Uganda side works will be done in time for the start of the construction work of this project, and will not hinder smooth implementation of this project. It should be noted that temporary construction works of the pipes and wires to the existing buildings are needed, prior to the construction and improvement of infrastructure.

2-2-4-4 Construction Supervision

The selected Japanese consultant company will enter a consultant contract with the Ministry of Health, and will promptly thereafter execute such works as development of detailed design documents (tender document, etc.), tendering, and consultant supervision of this Project.
The purpose of the consultant supervision is to ensure proper implementation of the contracted matters, including ensuring that the construction work will be implemented according to the design documents. The consultant company should secure quality of the work and conduct schedule control and other necessary works, by giving advice, issuing instructions and coordinating the parties concerned. The consultant supervision consists of the following works.

(1) Cooperation in the tender and contract works

The consultant company will prepare the tender documents, etc. necessary for the selection of contractors for construction per se and equipment installation works, and the tender work that consists mainly of public announcement of tender, receiving and acceptance of applications for tender, qualification screening of applicants, holding of a bidder's conference, distribution of tender documents, receiving and acceptance of bid documents, and evaluation of bids. Further, the consultant company will give advice and extend cooperation regarding concluding of contracts between the Ministry of Health of Uganda and successful bidders, or candidates for the contractors.

(2) Instruction, advice, and coordination for the construction contractors

The consultant company will study the construction schedule, construction plan, construction material procurement plan, equipment procurement and installation plan, etc. and give proper instructions and advice to the contractors and make adjustments. At the same time, the consultant company will coordinate the works between the parties concerned.

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

The consultant company will inspect the working drawings, shop drawings, documents, etc., submitted by the contractors and give necessary instructions on them, and approve them if they are found satisfactory.

(4) Confirmation and approval of construction materials and equipment

The consultant company will check the construction materials and equipment that the contractors intend to procure for compliance with the construction contract documents and approve them if they are found to be in compliance.

(5) Construction work inspection

The consultant company will witness product tests and performance tests at manufacturing plants or factories of construction materials and equipment as necessary, and execute the tests required for securing quality and performance of the products to be procured.

(6) Reporting of the state of progress of the construction work

The consultant company will monitor the progress of the construction works as against the planned schedule as well as the state of the works on the sites, and make reports thereof to the organisations concerned of both countries.

(7) Completion inspection and test operation

The consultant company will execute completion inspections and test operations of building works and associated facilities and equipment to confirm that the performance requirements specified in the construction contract documents are achieved, and will submit a report thereof to the Ministry of Health.

(8) Organisation for consultant supervision

The consultant company will station one permanent supervisor at each construction site to duly fulfil the obligations of the consultant company explained above. Further, the consultant company will dispatch to the construction site (a) specialised engineer(s) in each professional field depending upon the state of progress of the work, to conduct necessary discussions and inspections, give instructions, and make adjustments. In addition, the consultant company will assign (an) engineer(s) in charge in Japan to conduct necessary technical studies and to maintain smooth communication with the local sides. The consultant company will report necessary matters to the organisations concerned of the Japanese side on such items as state of progress, payment procedures, completion of work, and transfer of facilities and equipment of this requested Japanese assistance to the Uganda side.

The organisations concerning the consultant supervision and their relations are given in the diagram below.

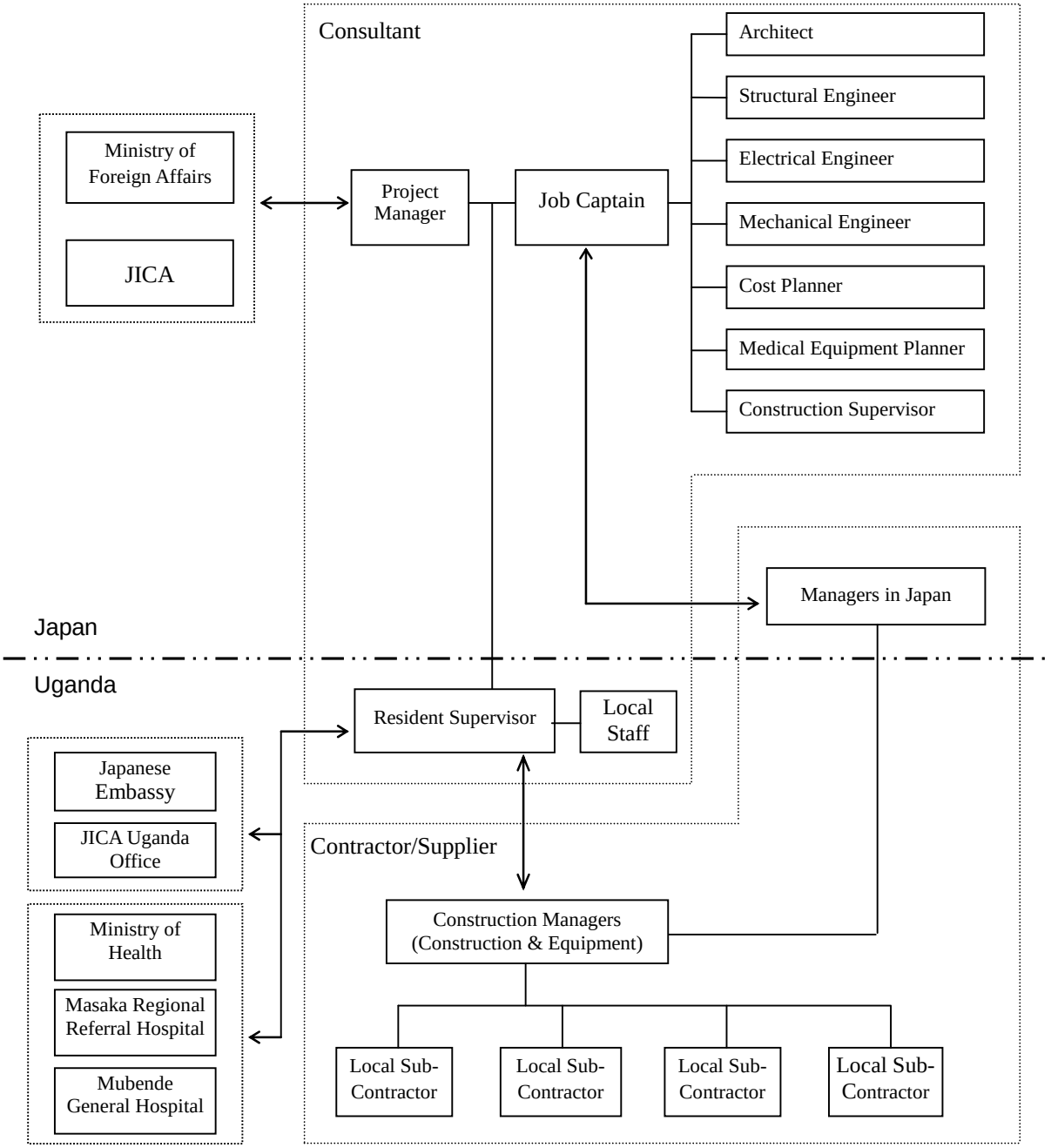


Figure 2-28 Supervision System

2-2-4-5 Quality Control Plan for Concrete

(1) Material used

- Cement
  Cement is produced in Uganda according to US310 quality standard. However, the cement is produced only in low volume and use of the Ugandan cement will be limited to such use as levelling concrete, rubble concrete. Cement meeting the specifications of the BS or Kenyan Standards is manufactured in Kenya, usable as normal Portland cement or equivalent and is in general use locally. This project will use such Kenyan cement for building structures when cement complying with US310 cannot meet required volume.

- Aggregate
  A field survey at various construction sites found undesirable variations in the size distribution of aggregates. It is therefore found necessary to conduct minute quality control of the aggregates. The fine aggregate to be used will be crushed stones or sand. The coarse aggregate will be river sand or crushed stones, and limited to a maximum size of 20 mm. There have been cases reported of the alkali aggregate reaction in aggregate. As a preventive measure against alkali silica reaction, the aggregate will be subjected to an alkali silica reactivity test.

- Cement admixture
  In Uganda, onsite concrete mixing is a general practice, and a cement admixture is not used in principle. However, the project will condone use of cement admixture if necessary.

- Water
  Water should be of a quality comparable to the waterworks water.

(2) Mixing plan

Concrete mixing will be onsite mixing by a rotary mixer, or job-mixed concrete in other words. Using this method, mixing is conducted by component volume ratio control. Therefore, control of the weights and specific gravities of the components will be important. Also important is proper handling and storage of cement and aggregates. Care must be exercised to select mixing times suited to local climatic conditions.

(3) Casting concrete

Method of casting concrete common in Uganda is to bring mixed concrete by cart to the pouring points and to pour the concrete from the carts. Due to the good local climatic conditions, drying shrinkage is small. However, the workability of the job-mixing and cart-pouring method is not good. Therefore, attention should be paid to prevent holes in the cast concrete, and measures such as use of a vibrator will be planned so that solid casting of concrete can be achieved. In Uganda, it is common to first pour concrete to form columns, second, to arrange bars and assemble frames for the beams, and then to pour the concrete to form the beams.

(4) Strength

Design strength of 20 to 40 N/mm^2 (28-day cube strength) is possible with cement meeting the Ugandan and Kenyan Standards planned for use for structural members,. Considering the conditions of aggregates and the scale of the buildings, a strength specification of 25 to 30 N/m^2 is planned. Strength control will be conducted for 7-day strength to achieve 0.65 Fc and 28-day strength to achieve 1.0 Fc.

(5) Quality control of concrete

Although the quality control of concrete will be performed by the method commonly adopted in Uganda, control methods of the Japanese Architectural Standard Specification for Reinforced Concrete Work (JASS5[*1]) will be applied as necessary.
The strength of mixed concrete will be determined by concrete cube test for test mixes and samples of mixed concrete from actual batches. The strength of the specimen will be confirmed to exceed the standard strength for quality control by the 28-day control.

A water bath suited for standard curing of concrete specimens will be installed at the construction sites. Compression tests of the specimens will be conducted by a third-party organisation, and the testing frequency will be every day on which casting work is done and once every 150 m^3 of concrete cast. The frequency of concrete-casting works will be high, in view of the casting method to be adopted, and compression tests by a third-party organisation will probably be conducted once for every 50 m^3.

Tests on the chloride content in fresh concrete will be conducted by a method commonly adopted in Japan, and the content will be confirmed not to exceed 0.3 kg/m^3.

[*1] JASS5: Japanese Architectural Standard Specification 5. Reinforced Concrete Work

2-2-4-6 Procurement Plan

(1) Procurement of Equipment and Materials for Construction

Equipment and materials whose cleanliness is easy to maintain, that are easily cleaned, and that are robust will be procured so that the equipment and materials match the use of the facility, since this Project is construction of a hospital facility. The material standards of the equipment and materials will be those that conform to the locally common BS. However, those for which no standard is provided in BS will be selected based on JIS. The procurement policy is as follows.

1) Local Procurement

The equipment and materials used will be locally procured to the extent possible in order to facilitate repairs and maintenance after completion of the facility. In this procurement, the quality level and the quantity to be procured will be checked and coordinated that the construction schedule, etc. are adversely affected. Imported equipment and materials will be handled as local products as long as they are freely available in the domestic market (those that are always on sale in the market without any import procedure).

Both sites for planned construction is a site to which equipment and materials can be transported and brought overland within 3 hours by vehicle from the capital, Kampala, if the equipment and materials cannot be procured in the local area of the site.

A paved road is available from Kampala to each construction site. Some portions of the road running in the city has unpaved or damaged sections and driving is somewhat difficult in those sections. However, repair is being conducted for the portion of the road running in the suburban area and driving is relatively easy in that portion.

2) Procurement by Import

The Japanese side will transport any equipment procured in Japan or from third countries to site at target hospitals. Equipment and materials that are judged to be difficult to locally obtain or not to satisfy the requirement on quality, or whose supply is judged to be unstable, will be procured by importing from Japan or a third country. In this case, for import and entry, the contractor needs to execute the import procedures smoothly in coordination with the Ministry of Health.

When ‘price plus packing and transportation cost’ for procurement from Japan or a third country and ‘price of local procurement’ are compared and the former is considerably lower for some equipment and materials, the equipment and materials will be procured by import.

Because Uganda is an inland country, the equipment to be procured from Japan or a third country will be seaborne to the main trading port, Mombasa, in the neighbouring country, Kenya, and transported overland by vehicle from the port to each site through Nairobi and Kampala.

When imports are transported by air, customs procedures will be implemented at Entebbe International Airport directly after arrival at the airport. However, because of the high cost, importing of procured equipment and materials will be mainly transported by sea or overland except in an emergency.

A container ship is operated once a month between Japan and the Port of Mombasa. About five weeks is necessary for a one-way trip, and unloading and entry take about two weeks. Therefore, it takes about seven weeks from Japan to Kampala.

It is about 500 km from the Port of Mombasa to Nairobi, and it is about 650 km from Nairobi to Kampala. Access from Kampala to the two hospitals is as follows.

Masaka Regional Referral Hospital is located about 130 km southeast of the capital, Kampala, and takes about two and a half hours by car.

Mubende Regional Referral Hospital is located about 150 km west of the capital, Kampala, and takes about two hours and forty minutes by car.

3) Transportation Plan

The state of the road surface is poor in a portion of the city and repairs are being conducted in the suburban area to improve road conditions. A speed limit of 80 km/h is imposed on automobiles for transportation. However, it has been observed that some large-sized cars such as container cars and trailers run more slowly than the speed limit and, therefore, transportation needs to be planned with sufficient extra time.

Items whose function may be degraded by impact, humidity, or high temperature are included in the equipment and materials, and therefore it is necessary to prepare the packaging to endure long-duration transportation over hazardous conditions.

Sufficient care is necessary due to the fact that the number of days necessary for procurement by import may vary largely, between one month and two months for example, because the circumstances of the supplier also has an effect.

4) Procurement Plan

Table 2-43 shows the main construction equipment and materials classified into those locally procured, those procured from Japan, and those procured from a third country, with the reasons for the selections.

Table 2-43 Procurement Plan for Major Construction Materials and Equipment

Type of work	Material and equipment	Procurement			Note
		Local	Japan	Third country	
Reinforced concrete work	Portland cement	○		○	Ugandan products have unstable quality and will used in rubble and base concrete. Kenyan product for structural frame
	Fine aggregate	○			Local products.
	Coarse aggregate	○			Local products.
	Concrete	○			There is ready-mixed concrete factory in Kampala. As 2 sites are far from Kampala, onsite concrete mixing will be conducted by component volume ratio control.
	Deformed bar	○			Locally manufactured. Local products are can be procured
	Formwork	○			Local products are can be procured.
Steel work	Steel frame (small and ordinary steel members)			○	Galvanized steel products for external use & larger sizes are not locally available. Steel work will be procured from Kenya
Masonry	Concrete block	○			Local products are can be procured
	Ventilation block	○			No problem with the local products
Waterproofing work	Silicon sealing material (for pane and sash peripheral sealing)		○		Japanese products will be procured as third country products are difficult to be procured
Plastering work	Cement mortar	○			No problem with the local products
Tile work	Tiles	○			There is no domestic product, but products of neighbouring countries are available in the domestic market.
Stone work	Terrazzo block (300 × 300)	○			Local products are can be procured
	Terrazzo block work	○			Commonly used
Carpentry	Timber for fitting works	○			No problem with the local products
Roofing work	Steel folded plate	○			No problem with the local products

Type of work	Material and equipment	Procurement			Note
		Local	Japan	Third country	
Metal work	Light-weight ceiling substrate		○		Japanese products will be procured for reasons of durability and quality.
	Decorated metal ware, handrail	○			Locally procurable products are used.
	Curtain rails for ward	○	○		Ceiling hanger will be procured from Japan
	Aluminium ceiling inspection hole, Aluminium expansion joint, Grating cover Manhole cover,		○		There is no local product. Third country products are difficult to procure. Japanese products are procured for reasons of quality and performance.
Wooden fixture work	Door, fixture, frame	○			Local products.
Metal fixture work	Aluminium fixtures	○			There is no domestically manufactured product. Procured products from Kenya through local agencies will be locally assembled
	Light steel fixture		○		Japanese products will be procured for reasons of quality and performance.
	Steel fixture (airtight)		○		Ditto
	X-ray shielding door, window		○		Ditto
	Metal parts for fixture		○		Locks will be Japanese products for reasons of performance and durability of the master-key system. Door closers, etc. will also be Japanese products.
Glass work	Ordinary sheet glass, 6mm	○			There is no domestically manufactured product. Imported products are available in the market. They have no quality problem.
	Glass block			○	No local product and procured from Kenya
Painting work	Interior painting	○			No problem with the local products
	Exterior painting	○			Local products are planned to be procured in view of maintenance.
Interior finish work	PVC sheet with welding method			○	Imported and procured from Kenya
	System ceiling of mineral fibre decorative acoustic panels			○	Imported and procured from Kenya
	Calcium silicate board		○		Imported and procured from Japan
	PVC ceiling cornice		○		There is no domestically manufactured product. Third country products are difficult to procure as well.
Finishing unit work	Sink, medical sink	○	○		Local products are procured except for stainless steel sinks. Stainless steel sinks are procured from Japan for reasons of quality and durability.
	Overhead cabinet	○			Local procurement
	Wooden furniture	○			Local procurement
	Doorplate, guide plate, etc., building plaque	○	○		Building plaque and some others are procured from Japan
Exterior work	Interlocking block	○			Domestic products are available but variation in dimension and accuracy should be minded.
	Curb	○			No problem with the local products
	Galvanized grating		○		There is no domestically produced product. They are procured from Japan.

Type of work	Material and equipment	Procurement			Note
		Local	Japan	Third country	
Electric Building Systems work	Electric transformer			○	Procured from Kenya for quality & price
	Power generator			○	Procured from Kenya for quality & price
	Boards		○		Procured from Japan for reliability
	Lighting equipment			○	Procured from Kenya for quality & price
	Wiring accessory			○	Procured from Kenya for quality & price
	Wires, cables			○	Procured from Kenya for quality & price
	Interphone			○	Procured from Kenya for quality & price
	Automatic Fire alarm			○	Procured from Kenya for quality & price
Mechanical Building systems, Installation	Air conditioner			○	Procured from Kenya for quality & price
	Ventilator & exhaust fans	○		○	To be selected for quality & price
	Air intake and outlet		○		Procured from Japan for quality & price
	Duct material			○	Procured from Kenya for quality & price
	Elevated water tank	○			Local procured products are acceptable
	Sanitary ware	○		○	To be selected for quality & price
	Piping material	○		○	To be selected for quality & price
	Pump	○			Local procured products are acceptable
	Medical gas facility		○		High reliability are required, procured from Japan.

(2) Procurement of Medical Equipment

In principle, the medical equipment of this project will be procured from Japan, because majority of the equipment are basic and of easy maintenance. However, the procurement from third countries' product should be also considered based on the fact that some surgical operation related items and so on need local agents in terms of operation and maintenance services, which is a part of after-sales services, and that the limitation of procurement to Japanese products would hinder fair competition in tendering.

The procurement equipment plan is shown as below.

Table 2-44 Procurement of major equipment

Equipment	Procurement country		
	Uganda	Japan	Third countries
C-Arm X-ray unit, Defibrillator, Laryngoscope, Operating light(ceiling), Operating light(stand), Anaesthesia machine with ventilator, Pulse oxymeter, Microscope, Incubator, Infant warmer, Electric balance, and Micro pipette, etc.	—	○	○
Dental chair/unit, Distillation unit, etc.	—	○	—

2-2-4-7 Operational Guidance Plan

(1) Initial operational guidance

The first time, basic operational guidance of the procured equipment is executed for the medical staffs by the engineers the equipment manufacturer or dealer dispatches. And it is to be implemented when the equipment is carried and installed. The content of guidance focuses on equipment that requires instalment to the site and includes the initial operation guidance, explanation of routine maintenance point and practicable trouble shooting, of the equipment.

(2) Plan of operational guidance

In this project, the operational guidance is conducted for the practitioners of the equipment, such as specialist doctors and medical staffs utilising Japanese soft component (technical assistance), which is originally requested by Ministry of Health. The content of guidance is about the importance of equipment maintenance, which is to be held in a seminar form, and the routine maintenance/operation point, which is to be held by special doctors and medical engineers as trainers in an actual training form in each site. Moreover, it is planned the improvement of the maintenance management ability by making the engineer in the maintenance workshop at the site to participate in this training, which Department of Health expects their upgrade functions.

2-2-4-8 Soft Component (Technical assistance) Plan

The study team has, through its field survey conducted from March 2 to March 31, 2009, confirmed the issues arising from equipment operations and maintenance. And for the purpose of tackling with the issues and strengthening the management of equipment operation and maintenance, Republic of Uganda requests Japanese government the technical assistance regarding the management and manipulation of medical equipment including practical trainings coping with emergency cases.

For better management and operation of equipment, ①it is necessary for staffers of the infrastructure division, technicians of the central workshop, and staffers of the targeted hospitals, to acknowledge importance of maintenance and to establish maintenance system, which leads to daily maintenance activities. ②it is material to strengthen the management and operation ability of the medical staffers who actually operate the equipment. Therefore, given that minimum sustainability of the Japanese cooperation is secured, it expects to be beneficial to implement the technical assistance which meets request from Uganda.

See the Annex-5 for the detailed plan.

2-2-4-9 Implementation Schedule

The implementation schedule of the project after the exchange of notes has been affected is as shown in Figure 2-29. The work consists of the detailed design, assistance on tender and the consultant supervision by the consultant, the construction by the contractor.

(1) Detailed design

The Ministry of Health and a Japanese consulting company, a Japanese juridical person, will conclude a consulting contract on the detailed design (preparation of tender documents) for the Project and this contract will be verified by JICA. Thereafter, the consultant will prepare the tender documents, in consultation with the Ministry of Health, based on the basic design study report, and it will be approved by the Ministry of Health.

The detailed design (preparation of the tender documents) is expected to take four months.

(2) Tender work

The tender work is expected to take three months.

(3) Construction by contractor and consultant supervision

On completion of the contract for construction, the contractor begins construction work. At the same time, the consultant begins the consultant supervision.

The construction is expected to take 14 months, of which details are shown below.

Table 2-45 Construction Detail of the Masaka Regional Referral Hospital

Project Component			Contents of the Facility
Main Building	OPD/Casualty Building (2 stories / 2,208.3 ㎡)	Ground Floor	O.P.D.：Surgical Casualty Dept.：1 Minor operation room, Material Sterilization Room
		First Floor	O.P.D.：General OPD(Medical, Paediatric) Specialised Medical(common)
	OP Theatre/Laboratory Building (2 stories / 1,625.9 ㎡)	Ground Floor	Operation Dept.：3 Operation Theatres, 1 Minor Operation theatre Room, Material Sterilization Room
		First Floor	Pharmacy Laboratory: Physiological / Pathological Examinations Lecture room
	Toilet Building (2 stories /132.5 ㎡)	Ground Floor First Floor	Toilet for outpatients, Toilet for staff, Toilet for disabilities
	Total 3966.7m^2		
Related Facilities (1 storey/ 186.0 ㎡)		Electric Room （ 75.0 ㎡）	Electric room Power receiving room, Generator room
		Elevated Water Tank （ 111.0 ㎡）	
Medical Equipment			Provision for OPD/Casualty Building and Operation/Lab. Building

Table 2-46 Construction Detail of the Mubende Regional Referral Hospital

Project Component			Contents of the Facility
Main Building	Casualty /Maternity Building (2 stories / 1,707.0 m²)	Ground Floor	O.P.D.：Surgical Casualty Dept.：1 Minor operation room, Material Sterilization Room
		First Floor	Maternity Dept.：Delivery, Prenatal Room, Postnatal Room
	O.P.D/ OP Theatre Building (2 stories / 1,960.0 m²)	Ground Floor	O.P.D.： General OPD(Medical, Paediatric) Specialised Medical(common) Pharmacy Laboratory: Physiological / Pathological Examinations
		First Floor	Operation Dept.：2 Operation Theatres, Material Sterilization Room O.P.D.：Special Clinics(Dental, E.N.T. Ophthalmological)
	Toilet Building (2 stories /132.5 m²)	Ground Floor First Floor	Toilet for outpatients, Toilet for staff, Toilet for disabilities
	Total 3799. 5m²		
Male Ward (1 storey / 467.7 m²)		Ground Floor	Patients room、Treatment room
Related Facilities (1 storey/ 178.8 m²)		Electric Room (75.0 m²)	Electric room Power receiving room, Generator room
		Elevated Water Tank (103.8 m²)	
		Septic Tank (27.0 m²) Percolation Trench (500.0 m²)	
Medical Equipment			Provision for Casualty /Maternity Building, O.P.D/ Operation Building, Male Ward

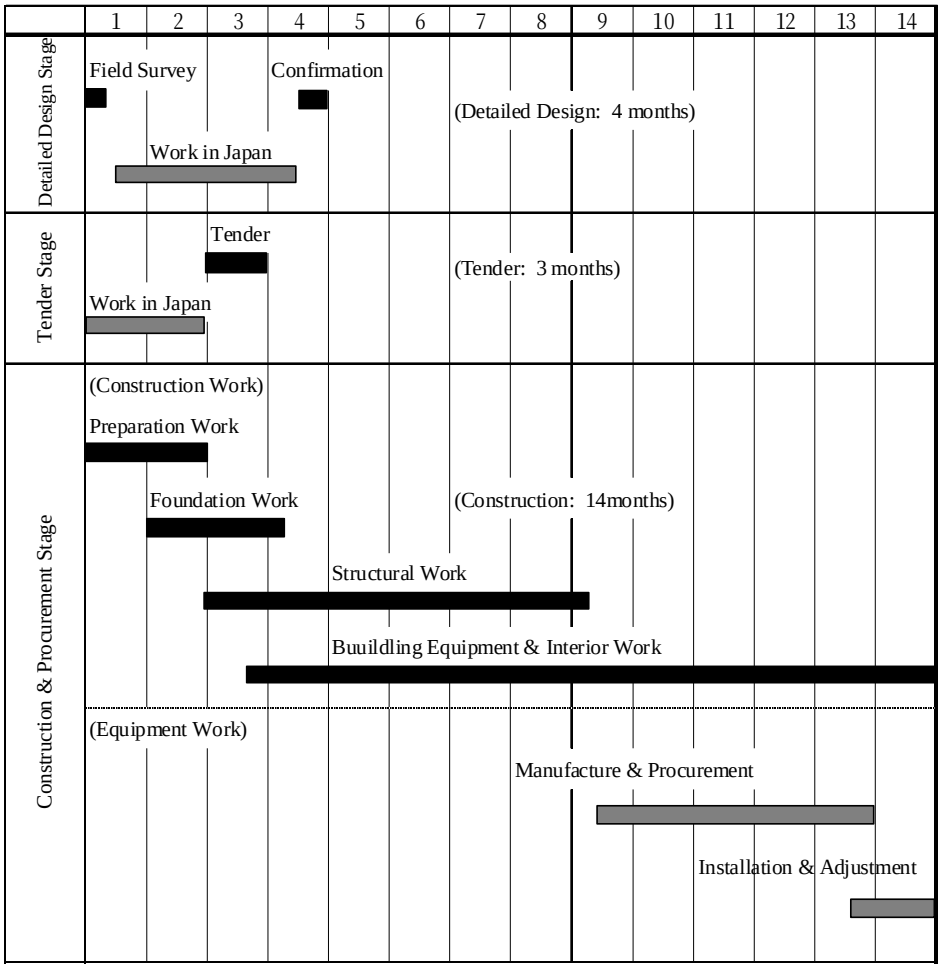


Figure 2-29 Project Schedule

2-3 Obligations of Recipient Country

The following are main items of the obligations of the Uganda side.

(1) Procedure

1) Application for and acquisition of building permits regarding the Project
2) Procedures for the bank arrangement (B/A) and for issuance of the authorization to pay (A/P) and bearing of commission fees associated with them
3) Prompt landing of imported materials and equipment cargos at port or point of entry, procedures for exemption of duties, Customs clearance, and assurance thereof, and securing of prompt domestic transportation
4) Provision of convenience necessary for entry to and stay in Uganda to the Japanese nationals who are employed to execute provision of facilities and equipment and execution of other works according to the verified contract
5) Exemption of all duties and all taxes in Uganda to the Japanese nationals who are employed to execute provision of facilities and equipment and execution of other works according to the verified contract
6) Securing of the budget required for effective use and maintenance of the facilities and equipment constructed and procured by the Project
7) Procedures, contracts and installation fees for power supply, telephone services, gas supply and sewage for the Project facilities.

(2) Exemption of duty and tax

The imported construction materials and equipment procured for this project are exempted from any customs duties and taxes by letter of Implementing Agency. In case of procurement by sub-contractors, VAT（Value Added Tax）should be paid in advance, but will be reimbursed through procedures prescribed by Uganda side.. The same process shall be undertaken for reimbursement of VAT for the amount paid in advance by Japanese contractor or supplier.

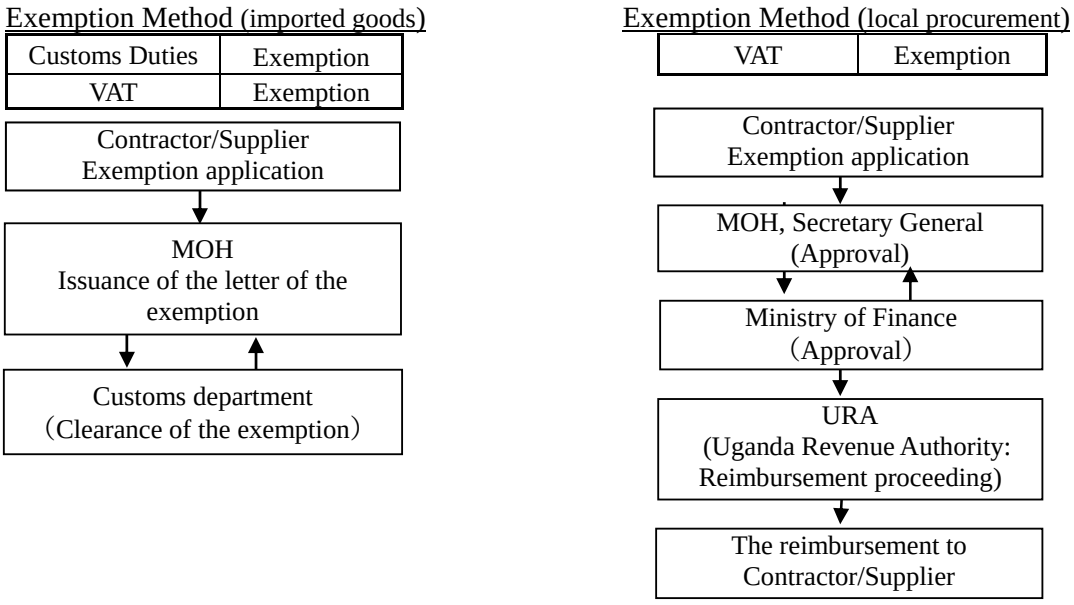


Figure 2-30 Outline of Duty and Tax Exemption Procedure

(3) Related construction work

Masaka Regional Referral Hospital

The items in scope of Uganda side, the schedule and cost are given in the following Table 2-47.

Table 2-47 Schedule of the Uganda Side Obligation Works_ Masaka RRH

Item of scope of Uganda	2010												2011												2012					
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6
A. Demolition of the existing facilities and site preparation of the construction sites								A.																						
B. Relocation of the demolished facilities							B.																							
C. Replacement of the existing infrastructure in the construction sites								C.										Construction Period												
D. Distribution of infrastructure to the sites																								D.						
E. Construction of walls and fences surrounding the sites																														
F. Carrying general furniture and supplies into the new building																										F.				
G. Relocation of the gates and access road																														
H. Relocation to the new buildings																										H.				
I. Provision of the site										I.																				

A. and B. in the table 2-47 are described in the table-2-48 and figure 2-31

Table 2-48 Facilities to be Demolished and Relocation of the Functions Masaka RRH

A. Demolition of the existing facilities and site preparation of the construction sites		B. Relocation of the function of demolished facilities		
Building No.	Building name	Building No.	Building name	Note
1	Record / Lecture	9	Mental Health Unit	Temporary use during the construction period only
2	Surgical OPD	9	Mental Health Unit	Temporary use during the construction period only
3	Blood Bank			Temporary use during the construction period only
4	Toilet	—	To be transferred	Permanently moved
5	Foundation	—	To be demolished	unused old foundations to be completely demolished and removed
6	Waiting area eave for X-ray Dept	—		To be Reroofed after completion of new facilities
7	Corridor roof	—		To be Reroofed after completion of new facilities
8	Corridor roof for Operation Theatre	—		To be Reroofed after completion of new facilities

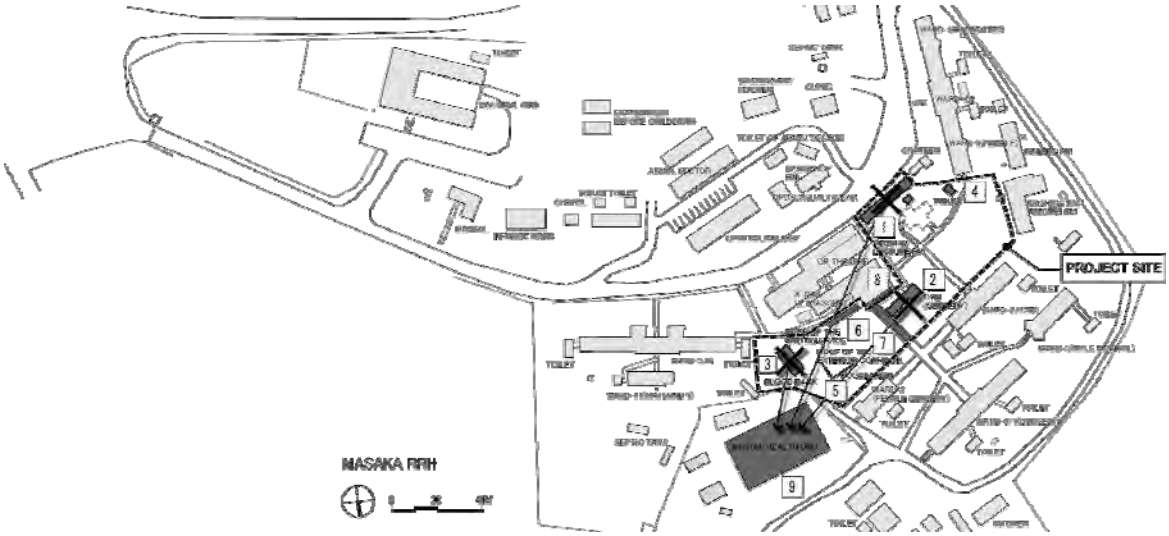


Figure 2-31 Facilities to be Demolished and Facilities to Which the Functions of the Subject Facilities Move, Masaka RRH

C. Replacement of the existing utilities in the construction sites [Before construction]

To relocate the existing utilities in the construction site, if any

(e.g.: Telecommunication line, electrical cable, water pipe, sewerage pipe, septic-tank etc.)

D. Connection of utilities to the sites [During construction]

To connect utilities to the construction site

(e.g.: Telecommunication line, electrical cable, water pipe, sewerage pipe etc.)

E. Construction of walls and fences surrounding the sites

No work for Masaka RRH

F. Transfer of general furniture and supplies to the new building [After construction]

To transfer the existing general furniture, supplies and medical equipment from the tentatively used building to the new building and supplement any lacking general furniture, supplies and medical equipment(stethoscope, sphygmomanometer machine, and apparatus wagon, etc.).

G. Relocation of the gates and access road

No work for Masaka RRH

H. Relocation to the new buildings [After construction]

1) To transfer the function of old OPD building to the new OPD
2) To transfer the function of old Theatre to the new Theatre.

I. Provision of the site [Before construction]

To provide space for the temporary construction site services (site office and storage)

Mubende General Hospital

The items in scope of Uganda side, the schedule and cost are given in the following Table 2-49.

Table 2-49 Schedule of the Uganda Side Obligation Works_Mubende RRH

Item of scope of Uganda	2010												2011												2012					
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6
A. Demolition of the existing facilities and site preparation of the construction sites								A.																						
B. Relocation of the demolished facilities							B.																							
C. Replacement of the existing infrastructure in the construction sites								C.										Construction Period												
D. Distribution of infrastructure to the sites																								D.						
E. Construction of walls and fences surrounding the sites																									E.					
F. Carrying general furniture and supplies into the new building																										F.				
G. Relocation of the gates and access road																										G.				
H. Relocation to the new buildings																										H.				
I. Provision of the site										I.																				

A. and B. in the Table 2-49 are described in the Table-2-50 and Figure 2-32

Table 2-50 Facilities to be Demolished and Facilities to Which the Functions of the Subject Facilities Move, Mubende RRH

A. Demolition of the existing facilities and site preparation of the construction sites		B. Relocation of the demolished facilities		
Building No.	Building name	Building No.	Building name	Note
1	Temporary Garage	—	To be transferred	Permanently moved
2	Record/Workshop	8	Private ward	Tentatively used during the construction period only
3	Community Department			
4	Temporary Kitchen	—	To be transferred	Permanently moved
5	Staff Quarter	9	New Staff quarter planned by World Bank	
6	Existing Trees	—	To be removed	
7	Hedge	—	To be demolished	

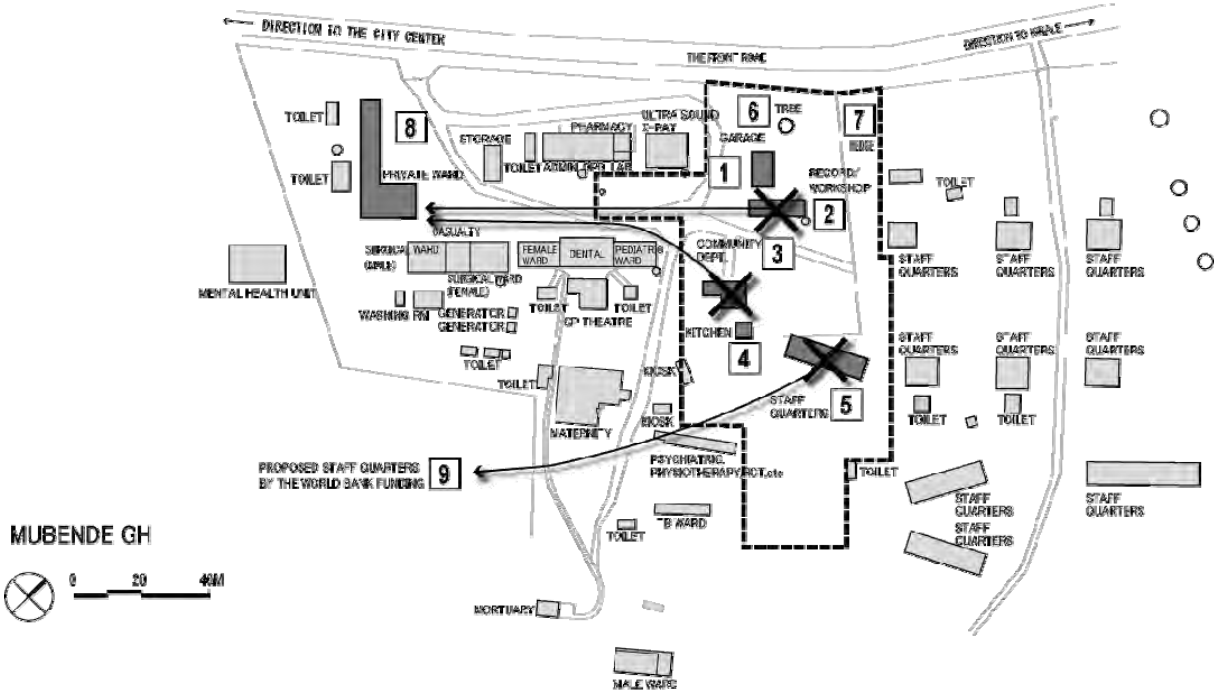


Figure 2-32 Facilities to be Demolished and Facilities to Which the Functions of the Subject Facilities Move, Mubende RRH

C. Replacement of the existing utilities in the construction sites [Before construction]

To relocate the existing utilities in the construction site, if any

(e.g.: Telecommunication line, electrical cable, water pipe, sewerage pipe, septic-tank etc.)

D. Connection of utilities to the sites [During construction]

To connect utilities to the construction site

(e.g.: Telecommunication line, electrical cable, water pipe, sewerage pipe etc.)

E. Construction of walls and fences surrounding the sites [After construction]

To plant hedges or construct fences surrounding the sites

F. Transfer of general furniture and supplies to the new building [After construction]

To transfer the existing general furniture, supplies and medical equipment from the tentatively used building to the new building and supplement any lacking general furniture, supplies and medical equipment(stethoscope, sphygmomanometer machine, and apparatus wagon, etc.).

G. Relocation of the gates and access road [After construction]

1) To shift the main gate
2) To transfer the private road in the hospital

H. Relocation to the new buildings [After construction]

3) To transfer the function of old OPD building to the new OPD
4) To transfer the function of old Theatre to the new Theatre.
5) To transfer patients in Maternity and Male ward to new Maternity Department and new Male ward

I. Provision of the site [Before construction]

1) To provide space for the temporary construction site services (site office and storage)
2) To provide space for the percolation trenches

(Include demolishing any underground objects)

2-4 Project Operation Plan

(1) Staffing plan

1) Masaka RRH

Current staff situation is as follows.

Table 2-51 Current Staff of Masaka RRH

Medical staff members	Present staff members
Medical officers	38
Resident doctors	12
Nurses	113
Facility maintenance staff members	5
Total	168

Source：Response to questionnaire to MOH and Preparatory study report

As for Masaka RRH, there is no need to hire new staff members after the execution of the project.

2) Mubende RRH

Current staffing situation and plans for augmentation after the execution of this project is as follows.

Table 2-52 Current Staff of Mubende RRH

Medical staff members	Present	Number of newly hired staff (after completion of this project)
Medical officers	5	2
Resident doctors	8	3
Nurses	44	—
Facility maintenance staff members	1	—
Total	58	5

Source：response to questionnaire to MOH and Preparatory study report

Mubende RRH is planning to newly hire 2 medical officers and 3 resident doctors after the implementation of this project.

(2) Maintenance plan

1) Facility

Masaka Regional Referral Hospital has five staff members for maintenance of the facility in the clerical work and management department, while Mubende Regional Referral Hospital has only one staff member. Both hospitals have a room and simple tools for maintenance and repair of the existing equipment and instruments is conducted in each hospital. For equipment and instruments that cannot be repaired by the staff at each hospital, the manufacturers are requested to repair or they replace them and are kept in use.

Only the in-house generator is considered to be special equipment in all existing facilities and are sustainably operated. However, it is considered that enhancement is necessary in the facility of the plan. No finishing material requiring special maintenance is planned for

buildings. However, the following are specialised building systems and maintenance personnel having specialised knowledge will be necessary.

- High-voltage power receiving equipment
- Generator
- Medical gas equipment
- Wastewater treatment equipment

The Ministry of Health is planning to request Umeme to maintain the high-voltage receiving equipment. Generators are also installed in the existing hospital and it has been judged that the staff members know well how to maintain and operate a generator. Relatively simple equipment are being planned for medical gas equipment and the wastewater treatment equipment and it has been determined that no dedicated engineer is necessary. However, management of the amount of oxygen remaining in the gas bottle and management of the water quality in the wastewater treatment need to be conducted by members of the hospital staff and operations will be carefully explained to concerned staff after these equipment are installed. Furthermore, discussions with the Uganda side to clarify the personnel system for the management and operation of the equipment will be necessary.

2) Medical equipment

In Masaka RRH, there is one staff member specialized in medical equipment maintenance. If necessary, certain staff members at the central workshop belonging to the infrastructure division of MOH visit the hospital. These engineers repair and maintain the equipment in trouble. In Mubende RRH, a maintenance workshop had been established by the assistance of UNDP. However, only one person, a tradesman, is employed with responsibility for overall facilities and equipment maintenance. In case more technical knowledge is required, the superintendent requests the central workshop for repairs.

Generally it is a hospital responsibility for the maintenance of facilities and medical equipment. Firstly the request for repair goes to the technician who is in charge of the maintenance at the hospital. When it is impossible to repair by hospital side or accessable dealer in the hospital, the repair request is made to the central workshop.

Even though the central workshop is a part of MOH, its budget is mostly financed from the income paid by the hospitals for the repair service because the budget from MOH is not enough to cover their activity.

Since no work is not generated until the hospitals request for repairs, routine maintenance is not adequately done. In addition, there are many cases that the repair reason (breakdown cause) is said to be mainly due to miss-operation of the equipment by medical staffs without proper handling information.

Starting this year, a part of the maintenance budget that had been distributed directly to the hospital will be allocated to the central workshop. Using this budget, the workshop can do maintenance activity without awaiting for request from the hospitals.

The central workshop has received some maintenance guidance by Japanese technical cooperation and will be expected in the near future to conduct preventive maintenance work, operation assistance to the equipment users, and quick repair of broken equipment in hospitals under their responsibility.

I n order to reliably secure the budget necessary to meet the increase in the maintenance cost for the medical equipment procured by this project, the Uganda-side has dispatched their Chief administration officer for the purpose of the budget measures and its enforcement.

2-5 Project Cost Estimation

2-5-1 Initial Cost Estimation

(1) Cost of Uganda Scope of Works

Table 2-53 Cost of the Uganda Side Obligation Works for the Masaka Regional Referral Hospital

(Unit: 1,000Ush.)

Item	Cost
1. Demolition of the existing facilities and site preparation of the construction sites	21,951
2. Relocation of the demolished facilities	10,283
3. Replacement of the existing infrastructure in the construction sites	10,000
4. Distribution of infrastructure to the sites	98,059
5. Construction of walls and fences surrounding the sites	0
6. Carrying general furniture and supplies into the new building	48,504
7. Relocation of the gates and access road	0
8. Relocation to the new buildings	4,042
9. Provision of the site	0
	192,839 (About 9.4 million yen)

Table 2-54 Cost of the Uganda side Obligation Works for the Mubende Regional Referral Hospital

(Unit:1,000 Ush.)

Item	Cost
1. Demolition of the existing facilities and site preparation of the construction sites	19,029
2. Relocation of the demolished facilities	12,976
3. Replacement of the existing infrastructure in the construction sites	10,000
4. Distribution of infrastructure to the sites	21,661
5. Construction of walls and fences surrounding the sites	11,680
6. Carrying general furniture and supplies into the new building	52,104
7. Relocation of the gates and access road	1,600
8. Relocation to the new buildings	4,342
9. Provision of the site	0
Total	133,392 (About 6.5 million yen)

Other charges related to procedural matters will be the issuing of the Banking Arrangement (B/A) and Approval for Payment (A/P) and the related fees which are estimated to be approximately 2 million yen.

(2) Calculation Conditions

1) Current as of: April, 2009

2) Exchange rate: 1 USD = 96.08 Japanese Yen
1 Ush = 0.049 Japanese Yen

3) Construction term: The period of detailed design, tenders, construction and procurement of equipment is identified in the implementation schedule.

4) Other: This Project will be implemented through the system of the Grant Aid cooperation by the Government of Japan.

2-5-2 Operation and Maintenance Cost

(1) Maintenance Cost

The maintenance cost of the facilities and equipment of this project is as shown in the table below, calculated incorporating the expected reduction of electric power cost by adoption of high-voltage power receiving and efficiency improvement of the air conditioning systems, and rational use of various filters corresponding to various degrees of cleanliness demanded by each room. The table below shows the maintenance cost for the initial year and the second year onward.

Masaka Regional Referral Hospital

Table 2-55 Result of Preliminary Calculation of Maintenance Cost

Unit: Ush

Item	Initial fiscal year	Following fiscal years
①Electricity charge	118,104,000	118,104,000
②Telephone charge	3,765,000	3,765,000
③Fuel cost of generator	10,656,000	10,656,000
④Water charge	16,983,000	16,983,000
⑤Oxygen charge	2,073,000	2,073,000
⑥Building maintenance cost	0	12,456,000
⑦Replacement part (filter replacement)	3,240,000	6,480,000
Sub total ① to ⑦ (facility maintenance cost)	154,821,000	170,517,000
⑧Equipment maintenance cost	81,894,000	81,894,000
Total ① to ⑧	236,715,000	252,414,000

① Electric charge ..... 118,104,000 Ush/year

The contract demand of electric power of the planned facilities is presumed as shown below from the capacities and other details of the facilities.

The actual consumption is supposed to be about 75% of the equipment capacity (100 k VA (80kW)) on average.

Table 2-56 Presumed Electric Power Consumption

	Capacity of Transformer(kV)	Actual consumption (kW)
Newly built facility	200	60

・Price structure

Electric power minimum charge	2,000	Ush/month
Electric power meter rate	410	Ush/kWh

・Electricity charge

	Charge (Ush)	Consumption (kW)	Used hour (h)	Day	Month	Load factor	Total
Newly built facility							
Minimum charge	2,000	—	—	—	12	1.0	24,000
Meter rate (1)	410	60	8	25	12	1.0	59,040,000
Meter rate (2)	410	60	16	25	12	0.5	59,040,000
Total							118,104,000

② Telephone charge …….....3,765,000 Ush/year

The telephone charge varies depending upon how many times the services are used. The frequency of uses combined for each facility is estimated and the charge is calculated from the assumptions.

・Price structure

Minimum charge		10,000 Ush/month
Domestic telephone call	Within Uganda telecom	180 Ush/min
	With other companies	360 Ush/min
International telephone call		450 Ush/min

・Telephone charge

	Charge (Ush)	Used hour (min/each)	Frequency (times/day)	Day	Month	Total
Minimum charge	10,000	—	—	—	12	120,000
Domestic call	180	1	20	25	12	1,080,000
	360	1	20	25	12	2,160,000
International call	450	3	1	25	12	405,000
Total						3,765,000

③ Fuel cost of generator…….....10,656,000 Ush/year

Power failures occur in Masaka four times a month, each lasting about 12 hours on average by the result of hearing at the site. On this assumption, the fuel cost is calculated as 12 hours operation for each incident and 4 incidents per month.
The project plans a 50 kVA power generator.

・Price structure

Generator fuel consumption	10	Litres/h
Fuel unit price	1850	Ush/Litres

・Fuel cost

	Cost (Ush)	Consumption (litres)	Used hour (h)	Day	Month	Annual consumption (litres)	Total (Ush)
Generator fuel Consumption	1850	10	12	4	12	5,760	10,656,000
Total							10,656,000

④ Water charge …….....16,983,000 Ush/year

The consumption of water from the city waterworks by the project facilities is as follows.

Table 2-57 Presumed Waterworks Water Consumption

	Water supply per day (m^3/day)
Newly installed facilities	40
Total	40

・Price structure

Meter rate (average)	1,767	Ush/m^3
Minimum rate	2,000	Ush/month

・Water charge

	Charge (Ush)	Water supply	Day	Month	Rate of city water consumption	Total
Newly installed facility						
Minimum rate	2,000	—	—	12	1	24,000
Meter rate	1,767	40	25	12	0.8	16,959,072
Total						16,983,072

⑤ Oxygen charge……2,073,000 Ush/year

Oxygen is used in the theatres, recovery rooms, etc., and its consumption is presumed as follows.

Table 2-58 Oxygen Consumption

Facility	Use	Consumption per day (cylinders/day)
Newly built facility	Theatre, etc.	18
Total		18

・Price structure

O_2 price	12,000	Ush/cylinder (1600L type)

・Oxygen charge

	Charge (Ush)	Consumption (cylinders)	Month	Annual Consumption (cylinders)	Load factor	Total (Ush)
O_2 charge	12,000	18	12	216	0.8	2,073,600
Total						2,073,600

⑥ Building maintenance cost …… ..... 12,456,000 Ush/year

The buildings of this project adopt exterior and interior finishing materials that are relatively easy to maintain. For this reason, the building maintenance cost required for exterior and interior finishing, electric facilities, water supply and drainage, purchase of replacement parts and spare parts for air conditioning facilities is presumed 1/3 to 1/2 of Japan's similar cases'. The building maintenance cost is necessary from the second year and onward.

・Price structure

3,000 Ush/m^2/year

・Building maintenance cost

	Cost (Ush)	Area (m^2)	Day	Month	Load factor	Total
Building maintenance cost	3000	4152	―	―	1.0	12,456,000
Total						12,456,000

⑦ Replacement part (filter replacement)……..... 6,480,000 Ush/year

A medium-performance filter is installed in the theatre. Also, a pre-filter is installed on each air conditioner.

The frequencies of filter replacements are presumed as shown below. The pre-filter is of regenerative type and replacement cost is presumed not necessary.

・Price structure

Pre-filter	About twice/month	Cleaning
Medium-performance filter	About twice /year	(1,080,000 Ush/piece) (Replacement to be supposed once a year in the first year)

・Filter replacement cost

	Cost (Ush)	Number	Frequency	Total (Ush)
Newly installed facility Medium performance filter	1,080,000	3	2	6,480,000
Total				6,480,000

⑧ Equipment maintenance cost..... 81,894,000 Ush/year

Equipment plan is conceived to satisfy needs of medical services mainly by equipment procurement and supplement equipment of shortage in number. The project scale is limited to such range of equipment as Ministry of Health and Masaka RRH can maintain properly. Therefore, the hospital needs to secure budget to cover maintenance cost for newly procured equipment. The project implementation will cost the hospital 81,894,000 Ush/year as maintenance fee and its breakdown is shown as follows.

Cost	Makasa RRH
Consumables	¥3,153,000
Spare parts	¥859,000
Total	¥4,012,000 （81,894,000Ush）

Exchange rate：1Ush=0.049Yen

The breakdown of consumable items and spare parts cost is shown as the following tables.

Table 2-59 Equipment that needs consumable items

No	Equipment name	Qty	Consumable item	Unit price (x¥1,000)	Cost (x¥1,000)	Equiv. Ush (x1000)
1	Suction unit	9	Catheter	198	1,782	
2	Defibrillator	5	Recording paper ,etc	182	910	
3	Infant warmer	1	Probe cover	99	99	
4	Nebulizer	10	Mask ,etc	30	300	
5	Water distiller	1	Cartridge	62	62	
	Sub-total				3,153	154

Table 2-60 Equipment that needs spare parts

No	Equipment name	Qty	Spare 17.5parts	Unit price (x¥1,000)	Cost (x¥1,000)	Equiv. Ush (x1000)
1	Water distiller	1	Heater	16	16	
2	Operating light, ceiling	3	Bulb	53	159	
3	Operating light, stand	2	Bulb	29	58	
4	Examination light	12	Bulb	8	96	
5	Defibrillator	2	ECG cable	8	16	
6	Infant warmer	1	Probe	18	18	
7	Pulse Oxymeter	5	Probe	64	320	
8	Nebulizer	5	Tube, etc	10	50	
9	Autoclave	3	Gasket	13	39	
		3	Heater element	29	87	
	Sub-total				859	18

Mubende Regional Referral Hospital

Table 2-61 Result of Preliminary Calculation of Maintenance Cost

Unit: Ush

Item	Initial fiscal year	Following fiscal years
①Electricity charge	118,104,000	118,104,000
②Telephone charge	3,765,000	3,765,000
③Fuel cost of generator	4,440,000	4,440,000
④Water charge	14,863,000	14,863,000
⑤Oxygen charge	1,382,000	1,382,000
⑥Building maintenance cost	0	13,338,000
⑦Replacement part (filter replacement)	2,160,000	4,320,000
Sub total ① to ⑦ (facility maintenance cost)	144,714,000	160,212,000
⑧Equipment maintenance cost	55,242,000	55,242,000
Total ① to ⑧	199,956,000	215,454,000

① Electric charge.....118,104,000 Ush/year

The contract demand of electric power of the planned facilities is presumed as shown below from the capacities and other details of the facilities.

The actual consumption is supposed to be about 75% of the equipment capacity (100 k VA (80kW)) on average.

Table 2-62 Presumed Electric Power Consumption

	Capacity of Transformer (kV)	Actual consumption (kW)
Newly built facility	200	60

・Price structure

Electric power minimum charge	2,000	Ush/month
Electric power meter rate	410	Ush/kW

・Electricity charge

	Charge (Ush)	Consumption (kW)	Used hour (h)	Day	Month	Load factor	Total
Newly built facility							
Minimum charge	2,000	—	—	—	12	1.0	24,000
Meter rate (1)	410	60	8	25	12	1.0	59,040,000
Meter rate (2)	410	60	16	25	12	0.5	59,040,000
Total							118,104,000

② Telephone charge .....3,765,000 Ush/year

The telephone charge varies depending upon how many times the services are used. The frequency of uses combined for each facility is supposed and the charge is calculated from the assumption.

・Price structure

Minimum charge		10,000 Ush/month
Domestic telephone call	Within Uganda telecom	180 Ush/min
	With other companies	360 Ush/min
International telephone call		450 Ush/min

・Telephone charge

	Charge (Ush)	Used hour (min/each)	Frequency (times/day)	Day	Month	Total
Minimum charge	10,000	—	—	—	12	120,000
Domestic call	180	1	20	25	12	1,080,000
	360	1	20	25	12	2,160,000
International call	450	3	1	25	12	405,000
Total						3,765,000

③ Fuel cost of generator……..... 4,440,000 Ush/year

Power failures occur in Mubende four times a month, each lasting about 5 hours on average by the result of hearing at the site. On this assumption, the fuel cost is calculated as 5 hours operation.
The project plans a 50 kVA power generator.

・Price structure

Generator fuel consumption	10	Litres/h
Fuel unit price	1850	Ush/Litres

・Fuel cost

	Cost (Ush)	Consumption (litres)	Used hour (h)	Day	Month	Annual consumption (litres)	Total (Ush)
Generator fuel Consumption	1850	10	5	4	12	2,400	4,440,000
Total							4,440,000

④ Water charge ……..... 14,863,000 Ush/year

The consumption of water from the city waterworks by the project facilities is as follows.

Table 2-63 Presumed Waterworks Water Consumption

	Water supply per day (m^3/day)
Newly installed facilities	35
Total	35

・Price structure

Meter rate (average) 1,767 Ush/m^3

Minimum rate 2,000 Ush/month

・Water charge

	Charge (Ush)	Water supply	Day	Month	Rate of city water consumption	Total
Newly installed facility						
Minimum rate	2,000	—	—	12	1	24,000
Meter rate	1,767	35	25	12	0.8	14,839,440
Total						14,863,440

⑤ Oxygen charge ..... 1,382,000 Ush/year

Oxygen is used in the theatres, recovery rooms, etc., and its consumption is presumed as follows.

Table 2-64 Oxygen Consumption

Facility	Use	Consumption per day (cylinders/day)
Newly built facility	Theatre, etc.	12
Total		12

・Price structure

O_2 price 12,000 Ush/cylinder (1600L type)

・Oxygen charge

	Charge (Ush)	Consumption (cylinders)	Month	Annual Consumption (cylinders)	Load factor	Total (Ush)
O_2 charge	12,000	12	12	144	0.8	1,382,400
Total						1,382,400

⑥ Building maintenance cost ..... 13,338,000 Ush/year

The buildings of this project adopt exterior and interior finishing materials that are relatively easy to maintain. For this reason, the building maintenance cost required for exterior and interior finishing, electric facilities, water supply and drainage, purchase of replacement parts and spare parts for air conditioning facilities is presumed 1/3 to 1/2 of Japan's similar cases'. The building maintenance cost is necessary from the second year and onward.

・Price structure

3,000 Ush/m^2/year

・Building maintenance cost

	Cost (Ush)	Area (m^2)	Day	Month	Load factor	Total
Building maintenance cost	3000	4,446	—	—	1.0	13,338,000
Total						13,338,000

⑦ Replacement part (filter replacement)…… ..... 4,320,000 Ush/year

A medium-performance filter is installed in the theatre. Also, a pre-filter is installed on each air conditioner.

The frequencies of filter replacements are presumed as shown below. The pre-filter is of regenerative type and replacement cost is presumed not necessary.

・Price structure

Pre-filter	About twice/month	Cleaning
Medium-performance filter	About twice /year	(1,080,000 Ush/piece) (Replacement to be supposed once a year in the first year)

・Filter replacement cost

	Cost (Ush)	Number	Frequency	Total (Ush)
Newly installed facility Medium performance filter	1,080,000	2	2	4,320,000
Total				4,320,000

⑧ Equipment maintenance cost ..... 55,242,000 Ush/year

Equipment plan is conceived to satisfy needs of medical services mainly by equipment procurement and supplementation of equipment with insufficient numbers. The project scale is limited to such range of equipment as Ministry of Health and Mubende RRH can maintain properly.

Therefore, the hospital needs to secure budget to cover maintenance cost for newly procured equipment. The project implementation will cost the hospital 55,242,000 Ush/year as maintenance fee and the breakdown is shown as follows..

Cost	Mubende RRH
Consumables	¥2,195,000
Spare parts	¥511,000
Total	¥2,706,000 （55,242,000 Ush）

Exchange rate：1Ush=0.049Yen

The breakdown of consumable items and spare parts cost is shown as the following tables.

Table 2-65 Equipment that need consumable items

No	Equipment name	Qty	Consumable item	Unit price(x¥1000)	Cost (x¥1000)	Equiv. Ush (x1000)
1	Suction unit	10	Catheter	198	1,980	
2	Infant warmer	1	Probe cover	99	99	
3	Water distiller	1	Cartridge	62	62	
4	Dental X-ray unit	9	X-ray film	6	54	
	Sub-total				2,195	108

Table 2-66 Equipment that need spare parts

No	Equipment name	Qty	Spare parts	Unit price(x¥1000)	Cost (x¥1000)	Equiv. Ush (x1000)
1	Water distiller	1	Heater	16	16	
2	Operating light, ceiling	2	Bulb	53	106	
3	Operating light, stand	3	Bulb	29	87	
4	Examination light	9	Bulb	8	72	
5	Infant warmer	1	Probe	18	18	
6	Pulse oxymeter	2	Probe	64	128	
7	Autoclave	2	Gasket	13	26	
		2	Heater element	29	58	
	Sub-total				511	25

(2) Financial situation

The management costs of all public hospitals are met by the MOFPED (Ministry of Finance Planning and economic development), excluding fees received from private patients. Principally, patients receive clinical services for free. It is documented to show by the guideline of Department of Health that each hospital should allocate 5% of the total management expenses to the maintenance of facilities and medical equipment.

Table 2-67 Annual health budget of the government（2003～2008）

Unit：Billion Ush

Year	2003/2004	2004/2005	2005/2006	2006/2007	2007/2008
National budget in Uganda	2,306.51	2,445.81	2,695.31	3,067.98	3,553.71
Health budget	218.84	236.91	241.87	242.63	277.36
Health budget increase/previous year(%)		8.25%	2.09%	0.31%	14.31%
Health budget/National budget	9.49%	9.69%	8.97%	7.91%	7.80%
Health budget from donors	156.22	195.11	268.38	139.22	150.90

Source：Preparatory research report
*1：not include the budget from donors in national budget and health budget
*2：Accounting period: beginning from July to June

The above table shows the national budget and health budgets of Uganda in the past five years. The proportion of health budget among national budget has been decreasing in this period. However, health budget amount has continued to increase. Particularly, the increase between 2006/2007 and 2007/2008 was 14.31% and the health budget amounted to 277 billion Ush in 2007/2008, from which the management expenses for both Masaka RRH and Mubende RRH was allocated. Therefore, the financial aspect of the health budget in Uganda is sound and budgets for target hospitals are secured.

The following tables show the breakdown of the budget and actual expenditure of both hospitals in the past three years.

Table 2-68 Budget and expenditures in Masaka RRH

Unit：Ush

Year		2005/2006	2006/2007	2007/2008
Total hospital budget		2,503,171,000	2,312,845,000	2,433,948,100
Total hospital expenditure		2,020,384,155	2,104,245,739	2,538,127,293
Break down	Human resources cost	1,179,938,690	1,316,473,434	1,448,041,066
	Maintenance cost	252,133,640	236,331,692	327,025,868
	Others	588,311,825	551,440,613	763,060,359

Source ：Preparatory research report

The budget of Mubende RRH, as well as Masaka RRH, is covered by the subsidy from the Ministry of Finance.

Table 2-69 Budget and expenditures in Mubende RRH

Unit：Ush

Year		2005/2006	2006/2007	2007/2008
Total hospital budget		1,072,224,803	1,074,028,646	1,160,908,562
Total hospital expenditure		1,072,224,803	1,074,028,646	1,160,908,562
Break down	Human resources cost*2	698,601,900	700,036,452	777,000,000
	Maintenance cost	113,518,400	113,518,400	113,878,400
	Others	260,104,503	260,473,794	270,030,162

Source：Preparatory research report

In Masaka RRH, the hospital budget is received directly from MOH because of its RRH status from its inception. In Mubende RRH, which was upgraded from GH in July, 2009, the current budget source has been its belonging district health bureau but the budget will soon be expected to receive directly from MOH just the same as Masaka RRH. So it is highly foreseeable for the budget securement.

(3) Financial position and maintenance cost

In order to conduct this project in the target hospitals, the following budget measures in respect of the increase in maintenance cost should be taken.

①The annual budget of Makasa RRH (Year:2007/2008) is approximately 2,434 million Ush. The maintenance cost of implemented facilities of the Project is estimated at about 252 million Ush. The present budget for existing facilities to be replaced is estimated to be approximately 131 million Ush. and the actual increase will be 121million Ush., which accounts for approximately 5% of the total hospital budget.

②The annual budget of Mubende RRH (Year:2007/2008) is approximately 1,160 million Ush. The maintenance cost of implemented facilities of the Project is estimated at about 215 million Ush. The present budget for existing facilities to be replaced is estimated to be approximately 68 million Ush. and the actual increase will be 147 million Ush., which accounts for approximately 13% of the total hospital budget.. And human resource cost is expected to increase by another approximate 109million Ush.

The Ministry of Health will conduct the following budget measures in order to cover the above incremental maintenance costs.

- In Masaka RRH, a part of the medical service fee (annual fee: about 300million Ush) will be allocated.
- In Mubende RRH, an additional budget measure will be taken due to its upgrade to RRH. An average budget amount (including human resource cost) among 13 RRH in 2008/2009 is about 2,200million Ush, which accounts for almost double the amount of the current budget of Mubende RRH. Therefore, it is secured that the hospital budget is to increase to the level of other RRH in the near future.

The operation and maintenance cost after implementing this project will be secured by the above measures.

2-6 Other Relevant Issues

1) It is important that the constructions borne by the Uganda side be implemented in line with the main construction schedule.

   ① Prior to the commencement of construction under the Project, the content and state of progress of the construction implemented by the Uganda side, e.g. the removal of existing buildings and shifting of utilities in site areas, should be periodically checked.

   ② A construction plan which will not obstruct the daily operations of the hospital in the existing facilities should be formulated.

   ③ Checks should be made to ensure that the required utensils, furniture, and equipment to be purchased by the Uganda side are brought in immediately after the completion of the main construction and that the activities envisioned for the facilities are implemented in full after the delivery of the building.

2) It should be checked that the Uganda side has secured the necessary budget to effectively use the facility and equipment without hindrance upon completion of the Project.

Chapter 3 Project Evaluation and Recommendations

CHAPTER 3. PROJECT EVALUATION AND RECOMMENDATIONS

3-1 Project Effect

The following Benefits are projected after completion of the Project

Table 3-1 Project Effect

Present condition & problems	Measures by the Project	Direct Benefits & Level of improvement	In-direct Benefits & Improvement
Obsolescence & deterioration of facilities and equipment at the target secondary hospitals resulting in poor quality and lack of sufficient medical services	・consolidation & equipment supplement of OPD & diagnosis dept. (Masaka RHH, Mubende RHH) ・Improvement of Casualty functions and equipment (Masaka RHH, Mubende RHH) ・provision of Maternity dept. and Male wards (Mubende RRH)	・Annual operation Nos. will increase from present 2,491 cases/year (Masaka RHH), 1,213cases/year (Mubende RHH) ・Annual OPD patients will increase from present 252,969 persons/year (Masaka RHH) & 83,620 persons/year (Mubende RHH) ・Annual delivery nos. will increase from present 2,021 cases/year (Mubende RHH) ・Annual in-patient nos. will increase from present 8,064 cases/year (Mubende RHH)	・Secondary level medical services are provided at referral hospitals ・improvement of medical services for 2.55million people ・improvement of healthcare indices of Uganda

Detailed descriptions are noted below.

(1) Expected Direct

It is expected that the project will produce the following direct effect:

Masaka Regional Referral Hospital

- Improvement of Medical Service Function by Consolidating the Outpatient Medical Treatment Function and Central Medical Treatment Function

  The outpatient medical treatment function and the central medical treatment function are obsolete and are currently distributed throughout the premises of the hospital. By consolidating these functions into the medical treatment building to be newly built, efficiency and service functions are expected to improve.

  As an indices of the above improvement, number of operations and the number of outpatients will be increased (2,491 operations/year] and 252,969 outpatients/year respectively for 2007/2008).

Mubende Regional Referral Hospital

- Improvement of Medical Service Function by Consolidating Outpatient Medical Treatment Function and Central Medical Treatment Function

  The outpatient medical treatment function and the central medical treatment function are obsolete and are currently dispersed throughout the premises of the hospital. By consolidating these functions and the specialized outpatient medical treatment function required for a regional referral hospital into the medical treatment building to be newly built, further improvement of efficiency and service functions are expected.

  By adjusting the hospital to the appropriate scale in relation to the number of workers and patients, indices such as the number of operations, the number of outpatients, and the number of deliveries will be increased, which are respectively 2,021 [deliveries/year], 1,213 [operations/year], and 83,620 [outpatients/year] for 2007/2008. The number of inpatients at 8,064 [inpatients/year] will also be increased because the male ward of the hospital will be improved.

- Improvement of the Emergency Medical Treatment Function

  Mubende Regional Referral Hospital provides emergency medical services in a part of the surgery ward and the medical service capacity of the casualty department is insufficient. The casualty department will be placed adjacent to the new surgery department to be built and also have an excellent relationship with the operation theatres. When it is completed under the Project, it will be possible to provide an immediate and efficient medical services for emergency patients in serious condition and the number of emergency patients at the hospital is expected to increase

- Improvement of Secondary Medical Services Provided in Mubende Regional Referral Hospital

  The Mubende Regional Referral Hospital was promoted from a general hospital to a regional referral hospital in July 2009. The necessary function as a secondary medical service facility will be enriched by enhancing functions such as specialized outpatient medical treatment departments (the ophthalmology and otolaryngology departments) which a regional referral hospital should have.

Masaka Regional Referral Hospital and Mubende Regional Referral Hospital

- Enhanced Maintenance of Medical Equipment and Material

  The following points will be improved by technical guidance under the soft component scheme.

  * The maintenance and management system will be enhanced to implement regular scheduled maintenance and management activities will be arranged at target hospitals.

  * The abilities of the medical personnel handling the equipment and the material in the counterpart hospital will be improved.

(2) Expected indirect effects

It is expected that this project will produce the following indirect effect.

- Improvement of Secondary Medical Services as a Referral Hospital

  Masaka Regional Referral Hospital was originally positioned as a referral hospital which accepted patients from the general hospitals in the vicinity. However, because its facility and equipment were insufficient, patients originally accepted by the Masaka Regional Referral Hospital were directly transported to higher-rated hospitals in Kampala. In the future, Masaka Regional Referral Hospital will again be able to provide proper secondary medical services for its catchment area as a referral hospital through the implementation of the Project.

  Mubende Regional Referral Hospital was promoted from a general hospital to a regional referral hospital and the functions necessary for a regional referral hospital will be arranged by the Project. Therefore, it will be possible for the hospital to provide proper secondary medical services as a referral hospital for the target population distributed over a wide area.

- Improvement of medical services for approximately 2.55million people in the catchment area

  Masaka RHH and Mubende RHH will provide improved medical services for the approximate 2.55 million beneficiaries of the catchment area requiring secondary medical services beyond their respective districts.

- Improvement of Healthcare indices of Uganda

  The provision of appropriately scaled hospital facilities for the Central Region will promote the improvement of healthcare indices such as infant and maternal mortality of Uganda.

(3) Formulation of Indices of Outcomes

The indices of outcomes indicating the achievement of the goals of the Project are increases in the following values in each of the counterpart hospitals:

Masaka Regional Referral Hospital

1) Increase in the Number of Operations (2,491 operations/2007/2008)

   Though this hospital currently has only one obsolete operation room, the number of operation rooms will be increased to three and the necessary equipment will be installed after the completion of the facility. In particular, a C-shaped-armed X-ray apparatus necessary for orthopedics operations will be procured, allowing the hospital to accept the patients for which operations could not performed to date. By virtue of these items, the number of operations will be increased.

2) Increase in the Number of Outpatients (252,969 outpatients/2007/2008)

   Currently, there are only three consultation rooms for outpatients in the obsolete outpatient building. However, upon completion of the facility, a consultation room, a treatment and disposition room, and the necessary equipment for each of the four main departments will be arranged, hence the number of outpatients will be increased.

Mubende Regional Referral Hospital

3) Increase in the Number of Operations (1,213 operations/2007/2008)

   Currently, there is only one obsolete operation room in the hospital. However, upon completion of the facility, there will be two operation rooms and the necessary equipment will also be arranged. Thereby, the number of operations will be increased.

4) Increase in the Number of Outpatients (83,620 outpatients/2007/2008)

Currently, there are only three consultation rooms for outpatients. However, upon completion of the facility, a consultation room, a treatment and disposition room, and the necessary equipment for each of the four main departments will be arranged. In addition, each of the ophthalmology and otolaryngology departments, which have had no dedicated rooms to date, will be improved, hence the number of outpatients will be increased.

Furthermore, an independent emergency department will be arranged and emergency patients will be able to receive dedicated medical services. Due to the increase in emergency patients, the number of outpatients for the entire hospital (including emergency patients) will be increased.

5) Increase in Women Who Deliver (2,021 deliveries/2007/2008)

The obsolete obstetrics department will have the proper number of labor pain and recovery rooms corresponding to the number of its workers and patients (increased from 20 to 30 beds), hence the number of deliveries at the hospital will increase.

6) Increase in Inpatients (2,021 inpatients/2007/2008)

A building, which was built as a dormitory for family members of patients and which is located deep in the premises, is temporarily used as the existing gentlemen's ward (internal medicine). The number of beds there will be increased from the current 12 to 37 beds. The dentistry department and the emergency department, which have provided their medical services in part of each of several wards to date, will be relocated to the new building, thereby freeing up vacant rooms for patients' bedrooms. By virtue of these items, an increase in the number of inpatients is expected.

3-2 Recommendations

3-2-1 Issues and recommendations that should be addressed by the Solomon Side

In order to facilitate the smooth and effective operation of the two regional referral hospitals which will be improved by the Project and thus to allow the above direct and indirect effects to be realized, the following items must additionally be arranged and improved.

(1) Arrangements must be made for the sustained use of the facility and equipment in good condition by securing the required budget for their proper operation and maintenance, and providing sufficient training for the medical staff members for the facilities which will be newly constructed under the cooperation project,.

(2) By securing a budget to cover the cost of the repair and maintenance of the medical equipment, sudden equipment failures can be quickly remedied, thereby minimizing any degradation in the medical services. Furthermore, in order to cope smoothly with equipment expected to reach the end of their service life in the future, it is necessary to plan for a reserve fund to purchase new equipment.

(3) In order for the sustainable development of the hospitals based on sound management to be realized, it is important to formulate proper financial and budgetary plans and always maintain good knowledge of the financial situation and to reflect the results thereof in the operations of the hospitals for further improvement.

(4) Technical guidance under the soft component system are planned to improve the maintenance system of the hospitals. Therefore, in addition to the maintenance staff members in charge of the medical equipment at the two hospitals, the relevant personnel in the maintenance department of the Ministry of Healthcare must also be scheduled to attend training courses during the technical guidance period. The selection of lecturers to provide technical guidance is also a key point.

3-2-2 Technical Cooperation and Coordination with Other Donors

Assistance from other donors, now under implementation or projected, are the equipment procurement program by ORET and the World Bank project to improve the General Hospitals.

Under the ORET equipment procurement program, equipment is planned to be procured for 10 RHH, including both Masaka and Mubende RHH, 29 GH and 62 Health Centres IV during the period from 2002 to 2010. the equipment are the X ray devices and ultrasonic devices which have been deleted from the present Project. Masaka RHH has already received the equipment. Mubende RHH will receive its equipment in the future, but the X-Ray examination room will be housed in an existing building and there is no duplication.
The World Bank plans to implement renewal and improvement of facility and equipment at a maximum 20 general hospital sites after 2011. since the program was decided when Mubende was still a general hospital, it is also included in the program. However, the planned facilities are the staff housing and ward buildings which are not part of the present Project.
Both projects attempt to realize targets of sector policies and strategies and therefore are in accordance with the policies of the countries involved in the Project for Improvement of Regional Medical Services in the Central Region of Uganda. Neither project by the other donors overlaps the scope of present Project and there are no duplications.

Appendices

1. Member List of the Survey Team

Preparatory Survey (March 2 to April 2, 2009)

No.	Name	Assignment title	Organization
1	Mr. Yuki ARATSU	Leader	Human Development Department, Japan International Cooperation Agency
2	Dr. Takahisa ASAKA	Technical Advisor	Expert Service Division , Bureau of International Cooperation, International Medical Center of Japan, Ministry of Health , Labor &Welfare
3	Ms. Aimi SHIMIZU	Project Coordinator	Health Human Resources Division Human Development Department, Japan International Cooperation Agency
4	Mr. Masahiro IKAWA	Project Manager & Architectural Planner	Nihon Sekkei, Inc.
5	Mr. Naoki TOMINAGA	Architectural & Facilities Designer	Nihon Sekkei, Inc.
6	Mr. Ryoji HARADA	Equipment Planner & Procurement	EARL Consultants, Inc
7	Mr. Takamasa HIROBE	Equipment Planner II	EARL Consultants, Inc.
8	Mr. Akio MATSUOKA	Construction & Cost Planner	Nihon Sekkei, Inc.
9	Ms Akiko OJI	Assistant Architectural Planner	Nihon Sekkei, Inc.
10	Mr. Hideo KOBAYASHI	Assistant Structural Engineer	Nihon Sekkei, Inc.
11	Mr. Nobuyuki SOMEKAWA	Assistant Building Systems Engineer	Nihon Sekkei, Inc.

Explanation on Draft Report (August 15 to August 28 2009)

No.	Name	Assignment title	Organization
1	Mr. Hideya KOBAYASHI	Leader	Japan International Cooperation Agency
2	Mr. Ryuji TAKEDA	Project Coordinator	Japan International Cooperation Agency
3	Mr. Masahiro IKAWA	Project Manager & Architectural Planner	Nihon Sekkei, Inc.
4	Mr. Ryoji HARADA	Equipment Planner	EARL Consultants, Inc.
5	Ms Akiko OJI	Assistant Architectural Planner	Nihon Sekkei, Inc.

2. Study Schedule

Preparatory Survey (March 2 to April 2, 2009)

	Team Member / Date	Member			Consultant Member							
		Leader	Technical Adviser	Plan Management	Project Manager & Architectural Planner	Equipment Planner 1/ Procurement & Cost Planner	Architectural & Facilities Planner	Architectural Planner (Assistant)	Facilities Planner (Assistant)	Structural Planner (Assistant)	Equipment Planner 2	Construction & Cost Planner
1	March 2 Mon				Narita → Bangkok							
2	3 Tue				→ Bangkok → Addis Ababa Addis Ababa → Entebbe						Narita → (Bangkok) →	
3	4 Wed				Pay a courtesy call on JICA Office & the Embassy Visit Ministry of Public Health、Explain inception report、Confirm inventory schedule						→(Addis Ababa) → Entebbe	
4	5 Thu				Pay a courtesy call and visit Entebbe GH Pay a courtesy call and visit Masaka RRH, investigate Mulago NRH (similar facility)						Same as left	
5	6 Fri		Haneda→Kansai Kansai→		Pay a courtesy call and visit Mityana GH Pay a courtesy call and visit Mubende GH					Narita → (Bangkok) →	Gombe,Nakaseke GH courtesy call /Visit	Narita → (Bangkok) →
6	7 Sat		→(Dubai)→ →Entebbe		Reconnoiter east area of Tororo GH (similar facility)					→(Addis Ababa) → Entebbe	Conference with DANYDA	→(Addis Ababa) → Entebbe
7	8 Sun		Kayunga,Kawolo GH Courtesy call /Visit		Intragroup conference、Organize materials	Kayunga,Kawolo GH Courtesy call /Visit	Intragroup conference、Organize materials				Kayunga,Kawolo GH Courtesy call /Visit	Intragroup conference、Organize materials
8	9 Mon		Nakaseke ,Entebbe GH courtesy call /Visit	investigation of other project in Uganda	investigate Entebbe GH investigate facilities	Nakaseke ,Entebbe GH courtesy call /Visit	investigate Entebbe GH investigate facilities				Nakaseke GH Equipment inspection	investigate Entebbe GH investigate facilities
9	10 Tue		Masaka RRH courtesy call /Visit		Conference with Masaka RRH		investigate Masaka RRH investigate facilities				Kawolo GH Equipment inspection	investigate Masaka RRH investigate facilities
10	11 Wed		Mityana GH、Mubende GH courtesy call /Visit		Conference with Mityana GH、Mubende GH		investigate Mubende GH investigate facilities				Kayunga GH Equipment inspection	investigate Mubende GH investigate facilities
11	12 Thu	Haneda→Kansai Kansai→	Gombe GH courtesy call /Visit		investigate Mityana GH investigate facilities	Gombe GH courtesy call /Visit	investigate Mityana GH investigate facilities				Gombe GH Equipment inspection	investigate Mityana GH investigate facilities
12	13 Fri	→Entebbe	Visit or Conference with Ministry of Public Health		Conference with Ministry of Public Health							
13	14 Sat	Intragroup conference,										
14	15 Sun	Organize materials								Entebbe → (Addis Ababa)		
15	16 Mon	Pay a courtesy call on JICA Office& the Embassy, Pay a courtesy call and visit Ministry of Public Health			investigate construction company					→(Bangkok)→	Hospital supplement investigation/Agent investigation	investigate construction company
16	17 Tue	Pay a courtesy call and visit Ministry of Public Health Conference with Ministry of Public Health (Meeting Minute)								→ Narita	Hospital supplement investigation/ Agent	investigate unit price
17	18 Wed	MD conference, Signing	Entebbe →		MD Conferenc, Signing						Hospital supplement investigation/Agent investigation	investigate market
18	19 Thu	Entebbe →	→(Dubai)→ (Kansai)→Haneda	Entebbe →	investigate Masaka RRH Requisition plan conference						Hospital supplement investigation/Agent investigation	investigate market
19	20 Fri	→(Dubai)→ (Kansai)→Haneda		→(Dubai)→ (Kansai)→Haneda	investigate Entebbe GH Requisition plan conference						Hospital supplement investigation/Agent investigation	investigate market
20	21 Sat				investigate Mubende GH Requisition plan conference						Hospital supplement investigation/Agent investigation	Collect chart of unit price investigation
21	22 Sun				Intragroup conference, Organize materials						Entebbe→ Nairobi	Intragroup conference、Organize materials
22	23 Mon				investigate Mityana GH Requisition plan conference						Agent investigation (Nairobi)	supplement investigation of procurement
23	24 Tue				Hospital supplement investigation						Agent investigation (Nairobi)	supplement investigation of procurement
24	25 Wed				Conference with Ministry of Public Health Plan of technical note						Agent investigation (Nairobi)	supplement investigation of procurement
25	26 Thu				Conference with Ministry of Public Health Plan of technical note		Entebbe → (Addis Ababa)	Conference with Ministry of Public Health Plan of technical note			Nairobi →	Entebbe → (Addis Ababa)
26	27 Fri				Conference with Ministry of Public Health Plan of technical note		→ (Bangkok)	Conference with Ministry of Public Health Plan of technical note			→ (Bangkok)	→ (Bangkok)
27	28 Sat				Conference with Ministry of Public Health Plan of technical note		→ Narita	Conference with Ministry of Public Health Plan of technical note			→ Narita	→ Narita
28	29 Sun				Intragroup conference, Organize materials			Intragroup conference, Organize materials				
29	30 Mon				Signing thechnical memorandum			Signing thechnical memorandum				
30	31 Tue				JICA Office・Report the Embassy Entebbe → (Addis Ababa)			JICA Office・Report the Embassy Entebbe → (Addis Ababa)				
31	April 1 Wed				→ (Bangkok) →			→ (Bangkok) →				
32	2 Thu				→ Narita			→ Narita				

Explanation on Draft Report (August 15 to August 28 2009)

Team Member / Date		Member		Consultant Menber		
		Leader	Plan Management	Project Manager & Architectural Planner	Equipment Planner 1/ Procurement & Cost Planner	Architectural Planner (Assistant)
1	August 15 Sat	Narita →				
2	16 Sun	→ Entebbe				
3	17 Mon	Courtesy call on JICA Office and Ministry of Health Visit Ministry of Health, Explain DBD amd Draft of MM				
4	18 Tue	Investigate the Site (Masaka RRH)				
5	19 Wed	Investigate the Site (Mubende GH)				
6	20 Thu	Conference with Ministry of Health (Minutes of Discussion)				
7	21 Fri	Conference with Ministry of Health (Minutes of Discussion) , Signing Report to JICA Office and the Embassy				
8	22 Sat	investigate the facilities in Eastern Region		Intragroup conference, Organize materials		
9	23 Sun	Entebbe →		Intragroup conference, Organize materials		
10	24 Mon	→(Dubai)→(Kansai)→Haneda		Conference with Ministry of Health		
11	25 Tue			Conference with Ministry of Health		
12	26 Wed			Additional Investigate Market		
13	27 Thu			Entebbe →		
14	28 Fri			Narita		

3. List of Parties Concerned in the Recipient Countries

Ugand Side

1-1 Ministry of Health

Dr.Sam Zaramba	Director General of Health Services
Dr. Kenya-Mugisha Nathan	Director Health Services (Clinical & Community) - MOH
Dr. Amandua Jacinto	Commissioner, Clinical Services
Eng. S.S.B. Wanda	Assistant commissioner (Infrastructure) -Health Infrastructure, Clinical Services
Eng. John Tumwesigye	Senior Engineer (mechanical) -Health Infrastructure, Clinical Services
Eng. Sitra Mulepo C.S	Senior Engineer (mechanical) -Health Infrastructure, Clinical Services
Eng. Paul Kaliba	Engineer (Civil) -Health Infrastructure, Clinical Services
Mega O M	Assistant Commisionaer Health service (Pharmacy)
Dr. Jackson Amone	ACHS(IC)
Ehtaku R	P.E (RR J)

1-2 Masaka RRH

Dr. Tugumisirize Florence	Medical Superintendent
Dr. Asuman Lukwago	Acting Medical Superintendent
Dr. Nuwamanya David	Principal Hospital Administrator
Dr. Stuart Musisi	District Health Officer
Dr. Albert Kamugisha	Medical Officer Special Grade
Dr. Musiitwa Hj	Senior Consultant Surgeon
Dr. Stephen Ssebaggala	Consultant Surgeon
Dr. Kasiisi Bealug	Senior Surgeon
Ms. Apalo Anne Olaro	Senior Principal Nursing Officer
Basiima Anng	Principal Ophtalmic Clinical Officer
Mr.Kakoraho Julius	Accountant
Zikusoka Fredrick	Smco I/C Cos
Olum Williamps	Senior Pharmacist
Perwanja Klinnie	Pharmacist
Orapa Austin Aszn	Engineering Technician

1-3 Mubende GH

Dr. Aggrey Ngobi	Medical Superintendent

1-4 Mityana GH

Dr. Isaac Kadowa	Medical Superintendent

1-5 Entebbe GH

Dr. Moses Muwanga	Medical Superintendent

1-6 Mubende District Office

Dr. Wilson Mubiru	District Health Officer – Mubende District

1-7 Nakaseke Hospital

Dr. Emmannel J. Mukuny	Medical Superintendent
Mr. Semakula David	Senior Hospital Administrator

1-8 Kalalo Hospital

Dr. Kamya David Ivan	Medical Superintendent
Dr. Kiberu Joshua	Senior Medical Officer

1-9 Kayunga Hospital

Dr. Kamya David Ivan	Medical Superintendent
Dr. Matovu Ahmed	Medical Superintendent
Dr. Kiberu Joshua	Senior Medical Officer
Ms. Nabusinba Harriet	Anesthetic Officer
Mr. Kabonge Henry	Threatre Assistant

1-10 Gombe Hospital

Dr. Lule Haruna	Medical Superientendent

Japan Side

2-1 Embassy of Japan

Mr. Keiichi Kato	Ambassador
Mr. Masaki Shiga	Councillor
Ms. Kotoha Itakura	Third Secretary

2-2 JICA Uganda Office

Mr. Tetsuo Seki	Resident Representative
Mr. Shintaro Takano	Deputy Resident Representative
Ms. Miyoko Inoue	Deputy Resident Representative
Ms. Mizuho Sugibayashi	Project Formulation Advisor
Ms. Akiko Niwa	JICA Expert

The World Bank /Africa Human Development Department

Mr.Peter Okwero	Senior Health Specialist
Mr.Dominic S haazen	Lead Health Policy Specialist
Ph.D.Gyle H martin	Senior Economist (Health)

4. MINUTES OF DISCUSSION

MINUTES OF DISCUSSIONS
PREPARATORY SURVEY (BASIC DESIGN)
ON THE PROJECT FOR THE REHABILITATION OF HOSPITALS
AND SUPPLY OF MEDICAL EQUIPMENT
IN THE CENTRAL REGION IN UGANDA

Based on the results of the Preparatory Survey (Preliminary Study), the Government of Japan decided to conduct a Preparatory Survey (Basic Design) on the Project for the Rehabilitation of Hospitals and Supply of Medical Equipment in the Central Region in Uganda (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to Uganda the Preparatory Survey (Basic Design) Team (hereinafter referred to as "the Team") headed by Mr. Yuki Aratsu, Senior Adviser to the Director General, Economic Infrastructure Department, JICA, to stay in the country from March 3 to March 31, 2009.

The Team held discussions with the officials concerned of the Government of the Republic of Uganda and conducted a field survey.

In the course of discussions and field survey, both sides have confirmed the main items described on the attached sheets. The Team will proceed to further study and prepare the Preparatory Survey (Basic Design) Report.

Kampala, March 19, 2009

Mr. Yuki Aratsu
Leader
Preparatory Survey Team
Japan International Cooperation Agency

Dr. Sam Zaramba
Acting Permanent Secretary/
Director General of Health Services
Ministry of Health
Government of the Republic of Uganda

ATTACHMENT

1. Objective of the Project

The objective of the Project is to improve the health care service delivery system in the Central Region in Uganda, through construction of selected facilities and procurement of the necessary medical equipment.

2. Project Sites

Both sides agreed to proceed with further survey on the facilities and equipment of Masaka and Mubende Hospitals as the first priority, and those of Mityana Hospital as the second priority, considering the scale of the Project. The sites of the hospitals are shown in Annex-1.

3. Responsible and Implementing Agency

3-1. The Responsible Agency is the Ministry of Health, the Government of Uganda.

3-2. The Implementing Agency is the Health Infrastructure Division, the Department of Clinical Services, the Ministry of Health, the Government of Uganda.

4. Project Items

The items finally agreed upon between the Government of the Republic of Uganda and the Team are shown in Annex-2 and Annex-3. JICA will assess the appropriateness of the items and make recommendations to the Government of Japan for approval.

5. Japan's Grant Aid Scheme

The Uganda side understands the Japan's Grant Aid Scheme and the necessary measures to be taken by the Government of Republic of Uganda as explained by the Team and described in Annex-4 and Annex-5.

6. Schedule of the Survey

6-1. The consultants will proceed to carry out further studies in Uganda until March 31, 2009.

6-2. JICA will prepare the draft report in English and dispatch the draft report explanation mission to Uganda in July 2009.

6-3. In case that the contents of the report are accepted in principle by the Government of the Republic of Uganda, JICA will complete the final Preparatory Survey (Basic Design) report and send it to the Government of the Republic of Uganda around October 2009.

7. Other Relevant Issues

7-1. Adequate Budgets

(1) The Uganda side explained that the Ministry of Health is planning to upgrade Mubende Hospital to a Regional Referral Hospital from July 1, 2009.

(2) The Uganda side has agreed to secure and allocate enough funds to implement the Project, and operate and maintain the constructed facilities and procured equipment by

the Project properly and effectively.

7-2. Staff Recruitment and Capacity Development

The Uganda side has agreed to undertake staff recruitment and capacity development towards the effective use of the constructed facilities and procured equipment by the Project.

7-3. Effective Use of Medical Equipment

(1) The Team pointed out that the following items, which had been procured as the components of the previous Grant Aid, are not effectively utilized, due to inadequate training of users and technicians.

1) Anesthesia Apparatus
2) Incubator
3) Colorimeter

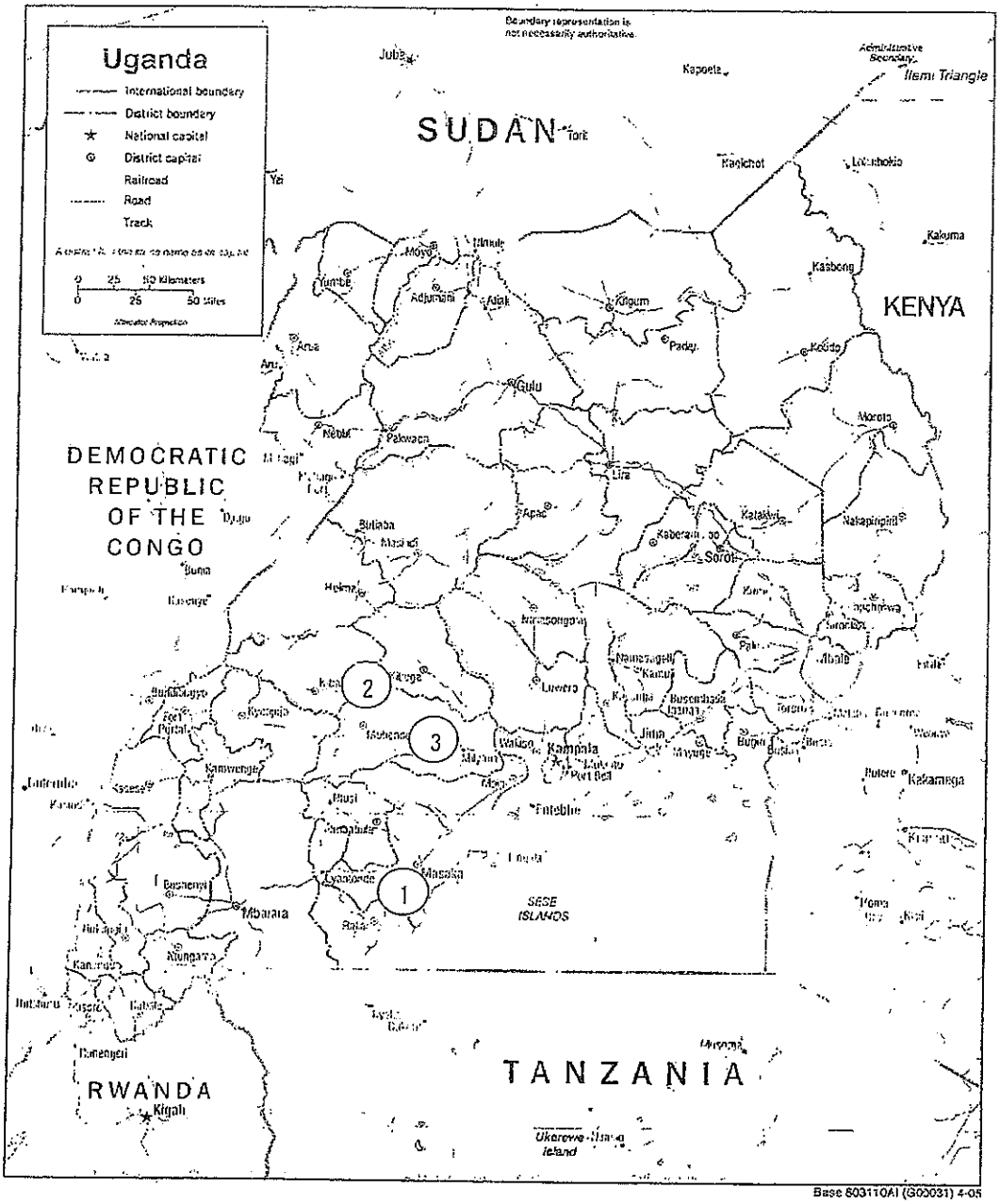
(2) The Uganda side has agreed to vitalize the utilization of this equipment by providing the concerned staff with appropriate training.

7-4. Consultant Services

The Uganda side requested for training of the equipment users and technicians be part of the consultant services for effective operation and maintenance of equipment, which require higher-level skills on operation and maintenance, as one of the components of the Grant Aid.

Annex-1: Sites Map
Annex-2: Project Facilities
Annex-3: Project Equipment
Annex-4: Japan's Grant Aid Scheme
Annex-5: Major Undertakings by Recipient Side

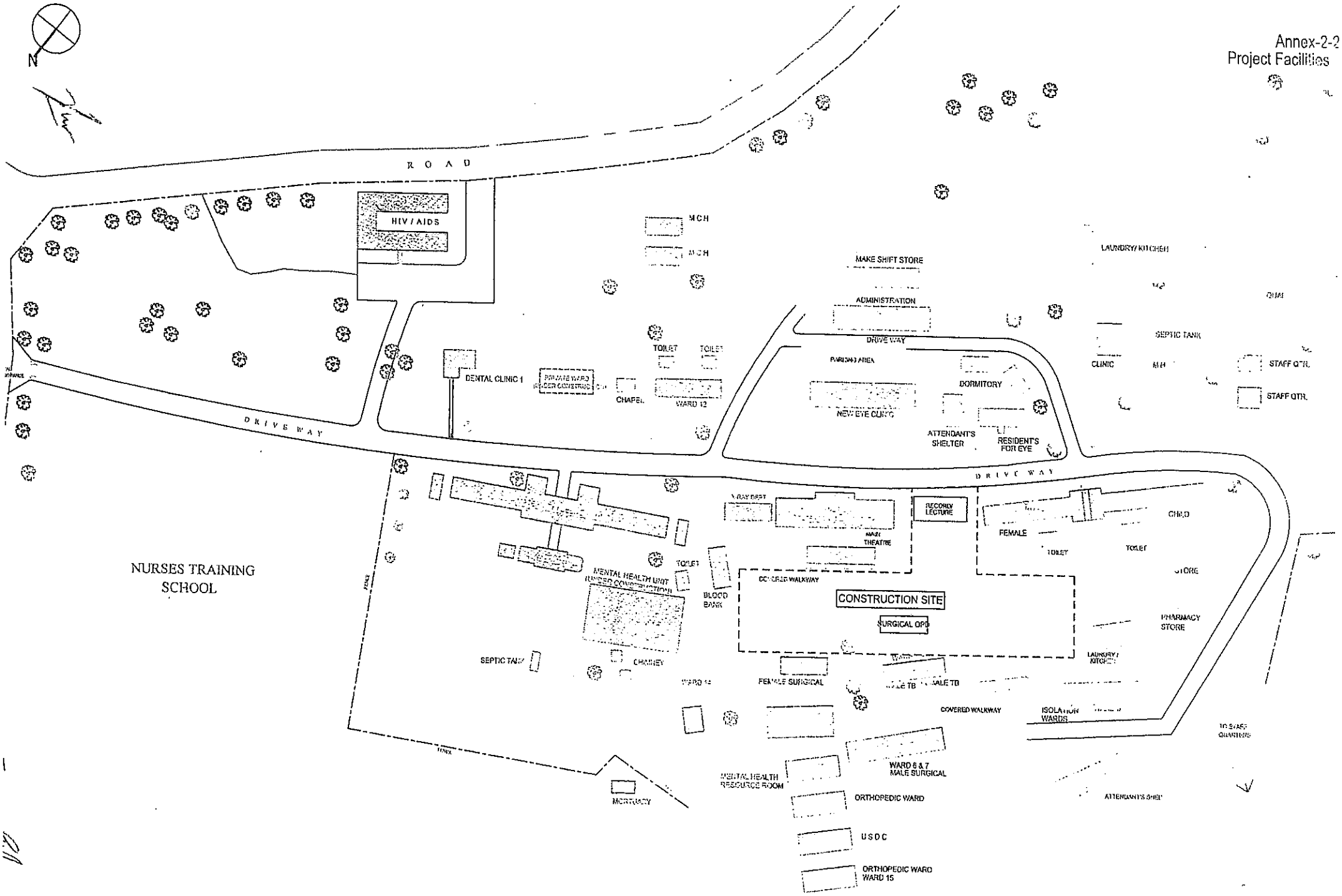
Project Sites Map



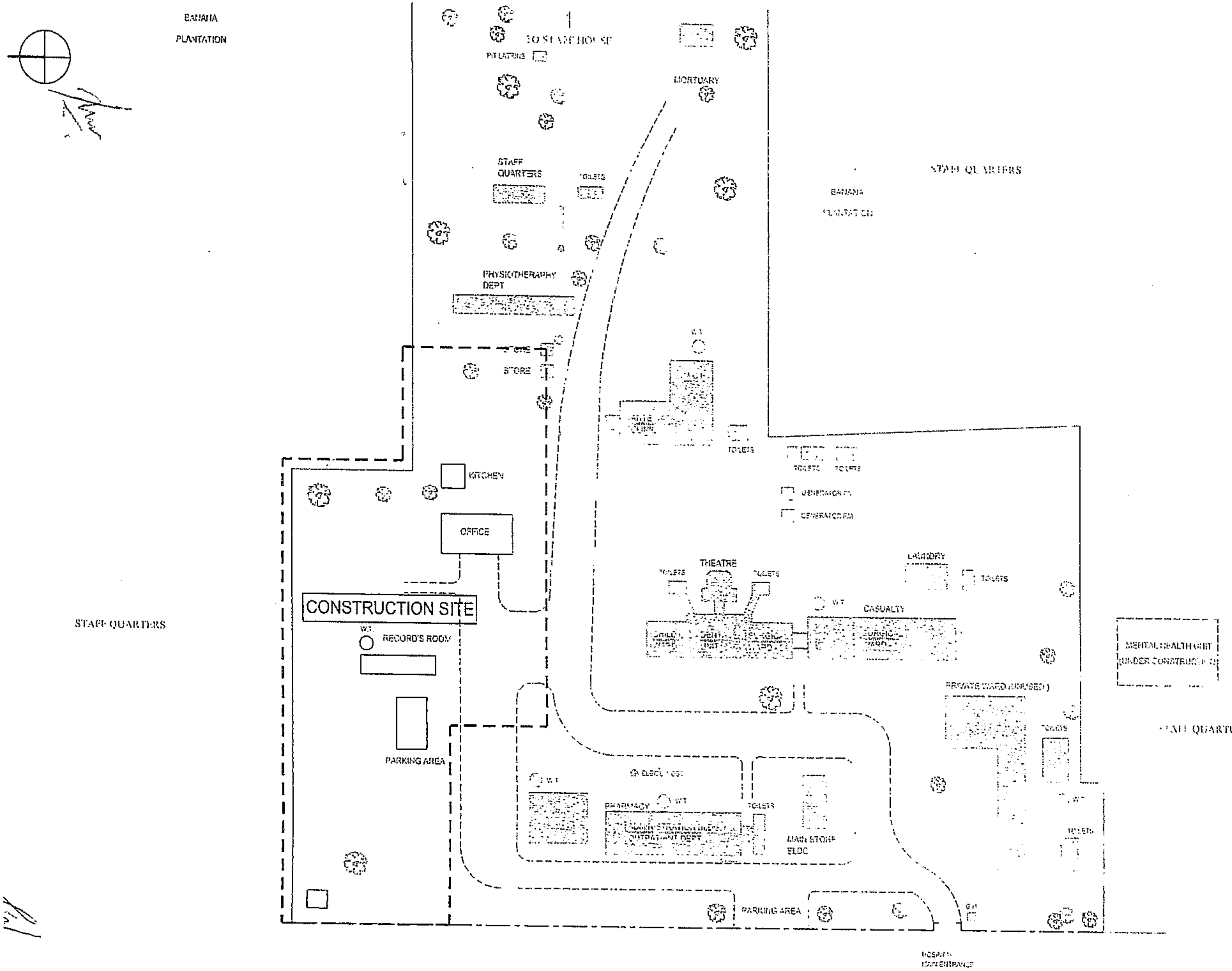
No.	District	Health Facility
1	Masaka	Masaka Regional Hospital
2	Mubende	Mubende Hospital
3	Mityana	Mityana Hospital

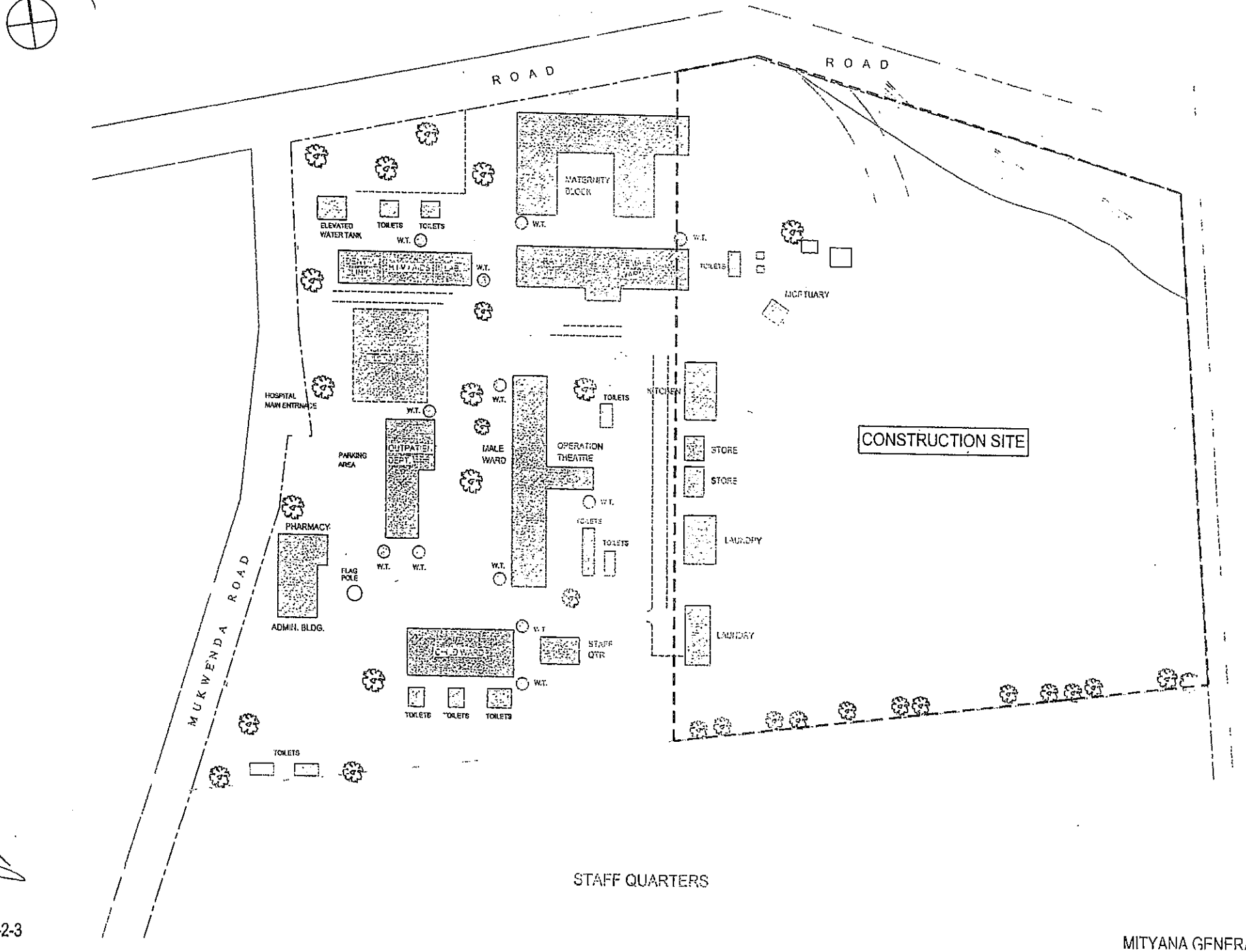
Project Facilities

Health Facility	Department	Priority
Masaka Regional Referral Hospital	・OPD with Casualty Unit ・Laboratory ・Operation theatre inc.Sterilization Dpt. ・Dental ・Generator ・Sewage and Water Supply System	1st Priority
Mubende General Hospital	・OPD with Casualty Unit ・Laboratory ・Operation theatre with Sterilization Dpt. ・Dental ・Maternity Unit with delivery suites ・Male Ward ・Generator ・Sewage and Water Supply System	1st Priority
Mityana General Hospital	・OPD with Casualty Unit ・Laboratory ・Operation theatre with Sterilization Dpt. ・Dental ・Generator ・Sewage and Water Supply System	2nd Priority



MASAKA REGIONAL REFERRAL HOSPITAL
SITE PLAN S=1:1500


BANANA
PLANTATION
MORTUARY
STAFF
QUARTERS
PHYSIOTHERAPHY
DEPT
STORE
KITCHEN
OFFICE
CONSTRUCTION SITE
STAFF QUARTERS
RECORD'S ROOM
PARKING AREA
THEATRE
LAUNDRY
CASUALTY
PRIVATE WARD
PHARMACY
OUTPATIENT DEPT
MAIN STORE
BLDC
PARKING AREA
STAFF QUARTERS
BANANA
MENTAL HEALTH UNIT
(UNDER CONSTRUCTION)


N
ROAD
ROAD
MATERNITY BLOCK
ELEVATED WATER TANK
TOILETS
TOILETS
W.T.
W.T.
W.T.
W.T.
TOILETS
MORTUARY
HOSPITAL MAIN ENTRANCE
W.T.
W.T.
TOILETS
KITCHEN
PARKING AREA
OUTPATIENT DEPT.
MALE WARD
OPERATION THEATRE
CONSTRUCTION SITE
STORE
STORE
W.T.
PHARMACY
TOILETS
TOILETS
LAUNDRY
FLAG POLE
W.T.
W.T.
W.T.
ADMIN. BLDG.
W.T
STAFF QTR
W.T.
TOILETS
TOILETS
TOILETS
LAUNDRY
MUKWENDA ROAD
TOILETS
STAFF QUARTERS

Masaka Regional Hospital

No.	Department	Equipment	Priority
1	Operation	Operating table, general	A
2	Operation	Operating table, Orthopaedic	A
3	Operation	Operating table, minor	A
4	Operation	Stretcher (Patient trolley)	A
5	Operation	Suction unit, Large	A
6	Operation	Suction unit, small	A
7	Operation	C-arm with I.I. unit	A
8	Operation	Electrosurgical unit	A
9	Operation	Laryngoscope	A
10	Operation	Laparotomy set	A
11	Operation	Caesarean section set	A
12	Operation	Mayo table (trolley)	C
13	Operation	Instrument / drug trolley	C
14	Operation	Drug trolley	C
15	Operation	Oxygen concentrator	B
16	Operation	Oxygen regulator with humidifier	B
17	Operation	Film viewer	A
18	Operation	Bronchoscope (ENT)	C
19	Operation	Oesophagoscope(ENT)	C
20	Operation	Cystoscope(ENT)	C
21	Operation	General sets	B
22	Operation	Hernia set	B
23	Operation	Dermatology set	A
24	Operation	Dressing set	B
25	Operation	Laparoscopy set	B
26	Operation-add	Operating light, ceiling	A
27	Operation-add	Operating light, stand	A
28	Operation-add	Hand washing water sterilizer	A
29	Operation, sterilization	Autoclave, vertical	A
30	Operation, sterilization	Autoclave, portable	A
31	Operation, sterilization	Sterilizing drum, large	B
32	Operation, sterilization	Sterilizing drum, medium	B
33	Operation, sterilization	Sterilizing drum, small	B
34	Anaesthesia Department	Laryngoscope	C
35	Anaesthesia Department	Pulse oxymeter	A
36	Anaesthesia Department	Defibrillator	A
37	Anaesthesia Department	Anaesthesia medication trolley	C
38	Anaesthesia Department	Resuscitation trolley	B
39	Anaesthesia Department	Refrigerator	B
40	Anaesthesia Department-add	Anaesthesia machine with ventilator	A
41	Anaesthesia Department	Ambu bag, with resuscitation valves	A
42	Anaesthesia Department	Tracheotomy set	C
43	Anaesthesia Department	Bronchoscope set	C
44	Emergency	Patient trolleys	A
45	Emergency	Procedure trolleys	C
46	Emergency	Drug trolley	C
47	Emergency	Autoclave machine portable	A
48	Emergency	Examination coach	A
49	Emergency	Portable stools	C
50	Emergency	Drug cupboard	C
51	Emergency	Proctoscope	B
52	Emergency	Liver Biopsy set	C
53	Emergency	Cut-down set	B
54	Emergency, resuscitation	Suction Machine (electrical)	A
55	Emergency, resuscitation	Suction Machine (Manual)	A
56	Emergency, resuscitation	Nebulizers	A
57	Emergency, resuscitation	Silicon resuscitator, Paediatric	A
58	Emergency, resuscitation	Silicon resuscitator, Adult	A
59	Emergency, resuscitation-add	Pulse oxymeter	A
60	Emergency, resuscitation	Oxygen concentrators	C
61	Emergency, resuscitation	Oxygen cylinders + heads and carrier	B
62	Emergency, resuscitation	Sterilizing drums, Big	C
63	Emergency, resuscitation	Sterilizing drums, Medium	C
64	Emergency, resuscitation	Sterilizing drums, Small	C
65	Emergency, resuscitation	Sphygmomanometer, Adults	B
66	Emergency, resuscitation	Sphygmomanometer, Paediatrics	B
67	Emergency, resuscitation	Stethoscope	C
68	Emergency, resuscitation	Instrument counter boards	C
69	Emergency, resuscitation-add	Defibrillator	A

No.	Department	Equipment	Priority
70	Dental	Compressor systems for dental chairs	A
71	Dental	Dental chairs /units	A
72	Dental	Light curing machines for composite	A
73	Dental	Dental X-Ray system (cone type)	A
74	Dental	Ultrasonic scalers	A
75	Dental	Dental kits (Dental surgical instruments including)	B
76	Dental	Electronic portable dental drill machine	A
77	Dental	Electronic suction machine	A
97	Laboratory, haematology	Micro hematocrit centrifuge	A
98	Laboratory, haematology	Automatic pipettes	A
99	Laboratory, haematology	Centrifuge	A
100	Laboratory, microbiology	Large capacity laboratory fridges → Laboratory refrigerator	B
101	Laboratory, microbiology	Water bath	B
102	Laboratory, microbiology	Centrifuge	C
103	Laboratory, microbiology	Colorimeter	B
104	Laboratory, Biochemistry	Flame photometer	C
105	Laboratory, Biochemistry	Centrifuge	C
106	Laboratory, blood bank	Blood transfusion fridges	A
107	Laboratory, blood bank	Incubator	C
108	Laboratory, blood bank	Water bath	C
109	Laboratory, blood bank	Microscopes	A
110	Laboratory, parasitology	Bunsen burner	C
150	OPD Medical	Defibrillator	B
151	OPD Medical	Ultrasonic Nebulizers	A
152	OPD Medical	Weighing scale, adult	B
153	OPD Medical	Stadiometer (Height scale)	B
154	OPD Medical	Sphygmomanometer	B
155	OPD Medical	Diagnostic set	A
156	OPD Medical	Suction unit, foot	B
157	OPD Medical	Refrigerator	B
158	OPD Medical	Medication trolley	B
159	OPD Medical	Patient examination table	A
160	OPD Medical	Wheel chair	B
161	OPD Medical	Patient trolley	B
162	OPD Medical	IV drop stand	B
163	OPD Paediatric	Diagnostic set	A
164	OPD Paediatric	Weighing scale, newborn, beam balance	B
165	OPD Paediatric	Weighing scale, paediatric, spring	B
166	OPD Paediatric	Weighing scale, adult	B
167	OPD Paediatric	Stadiometer (Height scale)	B
168	OPD Paediatric	Sphygmomanometer	B
169	OPD Paediatric	Otoscope	B
170	OPD Paediatric	Medication trolley	B
171	OPD Paediatric	Patient examination table	A
172	OPD Paediatric	Patient trolley	A
173	OPD Paediatric emergency	Autoclave	A
174	OPD Paediatric emergency	Radiant warmer	A
175	OPD Paediatric emergency	Weighing scale, newborn, beam balance	B
176	OPD Paediatric emergency	Otoscope	B
177	OPD Paediatric emergency	Ophthalmoscope	A
178	OPD Paediatric emergency	Medication trolley	B
179	OPD Paediatric emergency	Infusion incubator	B
180	OPD Surgery	Patient examination table	A
181	OPD Pharmacy	Drug refrigerator	B
182	OPD Pharmacy	Electric balance	A
183	OPD Pharmacy	Distillation unit	A

No.	Department	Equipment	Priority
Mubende Hospital			
1	OPD	Diagnostic set c	A
2	OPD	Minor surgery set	A
3	OPD	Examination light	A
4	OPD	Patient examination table	A
5	OPD	Film viewer	A
6	OPD	Instrument trolley	B
7	OPD	Instrument trays	B
8	OPD	Instrument toilet set	B
9	OPD	Refrigerator	B
10	OPD	Weighing scale, child	B
11	OPD	Weighing scale	B
12	OPD	Patient stretcher	A
13	OPD	Patient screen	B
14	Casuality	Operation light, mobile	A
15	Casuality	Operation table	A
16	Casuality	Suction pump, electric	A
17	Casuality	Oxygen cylinder, set A	B
18	Casuality	Resuscitator, adult	A
19	Casuality	Resuscitator, child	A
20	ANC/UNEPI	Diagnostic equipment, set c	C
21	ANC/UNEPI	Examination light	C
22	ANC/UNEPI	Examination couch	C
23	ANC/UNEPI	Instrument trays	C
24	ANC/UNEPI	Patient screen	C
25	ANC/UNEPI	Weighing scale, adult	C
26	Dental	Forceps set	B
27	Dental	Hand instruments	B
28	Dental	Dental X-ray	A
29	Dental	Dental chair	A
30	Laboratory	Centrifuge, electric	A
31	Laboratory	Centrifuge, hematocrit	A
32	Laboratory	Colorimeter	A
33	Laboratory	Water distiller	A
34	Laboratory	Flame photometer	C
35	Laboratory	Incubator culture	B
36	Laboratory	Microscope, binocular	A
37	Laboratory	Balance semi analytical	B
38	Laboratory	Hot air oven	B
39	Laboratory	Hot plate	B
40	Laboratory	VDRL shaker	B
41	Laboratory	Water bath	B
42	Pharmacy	Electronic balance	A
43	Pharmacy	Drug Refrigerator	A
44	Pharmacy	Dispenser trolley	B
45	Operation	Autoclave bench type	A
46	Operation	Autoclave Vertical	A
47	Operation	Autoclave machine	C
48	Operation	Anesthesia machine	A
49	Operation	ECG monitor	C
50	Operation	Pulse oxymeter	A
51	Operation	Operation light, fixed	A
52	Operation	Operation light, mobile	A
53	Operation	Operation table	A
54	Operation	Suction pump, electric	A
55	Operation	Diagnostic, set A	B
56	Operation	Instrument tray	C
57	Operation	Instrument trolley	C
58	Operation	Instrument set, general	B
59	Operation	Instrument set, general surgery	A
60	Operation	Instrument set, Obstetric	A
61	Operation	Instrument set, orthopedic	B
62	Operation	Laryngscope set, adult & pediatric	A
63	Operation	Oxygen concentrator	B
64	Operation	Oxygen cylinder, set A	B
65	Operation	Resuscitator, adult	A
66	Operation	Resuscitator, child	A
67	Operation	Suction pump, foot	B
68	Operation-Add	Hand washing water sterilizer	A

No.	Department	Equipment	Priority
69	General ward	Drug cupboard	C
70	General ward	Drip stands	C
71	General ward	Diagnostic, set C	C
72	General ward	Dressing set	C
73	General ward	Weighing scale, adult	C
74	General ward	Weighing scale, infant	C
75	General ward	Patient screen	C
76	General ward	X-ray film viewers	C
77	General ward	Wheel chairs	C
78	Male ward-add	Patient beds	B
79	Male ward-add	Bed side cabinet	B
80	Male ward-add	Examination bed	B
81	Maternity ward	Delivery bed	A
82	Maternity ward	Electric sucker	A
83	Maternity ward	Infant warmer	A
84	Maternity ward	Baby incubator	A
85	Maternity ward	Baby cot	B
86	Maternity ward	Patient screen	B
87	Maternity ward	Resuscitator, adult	A
88	Maternity ward	Resuscitator, child	A
89	Maternity ward	Weighing scale, adult	B
90	Maternity ward	Weighing scale, pediatric	B
91	Maternity ward	Instrument, delivery set	A
92	Maternity ward-add	Examination table	A

Mityana Hospital

No.	Department	Equipment	Priority
1	OPD	Diagnostic equipment, set c	A
2	OPD	Dressing set	B
3	OPD	Examination light	A
4	OPD	Instrument trolley	B
5	OPD	Instrument trays	B
6	OPD	Instrument toilet set	B
7	OPD	Refrigerator	B
8	OPD	Weighing scale, child	B
9	OPD	Weighing scale	B
10	OPD	Patient stretcher	A
11	OPD	Patient screen	B
12	OPD-add	Film viewer	A
13	OPD	Examination couch	A
14	Casualty	Pulse oxymeter	A
15	Casualty	Operation light, mobile	A
16	Casualty	Operation table	A
17	Casualty	Oxygen cylinder, set A	B
18	Casualty	Resuscitator, adult	A
19	Casualty	Resuscitator, child	A
20	Casualty	Suction pump, electric	A
27	Dental	Dental unit complete	A
28	Dental	Forceps set	B
29	Dental	Hand instruments	B
30	Dental	Dental X-ray	A
31	Dental	Protective mask	B
32	Laboratory	Centrifuge, electric	A
33	Laboratory	Centrifuge, hematocrit	A
34	Laboratory	Colorimeter	A
35	Laboratory	Water distiller	A
36	Laboratory	Hot air oven	A
37	Laboratory	Incubator culture	B
38	Laboratory	Refrigerator	B
39	Laboratory	Blood bank refrigerator	A
40	Laboratory	Balance semi analytical	A
41	Laboratory	Water bath	B
42	Laboratory	ESR stand, blood sedimentation stand with tube	B
43	OPD-Pharmacy	Balance, electronic	A
44	OPD-Pharmacy	Water distiller	A
45	OPD-Pharmacy	Drug refrigerator	A
46	OPD-Pharmacy	Dispenser trolley	A
47	Operation	Autoclave bench type	A
48	Operation	Autoclave Vertical	A
49	Operation	Autoclave machine	B
50	Operation	ECG monitor	B
51	Operation	Pulse oxymeter	A
52	Operation	Instrument set, general surgery	A
53	Operation	Instrument set, obstetric	A
54	Operation	Operation light, fixed	A
55	Operation	Operation light, mobile	A
56	Operation	Operation table	A
57	Operation	Suction pump, electric	A
58	Operation	Diagnostic, set A	B
59	Operation	Instrument tray	B
60	Operation	Instrument trolley	B
61	Operation	Instrument set, general	B
62	Operation	Instrument set, orthopedic	B
63	Operation	Instrument cupboard	B
64	Operation	Laryngoscope set, adult & pediatric	A
65	Operation	Oxygen concentrator	B
66	Operation	Oxygen cylinder, set A	B
67	Operation-add	Anesthesia machine with ventilator	A
68	Operation-add	Hand washing water sterilizer	A
69	Operation	Resuscitator, adult	A
70	Operation	Resuscitator, child	A

Japan's Grant Aid Scheme

The Government of Japan (hereinafter referred to as "the GOJ") is implementing the organizational reforms to improve the quality of ODA operations, and as part of this realignment, JICA was reborn on October 1, 2008. After the reborn of JICA, following the decision of the Government of Japan (hereinafter referred to as "the GOJ"),Grant Aid for General Project is extended by JICA.

Grant Aid is non-reimbursable fund to a recipient country to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

1. Grant Aid Procedures

Japanese Grant Aid is conducted as follows-

- Preparatory Survey (hereinafter referred to as "the Survey")
  - the Survey conducted by JICA
- Appraisal &Approval
  - -Appraisal by The GOJ and JICA, and Approval by the Japanese Cabinet
- Determination of Implementation
  - -The Notes exchanged between the GOJ and a recipient country
- Grant Agreement (hereinafter referred to as "the G/A")
  - -Agreement concluded between JICA and a recipient country
- Implementation -Implementation of the Project on the basis of the G/A

2. Preparatory Survey

(1) Contents of the Survey

The aim of the Survey is to provide a basic document necessary for the appraisal of the Project by JICA and the GOJ. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of agencies concerned of the recipient country necessary for the implementation of the Project.

- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, financial, social and economic point of view.
- Confirmation of items agreed on by both parties concerning the basic concept of the Project.
- Preparation of a basic design of the Project.
- Estimation of costs of the Project.

The contents of the original request by the recipient country are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of the Japan's Grant Aid scheme.

JICA requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA uses (a) registered consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

The Report on the Survey is reviewed by JICA, and after the appropriateness of the Project is confirmed, JICA recommends the GOJ to appraise the implementation of the Project.

3. Japan's Grant Aid Scheme

(1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the E/N will be singed between the GOJ and the Government of the recipient country to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

(2) Selection of Consultants

The consultant firm(s) used for the Survey Will be recommended by JICA to the recipient country to also work on the Project's implementation after the E/N and the G/A. in order to maintain technical consistency.

(3) Eligible source country

Under the Japanese Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. When JICA and the Government of the recipient country or its designated authority deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

(4) Necessity of "Verification"

The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by JICA. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

(5) Major undertakings to be taken by the Government of the Recipient Country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as Annex.

(6) "Proper Use"

The Government of recipient country is required to maintain and use the facilities constructed and the equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

(7) "Export and Re-export"

The products purchased under the Grant Aid should not be exported or re-exported from the recipient country.

(8) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). JICA will execute the Grant Aid by making

payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the Bank to JICA under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

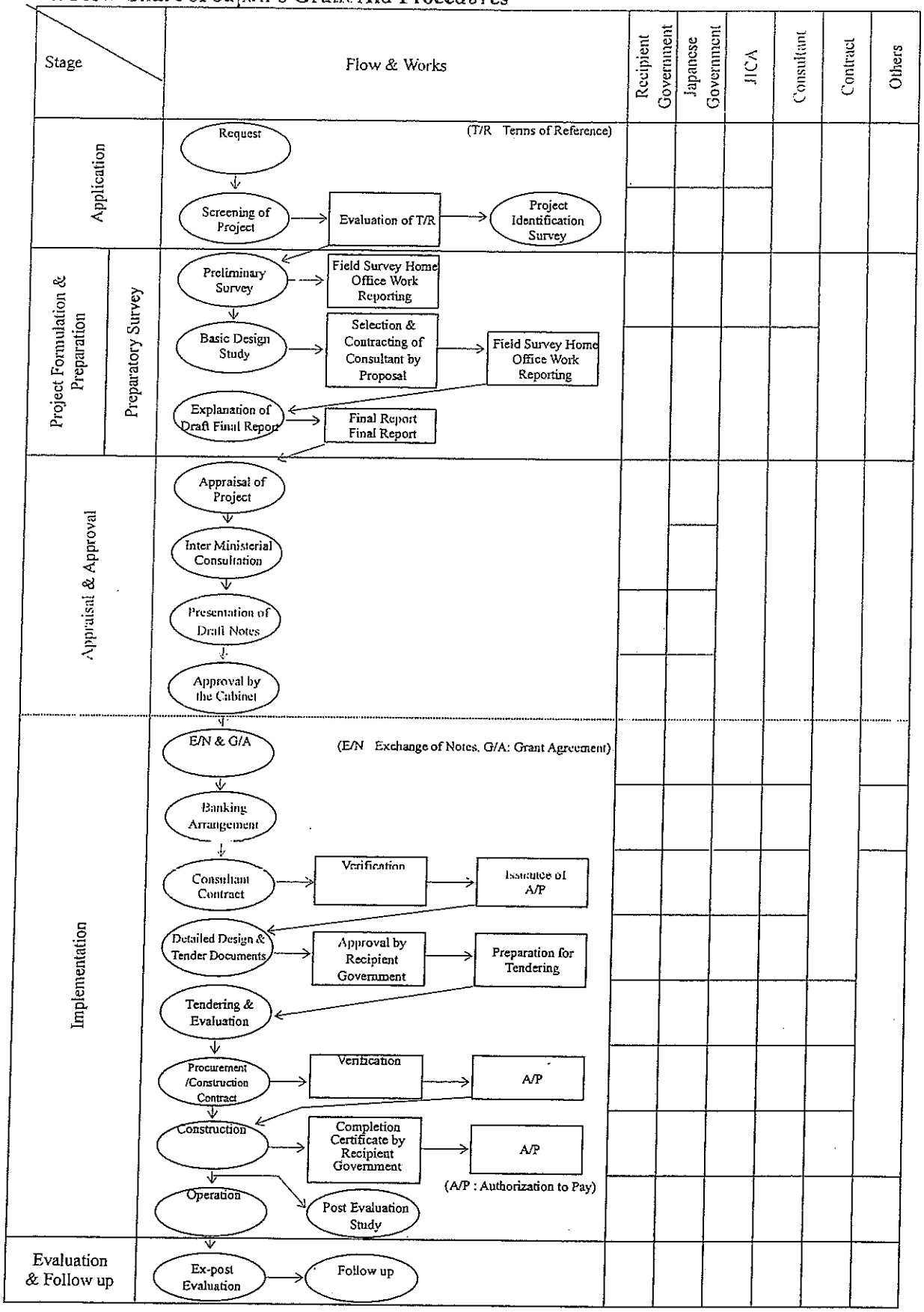
(9) Authorization to Pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions to the Bank.

(10) Social and Environmental Considerations

A recipient country must ensure the social and environmental considerations for the Project and must follow the environmental regulation of the recipient.

4. Flow Chart of Japan's Grant Aid Procedures



Annex-5

Major Undertakings to be taken by Recipient Side

NO	Items	To be covered by the Grant	To be covered by Recipient side
1	To secure land		●
2	To clear, level and reclaim the site when needed		●
3	To construct gates and fences in and around the site		●
4	To construct the parking lot	●	
5	To construct roads		
	1) Within the site	●	
	2) Outside the site		●
6	To construct the building	●	
7	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities		
	1)Electricity		
	a.The distributing line to the site		●
	b.The drop wiring and internal wiring within the site	●	
	c.The main circuit breaker and transformer	●	
	2)Water Supply		
	a.The city water distribution main to the site		●
	b.The supply system within the site (receiving and/or elevated tanks)	●	
	3)Drainage		
	a.The city drainage main (for storm, sewer and others) to the site		●
	b.The drainage system (for toilet sewer, ordinary waste, storm drainage and others) within the site	●	
	4)Gas Supply		
	a.The city gas main to the site		●
	b.The gas supply system within the site	●	
	5)Telephone System		
	a.The telephone trunk line to the main distribution frame / panel (MDF) of the building		●
	b.The MDF and the extension after the frame / panel	●	
	6)Furniture and Equipment		
	a.General furniture		●
	b.Project equipment	●	
8	To bear the following commissions to a bank of Japan for the banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
9	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country		
	1) Marine(Air) transportation of the products from Japan to the recipient country	●	
	2) Tax exemption and customs clearance of the products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	●	
10	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●

NO	Items	To be covered by the Grant	To be covered by Recipient side
11	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract		⑥
12	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid		⑦
13	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities as well as for the transportation and installation of the equipment		⑧

(B/A: Banking Arrangement, A/P: Authorization to pay)

MINUTES OF DISCUSSIONS
PREPARATORY SURVEY (BASIC DESIGN)
ON THE PROJECT FOR THE REHABILITATION OF HOSPITALS
AND SUPPLY OF MEDICAL EQUIPMENT
IN THE CENTRAL REGION IN UGANDA
(EXPLANATION ON DRAFT REPORT)

In March, 2009, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a Preparatory Survey Team on the Project for the Rehabilitation of Hospitals and Supply of Medical Equipment in the Central Region (hereinafter referred to as "the Project") in the Republic of Uganda (hereinafter referred to as "Uganda"), and through discussion, field survey, and technical examination of the results in Japan, JICA prepared a draft report of the study.

In order to explain and to consult the government of Uganda on the contents of the draft report, JICA sent to Uganda the Draft Report Explanation Team (hereinafter referred to as "the Team"), which is headed by Mr. Hideya Kobayashi, Director of the Grant Aid Project Management Division, Financing Facilitation and Procurement Supervision Department, JICA, from August 16 to 27, 2009.

As a result of discussions, both parties confirmed the main items described on the attached sheets.

Kampala, August 21, 2009

Hideya KOBAYASHI
Leader
Preparatory Survey Team
Japan International Cooperation Agency

Mary L. NANNONO
Permanent Secretary
Ministry of Health
Government of the Republic of Uganda

ATTACHMENT

1. Components of the Draft Report

The Uganda side agreed upon and accepted in principle the components of the Draft Report explained by the Team.

2. Japan's Grant Aid Scheme

The Uganda side understood the Japan's Grant Aid Scheme and the necessary measures to be taken by the Government of Uganda as explained by the Team and described in Annex-1 and Annex-2.

3. Schedule of the Study

JICA will complete the Final Report in accordance with the confirmed items and send it to the Government of Uganda around October 2009.

4. Confidentiality of the Project

Both sides confirmed that all information related to the Project including cost estimation of the Project described in Annex-3, detailed specifications of the facilities, the equipment and other technical information shall not be duplicated or released to any outside party before the signing of all the Contract(s) for the Project.

5. Other Relevant Issues

5-1. The Uganda side agreed to smoothly carry out the obligations of the Uganda side shown in Annex-4.

5-2. The Uganda side agreed to secure sufficient budget and personnel required in order that Mubende Hospital will function as a regional referral hospital.

5-3. The Uganda side agreed to secure and allocate sufficient budget to operate and maintain the medical equipment procured under the Project properly and effectively.

5-4. The Uganda side shall take necessary measures in order to meet the tax obligations under the Project.

5-5. The Uganda side strongly requested to the Team that a C-arm X-ray machine be procured for Masaka regional referral hospital under the Project.

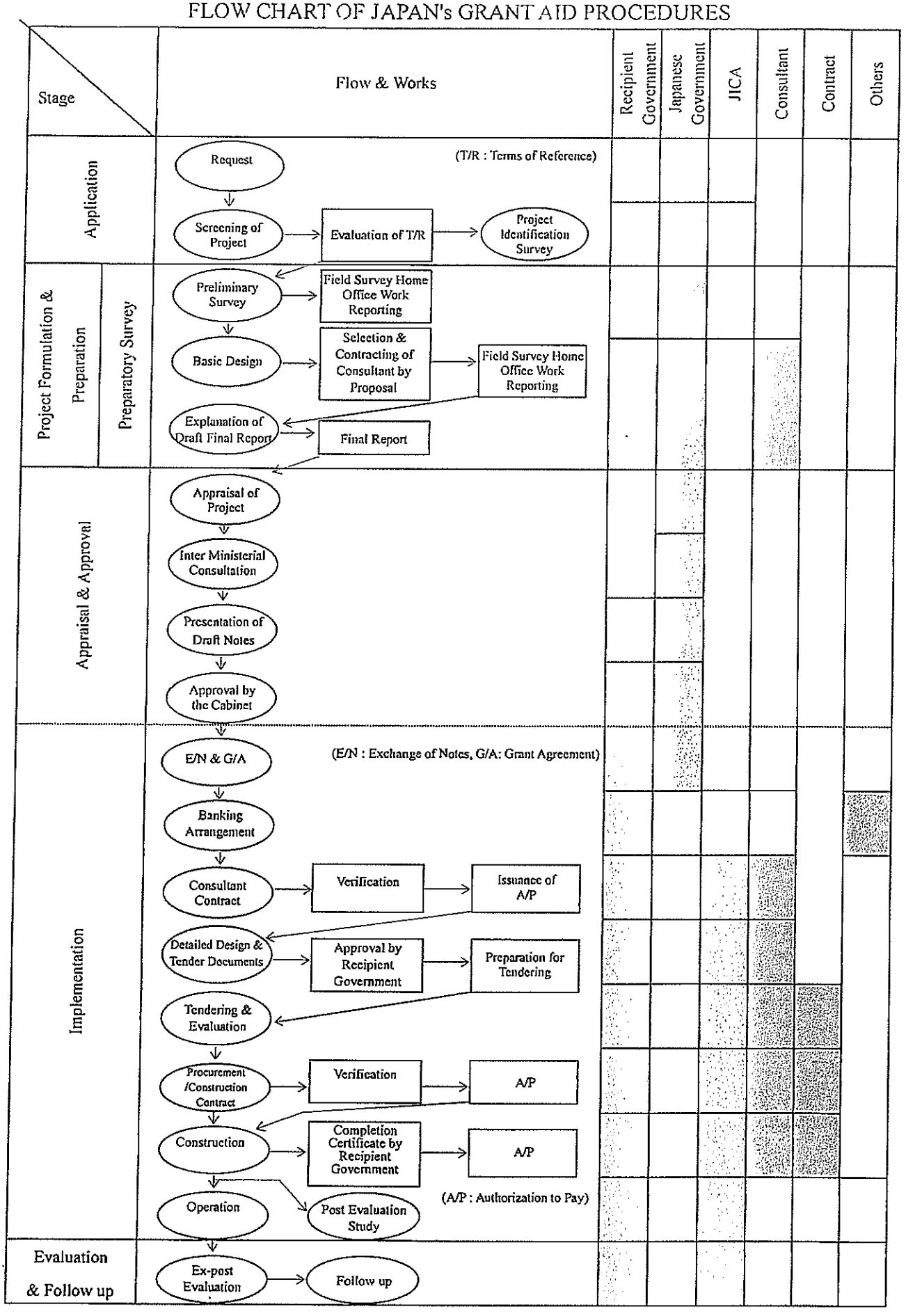
5-6. Plan of Soft Component

Both sides agreed on the concepts of the soft component described in Annex-5, which aims at strengthening the operation capacity and maintenance management of medical equipment in the hospitals targeted under the Project.

Annex-1: Flow Chart of Japan's Grant Aid Procedures
Annex-2: Major Undertakings to be taken by the Recipient Side
Annex-3: Project Cost Estimation
Annex-4: Obligations and Schedule of the Uganda side
Annex-5: Plan of Soft Component

Annex-1

FLOW CHART OF JAPAN's GRANT AID PROCEDURES



Annex-2

Major Undertakings to be taken by Both Sides

NO	Items	To be covered by the Grant	To be covered by Recipient side
1	To secure land		●
2	To clear, level and reclaim the site when needed		●
3	To construct gates and fences in and around the site		●
4	To construct the parking lot	●	
5	To construct roads		
	1) Within the site	●	
	2) Outside the site		●
6	To construct the building	●	
7	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities		
	1)Electricity		
	a.The distributing line to the site		●
	b.The drop wiring and internal wiring within the site	●	
	c.The main circuit breaker and transformer	●	
	2)Water Supply		
	a.The city water distribution main to the site		●
	b.The supply system within the site (receiving and/or elevated tanks)	●	
	3)Drainage		
	a.The city drainage main (for storm, sewer and others) to the site		●
	b.The drainage system (for toilet sewer, ordinary waste, storm drainage and others) within the site	●	
	4)Gas Supply		
	a.The city gas main to the site		●
	b.The gas supply system within the site	●	
	5)Telephone System		
	a.The telephone trunk line to the main distribution frame / panel (MDF) of the building		●
	b.The MDF and the extension after the frame / panel	●	
	6)Furniture and Equipment		
	a.General furniture		●
	b.Project equipment	●	
8	To bear the following commissions to a bank of Japan for the banking services based upon the Banking Arrangement		
	1) Advising commission of Authorization to Pay		●
	2) Payment commission		●
9	To ensure prompt customs clearance and to assist internal transportation of the products in recipient country		●
	1) Marine(Air) transportation of the products from Japan to the recipient country	●	
	2) Internal transportation from the port of disembarkation to the project site	●	
10	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the purchase of the products and the services are met		●
11	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●

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NUN

NO	Items	To be covered by the Grant	To be covered by Recipient side
12	To ensure that the facilities and the equipment be maintained and used properly and effectively for the implementation of the Project		●
13	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project		●

(B/A: Banking Arrangement, A/P: Authorization to pay)

Obligations and Schedule of the Uganda Side

Masaka RRH

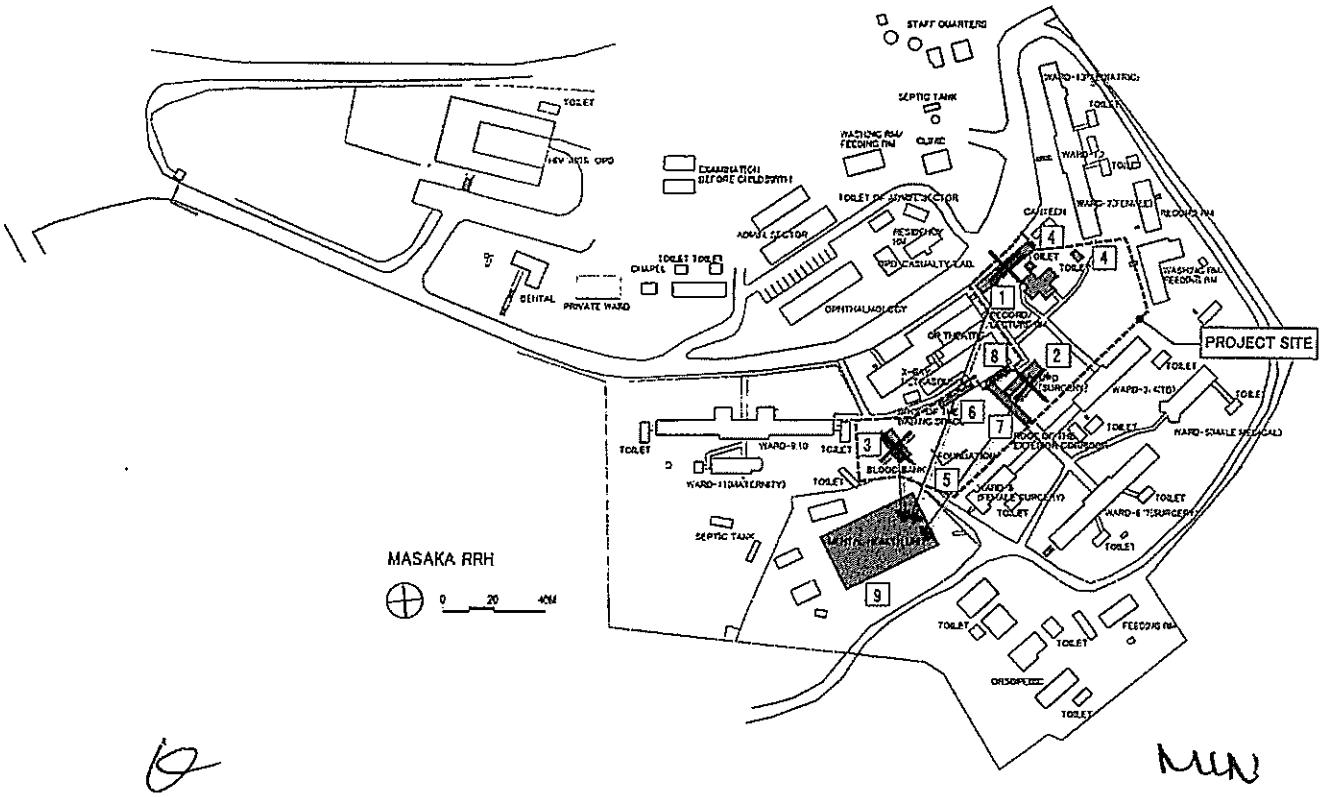
1.Tentative Schedule of the Uganda Side Obligation Works and the Estimated Cost

(Unit:1,000Ush)

Item of scope of Uganda	2010												2011												2012						Estimated Cost
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	
A. Demolition of the existing facilities and site preparation of the construction sites							A.																								21,951
B. Relocation of the demolished facilities										B.																					10,283
C. Replacement of the existing infrastructure in the construction sites							C.												Construction Period												10,000
D. Distribution of infrastructure to the sites																								D.							98,059
E. Construction of walls and fences surrounding the sites																															-
F. Carrying general furniture and supplies into the new building																										F.					48,504
G. Relocation of the gates and access road																															-
H. Relocation to the new buildings																										H.					4,042
I. Provision of the site										I.																					0
																														Total	192,839

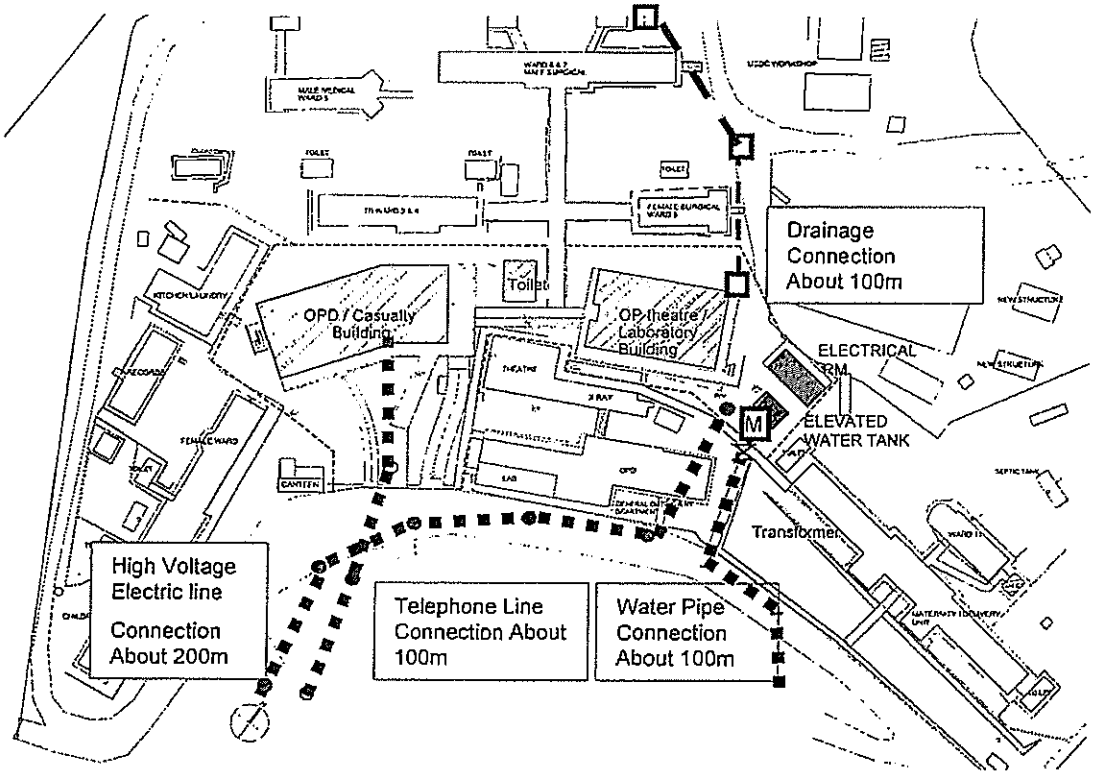
2.Demolition, Relocation, Functional Relocation [Before Construction]

A. Demolition of the existing facilities and site preparation of the construction sites		B. Relocation of the demolished facilities		
Building No.	Building Name	Building No.	Building Name	Note
NO. 1	Record / Lecture	NO.9	Mental Health Unit	Tentatively used during the construction period only
NO. 2	Surgical OPD	NO.9	Mental Health Unit	Tentatively used during the construction period only
NO. 3	Blood Bank			
NO. 4	Toilets	---	To be transferred	Permanently moved
NO. 5	Foundation	—	To be demolished	To be completely demolished because of old foundation of existed building
NO. 6	Waiting shad for X-ray Dept	—		To be Reroofed after completion of new facilities
NO. 7	Corridor shad	—		To be Reroofed after completion of new facilities
NO. 8	Corridor shade for Operation Theatre	—		To be Reroofed after completion of new facilities



Obligations and Schedule of the Uganda Side

D .Distribution of infrastructure to the site



Obligations and Schedule of the Uganda Side _

Mubende GH

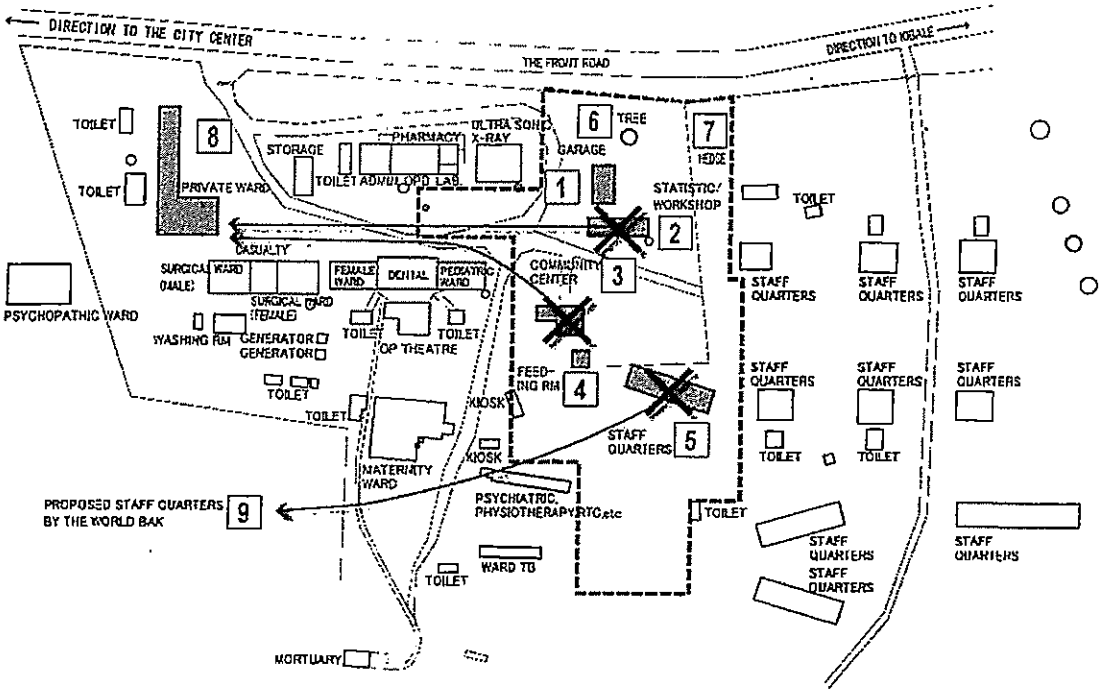
1.Tentative Schedule of the Uganda Side Obligation Works and the Estimated Cost

(Unit:1,000Ush)

Item of scope of Uganda	2010												2011												2012						Estimated Cost
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	
A. Demolition of the existing facilities and site preparation of the construction sites							A.																								19,029
B. Relocation of the demolished facilities										B																					12,976
C. Replacement of the existing infrastructure in the construction sites							C.												Construction Period												1,000
D. Distribution of infrastructure to the sites																								D.							21,661
E. Construction of walls and fences surrounding the sites																									E.						11,680
F. Carrying general furniture and supplies into the new building																										F.					52,104
G. Relocation of the gates and access road																										G.					1,600
H. Relocation to the new buildings																										H.					4,342
I. Provision of the site										I.																					0
																														Total	124,392

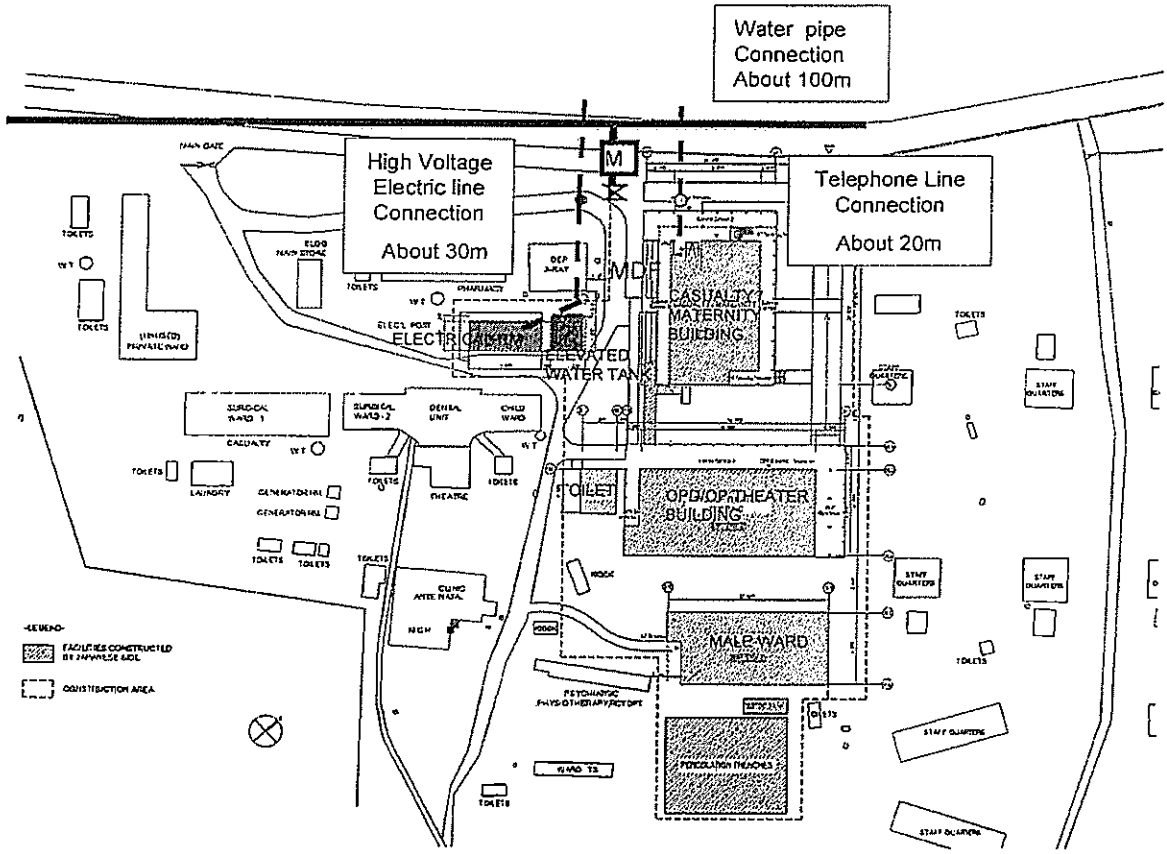
2.Demolition, Relocation, Functional Relocation [Before Construction]

A. Demolition of the existing facilities and site preparation of the construction site		B. Relocation of the demolished facilities		
Building No.	Building name	Building No.	Building name	Note
NO. 1	Temporary Garage	—	To be transferred	Permanently moved
NO. 2	Record/Workshop	NO.8	Private ward	Temporary use during the construction period
NO. 3	Communiuty Department			
NO. 4	Temporary Kitchen	—	To be transferred	Permanently moved
NO. 5	Staff Quarter	NO.9	New staff quarter planned under World Bank funding	
NO. 6	Existing Trees	—	To be removed	
NO. 7	Hedge	—	To be demolished	



Obligations and Schedule of the Uganda Side

D .Distribution of infrastructure to the site



Plan of Soft Component

1. Soft Component (technical assistance) Plan

Problem in current condition

① The medical staff members in Uganda know the manner of equipment operation. However, the training on the site is not enough so there is room for improvement in order to perform the operation and maintenance on a daily basis.

② There is the situation that very few hospital staff have the experience of emergency cases even in operating fields.

③ Some staff hesitate to use equipment that requires comparatively new technology and technique.

For the purpose of resolving above problems and strengthening the management of equipment operation and maintenance, Ministry Health in Uganda requests us the technical assistance.

2. Objectives of Soft Component

① To strengthen the management of medical equipment, operation and maintenance in the target hospitals.
② To improve the operation and maintenance ability of the medical equipment by the medical staff in the target hospitals.

3. Accomplishments of Soft-Component

Contents of Technical Assistance	Achievement	Confirmatory Method	Deliverables
Understanding of effectiveness of routine equipment maintenance	・To understand how to carry out equipment maintenance.	・To confirm the result of the implementation and management situation.	Equipment explanatory documents, the results of questionnaire, Seminar reports
Formation of sustaining equipment maintenance system	・To be able to prescribe the internal systematic flow (control) in the target hospital ・The cooperation and tie between the target hospitals and the central workshop of MOH has become strengthened.	・To form the internal systematic flow (control) chart about the operation and management system of the equipment. ・To designate the maintenance staff. ・To establish the organizational flow (control) system between the target hospitals and the central workshop of MOH	Internal systematic flow (control) chart (includes staff names), The results of questionnaire, Seminar reports
Establishment of a re-training plan	・To acknowledge the importance of the re-training.	・To share the re-training plan with MOH. ・To confirm the detailed timing, trainees contents of the retraining.	The suggestion of the plan, the results of questionnaire, Seminar reports
Acquisition of the knowledge and technique related to equipment operation and maintenance.	・To acquire the knowledge and technique regarding equipment operation and maintenance.	・To conduct the routine maintenance by medical staff in accordance with the method they learned by the training. ・To confirm the proper handling with the equipment by medical staff	①Seminar reports, Training course curriculums plan) ②Training implementation reports, (Annex) Training course curriculum, Test (plan), The results of questionnaire

5. Soft Component (Technical Assistance) Plan

PREPARATORY SURVEY REPORT
ON
THE PROJECT FOR THE REHABILITATION
OF
HOSPITALS AND SUPPLY OF MEDICAL EQUIPMENT
IN THE CENTRAL REGION OF UGANDA
IN
THE REPUBLIC OF UGANDA

Plan of Technical Assistance (Soft Component)

INDEX

September 2009

THE CONSORTIUM OF
NIHON SEKKEI, INC. / EARL CONSULTANTS, INC.

(1) Background of Soft Component

This project is to implement reconstruction of facilities and procurement of necessary equipment in order to improve the medical services for Masaka RRH and Mubende RRH as a secondary level medical institution.

In Masaka RRH, there is no specific technician for equipment management and some technicians take care of maintenance work for facilities and such easy repair works as replacement of bulbs. The hospital requests local private engineers when it needs more complicated repair services, and also procures spare parts at equipment agents in Kampala. In Mubende RRH, there is a maintenance workshop which was established in cooperation with UNDP. But only a few technicians have been engaged in general building maintenance work, and their maintenance activity is limited to easy repair works as at Masaka RHH. Therefore, there is a significant need to improve the current maintenance service in activity and ability.
After meeting with engineers of infrastructure division of MOH and officers in charge of health field of donors, it was learned that there is not enough opportunity for medical staff to attend practical training at a teaching hospital in Uganda even though they learn the operation and functions of medical equipment as book knowledge in a school of medical science. For example, though MOH has designated Mulago hospital as a training institution for medical staffers of district hospitals, such training has not been conducted frequently enough due to budget constraints. Thus, MOH has desired that equipment manufacturers or agents train the medical staffers for equipment operation and its clinical application. However, there are not many equipment agents who can provide proper application training except for a few agents who deal with X-ray equipment and ultrasound diagnostic units. Due to such circumstances, there was a case that some medical staffers understood function and operation of an incubator but could not cope with such emergency case as alarm warning of the incubator, for instance.
The central workshop of MOH has been established within the premise of infrastructure division and has been taking care of medical equipment of public hospitals in the region, and the 2 targeted hospitals are also covered by services of this workshop. The technical level of the workshop has been enhanced by Japanese technical assistance project up to the level that it can conduct troubleshooting and detect defective parts of malfunctioning equipment. However, the central workshop has not taken active leadership in maintenance activities of local hospitals.

The field survey team confirmed the following issues concerning equipment application and maintenance through the field survey conducted from March 2 to March 31, 2009,

① The medical staff members of Uganda know sufficiently the manner of equipment operation and maintenance because they studied the function and operation of medical devices in schools of medical science and/or teaching hospitals. However, on-site training is not conducted adequately and there is still room for improvement in order to perform daily operation and maintenances, and
② In Uganda, it is said that there are very few hospital staff members who have enough experience to deal with emergency cases sufficiently in medical treatment scene. For example, it is said that there are some staffers who hesitate to operate newly introduced equipment such as anaesthesia machine using halothane because they are not accustomed with the use and it requires comparatively new techniques.

For the purpose of sorting out above-mentioned issues and strengthening the management of equipment operation and maintenance, MOH of Uganda requested to Japan side the provision of technical assistance, so-called, soft component. For the appropriate management of equipment, it should be necessary to strengthen operation and maintenance ability of the medical staffers who actually operate the equipment, to acknowledge importance of maintenance and to establish the maintenance system in which daily maintenance activity is regularly conducted. Therefore, it is judged beneficial to implement the technical assistance to the request of Uganda.

(2) Objectives of Soft Component

The staffers of infrastructure division of MOH, technicians of the central workshop, and staffers of the targeted hospitals should be thoroughly educated in the importance of equipment maintenance through the necessary technical assistance, so that as a minimum Japan's co-operation effect should be sustained. The objectives to be achieved by the soft-component after completion of the technical assistance are described below:

Ⅰ.To establish the sustainable equipment maintenance system in the targeted hospitals, and

Ⅱ.To strengthen operation and maintenance ability of the medical staffers who operate medical equipment at the targeted hospitals.

(3) Accomplishments of Soft-Component (Direct Effect)

The accomplishments to be achieved at the completion of the soft-component are described as follows.

Ⅰ-1. To clearly identify responsible persons for medical equipment at the targeted hospitals,
Ⅰ-2. To establish a collaboration system between the hospitals and central workshop of MOH,
Ⅱ-3. To consider implementation of re-training plan regarding operation of equipment in clinical aspect for the targeted hospitals, and
Ⅱ-1. To introduce operation and maintenance method at the targeted hospitals.

(4) Method for Confirming the Degrees of Achievement

Items for confirmation of degrees of achievements that should be accomplished at the completion of the Soft-Component are indicated in the following table.

Items		Confirmatory Method
Ⅰ. To establish the sustainable equipment maintenance system in the targeted hospitals	Ⅰ-1. To clarify the management system (staffers, chain of command) of medical equipment	• To confirm the organizational chart of the maintenance system, and • To confirm the name of the responsible persons.
	Ⅰ-2. To establish a collaboration system between the hospitals and central workshop of the MOH	• To prepare the organization, and collaboration chart (including names of the persons in charge) and the chain of its command.
	Ⅰ-3. To consider the implementation of the re-training plan regarding operation of equipment in clinical aspects	• To confirm the re-training plan and knowledge sharing with MOH, and • To confirm the detailed implementation schedule such as expected date, trainees,and the contents.
Ⅱ.To strengthen operation and maintenance ability of the medical staffers who operate the equipment of the targeted hospitals	Ⅱ-1. To introduce operation and maintenance method	• To prepare the ①daily maintenance manual which is necessary for medical staffers to conduct regularly, • To prepare the ②operation manual of equipment in a clinical field, which is necessary for medical staffers to use properly, and • To prepare understanding of operation and maintenance for medical staffers based on the above ① and ② by questionnaire or examination papers.

(5) Activities of Soft Component (Input Plan)

1) The followings are detailed on-site activities (seminars) and trainees

Items		Input plan	Trainees
Ⅰ. To establish the sustainable equipment maintenance system at the targeted hospitals	Ⅰ-1. To clarify the management system (staffers, chain of command) of medical equipment	a) Implementation and follow-up regarding the seminar of equipment maintenance	Infrastructure division of MOH, technicians of the central workshop, and staffers of the targeted hospitals (management: medical superintendent, superintendent, and matron)
	Ⅰ-2. To establish a collaboration system between the hospitals and central workshop of MOH	a) Implementation and follow-up regarding the seminar of equipment maintenance	Infrastructure division of MOH, technicians of the central workshop, and staffers of the targeted hospitals (management: medical superintendent, superintendent, and matron)
	Ⅰ-3. To consider the implementation of the re-training plan regarding operation of equipment in a clinical field	b) Implementation and follow-up regarding the seminar of re-training plan	Infrastructure division of MOH, technicians of the central workshop, and staffers of the targeted hospitals (management: medical superintendent, superintendent, and matron)
Ⅱ. To strengthen the operation and maintenance ability of the medical staffers who operate the equipment of the targeted hospitals	Ⅱ-1. To introduce the operation and maintenance method	c) Implementation and follow-up regarding seminar of daily equipment maintenance	I Infrastructure division of MOH, technicians of the central workshop, and staffers of the targeted hospitals (management: medical superintendent, superintendent, and matron) technicians of the maintenance workshop of the targeted hospitals
		d) Implementation and follow-up regarding seminar of operation of equipment in a clinical field	Medical staffers of the targeted hospitals (OPD: Physicians, Nursing officers, Medical technicians Operation theatre: Surgeons, Anaesthesiologists, Clinical officers (medical technicians), Nursing officers, Obstetrics: Obstetricians, Nursing officers)

2) Activities include: ①Preparation works in Japan, ②First on-site technical assistance, ③Works in Japan, ④Second on-site technical assistance, and ⑤Works in Japan

The detailed plan is as follows:

① Preparation works in Japan

To make the following explanatory documents that will be used in the training course.

The Engineer for Seminar Planning/Administration will be engaged for 6 days for conducting above preparation.

Seminars	documents
a)Seminar of equipment maintenance	Draft equipment maintenance system
b)Seminar of re-training plan	Proposal documents of the re-training plan
c)Seminar of daily equipment maintenance	Explanatory documents (Equipment catalogues, Spare parts lists, daily maintenance manual, etc)
d)Seminar of equipment operation in a clinical field	Seminar plan of the equipment operation

②First on-site technical assistance

a) Implementation: seminar on equipment maintenance system

- To identify the problems regarding equipment maintenance activities and system in the present situation,
- To prepare a feasible collaboration structure among maintenance workshops of the targeted hospitals, the infrastructure division of MOH and the central workshop, and
- To instruct designing of draft maintenance system plan (Organizational chart, and names of person in-charge).

b) Implementation: seminar on re-training plan

- To encourage trainees to recognize the need and importance of the re-training plan by conducting this seminar,
- To assist in preparation of the plan in order to share the plan with MOH, and
- To instruct the detailed implementation schedule such as expected date, trainees, and the contents.

c) Implementation: seminar on daily equipment maintenance

- To explain the documents regarding equipment maintenance in terms of continuous medical services and to encourage trainees to recognize its importance,
- To discuss draft daily maintenance manuals and its introduction method with concerned staffers and adjust the contents in the seminar, and
- To prepare a discussion report on the results of Q&A with trainees after the seminar.

d) Preparation: seminar on equipment operation in a clinical field

- To make negotiations and contracts with trainers, who are recommended by MOH and the infrastructure division of MOH after explaining and adjusting the contents of the seminar. For the seminar date, Japan side will discuss and adjust with MOH and staffers of the targeted hospitals.

For implementation of the plan, management, and adjustment described above, Japan side will dispatch the engineer for seminar planning/administration qualified in equipment operation for 11 days (including time required for travel).

③Works in Japan

- Japan side will analyse results from the first technical assistance and carry out an adjustment for assistance contents necessary for the second training course,
- The final schedule of the training course will be adjusted with and reported to the hospital staffers, course attendants and course trainers, etc through MOH, and

・An examination and a questioning will be conducted after completion of this training seminar.

For conducting above works, the engineer for seminar planning/administration qualified in equipment operation will be engaged for 3 days.

④Second on-site technical assistance

a) Follow-up seminar on equipment maintenance system

・To confirm how the equipment maintenance system has been introduced following the first seminar and, to provide instructions if needed.

b) Follow-up seminar on re-training plan

・To confirm how knowledge of re-training plan is shared with MOH and how the re-training plan is introduced to the targeted hospitals following the first seminar, and to provide instructions if needed.

c) Implementation and follow-up seminar on daily equipment maintenance

・To train the attendants by lecturers using newly installed equipment using the daily operation manuals, which are prepared after discussions and adjustment with relevant staffers (Infrastructure division of MOH, and targeted hospitals, etc) during the first seminar, and

・The implementation and follow-up to this seminar will be a part of d) seminar of equipment operation in a clinical situation.

d) Implementation and follow-up seminar on equipment operation in a clinical situation

・To implement this seminar after completion of equipment installation and guidance of operation and maintenance by engineers dispatched during equipment supply,

・To conduct the training by lecturers using the installed equipment following training curriculum,

・To attend the seminar and monitor attendance of trainees and how far trainees learn skills, etc, for the purpose of finding difficulties of each trainees,

・To execute examination to measure the attendants' understanding level by themselves before the lecture is completed, and the self-evaluation is also done by themselves. Questioning is executed, and then to sum up the answers in order to evaluate how far the trainees have reached in skills,

・To compile an operation manual in a clinical field by lecturers after completion of the seminar considering technical levels of current hospital staffers, and

・To describe above-mentioned activities in a daily report and to conceive difficulties and proposals in the implementation report.

For the above-mentioned instructions and supervisions, Japan side will dispatch an engineer for medical equipment training seminar for 29 days including time required for travel and holidays.

e) The outline for the seminar of equipment operation in a clinical situation is as follows:

	Specialized field	Equipment	Trainers	Days
1	Operation /OPD department	1-1 C-arm X-ray unit	Principal Radiologist (1 person)	Preparation： 2 days×1 facility Implementation： 3 days×1 facility
		1-2 Operating table for orthopaedics, General operating table, operating light, Suction unit, and Electrosurgical unit	Consultant surgeon （1 person）	Preparation： 2 days×2 facilities Implementation： 8 days×2 facilities
		1-3 Pulse oxymeter, Defibrillator, and Anaesthetic machine with ventilator	Consultnant Anaesthesiologist （1 person）	Preparation： 2 days×2 facilities Implementation： 8 days×2 facilities
		1-4 Daily maintenance and management（for above 1-2 to 1-3 items）	Senior technician (1 person)	Preparation： 2 days×2 facilities Implementation： 3 days×2 facilities
			Nursing officer (1 person)	Preparation： 2 days×2 facilities Implementation： 3 days×2 facilities
2	General equipment	2-1 Daily maintenance/ opeartion training:Central sterilization department (Vertical autoclave with soft water machine, portable autoclave, Obstetrics and examination equipment)	Senior technician (1 person)	Preparation： 2 days×2 facilities Implementation： 3 days（Masaka RRH） 4 days（Mubende RRH）
		2-2 Obstetrics: Infant warmer and incubator, Delivery bed, Suction unit, and Operating light	Nursing officer (1 person)	Preparation： 2 days×1 facility Implementation： 4 days×1 facility
		2-3 Examination equipment (Microscope, Coloriometer, Centrifugal machine, and Distillation unit)	Medical technologist (1 person)	Preparation： 2 days×2 facilities Implementation： 3 days×2 facilities

⑤ Works in Japan

Japan side will collaborate results from the primary and secondary technical assistances and prepare a final implementation report.

The engineer for seminar planning/administration engages in this work for 3 days.

(6) Method for procuring the implement resources of Soft-Component

Implementation of this technical assistance needs lecturers with extensive actual experience and sufficient knowledge regarding medical equipment including its installation. Also, for the purpose of in-field training engineers who have actual wide experience in outpatient, operation, and obstetrics department etc. and well versed in equipment operations will be required. This soft-component shall be the indirect supporting type in which the Japanese consultant will plan and manage while utilizing qualified human resources of Uganda.

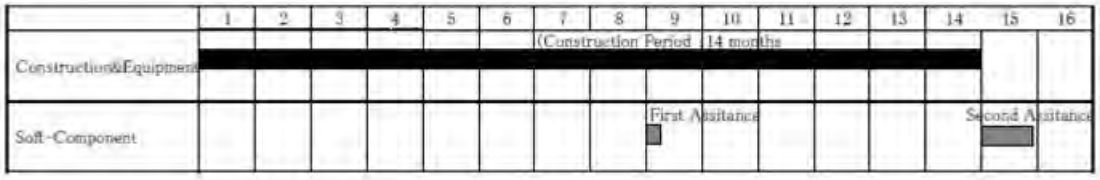
Based on the recommendation from the infrastructure division, the specialist doctors, chief nursing officers, and technicians who work in the MOH governed teaching hospital will be selected as an implementation resource.(the staff of Masaka RRH, and Mubende RRH are not implementation human resources because they are the recipients of this training.)

(7) Implementing Schedule of Soft-Component

The consultants who conduct the assistance are, in first, to determine the contents of assistances and cooperation and set the overall schedule based on the agreement with the infrastructure division (Central workshop) of MOH and the relevant staffers of the target hospitals. Thereafter they are to implement the technical assistance sequentially while evaluating the input and results. The following is the tentative overall flow.

During the plan, Uganda's domestic experts（specialist doctors, chief nursing officers, senior technicians, etc） will conduct the practical training which will be simulated emergency **c**ases in related to equipment and instruct daily equipment maintenance method for the purpose of more proper and efficient operation and management

Soft-component implementation schedule (plan)



(8) Deliverables of Soft-Component

Items （On site activities）		Deiverables
Ⅰ. To establish the sustainable equipment maintenance system in the targeted hospitals	Ⅰ-1. To clarify the management system (staffers, chain of command) of medical equipment	a)Implementation report of seminar of equipment maintenance. Attached documents: ①Seminar report, ②Equipment maintenance system (including Organizational chart, names of the in-charged persons), and ③Results of the questionnaire.
	Ⅰ-2. To establish the collaboration system between the hospitals and central workshop of MOH	
	Ⅰ-3. To consider the implementation of the re-training plan regarding operation of equipment in a clinical situation	b) Implementation report of seminar of re-training plan Attached documents: ①Seminar report, ②Re-training plan, and ③The results of questionnaires.

Items (On site activities)		Deiverables
Ⅱ. To strengthen operation and maintenance ability of the medical staffers who operate the equipment of the targeted hospitals	Ⅱ-1. To introduce operation and maintenance method	c)Implementation report of daily equipment maintenance, Attached documents: ①Seminar report, ②Daily maintenance manual, and ③The results of questionnaire. d) Implementation report of seminar of operation of equipment in a clinical field Attached documents: ①Seminar report, ②Seminar curriculum, ③Draft examination paper, ④Equipment operation manual in a clinical field, ⑤Equipment explanatory documents,（Equipment catalogues, Spare parts lists, ets） and ⑥Results of questionnaires

(9) Responsibility of Implementing Agencies of Recipient Country

Uganda side is responsible for recommending lecturers and disposition of trainees for this technical assistance. Based on the recommendation of MOH, the lecturers (specialist doctors, chief nursing officers, senior technicians, etc) should be selected before the seminars are started. In the target hospitals, the training and practical technical guidance for medical staffers that operate equipment will be performed by these specialists. For technicians in charge of medical equipment maintenance Japan side also will dispatch engineers to provide the technical instruction. It is desirable for the implementing agencies consisting of Infrastructure Division and medical superintendents of the target hospitals to conduct sustained and periodical instruction and management regarding maintenance of medical equipment and re-training during the implementation period of this technical assistance and even after its completion as the responsible managers.