Republic of Uganda
Ministry of Health

PREPARATORY SURVEY REPORT 2
ON
THE PROJECT FOR THE REHABILITATION OF HOSPITALS AND SUPPLY OF MEDICAL EQUIPMENT IN THE WESTERN REGION IN UGANDA
IN
THE REPUBLIC OF UGANDA

OCTOBER 2013

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

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PREFACE

Japan International Cooperation Agency (JICA) decided to conduct the preparatory survey 2 and entrusted the survey to the consortium of Yokogawa Architects & Engineers, Inc. and INTEM Consulting, Inc.

The survey team held a series of discussions with the officials concerned of the Government of Uganda, and conducted field investigations. As a result of further studies in Japan, 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.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of Uganda for their close cooperation extended to the survey team.

October, 2013

Nobuko Kayashima
Director General
Human Development Department
Japan International Cooperation Agency

SUMMARY

SUMMARY

1. Overview of the Country

The Republic of Uganda (hereinafter referred to as "Uganda") is an inland country in eastern Africa, surrounded by Kenya, Tanzania, Rwanda, the Democratic Republic of Congo and South Sudan. It covers approx. 241,000 km^2 (about 2/3 the area of Japan), and has a population of approx. 36.35 million (World Bank, 2012). The country's per capita GNI (Gross National Income) is US$440 (World Bank, 2012).

2. Background, History and Outline of the Project

Uganda is still a country which displays very high mortality rates, with the infant mortality rate at 58 per 1000 live births (2011), the under-five mortality rate at 90 per 1000 live births (2011) and the maternal mortality ratio at 310 per 100,000 live births (2010). These issues are attributable to the limited access to health services of impoverished people, particularly the socially vulnerable such as women and children in rural areas. It is the highest prioritised issue of the health sector to improve this situation and ensure treatment and prevention of preventable diseases.

The Government of Uganda formulated the National Health Policy (hereinafter referred to as "NHP") (1999/2000-2009/10) in 1999. Under this policy the Government of Uganda developed the Health Sector Strategic Plan (hereinafter referred to as "HSSP"), in which the government made efforts to improve the present situation through actions such as establishing a free medical care system throughout the country, improving the rate of accessibility to medical facilities by increasing their numbers, and strengthening medical delivery services all the way from the community level to the district level. These efforts have produced certain tangible outcomes, such as the ratio of the population having access to a medical facility within 5 km increasing from 49% (1999) to 72% (2004). Nevertheless, there were still a lot of medical facilities that were in need of rehabilitation and improvements to their facilities and equipment. Thus, the improvement of medical infrastructures has been continuously emphasised in NHP II (2010/11-2019/20) and the Health Sector Strategic and Investment Plan (hereinafter referred to as "HSSIP") (2010/11-2014/15), the programmes succeeding NHP and HSSP.

Along with the policy of the Government of Uganda, which was to take a gradual approach to promoting facility improvements divided by regions, "The Project for the Rehabilitation of Health Facilities and Supply of Medical Equipment in Mbale, Tororo, Bugiri and Busia Districts" was conducted between 2006 and 2007 and "The Project for the Rehabilitation of Hospitals and Supply of Medical Equipment in the Central Region in Uganda" was conducted between 2010 and 2012 with grant aid from Japan.

Under such circumstances, the Government of Uganda requested grant aid for "The Project for the Rehabilitation of Hospitals and Supply of Medical Equipment in the Western Region in Uganda" (hereinafter referred to as "the Project") in 2008, following these grant aid projects. This request aimed to enhance the function of medical services in four hospitals at Hoima, Kabale, Fort Portal and Masindi, which play important roles in the western region through the construction of facilities and

the procurement of medical equipment, and consequently to upgrade the quality of medical service delivery and to establish a more efficient and effective regional referral system in the western region in Uganda.

3. Outline of the Survey Results and Description of the Project

In response to the request, the Government of Japan decided to conduct a Preparatory Survey for the Project, and the Japan International Cooperation Agency (hereinafter referred to as "JICA") sent a Survey Team (Field Survey I) in May 2011. The Survey Team surveyed the requested four hospitals and cooperation projects financed by other donors, compiled an "Observations by the Survey Team" which is a comparative prioritisation list of the four hospitals, had discussions with the Ugandan authorities concerned, and narrowed the list down to three target hospitals. After the analysis I in Japan of the results of the Field Survey I, JICA sent the Survey Team (Field Survey II) in August 2011 and the Survey Team surveyed the three hospitals, had more detailed discussions with the Ugandan authorities, conducted field surveys of relevant governmental and private institutions, and collected referential data and information. Following further analysis in Japan and the draft report explanation mission in June 2012, the Preparatory Survey Report was compiled and submitted to the Ugandan authorities in August 2012.

Due to the delay in Cabinet approval procedure and changes in prices overtime, the Government of Japan decided to conduct the Preparatory Survey 2 in June 2013. The Survey Team had discussions with the Ugandan authorities, collected the latest price information of materials and equipment, surveyed the three hospitals, and confirmed the current conditions of their facilities and equipment. Following further analysis in Japan, the present Preparatory Survey Report 2 has been compiled.

The outline design of this Project has been drawn on the basis of consensus reached between the Ugandan and Japanese sides during the Preparatory Survey. Therefore, in principle, the outline design has not been changed in the Preparatory Survey 2.

The assistance components of the Project are the construction of an Outpatient Department Block (hereinafter referred to as "OPD Block") and an Operation Theatre/Maternity Ward (hereinafter referred to as "OT/Maternity Ward") at Hoima Regional Referral Hospital (hereinafter referred to as "RRH") and an OPD/Casualty Block and OT/Maternity Ward at Kabale RRH, as well as procuring medical equipment at Hoima, Kabale and Fort Portal RRHs, and implementing technical assistance for appropriate operations and maintenance of equipment (Soft Component assistance). It is expected that the Soft Component assistance will enable the effective use of equipment and conduction of medical activities. The following tables summarise the project components for each target hospital.

Outline of the Project for Hoima RRH

Project Component			Description
OPD Block (including outpatient toilet)	GF	760.00 m^2	Reception, Laboratory, Pharmacy, Staff room, Consultation rooms (paediatric, gynaecology, obstetrics.), ENT clinic, patient toilet, etc.
	1F	778.00 m^2	General OPD, Specialised OPD, Dental unit, HIV consultation room, Patient toilet, etc.
Subtotal		1,538.00 m^2	
OT/Maternity Ward	GF	810.00 m^2	OT: OT(2), HDU, Recovery room, Staff locker room, OT hall, CSSD Casualty: Ambulance, Triage/Clinic, Resuscitation room, Office, Sluice/sterilisation, Staff room, etc.
	1F	699.75 m^2	Maternity: Ward (42 beds), Newborn baby room, Maternity treatment room, Nurse station, Sluice/sterilisation, Patient toilet, etc.
Subtotal		1,509.75 m^2	
Power Receiving House	1F	36.0 m^2	Power receiving room, Generator room
Total		3,083.75 m^2	
Equipment for Main OT/Casualty/HDU : 19 items Equipment for CSSD: 3 items Equipment for OPD : 10 items Equipment for Ward : 2 items Equipment for Common use : 9 items Total : 43 items			Anaesthesia Machine, Operating Table, Operating Light, Ventilators, Operating Instrument Set, etc. Autoclave, Sterilizing Container Set, etc. Diagnostic Set, Examination Couch, etc. Bed for Ward, Infant Incubator X-ray Film Viewer, Nebulizer, etc.

Outline of the Project for Kabale RRH

Project Component			Description
OPD/Casualty Block (including outpatient toilet and connecting corridor)	GF	833.20 m^2	OPD: Reception, Laboratory, Pharmacy, Staff room, Patient toilet, etc. Casualty: Ambulance, Triage/clinic, Resuscitation room, Minor OT, Sluice/sterilisation, Office, Staff room, etc.
	1F	790.00 m^2	Consultation rooms (paediatric, gynaecology, general OPD, specialised OPD), Dental unit, Patient toilet, etc.
Subtotal		1,623.20 m^2	
OT/Maternity Ward	GF	744.00 m^2	OT(3), HDU, CSSD, Recovery room, Staff locker room, OT hall, etc.
	1F	765.75 m^2	Maternity: ward (42 beds), Delivery room (5), Newborn baby room, Nurse station, Sluice/sterilisation, Patient toilet, etc.
Subtotal		1,509.75 m^2	
Total		3,132.95m^2	
Equipment for Main OT/Casualty/HDU : 24 items Equipment for CSSD: 3 items Equipment for Delivery room : 3 items Equipment for OPD : 10 items Equipment for Ward : 2 items Equipment for Common use : 11 items Total : 53 items			Anaesthesia Machine, Operating Table, Operating Light, Ventilators, Operating Instrument Set, etc. Autoclave, Sterilizing Container Set, etc. Delivery bed, Doppler, etc. Diagnostic Set, Examination Couch, Ultrasound Scanner, etc. Bed for Ward, Infant Incubator, etc. X-ray Film Viewer, Nebulizer, etc.

Outline of the Project for Fort Portal RRH

Project Component	Description
Equipment for Main OT/Casualty/HDU: 17 items	Anaesthesia Machine, Operating Table, Operating Light, Ventilators, Operating Instrument Set, etc.
Equipment for CSSD : 2 items	Autoclave, Sterilizing Container Set
Equipment for Delivery room : 2 items	Delivery bed, Doppler
Equipment for OPD : 5 items	Diagnostic set, Examination couch, etc.
Equipment for Ward : 1 item	Infant Incubator
Equipment for common use : 8 items	X-ray Film Viewer, Nebulizer, etc.
Total : 35 items	

4. Project Schedule and Cost Estimate

When the Project is implemented, the detailed design will take about 4.0 months, the tender procedures about 3.0 months, the construction work, including procurement and installation of the equipment, 13.0 months and the technical assistance on the operation and management of equipment (soft component) about 1.5 months. The total cost to be borne by the Ugandan side is estimated at approximately 14 million yen (367 million UShs).

5. Project Evaluation

(1) Relevance

The Project will be beneficial to about 6 million people, contribute to the achievement of the target goals of NHP II and HSSIP, and contribute to the improvement of the basic human needs (BHN) of residents in the western region in Uganda as well as to the safety and stability of their livelihood through the upgrading of medical services. In this regard, the significance and necessity of the Project will be high.

(2) Effectiveness

The following (1) Quantitative Effects and (2) Qualitative Effects are expected by the implementation of the grant aid project.

1) Quantitative Effects

Quantitative Effects expected by the Project are as follows.

The existing facilities of the target hospitals are aging and their space is not large enough to accept the increasing number of patients. This situation is expected to be improved through the implementation of the Project. Post-implementation project effects shall be confirmed for each target hospital based on the current situation in the fiscal year 2011/2012 (from July 2011 to June 2012 according to the Ugandan fiscal year) and evaluated quantitatively with the expected figures set for the fiscal year 2018/2019, three years after the completion of the Project.

a) Hoima RRH (target building components: OPD, operation theatre, casualty[*1])

Index	Base Value (2011)	Target Value (2018) (3 years after project completion)
Number of outpatients*[2] (case/year)	117,490	146,900
Number of operations[*3] (case/year)	3,602	4,500
Number of emergency patients (case/year)	3,656	4,600

*1 Maternity ward is included in the target building components but the delivery room is not included, therefore the area will not be incorporated as one of the target sections.

*2 Outpatients: general outpatient, paediatric, obstetrics, surgery, orthopaedic, dental, ENT, diabetes, Gynaecology departments

*3 Dental operations are not included.

b) Kabale RRH (target building components: OPD, operation theatre, casualty, maternity ward)

Index	Base Value (2011)	Target Value (2018) (3 years after project completion)
Number of outpatients*[4] (case/year)	112,990	141,200
Number of operations[*5] (case/year)	5,826	7,300
Number of emergency patients (case/year)	1,694	2,100
Number of deliveries (case/year)	5,817	7,300

*4 Outpatients: paediatrics, internal medicine, surgery, orthopaedics, Gynaecology departments

*5 Dental operations are not included.

c) Fort Portal RRH

Procurement of medical equipment is planned for the OPD, operation theatre, casualty and Obstetrics/Gynaecology Departments. However, the construction of facilities is not planned for this hospital, thus it would be difficult to set a specified increase in numbers for each department. Therefore, only the number of outpatients shall be set as the indicator.

Index	Base Value (2011)	Target Value (2018) (3 years after project completion)
Number of outpatients*[6] (case/year)	142,867	178,600

*6 Outpatients: general outpatients, paediatric, internal medicine, surgery, orthopaedics, ophthalmology, ENT, dental, Obstetrics/Gynaecology departments

2) Qualitative Effects

a) Improvement of healthcare services in rural areas will increase satisfaction of hospital patients.

b) By improving the target hospitals, they will function effectively as the top referral hospitals in the regions, which will lead to the improvement of the referral system.

In conclusion, the validity of the Project to be implemented by grant aid from our country as well as the anticipated effectiveness of the Project will be high.

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LOCATION MAP

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HOIMA
REGIONAL REFERRAL HOSPITAL

PERSPECTIVE

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

KABALE
REGIONAL REFERRAL HOSPITAL

PERSPECTIVE

LIST OF FIGURES AND TABLES

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ABBREVIATOINS

Abbreviation	English
AfDB	African Development Bank
AIJ	Architectural Institute of Japan
A/P	Authorisation to Pay
B/A	Banking Arrangement
BHN	Basic Human Needs
BS	British Standards
CDF	Capital Development Fund
CPD	Continuous Professional Development
CSSD	Central Supply and Sterilisation Department
CSU	Central Sterilisation Unit
DAC	Development Assistance Committee
E/N	Exchange of Notes
ENT	Eye Nose Throat
EU	European Union
5S	Seiri, Seiton, Seiso, Seiketsu, Shitsuke (Sort, Set, Shine, Standardize, Sustain)
G/A	Grant Agreement
GDP	Gross Domestic Product
GF	Ground Floor
GH	General Hospital
HC	Health Centre
HDU	High Dependency Unit
HSSIP	Health Sector Strategic and Investment Plan
HSSP	Health Sector Strategic Plan
JCRC	Joint Clinical Research Centre
JICA	Japan International Cooperation Agency
JOCV	Japan Overseas Cooperation Volunteers
MDF	Main Distribution Frame
MOFPED	Ministry of Finance, Planning and Economic Development
MOH	Ministry of Health

NGO	Non-Governmental Organisations
NHP	National Health Policy
NRH	National Referral Hospital
NWSC	National Water Service Company
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
OPD	Outpatient Department
OT	Operation Theatre
PBX	Private Automatic Branch Exchanger
QS	Quantity Survey
RRH	Regional Referral Hospital
SHSSPP	Support to Health Sector Strategic Plan Project
UK	United Kingdom
UNABCEC	Uganda National Association of Building and Civil Engineering Contractors
UNBS	Uganda National Bureau of Standards
URA	Uganda Revenue Authority
USAID	United States Agency for International Development
UShs	Uganda Shilling
VAT	Value Added Tax
WB	World Bank
WHO	World Health Organisation

CHAPTER 1 BACKGROUND OF THE PROJECT

Chapter 1 Background of the Project

1-1 Background, History and Outline of the Requested Japanese Assistance

The Republic of Uganda (hereinafter referred to as "Uganda") is still a country which displays very high mortality rates, with the infant mortality rate at 58 per 1000 live births (2011), the under-five mortality rate at 90 per 1000 live births (2011) and the maternal mortality ratio at 310 per 100,000 live births (2010). In order to achieve the Millennium Development Goals (hereinafter referred to as "MDGs") by 2015, improvement of the infant mortality rate, under-five mortality rate, and maternal mortality ratio are critical. These issues are attributable to the distribution delay and lack of medicinal products and lack of healthcare professionals, in addition to the limited access to health services of impoverished people, particularly the socially vulnerable such as women and children in rural areas. It is the highest prioritised issue of the health sector to improve this situation and ensure treatment and prevention of preventable diseases.

The Government of Uganda formulated the National Health Policy (hereinafter referred to as "NHP") (1999/2000-2009/2010) in 1999. Under this policy the Government of Uganda developed the Health Sector Strategic Plan (hereinafter referred to as "HSSP"), in which the government made efforts to improve the present situation through actions such as establishing a free medical care system throughout the country, improving the rate of accessibility to medical facilities by increasing their numbers, and strengthening medical delivery services from the community level to the district level. These efforts have produced certain tangible outcomes, such as the ratio of the population having access to a medical facility within 5 km increasing from 49% (1999) to 72% (2004). Nevertheless, there were still a lot of medical facilities that were in need of rehabilitation and improvements to their facilities and equipment. Thus, the improvement of medical infrastructures has been continuously emphasised in NHP II (2010/2011- 2019/2020) and the Health Sector Strategic and Investment Plan (hereinafter referred to as "HSSIP") (2010/2011-2014/2015), the programmes succeeding NHP and HSSP. HSSIP has set its midterm target as "to attain a good standard of health for all people in Uganda in order to promote a healthy and productive life", and has set up "to improve the levels, and equity in access and demand to defined services needed for health" as one of the policies to achieve this target.

Along with the policy of the Government of Uganda, which was to take a gradual approach to promoting facility improvements divided by regions, "The Project for the Rehabilitation of Health Facilities and Supply of Medical Equipment in Mbale, Tororo, Bugiri and Busia Districts" was conducted between 2006 and 2007 and "The Project for the Rehabilitation of Hospitals and Supply of Medical Equipment in the Central Region in Uganda" was conducted between 2010 and 2012 with grant aid from Japan.

Under such circumstances, the Government of Uganda requested grant aid for "The Project for the Rehabilitation of Hospitals and Supply of Medical Equipment in the Western Region in Uganda" (hereinafter referred to as "the Project") in 2008, following these grant aid projects. This request

aimed to enhance the function of medical services in four hospitals at Hoima, Kabale, Fort Portal and Masindi that play important roles in the western region through the construction of facilities and the procurement of medical equipment, and consequently to upgrade the quality of medical service delivery and to establish a more efficient and effective regional referral system in the western region in Uganda.

The overall request from the Government of Uganda is summarised in the following table.

Table－1　Request Components from the Republic of Uganda

Target hospital	Hoima RRH*[1]	Kabale RRH	Fort Portal RRH	Masindi GH*[2]
Components	1.Operation theatre (OT) 2.OPD*[3] w/ casualty unit 3.Male/female ward 4.Incinerator 5.Generator room 6.Accommodation for 30 interns 7.Medical equipment (including ambulance & multipurpose vehicles)	1.OPD w/ casualty unit 2.Operation theatre 3.Maternity ward (50 beds) w/ obstetric OT 4.Incinerator 5.Generator room 6.Accommodation for 30 interns 7.Medical equipment (including ambulance & multipurpose vehicles)	1.Main laboratory 2.Casualty unit (OPD extension) 3.Accommodation for 30 interns 4.Medical equipment (including ambulance & multipurpose vehicles)	1.Operation theatre 2.OPD w/ casualty unit 3.Delivery unit for Maternity Dept 4.Generator room 5.Medical equipment (including ambulance & multipurpose vehicles)

*1: RRH: Regional Referral Hospital
*2: GH: General Hospital
*3: OPD: Outpatient Department

1-2　Natural Conditions

(1) Topographic Survey

Copies of the topographic maps at Hoima and Kabale sites are attached to Appendix 6-1 of this report. The plot plans for Hoima RRH and Kabale RRH were drawn based on the topographic maps compiled by the local consultant.

(2) Geotechnical Investigations

At the Hoima and Kabale sites, the design soil bearing capacity (long-term) was 150 kPa/m^2 at GL-1.5m depth. Partial copies of the geotechnical investigation report at the Hoima and Kabale sites are attached to Appendix 6-2 of this report.

1-3　Environmental and Social Considerations

The Project is to construct new buildings in the current hospital premises as well as to supply and install medical equipment at Hoima RRH and Kabale RRH, and to supply and install medical equipment at Fort Portal RRH. The Project will be classified as Category C specified in JICA "Guidelines for Environmental and Social Considerations", which are likely to have minimal or little adverse impact on the environment and society. Specifically the environmental and social

considerations are kept in mind in the following matters in the Project.

(1) Sewage

1) Hoima RRH

As the area around Hoima RRH is not provided with a public sewerage system, wastewater from the OPD Block and the Operation Theatre/Maternity Ward (hereinafter referred to as the OT/Maternity Ward) will be treated in a septic tank, which is a popular treatment method locally. Then the treated wastewater will be seeped underground within the site ground via a percolation pipe.

2) Kabale RRH

The area around Kabale RRH is equipped with a public sewerage system, and the wastewater from the OPD/Casualty Block and OT/Maternity Ward will be connected to the hospital's sewerage pipe and discharged into the city main sewer.

(2) Solar Heater System

During the explanatory mission on the draft report, the Government of Uganda requested a solar heater system for hot water supply. In the Project, hot water is planned to be supplied for the newborn baby bath in the delivery room and newborn room, the scrub unit in the operation theatre, the patient showers at the Maternity Ward, and the staff showers at the Maternity Ward and the OPD Block in both Hoima and Kabale RRHs. It means the solar heater system should be installed in the OT/Maternity Ward and the OPD Block of both hospitals.

As the both hospitals are located in the equator, where abundant solar thermal is available, consumption of electric power is expected to be suppressed by introducing the solar heater system.

CHAPTER 2 CONTENTS OF THE PROJECT

Chapter 2 Contents of the Project

2-1 Basic Concept of the Project

2-1-1 Superior Objectives and Project Objectives

In Uganda, accessibility for socially vulnerable people to medical services still remains limited, and the improvement of this situation is an urgent issue in the health sector.

The Government of Uganda programmed HSSP, in which the government made efforts to improve the present situation, such as, to establish a free medical care system throughout the country, to improve the rate of accessibility to medical facilities by increasing their numbers, and to strengthen the medical delivery services 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). Nevertheless, there were still a lot of medical facilities that were in need of rehabilitation and improvement of facilities and equipment. Thus, the improvement of medical infrastructures has been continuously emphasised in NHP II (2010/11-2019/20) and HSSIP (2010/11-2014/15), the succeeding programmes to NHP and HSSP.

Especially, deterioration and shortage of facilities and equipment were significant at RRHs that serve as the core of regional medical services. The government founded the Capital Development Fund (hereinafter referred to as "CDF"), a system to allocate national budget directly to the RRHs, which has been applied to the construction and rehabilitation of buildings as well as the procurement and repairs of medical equipment. The CDF budget, however, is not enough to deal with large projects of facility construction and/or equipment procurement.

The Project aims to enhance the function of medical services in the target RRHs, which will play important roles in the medical service delivery in the western region in Uganda through the construction of facilities and the procurement of equipment. Thus, it will contribute to the superior objectives of the Project to upgrade the quality of regional medical services, improve the accessibility to the medical facilities, and establish a more efficient and effective regional referral system, which, on the whole, will result in the improvement of regional health.

2-1-2 Outline of the Project

The assistance components of the Project are the construction of an Outpatient Department Block (hereinafter referred to as "OPD Block") and an Operation Theatre/Maternity Ward (hereinafter referred to as "OT/Maternity Ward) at Hoima RRH and an OPD/Casualty Block and an OT/Maternity Ward at Kabale RRH, as well as procuring the equipment at Hoima, Kabale and Fort Portal RRHs, and implementing the Soft Component assistance for appropriate operations and maintenance of equipment. It is expected that the Soft Component assistance will enable the effective use of equipment and conduction of medical activities.

Table-2 Outline of the Project for Hoima RRH

Project Component		Description
OPD Block (including outpatient toilet)	GF 760.00 m^2	Reception, Laboratory, Pharmacy, Staff room, Consultation rooms (paediatric, gynaecology, obstetrics.), ENT clinic, patient toilet, etc.
	1F 778.00 m^2	General OPD, Specialised OPD, Dental unit, HIV consultation room, Patient toilet, etc.
Subtotal	1,538.00 m^2	
OT/Maternity Ward	GF 810.00 m^2	OT: OT(2), HDU, Recovery room, Staff locker room, OT hall, CSSD Casualty: Ambulance, Triage/Clinic, Resuscitation room, Office, Sluice/sterilisation, Staff room, etc.
	1F 699.75 m^2	Maternity: Ward (42 beds), Newborn baby room, Maternity treatment room, Nurse station, Sluice/sterilisation, Patient toilet, etc.
Subtotal	1,509.75 m^2	
Power Receiving House	1F 36.0 m^2	Power receiving room, Generator room
Total	3,083.75 m^2	
Equipment for Main OT/Casualty/HDU : 19 items Equipment for CSSD: 3 items Equipment for OPD : 10 items Equipment for Ward : 2 items Equipment for Common use : 9 items Total : 43 items		Anaesthesia Machine, Operating Table, Operating Light, Ventilators, Operating Instrument Set, etc. Autoclave, Sterilizing Container Set, etc. Diagnostic Set, Examination Couch, etc. Bed for Ward, Infant Incubator X-ray Film Viewer, Nebulizer, etc.

Table-3 Outline of the Project for Kabale RRH

Project Component		Description
OPD/Casualty Block (including outpatient toilet and connecting corridor)	GF 833.20 m^2	OPD: Reception, Laboratory, Pharmacy, Staff room, Patient toilet, etc. Casualty: Ambulance, Triage/clinic, Resuscitation room, Minor OT, Sluice/sterilisation, Office, Staff room, etc.
	1F 790.00 m^2	Consultation rooms (paediatric, gynaecology, general OPD, specialised OPD), Dental unit, Patient toilet, etc.
Subtotal	1,623.20 m^2	
OT/Maternity Ward	GF 744.00 m^2	OT(3), HDU, CSSD, Recovery room, Staff locker room, OT hall, etc.
	1F 765.75 m^2	Maternity: ward (42 beds), Delivery room (5), Newborn baby room, Nurse station, Sluice/sterilisation, Patient toilet, etc.
Subtotal	1,509.75 m^2	
Total	3,132.95m^2	
Equipment for Main OT/Casualty/HDU : 24 items Equipment for CSSD: 3 items Equipment for Delivery room : 3 items Equipment for OPD : 10 items Equipment for Ward : 2 items Equipment for Common use : 11 items Total : 53 items		Anaesthesia Machine, Operating Table, Operating Light, Ventilators, Operating Instrument Set, etc. Autoclave, Sterilizing Container Set, etc. Delivery bed, Doppler, etc. Diagnostic Set, Examination Couch, Ultrasound Scanner, etc. Bed for Ward, Infant Incubator, etc. X-ray Film Viewer, Nebulizer, etc.

Table-4 Outline of the Project for Fort Portal RRH

Project Component	Description
Equipment for Main OT/Casualty/HDU: 17 items Equipment for CSSD : 2 items Equipment for Delivery room : 2 items Equipment for OPD : 5 items Equipment for Ward : 1 item Equipment for common use : 8 items Total : 35 items	Anaesthesia Machine, Operating Table, Operating Light, Ventilators, Operating Instrument Set, etc. Autoclave, Sterilizing Container Set Delivery bed, Doppler Diagnostic set, Examination couch, etc. Infant Incubator X-ray Film Viewer, Nebulizer, etc.

2-2 Outline Design of the Japanese Assistance

2-2-1 Design Policy

(1) Basic Policies

1) Strengthening of the hospital function

The objective of the Project is to strengthen the hospital functions of the three target hospitals to the essential levels required of secondary medical facilities in order to promote the improvement of the medical services and referral system in the western region in Uganda.

2) Consideration for the facility master plan

Following the establishment of CDF in 2008/09, each RRH commissioned the programming of a master plan to architectural and engineering consultant offices in and around Kampala with the support of the Health Infrastructure Division of MOH., and a provisional master plan was developed for each RRH in 2009/10. Provisional facility master plans have been developed for Hoima RRH and Kabale RRH, however, they have not been officially approved by the Health Infrastructure Division of MOH, and the requirements and conditions on which the master plans are based on seem obscure. The facility master plans may be reviewed in future, however, the facilities to be rehabilitated in the Project should be planned in consideration that they will continuously take the central role of medical service at delivery in the future.

3) Determination of the size of the planned facilities

The scale or size of the planned facilities of the target hospitals will be determined based on performance data on diagnosis and treatment during the past three years, and also consider forecast population increases in the areas to be covered by these hospitals.

4) Height of the buildings

In principle, the buildings will be two stories in height to effectively utilise the limited available site area of the hospitals with the minimum adverse effects on the medical services. Staircases and ramps will be used as the means of access in the vertical direction instead of elevators or similar facilities that may require considerable maintenance costs.

5) Structural design

The Project will adopt Ugandan standards for earthquake resistance and wind force resistance. The structure of the target hospital facilities will be designed to allow the facilities to provide continuous medical activities without disruption in case of natural disasters (particularly rainy seasons and earthquakes) taking into consideration of Uganda’s natural conditions.

6) Technical and fiscal sustainability

The facility plan and equipment plan will be formed in consideration of 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.) and the staff reinforcement plan of the medical staff. The construction materials are to be selected with preference to those meeting the criteria for sturdiness, low maintenance requirements, availability in the local markets, and ease of replacement or repairs.

7) Plot plan and construction plan for sustainable medical service delivery

Candidate lots for the construction site have been proposed by Hoima RRH and Kabale RRH. These candidate sites will be respected and the plot plans as well as the construction plans will be developed that will least interfere with medical services of each hospital during the construction work periods.

8) Equipment plan

Basic polities for equipment planning are as follows:

① Consistency with functions, hospital level and staff/ activity size of the targeted hospitals
② Easy operation and management after implementation of the Project
③ Consistency with hospital facilities
④ Effective utilization of existing equipment
⑤ Introduction of advanced medical technology of Japan
⑥ Equipment provision to Masindi GH will be excluded, because it was found through the field surveys that medical equipment would be improved with the support of other donor agencies.

In addition, it was decided to take such the procedures; the equipment suitable for the Project was selected first by the established criteria, along with the policies above, then, the adequate equipment suitable for each hospital situation is planned with confirming the relevancy.

9) Soft components (Technical Assistance)

For promoting effective utilisation of the procured equipment, Ugandan side requested for technical assistance to improve the skill of equipment maintenance. Each hospital's condition, technical level and the cooperation with on-going technical cooperation project, "The Project on Improvement of Health Service through Health Infrastructure Management" should be considered for planning this technical assistance.

10) Coordination with supports by other donors

The project will be fully informed of the support programs of other donors, and will be careful that assistance provided by the Project will not duplicate the activities of other donors.

(2) Policies to Natural Conditions

1) Temperature and humidity

The monthly mean maximum temperatures at Hoima and Kabale range from 25˚C to 28˚C, and the temperature does not exceed 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 such as operation theatres and High Dependence Unit (hereinafter referred to as "HDU").

2) Precipitation

Both Hoima and Kabale have rainfall throughout the year, but 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) Policies to Socio-economic Customs

According to the documents issued by the Uganda Bureau of Statistics, construction costs rose about 11% during the past several years. In especial, significant increases are observed in the prices of fuel, such as petrol and diesel. The three target hospitals at Kabale and Hoima and Fort Portal are situated in the western region, at a distance of 200 ~ 400km from Kampala. Therefore, transportation costs of construction materials and medical equipment share a large percentage of the project cost. In developing the facility construction and equipment procurement plans, these requirements should be taken into consideration.

(4) Policies to Construction and Procurement Situations

A number of buildings including high-rise hotel and office buildings and large commercial buildings are constructed, and elevators are seen in Kampala. On the other hand, in Kabale and Hoima, even large commercial buildings are 4 or 5 stories high in which elevators are not installed.

The buildings to be constructed in the Project will be 2 stories high in principle. Staircases and ramps will be planned instead of the elevators.

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. The locally prevalent construction methods should be adopted as much as possible.

(5) Policies to Employing Local Contractors

Currently, about 70 companies are registered with the Uganda National Association of Building and Civil Engineering Contractors (hereinafter referred to as "UNABCEC"). Member companies are not categorised by trade such and architecture or civil, but 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, number of employees, past performance, or yearly contract amounts of member companies.

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

It is said that there are 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 the other two. 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 levels 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.

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

(6) Policies concerning Capability of the Implementing Agency for Proper Management and Maintenance

1) Facility plan

Hoima RRH and Kabale RRH 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. Both Hoima RRH and Kabale RRH have about twenty buildings. Many of them were built between 1930 and 1950. Some of these structures are seriously deteriorated.

At present, several persons are in charge of maintenance of facilities and equipment in Hoima RRH and Kabale RRH. The work on the equipment maintenance in principle and only one technician is in charge of facility maintenance.

In planning the 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

Some equipment needs specific consumables. Basically the failure of medical equipment is inevitable in the long term, and some equipment requires specific parts for repairs. Therefore, the following points need to be fully considered for the equipment planning.

① Agency handling the equipment should exist in Uganda or neighbour countries.
② Equipment requiring high operation cost should be eliminated.
③ Specifications of equipment should correspond to the technical level of the targeted hospitals.

(7) Policies for setting Grade of 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 Line (Draft 2004)
- Seismic Code Practice for Structural Designs – U319

The hospital components (departments and sections, etc.) 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

In Uganda, there is a "Standard List of Medical Equipment and Furniture (hereinafter referred to as the "Standard List")" guiding the suitable equipment for each level of the health facilities and this Standard List also includes the general specifications. In planning the grade and specification of the equipment, this Standard List should be referred to.

However, it often contains higher specifications than the actual necessity. Therefore, the standard list should be used as a reference and the grade of equipment should be planned corresponding to the services delivered by the targeted hospitals and technical level of staff with referring the similar level of hospitals.

(8) Policies to Methods and Period of Construction and Procurement

1) Policy to the method of construction

Locally common construction methods in Uganda will be preferentially adopted to try to ease

the acquisition, maintenance and control. Also, materials will be selected taking into account of the availability of materials in the Ugandan market.

2) Policy to the method of procurement

Uganda is basically an agricultural country, with coffee, tea and fishery products as its main products. Uganda depends almost entire on import for the supply of construction materials mainly from Kenya, South Africa, India, etc. except for a few materials such as cement, bricks and reinforcement steel, etc. In order to facilitate maintenance after the completion of the Project, the construction materials will be procured locally to the extent possible. In such cases, the quality and quantity of material supply should be carefully investigated so that the construction schedule may not be adversely affected.

Materials, products and equipment to be imported from Japan and third countries will be shipped to the Port of Mombasa, Kenya. The goods will then be transported by truck to each site. The goods will undergo the customs clearance at the country border city Malaba.

The Project includes procurement of medical equipment that is expected to be shipped by air. The medical equipment will be airfreighted from Japan or third countries to Entebbe Airport in Uganda, and then transported to each site by road.

3) Policy to the construction period

The Project is construction of about 3,000 m^2 size at both Hoima RRH and Kabale RRH. In consideration that the entire construction period is expected to be 13.0 months, and that the two sites are away from each other, it is regarded appropriate to conduct the Project in a single year by commencing the construction works at the two sites simultaneously.

The both construction sites are situated in the hospital premises. Improvement of various infrastructures such as rerouting of soil sewerage, as well as demolishing of the existing facilities will be implemented under the responsibility of Uganda. Therefore, it is important that all the concerned persons thoroughly understand and confirm with each other the construction implementation schedule so that the progress in the construction of the project buildings may not be hindered. It is also important that the construction works will be well planned so as not to hinder the medical services and routing hospital operations.

2-2-2 Basic Plan

2-2-2-1 Overall Project Description

(1) Description of the Surveys

In response to the request from the Government of Uganda, the Government of Japan decided to conduct a Preparatory Survey for the Project, and the Japan International Cooperation Agency (hereinafter referred to as "JICA") sent a Survey Team (Field Survey I) in May 2011. The Survey Team surveyed the requested four hospitals and cooperation projects financed by other donors, compiled an "Observations by the Survey Team" which is a comparative prioritisation list of the four hospitals, had discussions with the Ugandan authorities concerned, and narrowed the list down to three target hospitals. After the analysis I in Japan of the results of the Field Survey I, JICA sent the Survey Team (Field Survey II) in August 2011 and the Survey Team surveyed the target three hospitals, had more detailed discussions with the Ugandan authorities, conducted field surveys of relevant governmental and private institutions, and collected referential data and information. Following the analysis II in Japan and the draft report explanation mission in June 2012, the Preparatory Survey Report was compiled in August 2012 and submitted to the Ugandan authorities.

Due to the delay in Cabinet approval procedure and changes in prices overtime, the Government of Japan decided to conduct the Preparatory Survey 2 in June 2013. The Survey Team had discussions with the Ugandan authorities, collected the latest price information of materials and equipment, surveyed the three RRHS, and confirmed the current conditions of their facilities and equipment. Following further analysis in Japan, the present Preparatory Survey Report 2 has been compiled.

The outline design of this Project has been drawn on the basis of the consensus reached between the Ugandan and Japanese sides during the Preparatory Survey. Therefore, in principle, the outline design has not been changed in the Preparatory Survey 2.

The contents of the field surveys are described in the following page.

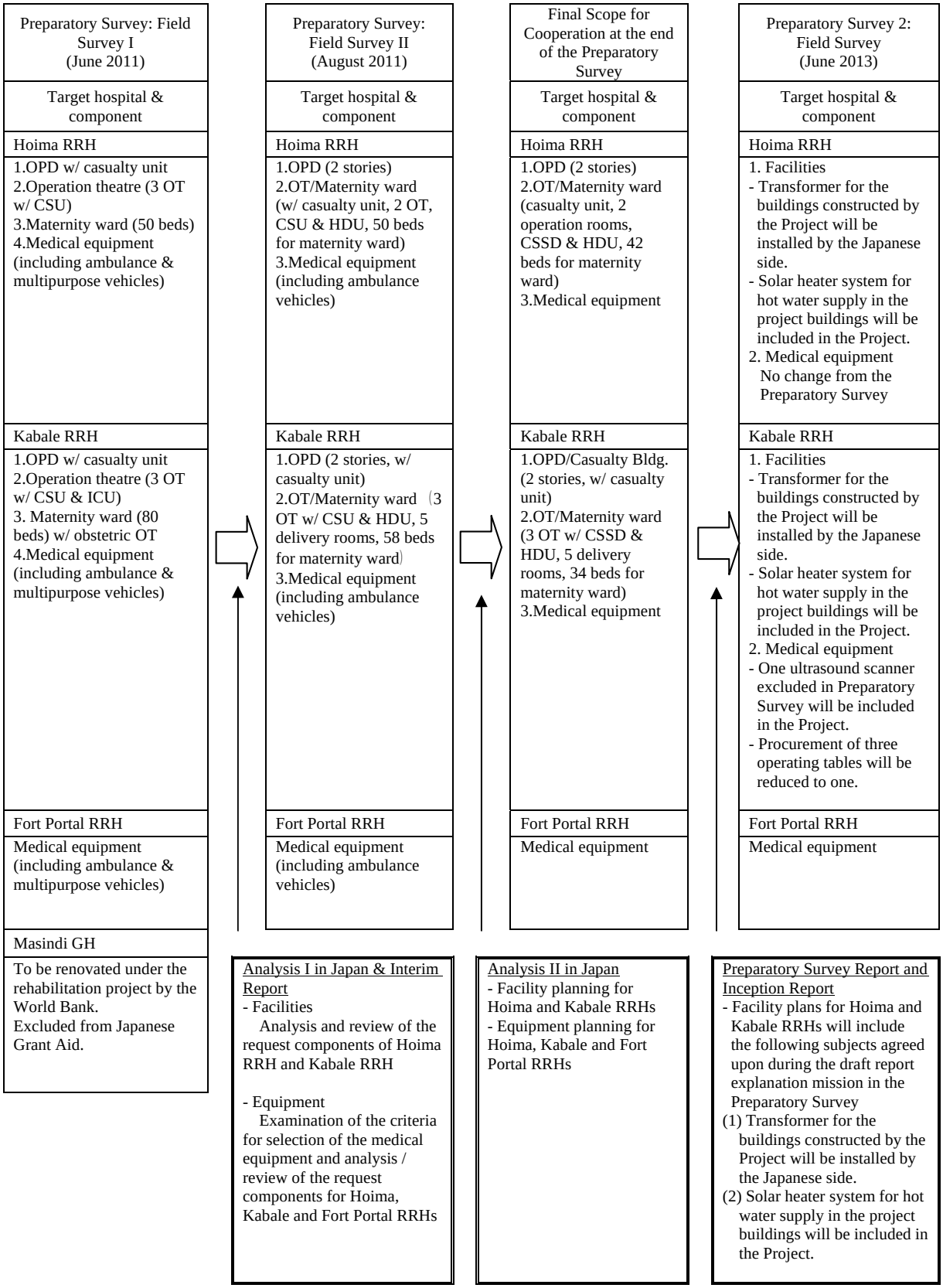


Figure-1 Description of the Surveys

(2) Selection of the Target Hospitals

Through the analysis of the results of the field survey I, the survey team has compiled the findings into the "Observations by the Survey Team".

Table-5 Observations by the Survey Team (June 1st, 2011)

Criteria	Hoima RRH	Kabale RRH	Fort Portal RRH	Masindi GH
Improvement and support plans by other donors during last 10 years	Constructed and now functioning ・Eye department (NGO, UK) ・Mental ward (AfDB) ・Paediatric ward (Renovated by the Government of Italy)	Constructed and now functioning ・Mental ward (AfDB) ・Eye department (Lions Aid, Norway)	Constructed and now functioning ・Mental ward (AfDB) To be constructed ・Main laboratory (USAID)	Loan amount of investment for GH and HC4 was agreed with WB and Masindi was highly prioritized as 4th rank for systematic rehabilitation
Improvement and support plans by national budget	・Lab extension (CDF) Under Construction ・Paying ward (CDF) ・Drug store (CDF) ・Staff housing (CDF) ・Getting land for the expansion (CDF)	Under Construction ・Private wing (CDF) ・Nurses' hostel (CDF) Constructed, but waiting for a specialist and equipment supply ・ENT department (MOH)	Main facilities were invested recently by MOH and now functioning Under Construction ・Private wing (CDF) ・Staff housing and Interns' hostel (CDF)	
Status and needs of facilities	・Established in 1938 ・Old buildings but look not so bad ・OPD & maternity ward so much crowded ・Many buildings were built by other donors ・New OPD is planned to build across the public road & land title is under preparation ・Status of power supply is very bad ・Staff housing under construction **・Need of new facilities seems very high**	・Established in 1944 ・Old buildings but look not so bad ・Building space is insufficient ・OPD, surgical ward & maternity ward so much crowded ・Beautiful garden court to be conserved ・Frequent power failure ・Private wing & nurses' hostel under construction **・Need of new facilities seems very high**	・Established in 1930 ・Many buildings newly built & rehabilitated ・New laboratory building will be built by other donor's fund ・Buildings are well maintained & kept clean ・Private wing & staff housing under construction **・Need of new facilities seems not imminent**	・Established in 1922 ・Old buildings **・WB financial support is expected**
Status and needs of equipments	Shortage of essential medical equipment ・Operation theatre ・CSU ・Laboratory etc.	Shortage of essential medical equipment ・Operation theatre ・CSU ・Laboratory etc.	Laboratory equipment will be procured by USAID Shortage of essential medical equipment ・Operation theatre ・CSU etc.	Medical equipment will be procured by WB

Hospital function	**Treatment Department**	･OPD･Gyn/Obs･Internal medicine･Surgical/Orthopaedic･Paediatric･Psychiatry･Eye･Dental･TB	･OPD･Gyn/Obs･Internal medicine･Surgical/Orthopaedic･Paediatric･Psychiatry･Eye･Dental･TB	･OPD･Gyn/Obs･Internal medicine･Surgical/Orthopaedic･Paediatric･Psychiatry･Eye･Dental･TB	
	Human resource (Doctors and other staffs)	MDs with specialty ･Physician 1 ･Obs/Gyn. 1 ･Paediatric 1 ･Ophthalmology 2 ･Anaesthetic 1 ･Public health 1 General MDs 5 Clinical Officers 10 Anaesthetic Officers 4 Orthopaedic staffs 4 Radiographers 1 Laboratory staffs 5	MDs with specialty ･Physician 1 ･Obs/Gyn. 3 ･Ophthalmology 1 General MDs 2 Clinical Officers 6 Anaesthetic Officers 3 Orthopaedic staffs 5 Radiographers 3 Laboratory staffs 10	MDs with specialty ･Physician 1 ･Surgeons 2 ･Obs/Gyn 1 ･Paediatric 1 ･Ophthalmology 1 ･Radiology 1 General MDs 9 Clinical Officers 15 Anaesthetic Officers 3 Orthopaedic staffs 8 Radiographers 3 Laboratory staffs 4	MDs 3 Clinical Officers 6
Referral system	**Referral cases**	･Surgery/Orthopaedic surgery, needing specialists ･Further investigation by specialists (Neurological, Heart, etc.) ･Evaluation with CT, Endoscopy, Biopsy etc. ･Special care (palliative, chemotherapy)	･Surgery/Orthopaedic surgery, needing specialists ･Further investigation by specialists (Neurological, Heart, Eye etc.) ･Evaluation with CT, Endoscopy, Biopsy etc. ･Special care (palliative, chemotherapy) ･Mental	･Further investigation by specialists (Neurological, Heart, ENT etc.) ･Evaluation with CT, Endoscopy, Biopsy etc. ･Complicated orthopaedic surgery ･Special care (palliative, chemotherapy) ･Mental	
	Referred hospital	Mainly Mulago	Mainly Mulago or Mbarara, Otherwise Private hospitals in the same area	Mainly Mulago, Otherwise Butabika (for mental health)	Mulago, Hoima, Gulu
Others		･Requesting a surgeon to MOH	･Requesting a surgeon to MOH	･Comparatively hospital management are well organized	
Suggestion by the Survey Team		･Facilities rehabilitation, and standard equipment supply ･Fulfilment of doctors (especially surgeon)	･Facilities rehabilitation, and standard equipment supply ･Fulfilment of doctors (especially surgeon)	･Equipment supply to upgrade the medical services ･ENT/Eye & Casualty Unit are needed but those are small buildings and could be improved by the hospital	WB financial support is expected.

(3) Request Components from the Recipient Country at the Field Survey I

1) Facilities

The request components presented by MOH in response to the results of the field surveys at the four candidate hospitals are summarised in the following table.

Hospital	Request Components
Hoima RRH	- Construction of OPD with Casualty Unit - Construction of an Operation Theatre (3 operation rooms) complete with CSU - Construction of a Maternity Ward (50 beds) - Procurement of medical equipment including ambulance vehicle and multipurpose vehicle
Kabale RRH	- Construction of OPD with Casualty Unit - Construction of an Operation Theatre (3 operation rooms) complete with a central sterilising unit (CSU) and ICU - Construction of a Maternity Ward (80 beds) with an obstetrics theatre - Procurement of medical equipment including ambulance vehicle and multipurpose vehicle
Fort Portal RRH	- Procurement of medical equipment including ambulance vehicle and multipurpose vehicle
Masindi GH	- To be excluded from the Project because the WB's financial support is expected.

2) Equipment

The equipment study on the request from Masindi GH was not conducted, for the reason that rehabilitation of the hospital infrastructure was to be carried out by the Uganda Health Systems Strengthening Project by WB and decided not to be covered by the scope of the Project. The rehabilitation of the facilities at Fort Portal RRH was also excluded from the Project because the facilities seemed sufficient and in good conditions. However, the situation of existing equipment in this hospital was confirmed to be deficient and decrepit, so the equipment rehabilitation was decided to be included to the scope of the Project. The survey team confirmed if the equipment list shown on the application form was the final request or not. However, the target hospitals did not recognise the contents of the request, so the survey team requested each target hospital to prepare the list of the final requested equipment and received it by the end of field survey.

(4) Request Components from the Recipient Country at the Field Survey II

1) Facilities

As a result of the discussions with MOH, Hoima RRH and Kabale RRH based on the analysis I in Japan, the request components were narrowed down as follows:

Hospital	Request Components at Field Survey I
Hoima RRH	1 Construction of OPD with Casualty Unit 2 Construction of an Operation Theatre (3 operation rooms) complete with CSU 3 Construction of a Maternity Ward (50 beds)

⇒

Request Components at Field Survey II
1. OPD (2 stories) GF: reception, laboratory, pharmacy, clinic (6 rooms), others 1F: clinic (5 rooms), dental clinic, others 2. OT/Maternity Ward (2 stories) GF: operation theatre (2 rooms) with ancillary rooms, HDU, CSU, casualty unit 1F: maternity ward (50 beds)

Hospital	Request Components at Field Survey I		Request Components at Field Survey II
Kabale RRH	1 Construction of OPD with Casualty Unit 2 Construction of an Operation Theatre (3 operation rooms) complete with CSU and ICU 3 Construction of a Maternity Ward (80 beds) with an obstetrics theatre	⇒	1. OPD/Casualty Block (2 stories) GF: OPD: reception, laboratory, pharmacy, casualty unit, others 1F: OPD: clinic (7 rooms), dental clinic, others 2. OT/Maternity Ward (2 stories) GF: operation theatre (3 rooms, one for obstetric operation) with ancillary rooms, HDU, CSU 1F: maternity ward (58 beds), 5 delivery rooms, new born room, other ancillary rooms

Major differences in the two request components are as follows:

① Hoima RRH

a) Because the OPD Block and OT/Maternity Ward are designed at separate locations in the hospital premises, the casualty unit is planned in the OT/Maternity Ward. The OPD Block accommodates rooms for the outpatient department only.

b) Three operation rooms were requested at first, but there was one operation room exclusively for obstetric operation in the existing maternity ward. The survey team calculated two operation rooms would be sufficient to cater for the demand even taking into account the past records and assumed population increase in future (five years after the completion of the Project), and recommended two operation, which the Ugandan side agreed upon. (See '2-2-2-3 I (2) 2)③Operation theatre' for details.)

② Kabale RRH

a) The original request for two single-story buildings; one for the operation theatre and the other for the maternity ward was changed to a two-story building composed of the operation theatre on the ground floor and the maternity ward on the first floor.

b) Relevant to the above change, three operation rooms were designed in the operation theatre, including one for obstetric operation.

c) Twenty two beds were planned to remain at the existing Maternity Ward, and 10 beds were planned for ophthalmology and ENT respectively. Consequently, 58 beds were requested for the new Maternity Ward, so that Kabale RRH would have 92 beds in the Maternity Ward in total. (See '2-2-2-3 I (3) 2)④Maternity Ward' for details.)

2) Equipment

During the field survey II, the Survey Team had discussions with the concerned parties of MOH and the target hospitals on the tentative version of selection criteria which was drafted based on the results of field survey I. The final list of requested equipment was established out of the requested equipment collected during the field survey I, through the evaluation of the validity of equipment based on these criteria.

3) Soft component

According to MOH, there were the cases that the procured equipment was not utilised effectively in the past projects, which caused by the reasons that the instruction on the equipment operation and maintenance and information on the procurement of consumables and spare parts was not sufficient and that the system of maintenance and management was still immature. Under these circumstances, the Ugandan side requested for the technical assistance on improving the maintenance skills and clinical skills for operation of the procured equipment under the Project.

"Project on Improving of Health Service through Health Infrastructure Management", the technical cooperation by JICA is presently implemented to enforce the management system of medical equipment in the health facilities in Uganda. This technical cooperation is planned to be countrywide activities and it could be difficult to expect the cooperation specialised on the improvement of skill of the planned equipment by this grant aid project. Therefore, the technical assistance for the specified equipment was planned as Soft Component under the cooperation with the technical cooperation project.

(5) Preparatory Survey 2: Results of the Field Survey

1) Facilities

The Survey Team visually checked the site conditions at Hoima and Kabale RRHs and confirmed there were no changes compared to their conditions as of the Field Survey II of the Preparatory Survey (August 2011). The banana field at the Kabale site where the OPD/Casualty Block was to be constructed has been levelled, with trees being cut and removed.

In the future, after the signing of the Exchange of Notes (hereinafter referred to as "E/N") and the Grant Agreement (hereinafter referred to as "G/A"), if the existing facilities are dismantled and removed out of the construction site, there will be no problems in the construction schedule.

The following two subjects, a matter of agreement at the time of the draft report explanation mission, were presented by the Survey Team and accepted by the Ugandan side with consent.

a. A new transformer for the project buildings at Hoima and Kabale RRHs will be installed by the Japanese side.
b. A solar heater system will be added to the hot water supply system for the project buildings at Hoima and Kabale RRHs.

2) Equipment

No major changes were observed in the conditions of Hoima and Fort Portal RRHs, while the following changes were found at Kabale RRH. The Survey Team examined and discussed with the Ugandan side on the proper measures, and both sides reached the following consensus.

a. Two new operating tables were planned to be installed at Kabale RRH. Accordingly, three

operating tables to be procured in the Project should be reduced to one.

b. At the time of the Preparatory Survey, the ultrasound scanner was excluded from the supply lists of the medical equipment because the existing one was functioning in spite of its aging. However, that machine failed after the previous survey, and was not recovered properly. Since then, there is no working ultrasound scanner, and it makes difficult for clinicians to diagnose diseases. At the time of the Field Survey in the Preparatory Survey 2, the Ugandan side requested the ultrasound scanner to be included in the Project again, and in view of its necessity, it should be included in the equipment plan.

3) Soft component

Nothing was observed in the situations that would require changes in the soft component planning.

2-2-2-2 Site Planning

(1) Hoima RRH

There is a courtyard in the hospital premises to be large enough by removing the existing container office between MCH and the Administration Bldg. facing the front street. The new OPD Block is planned in this space.

The new OPD Block and the OT/Maternity Ward will be located at places separated by the hospital road. The casualty unit is usually situated in the OPD building, however, there is a need to strengthen cooperation of the casualty unit and the operation theatre; therefore the casualty unit will be combined in the operation theatre. The OT/Maternity Ward will be placed in the space to be created by dismantling the decrepit existing OT and kitchen, because it is desirable to construct the OT/Maternity Ward adjacent to the existing Maternity Ward.

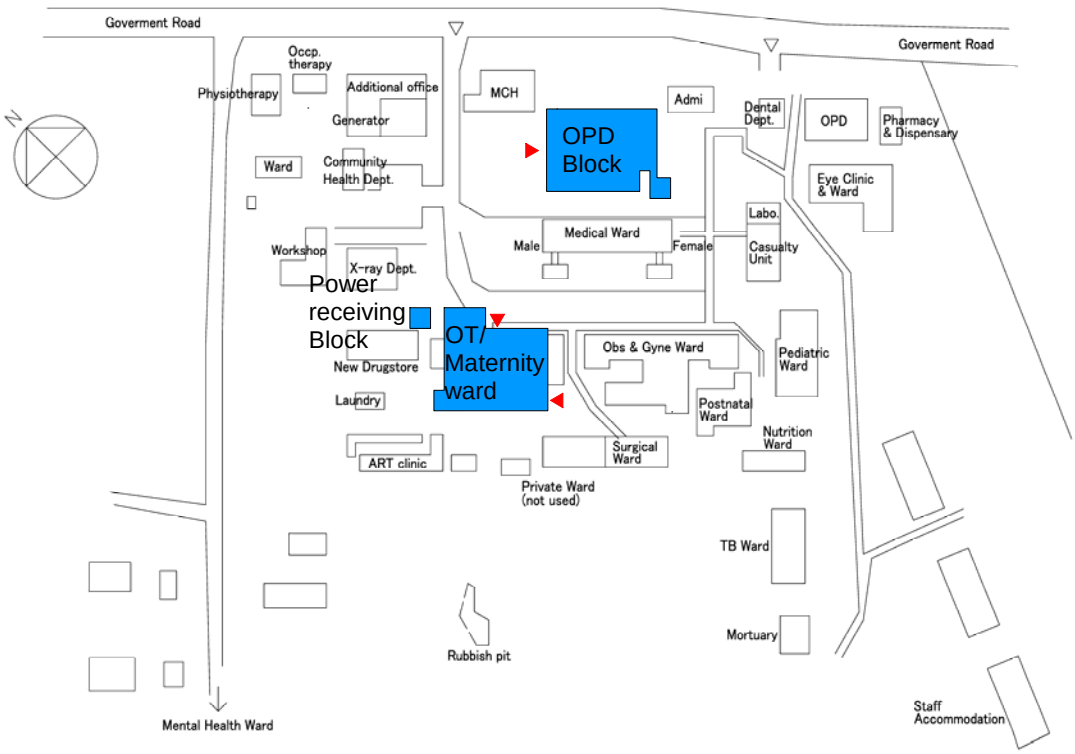


Figure-2 Hoima RRH: Layout Planning

(2) Kabale RRH

The Ugandan side has been levelled the construction site of the OPD/Casualty Block which was agreed during the Field Survey II. The preparatory work under the responsibility of the Ugandan side has been mostly over.

The OT/Maternity Ward will be planned at the space to be created by demolishing the existing operation theatre, and the two buildings will be connected by a connection corridor.

The decrepit existing OPD building will be demolished after the completion of the OPD/Casualty Block, and its space will be used for the parking lot and front yard.

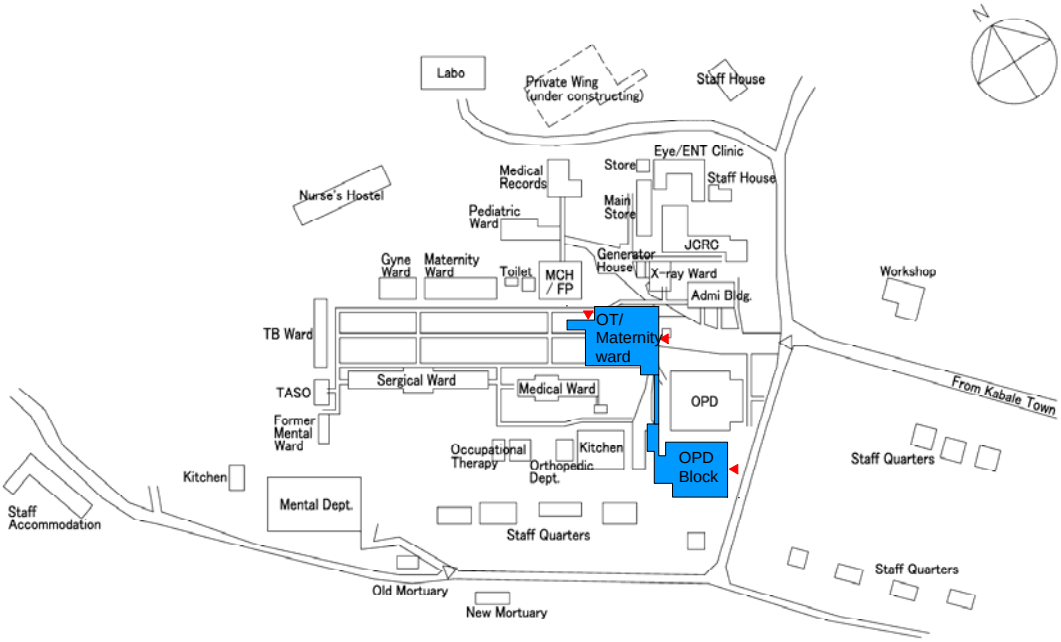


Figure-3 Kabale RRH: Layout Planning

2-2-2-3 Facility Planning

I Architectural Planning

(1) Design Conditions for planning the capacity of facilities

The number and size of main rooms of each department is determined using the assumption explained below based on the number of patients forecast for the year 2018/2019, or five years after completion and commissioning of the Project. The number of patients in 2018/2019 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) Assumed population increase

The number of patients may be assumed to increase in proportion to the population. As a first step, the population of the western region in Uganda for 2018/2019 is forecast and the rate of population increase is calculated. The newest data of population, the year 2010/2011 is set as 1, and the population in 2018/2019 is estimated.

The annual population increase is 3.2% according to the MOH's "The State of Uganda Population Report". Then, the population in the year 2018/2019 is expected as 1.29. This figure is used for the estimation of the number of patients.

2010/11		1		
2011/12	x1.032	1.032		
2012/13	x1.032	1.065		
2013/14	x1.032	1.099		
2014/15	x1.032	1.134		
2015/16	x1.032	1.171		
2016/17	x1.032	1.208		
2017/18	x1.032	1.247		
2018/19	x1.032	1.287	→	**1.29**

2) Conditions of hospital operation

The working days and operation hours of each department of the target hospitals are set as follows according to the workload analysis of RRHs in the western region in Uganda.

Department	Conditions of Hospital Operation	
OPD	300 days/year	8 hours/day
Casualty	365 days/year	24 hours/day
Delivery	365 days/year	
Operation cases	365 days/year	6 cases/room･day
Average admission days in the Maternity Ward	5 days (following the past records at Kabale RRH and Hoima RRH)	
Bed occupancy	90%	
Consultation time	Medicine, Paediatrics	8 minutes/person/room
	Other departments	20 minutes/person/room

(2) Hoima RRH

1) Number of Patients

Following table shows the number of patients at each department in the past three years. The data on 2011/12 which was obtained during the Preparatory Survey 2 is shown for reference.

Patients/visitors at each department		2008/09	2009/10	2010/1	Average	2011/12	Remark
A.	Outpatients	106,992	110,067	104,603	107,221	138,949	
	(Breakdown)						
	General OPD (Medical)	36,879	55,369	37,928	43,392	76,950	
	Casualty	123	118	272	171	461	
	Paediatrics	10,014	11,291	14,455	11,920	10,940	
	Gynaecology	928	725	864	839	948	
	Surgery	487	39	0	175	248	
	Orthopaedics	1,526	1,078	1,972	1,525	2,404	
	Ophthalmology	5,556	6,752	7,959	6,756	6,382	Existing
	Dental	9,686	10,050	11,461	10,399	11,568	
	Private	0	0	0	0	0	
	ENT	2,865	2,561	2,471	2,632	2,180	
	Physiotherapy	921	618	1,184	908	1,118	Existing
	Occupational therapy	0	0	0	0	0	Existing
	Hypertension	1,622	1,257	1,411	1,430	1,607	
	Diabetes	943	783	1,248	991	1,296	
	HIV/AIDS	3,805	1,406	3,098	2,770	2,861	
	Psychiatry	5,605	6,739	7,504	6,616	7,607	Existing
	Antenatal	24,400	9,484	10,341	14,742	9,349	
	Family Planning	1,632	1,797	2,435	1,955	3,030	
	Total	106,992	110,067	104,603	107,221	138,949	
		(93,278)	(94,161)	(85,521)	**(90,986)**	(120,812)	Excluding ophthalmology, physiotherapy, occupational therapy, psychiatry and family planning
B.	No. of emergency patients	1,971	2,374	2,615	2,320	3,656	
	(Breakdown)						
	Injuries - Road Accidents	335	337	448	373	368	
	Injuries (Trauma due to other causes)	1,470	1,846	1,958	1,758	3,058	
	Animal / Snake bites	166	191	209	189	230	
	Total	1,971	2,374	2,615	**2,320**	3,656	
C.	Operations	13,320	13,822	13,331	13,491	20,547	
	Operations except for dental operation	3,634	3,772	1,870	**3,092**	3,602	
	(Caesarean)	(894)	(996)	(1,178)	(1,023)	(1,202)	
D.	Inpatients in the Maternity Ward	4,122	4,193	4,164	4,160	4,476	
	Annual total admission days (person・day)	16,212	18,224	18,616	17,684	14,982	
	Average admission days (day)	3.93	4.35	4.47	4.25	5.38	
	Bed occupancy rate (%)	153.16%	172.17%	175.87%	**167.07%**	185%	
E.	Total No. of deliveries	3,544	3,685	3,687	**3,639**	3,911	

Source: Data in the answers to the Questionnaire

2) Study by department

① OPD

<Preconditions>

1. Consultation rooms for ophthalmology, physiotherapy, occupational therapy, psychiatry and family planning are not considered, because they already have the rooms.
2. Among other departments, consultation rooms for medical (general OPD), paediatric, dental and ENT departments that have many patients, as well as for antenatal, gynaecology and HIV/AIDS that require special considerations are estimated separately.
3. Surgical, orthopaedic, hypertension and diabetes are integrated in the specialised OPD (special clinic) to estimate the required number of consultation rooms.
4. Working days of OPD are 300 days/year.
5 OPD is opened for 8 hours/day (480 minutes/day).
6. On the average one patient spends 8 minutes for consultation at medical and paediatric OPD, and 20 minutes at dental and other departments.

<Based on the average annual number of patients in three years>

	Annual No. of outpatients (p/year)	Annual working day (day/year)	Opening hour (min/day)	Average No. of daily patients (p/day)	Rate of population increase	Expected No. of daily patients in 2018/19 (p/day)	Consultation room				
							Average of consultation time (min/p/room)	Max. No. of daily patients per room (p/room/day)	Required No. of consultation rooms (room)	Calculated No. of rooms (room)	**Required No. of rooms after examination (room)**
	A	B	C	D=A/B	E	F=D*E	G	H=C/G	I=F/H		
1. Medical (General OPD)	43,392	300	480	144.64	1.29	186.59	8	60	3.11	4	**5**
2. Paediatric	11,920	300	480	39.73	1.29	51.26	8	60	0.85	1	**1**
3. Dental	10,399	300	480	34.66	1.29	44.72	20	24	1.86	2	**2**
4. ENT	2,632	300	480	8.77	1.29	11.32	20	24	0.47	1	**1**
5. HIV/AIDS	2,770	300	480	9.23	1.29	11.91	20	24	0.50	1	**1**
6. Gynaecology	839	300	480	2.80	1.29	3.61	20	24	0.15	1	**1**
7. Antenatal	14,742	300	480	49.14	1.29	63.39	8	60	1.06	2	**1**
8. Specialised OPD	4,121	300	480	13.74	1.29	17.72	20	24	0.74	1	**1**
Total	90,815	--	--	302.72	--	390.50	--	--	--	13	**13**

<Examination of the calculated number of rooms required>

Four rooms will be necessary for the general OPD when the number of rooms are estimated based on the average number of patients in three years. In fact, however, the OPD patients in the year 2009/10 counted 55,369, which showed about 46% increase from 36,879 patients in 2008/09 and 37,928 patients in 2010/11. The required number of rooms becomes 5 rooms when it is calculated based on the 55,369 patients in 2009/10. The number of patients is assumed to continuously increase owing to the construction of the new OPD. In consideration of these factors, five rooms should be planned in the Project.

The calculation indicates that gynaecology and antenatal will need three rooms in total,

however, their examinations are similar and they can share the consultation rooms commonly. Thus, two consultation rooms will be planned for gynaecology and antenatal clinics.

② Casualty unit

<Preconditions>

1. Triage is incorporated in the clinic.
2. Casualty Unit is operated 365 days/year and 24 hours/day (1,440 minutes/day).
3. On the average one patient spends 120 minutes/room for diagnosis and/or treatment, and 480 minutes/bed for recovery.

<Based on the average number of patients in three years>

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 population increase	Expected No. of daily patients in 2018/19 (p/day)	Clinic / Triage			
						Average of filtering time (min/p/room)	Max. No. of daily patients per room (p/room/day)	Required No. of clinic (room)	**Required No. of rooms (room)**
A	B	C	D=A/B	E	F=D*E	G	H=C/G	I=F/H	
2,320	365	1,440	6.36	1.29	8.20	120	12	0.68	**1**
						Resuscitation room			
						Average of recovery time (min/p/bed)	Max. No. of daily patients per bed (p/bed/day)	Required No. of beds (bed)	**Required No. of beds (bed)**
						J	K=C/J	L=F/K	
						480	3	2.73	**3**

③ Operation theatre

<Preconditions>

1. Working days of the operating theatre are 365 days/year.
2. Dental operation theatre is excluded.
3. According to the past records, the average number of operations per room is 6 cases/ room/day.
4. On the average one person spends 0.5 day/bed in the recovery room for recovery.

<Based on the average number of operations in three years>

Annual No. of operations / patients (p/year)	Annual working day (day/year)	Average No. of daily operations / patients (p/year)	Rate of population increase	Expected No. of daily operations /patients in 2018/19 (p/day)	Caesarean			Operation		
					Average No. of operations/patients per room (p/room/day)	Required No. of rooms (room)	**Planned No. of rooms (room)**	Average No. of operations/patients per room (p/room/day)	Required No. of rooms (room)	**Planned No. of rooms (room)**
A	B	C=A/B	D	E=C*D	F	G=E/F		F	G=E/F	
a) 1,023	365	2.80	1.29	3.62	6	0.60	**1**			
b) 2,069	365	5.67	1.29	7.31				6	1.22	**2**
c)3,092	(Total)									

Note: a) Caesarean operation; b) Operation except for caesarean; c) Total

There is one obstetric operation room in the existing maternity ward. Consequently, two operation rooms will be planned in the new OT/Maternity Ward.

④ Maternity ward

<Preconditions>

1. Working days of the maternity ward are 365 days/year.
2. On the average one inpatient stays for 5 days in the hospital.
3. Usual bed occupancy rate is 90%.

<Based on the average number of patients in three years>

Annual No. of inpatients (p/year)	Annual working day (day/year)	Average admission days (day/p)	Total admission days per year (day/year)	Rate of population increase	Expected total admission days in 2018/19 (day/year)	Bed occupancy rate (%)	Expected total admission days (day/year)	Required No. of beds (bed)	Planning	
									No. of beds (bed)	Bed occupancy rate (%)
A	B	C	D=A*C	E	F=D*E	G	H=F/G	I=H/B	**J**	K=F/B/J
4,160	365	5	20,800	1.29	26,832	90%	29,813	81.68	**82**	89.65%

(Number of beds planned)

1. 20 beds in the existing maternity ward	→	**20 beds** (existing)
2. 16 beds in the postnatal ward adjacent to the existing maternity ward	→	**16 beds** (existing)
3. 4 beds in the space remodelled from the new born baby room and storage in the postnatal ward*	→	**4 beds** (after renovation)
4. 42 beds in the new maternity ward	→	**42 beds** (new)
	Total	**82 beds**

* The requested number of beds at the time of field survey II was 50. The planned number of beds is 82 as calculated above, while the existing maternity ward has 20 beds, postnatal ward 16 beds, and 4 beds will be installed after remodelling. Consequently, the new maternity ward will have 42 beds.

⑤ Delivery unit

<Preconditions>

1. The average number of deliveries per bed is 3 persons/room/day.

<Based on the average number of deliveries in three years>

Annual No. of deliveries (p/year)	Annual working day (day/year)	Average No. of daily deliveries (p/day)	Rate of population increase	Expected average No. of daily deliveries in 2018/19 (p/day)	Delivery Room		
					Average No. of daily deliveries per bed (p/day/bed)	Required No. of delivery beds (bed)	**Planned No. of delivery beds (bed)**
A	B	C=A/B	D	E=C*D	F	G=E/F	
3,639	365	9.97	1.29	12.86	3	4.29	**5**

The existing Maternity Ward has delivery rooms. Consequently, new delivery rooms will not be planned in the Project.

3) Required floor areas

Based on the number of rooms needed for each department as calculated above, the required total floor areas on building plans are estimated. The floor area of each room of the target hospitals is assumed in consideration of the current status of existing facilities, and with reference to the standard for medical facilities in Uganda and the standard for medical facilities in Japan (AIJ Architectural Design Data Corpus and others).

In addition, medical equipment layout expected in each room, the number of patients and the number of medical staff are comprehensively considered to calculate the required floor area of each room.

Table-6 Floor Areas of Hoima RRH

OPD Block GF			
Dept	Room	Floor areas(m2)	Size (m)
OPD	Entrance hall	32.0	4.0x8.0
	Reception, Office (med. record storage)	30.0	6.0x5.0
	Laboratory	36.0	6.0x6.0
	Pharmacy	36.0	6.0x6.0
	Staff room (M & W) (w/ toilet, shower)	36.0	6.0x6.0
	Paediatric consultation	18.0	6.0x3.0
	Paediatric treatment	18.0	6.0x3.0
	Obstet. consultation	18.0	6.0x3.0
	Obs/Gyn. treatment	18.0	6.0x3.0
	Gynaec. consultation	18.0	6.0x3.0
	ENT clinic	36.0	6.0x6.0
	Med. supply storage-1	18.0	6.0x3.0
	Fire hydrant pump room	10.0	2.0x5.0
	Waiting space	104.0	2.0x52.0
	Corridor	144.0	2.0x72.0
	Staircase	44.0	4.0x6.0+4.0x5.0
	Ramp	104.0	4.0x26.0
	Connection corridor	4.0	2.0x2.0
	Toilet	36.0	6.0x6.0
GF Total		760.0 m2	
OPD Block 1F			
OPD	General OPD consul-1	18.0	6.0x3.0
	General OPD consul-2	18.0	6.0x3.0
	General OPD consul-3	18.0	6.0x3.0
	General OPD treatment	36.0	6.0x6.0
	General OPD consul-4	18.0	6.0x3.0
	General OPD consul-5	18.0	6.0x3.0
	Special OPD consul.	18.0	6.0x3.0
	Special OPD treat.	18.0	6.0x3.0
	Med. supply storage-2	6.0	1.5x4.0
	Dental clinic	54.0	6.0x9.0
	Dental X-ray	9.0	3.0x3.0
	Dental storage	9.0	3.0x3.0
	HIV counselling	18.0	6.0x3.0
	HIV consultation	18.0	6.0x3.0
	Staff toilet	6.0	1.5x4.0
	Waiting space	100.0	2.0x50
	Corridor	186.0	(2.0x70.0)+(4.0x10.0) +(1.5x4.0)
	Staircase	66.0	6.0x6.0+6.0x5.0
	Ramp	104.0	4.0x26.0
	Connection corridor	4.0	2.0x2.0
	Toilet	36.0	6.5x6.0
1F Total		778.0 m2	
Total		1538.0 m2	

Casualty	Ambulance	36.0	6.0x6.0
	Triage / Clinic	18.0	6.0x3.0
	Resuscitation room	42.0	6.0x7.0
	Sluice/sterilisation	6.0	3.0x2.0
	Anteroom (Ambu-OT)	12.0	2.0x6.0
	Office	12.0	3.0x4.0
	Nurse station-2	18.0	6.0x3.0
	Staff room (w/ toilet, shower)	27.0	3.0x9.0
	Duty room	9.0	3.0x3.0
	Corridor	72.0	3.0x24.0
	Subtotal	252.0 m2	
Common	Ward entrance	24.0	6.0x4.0
	Corridor	47.25	1.5x31.5
	Staircase	12.0	6.0x2.0
	Ramp	105.75	4.5x23.5
	Fire hydrant pump room	9.0	4.5x2.0
	Subtotal	198.0 m2	
GF Total		810.0 m2	
OT / Maternity Ward 1F			
Maternity ward	8-bed room-1	45.0	6.0x7.5
	8-bed room-2	45.0	6.0x7.5
	8-bed room-3	45.0	6.0x7.5
	8-bed room-4	45.0	6.0x7.5
	8-bed room-5	45.0	6.0x7.5
	2-bed room	22.5	3.0x7.5
	Attendant room (w/ toilet)	28.50	3.0x9.5
	Linen store	5.25	1.5x3.5
	Maternity treatment	22.5	3.0x7.5
	Nurse station	22.5	3.0x7.5
	Newborn baby room	22.5	3.0x7.5
	Sluice/sterilisation	12.0	3.0x4.0
	Patient toilet	45.0	6.0x7.5
	Staff room	9.0	3.0x3.0
	Staff toilet	6.75	1.5x4.5
	Corridor	124.5	3x(30+7.5)+1.5x(4.5+ 3.5)
	Subtotal	546.0 m2	
Common	Corridor	15.0	3.0x2.0+1.5x6.0
	Staircase	24.0	6.0x4.0
	Ramp	114.75	4.5x25.5
	Subtotal	153.75 m2	
1F Total		699.75 m2	
Total		1509.75 m2	

OT/Maternity Ward GF			
Dept	Room	Floor areas(m2)	Size (m)
Operation theatre	Operation theatre-1	36.0	6.0x6.0
	Operation theatre-2	36.0	6.0x6.0
	Anaesthesia room	9.0	3.0x3.0
	Recovery room	18.0	6.0x6.0
	Nurse station, operation gowning room	13.5	3.0x4.5
	OT hall	85.5	6.0x6.0+3.0x4.5+3.0 x12.0
	Anteroom	24.0	6.0x4.0
	Staff locker room & ancilary room	36.0	6.0x6.0
	CSSD	48.0	6.0x8.0
	HDU	36.0	6.0x6.0
	Nurse station-1	18.0	6.0x3.0
	Subtotal	360.0 m2	

Power Receiving Block			
Dept	Room	Floor areas(m2)	Size (m)
Common	Power receiving room	18.0	3.0x6.0
	Generator room	18.0	3.0x6.0
	Total	36.0 m2	

4) Components of each building

Based on the discussions with MOH and Hoima RRH and the site surveys facilities construction at Hoima RRH is planned to consist of three buildings; the OPD Block, the OT/Maternity Ward and the power receiving block. The power receiving block requires only small space; nevertheless, it is planned as a separate one to avoid the emission of noise and vibrations during the operation of the generator system.

Building	Floor	Room
OPD Block	GF	Entrance hall, Reception, Laboratory (including blood sampling room), Pharmacy, Staff room (including toilet and shower, separate rooms for male and female staff), Obstetrics consultation room, Obstetrics/gynaecology treatment room, Gynaecology consultation room, Paediatric consultation room, Paediatric treatment room, ENT clinic, Waiting space, Corridor, Staircase, Ramp, Medical supply storage-1, etc.
	1F	General OPD consultation room (5 rooms), General OPD treatment room, Specialised OPD consultation room, Specialised OPD treatment room, HIV consultation room, HIV counselling room, Dental clinic, Medical supply storage-2, Staff toilet, Waiting space, Corridor, Staircase, Ramp, etc.
	G, 1F	Outpatient toilets (men, women and handicapped) on each floor in a separate building
OT/Maternity Ward	GF	Operation Theatre: OT (2 rooms), Recovery room (2 beds), Anaesthesia room, Nurse station with operation meeting room, Staff locker room (men/women), Anteroom, Operation hall, HDU (4 beds), Nurse station-1, CSSD, etc. Casualty Unit: Ambulance, Triage/Clinic, Resuscitation room (3 beds), Sluice/sterilisation room, Nurse station-2, Office (also serving as guard post), Staff locker room (men/women), Duty room, Anteroom (Ambu-OPT), Corridor, etc. Maternity Ward: Ward entrance, corridor, staircase, ramp, etc.
	1F	Maternity Ward: 8-bed rooms (5), 2-bed room (1), Nurse station, Maternity treatment room, Newborn baby room, Sluice/sterilisation room, Staff room, Staff toilet, Attendant room, Linen store, Patient toilet, Corridor, Staircase, Ramp, etc.
	G, 1F	Inpatient toilets in a separate building
Power Receiving Block	GF	Power receiving room, Generator room

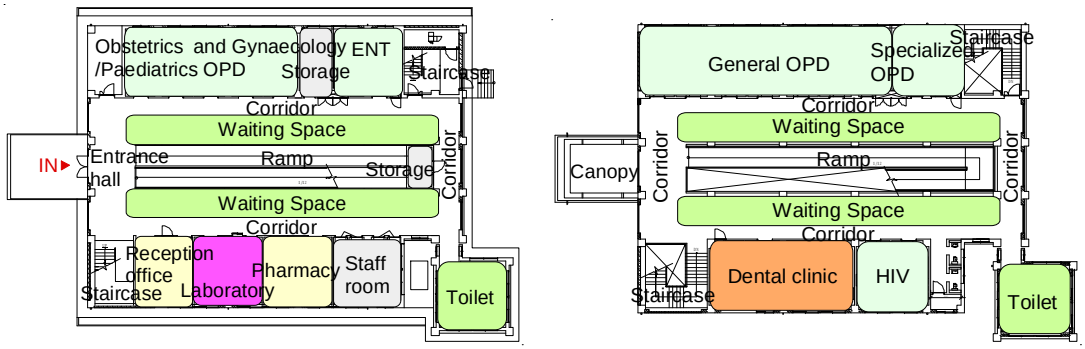
5) Floor planning (zoning plan)

① OPD Block

The site is located in the hospital premises. A two-story building will be planned for the better use of land. Elevators are not common in the Hoima area, and their maintenance costs will be considerably high; engineers will have to be called from Kampala for maintenance and repairs, for example. Instead, ramps and stairways will be planned for the vertical migration.

Consultation rooms are the main components in the OPD Block. They will be lined along the north and south peripheral walls in order to ensure sufficient natural light and breeze in the rooms,

In the Project, the ramps are designed at the centre in the building with airy space above, and patients waiting space will be provided around the ramps. Staff corridors will be provided along the window side of the consultation and treatment rooms so that the movement of doctors, nurses and other medical staff will not intersect with the circulation of patients. Toilets will be installed at a separate corner, to minimise the offensive odours into the hospital buildings.



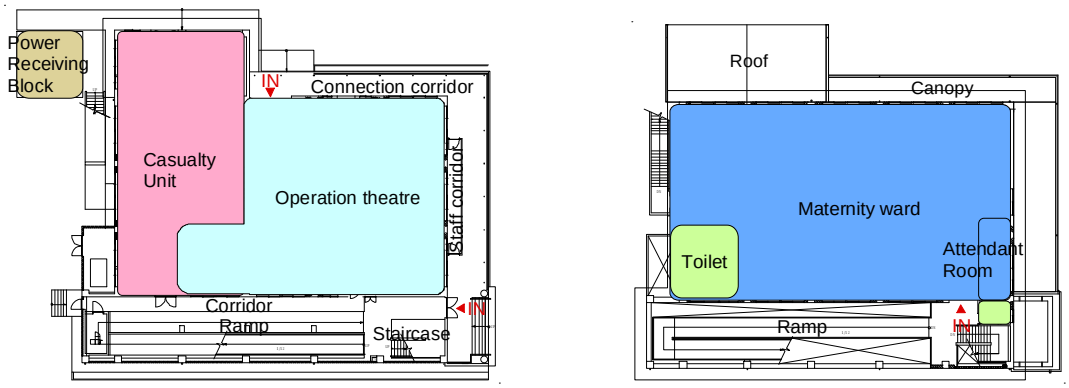
Ground Floor First Floor

Figure-4 Hoima RRH: Zoning of OPD Block

② OT/Maternity Ward

Similar to the OPD Block, the OT/Maternity Ward will be also planned as a two story building. The operation theatre and casualty departments will be on the ground floor, and the maternity ward on the first floor.

Ramps will be designed on the rear side of the building near the stairways for the purpose of transfer of patients by a stretcher or wheelchair. The space above the ramps will be designed as an atrium to serve as if the roofed outdoor space so that ample sun lights and outdoor air will be taken into the building.



Ground Floor First Floor

Figure-5 Hoima RRH: Zoning of OT/Maternity Ward

6) Elevation planning (shape, exterior finishing material)

The buildings will be of a rigid-frame concrete structure, which is commonly used locally, with masonry exterior walls. Columns and beams and a part of masonry walls will be finished with painting on the cement mortar substrate. The exterior walls will be fair-faced brick masonry walls or mortar with paint finish.

Sloped roofs (15˚) of corrugated galvanised steel sheets will be adopted for economy and ease of construction.

The elevation design will be based on the fenestration plan to create about 5-meter wide window opening spaces between the 6-meter pitch columns. High side lights will be installed for the rooms like the recovery room that may not require so much light. Glass blocks will be used to admit daylight to the patient movement spaces like the staircases and corridors.

7) Sectional planning

The height of the ground floor is set at 3.85 meters and the first floor at 3.80 meters, in consideration of the required ceiling height of various rooms (3.00 m) and spaces for pipes for water supply and sewage above the ceiling. In the Project, the sectional planning shall be made in consideration of sufficient natural air flow, because the rooms other than the operation theatres and HDU will not be equipped with air conditioners.

In the OPD Block, vent grilles will be provided above the ramps so that air flowing into the building through the openings on the exterior walls will flow out through the vent grilles under the roof. In the space above the ceiling, air intakes will be provided on the soffit of the eaves so that air flows inside the above-ceiling space and flows out through the vent grilles on top of the atrium. Polycarbonate roofings will be used part of the atrium ceilings, which will serve as roof lights.

In the OT/Maternity Ward, the operation rooms and HDU will be equipped with air conditioners and the other rooms on the ground floor will not be exposed to radiation heat from the roof. Natural light and air flow will be ensured by opening/closing of the high side windows. In the maternity ward on the first floor sun light and natural air flow will be provided through the openings in the north and south exterior walls.

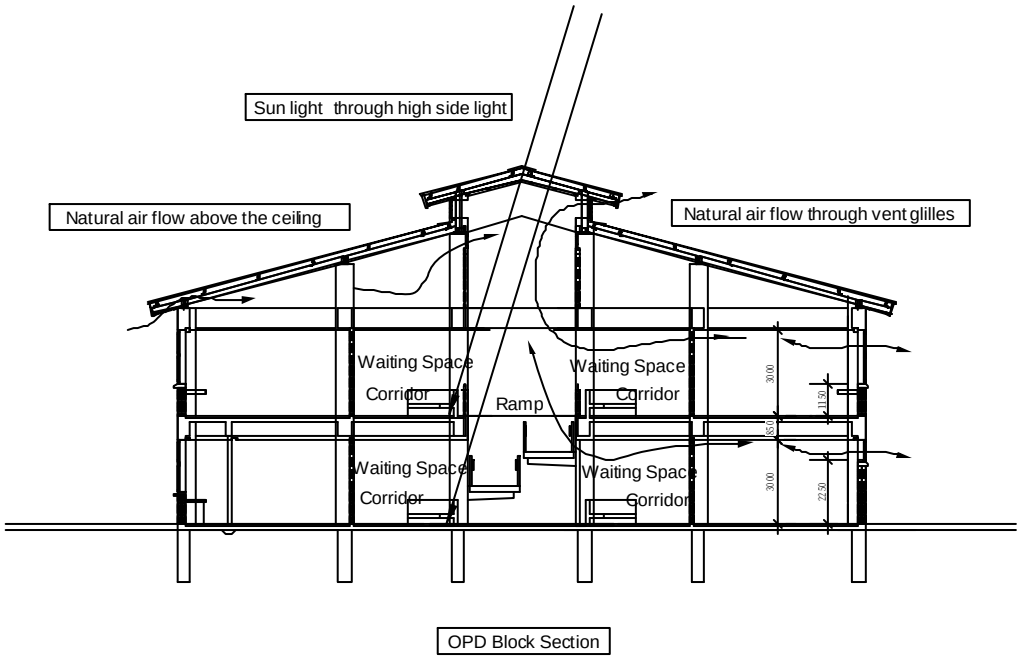


Figure-6 Hoima RRH: Section of OPD Block

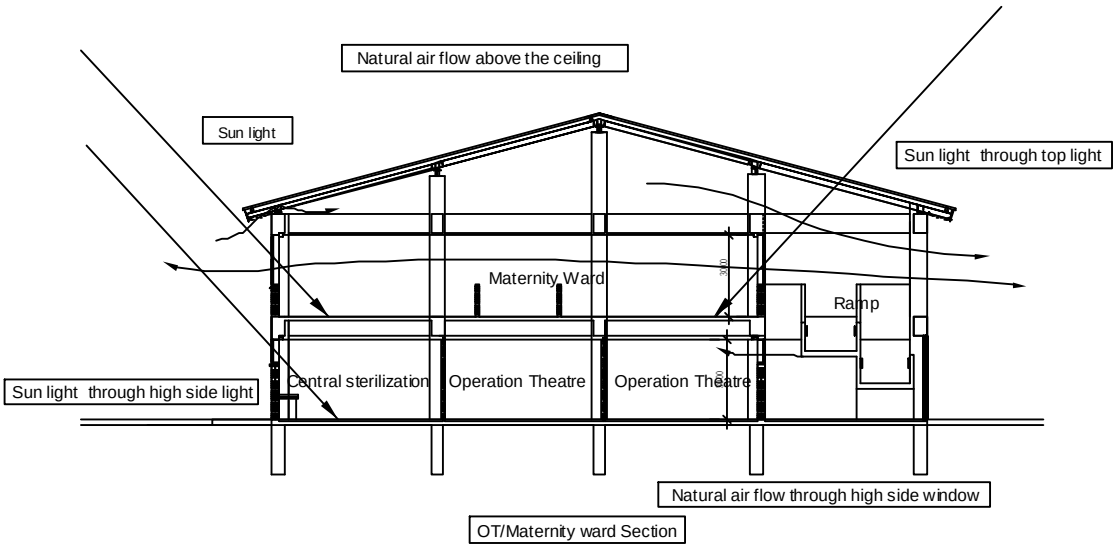


Figure-7 Hoima RRH: Section of OT/Maternity Ward

(3) Kabale RRH

1) Number of Patients

Following table shows the number of patients at each department in the past three years. The data on 2011/12 which was obtained during the Preparatory Survey 2 is shown for reference.

Patients/visitors at each department		2008/09	2009/10	2010/11	Average	2011/12	Remark
A.	Outpatients	64,004	86,017	121,567	90,529	162,603	
	(Breakdown)						
	Paediatrics	6,545	7,459	9,906	7,970	10,126	
	Medical	29,838	47,707	73,287	50,277	89,125	
	Surgery	503	215	0	239	918	
	Private	1,773	1,732	1,870	1,792	2,113	Existing
	Orthopaedics	1,616	2,221	2,260	2,032	3,019	
	Ophthalmology	2,248	2,363	2,420	2,344	2,612	Existing
	ENT	1,119	1,394	1,851	1,455	2,091	Existing
	Dental	4,718	4,490	6,897	5,368	8,911	
	Physiotherapy	2,951	1,399	1,653	2,001	3,132	Existing
	Occupational therapy	0	364	299	221	439	Existing
	Gynaecology	222	367	597	395	891	
	Psychiatry	998	521	511	677	12,531	Existing
	Antenatal	8,110	8,918	10,206	9,078	11,973	Existing
	Family Planning	3,363	6,867	9,810	6,680	14,722	Existing
	Total	64,004	86,017	121,567	90,529	162,603	
	Total	(43,442)	(62,459)	(92,947)	**(66,281)**	(112,990)	Excluding private ward (Grade A), ophthalmology, ENT, physiotherapy, occupational therapy, psychiatry, antenatal and FP
B.	No. of emergency patients	1,099	1,857	448	1,135	1,694	
	(Breakdown)						
	Injuries - Road Accidents	348	392	341	360	963	
	Injuries (Trauma due to other causes)	717	1,399	67	728	661	
	Animal / Snake bites	34	66	40	47	70	
	Total	1,099	1,857	448	**1,135**	1,694	
C.	Operations	3,219	5,305	4,034	4,186	6,892	
	Operations except for dental operation	2,047	2,485	3,114	**2,549**	5,826	
	(Caesarean)	(642)	(604)	(853)	(700)	(1,067)	
D.	Inpatients in the Maternity Ward	3,514	3,552	6,986	4,684	4,169	**No. of beds: 30**
	Annual total number of admission days (p･day)	19,255	15,768	16,452	17,158	20,845	
	Average admission days (day)	5.48	4.44	2.35	4.09	5	
	Bed occupancy rate (%)	**175.84**	**144.00**	**150.25**	**163.05**	190.37	
E.	Total No. of deliveries	3,208	3,312	5,754	**4,091**	5,817	

Source: Data in the answers to the Questionnaire

2) Study by department

① OPD

<Preconditions>

1.Consultation rooms for the private ward (Grade A), ophthalmology, ENT, physiotherapy, occupational therapy, psychiatry, antenatal and family planning are not considered, because they already have ones.

2. Among other departments, consultation rooms for medical, paediatric, gynaecology and dental are estimated separately.

3. Surgical and orthopaedic departments are integrated in the specialised OPD (special clinic) to estimate the required number of consultation rooms.

4. Working days of OPD are 300 days/year.

5. OPD is operated for 8 hours/day (480 minutes/day).

6. On the average one patient spends 8 minutes for consultation at medical and paediatric OPD, and 20 minutes at dental and other departments.

<Based on the average number of patients in three years>

	Annual No. of outpatients (p/year)	Annual working day (day/year)	Opening hour (min/day)	Average No. of daily patients (p/day)	Rate of population increase	Expected No. of daily patients in 2018/19 (p/day)	Consultation room			
							Average of consultation time (min/p/room)	Max. No. of daily patients per room (p/room/day)	Required No. of consultation rooms (room)	**Required No. of rooms (room)**
	A	B	C	D=A/B	E	F=D*E	G	H=C/G	I=F/H	
1. Medical	50,277	300	480	167.59	1.29	216.19	8	60	3.60	**4**
2. Paediatric	7,970	300	480	26.57	1.29	34.27	8	60	0.57	**1**
3. Dental	5,368	300	480	17.89	1.29	23.08	20	24	0.96	**1**
4. Gynaecology	395	300	480	1.32	1.29	1.70	20	24	0.07	**1**
5. Specialised OPD	2,271	300	480	7.57	1.29	9.77	20	24	0.41	**1**
Total	66,281	300	480	220.94	1.29	285.01	--	--	--	**8**

② Casualty unit

<Preconditions>

1. Triage is incorporated in the clinic.

2. Casualty Unit is operated 365 days/year and 24 hours/day (1,440 minutes/day).

3. On the average one patient spends 120 minutes/room for diagnosis and/or treatment, and 480 minutes/bed for recovery.

<Based on the average number of patients in three years>

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 population increase	Expected No. of daily patients in 2018/19 (p/day)	Clinic / Triage			
						Average of filtering time (min/p/room)	Max. No. of daily patients per room (p/room/day)	Required No. of clinic (room)	**Required No. of rooms (room)**
A	B	C	D=A/B	E	F=D*E	G	H=C/G	I=F/H	
1,135	365	1,440	3.11	1.29	4.01	120	12	0.33	**1**
						Resuscitation room			
						Average of recovery time (min/p/bed)	Max. No. of daily patients per bed (p/bed/day)	Required No. of beds (bed)	**Required No. of beds (bed)**
						J	K=C/J	L=F/K	
						480	3	1.34	**2**

③ Operation theatre

<Preconditions>

1. Working days of the operating theatre are 365 days/year.
2. Dental operation theatre is excluded.
3. According to the past records, the average number of operations per room is 6 cases/ room/day.
4. On the average one person spends 0.5 day/bed in the recovery room for recovery.

<Based on the average number of operations in three years>

Annual No. of operations / patients (p/year)	Annual working day (day/year)	Average No. of daily operations / patients (p/year)	Rate of population increase	Expected No. of daily operations /patients in 2018/19 (p/day)	Caesarean			Operation		
					Average No. of operations/patients per room (p/room/day)	Required No. of rooms (room)	**Planned No. of rooms (room)**	Average No. of operations/patients per room (p/room/day)	Required No. of rooms (room)	**Planned No. of rooms (room)**
A	B	C=A/B	D	E=C*D	F	G=E/F		F	G=E/F	
a) 700	365	1.92	1.29	2.47	6	0.41	**1**			
b) 1,849	365	5.07	1.29	6.53				6	1.09	**2**
c) 2,549	(Total)									

Note: a) Caesarean operation; b) Operation except for caesarean; c) Total

④ Maternity ward

<Preconditions>

1. Working days of the maternity ward are 365 days/year.
2. On the average one inpatient stays for 5 days in the hospital.
3. Usual bed occupancy rate is 90%.

<Based on the average number of patients in three years>

Annual No. of inpatients (p/year)	Annual working day (day/year)	Average admission days (day/p)	Total admission days per year (day/year)	Rate of population increase	Expected total admission days in 2018/19 (day/year)	Bed occupancy rate (%)	Expected total admission days (day/year)	Required No. of beds (bed)	Planning	
									No. of beds (bed)	Bed occupancy rate (%)
A	B	C	D=A*C	E	F=D*E	G	H=F/G	I=H/B	**J**	K=F/B/J
4,684	365	5	23,420	1.29	30,212	90%	33,569	91.97	**92**	89.97%

(Number of beds planned)

1. The existing maternity ward has 22 obstetric beds and 9 pay-beds. The pay beds will be moved into the private ward which is under construction now when it is completed. Four delivery rooms and ancillary rooms in the existing maternity ward are dilapidated and have low functionality. The delivery rooms shall be newly planned in the new OT/Maternity Ward in the Project. Then, by remodelling the delivery rooms in the existing maternity ward into the bed rooms, 16 obstetric beds can be ensured. Consequently, the number of obstetric beds will be 47 after the renovation: (22 existing beds + 9 pay-beds to be moved + 16 beds to be created through the remodelling of the existing delivery rooms). → **47 beds** (after the renovation of the existing ward)
2. The new maternity ward is planned to have 34 beds.* → **34 beds** (new)
3. The total of 1.+2. above (81 beds) is 11 beds insufficient for the required 92 beds. This shortfall of 11 beds is planned to be covered by Kabale RRH at the time of remodelling of the existing maternity ward. → **11 beds**

Total **92 beds**

* The requested number of beds at the time of field survey II was 58, and 47 beds will be ensured after the renovation of the existing maternity ward. It is necessary to provide 45 beds in the new OT/Maternity ward to reach the required 92 beds (92-47). In consideration of the appropriate size of the Project, it has been agreed that the Japanese side will provide 34 beds while the Ugandan side will cover the remaining 11 beds.

(Recommendation)

In the course of discussions between Kabale RRH and the Survey Team during the Field Survey II, Kabale RRH requested that the ophthalmology and ENT wards should be secured each having 10 beds after the renovation of the existing maternity ward.

However, clinics and operation theatres of ophthalmology and ENT are apart from the existing maternity ward. Besides, it is not preferable that the 10 beds each for ophthalmology and ENT share a part of the maternity ward among. Consequently it is proposed that the ophthalmology and ENT wards will be constructed by the Ugandan side near the existing clinics and operation theatres of ophthalmology and ENT.

⑤ Delivery unit

<Preconditions>

The average number of deliveries per bed is 3 persons/room/day.

<Based on the average number of deliveries in three years>

Annual No. of deliveries (p/year)	Annual working day (day/year)	Average No. of daily deliveries (p/day)	Rate of population increase	Expected average No. of daily deliveries in 2018/19 (p/day)	Delivery Room		
					Average No. of daily deliveries per bed (p/day/bed)	Required No. of delivery beds (bed)	**Planned No. of delivery beds (bed)**
A	B	C=A/B	D	E=C*D	F	G=E/F	
4,091	365	11.21	1.29	14.46	3	4.82	**5**

3) Required floor areas

Based on the number of rooms needed for each department as calculated above, the required total floor areas on building plans are estimated. The floor area of each room of the target hospitals is assumed in consideration of the current status of existing facilities, and with reference to the standard for medical facilities in Uganda and the standard for medical facilities in Japan (AIJ: Architectural Design Data Corpus and others).

In addition, medical equipment layout expected in each room, the number of patients and the number of medical staff are comprehensively considered to calculate the required floor area of each room.

Table--7 Floor Areas of Kabale RRH

OPD/Casualty Block GF			
Dept	Room	Floor areas(m2)	Size (m)
OPD	Entrance hall	50.0	4.0x6.0+3.0x6.0+4.0 x2.0
	Reception, Office (med. record storage)	30.0	6.0x5.0
	Laboratory	36.0	6.0x6.0
	Pharmacy	36.0	6.0x6.0
	Med supply storage-1	36.0	6.0x6.0
	Staff room (M) (w/ toilet, shower)	36.0	6.0x6.0
	Waiting space	48.0	2.0x24.0
	Corridor	84.0	2.0x42.0
	Staircase	48.0	(4.0x6.0)x2
	Ramp	40.0	2.0x20.0
	Subtotal	444.0 m2	
Casualty	Ambulance	36.0	6.0x6.0
	Triage/Clinic	18.0	6.0x3.0
	Resuscitation room	45.0	6.0x7.5
	Sluice/sterilisation	18.0	6.0x3.0
	Minor operation theatre	27.0	6.0x4.5
	Office	10.5	3.0x3..5
	Nurse station	18.0	6.0x3.0
	Staff room (M, W) (w/ toilet, shower)	27.0	3.0x9.0
	Duty room (M)	9.0	3.0x3.0
	Corridor	61.5	3.0x20.5
	Subtotal	270.0 m2	
Common	Fire hydrant pump room	12.0	2.0x6.0
	Connection corridor	4.0	2.0x2.0
	Toilet	60.0	5.0x12.0
	Subtotal	76.0 m2	
Connection corridor (OPD-OT)		43.2	2.0x21.6
GF Total		833.2 m2	
OPD/Casualty Block 1F			
OPD	Dental clinic	54.0	6.0x9.0
	Dental X-ray	9.0	3.0x3.0
	Dental storage	9.0	3.0x3.0
	Gynaecology treatment	18.0	6.0x3.0
	Gynaecology consul.	18.0	6.0x3.0
	Staff toilet	6.75	1.5x4.5
	Med. supply storage-2	4.5	1.5x3.0
	Special OPD consul.	18.0	6.0x3.0
	General OPD consul-1	18.0	6.0x3.0
	General OPD consul-2	18.0	6.0x3.0
	Common treatment room	36.0	6.0x6.0
	General OPD consul-3	18.0	6.0x3.0
	General OPD consul-4	18.0	6.0x3.0
	Paediatric consultation	18.0	6.0x3.0
	Waiting space	100.0	2.0x50
	Corridor	186.75	2.0x62.0+4.0x14.0+ 1.5x4.5
	Staircase	72.0	6.0x6.0x2
	Ramp	104.0	4.0x26.0
	Subtotal	726.0 m2	
Common	Connection corridor	4.0	2.0x2.0
	Toilet	60.0	5.0x12.0
	Subtotal	64.0 m2	
1F Total		790.0 m2	
Total		1623.2 m2	

OT/Maternity Ward GF			
Dept	Room	Floor areas(m2)	Size (m)
Operation theatre	Operation theatre-1	36.0	6.0x6.0
	Operation theatre-2	36.0	6.0x6.0
	Operation theatre-3	36.0	6.0x6.0
	Anaesthesia room	9.0	3.0x3.0
	Recovery room	18.0	6.0x7.0
	Nurse station, operation meeting room	15.0	3.0x5.0
	Nurse station-2	18.0	6.0x3.0
	HDU	36.0	6.0x6.0
	OT hall	93.0	6.0x6.0+3.0x19.0
	Anteroom	16.0	4.0x4.0
	Locker room corridor	12.0	6.0x2.0
	Staff room (M) (w/ toilet, shower)	16.0	4.0x4.0
	Staff room (W) (w/ toilet, shower)	16.0	4.0x4.0
	CSSD	51.0	6.0x7.0+3.0x3.0
	Subtotal	408.0 m2	
Common	Electric room	8.0	2.0x4.0
	Fire hydrant pump room	8.0	2.0x4.0
	Corridor	80.0	2.0x40.0
	Subtotal	96.0 m2	
Maternity wa	Corridor	53.25	1.5x35.5
	Staircase	48.0	6.0x4.0x2
	Ramp	114.75	4.5x25.5
	Ward entrance	24.0	6.0x4.0
	Subtotal	240.0 m2	
GF Total		744.0 m2	
OT/Maternity Ward 1F			
Maternity Ward	8-bed room-1	45.0	6.0x7.5
	8-bed room-2	45.0	6.0x7.5
	8-bed room-3	45.0	6.0x7.5
	8-bed room-4	45.0	6.0x7.5
	2-bed room	22.5	3.0x7.5
	Attendant room	15.0	2.0x7.5
	Nurse station	22.5	3.0x7.5
	Newborn baby room	22.5	3.0x7.5
	Delivery room-1	15.0	3.0x5.0
	Delivery room-2	15.0	3.0x5.0
	Delivery room-3	15.0	3.0x5.0
	Delivery room-4	15.0	3.0x5.0
	Delivery room-5	20.0	4.0x5.0
	Sluice/sterilisation	12.0	3.0x4.0
	Staff toilet, shower	10.5	3.0x3.5
	Corridor	193.0	3.0x39.0+2.0x30.5+ 2.5x6.0
	Staircase	48.0	6.0x4.0x2
	Ramp	114.75	4.5x25.5
	Patient toilet	45.0	6.0x7.5
1F Total		765.75 m2	
Total		1509.75 m2	

4) Components of each building

Based on the discussions with MOH and Kabale RRH and the site survey, facilities construction at Kabale RRH is planned to consist of two buildings; the OPD/Casualty Block and the OT/Maternity Ward.

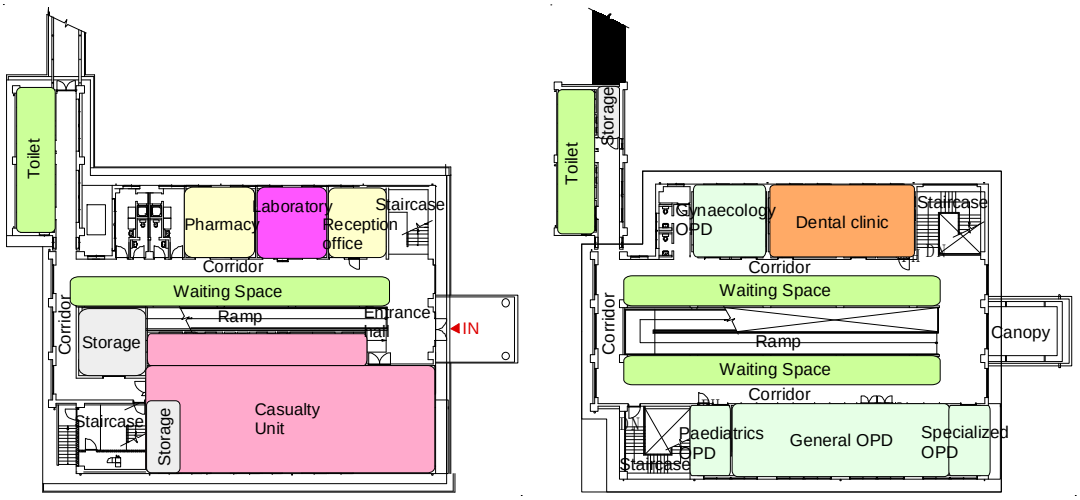
Building	Floor	Room
OPD / Casualty Block	GF	Casualty Unit: Ambulance, Triage/Clinic, Resuscitation room (2 beds), Minor OT, Sluice/sterilisation room, Nurse station, Office (also serving as a guard post), Staff room (Men/Women), Duty room, Corridor, etc. Outpatient Department: Entrance hall, Reception/Office (including medical record storage), Laboratory, Pharmacy, Staff room (Men/Women), Waiting space, Staircase, Ramp, Medical supply storage-1, etc.
	1F	General OPD consultation room (4 rooms), Paediatric consultation room, Specialised OPD consultation room, Common treatment room, Gynaecological consultation room, Gynaecological treatment room, Dental clinic, Medical supply storage-2, Staff toilet, Waiting space, Corridor, Ramp, etc.
	G, 1F	Outpatient toilets in a separate building
OT/Maternity Ward	GF	Operation Theatre: OT (3 rooms; 1 for obstetric operation), Recovery room, Anaesthesia room, Nurse station/operation meeting room, Staff locker room (men/women), Anteroom, Operation hall, HDU (4 beds), Nurse station, CSSD, etc. Maternity Ward: Ward entrance, Corridor, Staircase, Ramp Common space: Electric room, Receiving tank pump room, Fire hydrant pump room, Storage, etc.
	1F	Maternity Ward: Patient room (8-bed: 4 rooms, 2-bed: 1 room), Nurse station, Delivery room (5 rooms), Newborn baby room, Sluice/sterilisation room, Staff toilet, Patient toilet, Attendant room, Corridor, Staircase, Ramp, etc.

5) Floor planning (zoning plan)

A two-story building will be planned similar to Hoima RRH. Staircases and ramps will be provided for the vertical migration instead of elevators.

① OPD/Casualty Block

In the Project, the slopes are designed at the centre in the building. Rooms for the OPD will be located in the north half and the rooms for the Casualty Unit will be in the south half of the ground floor. On the first floor, clinics for the OPD will be lined along the north and south peripheral walls. Patients waiting space and corridors will be located in the inner areas around the ramps in the centre. Patient toilets for the OPD will be installed in an independent house along the walkway to the OT/Maternity Ward, to minimise the offensive odours into the hospital buildings.



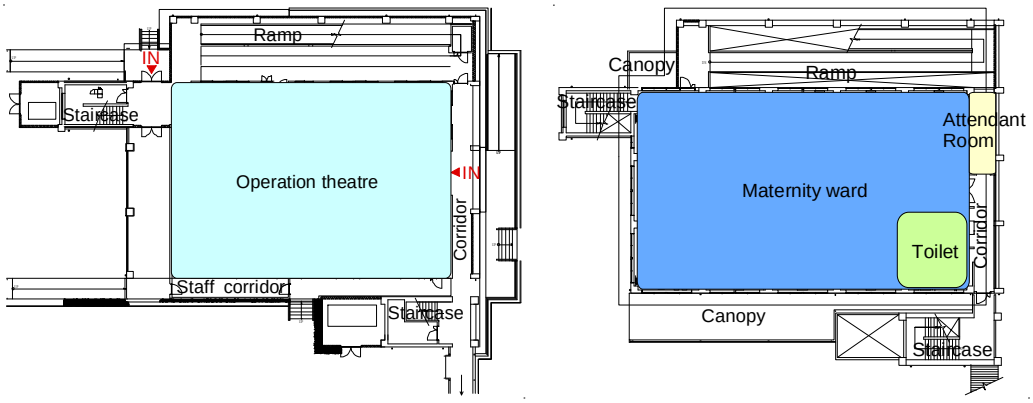
Ground Floor First Floor

Figure-8 Kabale RRH: Zoning of OPD/Casualty Block

② OT/Maternity Ward

The OT/Maternity Ward will be also planned as a two story building. The operation theatre will be on the ground floor, and the maternity ward on the first floor.

Ramps will be designed on the north side of the building for the purpose of transfer of stretchers and wheelchairs to the Maternity Ward. The space above the ramps will be designed as an atrium to serve as if the roofed outdoor space so that ample sun lights and outdoor air will be introduced into the building.



Ground Floor First Floor

Figure-9 Kabale RRH: Zoning of OT/Maternity Ward

6) Elevation planning (shape, exterior finishing material)

The elevation plan will be the same as that for Hoima RRH.

7) Sectional planning

The elevation plan will be the same as that for Hoima RRH.

II Structural Planning

(1) Structural Design Standards

The Japanese survey team and the officers in charge of architectural planning of the Health Infrastructure Division, Department of Clinical Services of MOH discussed and agreed that the Ugandan structural design standards would be applicable to the load requirements, and that the structural analysis and design method would comply with the structural standards of the Architectural Institute of Japan.

(2) Design Loads

1) Dead load

All the weights of building structures, finishes, and utility appliances will be considered.

2) Live load

The live load criteria stated in the Public Health (Building) Rules and the Structural Design Guide Lines (Draft 2004) will be applied. The design live load requirements of the principal rooms are as follows:

Roof	: 1.50 KN/m^2 (flat roof, slope roof 0°≦ and ≦10°)
	: 0.50 KN/m^2 (slope roof 10°< and ≦30°, limited access)
Ward, toilet	: 2.40 KN/m^2
Clinic, treatment room	: 3.00 KN/m^2
Operation theatre	: 4.80 KN/m^2
Office	: 3.50 KN/m^2
Data room	: 7.50 KN/m^2
Corridor, stairs	: 4.80 KN/m^2

3) Wind load

The following formula, which is stated in the Structural Design Guide Lines (Draft 2004), will be applied to calculate the design wind load.

$F = Cf \cdot q \cdot As$

$q = K \cdot V^2$

where:

F	: Wind force (N)
Cf	: Wind force coefficient
As	: Effective frontal areas of buildings
q	: Design stream velocity pressure (765N/m^2)
K	: Constant dependent on site altitude (0.53)
V	: Standard velocity (38m/sec.)

4) Seismic load

The following formula, which is stated in the Seismic Code of Practices for Structural

Designs-US319 (2003), will be applied to calculate the design seismic load.

Cd = C・Z・I・K

where:

Cd : Design horizontal seismic coefficient at the ground level

C : Basic seismic coefficient for the fundamental translational period ($C \leqq 0.8$)

Z : Seismic zone factor (at both Hoima and Kabale, Z=1.0)

I : Structure importance factor (Hospitals, I=1.5)

K : Structural performance factor (Ductile moment-resisting frame, K=1.0; Ductile moment-resisting frame with masonry infill, K=2.0)

(3) Framing Planning

The project buildings will be constructed of reinforced concrete with rigid frames that consists of steel girders supporting the folded roof system and supportive reinforced concrete slabs, which is a simple and practical frame system predominant in Uganda, using materials available in local markets. Interior and exterior walls will be of masonry construction, and the ground floor slab will be reinforced concrete subfloor.

(4) Foundation Planning

Four holes were bored in the site grounds at Hoima RRH and Kabale RRH respectively in order to check the geotechnical conditions of the sites. The design long-term bearing capacity of soils based on the geotechnical investigation reports are summarised as follows:

Site	Embedded length below GL (m)	Type of soil	Long-term bearing capacity (KPa/m^2)
Hoima RRH	1.50	Clayey silt	150
Kabale RRH	1.50	Silty clay	150

Accordingly, isolated footing system will be adopted both for Hoima RRH and Kabale RRH.

(5) Structural Materials and Construction Methods

1) Concrete

Concrete needs to be manufactured with concrete mixer trucks at each site, because there are no concrete mills that are capable of manufacturing ready mixed concrete.

The design strength of concrete (Fc) will be set at $25N/mm^2$ (by 28th-day compressive strength test with 150 square specimens.)

2) Reinforcing steel

Standard deformed bars, which are produced in Uganda, of Grade 460 conforming to BS 4449 will be used. The size of bars ranges from 8, 10, 12, 16, 20 to 25mm. All the bars should be connected with lap joints.

III Utility Systems Planning

(1) Electrical Planning

1) Power incoming installations

The main cable for electric power supply to the planned facilities at Hoima RRH and Kabale RRH will be tapped from Umeme's 11-kV transmission lines to the 100kVA pole transformer. The received electric power is stepped down to 415-240V and distributed by 3-phase 4-line cables to each consumption point.

The electric power required at the project facilities is estimated to be from 100 to 200kVA at both Hoima and Kabale. A new electric pole, pole transformer and protection circuit will be installed by the Japanese side for the expected increase of electric consumption (the required power supply based on the transformer capacity 45VA/m^2, and power consumption 15W/m^2).

2) Generator system

The requirement for backup power for the operation theatres, refrigerators, some outlets and water pump, etc. is assumed to be about 50kVA. Based on this assumption, a package type kerosene-fuel 50kVA diesel generator will be installed in the electric room at Hoima RRH. The diesel engine should be manually switched on at the time of power failure. At Kabale RRH, the existing 200kVA generator will also serve for the project facilities.

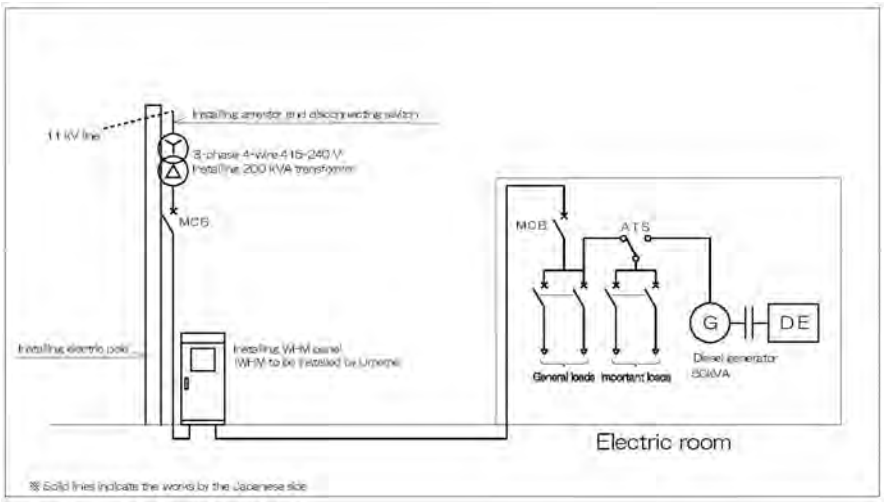


Figure-10 Hoima RRH: Schematic Diagram of Receiving and Transforming Systems

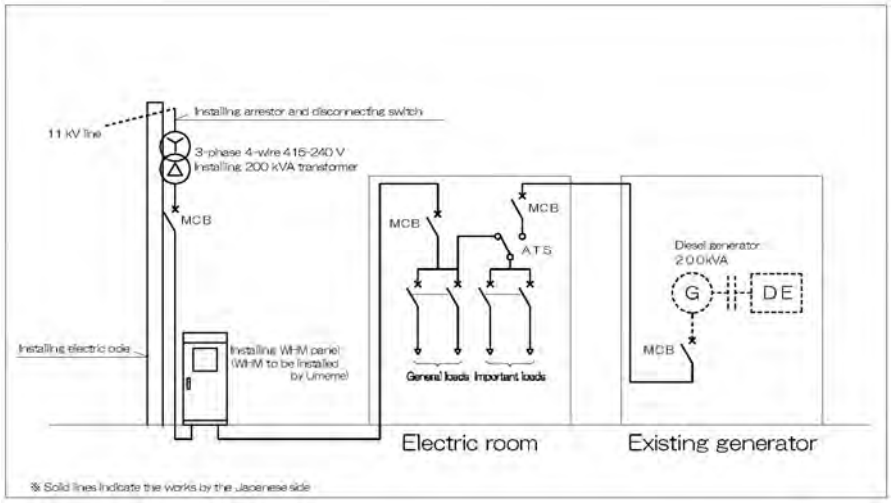


Figure-11　Kabale RRH: Schematic Diagram of Receiving and Transforming Systems

3) Receptacles and lights

The design illuminance is set at about 70% of the JIS standards. As light sources, energy efficient type shaded fluorescent lamps which are commonly used locally are planned. In the operation theatres embedded lights with acryl covers d lights will be planned to avoid dust falling down the lights. In the corridors, emergency lights and emergency exit sign lights with built-in batteries will be planned.

Receptacles for a single-phase 240V cable with 2P15A grounding will be installed for common use.

4) Lightening arrester and grounding device

The existing buildings are equipped with the lightning system. Similarly a lightening rod will be installed on the roof of the project buildings. The grounding electrodes will be embedded in the ground for the general power supply and for the operation theatres respectively.

5) Telephone system

The telephone wiring up to the MDF will be the responsibility of the Ugandan side. Two lines will be drawn to both Hoima and Kabale sites.

A PBX will be installed at the reception of the OPD Block, to establish a system which enables the extension-to-extension call. Telephone sets will be installed at each room except for the patient rooms. Extension numbers will be allotted to each telephone set. Installation of a primary side cable of MDF is the responsibility of the Ugandan side.

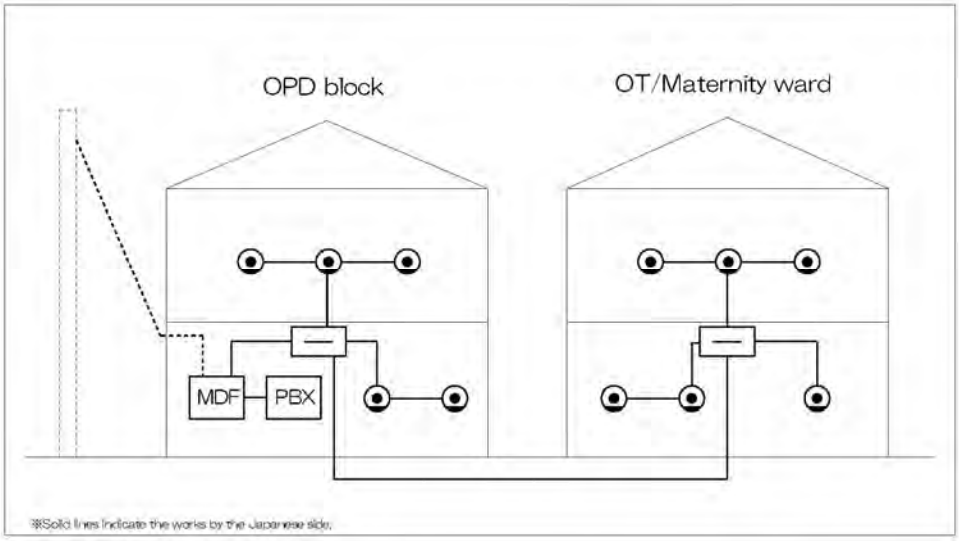


Figure-12 Schematic Diagram of Telephone Infrastructures

6) Cable piping for information network

Empty pipes will be installed from the terminal panel to each room (except for the patient rooms) so that cables can be laid to establish the information network system in the future.

7) TV common antenna system

A TV antenna will be installed near the elevated water tank from which TV cable/wires will be laid to the offices, waiting spaces and attendant rooms.

8) Public address system

A main panel for the public address system will be installed at the reception in the OPD Block with speakers in the common space, to enable broadcasting in the entire building as well as paging in each ward and/or floor.

9) Automatic fire alarm system

Smoke and thermal detectors will be installed where necessary. They will transmit alarms to the central receiver at the reception in the OPD Block.

(2) Mechanical Planning

1) Water supply system

Both Hoima RRH and Kabale RRH are supplied with city water by the National Water Service Company (hereinafter referred to as “NWSC”). A branch pipe will be drawn from the existing water supply pipe in the hospital premises. According to NWSC, the city water main for Hoima RRH has sufficient water pressure. Water will be directly led to the elevated water tanks on top of the OPD Block and OT/Maternity Ward, and then supplied to each point of consumption with the use of pressure pump in order to cover the pressure drop at the shower

head. In Kabale RRH, the water pressure of the city water main is not very high according to NWSC. Water will be led to a water receiving tank on the ground level after which water will be pumped up to the elevated tanks on top of the OPD/Casualty Block and OT/Maternity Ward, and then supplied to each point of consumption with the use of pressure pump in order to cover the pressure drop at the shower head.

Based on the following consumption data, the elevated water tanks planned to have sufficient capacity for the two-day consumption. The size of the water receiving tank at Kabale RRH is planned to cover for the half-day consumption:

Table-8 Water Consumption at Hoima RRH (OT/Maternity Ward)

	Calculation Conditions			Water Consumption	
	person/day	%	person	L/day•person	m^3/day
Doctor and nurse	22	80%	18	80	1.44
Inpatient	50	100%	42	150	6.30
Attendant for inpatient	50	50%	21	20	0.42
Total					8.16

Table-9 Water Consumption at Hoima RRH (OPD Blok)

	Calculation Conditions			Water Consumption	
	person/day	%	person	L/day•person	m^3/day
Doctor and nurse	36	80%	29	80	2.32
Outpatient	390	100%	390	20	7.80
Attendant for outpatient	390	50%	195	20	3.90
Total					14.02

Table-10 Water Consumption at Kabale RRH (OT/Maternity Ward)

	Calculation Conditions			Water Consumption	
	person/day	%	person	L/day•person	m^3/day
Doctor and nurse	40	80%	32	80	2.56
Inpatient	34	100%	34	150	5.10
Attendant for inpatient	34	50%	17	20	0.34
Total					8.00

Table-11 Water Consumption at Kabale RRH (OPD/Casualty Block)

	Calculation Conditions			Water Consumption	
	person/day	%	person	L/day•person	m^3/day
Doctor and nurse	34	80%	28	80	2.24
Outpatient	285	100%	285	20	5.70
Attendant for outpatient	285	50%	143	20	2.86
Total					10.80

Accordingly, the capacity of each elevated water tank is estimated as follows:

For Hoima RRH OT/Maternity Ward: $8.16m^3/day \cdot 2\ days = 16.32m^3 \rightarrow 17m^3$

For Hoima RRH OPD Block: $14.02m^3/day \cdot 2\ days = 28.04m^3 \rightarrow 29m^3$

For Kabale RRH OT/Maternity Ward: $8.00m^3/day \cdot 2\ days = 16.00m^3 \rightarrow 16m^3$

For Kabale RRH OPD/Casualty Block: $10.80m^3/day \cdot 2\ days = 21.60m^3 \rightarrow 22m^3$

The elevated tanks are planned to be panel tanks, and the compartment will be provided for the ease of cleaning and maintenance.

The water receiving tank at Kabale RRH will be a round tank whose capacity is calculated as follows:

For Kabale RRH: $(8.00m^3/day + 10.80m^3/day) \cdot 0.5day = 9.40m^3 \rightarrow 10m^3$

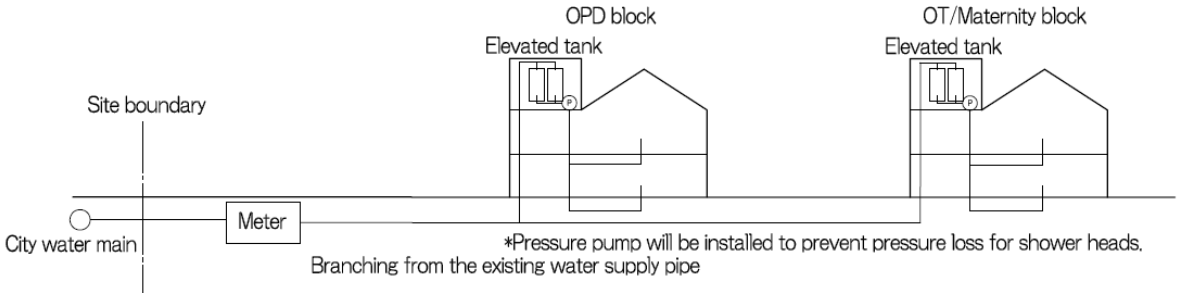


Figure-13 Hoima RRH: Schematic Diagram of Water Supply System

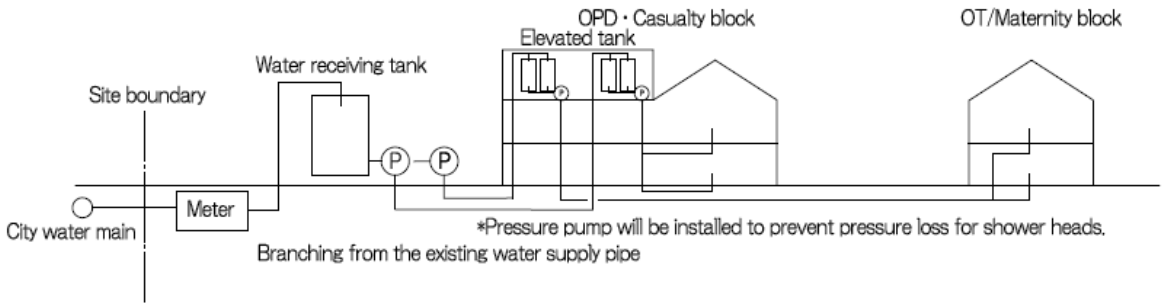


Figure-14 Kabale RRH: Schematic Diagram of Water Supply System

2) Wastewater sewerage system

As the area around Hoima RRH is not provided with a public sewerage system, wastewater will be treated in a septic tank and then seeped underground via a percolation pipe.

The area around Kabale RRH is equipped with a public sewerage system, and the soil wastewater and domestic wastewater will be connected to the hospital's sewerage pipe and discharged into the city main sewer.

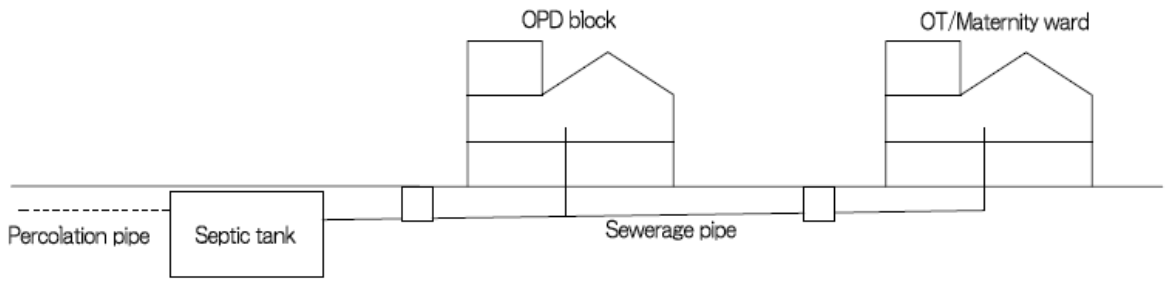


Figure-15 Hoima RRH: Schematic Diagram of Wastewater Sewerage System

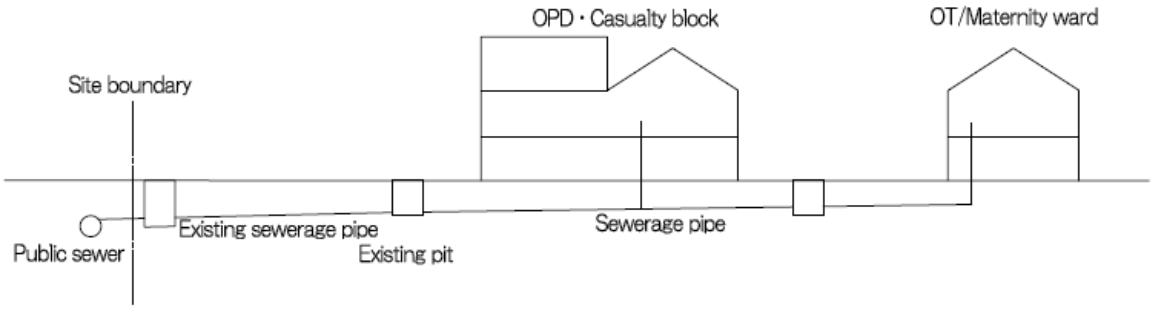


Figure-16 Kabale RRH: Schematic Diagram of Wastewater Sewerage System

3) Hot water supply system

Hot water will be supplied for patient showers, hand-washing sinks and staff showers (for men and women) at the operation theatre in the OT/Maternity Ward and OPD Block at Hoima and Kabale RRHs. At Kabale RRH hot water will be also supplied for newborn baby baths. A solar panel system will be installed on the roof at both Hoima and Kabale RRH to take advantage of daytime solar heat. In addition, hot water will be supplied by independent electric hot water supply units at individual places such as hand-washing sinks at the operation theatre and newborn baby baths, etc.

4) Sanitary fixtures

Patients, family attendants of the patients and hospital visitors will use squat toilets (Eastern-style toilet) equipped with high-tank flushing units. Patients in the Maternity Ward and hospital staff will use Western-style water closets. Water closets will also be adopted in the handicap toilets.

5) Fire fighting facilities

Fire water tanks using rain water as the main water source will be installed, to be equipped with a fire hydrant and a pump. Fire extinguisher will be also installed at necessary places.

6) Waste treatment system

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 survey, the standards for incinerators of Uganda were still in the process of formulation, and the incinerator was dropped from the list of requested items.

7) Air-conditioning system

In principle, rooms will be designed to allow ample natural draft to realise sufficient ventilation. Forced ventilation system will be installed in all the operation theatres as well as toilets and shower rooms that do not face outside.

Air-conditioning facilities will be designed for the operation theatres and HDU.

IV Construction Materials Planning

(1) Exterior Finishing Materials

1) Roof

Locally available galvanised precoated steel sheets will be used for roofing to facilitate maintenance. The roofs will be sloped roofs, with a gradient of 15 degrees or more, to prevent rainwater seepage into the inside.

2) Exterior wall

For the facility of maintenance, the exterior walls of the buildings will be fair-faced brickwork or paint finish over cement mortar substrate.

(2) Interior Finishing Materials

1) Floor

Floors will be finished with easy to clean and durable terrazzo polished in situ.

2) Interior wall

Interior walls in general will be masonry walls finished with paint on cement mortar substrate. Walls of operations theatres and delivery rooms, etc. that are liable to be contaminated with hazardous substances will be brickwork walls finished with tiles on cement mortar substrate. The walls of hallways and rooms and the projecting corners of columns that stretchers or carts can hit will be equipped with stretcher guards or corner guards, for the purpose of protection and also serving as a handrail.

3) Ceiling

① Ceilings of the rooms that require a high degree of cleanliness, such as the operation theatres and delivery rooms, will be finished with antimicrobial paint on calcium silicate boards for ease of cleaning and maintenance.

② The ceilings of general rooms, corridors and waiting halls will be finished with paint on gypsum boards.

③ The ceilings of toilets, shower rooms, etc. will be finished with paint on calcium silicate boards.

4) Doors and window sashes

External doors and windows will be equipped with aluminium sashes for their weather durability.

Internal doors for general rooms will be plywood doors and frames. The operation theatres and delivery rooms which require durable and easy-to-clean fittings will be provided with stainless steel doors and frames.

The following tables show the finishing schedule under consideration at present.

Table-12 Finishing Schedule

Building Element	Local Method (including the existing buildings)	Adopted Method	Reason for adopting the method
Roof	Sloped roof (Corrugated galvanised steel sheets)	Sloped roof (Corrugated galvanised precoated steel sheets)	Commonly used locally. Easy for maintenance
Exterior wall	Fair-faced brickwork, or fair-faced brickwork finished with paint on cement mortar substrate	Fair-faced brickwork, or fair-faced brickwork finished with paint on cement mortar substrate	Commonly used locally. Easy for maintenance
Floor	Terrazzo in situ	Terrazzo in situ	Durable and easy cleaning
		Tile	Easy for cleaning
Interior wall	Paint on mortar substrate	Paint on mortar substrate	Commonly used locally, easy for maintenance
		Tile	Commonly used locally, easy for maintenance
Ceiling	Paint finish on gypsum board substrate Mineral fibre decorative acoustic panel	Paint on gypsum board substrate	Commonly used locally, relatively easy for maintenance
		Calcium silicate board	Waterproof, relatively easy for maintenance
Doors & Windows	Steel windows Aluminium windows	Aluminium doors & windows	Commonly used locally, good weather durability
	Wooden doors Steel doors	Aluminium doors & windows	Good soundproofing and operability, easy for maintenance
		Steel doors & windows Wooden doors & windows	Good weather durability and soundproofing
		Stainless steel doors & windows	Good soundproofing, easy for cleaning

5) Equipment for utility systems

The usable lives of equipment for building utility systems range from 10 to 15 years, considerably shorter than construction materials. Such equipment should be selected to facilitate maintenance, including renewals, by the Ugandan side after these equipment will be handed over to the Ugandan side. Therefore, to the extent possible, they will be procured locally or from third countries including Kenya with demonstrated performance, while ensuring acceptable levels of quality.

2-2-2-4 Equipment Planning

The team confirmed final requested equipment narrowed down through the discussion with MOH and concerned persons with the targeted hospitals during the Field Survey II. However, the equipment requested was still numerous and covering all the departments. Therefore, to sustain the consistency with the facility planning, it was decided to take such the procedures; “First step: the equipment suitable for the Project was selected by the established criteria” and “Second step: the adequate equipment suitable for each hospital situation is planned with confirming the relevancy”.

[First step: the equipment suitable for the Project was selected by the established criteria]

Selection Criteria 1

① The equipment that is used for clinical purpose and corresponds to the services and clinical level of the targeted hospitals should be selected.

② The equipment should be limited to the one for the departments targeted for facility rehabilitation under the Project. This criterion is also applicable to Fort Portal RRH and the same departments with Hoima RRH and Kabale RRH are targeted, though the facility rehabilitation is not planned at Fort Portal RRH in the Project.

③ The Equipment considered to be low cost effective due to low frequency of use should be excluded.

④ In principle, the equipment that can be easily procured by the Ugandan side will be excluded.

⑤ The equipment whose purpose can be substituted by other clinical ways or by the use of other equipment will be excluded.

⑥ The equipment presumed not to conform to the scheme of Japanese Grant Aid project for the reasons that it is consumables itself or can be utilised in another purpose should be excluded.

The result of examination based on the above criteria is as follows.

Note:

"×" indicates the items do not conform to the criteria. If there is any one of unconformable criteria, the items were left out of selection. The items fulfilling all the criteria with "○" in the Overall Result were selected by these criteria.

Table-13 Equipment List Studied with the Criteria

No.	Equipment	Criteria						Overall Result
		①	②	③	④	⑤	⑥	
1	ABR System			×				×
2	Air Mattress (for Bedsore Prevention)			×				×
3	Amalgamator					×		×
4	Ambulance						×	×
5	Anaesthesia Machine							○
6	Audiometer (Clinical)			×				×
7	Audiometer (for Paediatric)			×				×
8	Audiometer (Screening)							○
9	Auto Refractor			×				×
10	Autoclave (Large)							○
11	Autoclave (Medium)					×		×
12	Autoclave (Table Top Type)					×		×
13	Automatic Film Processor					×		×
14	Baby Cot				×			×
15	Balance (Analytical)		×					×
16	Balance (Electric)		×					×
17	Balkan Beam			×				×
18	Band Saw		×					×
19	Bed (for Emergency)							○
20	Bed (for HDU)							○
21	Bed (for Orthopedic)					×		×
22	Bed (for Patient)							○
23	Bed Side Locker				×			×
24	Belt Sander		×					×
25	Bobarth Ball Set		×					×
26	Bohlers Stirrups		×					×
27	Bone Drilling Machine (Manual)		×					×
28	Bone Saw		×					×
29	Bronchoscope							○
30	Bull Head Lamp				×			×
31	Cabinet (for Drug)				×			×
32	Cabinet (for Drying)					×		×
33	Cabinet (for Instrument)				×			×
34	C-arm X-ray Unit							○
35	Cassette Set					×		×
36	Cassette Set (Gridded Type)					×		×
37	CD4 Counter		×					×
38	Centrifuge (HCT)		×					×
39	Centrifuge (Table Top Type)							○
40	Chemistry Analyzer		×					×
41	Colorimeter		×					×
42	Crutches				×			×
43	Deep Freezer		×					×
44	Defibrillator							○
45	Delivery Bed							○
46	Dental Unit							○
47	Dental X-ray Machine							○
48	Desk & Chair Set (for Doctor)				×			×
49	Diagnostic Set							○
50	Diagnostic Set (for MCH)					×		×
51	Distillator		×					×
52	Doppler							○
53	Dryer		×					×
54	Dynamometer (Hand, Finger)		×					×
55	ECG (12 lead)							○
56	ECT		×					×
57	Electric Cautery Apparatus		×					×
58	Electric Saw		×					×
59	Electric Surgical Unit							○
60	Electrical Nerve Stimulators (TENS)		×					×
61	Electroencephalogram (EEG)		×					×
62	Electrophoresis Apparatus		×					×
63	EMG		×					×
64	EMS		×					×
65	Endoscope Set							○
66	ENT Unit							○
67	Esophagoscope					×		×
68	Examination Couch							○
69	Examination Lamp (Mobile Type)							○
70	Examination Table (for Ob&Gy w/Examination Unit)							○

No.	Equipment	Criteria						Overall Result
		①	②	③	④	⑤	⑥	
71	Exercise Ball Set		×					×
72	Exercise Equipment Set (for Hand therapy)		×					×
73	Exerciser (for Arm Muscle)		×					×
74	Exerciser (for Finger)		×					×
75	External Fixation Set						×	×
76	Extraction Forceps Set				×			×
77	Glucometer		×					×
78	Goniometer		×					×
79	Grinder		×					×
80	Haematology Analyzer		×					×
81	Hand Circular Saw		×					×
82	Hand Wash Trolley				×			×
83	Hawley Table			×				×
84	Hearing Aid Analyzer		×					×
85	Hot Air Oven		×					×
86	Hot Plate		×					×
87	Incubator (Anaerobic)		×					×
88	Infant Incubator							○
89	Infant Incubators (for Transport)			×				×
90	Infant Warmer			×				×
91	Infrared Therapy Machine		×					×
92	Infusion Pump				×			○
93	Instrument Set (for Adenoidectomy)				×			×
94	Instrument Set (for Antrum Wash Out)				×			×
95	Instrument Set (for Bilateral Tubal Ligation)				×			×
96	Instrument Set (for Burr Hole)			×				×
97	Instrument Set (for Caesarean Section)							○
98	Instrument Set (for Cataract)			×				×
99	Instrument Set (for Delivery)							○
100	Instrument Set (for Dental)							○
101	Instrument Set (for Dental extraction/Examination)					×		×
102	Instrument Set (for Dental Filling)					×		×
103	Instrument Set (for Dental Surgery)			×				×
104	Instrument Set (for Dilatation)							○
105	Instrument Set (for Dressing)				×			×
106	Instrument Set (for ENT Casualty)			×				×
107	Instrument Set (for ENT Clinic)							○
108	Instrument Set (for Extra Ocular)			×				×
109	Instrument Set (for General Surgery Large)							○
110	Instrument Set (for Gynecology)							○
111	Instrument Set (for Hernia/Hydrocoelectomy)				×			×
112	Instrument Set (for Hysterectomy)				×			×
113	Instrument Set (for Intra Ocular)			×				×
114	Instrument Set (for Intubation)					×		○
115	Instrument Set (for IUCD)				×			×
116	Instrument Set (for IV Cut Down)				×			×
117	Instrument Set (for Laparotomy)							○
118	Instrument Set (for Laparotomy, Paediatric)			×				×
119	Instrument Set (for Lumbar Puncture, Adult)				×			×
120	Instrument Set (for Lumbar Puncture, Paediatric)				×			×
121	Instrument Set (for Mastoidectomy)			×				×
122	Instrument Set (for Myringotomy)				×			×
123	Instrument Set (for Obstetric Laparotomy)					×		×
124	Instrument Set (for Orthopedic Accessories)						×	×
125	Instrument Set (for Orthopedic)							○
126	Instrument Set (for Pathology)		×					×
127	Instrument Set (for Polypectomy)				×			×
128	Instrument Set (for Post Mortem)		×					×
129	Instrument Set (for Proof Puncture)				×			×
130	Instrument Set (for Sinus Operation)			×				×
131	Instrument Set (for Skin Grafting)			×				×
132	Instrument Set (for Stech Removing)				×			×
133	Instrument Set (for Stripping)			×				×
134	Instrument Set (for Surgical Toilet and Suture)				×			×
135	Instrument Set (for Suture)				×			×
136	Instrument Set (for Tonsillectomy)				×			×
137	Instrument Set (for Tracheostomy)							○
138	Instrument Set (for Tubal Ligation)				×			×
139	Instrument Set (for Turbinectomy)			×				×
140	Instrument Set (for Urology)		×					×

No.	Equipment	Criteria						Overall Result
		①	②	③	④	⑤	⑥	
141	Instrument Set (for Vasectomy)		×					×
142	Instrument Set (for VVF)					×		×
143	Instrument Shelf				×			×
144	Instrument Tray w/Stand				×			×
145	Instrument Tray				×			×
146	Irrigation Stand				×			×
147	IV Production Unit		×					×
148	Jigsaw		×					×
149	Laryngoscope Set					×		×
150	Lens Set (Trial)				×			×
151	Lens (+20D for Indirect Ophthalmoscope)				×			×
152	Light Cure Machine					×		×
153	Magnifier (Head Worn Type)				×			×
154	Mattress (for Exercising)		×					×
155	Microscope (Binocular)							○
156	Mirror		×					×
157	Mobile X-ray Unit			×				×
158	Multipurpose Tent		×					×
159	Muscle Stimulator		×					×
160	Nebulizer							○
161	Needle Aspiration Biopsy Set						×	×
162	OAE Machine			×				×
163	Operating Light (Ceiling Type)							○
164	Operating Light (Mobile Type)							○
165	Operating Microscope (for ENT)							○
166	Operating Microscope (Portable)			×				×
167	Operating Table							○
168	Ophthalmoscope (Direct)			×				×
169	Ophthalmoscope (Indirect, Head Worn Type)			×				×
170	Otoscope				×			×
171	Over Bed Table				×			×
172	Oxygen Concentrator					×		×
173	Paraffin Bath		×					×
174	Parallel Bar (for Children and Adults)		×					×
175	Patient Monitor					×		×
176	Patient Transfer Suitcase			×				×
177	Patient Trolley							○
178	pH Meter		×					×
179	Phototherapy Unit			×				×
180	Pinch Gauge (Hydraulic)		×		×			×
181	Plaster Bender					×		×
182	Plaster Saw (Electrical)			×				×
183	Plaster Shear (Manual)							×
184	Plaster Table				×			×
185	Portable Monitor							○
186	Pulse Oxymeter					×		×
187	Quadriceps Chair		×					×
188	Refrigerator (for Mortuary)		×					×
189	Refrigerator (for Specimen)		×					×
190	Refrigerator (for Blood Bank)		×					×
191	Refrigerator (for Ice Pack)		×					×
192	Refrigerator (for Kitchen)		×					×
193	Refrigerator (for Laboratory)							○
194	Refrigerator (for Medicine)							○
195	Refrigerator (w/ Freezer)		×					×
196	Resuscitation Bag (for Adult)							○
197	Resuscitation Bag (for Paediatric)							○
198	Retinoscope			×				×
199	Sewing Machine (Electric)		×					×
200	Shaker		×					×
201	Shaker (for VDRL)		×					×
202	Short Wave Diathermy Machine		×					×
203	Shoulder Wheel		×					×
204	Sign Nails						×	×
205	Skull Caliper (w/ Key)				×			×
206	Slit Lamp (w/ Applanation Tonometer)				×			×
207	Slit Lamp (w/ Teaching Provision)				×			×
208	Slitlamp			×				×
209	Soundproofing Booth			×				×

No.	Equipment	Criteria						Overall Result
		①	②	③	④	⑤	⑥	
210	Spectrophotometer		×					×
211	Spirometer			×				×
212	Stair		×					×
213	Standing Frame		×					×
214	Stationary Bike		×					×
215	Steam Sterilizer					×		×
216	Stool (for Surgeon)				×			○
217	Stool (for Patient)				×			×
218	Sterilizing Container Set (Drum & Carrier)							○
219	Stretcher				×			×
220	Stretcher (for Mortuary)		×					×
221	Suction Machine (Electric)							○
222	Suction Machine (for Vacuum Molding)		×					×
223	Suction Machine (Manual)				×			×
224	Surgical Light (Head Worn Type)					×		×
225	Syringe Pump							○
226	Tilting Table		×					×
227	Tonometer (Digital)			×				×
228	Tonometer (Non Contact Type)			×				×
229	Touch Mixer		×					×
230	Traction Machine (for Neck & Back)		×					×
231	Treadmill		×					×
232	Trolley (for Dressing)				×			×
233	Trolley (for Drug & Instrument)				×			×
234	Trolley (for Drug)				×			×
235	Trolley (for Emergency)				×			×
236	Trolley (for Instrument)				×			×
237	Trolley (for Mortuary)		×					×
238	Trolley (Mayo Type)				×			×
239	Tympanometer			×				×
240	Tympanometer (Handheld)			×				×
241	Ultrasonic Dental Scalar					×		×
242	Ultrasound Keratometer Machine			×				×
243	Ultrasound Scanner (Portable)							○
244	Ultrasound Scanner (for Clinical)					×		×
245	Ultrasound Therapy Machine		×					×
246	Under Water Seal Drainage Set						×	×
247	Vacuum Extractor (Electric)					×		×
248	Vacuum Extractor (Manual)					×		×
249	Ventilators (Adult)							○
250	Ventilator (Paediatric)			×				×
251	Universal Polishing Machine		×					×
252	Visual Field Machine (Automated)			×				×
253	Vitrectomy Machine			×				×
254	Walking Frame		×					×
255	Washing Basin w/Stand				×			×
256	Washing Machine		×					×
257	Water Bath		×					×
258	Weighing Scale (for Specimen)		×					×
259	Weighing Scale (Infant)				×			×
260	Weight Set		×					×
261	Weight/Height Measuring Scale				×			×
262	Wheel Chair				×			×
263	Working Table (Large)							○
264	X-ray Film Viewer							○
265	X-ray Processing Unit (for Dental Film)					×		×
266	YAG Laser Machine			×				×

[Second step: the adequate equipment suitable for each hospital situation is planned with confirming the relevancy]

The equipment approved relevancy for the Project was selected at the first step. At the second step, each item was evaluated in terms of validity, based on conditions of the departments of each hospital through the following criteria.
Meanwhile, through the discussion during the draft report explanation mission, each RRH pointed the different understanding against the result of evaluation drafted by the consultant after analysis II in Japan, and requested to restore or add some equipment. For these reasons, some modifications were added to the result of evaluation through the reexamination of requests after the draft report explanation mission.

Selection Criteria 2

(a) The equipment should be targeted for facility rehabilitation under the Project.
(In case of Fort Portal RRH, the same department planned facility rehabilitation in the other two RRHs under the Project should be targeted.)
(b) Certain staffs are/will be appointed who can properly operate and maintain the equipment.
(c) The equipment whose purpose will overlap the existing ones that are in good conditions and in sufficient quantity will be excluded or reduced the planned number.
(d) The equipment usage purpose that can be substituted by other clinical ways will be excluded.
(e) The equipment presumed to be of less frequent usage will be eliminated or the planned number will be reduced.

The result of evaluation based on the above criteria is shown in the following tables.

Note:
"○" indicates the items conforming to the criteria; on the other hand, "×" indicates conformability to the criteria. If there is any one of unconformable criteria, the items were left out of selection and showed "×" in the overall result. "△" in the criteria indicates that the number of equipment was regarded as overmuch. The items fulfilling all the criteria with "○" in the Overall Result were selected as the final planned equipment.

Table-14 Hoima RRH

Code No.	Equipment	Request			Evaluation/the number of equipment							
		Department	Q'ty	Total	(a)	(b)	(c)	(d)	(e)	Overall Result		
										Evaluation	Q'ty	Total
5	Anaesthesia Machine	Main OT	2	3	○	○	○	○	○	○	2	2
		Ophthalmology OT	1		×	○	○	○	○	×	-	
8	Audiometer (Screening)	ENTclinic	1	1	○	○	○	○	○	○	1	1
10	Autoclave (Large)	CSSD	2	2	○	○	○	○	○	○	2	2
19	Bed (for Emergency)	Casualty department	3	3	○	○	○	○	○	○	3	3
20	Bed (for HDU)	HDU	4	7	○	○	○	○	○	○	4	4
		Medical ward	3		×	○	○	○	○	×	-	
22	Bed (for Patient)	Maternity ward	50	50	○	○	○	○	△	△	42	42
34	C-arm X-ray Unit	Main OT	1	1	○	○	○	○	○	○	1	1
39	Centrifuge (Table Top Type)	OPD Laboratory	1	2	○	○	○	○	○	○	1	1
		Main OT	1		×	○	○	○	○	×	-	
44	Defibrillator	Casualty department	1	2	○	○	○	○	○	○	1	1
		HDU	1		○	○	○	×	○	×	-	
45	Delivery Bed	Delivery room	8	8	×	○	○	○	○	×	-	-
46	Dental Unit	Dental clinic	3	3	○	○	△	○	○	△	2	2
49	Diagnostic Set	Paediatric consultation room	1	8	○	○	○	○	○	○	1	3
		Specialised OPD consultation	1		○	○	○	○	○	○	1	
		HIV consultation room	1		○	○	○	○	×	×	-	
		General OPD consultation room	2		○	○	○	△	○	△	1	
		Medical ward	3		×	○	○	○	○	×	-	
55	ECG (12 lead)	HDU	1	3	○	○	○	○	○	○	1	1
		Medical ward	2		×	○	○	○	○	×	-	
59	Electric Surgical Unit	Main OT	2	2	○	○	○	△	○	△	1	1
65	Endoscope Set	Main OT	1	1	○	○	○	○	○	○	1	1
66	ENT Unit	ENTclinic	1	1	○	○	○	○	○	○	1	1
68	Examination Couch	Obstet. Consultation room	1	20	○	○	○	○	○	○	1	15
		Gynaec. Consultation room	1		○	○	○	○	○	○	1	
		ENTclinic	1		○	○	○	○	○	○	1	
		Paediatric consultation room	1		○	○	○	○	○	○	1	
		Paediatric treatment room	1		○	○	○	○	○	○	1	
		Specialised OPD consultation room	1		○	○	○	○	○	○	1	
		Specialised OPD treatment room	1		○	○	○	○	○	○	1	
		HIV treatment room	1		○	○	○	○	○	○	1	
		HIV consultation room	1		○	○	○	○	×	×	-	
		General OPD consultation room	5		○	○	○	○	○	○	5	
		General OPD treatment room	2		○	○	○	○	○	○	2	
		Casualty department	1		○	○	×	○	×	×	-	
		HDU	1		○	○	○	○	×	×	-	
		Maternity treatment room	2		○	○	×	○	×	×	-	
69	Examination Lamp (Mobile Type)	Paediatric consultation room	1	14	○	○	○	○	○	○	1	4
		General OPD consultation room	2		○	○	○	○	△	△	1	
		Specialised OPD consultation room	1		○	○	○	○	○	○	1	
		HIV consultation room	1		○	○	○	○	×	×	-	
		Casualty department	2		○	○	○	○	△	△	1	
		Obs/Gyn. OT	1		○	○	○	○	×	×	-	
		Obs/Gyn. OPD consultation room	2		○	○	○	○	×	×	-	
		Obs/Gyn. ward	4		○	○	○	○	×	×	-	
70	Examination Table (for Ob&Gy w/	Obs/Gyn. OPD Treatment room	2	4	○	○	○	△	○	△	1	2
		Maternity treatment room	1		○	○	○	○	×	×	-	
		Maternity Ward	1		○	○	○	○	○	○	1	
88	Infant Incubator	Newborn baby room	5	5	○	○	○	△	○	△	3	3
92	Infusion Pump	Resuscitation room	2	6	○	○	○	△	○	△	1	2
		HDU	4		○	○	○	△	○	△	1	
97	Instrument Set (for Caesarean S	Main OT	5	5	○	○	○	△	○	○	1	1
104	Instrument Set (for Dilatation)	Main OT	5	5	○	○	○	△	○	○	1	1
110	Instrument Set (for Gynecology)	Obs/Gyn. OPD Treatment room	6	6	○	○	○	△	○	△	2	2
125	Instrument Set (for Orthopedic)	Main OT	1	1	○	○	○	○	○	○	1	1
137	Instrument Set (for Tracheostom	OT	1	2	○	○	○	○	○	○	1	2
		Resuscitation room	1		○	○	○	○	○	○	1	
155	Microscope (Binocular)	OPD Laboratory	1	3	○	○	○	○	○	○	1	1
		Main OT	2		×	○	○	○	○	×	-	

Code No.	Equipment	Request			Evaluation/the number of equipment							
		Department	Q'ty	Total	(a)	(b)	(c)	(d)	(e)	Overall Result		
										Evaluation	Q'ty	Total
160	Nebulizer	Paediatric consultation room	1	4	○	○	○	○	○	○	1	3
		General OPD treatment room	1		○	○	○	○	○	○	1	
		Specialized OPD	1		○	○	○	○	○	○	1	
		Resuscitation room	1		○	○	○	○	×	×	-	
163	Operating Light (Ceiling Type)	Main OT	2	2	○	○	○	○	○	○	2	2
164	Operating Light (Mobile Type)	Obs/Gyn. OT	1	1	×	○	○	○	○	×	-	-
165	Operating Microscope (for ENT)	Main OT	1	1	○	○	○	○	○	○	1	1
167	Operating Table	Main OT	2	3	○	○	○	○	○	○	2	2
		Obs/Gyn. OT	1		×	○	○	○	○	×	-	
177	Patient Trolley	Recovery room	5	17	○	○	○	△	○	△	2	2
		Resuscitation room	2		○	○	○	×	○	×	-	
		Maternity Ward	1		○	○	×	○	○	×	-	
		Obs/Gyn. OT	2		×	○	○	○	○	×	-	
		Ophthalmology ward	1		×	○	○	○	○	×	-	
		OT of ophthalmology	1		×	○	○	○	○	×	-	
		Medical ward	5		×	○	○	○	○	×	-	
185	Patient Monitor	Main OT	3	11	○	○	△	△	○	△	2	4
		HDU	4		○	○	○	△	○	△	1	
		Resuscitation room	3		○	○	○	△	○	△	1	
		Obs/Gyn. OT	1		×	○	○	○	○	×	-	
193	Refrigerator (for Laboratory)	OPD Laboratory	1	1	○	○	○	○	○	○	1	1
194	Refrigerator (for Medicine)	OPD Laboratory	1	3	○	○	○	×	○	×	-	1
		Med. Supply storage	1		○	○	○	○	○	○	1	
		Obs/Gyn. OT	1		×	○	○	○	○	×	-	
196	Resuscitation Bag (for Adult)	Delivery room	2	2	×	○	○	○	○	×	-	-
216	Stool (for Surgeon)	Main OT	4	4	○	○	○	△	○	△	2	2
218	Sterilizing Container Set (Drum &	CSSD	1	1	○	○	○	○	○	○	1	1
221	Suction Machine (Electric)	Central OT	3	11	○	○	○	△	○	○	2	4
		Resuscitation room	2		○	○	○	△	○	△	1	
		HDU	2		○	○	○	△	○	△	1	
		Obs/Gyn. OT	2		×	○	○	○	○	×	-	
		Paediatric ward	2		×	○	○	○	○	×	-	
225	Syringe Pump	Resuscitation room	2	6	○	○	○	△	○	△	1	3
		HDU	4		○	○	○	△	○	△	2	
249	Ventilators (Adult)	HDU	2	2	○	○	○	△	○	△	1	1
263	Working Table (Large)	CSSD	1	1	○	○	○	○	○	○	1	1
264	X-ray Film Viewer	Obstet. consultation room	1	13	○	○	○	○	○	○	1	8
		Gynaec. consultation room	1		○	○	○	○	○	○	1	
		ENTclinic	1		○	○	○	○	○	○	1	
		Paediatric consultation room	1		○	○	○	○	○	○	1	
		Specialised OPD consultation room	1		○	○	○	○	○	○	1	
		HIV consultation room	1		○	○	○	○	×	×	-	
		General OPD consul	5		○	○	○	△	○	△	2	
		Resuscitation room	1		○	○	○	○	×	×	-	
		Operation theatre	1		○	○	○	○	○	○	1	

Table-15 Kabale RRH

Code No.	Equipment	Request			Evaluation/the number of equipment							
		Department	Q'ty	Total	(a)	(b)	(c)	(d)	(e)	Overall Result		
										Evaluation	Q'ty	Total
5	Anaesthesia Machine	Main OT	3	4	○	○	○	○	○	○	3	3
		ENT OT	1		×	○	○	○	○	×	-	
10	Autoclave (Large)	CSSD	2	2	○	○	○	○	○	○	2	2
19	Bed (for Emergency)	Casualty department	3	3	○	○	○	○	○	○	3	3
20	Bed (for HDU)	HDU	4	4	○	○	○	○	○	○	4	4
22	Bed (for Patient)	Maternity ward	66	66	○	○	○	○	△	△	34	34
29	Bronchoscope	Main OT	1	1	○	○	○	○	○	○	1	1
34	C-arm X-ray Unit	Main OT	1	1	○	○	○	○	○	○	1	1
39	Centrifuge (Table Top Type)	OPD laboratory	1	3	○	○	○	○	○	○	1	1
		Main laboratory	2		×	○	○	○	○	×	-	
44	Defibrillator	Casualty department	1	3	○	○	○	×	○	×	-	2
		Main OT	1		○	○	○	○	○	○	1	
		HDU	1		○	○	○	○	○	○	1	
45	Delivery Bed	Delivery room	5	5	○	○	○	○	○	○	5	5
46	Dental Unit	Dental clinic	3	3	○	○	○	△	○	△	2	2
47	Dental X-ray Machine	Dental clinic	1	1	○	○	○	○	○	○	1	1
49	Diagnostic Set	Paediatric OPD consultation room	1	3	○	○	○	○	○	○	1	3
		General OPD consultation room	1		○	○	○	○	○	○	1	
		Specialised OPD consultation	1		○	○	○	○	○	○	1	
52	Doppler	Obs/Gyn. Ward	3	3	○	○	○	△	○	△	1	1
55	ECG (12 lead)	Casualty department	1	3	○	○	○	○	○	○	1	2
		HDU	1		○	○	○	○	○	○	1	
		Medical ward	1		×	○	○	○	○	×	-	
59	Electric Surgical Unit	Main OT	2	2	○	○	○	△	○	△	1	1
65	Endoscope Set	Main OT	1	1	○	○	○	○	○	○	1	1
66	ENT Unit	ENTclinic	1	1	○	○	○	○	○	○	1	1
68	Examination Couch	Specialised OPD consultation room	1	15	○	○	○	○	○	○	1	9
		Specialised OPD treatment room	1		○	○	○	○	○	○	1	
		Gynaec. OPD Consultation room	1		○	○	○	○	○	○	1	
		Paediatric OPD consultation room	1		○	○	○	○	○	○	1	
		Paediatric OPD treatment room	1		○	○	×	○	○	×	-	
		General OPD consultation room	4		○	○	○	○	○	○	4	
		General OPD treatment room	2		○	○	○	△	○	△	1	
		Medical ward	1		×	○	○	○	○	×	-	
		Surgery ward	1		×	○	○	○	○	×	-	
		Paediatric ward	1		×	○	○	○	○	×	-	
		TB ward	1		×	○	○	○	○	×	-	
69	Examination Lamp (Mobile Type)	General/Specialised OPD treatment room	3	11	○	○	○	○	△	△	1	4
		Paediatric OPD treatment room	1		○	○	○	○	○	○	1	
		Obs/Gyn. Ward	3		○	○	○	○	△	△	2	
		Medical ward	1		×	○	○	○	○	×	-	
		Paediatric ward	1		×	○	○	○	○	×	-	
		Surgery ward	1		×	○	○	○	○	×	-	
		TB ward	1		×	○	○	○	○	×	-	
70	Examination Table (for Ob&Gy w/Examination Unit)	Gynaec. consultation room	1	3	○	○	○	○	○	○	1	1
		Obstet. OPD treatment room	1		○	○	○	×	○	×	-	
		MCH Consutlation room	1		×	○	○	○	○	×	-	
88	Infant Incubator	Maternity ward	3	3	○	○	○	△	○	△	2	2
92	Infusion Pump	HDU	2	2	○	○	○	○	○	○	2	2
97	Instrument Set (for Caesarean Section)	Main OT	5	5	○	○	○	△	○	△	1	1
99	Instrument Set (for Delivery)	Delivery room	10	10	○	○	○	△	○	△	3	3
100	Instrument Set (for Dental examination)	Dental clinic	12	12	○	○	○	△	○	△	1	1
104	Instrument Set (for Dilatation)	Main OT	3	3	○	○	○	△	○	△	1	1
109	Instrument Set (for General Surgery Large)	Minor OT	3	9	○	○	○	○	×	×	-	2
		Main OT	6		○	○	○	△	○	△	2	
114	Instrument Set (for Intubation)	HDU	1	1	○	○	○	○	○	○	1	1
117	Instrument Set (for Laparotomy)	Main OT	4	4	○	○	○	△	○	△	1	1
125	Instrument Set (for Orthopedic)	Main OT	5	5	○	○	○	△	○	△	1	1
137	Instrument Set (for Tracheostomy)	Casualty department	1	1	○	○	○	○	○	○	1	1
155	Microscope (Binocular)	OPD laboratory	1	2	○	○	○	○	○	○	1	1
		Central OT	1		×	○	×	○	○	×	-	

Code No.	Equipment	Request			Evaluation/the number of equipment							
		Department	Q'ty	Total	(a)	(b)	(c)	(d)	(e)	Overall Result		
										Evaluation	Q'ty	Total
160	Nebulizer	Casualty department	2	12	○	○	○	○	×	×	-	3
		Paediatric OPD treatment room	1		○	○	○	○	○	○	1	
		General OPD treatment room	2		○	○	○	△	○	△	1	
		HDU	1		○	○	○	○	○	○	1	
		Medical ward	2		×	○	○	○	○	×	-	
		Paediatric ward	2		×	○	○	○	○	×	-	
		Surgery ward	1		×	○	○	○	○	×	-	
		TB ward	1		×	○	○	○	○	×	-	
163	Operating Light (Ceiling Type)	Main OT	3	3	○	○	○	○	○	○	3	3
164	Operating Light (Mobile Type)	Casualty department	3	6	○	○	×	○	○	×	-	1
		Minor OT	1		○	○	○	○	○	○	1	
		Central OT	1		○	○	×	○	○	×	-	
		ENTOT	1		×	○	○	○	○	×	-	
165	Operating Microscope (for ENT)	Main OT	1	1	○	○	○	○	○	○	1	1
167	Operating Table	Minor OT	1	5	○	○	×	○	○	×	-	3
		Main OT	3		○	○	○	○	○	○	3	
		ENTOT	1		×	○	○	○	○	×	-	
177	Patient Trolley	Casualty department	4	19	○	○	×	○	○	×	-	2
		Recovery room	5		○	○	○	△	○	△	2	
		Obs/Gyn. ward	1		○	○	×	○	○	×	-	
		ENTOT	1		○	○	×	○	○	×	-	
		Orthopaedic OT	1		×	○	○	○	○	×	-	
		Medical ward	2		×	○	○	○	○	×	-	
		Paediatric ward	2		×	○	○	○	○	×	-	
		Surgery ward	2		×	○	○	○	○	×	-	
		TB ward	1		×	○	○	○	○	×	-	
185	Patient Monitor	Casualty department	3	11	○	○	○	△	○	△	1	4
		Main OT	3		○	○	○	△	○	△	2	
		HDU	4		○	○	○	△	○	△	1	
		Obs/Gyn. ward	1		×	○	○	○	○	×	-	
193	Refrigerator (for Laboratory)	OPD laboratory	1	1	○	○	○	○	○	○	1	1
194	Refrigerator (for Medicine)	Med. supply storage	1	1	○	○	○	○	○	○	1	1
196	Resuscitation Bag (for Adult)	Casualty department	2	7	○	○	○	△	○	△	1	2
		HDU	1		○	○	○	○	○	○	1	
		Medical ward	1		×	○	○	○	○	×	-	
		Paediatric ward	1		×	○	○	○	○	×	-	
		Surgery ward	1		×	○	○	○	○	×	-	
		TB ward	1		×	○	○	○	○	×	-	
197	Resuscitation Bag (for Paediatric)	Casualty department	2	3	○	○	○	△	○	△	1	1
		Paediatric ward	1		×	○	○	○	○	×	-	
216	Stool (for Surgeon)	Minor OT	2	5	○	○	○	○	×	×	-	3
		Main OT	3		○	○	○	○	○	○	3	
218	Sterilizing Container Set (Drum & Carrier)	CSSD	1	1	○	○	○	○	○	○	1	1
221	Suction Machine (Electric)	Main OT	2	15	○	○	○	○	○	○	2	4
		HDU	2		○	○	○	○	○	○	2	
		Delivery room	3		○	○	×	○	○	×	-	
		Medical ward	2		×	○	○	○	○	×	-	
		Paediatric ward	2		×	○	○	○	○	×	-	
		Surgery ward	2		×	○	○	○	○	×	-	
		TB ward	2		×	○	○	○	○	×	-	
225	Syringe Pump	HDU	2	2	○	○	○	○	○	○	2	2
243	Ultrasound Scanner (Portable)	Casualty department	1	3	○	○	○	○	×	×	-	-
		Gynae. treatment room	1		○	○	×	○	○	×	-	
		Maternity ward treatment room	1		○	○	○	○	×	×	-	
249	Ventilators (Adult)	HDU	2	2	○	○	○	△	○	△	1	1
263	Working Table (Large)	CSSD	1	1	○	○	○	○	○	○	1	1
264	X-ray Film Viewer	Specialised OPD consultation room	1	7	○	○	○	○	○	○	1	4
		Gynae. OPD consultation room	1		○	○	○	○	○	○	1	
		Paediatric OPD consultation room	1		○	○	○	○	○	○	1	
		General OPD consultation room	4		○	○	○	△	○	△	1	

Table-16 Fort Portal RRH

Code No.	Equipment	Request			Evaluation/Q'ty							
		Department	Q'ty	Total	(a)	(b)	(c)	(d)	(e)	Overall Result		
										valuatio	Q'ty	Total
5	Anaesthesia Machine	Main OT	3	5	○	○	○	○	○	○	3	3
		Obs/Gyn. OT	1		×	○	○	○	○	×	-	
		Ophthalmology OT	1		×	○	○	○	○	×	-	
8	Audiometer (Screening)	ENTclinic	1	1	○	○	○	○	○	○	1	1
10	Autoclave (Large)	CSSD	2	2	○	○	○	○	○	○	2	2
19	Bed (for Emergency)	Casualty department	3	3	○	○	○	○	○	○	3	3
20	Bed (for HDU)	Medical ward (HDU)	4	4	×	○	○	○	○	×	-	-
29	Bronchoscope	ENTclinic	1	1	○	○	○	○	○	○	1	1
34	C-arm X-ray Unit	Main OT	1	1	○	○	○	○	○	○	1	1
39	Centrifuge (Table Top Type)	Main laboratory	1	1	×	○	○	○	○	×	-	-
44	Defibrillator	Casualty department	1	3	○	○	○	○	○	○	1	2
		OT	-		○	○	○	○	○	○	1	
		Medical ward (HDU)	1		×	○	○	○	○	○	-	
		Paediatric ward	1		×	○	○	○	○	×	-	
45	Delivery Bed	Delivery room	5	5	○	○	△	○	○	△	2	2
46	Dental Unit Set	Dental clinic	1	1	○	○	×	○	○	×	-	-
52	Doppler	Obs/Gyn. OPD consultation roor	2	3	○	○	○	△	○	△	1	1
		Obs/Gyn. OT	1		○	○	○	○	×	×	-	
55	ECG (12 lead)	Casualty department	2	2	○	○	○	△	○	△	1	1
59	Electric Surgical Unit	Main OT	2	3	○	○	○	△	○	△	1	1
		Minor OT	1		○	○	○	○	×	×	-	
65	Endoscope Set	Main OT	1	1	○	○	○	○	○	○	1	1
66	ENT Unit	ENTclinic	2	2	○	○	○	△	○	△	1	1
68	Examination Couch	Casualty department	1	2	○	○	○	○	×	×	-	-
		Surgery OPD consultation room	1		×	○	○	○	○	×	-	
69	Examination Lamp (Mobile Type)	General OPD	9	19	○	○	○	△	×	×	-	3
		Obs/Gyn. OPD	4		○	○	○	△	○	△	1	
		Paediatric OPD	2		○	○	○	△	○	△	1	
		Surgery OPD	1		○	○	○	○	○	○	1	
		Medical ward	3		×	○	○	○	○	×	-	
70	Examination Table (for Ob&Gyw/Exam	Obs/Gyn. Consultation room	6	6	○	○	×	○	○	×	-	-
88	Infant Incubator	Maternity ward	4	4	○	○	○	△	○	△	2	2
92	Infusion Pump	Casualty department	3	23	○	○	○	△	○	△	1	1
		Medical ward (HDU)	10		×	○	○	○	○	×	-	
		Paediatric ward	10		×	○	○	○	○	×	-	
97	Instrument Set (for Caesarean Sectio	Obs/Gyn. OT	3	3	○	○	○	△	○	○	1	1
99	Instrument Set (for Delivery)	Obs/Gyn. department	10	10	○	○	×	○	○	×	-	-
100	Instrument Set (for Dental examinatio	Dental clinic	3	3	○	○	×	○	○	×	-	-
104	Instrument Set (for Dilatation)	Main OT	3	3	○	○	×	○	○	×	-	-
107	Instrument Set (for ENT Clinic)	ENTclinic	1	1	○	○	○	△	○	△	1	1
109	Instrument Set (for General Surgery I	Main OT	3	3	○	○	○	△	○	△	1	1
110	Instrument Set (for Gynecology)	Obs/Gyn. Consultation room	3	6	○	○	△	○	○	△	1	2
		Delivery room	3		○	○	△	○	○	△	1	
114	Instrument Set (for Intubation)	Main OT	2	3	○	○	△	○	○	△	1	1
		Minor OT	1		○	○	×	○	○	×	-	
		Obs/Gyn. OT	1		○	○	×	○	○	×	-	
117	Instrument Set (for Laparotomy)	Main OT	5	7	○	○	○	△	○	△	1	1
		Obs/Gyn. OT	2		○	○	×	○	○	×	-	
125	Instrument Set (for Orthopedic)	Main OT	1	1	○	○	△	○	○	△	1	1
137	Instrument Set (for Tracheostomy)	Main OT	2	2	○	○	△	○	○	△	1	1
155	Microscope (Binocular)	Main OT	2	2	×	○	×	○	○	×	-	-
160	Nebulizer	Casualty department	1	9	○	○	○	○	○	○	1	1
		Surgery department	2		×	○	○	○	○	×	-	
		Medical ward (HDU)	3		×	○	○	○	○	×	-	
		Paediatric ward	3		×	○	○	○	○	×	-	
164	Operating Light (Mobile Type)	Main OT	2	4	○	○	○	○	○	○	2	4
		Minor OT	1		○	○	○	○	○	○	1	
		Obs/Gyn. OT	1		○	○	○	○	○	○	1	

Code No.	Equipment	Request			Evaluation/Q'ty							
		Department	Q'ty	Total	(a)	(b)	(c)	(d)	(e)	Overall Result		
										Evaluatio	Q'ty	Total
165	Operating Microscope (for ENT)	Main OT	1	1	○	○	○	○	○	○	1	1
167	Operating Table	Main OT	2	3	○	○	○	○	○	○	2	2
		Minor OT	1		○	○	○	○	×	×	-	
177	Patient Trolley	OPD	4	14	○	○	○	○	×	×	-	2
		Main OT	3		○	○	○	△	○	△	2	
		Obs/Gyn. OT	1		×	○	○	○	○	×	-	
		Surgery ward	2		×	○	○	○	○	×	-	
		Medical ward (HDU)	4		×	○	○	○	○	×	-	
185	Portable Monitor	Casualty department	3	19	○	○	○	△	○	△	1	3
		Main OT	3		○	○	○	△	○	△	2	
		Minor OT	1		×	○	○	○	○	×	-	
		Obs/Gyn. OT	1		×	○	○	○	○	×	-	
		Surgery ward	4		×	○	○	○	○	×	-	
		Medical ward (HDU)	4		×	○	○	○	○	×	-	
		Paediatric ward	3		×	○	○	○	○	×	-	
194	Refrigerator (for Laboratory)	Main OT	1	3	○	○	○	○	×	×	-	-
		Obs/Gyn. OT	1		○	○	○	○	×	×	-	
		Medical ward (HDU)	1		○	○	○	○	×	×	-	
196	Resuscitation Bag (for Adult)	Main OT	2	7	○	○	×	○	○	×	-	-
		Obs/Gyn. department	4		○	○	×	○	○	×	-	
		Obs/Gyn. OT	1		○	○	×	○	○	×	-	
197	Resuscitation Bag (for Paediatric)	Main OT	1	5	○	○	×	○	○	×	-	-
		Delivery room	1		○	○	×	○	○	×	-	
		Obs/Gyn. OT	2		×	○	×	○	○	×	-	
		Paediatric ward	1		×	○	×	○	○	×	-	
216	Stool (for Surgeon)	Main OT	6	10	○	○	△	○	○	△	2	2
			2		×	○	○	○	○	×	-	
		Ophthalmology OT	2		○	○	×	○	○	×	-	
218	Sterilizing Container Set (Drum & Car	CSSD	1	1	○	○	○	○	○	○	1	1
221	Suction Machine (Electric)	Casualty department	2	14	○	○	△	○	○	△	1	4
		Main OT	3		○	○	○	○	○	○	3	
		Minor OT	1		○	○	×	○	○	×	-	
		Obs/Gyn. OT	1		×	○	○	○	○	×	-	
		Surgery ward	2		×	○	○	○	○	×	-	
		Medical ward (HDU)	5		×	○	○	○	○	×	-	
243	Ultrasound Scanner (Portable)	Casualty department	1	2	○	○	○	×	○	×	-	1
		Obs/Gyn. department	1		○	○	○	○	○	○	1	
249	Ventilators (Adult)	Casualty department	2	2	○	○	○	△	○	○	1	1

[Review in the Preparatory Survey 2]

The Preparatory Survey 2 was conducted with the above issues in the Preparatory Survey being taken into consideration, and the Survey Team found a change in the situation of Kabale RRH. Through the analysis of the survey results, the Survey Team concluded that there was no need to change the latest equipment plan except for the following two items:

(1) Operating table: It was confirmed that several items of equipment had been supplied to Kabale RRH from MOH, including two operating tables. Accordingly, the number of operating tables to be procured in the Project should be reduced from three to one.

(2) Ultrasound scanner: At the time of the Preparatory Survey the ultrasound scanner was excluded from the supply list of the medical equipment, because the existing one was functioning in spite of its aging. However, that machine failed after the previous survey, and was not recovered properly. Since then, there is no working ultrasound scanner, and it makes difficult for clinicians to diagnose diseases. At

the time of the Field Survey in the Preparatory Survey 2, the Ugandan side requested the ultrasound scanner to be included in the Project again, and in view of its necessity, it should be included in the equipment plan.

The results of the above-mentioned examinations are compiled in the following list of planned equipment:

Table-17 List of Planned Equipment

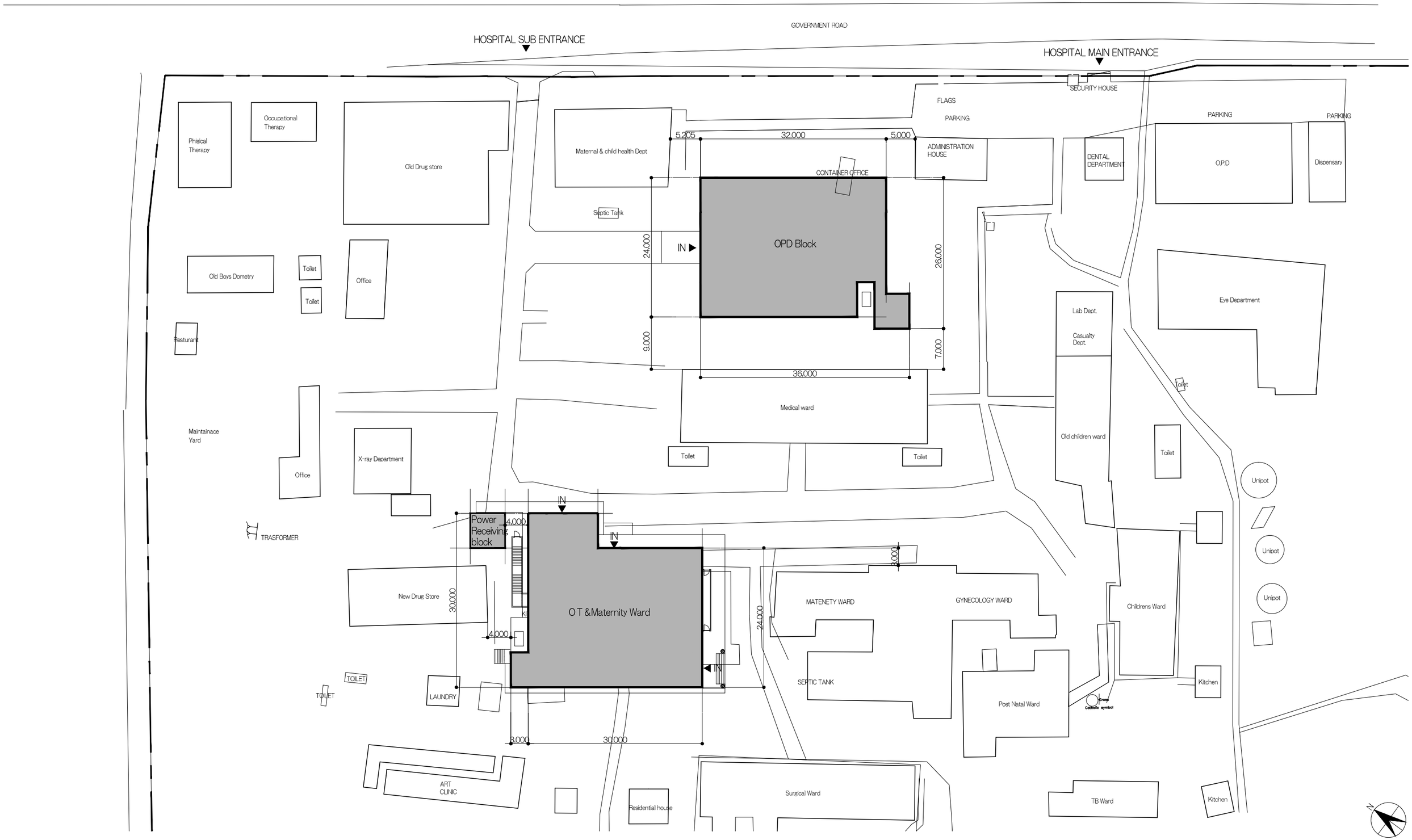
No.	Code No.	Equipment	Q'ty	Allocation List																																		
				Hoima RRH															Kabale RRH														Fort Portal RRH							
				OPD									OT/Maternity Ward					Sub total	OPD							OT/Maternity Ward					Sub total	OPD	Casualty	OP Theater	CSSD	Dental	ENT	Obs/Gyn.	Sub total
				Laboratory	Obs/Gyn.	ENT	Paediatric	HIV	OPD General/Special	Med supply storage	Dental	OP Theater	CSSD	Casualty	HDU	Maternity Ward		Laboratory	Obs/Gyn.	ENT	Paediatric	OPD General/Special	Med supply storage	Dental	OP Theater	CSSD	Casualty	HDU	Maternity Ward										
1	5	Anaesthesia Machine Set	8									2					2								3					3			3					3
2	8	Audiometer (Screening)	2			1											1																		1		1
3	10	Autoclave (Large)	3										1				1									1				1				1				1
4	19	Bed (for Emergency)	9											3			3										3			3							3
5	20	Bed (for HDU)	8												4		4											4		4								
6	22	Bed (for Patient)	76													42	42												34	34								
7	29	Bronchoscope	2																						1					1					1		1
8	34	C-arm X-ray Unit	3									1					1								1					1			1					1
9	39	Centrifuge	2	1													1	1												1								
10	44	Defibrillator	5											1			1								1			1		2		1	1					2
11	45	Delivery Bed	7																										5	5						2	2
12	46	Dental Unit Set	2								1						1							1						1								
13	49	Diagnostic Set	6				1		2								3				1	2								3								
14	52	Doppler	2																										1	1						1	1
15	55	ECG (12 lead)	4												1		1									1	1			2		1						1
16	59	Electric Surgical Unit	3									1					1								1					1			1					1
17	65	Endoscope Set	2									1					1								1					1								
18	66	ENT Unit	3			1											1			1										1					1		1
19	68	Examination Couch	24		2	1	2	1	9								15		1		1	7								9								
20	69	Examination Lamp (Mobile Type)	11				1		2			1					4				1	1							2	4	3							3
21	70	Examination Table (for Obs/Gyn.)	3		1											1	2		1											1								
22	88	Infant Incubator	7													3	3												2	2						2	2
23	92	Infusion Pump	5											1	1		2											2		2		1					1
24	97	Instrument Set (for Caesarean Section)	3									1					1								1					1			1					1
25	99	Instrument Set (for Delivery)	3																										3	3							
26	100	Instrument Set (for Dental examination)	1																					1						1								
27	104	Instrument Set (for Dilatation)	2									1					1								1					1								
28	107	Instrument Set (for ENT Clinic)	1																																1		1
29	109	Instrument Set (for General Surgery Large)	3																						2					2			1					1
30	110	Instrument Set (for Gynecology)	4		2												2																			2	2

No.	Code No.	Equipment	Q'ty	Allocation List																																		
				Hoima RRH															Kabale RRH														Fort Portal RRH							
				OPD									OT/Maternity Ward					Sub total	OPD							OT/Maternity Ward					Sub total	OPD							
				Laboratory	Obs/Gyn.	ENT	Paediatric	HIV	General/Special OPD	Med supply storage	Dental	OP Theater	CSSD	Casualty	HDU	Maternity Ward		Laboratory	Obs/Gyn.	ENT	Paediatric	General/Special OPD	Med supply storage	Dental	OP Theater	CSSD	Casualty	HDU	Maternity Ward		Casualty	OP Theater	CSSD	Dental	ENT	Obs/Gyn.	
31	114	Instrument Set (for Intubation)	2																								1		1								1
32	117	Instrument Set (for Laparotomy)	2																						1				1								1
33	125	Instrument Set (for Orthopedic)	2									1					1								1				1								
34	137	Instrument Set (for Tracheostomy)	4									1		1			2										1		1								1
35	155	Microscope (Binocular)	2	1													1	1											1								
36	160	Nebulizer	7				1		2								3				1	1						1		3		1						1
37	163	Operating Light (Ceiling Type)	5									2					2								3					3								
38	164	Operating Light (Mobile Type)	5																								1		1		1						1	4
39	165	Operating Microscope (for ENT)	3									1					1								1				1		1						1
40	167	Operating Table	5									2					2								1				1		2						2
41	177	Patient Trolley	6									2					2								2				2		2						2
42	185	Portable Monitor	11									2		1	1		4								2		1	1		4		1	2				3
43	193	Refrigerator (for Laboratory)	2	1													1	1											1								
44	194	Refrigerator (for Medicine)	2						1								1						1						1								
45	196	Resuscitation Bag (for Adult)	2																								1	1	2								
46	197	Resuscitation Bag (for Paediatric)	1																								1		1								
47	216	Stool (for Surgeon)	7									2					2								3				3		2						2
48	218	Sterilizing Container Set (Drum & Carrier)	3										1				1									1			1			1					1
49	221	Suction Machine (Electric)	12									2		1	1		4								1		1	2		4		1	3				4
50	225	Syringe Pump	5											1	2		3											2		2							
51	243	Ultrasound Scanner (Portable)	2																1										1							1	1
52	249	Ventilators (Adult)	3												1		1										1		1		1						1
53	263	Working Table (Large)	2										1				1									1			1								
54	264	X-ray Film Viewer	12		2	1	1		3			1					8		1		1	2							4								
55	268	Oxygen Cylinder set-1	1									1					1																				
56		Oxygen Cylinder set-2	1																						1				1								
57		Oxygen Cylinder set-3	6												1		1											1	1		1	3					4
58	269	Endoscope Set w/Coagulation	1																												1						1
59	270	Examination Unit (for Obs/Gyn.)	3		1											1	2		1										1								

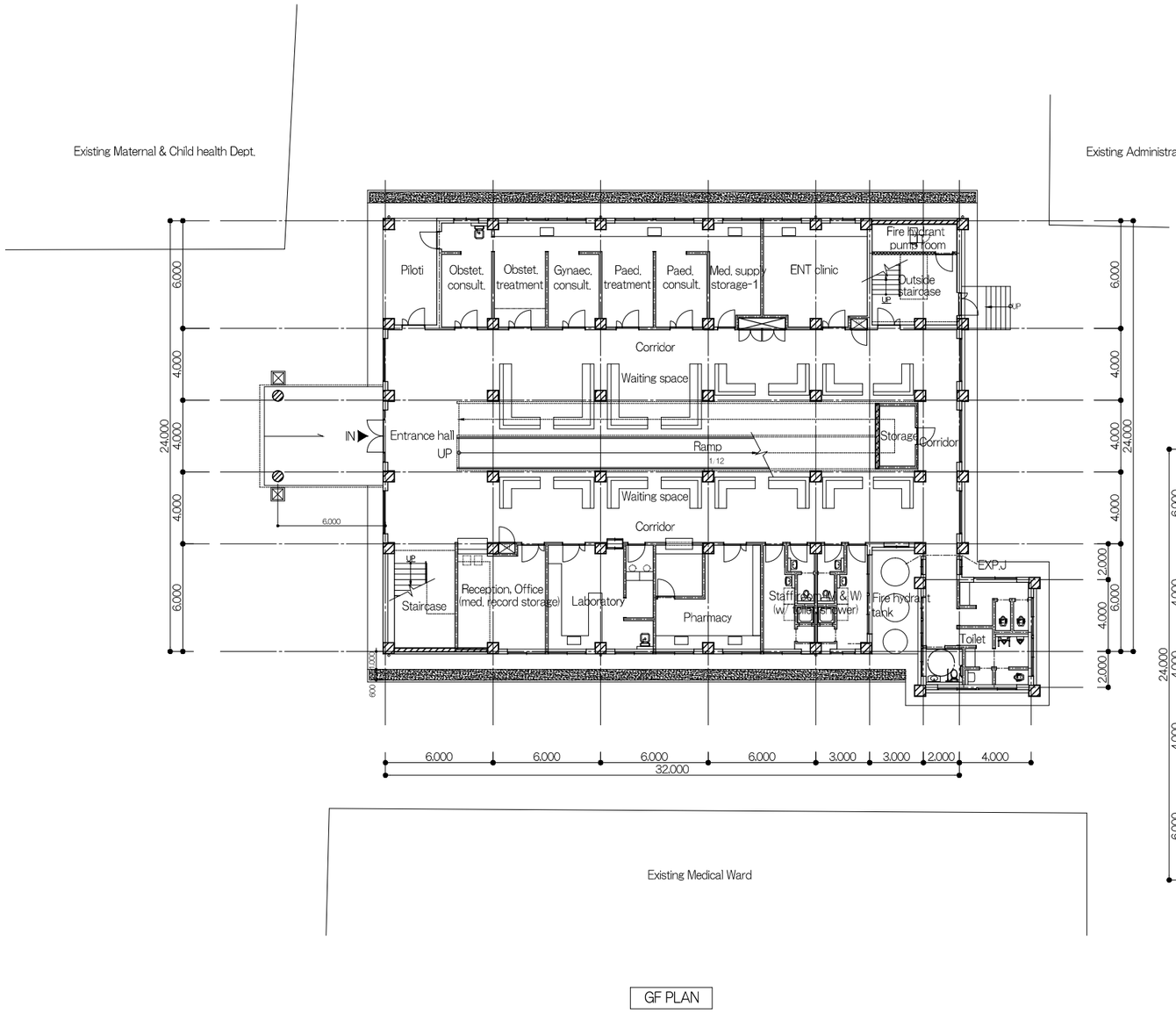
2-2-3 Outline Design Drawings

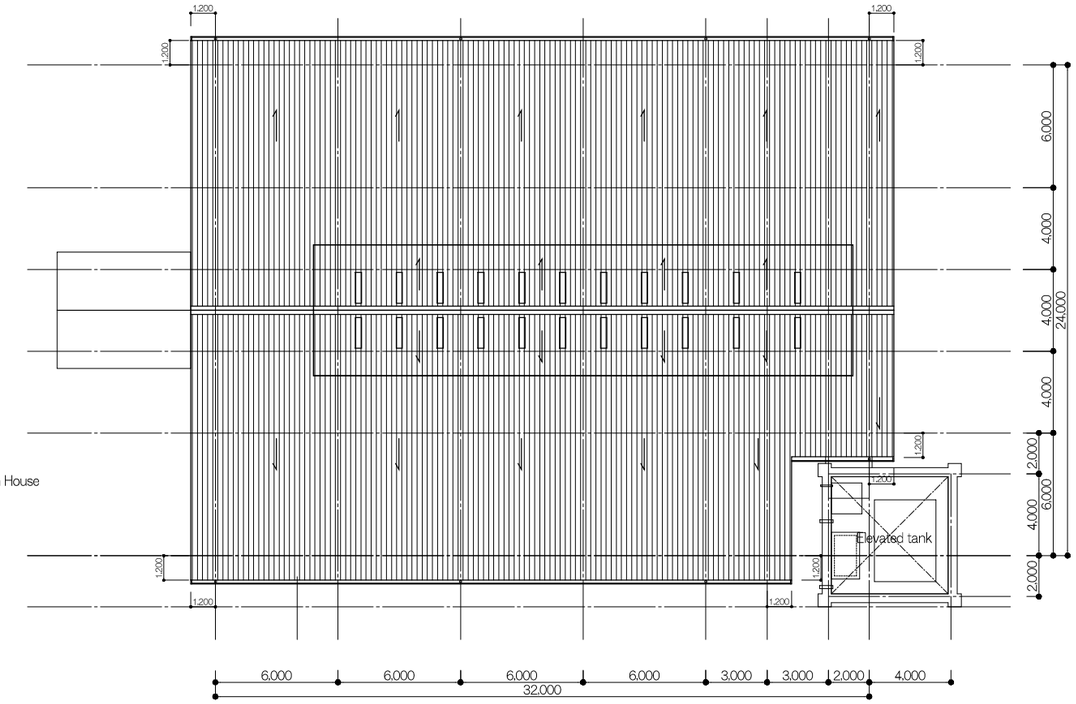
Hoima RRH:
- Plot Plan
- OPD Block Plan
- OPD Block Elevation
- OT/Maternity Ward Plan
- OT/Maternity Ward Elevation
- Section

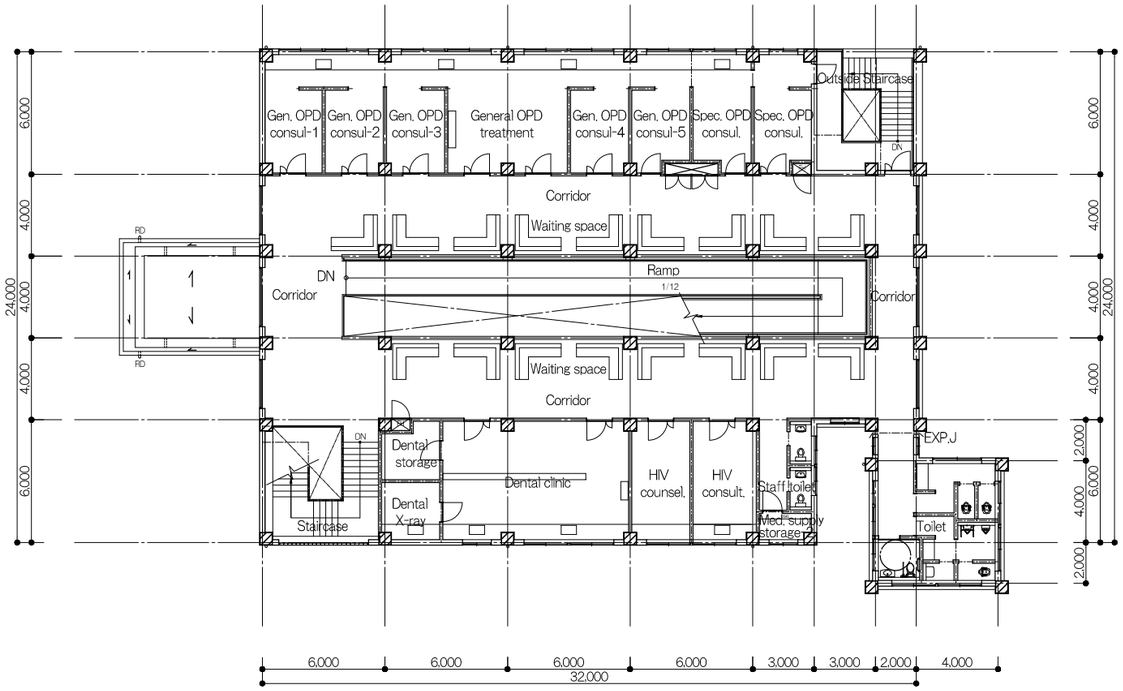
Kabale RRH:
- Plot Plan
- OPD/Casualty Block Plan
- OPD/Casualty Block Elevation
- OT/Maternity Ward Plan
- OT/Maternity Ward Elevation
- Section



PREPARATORY SURVEY ON THE PROJECT FOR THE REHABILITATION OF HOSPITALS AND SUPPLY OF MEDICAL EQUIPMENT IN THE WESTERN REGION IN UGANDA	HOIMA REGIONAL REFERRAL HOSPITAL	Name of drawing: PLOT PLAN Scale of drawing: 1:600	Number of drawing: H-01

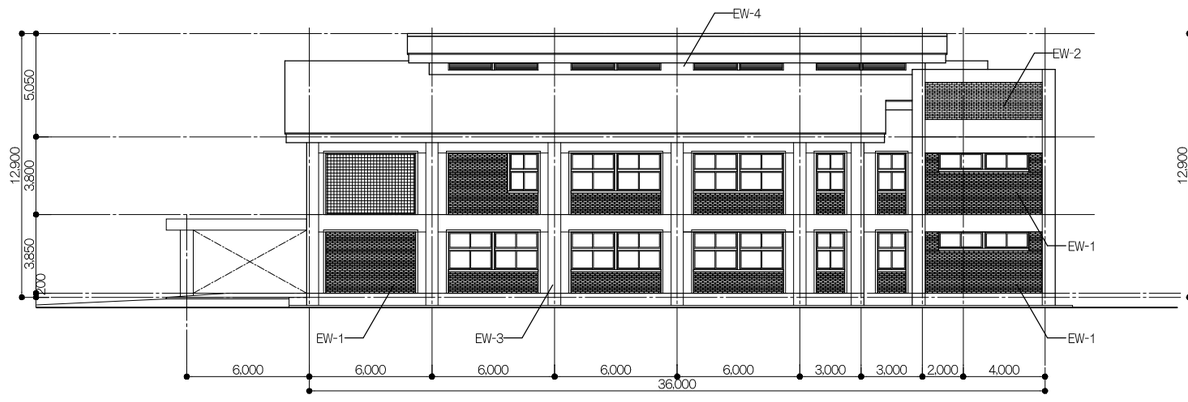




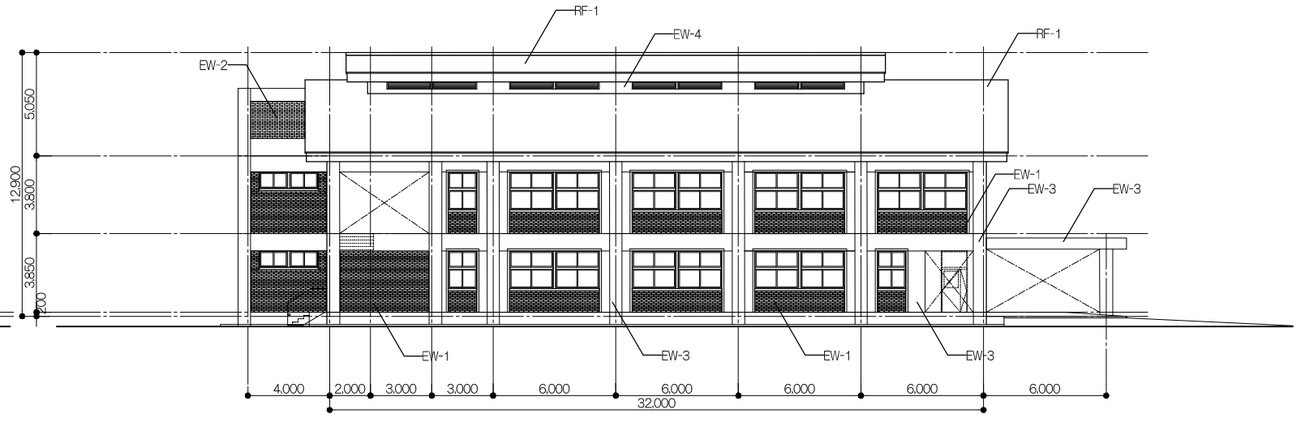


OPD block

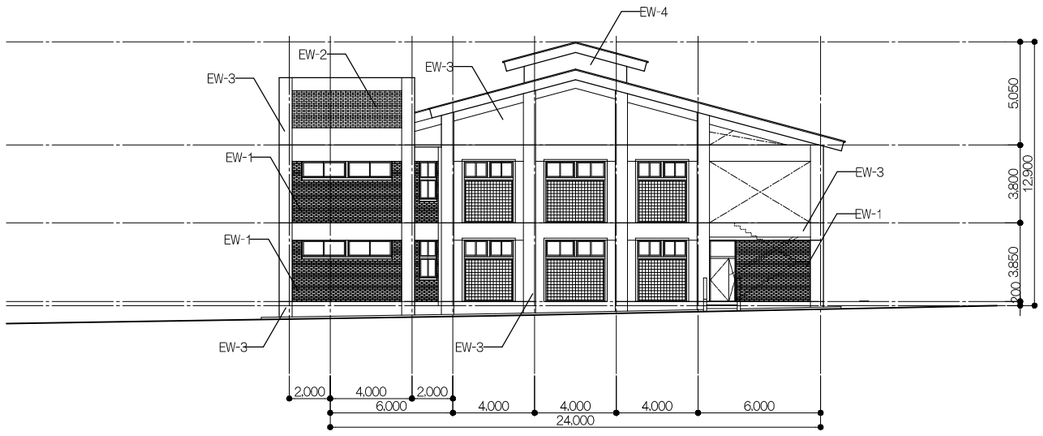
PREPARATORY SURVEY ON THE PROJECT FOR THE REHABILITATION OF HOSPITALS AND SUPPLY OF MEDICAL EQUIPMENT IN THE WESTERN REGION IN UGANDA	HOIMA REGIONAL REFERRAL HOSPITAL	Name of Drawing: OPD Block PLAN Scale of Drawing: 1:300	Number of Drawing: H-02



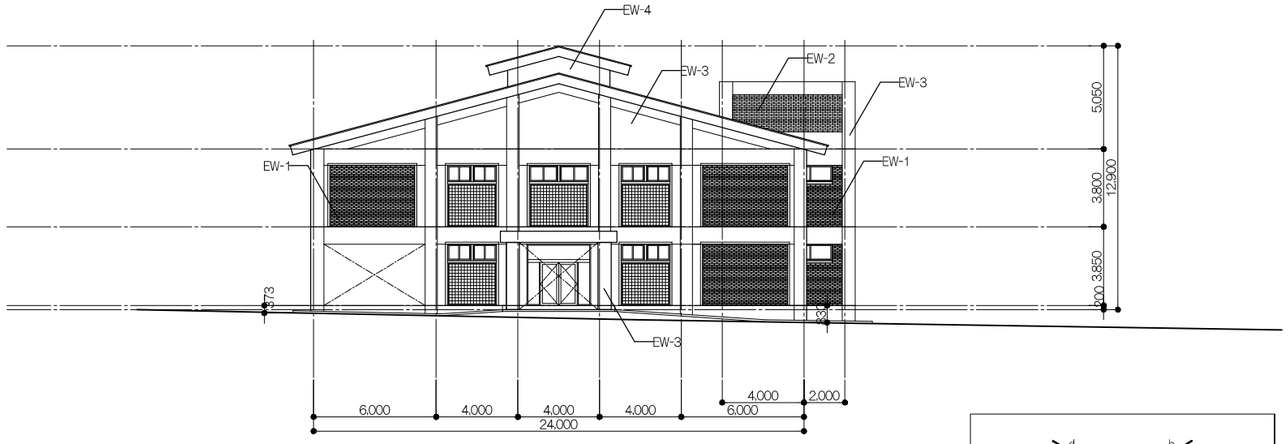
Elevation a-a



Elevation c-c



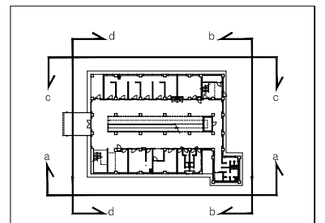
Elevation b-b



Elevation d-d

Legend

RF-1	CORRUGATED GALVANIZED STEEL SHEETROOFING t=0.5
RF-2	CONCRETE FLAT ROOF W/ TROWELING , ASPHALT WATER PROOFING ,CONCRETE W/TROWEL FINISH
EW-1	FAIR FACE BRICK
EW-2	FAIR FACE POROUS BRICK
EW-3	MORTAR W/ ELASTIC PAINTING FINISH
EW-4	CARRUGATED GALVANIZED STEEL SHEET ROOFING t=0.5



OPD block

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

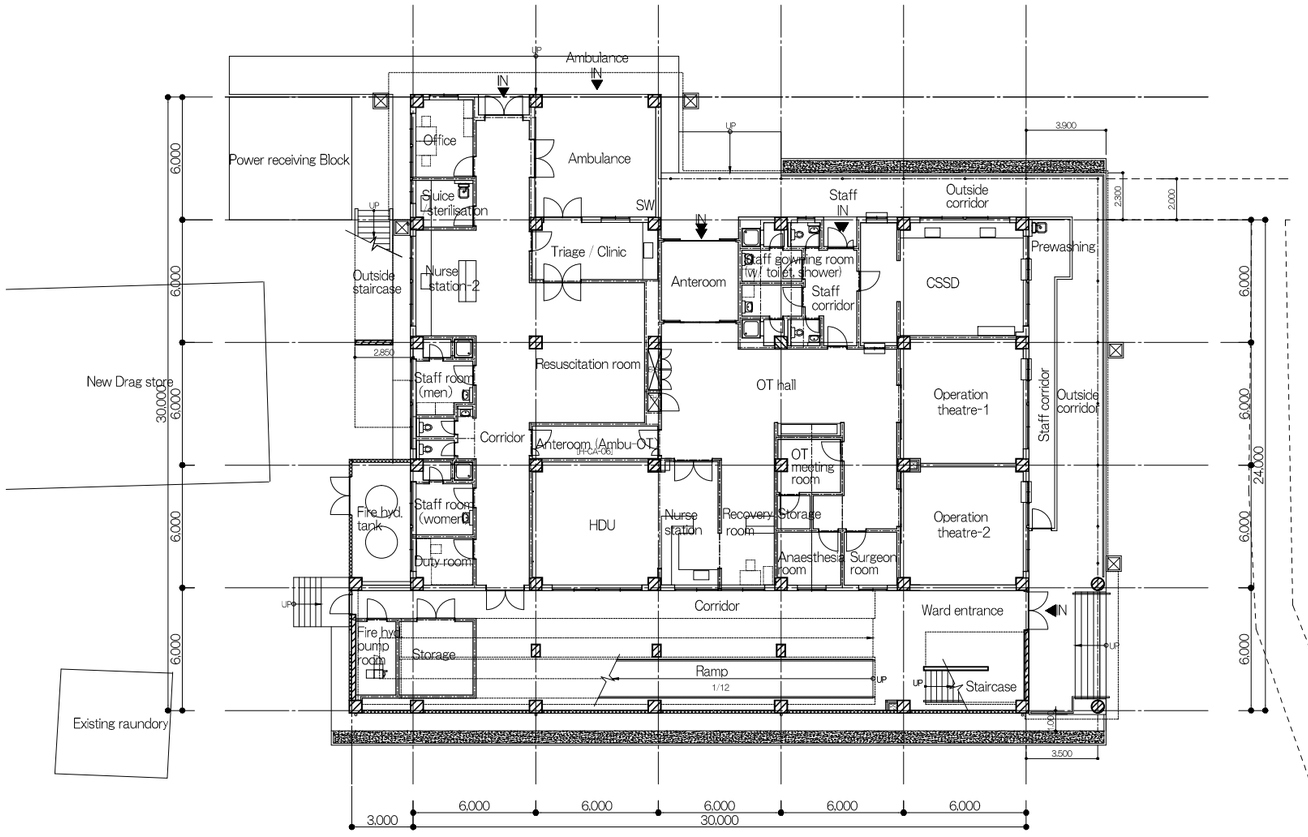
HOIMA

REGIONAL REFERRAL HOSPITAL

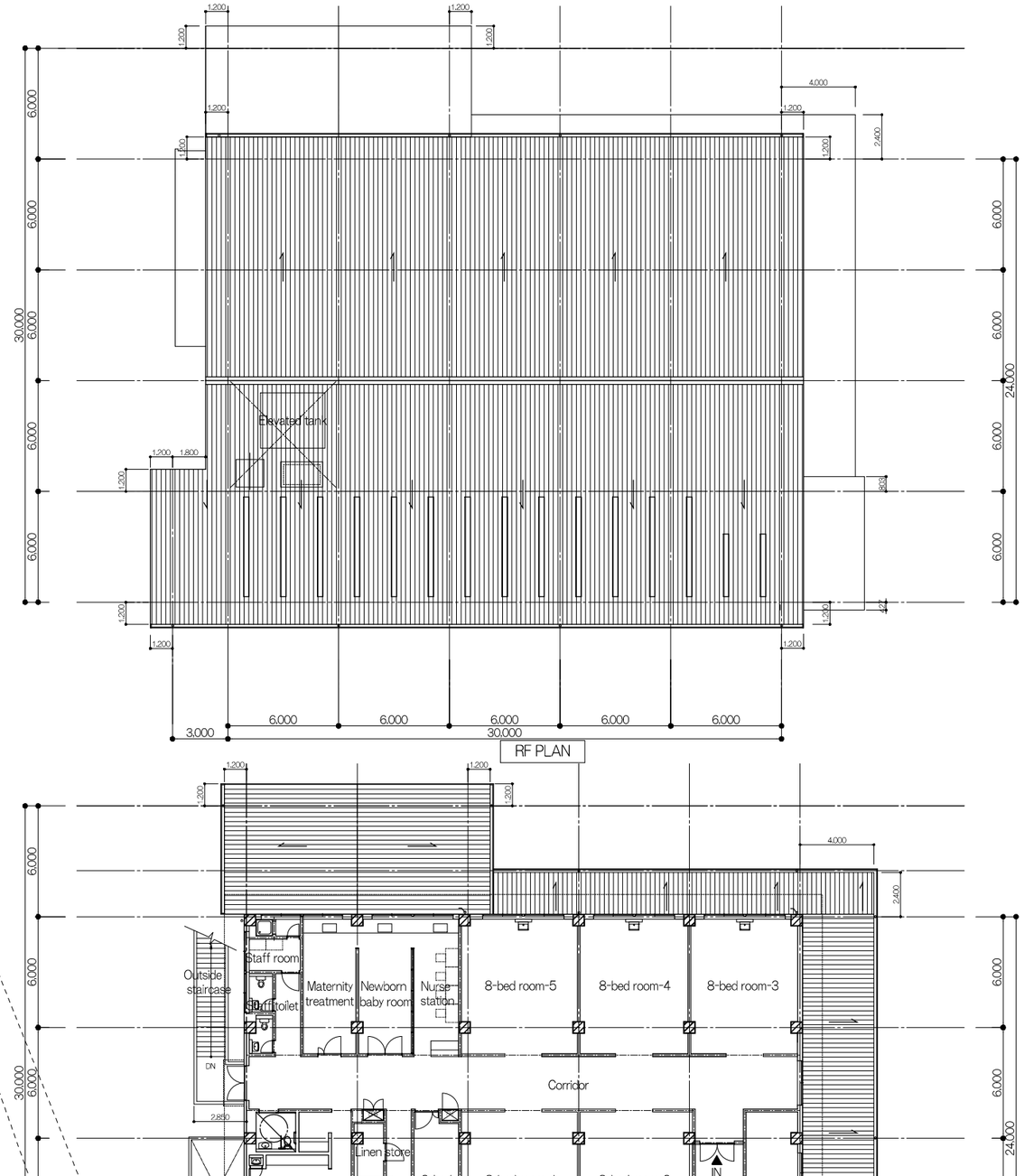
Name of Drawing: OPD Block Elevation

Scale of Drawing: 1:300

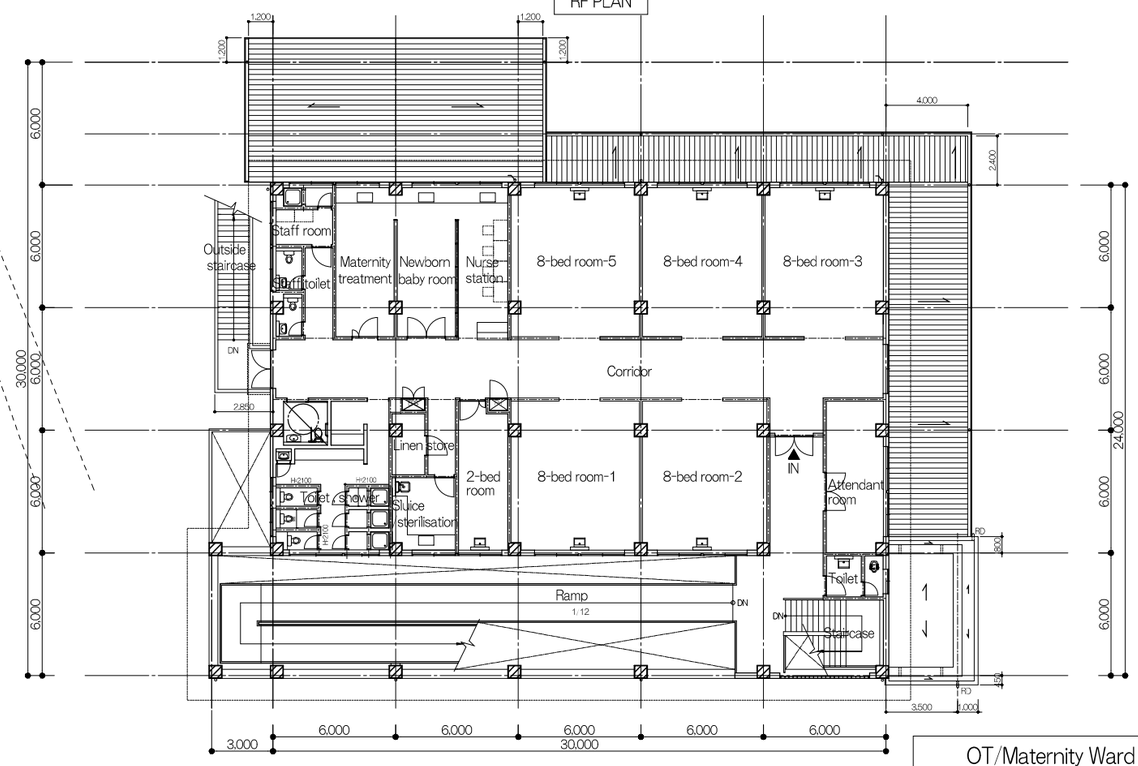
Number of Drawing: H-03



GF PLAN



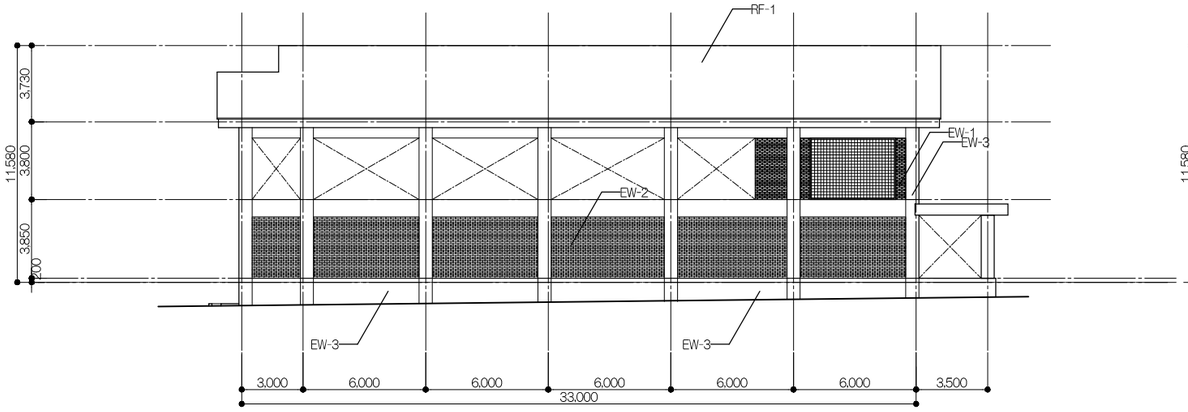
RF PLAN



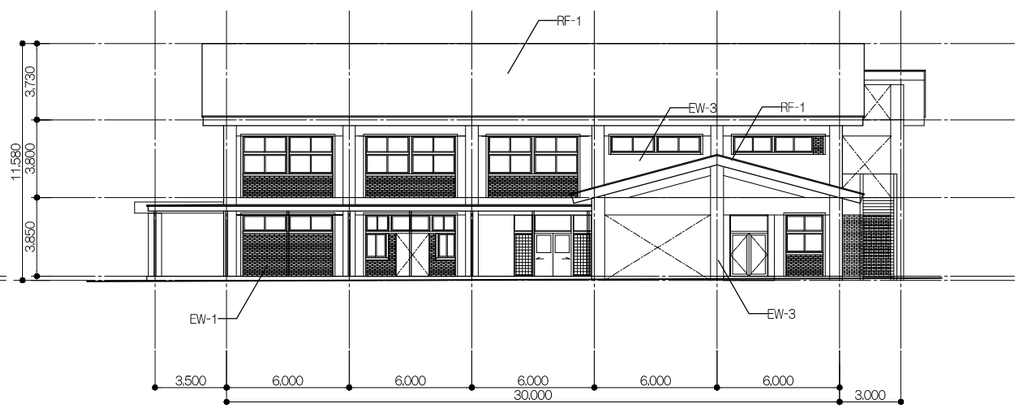
1F PLAN

OT/Maternity Ward

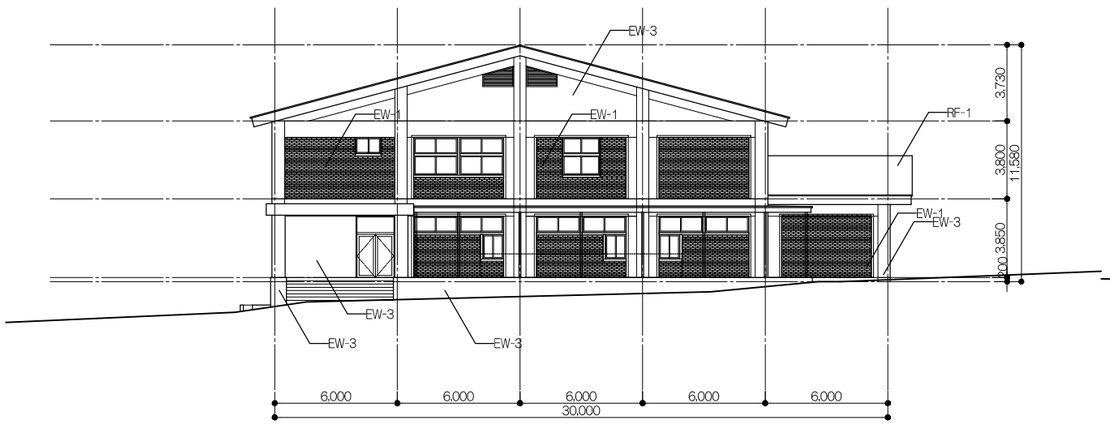
PREPARATORY SURVEY ON THE PROJECT FOR THE REHABILITATION OF HOSPITALS AND SUPPLY OF MEDICAL EQUIPMENT IN THE WESTERN REGION IN UGANDA	HOIMA REGIONAL REFERRAL HOSPITAL	Name of Drawing: OT/Maternity Ward PLAN Scale of Drawing: 1:300	Number of Drawing: H-04



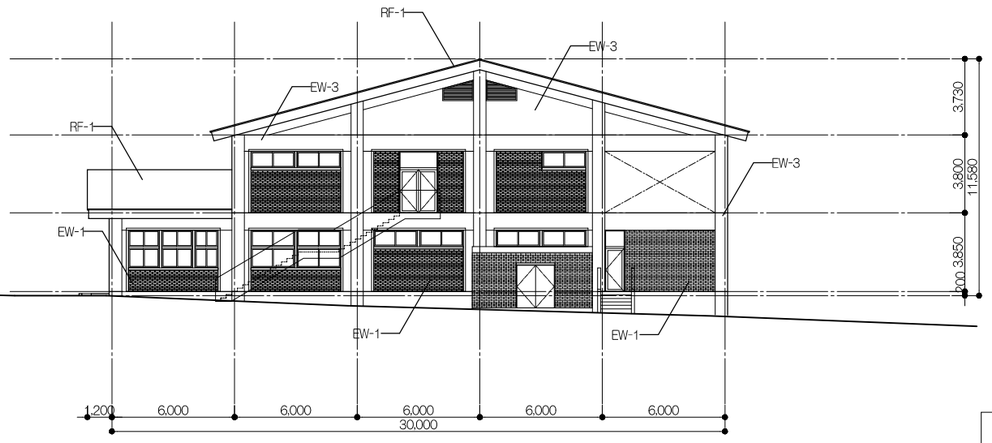
Elevation a-a



Elevation c-c



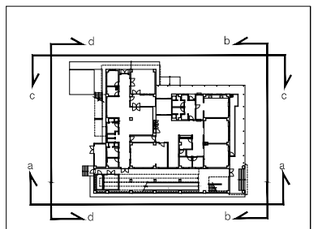
Elevation b-b



Elevation d-d

Legend

RF-1	CORRUGATED GALVANIZED STEEL SHEETROOFING t=0.5
RF-2	CONCRETE FLAT ROOF W/ TROWELING , ASPHALT WATER PROOFING ,CONCRETE W/TROWEL FINISH
EW-1	FAIR FACE BRICK
EW-2	FAIR FACE PORUS BRICK
EW-3	MORTAR W/ ELASTIC PAINTING FINISH
EW-4	CARRUGATED GALVANIZED STEEL SHEET ROOFING t=0.5



OT/Maternity Ward

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

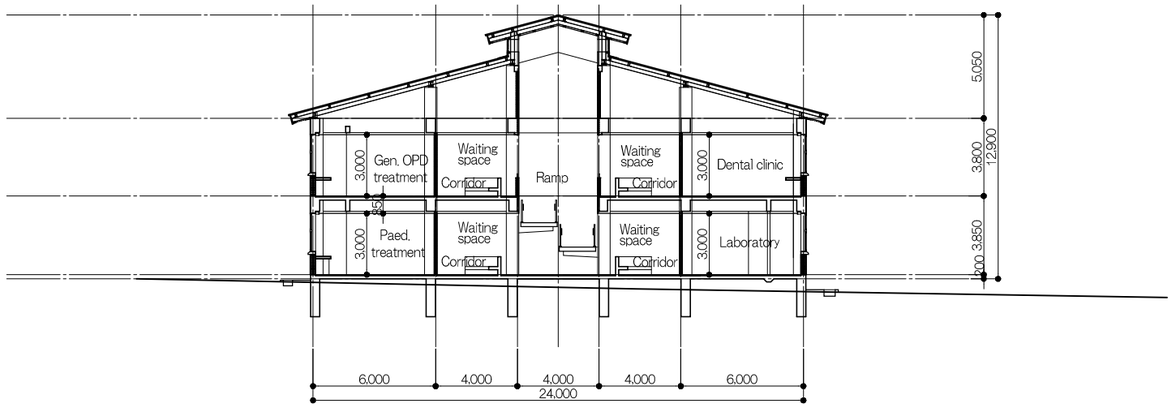
HOIMA

REGIONAL REFERRAL HOSPITAL

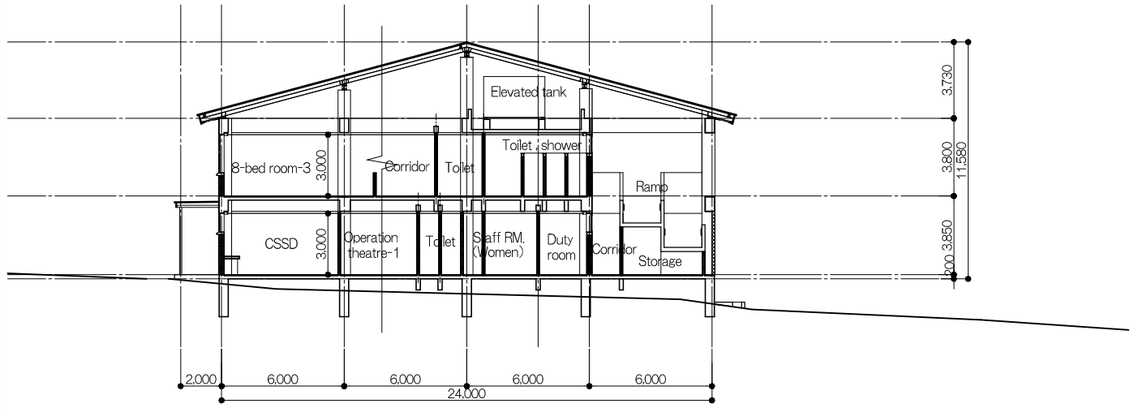
Name of Drawing: OT/Maternity Ward Elevation

Scale of Drawing: 1:300

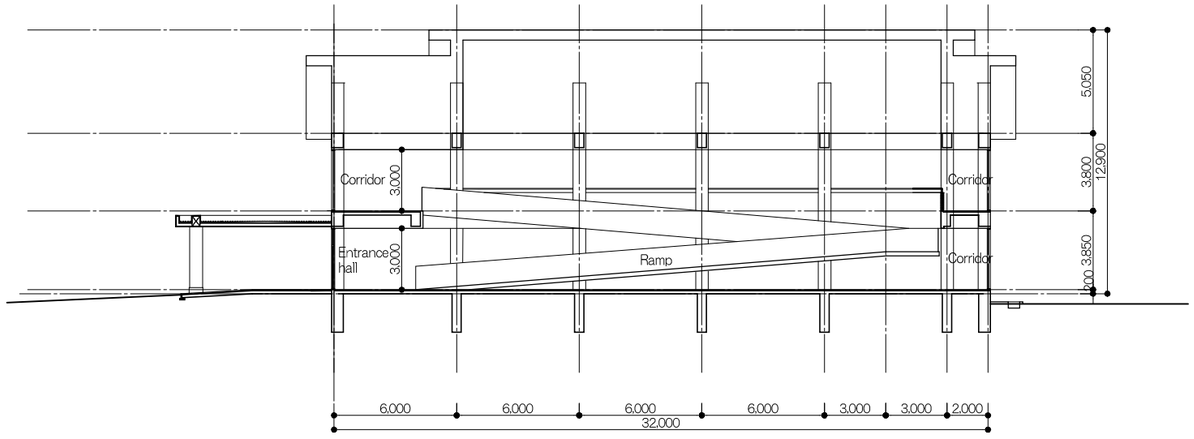
Number of Drawing: H-05



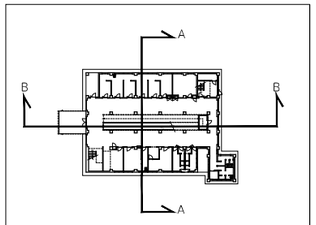
Section A-A



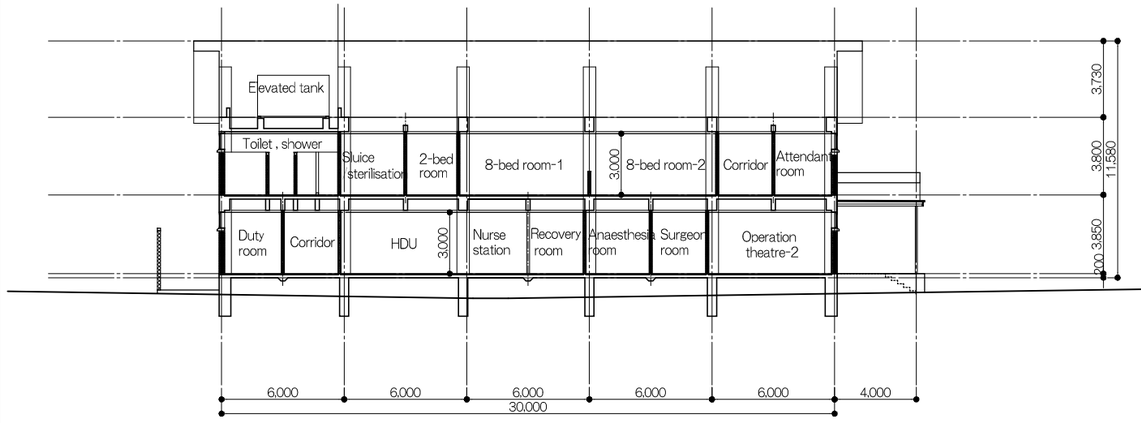
Section A'-A'



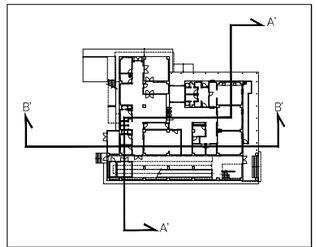
Section B-B



OPD block



Section B'-B'



OT/Maternity Ward

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

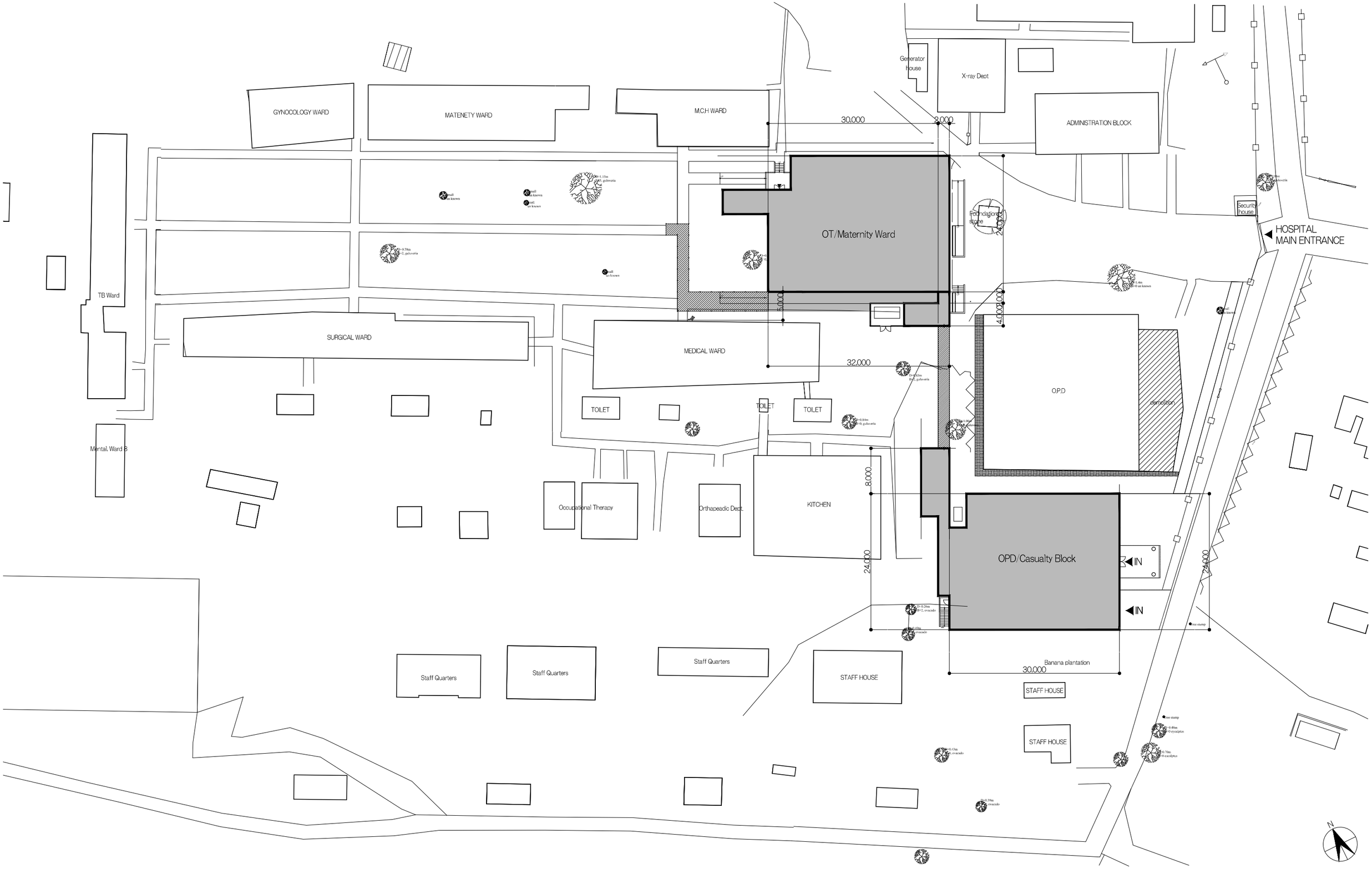
HOIMA

REGIONAL REFERRAL HOSPITAL

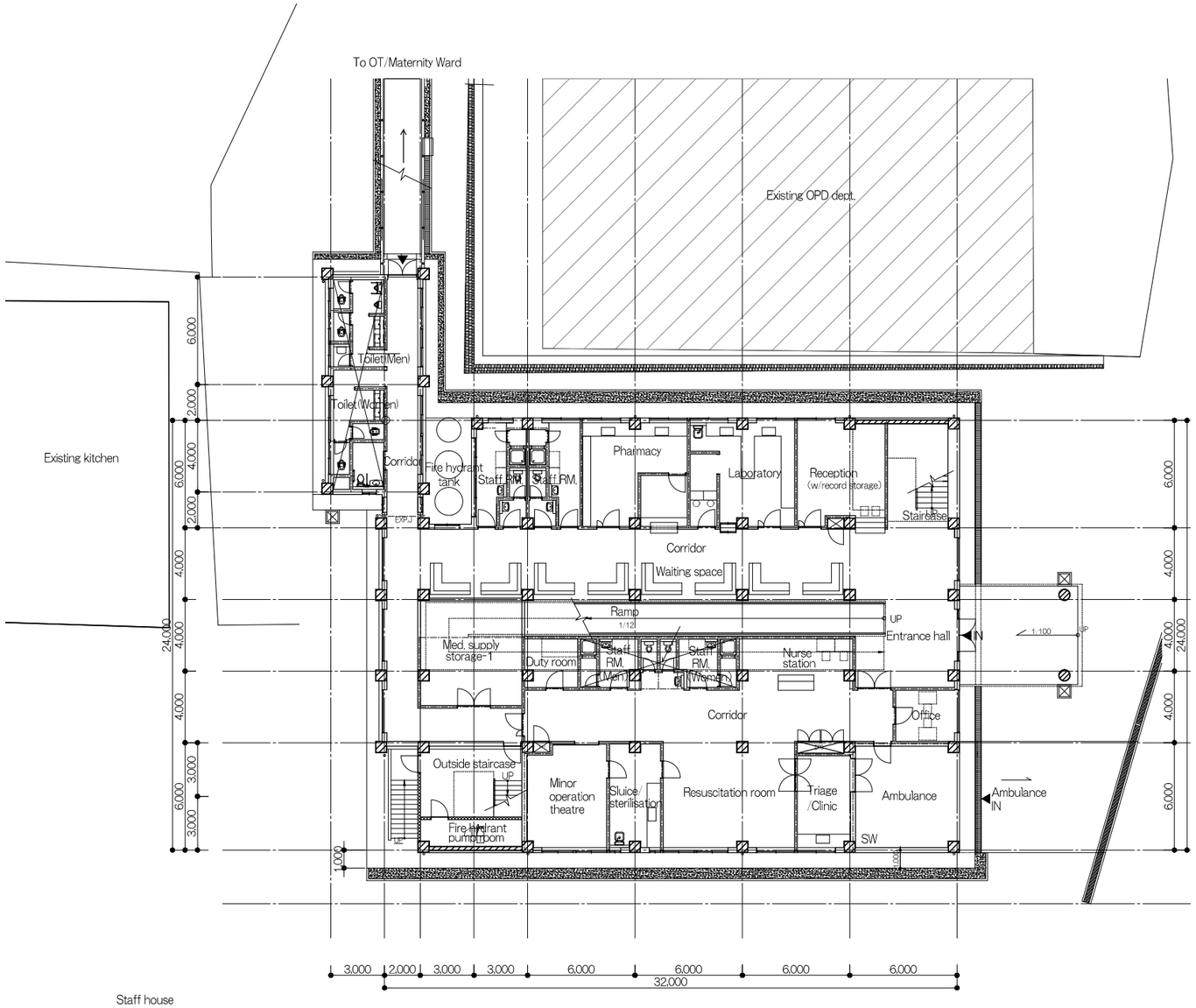
Name of Drawing: Section

Scale of Drawing: 1:300

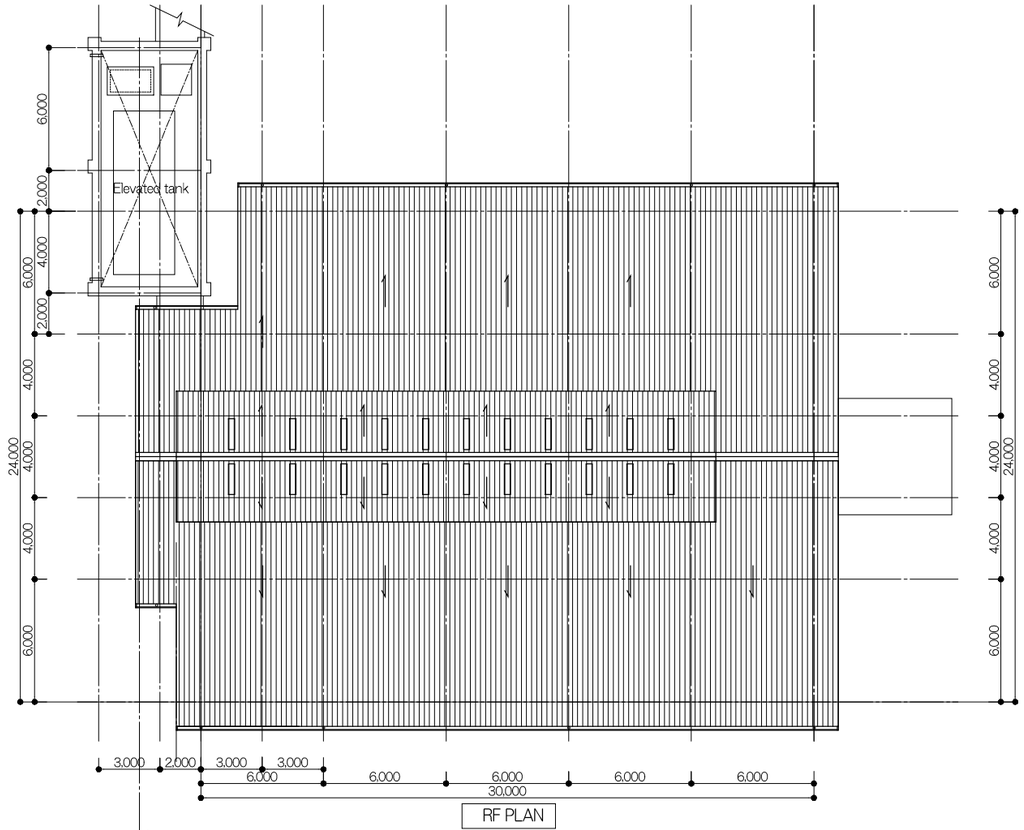
Number of Drawing: H-06



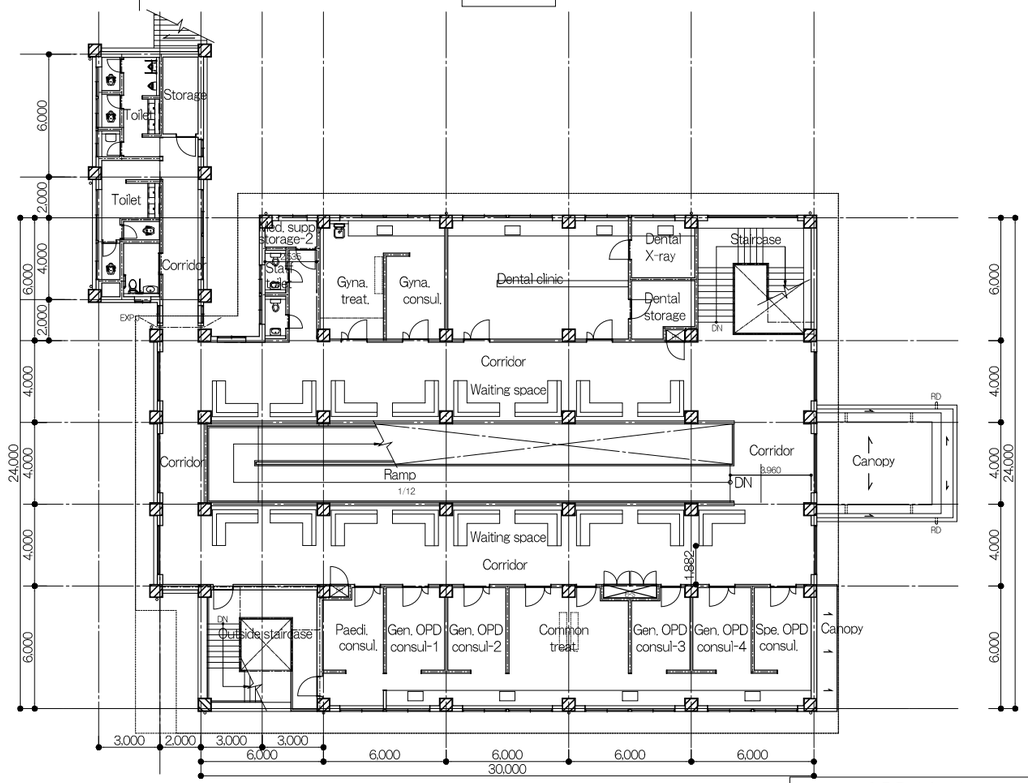
PREPARATORY SURVEY ON THE PROJECT FOR THE REHABILITATION OF HOSPITALS AND SUPPLY OF MEDICAL EQUIPMENT IN THE WESTERN REGION IN UGANDA	KABALE REGIONAL REFERRAL HOSPITAL	Name of drawing: PLOT PLAN Scale of drawing: 1:600	Number of drawing: K-01



GF PLAN



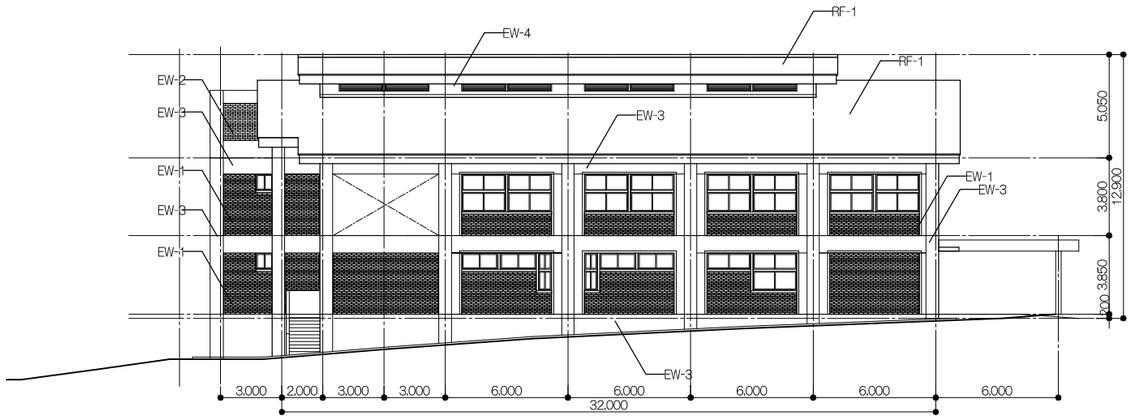
RF PLAN



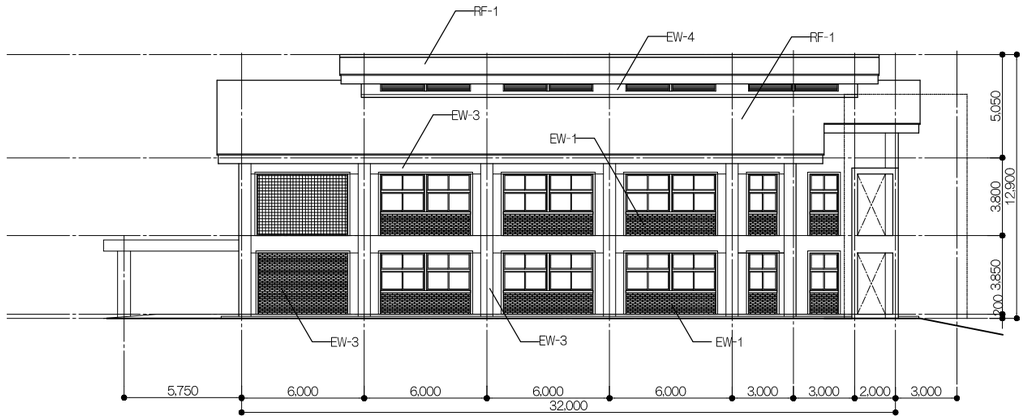
1F PLAN

OPD block

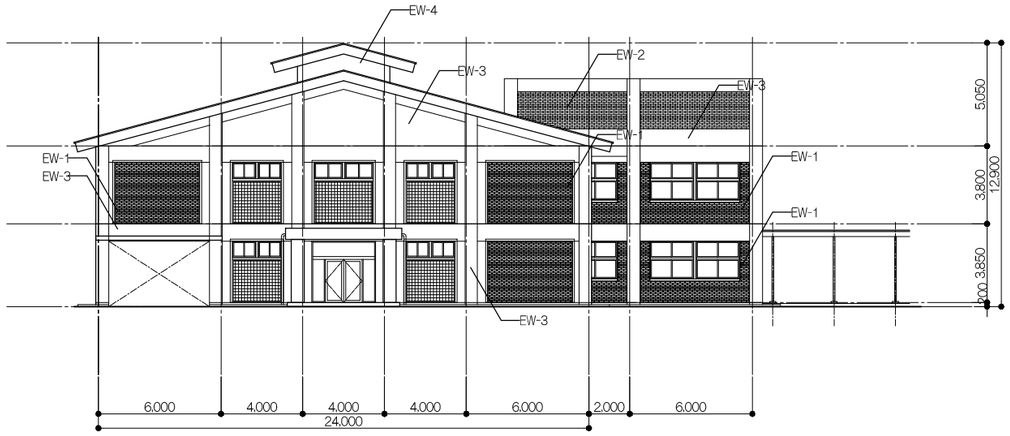
PREPARATORY SURVEY ON THE PROJECT FOR THE REHABILITATION OF HOSPITALS AND SUPPLY OF MEDICAL EQUIPMENT IN THE WESTERN REGION IN UGANDA	KABALE REGIONAL REFERRAL HOSPITAL	Name of Drawing: OPD/Casualty Block PLAN Scale of Drawing: 1:300	Number of Drawing: K-02



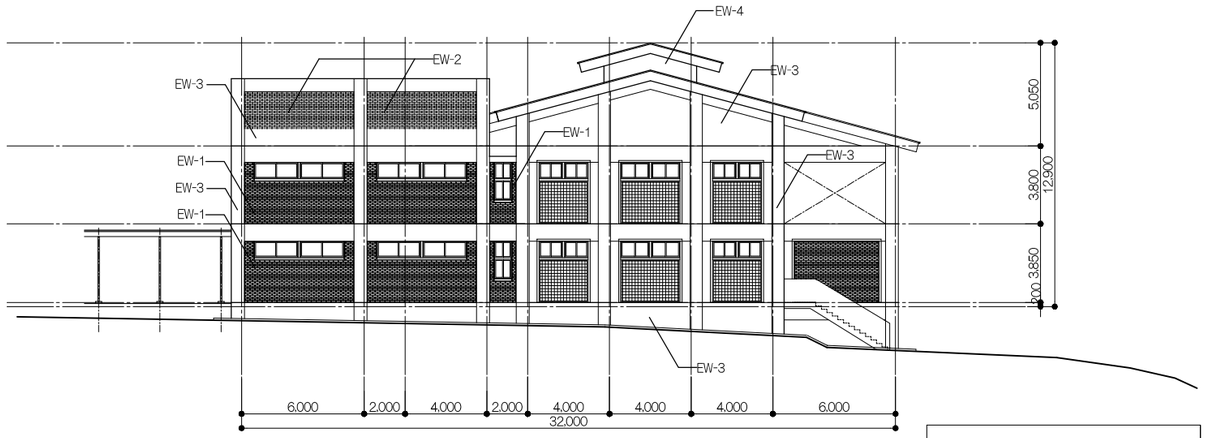
Elevation a-a



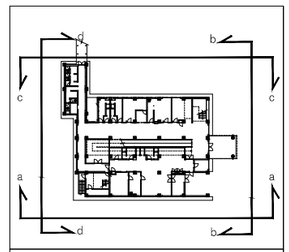
Elevation c-c



Elevation b-b



Elevation d-d



OPD block

Legend

RF-1	CORRUGATED CALVANIZED STEEL SHEETROOFING t=0.5
RF-2	CONCRETE FLAT ROOF W/ TROWELING , ASPHALT WATER PROOFING ,CONCRETE W/TROWEL FINISH
EW-1	FAIR FACE BRICK
EW-2	FAIR FACE PORUS BRICK
EW-3	MORTAR W/ ELASTIC PAINTING FINISH
EW-4	CARRUGATED GALVANIZED STEEL SHEET ROOFING t=0.5

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

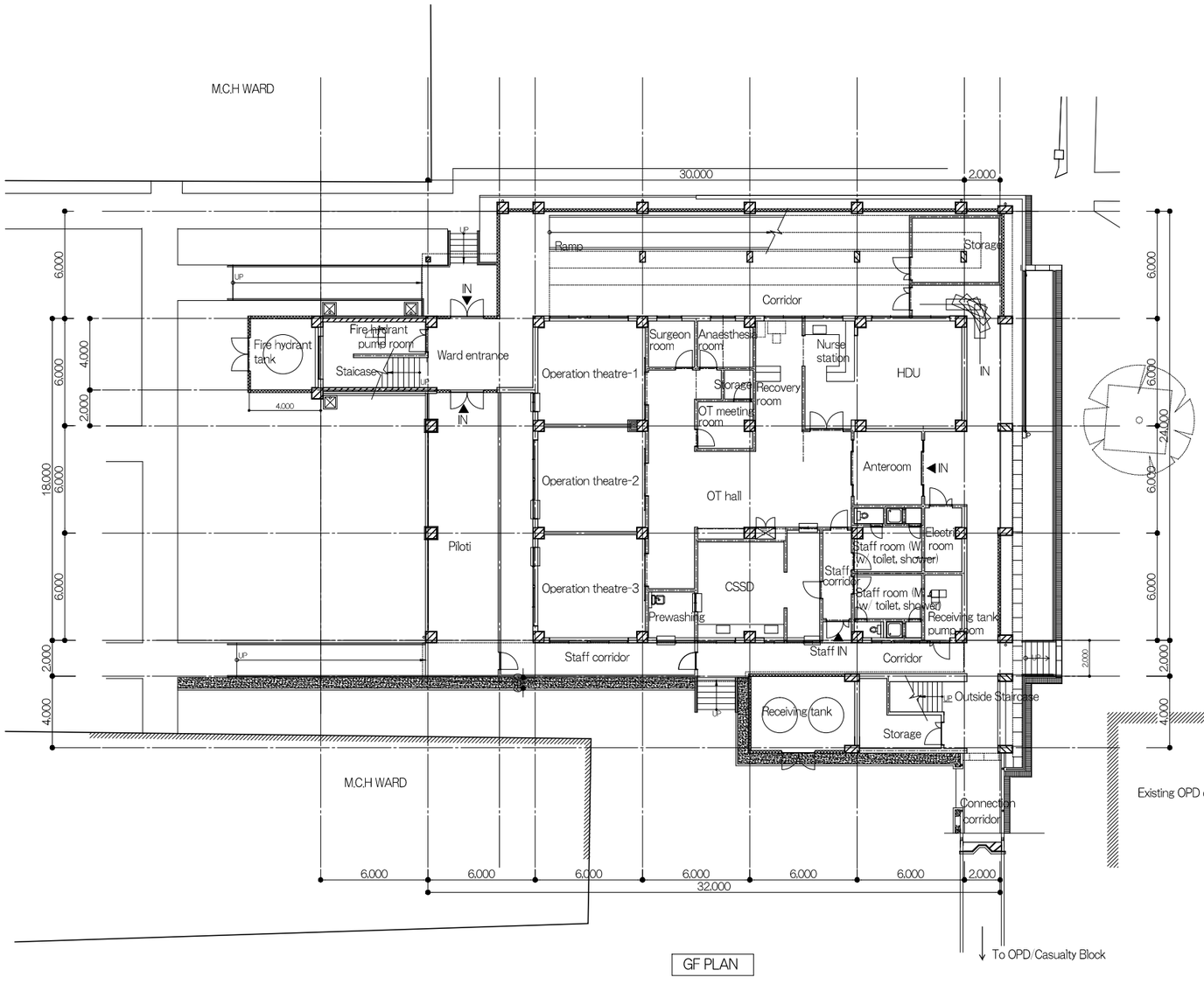
KABALE

REGIONAL REFERRAL HOSPITAL

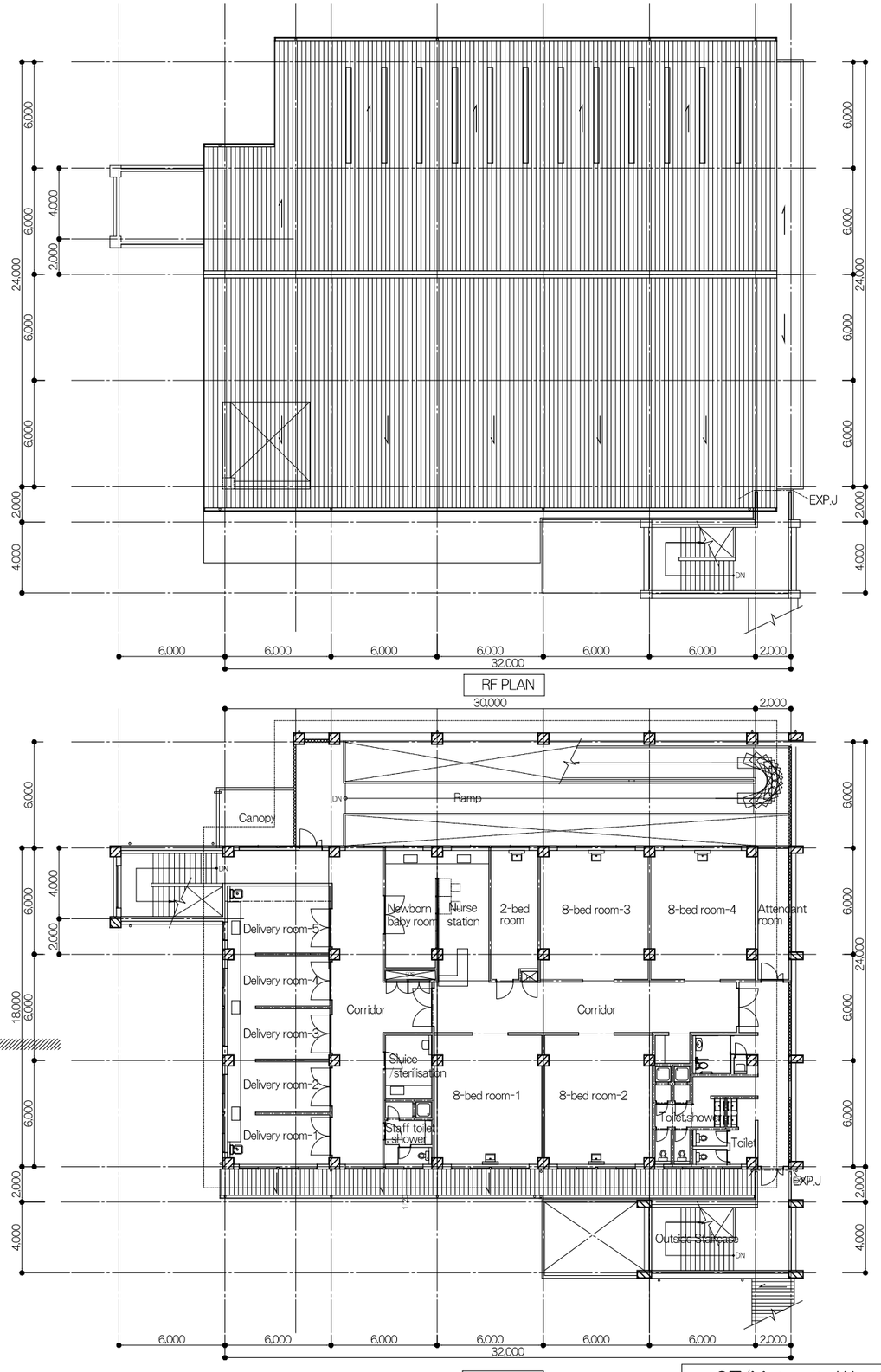
Name of Drawing: OPD/Casualty Block Elevation

Scale of Drawing: 1:300

Number of Drawing: K-03



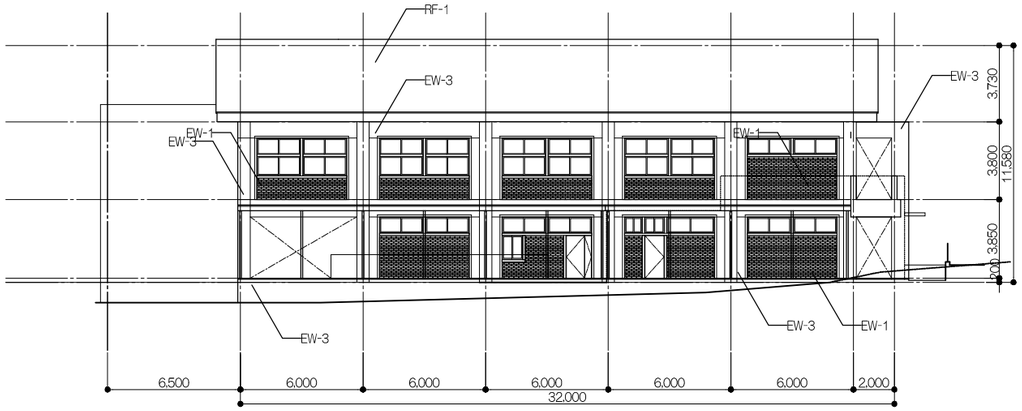
GF PLAN



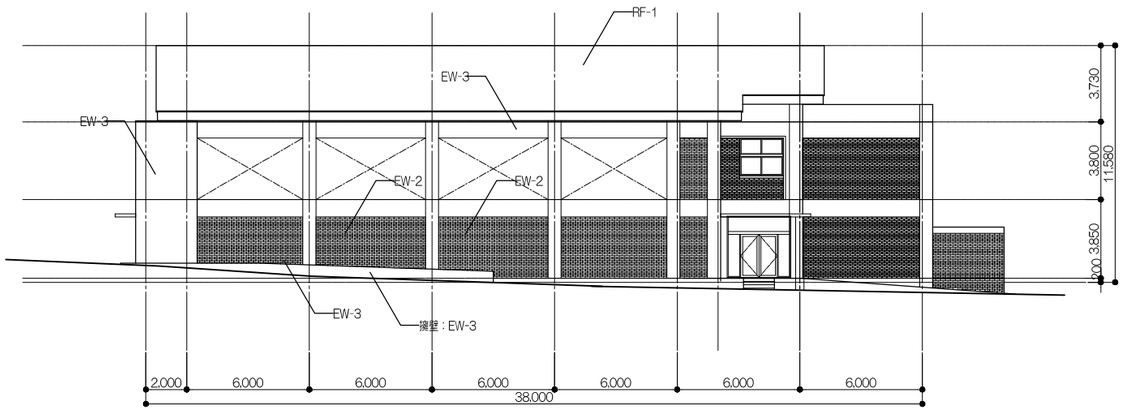
1F PLAN

OT/Maternity Ward

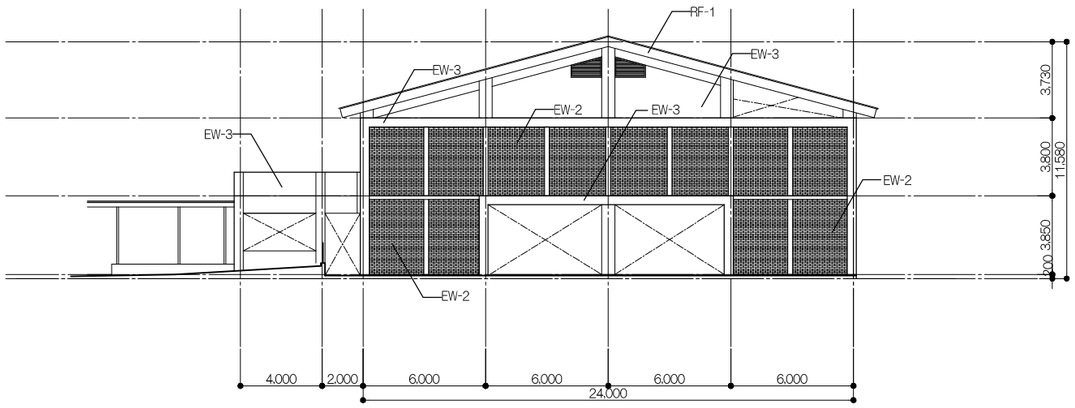
PREPARATORY SURVEY ON THE PROJECT FOR THE REHABILITATION OF HOSPITALS AND SUPPLY OF MEDICAL EQUIPMENT IN THE WESTERN REGION IN UGANDA	KABALE REGIONAL REFERRAL HOSPITAL	Name of Drawing: OT/Maternity Ward PLAN Scale of Drawing: 1:300	Number of Drawing: K-04



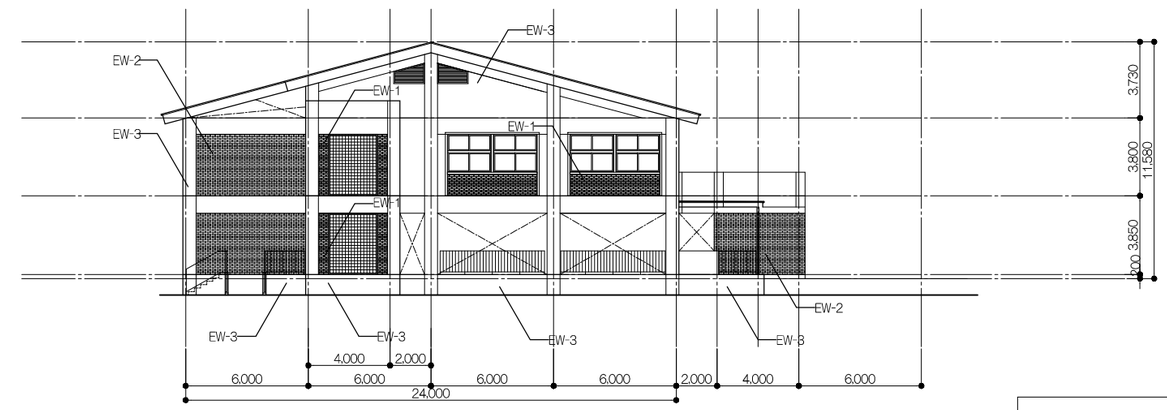
Elevation a-a



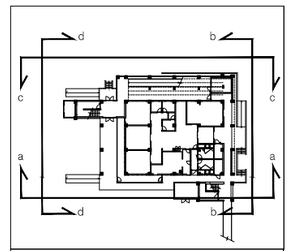
Elevation c-c



Elevation b-b



Elevation d-d



OT/Maternity Ward

Legend

RF-1	CORRUGATED CALVANIZED STEEL SHEETROOFING t=0.5
RF-2	CONCRETE FLAT ROOF W/ TROWELING , ASPHALT WATER PROOFING ,CONCRETE W/TROWEL FINISH
EW-1	FAIR FACE BRICK
EW-2	FAIR FACE PORUS BRICK
EW-3	MORTAR W/ ELASTIC PAINTING FINISH
EW-4	CARRUGATED GALVANIZED STEEL SHEET ROOFING t=0.5

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

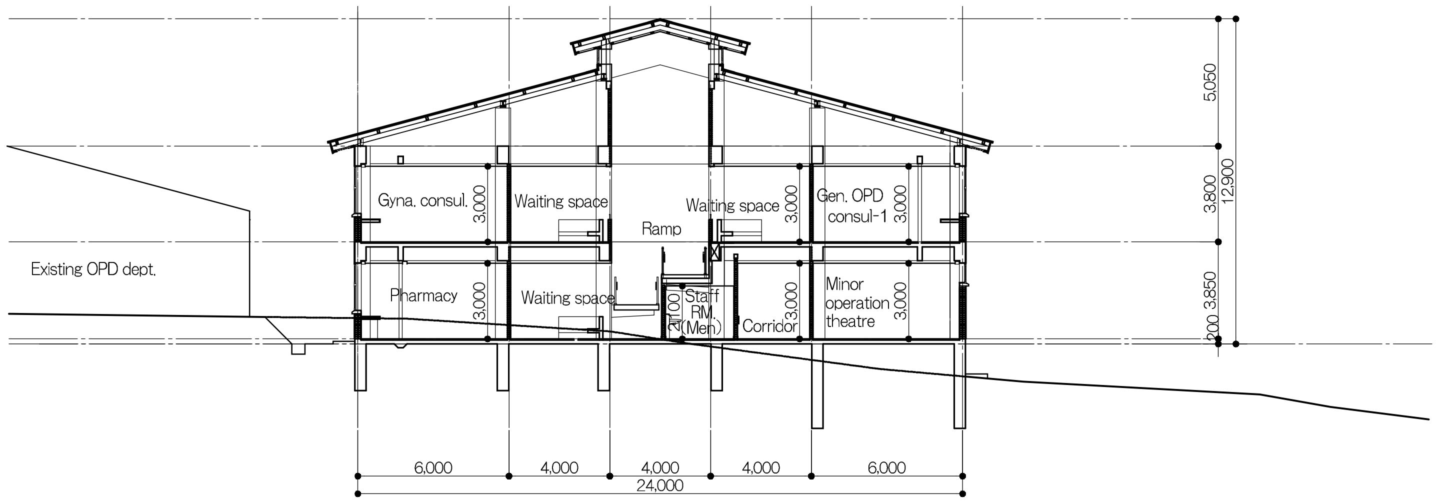
KABALE

REGIONAL REFERRAL HOSPITAL

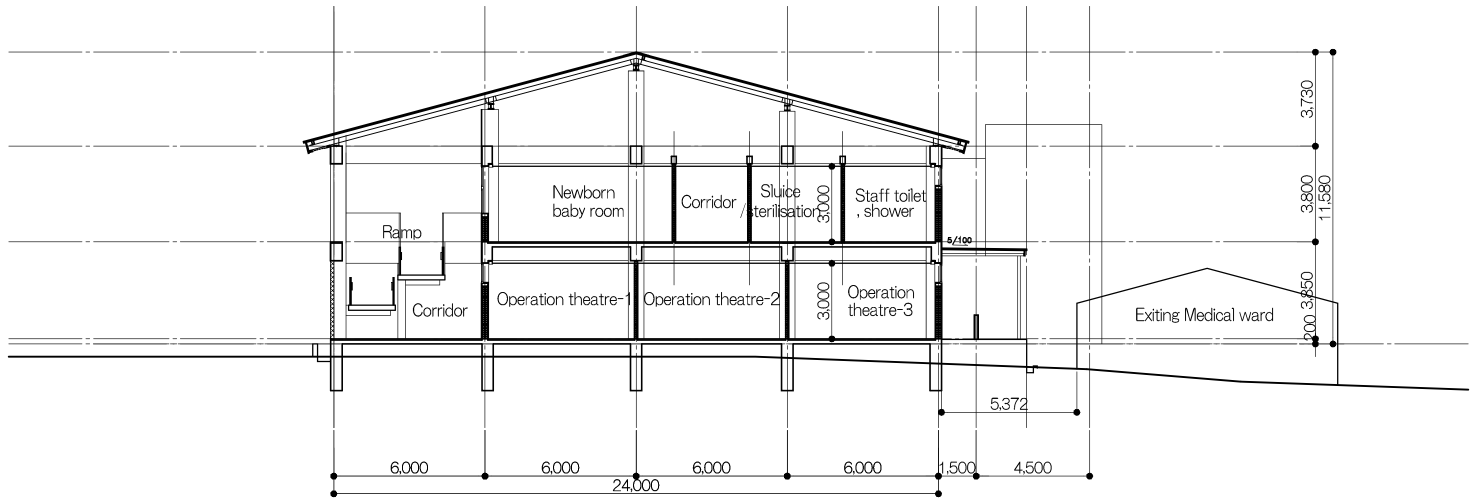
Name of Drawing: OT/Maternity Ward Elevation

Scale of Drawing: 1:300

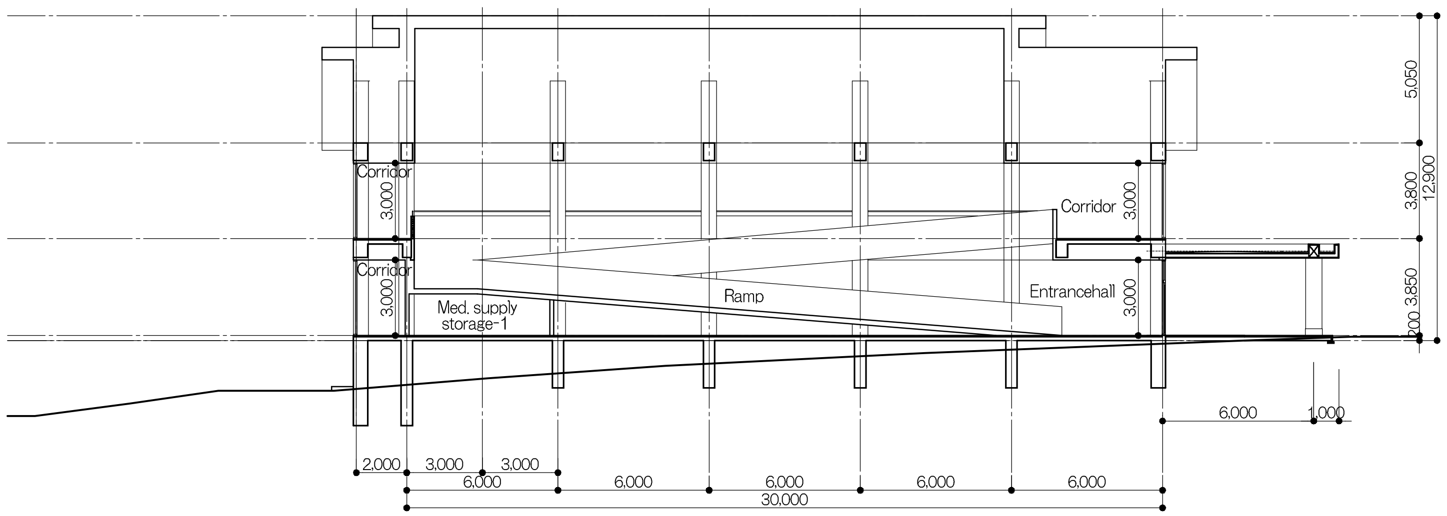
Number of Drawing: K-05



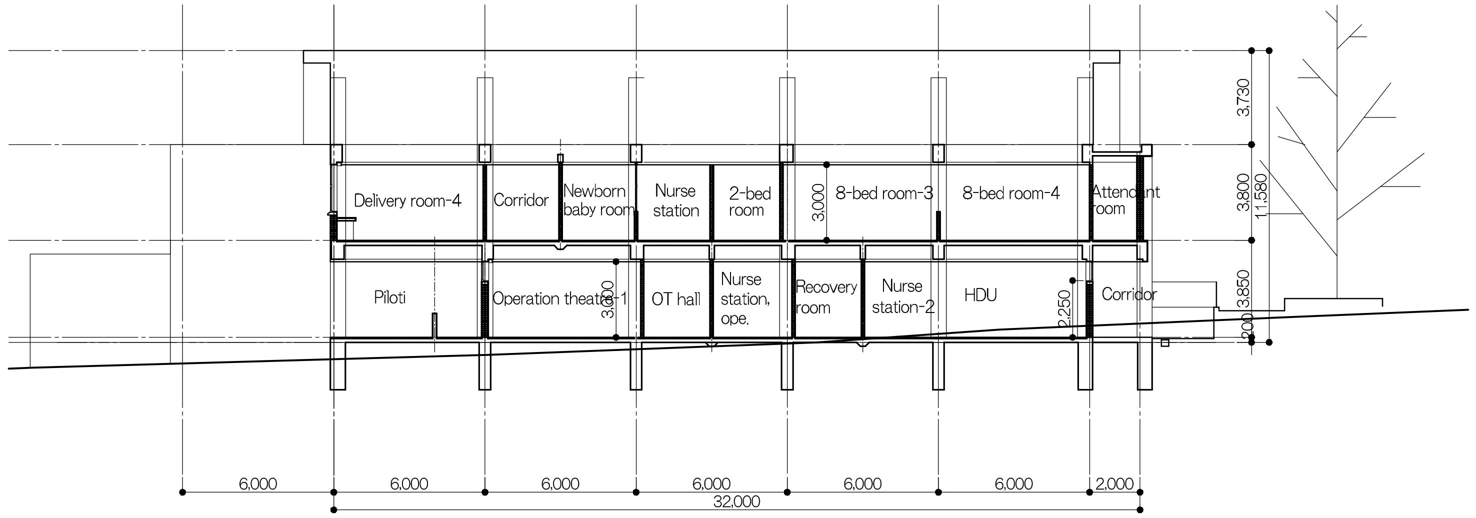
Section A-A



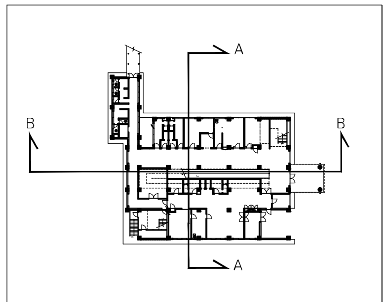
Section A'-A'



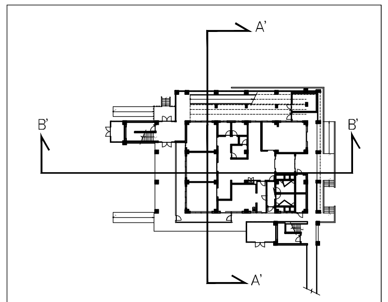
Section B-B



Section B'-B'



OPD block



OT/Maternity Ward

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

KABALE

REGIONAL REFERRAL HOSPITAL

Name of Drawing	Number of Drawing
Section	K-06
Scale of Drawing: 1:300	

2-2-4 Implementation Plan

2-2-4-1 Implementation Policy

(1) Organisation for Project Implementation

The project consists of the construction of OPD Block, OT/Maternity Ward including the casualty department at Hoima RRH, construction of OPD/Casualty Block and OT/Maternity Ward at Kabale RRH, as well as supply and installation of medical equipment for Hoima RRH, Kabale RRH and Fort Portal RRH. The work for which the Japanese side is responsible will be implemented in compliance with the Japanese Grant Aid scheme.

Preparation works of the sites such as grading, demolition and/or removal of existing buildings and structures will the responsibility of the Ugandan side. Prompt execution of these preparatory works will be necessary once the implementation of the Project is officially approved.

Once the Project is approved at the Cabinet meeting in Japan and E/N and G/A are signed, the Project will be officially implemented. After the signing of E/N and G/A, the implementation organisation of the Ugandan side and the Japanese consultant will conclude the consultant agreement, and the Project will enter the detailed design stage. Following completion of the detailed design, tenders will be called to the Japanese contractors for the construction work and to the Japanese equipment suppliers for the supply and installation of the equipment. The successful contractor and successful equipment supplier will carry out their respective works.

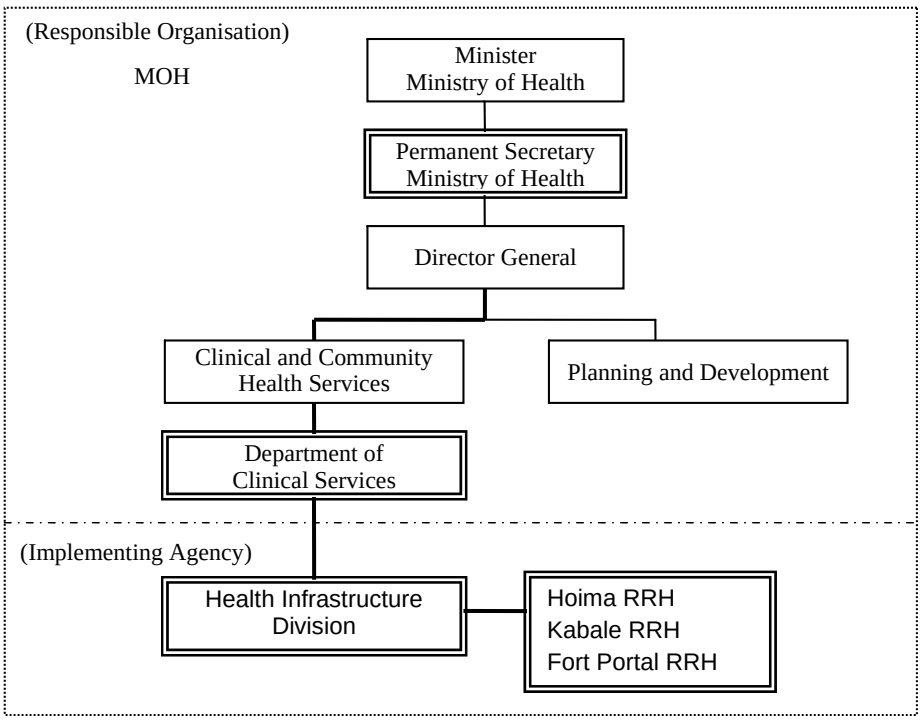


Figure-17 Relation among the Project Executing Organisations

The responsible organisation is MOH and the implementing agency for the Project is the Health Infrastructure Division, Department of Clinical Services of MOH. Hoima RRH, Kabale

RRH and Fort Portal RRH will be also involved in the implementation of the Project. The responsible organisation and the implementing agency will share the responsibilities to be undertaken by the Government of Uganda as indicated in "2-3 Obligations of the Recipient Country" in this report.

(2) Consultant

After the E/N between the Government of Japan and the Government of Uganda and G/A between JICA and the Government of Uganda are concluded the Japanese consultant will, conforming to the Japanese Grant Aid scheme, enter into an agreement on consulting services with the implementing agency of Uganda. Then the consultant will be responsible for the following services under this agreement:

① Detailed design & tender

Finalisation of the component plan, preparation of the detailed design documents (drawings, specifications and other technical documents concerning the facilities and medical equipment to be included in the Project), and assistance in tender and contract procedures to select the construction contractor and the equipment supplier (tender documents, tendering, tender evaluation and contract conclusion).

② Supervision of the construction and equipment work

Supervising the contractor in construction work as well as supervising the supplier in procurement, supply, installation, orientation for operation, and instruction for maintenance of the medical equipment.

The detailed design involves determining the details of the architectural and equipment plans according to the Preparatory Survey Report, to compile the tender documents that will include the specifications, tender conditions, draft conditions of contracts for construction as well as supply and installation of medical equipment, and to estimate construction costs and equipment costs. The tender and contract assistance includes attendance to the tendering for the selection of the construction contractor and the medical equipment supplier, assistance in the procedures for concluding each contract, and reporting to JICA, etc.

The supervision of the construction and equipment work involves ensuring that the contractor/supplier has effectively carried out the construction or medical equipment supply and installation work in accordance with the contractual terms, and to confirm that they have properly met their contractual obligations. For the successful completion of the Project, the consultant will, from a true and fair perspective, extend advice and instructions, and coordinate the persons concerned. Specifically, the supervisory services of the consultant include the followings:

i) Review and approval of the work program, shop drawings, equipment specifications and other documents prepared and submitted by the construction contractor and the medical

equipment supplier.

ii) Inspection and approval of the construction machinery and materials, and pre-shipment inspection and approval of the quality, quantity and performance of medical equipment.

iii) Confirmation of the delivery and installation of equipment for the facilities and medical equipment, and their operation manuals.

iv) Supervision of the work progress and reporting.

v) Final inspections of the facilities and medical equipment, and attendance during the handover.

In addition to the aforementioned services, the consultant will report to the Japanese authorities concerned regarding the progress of the Project, payment procedures, completion of the Project and handing-over, etc.

(3) Order for Construction Work and Equipment Procurement

The work orders pertaining to the Project will be limited to Japanese companies satisfying the eligibility requirements. Contractors will be selected by public tender with restricted eligibility.

Based on the contract, the selected construction contractor will construct the facilities, and the equipment supplier will procure, supply and install medical equipment. They will also give technical instructions to the Ugandan side concerning the operation and maintenance of the supplied equipment. Once the equipment is handed over, the equipment supplier will, in cooperation with the agency of the equipment manufacturers, support the continuous supply of spare parts and consumables for major equipment during the guarantee period, either free of charge or on a chargeable basis.

(4) Japan International Cooperation Agency

The Financing Facilitation and Procurement Supervision Department of JICA will supervise the progress of the Project to ensure that it will be properly implemented in compliance with the Grant Aid scheme.

(5) Implementation Plan

During the detailed design period, the Ugandan implementing agency and the Japanese consultant will examine the project implementation plan. This examination includes identification of the scope of works of each party, confirmation of the commencement date and method of work, and work-related discussions by each individual party so that the work can be conducted efficiently based on the schedule specified in the Preparatory Survey Report. In special, the site preparation work by the Ugandan side, including the demolition and removal of obstacles in the site grounds, should be carried out before the construction work of the Project by the Japanese side.

2-2-4-2 Implementation Conditions

(1) Observations for Construction

The following matters should be observed during the project construction, and the work execution program should be planned to take these observations into consideration.

1) Temporary facilities

Both of the project sites at Hoima RRH and Kabale RRH are located within the hospital premises where the existing single-story buildings spread. The lot of Hoima RRH premises is mostly flat, while that of Kabale RRH premises is a sloped land. The OPD Block site at Hoima RRH faces a 14-meter wide public road and the OT/Maternity Ward site faces a 4-meter wide public road. Construction gates will be constructed along these roads so that construction materials and equipment can be transported without passing the hospital roads. The OPD/Casualty Block site at Kabale RRH is situated at the centre of the hospital premises, surrounded by many existing buildings. Construction materials and equipment will have to be transported through the main gate of the hospital, and a part of the existing parking area will be utilised for temporary material yard. The construction site, therefore, will be enclosed with temporary fences and a gate. The OPD/Casualty Block site faces a 4m-wide public road, and a temporary gate will be installed along this road. A temporary office and temporary storage shed will be installed within the construction sites at Hoima RRH and Kabale RRH.

2) Management of work schedule

There are ready-mixed concrete plants only in Kampala. Concrete will be mixed on the construction sites by rotary mixer and poured. Due to the limited area of the construction sites, mixed concrete cannot be poured by buckets lifted by cranes; instead, by carts or by hand buckets relayed by persons standing in lines, etc. The amount of concrete that can be poured a day is limited. Accordingly, the construction schedules should have sufficient allowances.

3) Safety management

The planned construction sites at both Hoima and Kabale RRHs are situated in the hospital premises. Therefore, cautions must be secured in terms of the safety of the patients, family attendants, visitors and hospital staffs who come in and out. The hoardings of the construction sites will be constructed of corrugated galvanised steel sheets to separate the construction site from the existing hospital premises for the purpose of protecting third persons from accidents and for guarding and security reasons.

(2) Observations for Equipment Procurement

1) Management of work schedule

For Fort Portal RRH where equipment procurement is only planned, sufficient consideration on the work schedule would be necessary, because the procured equipment will be installed in the existing facilities and careful adjustment will be necessary to avoid affecting the hospital services.

For Hoima RRH and Kabale RRH, the procured equipment is planned to be installed in the new facilities to be built under the Project and the installation schedule of the equipment like OT equipment should be adjusted to the progress of construction works. Therefore, equipment procurement planning will require information shared with the construction contractor and ensure the consistency with the facility construction planning.

2) Dispatch of the equipment engineers for installation

It is extremely important to impart knowledge and skills regarding appropriate operation and maintenance of the equipment so as to contribute to health care services through continuous proper operation of the procured equipment after implementation of the Project. That being the case, engineers with thoroughly familiar with the operation of the equipment should be selected for the equipment installation and adequate time should be allotted for instruction thereof (skills for operation, simple repair, inspection, etc.) and to make sure that those concerned on the receiving side acquire sufficient understanding concerning its operation and maintenance.

2-2-4-3 Scope of Works

To implement this cooperation project, works of Ugandan side and Japanese side should be defined clearly. The following tables show the works at Hoima, Kabale and Fort Portal RRHs to be undertaken by each government.

(1) Hoima RRH

Table-18 Works of Ugandan Side and Japanese Side (Hoima RRH)

Japanese Side Work	**Ugandan Side Work**
Construction Site	
	1. Securing of a plot for construction site 2. Site preparation, removal of the existing facilities, etc. 1) Demolition and removal of remaining existing facilities (OT, kitchen, container office, warehouse) 2) Cutting trees in the site and removal of topsoil 3) Removal of the existing power cable, telephone cable, water supply pipe and wastewater pipe passing the site, and rerouting
External Work	
1. Road within the site	1. Roads outside the site 2. Planting in the site
Building Construction	
1. Construction of OPD Block, OT/Maternity Ward and Power Receiving Block	
Infrastructure Improvement	
1. Electric system 1) Installation of a 200kVA pole transformer for the project buildings and installation of trunk cables to the Power Receiving Block 2) Installation of a 50 kVA generator for emergency backup at OPD Block and OT/Maternity Ward	1. Electric system 1) Power incoming installations up to the 200kVA pole transformer
2. Water supply Drawing a branch pipe from the existing water supply pipe after the existing meter to OPD Block and OT/Maternity Block	2. Water supply Connection to the main water supply pipe in the hospital premises
3. Wastewater 1) Installation of septic tank for OPD Block and OT/Maternity Block 2) Installation of a percolation sewerage pipe beyond the above septic tank	3. Wastewater
4. Telephone Installation of cable and handhole to OPD Block	4. Telephone Telephone wiring up to the MDF in OPD Block
Equipment, Furniture and Fixtures	
1. Provision and installation of medical equipment	1. Purchase of bed side tables and mosquito nets and transfer of existing equipment
2. Curtain rail	2. Curtain, venetian blind
3. Installation of built-in furniture such as reception counters, bench seats in the waiting space	3. Purchase of general furniture and transfer of existing furniture

(2) Kabale RRH

Table-19 Works of Ugandan Side and Japanese Side (Kabale RRH)

Japanese Side Work	Ugandan Side Work
Construction Site	
	1. Securing of a plot for construction site 2. Site preparation, removal of the existing facilities, etc. 1) Demolition and removal of remaining existing facilities (OT, canteen, outpatient toilet, part of OPD) 2) Cutting trees in the site and removal of topsoil 3) Removal of the existing power cable, telephone cable, water supply pipe and wastewater pipe passing the site, and rerouting
External Work	
1. Road within the site	1. Roads outside the site 2. Planting in the site
Building Construction	
1. Construction of OPD/Casualty Block and OT/Maternity Ward (Architectural work, electrical work, plumbing work, AC/ventilation work)	
Infrastructure Improvement	
1. Electric system 1) Installation of a 200kVA pole transformer for the project buildings and installation of trunk cables to the electrical room in OT/Maternity Ward 2) Piping and wiring between the existing generator (200kVA) and the electrical room	1. Electric system Power incoming installations up to the 200kVA pole transformer
2. Water supply Drawing a branch pipe from the existing water supply pipe after the existing meter to water receiving tank adjacent to OPD/Casualty Block and OT/Maternity Ward	2. Water supply Connection to the main water supply pipe in the hospital premises
3. Wastewater Connection from the final pit outside OPD/Casualty Block and OT/Maternity Ward the existing sewerage pit	3. Wastewater
4. Telephone Installation of cable and handhole to OPD/Casualty Block	4. Telephone Telephone wiring up to the MDF in OPD/Casualty Block
Equipment, Furniture and Fixtures	
1. Provision and installation of medical equipment 2. Curtain rail 3. Installation of built-in furniture such as reception counters, bench seats in the waiting space	1. Purchase of bed side tables and mosquito nets and transfer of existing equipment 2. Curtain, venetian blind 3. Purchase of general furniture and transfer of existing furniture

(3) Fort Portal RRH

Only the supply and installation of medical equipment is considered in the Project, and in principle, no significant works are assumed under the responsibility of Ugandan side.

2-2-4-4 Consultant Supervision

(1) Facility Construction Supervisory Plan

1) Supervisory principles

For the prompt and proper accomplishment of the services, the Consultant will organize a project team to pursue the detailed design and supervisory work based on the outline design, in compliance with the Grant Aid scheme. The supervisory principles of the Project are as follows:

a) The Consultant will maintain close communication with the authorities concerned in both countries in order to avoid delays in the progress and completion of the construction work as well as the equipment supply/installation work.

b) The Consultant will maintain a fair standpoint, and will promptly extend appropriate instructions and assistance to the contractors during construction and equipment work.

c) The Consultant will extend appropriate instructions and advice regarding the operation and maintenance of the medical equipment after the installation and handing-over.

d) After confirming that the construction and equipment supply/installation work is completed in compliance with the contractual terms, the Consultant will witness the handing over of the facilities and equipment. The services of the Consultant will be completed when the work is accepted and approved by the Kenyan side.

2) Supervision of construction works

A Japanese resident representative of the consultant (an architect) will be posted at Hoima and Kabale site respectively in order to supervise the construction works. In addition, the following engineers will be sent to the site as necessary during the work period.

- Supervision or works (Supervisory manager: presence at the commencement of construction work, entire management, schedule coordination, final inspection before completion)
- Supervision of works (architecture: construction methods, materials and specifications)
- Supervision of works (structural engineering: supporting ground, foundation work, framing work)
- Supervision of works (electrical work: incoming power and transformer, electric apparatus, final inspection before completion)
- Supervision of works (mechanical work: intake system, plumbing systems, final inspection before completion)

(2) Equipment Supervisory Plan

1) Equipment supervisory principles

The equipment is planned to be procured in Japan or the third countries. The inspection of equipment will be performed at the loading port, prior to the shipment, by an entrusted and

neutral inspection agency. The consultant should check the certificate of shipment inspection provided by the inspection agency and issue the inspection report to the implementing agency of Uganda after confirming the completion of inspection.

All the equipment procured in the Project will be inspected and provisionally handed over at each site. Final handing over should be conducted in the presence of the buyer, supplier and the consultant in Kampala. The names of models, origin of product, names of manufacturers, stickers printing the name of Japanese grant-aid attached or not and appearance will be inspected following the items in the contract documents.

2) Procurement supervision plan

Regarding procurement supervision, the following consultants will be assigned.

- Procurement supervision engineer :1 person
  Provisional Inspection/Handing over at Hoima RRH and Kabale RRH, and Final confirmation of Inspection/Handing over to MOH in Kampala
- Resident procurement supervision engineer: 1 person
  Procurement supervision at Fort Portal RRH and Hoima RRH, and Provisional Inspection/Handing over at Fort Portal RRH
- Local Procurement supervision engineer (Ugandan): 1 person
  Procurement supervision in Kabale RRH
- Inspection engineer: 1 person
  Confirmation for procurement schedule, preparation for third party inspection prior to the shipment, checking the certification of the inspection

(3) Project Implementation Diagram

The consultant will form a project team to conduct the above-mentioned services in Japan and Uganda.

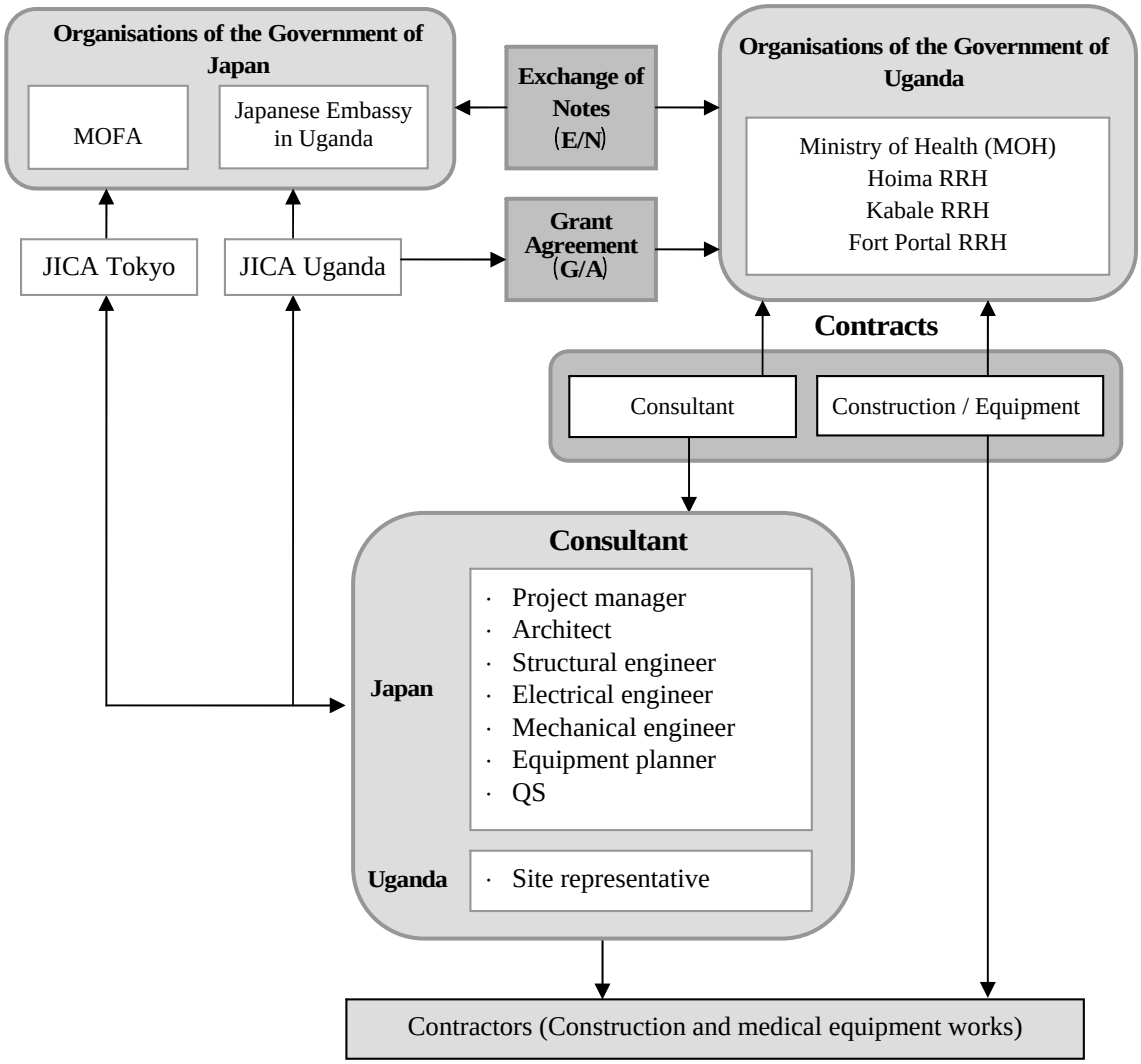


Figure-18 Project Implementation System Diagram

2-2-4-5 Quality Control Plan

The site representative of the consultant will inspect the quality of construction materials when they are delivered to the site. The required test items for quality control will be clarified in the particular specifications.

- The bearing strength of the soil will be tested at site in the presence of the structural engineer.
- To avoid alkali-aggregate reactions, aggregates to be used at the Hoima and Kabale sites will be taken to the Uganda National Bureau of Standards in Kampala for the alkali-silica reaction testing.
- Tests of concrete mixing samples will be commissioned to a laboratory under the Ministry of Transport and Works in Kampala in order to check the mixing strength of concrete.
- During the construction work period, concrete mixing samples will be taken every day on which casting work is done and once every 50m^3 of concrete cast for tests on slump, chloride

content in fresh concrete and concrete strength. Compressive tests will be conducted by third testing laboratories in Kampala and Mbarara.

- The quality of reinforcement bars will be inspected at each delivery lot with the product test report of the fabricator (mill sheets). In addition, random sampling tests for tensile strength will be commissioned to a third testing laboratory.

2-2-4-6 Procurement Plan

(1) Construction Materials

Construction equipment and materials will be procured based on the following policies:

a) Equipment and materials whose cleanliness is easy to maintain, that are and easily cleaned, and that are robust and durable will be procured, since the Project is a construction project of hospital buildings in which cleanliness is the most important factor. Ease of maintenance and repairs after the completion of the Project will also be taken into consideration.

b) Equipment and materials standards will comply with the locally common British Standards and the Uganda National Standards. Those for which there is no applicable standard will be selected in accordance with the Japanese Industrial Standards.

c) Equipment and materials that are regarded to be hardly available in the local market, or not to satisfy the quality requirements, or whose supply is judged to be unstable, will be procured by importing from Japan or a third country. However, import goods that are widely prevalent in the Uganda market and easily available are regarded as the locally procured ones.

Table-20 Procurement of Products and Materials

Materials and Equipment	Market in Uganda		Procurement Countries		
	Situation	Import	Uganda	Third countries	Japan
(Construction materials)					
1. Aggregate (sand, crushed stone)	○		○		
2. Cement	○		○		
3. Reinforcement bar	○		○		
4. Structural steel	○		○		
5. Brick	○		○		
6. Plywood, lumber	○		○		
7. Floor / wall tile	○		○		
8. Wooden door and window sash	○		○		
9. Steel door and window sash	○		○		○
10. Aluminium door and window sash	○		○		
11. Finishing hardware	○		○		
12.Glass	○		○		
13.Paint	○		○		
14. Folded plate for roofing	○		○		
15. Construction machinery / equipment	○		○		
(Utility appliances and materials)					
1. Wire, cable	○		○		○
2. PVC conduit, hardware	○		○		
3. Steel pipe	○		○		
4. Light	○		○		
5. Switch panel, distribution panel, control panel					○
6. Generator	○		○		
7. Cable / wire supports	○		○		
8. Telephone system	○		○		○
9. Automatic fire alarm	○		○		
10. PVC pipe (plumbing)	○		○		
11. SGP pipe (water supply)					○
12. Pump					○
13. Sanitary ware	○		○		
14. Elevated water tank	○		○		
15. Fire hydrant	○		○		
16. Air conditioner					○
17. Fan	○		○		
18. Spiral duct					○

(2) Equipment

The procured equipment should be the product of Japan or the third countries for which after-sales service is available by the agents in Uganda or neighbour countries. For the equipment procured from the third countries, manufacturers shall be secured the quality of the equipment by the way to limit to ones which have their headquarters in DAC or OECD

countries or else.

(3) Transport and Delivery Route of Construction Materials and Equipment

It will take about five weeks for shipping of the materials and equipment from Japan to Mombasa Port in Kenya. After the unloading at the port, the inland transportation to each site via Nairobi is expected to take about two weeks, including the customs clearance at the country border Malaba (Mombasa – Nairobi: approx. 500 km, Nairobi – Kampala: approx. 650 km, Kampala – Hoima: approx. 210 km, Kampala – Kabale: approx. 430 km, Kampala – Fort Portal: approx. 320 km). Roads from Kampala to each site are paved and mostly in good conditions, some areas being under construction.

The last 80 km to Kabale, however, continues steep climbing slope and large vehicles like trailer trucks have to keep low-speed running. The transportation schedule should be planned to have sufficient time allowance taking into these conditions.

2-2-4-7 Operation Guidance Plan

Special consideration will be necessary for operating and maintaining the equipment to be procured in the Project, because it is mostly used for medical purpose and it can cause the fatal cases. Therefore, it is essential to provide adequate instruction and training of operation and maintenance of the equipment by a skilful engineer with sufficient experience and knowledge at the time of delivery. The consultant will check if the guidance is properly performed. The consultant shall also confirm if the persons in charge at each hospital well understand by conducting interviews with the responsible persons in the hospital.

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

In the Project, some higher level of equipment is planned for certain departments where the adequate personnel with usage experience and skill have been confirmed. However, there is the case that the equipment is not used at the department at this moment or the case that some personnel among the medical and paramedical staff do not have sufficient skill on the equipment.

Also there were the cases that the procured equipment in the past project was not utilized adequately, which were caused by such reasons as that the instruction and information was not provided sufficiently as described above.

Therefore it will be affective to provide the technical assistance on the equipment approved to be needed for improving the operating skill with clinical knowledge. This assistance will lead the effective and long term usage of equipment.

The objectives and plans of Soft Component is as below.

(1) Objective of Soft Component

Technical training will be provided to regional workshop technicians and health professionals

(medical doctors, nurses, user trainers etc.) assigned to Hoima RRH, Kabale RRH and Fort Portal RRH, in the presence of the person in charge of the central workshop. If the effect of the assistance of the Project continues, the achievement of the following three objectives can be expected.

I Maintenance and management techniques for the procured equipment will be improved and the equipment will be properly managed and operated over a long period of time.
II Operational and clinical techniques for the effective use of procured equipment will be improved and hospital service will also be improved.
III At each hospital, roles and functions of CSSD will be clarified, the operation system will be improved, and prevention of nosocomial infections will be strengthened.

(2) Activities of Soft Component

Activities to achieve each output are as follows.

Output		Plan of Operation	
		Lecturer	Outline of Training
I Maintenance technique	① Confirmation of basic knowledge of procured equipment	Equipment maintenance technique consultant	Confirmation of operation principles, purpose of use etc., and reorganization and review of basic knowledge
	② Acquisition of methods of daily and periodic maintenance of procured equipment		Acquisition of methods of daily and periodic maintenance of procured equipment Development of a maintenance and management plan
	③ Improvement of failure diagnosis and handling techniques		Acquisition of troubleshooting techniques including identification of fault locations and handling techniques
II Clinical technique	① Confirmation of functions and roles of procured equipment	Clinical technique consultant	Acquisition of knowledge such as operation principles of procured equipment
	② Acquisition of appropriate handling techniques with the use of target equipment that are tailored to the situation of the patient		Acquisition of patient handling and management methods suited to the condition of the patient
III CSSD	① Improvement of the system of CSSD	Equipment maintenance technique consultant	Organization and improvement of a suitable operation system of CSSD of each hospital
	② Improvement of operation and management techniques for procured equipment		Acquisition of operation techniques with the use of procured equipment

(3) Input Plan

Lecturers

Equipment maintenance technique consultant : Japanese, 1 person

Clinical technique consultant : Ugandan medical doctor, 1 person

Technical training planning consultant : Japanese, 1 person

In order to implement seminars efficiently, elaborate preparations are required, such as development of a technical training plan, meetings with MOH, targeted hospitals, other related organizations etc., arrangement of venues, arrangement of transportation and scheduling, etc. For this purpose “Technical Training Planning” personnel should be assigned to conduct such operations.

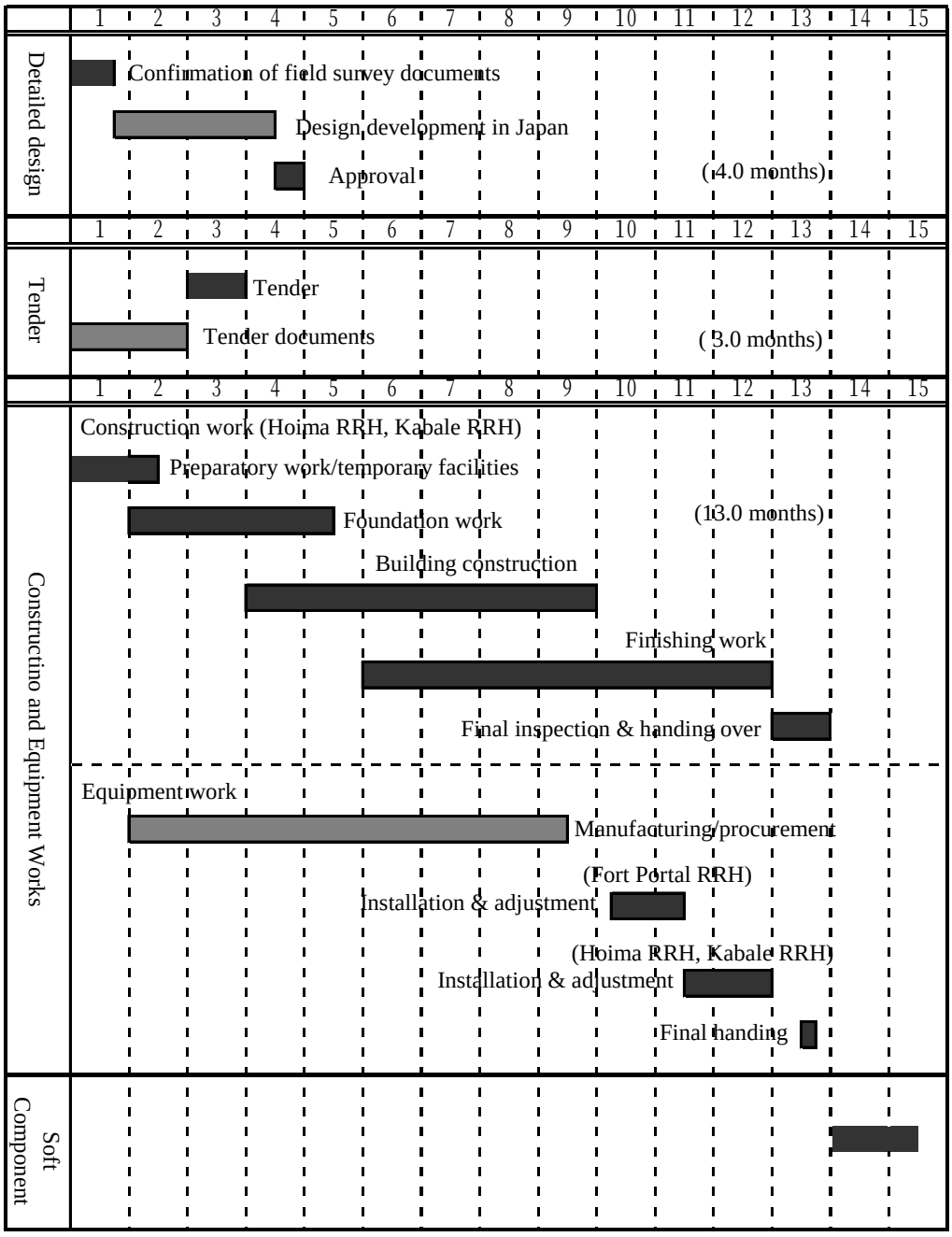
Meanwhile, a Ugandan medical doctor is planned as a clinical technique consultant, with the view that the content of the assistance to be more suitable for Ugandan situation and the effect of this assistance to be sustainable after implementation.

2-2-4-9 Implementation Schedule

The detailed design will take about 4.0 months, the tender procedure will take about 3.0 months, the construction works including procurement and installation of the equipment will take approximately 13.0 months, and the technical assistance on the operation and management of equipment (soft component) will take about 1.5 months. The following chronogram shows a rough project implementation schedule.

Note: The following chronogram indicates the expected period for each work stage. It does not mean the detailed design and construction / equipment supply and installation works will start at the same time (i.e. the field surveys and preparatory work will not start simultaneously).

Table-21 Project Implementation Schedule



2-3 Obligations of the Recipient Country

(1) Formalities

1) Application for and acquisition of building permits regarding the Project
2) Procedures for the B/A and issuance of A/P, and bearing of commission fees associated with them
3) Prompt landing of imported materials and equipment cargos at the 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 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 in the Project
7) Procedures, contracts and installation fees for power supply, telephone services, water supply and sewage for the project facilities.
8) Provision of land necessary for construction work (temporary material yard)

(2) Exemption of Duties and Taxes

The imported construction materials and equipment for the Project are exempted from any customs duties and taxes by a letter of the Implementing Agency of Uganda. In case of local procurements by the Japanese contractor / supplier, Value Added Tax (hereinafter referred to as “VAT”) will be paid in advance, but MOH should refund it later. For this purpose, MOH should budget for counterpart funds to cover VAT obligations which the Japanese contractor / supplier may incur while procuring materials, goods and services in the course of executing the works. The Japanese contractor shall present a VAT refund application to the MOH who upon satisfactory examination shall take the necessary procedures to have VAT refunded. In case of procurement by sub-contractors, contracts shall be exempted from Output VAT and no Input VAT shall be refundable in respect of the work executed.

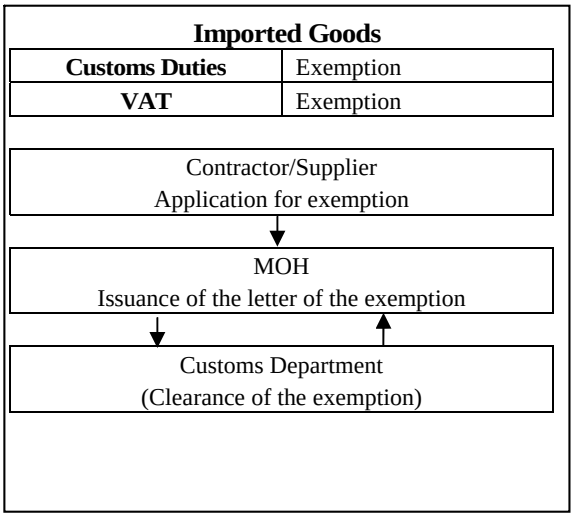


Figure-19 Exemption Procedure of Customs Duties on Imported Goods

(3) Related Construction Work

1) Hoima RRH

① Before the commencement of the works by the Japanese side

a) Transfer of functions from the existing Operation Theatre.

Transfer of operational functions from the existing Operation Theatre to Maternity Ward and ophthalmology clinic.

b) Demolition and removal of the existing facilities in the site (existing Operation Theatre, kitchen and container office)

c) Cutting of trees in the site and removal of topsoil

d) Removal of the existing power cable, telephone cable, water supply pipe and wastewater pipe passing the site, and their rerouting

② During the works by the Japanese side

e) Improvement of infrastructure for the Project

Power incoming installations up to the newly installed 200kVA pole transformer

③ After the completion of the works by the Japanese side

f) Construction of a fence and a gate

Construction of a fence to separate the outpatient area and inpatient area, and transfer of the gate.

g) Construction of a hospital road as the access to the OT/Maternity Ward

Construction of a hospital road connecting the sub entrance of hospital premises and the entrance of the casualty unit in the OT/Maternity Ward.

h) Procurement of general furniture and fixtures

- Purchase of general furniture and fixtures
- Transfer of existing equipment

i) Functional transfer from the existing facilities to the new facilities

i) Functional transfer from the existing OPD Block to the new OPD Block

ii) Functional transfer from the temporary OT block to the new OT block

iii) Functional transfer from the existing Maternity Ward to the new Maternity Ward, and renovation of the existing newborn baby room and storage into the obstetric patient rooms

2) Kabale RRH

① Before the commencement of the works by the Japanese side

a) Transfer of functions from the existing Operation Theatre

Transfer of operational functions from the existing Operation Theatre to OT in the private ward.

b) Demolition of and removal of the existing facilities in the site (existing Operation Theatre, part of OPD and outpatient toilet)

c) Cutting of trees in the site and removal of topsoil

d) Removal of the existing power cable, telephone cable, water supply pipe and wastewater pipe passing the site, and their rerouting

② During the works by the Japanese side

e) Improvement of infrastructure

Power incoming installations up to the newly installed 200kVA pole transformer

③ After the completion of the works by the Japanese side

f) Construction of fences and gates

- Construction of fences on the east and south sides of the OPD/Casualty Block, a gate for the access of ambulances and a security house.
- Construction of a fence on the east side of the OT/Maternity Ward to separate the outpatient area and inpatient area, and a gate.

g) Construction of a road outside the site

- Paving of a hospital road on the east of the OPD/Casualty Block.
- Construction of an access road to the kitchen on the south of the OPD/Casualty Block.

h) Procurement of general furniture and fixtures

- Purchase of general furniture and fixtures
- Transfer of existing equipment

i) Functional transfer from the existing facilities to the new facilities

i) Functional transfer from the existing OPD Block to the new OPD Block

ii) Functional transfer from the temporary OT block to the new OT block

iii) Functional transfer from the existing Maternity Ward to the new Maternity Ward, and renovation of the delivery rooms into the obstetric patient rooms in the existing Maternity Ward

3) Fort Portal RRH

Securing locations for mounting the equipment to be procured in the Project, transfer of the existing equipment and ensuring necessary power source, etc.

2-4 Project Operation Plan

(1) Staff Allocation Plan

In Uganda, the shortage of health professionals is an urgent issue. To respond to this issue, MOH established securing and developing human resources as one of the measures for achieving the goal of HSSP I, II, and have led the measures. As a result, in HSSP I, the total rate of trained health professionals to be placed in medical facilities has risen from 33% to 68%. However, problems have now arisen, such as the number of healthcare workers has increased in urban areas while the workers do not tend to remain in remote areas. In the target three hospitals that are located relatively far from Kampala, their role as the regional referral hospital is not fulfilled sufficiently due to the absence of doctors.

These issues have been carried forward to the present HSSIP: 2010/2011-2014/2015 in more specific measures such as the salary increase and provision of staff quarters. Currently, staff accommodation and nurse dormitory are being constructed in the target three hospitals. It can be regarded as a part of this effort. Donor agencies like WHO, WB, USAID, Italian Cooperation, etc. have contributed to human resource development projects respectively.

On the other hand, several medical staffs left each hospital at the time of the field survey at the three target hospital in June 2013. The assumed reason was that they moved to health centres following the MOH's polity to raise wages of medical staff at the health centres in the fiscal year 2012/13 with an intention to increase the health workers at the primary level.

MOH also plans to prioritise the allocation of medical staff at the secondary and tertiary level hospitals, and raise wages accordingly, which is expected to increase medical staff at these hospitals. The target three hospitals have completed staff accommodation facilities to improve the work conditions of their staffs.

At the same time, the target three hospitals endeavour to upgrade the capability of hospital staff through the in-hospital trainings and seminars as well as those at the national referral hospitals, and with the support of visiting doctors on the regular basis from the national

referral hospitals to provide specialised medical services. MOH also supports the visiting doctor system to the referral hospitals. With these measures, no particular problems are observed on the Ugandan side during the implementation as well as after the completion of the Project.

1) Hoima RRH

① Staff increase plan

Current staff allocation and plans for increasing the number of staff after the completion of the Project is shown in the following table:

Hospital Staff	No. of staff in 2010/2011	No. of staff in 2011/2012	No. of newly employed staff	No. of staff in 2015/2016
Medical Officers	15	14	3	17
Clinical Officers	25	21	7	28
Medical technicians	15	3	14	17
Nurses	116	109	19	128
Finance & admin. staff	9	9	1	10
Support staff	73	75	2	77
Total	253	231	46	277

Source: Answer to the Questionnaire to Hoima RRH

MOH intends to increase 46 hospital staffs in three years between the fiscal year 2011/2012 and 2015/2016 when the Project is completed and the hospital starts operation. However, in terms of the number of doctors, 17 are hardly sufficient. For example in 2010/2011, Hoima RRH asked Mulago NRH and other hospitals for the visiting doctors of plastic surgery, obstetrics and gynaecology and orthopaedics to compensate for the shortage of specialists. Hoima RRH plans to ask Mulago NRH for the dispatch of specialists continuously after the year 2014/15, and MOH is expected to support the dispatch of visiting doctors.

② Staff training plan

Hoima RRH plans the following staff training programmes:

Training Programme	Activities
Training of several doctors at Mulago NRH and Butabika NRH every year	- At the time of August 2011, four doctors took master's-degree training in surgery, obstetrics/ gynaecology and epidemiology. - One psychiatric staff took training in Butabika NRH.
Acquisition of bachelor's degree by several nurses every year	At the time of August 2011, four nurses were working to obtain a bachelor's degree.
Acquisition of bachelor's degree in medicine and surgery by clinical officers	At the time of Augusts 2011, three clinical officers were working to obtain a bachelor's degree.
Continuous Professional Development (CPD)	With the support from Mulago NRH and other medical educational institutions, in-hospital training is held on a regular basis.

2) Kabale RRH

① Staff increase plan

Current staff allocation and plans for increasing the number of staff after the completion of the Project is shown in the following table:

Hospital Staff	No. of staff in 2010/2011	No. of staff in 2011/2012	No. of newly employed staff	No. of staff in 2015/2016
Medical Officers	7	10	6	16
Clinical Officers	17	19	6	25
Medical technicians	30	34	3	37
Nurses	109	114	6	120
Finance & admin. staff	12	13	4	16
Support staff	55	55	3	58
Total	230	245	27	272

Source: Answer to the Questionnaire to Kabale RRH

MOH intends to increase 27 hospital staffs in three years between the fiscal year 2011/2012 and 2015/2016 when the Project is completed and the hospital starts operation. However, in terms of the number of doctors, 16 are hardly sufficient. For example in 2010/2011, Kabale RRH asked Mbarara NRH for the visiting doctors of surgery and obstetrics to compensate for the shortage of specialists. Kabale RRH plans to ask Mbarara NRH for the dispatch of specialists continuously after the year 2014/2015, and MOH is expected to support the dispatch of visiting doctors.

② Staff training plan

Kabale RRH plans the following staff training programmes:

Training Programme	Activities
Acquisition of bachelor's degree by several nurses every year	At the time of August 2011, five nurses were working to obtain a bachelor's degree.
Acquisition of bachelor's degree in medicine and surgery by clinical officers	At the time of Augusts 2011, one clinical officer was working to obtain a bachelor's degree.
Continuous Professional Development (CPD)	With the support from Mulago NRH and other medical educational institutions, in-hospital training is held on a regular basis.

3) Fort Portal RRH

① Staff increase plan

Current staff allocation and plans for increasing the number of staff after the completion of the Project is shown in the following table:

Hospital Staff	No. of staff in 2010/2011	No. of staff in 2011/2012	No. of newly employed staff	No. of staff in 2014/2015
Medical Officers	19	19	3	22
Clinical Officers	35	24	6	30
Medical technicians	19	21	6	27
Nurses	128	117	9	126
Finance & admin. staff	14	16	3	19
Support staff	113	101	6	107
Total	328	298	33	331

Source: Answer to the Questionnaire to Fort Portal RRH

MOH intends to increase33 hospital staffs in three years between the fiscal year 2011/2012 and 2015/2016 when the Project is completed and the hospital starts operation. However, in terms of the number of doctors, 22 are hardly sufficient. For example in 2010/2011, Fort Portal RRH asked Mulago NRH and other hospitals for the visiting doctors of plastic surgery, obstetrics, gynaecology and surgery to compensate for the shortage of specialists. Fort Portal RRH plans to ask Mulago NRH for the dispatch of specialists continuously after the year 2014/2015, and MOH is expected to support the dispatch of visiting doctors.

② Staff training plan

Fort Portal RRH plans the following staff training programmes:

Training Programme	Activities
Acquisition of bachelor's degree by several nurses every year	At the time of August 2011, four nurses were working to obtain a bachelor's degree.
Acquisition of bachelor's degree in medicine and surgery by clinical officers	At the time of Augusts 2011, two clinical officers were working to obtain a bachelor's degree.
Continuous Professional Development (CPD)	With the support from Mulago NRH and other medical educational institutions, in-hospital training is held on a regular basis.

(2) Maintenance Plan

1) Health Infrastructure Workshop

Health Infrastructure Division, Department of Clinical Services of MOH is in charge of healthcare infrastructure such as facilities and medical equipment and manages the Workshop for rehabilitation of facilities and repairs of equipment. The country is divided into 8 areas and a workshop is located in each area; the central workshop being in Kampala (under MOH) and the other seven workshops in the regional areas (under the regional referral hospitals).

Outline of the maintenance and management system is as below.

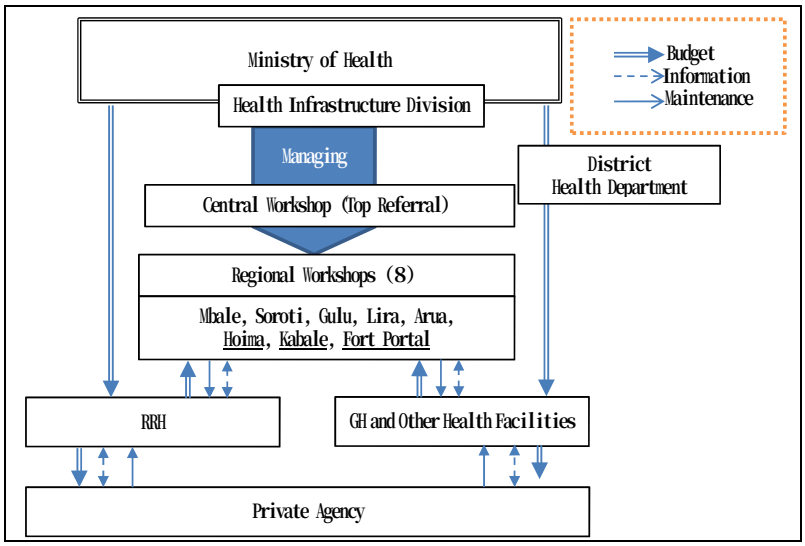


Figure-20 Outline of Maintenance and Management System

Ref: Journal of International Development and Cooperation Vol. 23 "A study on the sustainable management of medical equipment in developing countries"

2) Budget for Maintenance and Management at the Target Hospitals

Maintenance and management of health infrastructure became managed by government budget in the central workshop system since the free medical care service in public health facilities was adopted in 2001. In this system, the maintenance budget which once allocated to each health facility is collected by the regional workshops, and the workshops implement maintenance and repairing works by themselves or commission to local agencies when necessary.

In addition, CDF allows the regional referral hospitals to procure at their own discretion costly equipment which the workshops have put off to purchase.

3) Facility Maintenance Plan

The target three hospitals have regional workshops that cover the nearby areas in which several electrical, electronic and mechanical technicians are regularly appointed. However, there is only one facility maintenance technician who has technician-grade expertise at each hospital.

The existing electrical and mechanical installations in the three target hospitals are composed of ordinary equipment, except for the emergency generator system and air conditioners in the operation theatres. When troubles are found in the facilities, the facility maintenance technician commissions external professionals for repairs in consultation with the hospital director.

Facilities to be constructed in Hoima RRH and Kabale RRH in the Project will not be

provided with such building equipment that requires higher expertise than that installed in the existing facilities. However, in accordance with the expansion of the hospital facilities through the implementation of the Project, there is a need for a system that grasps the situation of the entire hospital facilities and can respond quickly when a trouble has occurred. To that end, it will be preferable that two maintenance technicians will be appointed to take care of facility maintenance. It is also important that these two technicians can understand the components of the facilities during the construction work, to fully understand the contents of facility maintenance manual by the time of completion. Being well aware of this issue, the Ugandan side plans to increase the facility maintenance personnel.

4) Equipment Maintenance Plan

The cases were found that the equipment procured in the past projects were not operated or maintained adequately in the target hospitals through the hearing at the target hospitals of the Project, the target hospitals in the past Projects or the JOCV members working as engineers specialised in medical equipment maintenance.

The issues regarding maintenance and management of medical equipment are as below:

- Insufficient learning of equipment operation and maintenance by the medical staff and equipment maintenance engineers.
- Insufficient skill of workshop staff due to the immature systems of qualification and training in Uganda.
- Sufficient maintenance services cannot be received from the agencies or manufacturers due to the limitation of budget.
- Information to find where to procure consumables or spare parts is insufficient.

It is expected to encourage the improvement of the maintenance and management system in consideration of the issues mentioned above and tying up with the JICA Technical Cooperation “Project on Improving of Health Service through Health Infrastructure Management” for the implementation of the Project.

It was considered that public hospitals did not have experiences to make maintenance service contact with local agencies or manufacturers in Uganda at the stage of the Preparatory Survey. However, in the Preparatory Survey 2, it was confirmed that maintenance service contracts have been concluded between the public hospitals and local agencies or manufacturers. Accordingly, the costly equipment, the sophisticated equipment, lifesaving equipment or the one that is considered indispensable should be taken care of by the local agencies or manufacture under the maintenance service contract for approximately five years after the manufacturer’s warranty period is expired, in order to secure adequate operation and maintenance under the responsibility of the Ugandan side.

The equipment which needs the maintenance service contract is the following seven items. Approximately 9,000 US$ for each hospital is assumed to be necessary annually. The Survey

Team and MOH agreed during the draft report explanation mission that MOH would prepare the maintenance service contracts, and Hoima, Kabale and For Portal RRHs would contract with supplier's local agent for management. Since the contract price is expensive for each RRH, MOH will encourage the Ministry of Finance to allocate additional budget to each RRH.

Following equipment will need maintenance service contract

(1) Anaesthesia Machine
(2) Autoclave (Large)
(3) C-arm X-ray Unit
(4) Defibrillator
(5) Patient Monitor
(6) Ultrasound Scanner (Portable)
(7) Ventilators (Adult)

2-5 Project Cost Estimation

2-5-1 Initial Cost Estimation

The detailed initial costs to be borne by the Ugandan side according to the split of works are estimated based on the calculation conditions as specified in (2), when the Project is implemented through the Japanese Grant Aid. This cost estimation is provisional.

(1) Costs to be borne by the Ugandan side

1) Hoima RRH

Costs to be borne by the Ugandan side for Hoima RRH (In 1,000UShs)

Item	Cost
a. Transfer of functions from the existing Operation Theatre	4,830
b. Demolition and removal of the existing facilities in the site (existing Operation Theatre, kitchen and container office)	15,408
c. Cutting of trees in the site and removal of topsoil	7,245
d. Removal of the existing infrastructure systems and their rerouting	4,830
e. Improvement of infrastructure for the Project (Power incoming installations up to the 200kVA pole transformer to be installed by the Japanese side)	10,000
f. Construction of a fence to separate the outpatient area and inpatient area, and transfer of the gate	3,600
g. Construction of a hospital road connecting the sub entrance of hospital premises and the OT/Maternity Ward	24,150
h. Procurement of general furniture and fixtures as well as transfer of existing equipment	48,000
i. Functional transfer from the existing facilities to the new facilities (OPD Block, OT/Maternity Ward)	4,830
Total	122,893

(Equivalent to approx. 4.7 million yen)

2) Kabale RRH

Costs to be borne by the Ugandan side for Kabale RRH (In 1,000UShs)

Item	Cost
a. Transfer of functions from the existing Operation Theatre	4,830
b. Demolition of and removal of the existing facilities in the site (existing Operation Theatre, part of OPD and outpatient toilet)	18,000
c. Cutting of trees in the site and removal of topsoil	4,660
d. Removal of the existing infrastructure systems and their rerouting	6,000
e. Improvement of infrastructure for the Project (Power incoming installations up to the 200kVA pole transformer to be installed by the Japanese side)	10,000
f. Construction of fences and gates	12,000
g. Construction of a road outside the site	36,000
h. Procurement of general furniture and fixtures and transfer of existing equipment	48,000
i. Functional transfer from the existing facilities to the new facilities	4,830
Total	144,320

(Equivalent to approx. 5.5 million yen)

3) Fort Portal RRH

There are no construction works and only the supply and installation of medical equipment is considered in the Project. Accordingly, no construction works are assumed under the responsibility of Ugandan side.

4) Costs for B/A and A/P

Charges related to procedural matters will be the issuing of B/A and A/P, and necessary charges. Costs relevant to the issuing of B/A and A/P for the consulting agreement, construction contract and equipment supply/installation contract is estimated to be approximately 3.6 million yen in total.

(2) Calculation Conditions

1) Time of Estimation : as of June 2013
2) Conversion Rate : 1.00 US$ = 98.92 yen
: 1.00 US$ = 2,595.41 UShs
: 1 UShs = 0.03811 yen
3) Construction Period : 13 months
4) Other Conditions:

Project implementation intended to be in compliance with the Grant Aid scheme of the Government of Japan.

2-5-2 Operation and Maintenance Cost

(1) Hoima RRH and Kabale RRH

Costs for utility charges after the completion of the Project are assumed to increase at Hoima RRH and Kabale RRH due to the construction of new buildings. Tables below show operation and maintenance costs for the initial year and from the second year onward at each hospital. The costs expected from the second year and after assumes 5% annual price increase.

1) Operation and maintenance costs of Hoima RRH

(In UShs)

Item	Initial fiscal year	Following fiscal years
① Electricity charge	77,929,843	81,826,335
② Telephone charge	4,082,600	4,286,730
③ Fuel cost of generator	17,841,600	18,733,680
④ Water charge	15,607,668	16,388,051
⑤ Oxygen charge	169,920	178,416
⑥ Building maintenance cost	0	9,251,250
Sub-total ① – ⑥ (facility maintenance cost)	115,631,631	130,664,462
⑦ Equipment maintenance cost	6,131,250	29,796,503
Total ① – ⑦	121,762,881	160,460,965

① Electricity charge --- 77,929,843UShs/year

The contract demand of electric power of the facilities to be constructed in the Project is presumed as shown below based on the capacities and other details of the facilities. A new 200 kVA pole transformer will be installed for the newly built facilities. For calculation purpose, this 200 kVA capacity is for the consumption assumed in the new OPD Block and the new OT/Maternity Ward. The actual consumption is estimated to be about 60% of the capacity, with 50% demand factor and 80% power factor (factor for conversion of kVA into kW).

Presumed Electric Power Consumption

	Capacity of Transformer (kVA)	Actual Consumption (kW)
Newly built facilities	200	42

- Price structure

Electric power basic rate 20,000UShs/month

Electric power metered charge 376.1UShs/kWh (peak time)

276.7UShs/kWh (off-peak)

Electricity charge

	Charge (UShs)	Consumption (kW)	Hour (h)	Day	Month	Load factor	Total (UShs)
Newly built facilities							
Basic rate	20,000.0		-	-	12	1.0	240,000
Metered charge (daytime)	376.1	42	8	25	12	1.0	37,910,880
Metered charge (night)	276.7	42	16	25	12	0.5	27,891,360
VAT（18%）							11,887,603
Total							77,929,843

② Telephone charge --- 4,082,600UShs/year

The telephone charge varies depending on 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

Basic rate	10,000UShs/month
Domestic telephone call	180UShs/min. (Within Uganda telecom)
	360UShs/min. (With other companies)
International telephone call	450UShs/min.

Telephone charge

	Charge (UShs)	Duration of call (min/each)	Frequency (times/day)	Day	Month	Total (UShs)
Basic rate	10,000	--	--	--	12	120,000
Domestic call	180	1	20	25	12	1,080,000
	360	1	20	25	12	2,150,000
International call	450	3	1	25	12	405,000
VAT（18%）						327,600
Total						4,082,600

③ Fuel cost of generator --- 17,841,600UShs/year

Out of the hearing at the site during the field surveys, power failures occur 6 times a month, each lasting about 5 hours on average. Fuel cost is estimated based on this assumption. A 50 kVA power generator is planned for the Project.

- Price structure

Fuel consumption of a generator	12 litres/h
Unit price of fuel	4,130UShs/litres

Fuel cost of generator

	Charge (UShs)	Consumption (litres)	Operation hours (h)	Operation times	Month	Annual consumption (litres)	Total (UShs)
Fuel consumption	4,130	12	5	6	12	4,320	17,841,600
Total							17,841,600

④ Water charge --- 15,607,668UShs/year

The consumption of city water in the facilities to be constructed in the Project is presumed as follows:

Presumed Water Consumption

	Water supply per day (m^3/day)
Newly built facilities	22
Total	22

- Price structure

Basic rate 8,000UShs/month

Metered charge (average) 1,951UShs/m^3

Water charge

	Charge (UShs)	Water supply	Day	Month	City water consumption rate	Total (UShs)
Newly built facilities						
Basic rate	8,000			12	1	96,000
Metered charge (water supply)	1,951	22	25	12	1	12,876,000
VAT（18%）						2,335,068
Total						15,607,668

⑤ Oxygen charge --- 169,920UShs/year

In general, oxygen concentrators are used for oxygen supply to the patients and oxygen cylinders are used for respirators anaesthetic apparatus in the operation theatres. Oxygen consumption in the newly built facilities is presumed as follows:

Presumed Oxygen Consumption

	Usage	Consumption per month (cylinders/month)
O_2 charge	OT, etc.	1

Oxygen charge

	Charge (UShs)	Consumption (cylinders)	Month	Annual consumption (cylinder)	Load factor	Total (UShs)
O_2 charge	15,000	1	12	12	0.8	144,000
VAT (18%)						25,920
Total						169,920

⑥ Building maintenance cost --- 9,251,250UShs/year

The buildings of to be constructed in the Project will 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 to be around 1/3 or 1/2 of Japan's similar cases. The building maintenance cost will be necessary from the second year and onward.

- Building maintenance cost --- 3,000UShs/year

	Cost(UShs)	Area (m^2)	Day	Month	Load factor	Total (UShs)
Building maintenance cost	3,000	3,083.75	-	-	1.0	9,251,250
Total						9,251,250

⑦ Equipment maintenance cost --- 6,131,250 UShs/year

The maintenance cost including consumables and spare parts of the equipment to be procured in the Project is assumed to increase by approximately 6.1 million UShs annually after the completion of the Project. The expense of oxygen gas needed for Anaesthesia Machine and Ventilators (Adult) is separately considered in ⑤ above. As it is mentioned in paragraph 2-4 (2) 4), the annual maintenance service contract cost of 23,358,690UShs (Approx. 9,000 US$) will be necessary after the one-year warrantee period of the equipment manufacturer expires.

Equipment	Consumable and Spare parts	Amount needed per year	Unit price (UShs)	Q'ty of equipment	Sub total (UShs)
Anaesthesia Machine	Oxygen	Stated ⑤ above		2	
	Anaesthesia gas	1	50,000		100,000
	Soda lime	6	20,000		240,000
Autoclave (Large)	Filter	1	294,000	2	588,000
	Recording paper	1	30,000		60,000
C-arm X-ray Unit	X-ray film	1	100,000	1	100,000
	Developing solution	6	145,000		870,000
	Fixing solution	6	145,000		870,000
Centrifuge (Table Top Type)	Test tube	12	10,000	1	120,000
Defibrillator	Recording paper	1	30,000	1	30,000
Diagnostic Set	Battery	1	3,000	3	9,000
	Spare lamp	1	30,000		90,000
ECG (12 lead)	Cream	12	8,000	1	96,000
	Recording paper	12	30,000		360,000
	Electrode	12	45,000		540,000
Electric Surgical Unit	Knife	1	170,000	1	170,000
	Spare handle	1	51,250		51,250
Endoscope Set	Spare lamp	1	30,000	1	30,000
Infant Incubator	Sleeve for treatment window	1	45,000	2	90,000
Infusion Pump	Infusion set	12	2,250	2	54,000
Microscope (Binocular)	Slide glass	12	5,000	1	60,000
	Emulsion oil	1	8,000		8,000
Nebulizer	Cup for medicinal solution	12	10,000	3	360,000
Patient Monitor	Recording paper	6	30,000	4	720,000
Syringe Pump	Syringe	24	3,000	3	216,000
Ventilators (Adult)	Oxygen	Stated ⑤ above		1	
	Aspiration Circuit	1	59,000		59,000
X-ray Film Viewer	Spare lamp	3	10,000	8	240,000
			Total		6,131,250

2) Operation and maintenance costs of Kabale RRH

(In UShs)

Item	Initial fiscal year	Following fiscal years
① Electricity charge	77,929,843	81,826,335
② Telephone charge	4,082,600	4,286,730
③ Fuel cost of generator	17,841,600	18,733,680
④ Water charge	13,926,360	14,622,678
⑤ Oxygen charge	169,920	178,416
⑥ Building maintenance cost	0	9,398,850
Sub-total ① – ⑥ (facility maintenance cost)	113,950,323	129,046,689
⑦ Equipment maintenance cost	7,977,250	31,734,803
Total ① – ⑦	121,927,573	160,781,492

① Electricity charge --- 77,929,843UShs/year

The contract demand of electric power of the facilities to be constructed in the Project is presumed as shown below based on the capacities and other details of the facilities. A new 200 kVA pole transformer will be installed for the newly built facilities. For calculation purpose, this 200 kVA capacity is for the consumption assumed in the new OPD/Casualty Block and the new OT/Maternity Ward. The actual consumption is estimated to be about 60% of the capacity, with 50% demand factor and 80% power factor (factor for conversion of kVA into kW).

Presumed Electric Power Consumption

	Capacity of Transformer (kVA)	Actual Consumption (kW)
Newly built facilities	200	42

- Price structure

Electric power basic rate 20,000UShs/month

Electric power metered charge 376.1UShs/kWh (peak time)

276.7UShs/kWh (off-peak)

Electricity charge

	Charge (UShs)	Consumption (kW)	Hour (h)	Day	Month	Load factor	Total (UShs)
Newly built facilities							
Basic rate	20,000.0		-	-	12	1.0	240,000
Metered charge (daytime)	376.1	42	8	25	12	1.0	37,910,880
Metered charge (night)	276.7	42	16	25	12	0.5	27,891,360
VAT（18%）							11,887,603
Total							77,929,843

② Telephone charge --- 4,082,600UShs/year

The telephone charge varies depending on 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

Basic rate	10,000UShs/month
Domestic telephone call	180UShs/min. (Within Uganda telecom)
	360UShs/min. (With other companies)
International telephone call	450UShs/min.

Telephone charge

	Charge (UShs)	Duration of call (min/each)	Frequency (times/day)	Day	Month	Total (UShs)
Basic rate	10,000	--	--	--	12	120,000
Domestic call	180	1	20	25	12	1,080,000
	360	1	20	25	12	2,150,000
International call	450	3	1	25	12	405,000
VAT（18%）						327,600
Total						4,082,600

③ Fuel cost of generator --- 17,841,600UShs/year

Out of the hearing at the site during the field surveys, power failures occur 10 times a month, each lasting about 3 hours on average. Fuel cost is estimated based on this assumption. The existing 200 kVA power generator will serve for the newly built OPD/Casualty Block and the OT/Maternity Ward in the Project, with an assumption of 50 kVA power capacity for these facilities.

- Price structure

Fuel consumption of a generator	12 litres/h
Unit price of fuel	4,130UShs/litres

Fuel cost of generator

	Charge (UShs)	Consumption (litres)	Operation hours (h)	Operation times	Month	Annual consumption (litres)	Total (UShs)
Fuel consumption	4,130	12	3	10	12	4,320	17,841,600
Total							17,841,600

④ Water charge --- 13,926,360UShs/year

The consumption of city water in the facilities to be constructed in the Project is presumed as follows:

Presumed Water Consumption

	Water supply per day (m^3/day)
Newly built facilities	20
Total	20

- Price structure

Basic rate	8,000UShs/month

Metered charge (average) 1,951UShs/m^3

Water charge

	Charge (UShs)	Water supply	Day	Month	City water consumption rate	Total (UShs)
Newly built facilities						
Basic rate	8,000			12	1	96,000
Metered charge (water supply)	1,951	22	25	12	1	11,706,000
VAT（18%）						2,124,360
Total						13,926,360

⑤ Oxygen charge --- 169,920UShs/year

In general, oxygen concentrators are used for oxygen supply to the patients and oxygen cylinders are used for respirators anaesthetic apparatus in the operation theatres. Oxygen consumption in the newly built facilities is presumed as follows:

Presumed Oxygen Consumption

	Usage	Consumption per month (cylinders/month)
O_2 charge	OT, etc.	1

Oxygen charge

	Charge (UShs)	Consumption (cylinders)	Month	Annual consumption (cylinder)	Load factor	Total (UShs)
O_2 charge	15,000	1	12	12	0.8	144,000
VAT (18%)						25,920
Total						169,920

⑥ Building maintenance cost --- 9,398,850 UShs/year

The buildings to be constructed in the Project will 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 to be around 1/3 or 1/2 of Japan's similar cases. The building maintenance cost will be necessary from the second year and onward.

- Building maintenance cost --- 3,000UShs/year

	Cost(UShs)	Area (m^2)	Day	Month	Load factor	Total (UShs)
Building maintenance cost	3,000	3,132.95	-	-	1.0	9,398,850
Total						9,398,850

⑦ Equipment maintenance cost --- 7,977,250UShs/year

The maintenance cost including consumables and spare parts of the equipment to be procured in the Project is assumed to increase by approximately 8.0 million UShs annually after the completion of the Project. The expense of oxygen gas needed for Anaesthesia Machine and Ventilators (Adult) is separately considered in ⑤ above. As it is mentioned in paragraph 2-4 (2) 4), the annual maintenance service contract cost of 23,358,690 UShs (Approx. 9,000 US$) will be necessary after the one-year warrantee period of the equipment manufacturer expires.

Equipment	Consumable and Spare parts	Amount needed per year	Unit price (UShs)	Q'ty of equipment	Sub total (UShs)
Anaesthesia Machine	Oxygen	Referred to ⑤ above		2	
	Anaesthesia gas	1	50,000		100,000
	Soda lime	6	20,000		240,000
Autoclave (Large)	Filter	1	294,000	2	588,000
	Recording paper	1	30,000		60,000
C-arm X-ray Unit	X-ray film	1	100,000	1	100,000
	Developing solution	6	145,000		870,000
	Fixing solution	6	145,000		870,000
Centrifuge (Table Top Type)	Test tube	12	10,000	1	120,000
Defibrillator	Recording paper	1	30,000	1	30,000
Diagnostic Set	Battery	1	3,000	3	9,000
	Spare lamp	1	30,000		90,000
Doppler	Gel for Doppler	1	70,000	1	70,000
ECG (12 lead)	Cream	12	8,000	2	192,000
	Recording paper	12	30,000		720,000
	Electrode	12	45,000		1,080,000
Electric Surgical Unit	Knife	1	170,000	1	170,000
	Spare handle	1	51,250		51,250
Endoscope Set	Spare lamp	1	30,000	1	30,000
Infant Incubator	Sleeve for treatment window	1	45,000	2	90,000
Infusion Pump	Infusion set	12	2,250	2	54,000
Microscope (Binocular)	Slide glass	12	5,000	1	60,000
	Emulsion oil	1	8,000		8,000
Nebulizer	Cup for medicinal solution	12	10,000	3	360,000
Patient Monitor	Recording paper	6	30,000	4	720,000
Syringe Pump	Syringe	24	3,000	3	216,000
Ultrasound Scanner (Portable)	Gel	6	70,000	1	420,000
	Recording paper	12	30,000		360,000
Ventilators (Adult)	Oxygen	Referred to ⑤ above		1	
	Aspiration Circuit	1	59,000		59,000
X-ray Film Viewer	Spare lamp	3	10,000	8	240,000
			合計		7,977,250

(2) Fort Portal RRH

This Project will cover the procurement and installation of medical equipment for Fort Portal RRH. Accordingly, only the equipment maintenance cost including spare parts and replacement parts will increase after the completion of the Project, which is estimated to be approximately 7.3 million UShs annually. As it is mentioned in paragraph 2-4 (2) 4), the annual maintenance contract cost of 23,358,690UShs (Approx. 9,000 US$) will be necessary after the one-year warrantee period of the equipment manufacturer expires. The total annual maintenance costs in the second year and after will be approximately 31.1 million UShs.

Equipment	Consumable and spare parts	Needed amount per year	Unit price (UShs)	Q'ty of equipment	Sub total (UShs)
Anaesthesia Machine	Oxygen	12	15,000	2	360,000
	Anaesthesia gas	1	50,000		100,000
	Soda lime	6	20,000		240,000
Autoclave (Large)	Filter	1	294,000	2	588,000
	Recording paper	1	30,000		60,000
C-arm X-ray Unit	X-ray film	1	100,000	1	100,000
	Developing solution	6	145,000		870,000
	Fixing solution	6	145,000		870,000
Centrifuge (Table Top Type)	Test tube	12	10,000	1	120,000
Defibrillator	Recording paper	1	30,000	1	30,000
Diagnostic Set	Battery	1	3,000	3	9,000
	Spare lamp	1	30,000		90,000
Doppler	Gel for Doppler	1	70,000	1	70,000
ECG (12 lead)	Cream	12	8,000	1	96,000
	Recording paper	12	30,000		360,000
	Electrode	12	45,000		540,000
Electric Surgical Unit	Knife	1	170,000	1	170,000
	Spare handle	1	51,250		51,250
Endoscope Set	Spare lamp	1	30,000	1	30,000
Infant Incubator	Sleeve for treatment window	1	45,000	2	90,000
Infusion Pump	Infusion set	12	2,250	2	54,000
Microscope (Binocular)	Slide glass	12	5,000	1	60,000
	Emulsion oil	1	8,000		8,000
Nebulizer	Cup for medicinal solution	12	10,000	3	360,000
Patient Monitor	Recording paper	6	30,000	3	540,000
Syringe Pump	Syringe	24	3,000	3	216,000
Ultrasound Scanner (Portable)	Gel	6	70,000	1	420,000
	Recording paper	12	30,000		360,000
Ventilators (Adult)	Oxygen	12	15,000	1	180,000
	Aspiration Circuit	1	59,000		59,000
X-ray Film Viewer	Spare lamp	3	10,000	8	240,000
			Total		7,341,250

(3) Financial Conditions

1) Budget Allocation to Health Sector

The following table shows health budgets of Uganda during the past five years since the fiscal year 2007/2008. The health budgets from international donor agencies differ significantly by fiscal year. On the other hand, the allocation to health budget from the national budget has been stable within the range of 8.3 – 9.6%.

(In billion UShs)

Year	Health budget from the national budget	Health budget from the donor agencies	Total	Allocation to health budget (%)
2007/08	277.36	141.12	418.48	9.0
2008/09	375.46	253.00	628.46	8.3
2009/10	435.80	301.80	737.60	9.6
2010/11	567.56	90.44	660.00	8.9
2011/12	593.02	206.10	799.11	8.3

Source: Annual Health Sector Performance Report 2011/2012

2) Budget Allocation to Each Hospital

Regional referral hospitals belong to MOH; however, being the semi-autonomous institutions, their management costs are directly allocated to each regional referral hospital by the Ministry of Finance Planning and Economic Development (MOFPED).

Labour costs of doctors and hospital staff have been determined based on the qualifications, education, experience, etc. The salaries of hospital staff have been allocated out of the state budget.

In the year 2008/2009, CDF was established for the improvement of facilities and procurement of equipment at the regional referral hospitals, which will be continued for 15 years. Owing to the CDF, the budget of each regional referral hospital has been increased considerably. The amount of CDF at each regional referral hospital stay in the range from about 1,000 to3,000 million UShs, and the works at each target hospital in the Project under the responsibility of the Government of Uganda are expected to be financed by this CDF.

The following tables indicate budgets and expenditures at Hoima, Kabale and Fort Portal RRH during the past five years. With the input of CDF since the fiscal year 2008/2009, the budgets have been increased significantly in the three RRHs.

① Hoima RRH

(In million UShs)

Year		2007/08	2008/09	2009/10	2010/11	2011/12
Budget		2,162	3,599	3,920	4,543	4,514
	Recurrent budget	2,162	2,456	2,777	3,278	2,114
	CDF	---	1,143	1,143	1,265	2,400
Expenditure		2,162	3,519	3,920	3,171	4,369
	Current expenditure	2,162	2,456	2,777	2,006	2,103
	Capital expenditure	---	1,143	1,143	1,165	2,266

Source: Reply to the Questionnaire

The maintenance cost of approximate 160 million UShs in the second year and after estimated in the previous section shares about 7.6% of the recurrent budget for fiscal year 2011/2012, which remains in the range of reasonable increase compared to the past tendencies of budget increase.

② Kabale RRH

(In million UShs)

Year		2007/08	2008/09	2009/10	2010/11	2011/12
Budget		1,805	3,918	3,914	3,734	3,023
	Recurrent budget	1,805	2,032	2,114	2,131	2,223
	CDF	---	1,886	1,800	1,603	800
Expenditure		1,805	3,872	4,063	3,730	3,422
	Recurrent expenditure	1,805	1,986	2,263	2,127	2,667
	Capital expenditure	---	1,886	1,800	1,603	755

Source: Reply to the Questionnaire

The maintenance cost of approximate 161 million UShs in the second year and after estimated in the previous section shares about 7.2% of the recurrent budget for fiscal year 2011/2012, which remains in the range of reasonable increase compared to the past tendencies of budget increase.

③ Fort Portal RRH

(In million UShs)

Year		2007/08	2008/09	2009/10	2010/11	2011/12
Budget		2,031	3,383	4,269	4,603	5,984
	Recurrent budget	2,031	2,467	2,519	2,988	2,614
	CDF	---	916	1,750	1,615	3,370
Expenditure		2,031	3,383	4,269	4,603	5,984
	Recurrent expenditure	2,031	2,460	2,375	2,988	2,614
	Capital expenditure	---	923	1,894	1,615	3,370

Source: Reply to the Questionnaire

The maintenance cost of approximate 31.1 million UShs after the completion of the Project shares about 1.2% of the recurrent budget for fiscal year 2011/2012, which remains in the range of reasonable increase compared to the past tendencies of budget increase.

CHAPTER 3 PROJECT EVALUATION

Chapter 3 Project Evaluation

3-1 Preconditions

The Government of Uganda needs to consider the issues mentioned below to achieve satisfactory implementation of the Project.

The matters the Ugandan side is responsible for will be carried out in cooperation among MOH, Division of Health Infrastructure and Hoima, Kabale and Fort Portal RRHs according to each scope of responsibility. There will be no construction works to be undertaken by Fort Portal RRH because only supply and installation of medical equipment in the existing facilities is considered in the Project.

The construction sites of the new facilities in Hoima RRH and Kabale RRH are located within the present hospital premises. Thus, there will be no need for the acquisition of new land for the construction sites. Also, there will be no need for the environmental assessment, because they will be renovation works in the existing hospitals.

MOH	- Procedures for exemption of duties and prompt customs clearance - Procedures for exemption of VAT - Procedures for issuing B/A and A/P
Hoima RRH Kabale RRH	- Acquisition of the permission for construction (Each RRH will apply and acquire the permission to the district office with support of the Health Infrastructure Division, Department of Clinical Services of MOH) - Demolition and removal of the existing facilities (Hoima RRH: existing Operation Theatre, kitchen and container office, Kabale RRH: existing Operation Theatre, canteen and outpatient toilet) - Cutting trees in the site and removal of topsoil - Removal of existing power cable, telephone cable, water supply pipe and wastewater pipe passing the site, and their rerouting - Connection of infrastructure systems (electricity, water supply, sewage) - Construction of roads outside the sites and installation of fences

3-2 Necessary Inputs by the Recipient Country

Issues the Ugandan side should tackle for the emergence and continuation of effects of the Project are listed below.

(1) Issues the Government of Uganda needs to tackle

1) Securing operational and maintenance budgets for target projects required at each hospital

Increased amount of maintenance and operation cost necessary from the second year after the

implementation of the Project are estimated at approx. 160 million UShs in Hoima RRH (approx. 7.6% of recurrent budget in the fiscal year 2011/2012), approx. 161 million UShs in Kabale RRH (approx. 7.2% of recurrent budget in the fiscal year 2011/2012), and approx. 31.1 million UShs in Fort Portal RRH (1.2% of recurrent budget in the fiscal year 2011/2012). In consideration of the past sum of recurrent budgets and increasing tendency, there should be no problem in securing the increased budget. Therefore, in order to maintain the effect of the Project, each hospital will be required to continuously secure the current recurrent budget, and also to appropriately allocate the budget to rightly operate and maintain the facilities and equipment relevant to the projects.

2) Implementation of appropriate operation and maintenance

In order for each hospital to continuously implement appropriate operation and maintenance, the system of management of maintenance management should be reinforced, and skills of workshop staffs and healthcare professionals of each hospital on the operation and maintenance of healthcare infrastructure needs to be improved. Currently, under NHP II, an action for improvement is in progress with the improvement of healthcare services as the focus area. In addition, JICA technical cooperation "Project on Improvement of Health Service through Health Infrastructure Management" and technical assistance (soft component) regarding the Project is planned to improve operation and maintenance skills in the hospitals. Each hospital will be required to make efforts to sustain the effect of the Project by utilising skills learned through these actions and technical aids in implementing appropriate operation and maintenance, as well as by aiming to transfer the skills to other staffs through in-house training.

3) Securing CDF and budget for contract cost of medical equipment maintenance service

Issues of failure and breakage of infrastructure such as facilities and equipment can be infallibly reduced by appropriate operation and maintenance at the hospital. However, it should be assumed that after a certain period, unexpected refurbishment or repair of the facilities or maintenance and repair of sensitive instruments may not be handled by the hospitals with their maintenance budget or skills. Each hospital will be required to secure the budget for equipment maintenance and spare parts procurement by utilising CDF if they are too expensive to be covered within the ordinary operation and maintenance budget.

Regarding high-cost equipment, sensitive equipment, life-saving equipment procured by the Project, a maintenance contract regarding equipment maintenance must be closed, paid by Uganda, with the local agency for about five years after the warranty period. The Japanese survey team and MOH agreed during the explanatory mission of draft report that maintenance service contracts would be concluded between each target hospital and supplier's local agent under the auspices of MOH.

4) Securing healthcare professionals and training for appropriate utilisation and maintenance of medical equipment

Shortage of healthcare professionals in rural hospitals is a common issue in the target hospitals, and each hospital is putting in much effort in securing and training staffs through various measures including in-house training and recruitment of interns.

In order to preserve the effect of the Project, it is essential for MOH and each hospital to secure healthcare professionals and to train them for appropriate utilisation and maintenance of medical equipment in each hospital, for which continuous effort will be required.

(2) Issues that will be Supplemented and Reinforced by other Schemes

In the JICA Technical Cooperation "Project on Improvement of Health Service through Health Infrastructure Management" currently in progress, actions to improve the delivery of healthcare services by the effective and efficient utilisation of healthcare infrastructure is underway. This technical cooperation project is working on actions for the improvement of appropriate utilisation and maintenance of medical equipment at the hospitals and medical equipment maintenance workshops, including Hoima RRH and Kabale RRH, which are the targeted hospitals by the grant aid project. Collaboration with this technical cooperation project is very important for the emergence and sustainability of the effect of the Project.

Dispatching JOCV members who specialise in healthcare such as 5S and clinical engineers has been promoted, and these volunteers are expected to support the appropriate utilisation of the provided equipment. Collaboration and supplementation with these schemes are expected.

3-3 Important Assumptions

Important assumptions for the realisation and sustainability of the Project effects are as follows:

(1) National policies for health service should be continued.

The NHP (1999/2000-2009/10) and HSSP I, and II formulated thereof, as well as the succeeding NHP II (2010/11-2019/20) and HSSIP (2010/11-2014/15), have worked on free medical care, improved access rate by the proliferation of healthcare facilities, and reinforcement of the delivery of healthcare services.

In order for the achievement of the Project to be realised and sustained, the direction of such healthcare policies should not be largely changed. Shortage of healthcare professionals in Uganda is a pressing issue in particular, and MOH has been leading measures to secure and train staff in order to achieve the HSSIP objectives.

It is an important criterion for these policies to be sustained and staff to be secured for the target hospitals.

(2) Stable national finances should be sustained so that proper budget will be allocated to the healthcare sector.

As stated above, healthcare services to patients at public hospitals have been provided free of charge in principle, excluding some clinical examination fees, based on the national health policy. Therefore, in order for the hospitals to continue appropriate operation, it is critical for them to secure budget allocation from the government.

Budget allocated from the national budget to the healthcare sector has been stable within the range of 8.3 – 9.6% for the past five years (fiscal year 2007/2008-2011/2012). For the achievement of the Project to be sustained, budget necessary for hospital operation must be secured continuously, and actions for stable and appropriate national finance should be taken.

3-4 Project Evaluation

3-4-1 Relevance

(1) Project Beneficiaries

The direct beneficiaries will be inpatients and outpatients of the three target hospitals. In addition, by accepting the referral of patients from general hospitals and health centres in the District of each hospital, the three target hospitals will serve as key hospitals in the regional referral system. From this viewpoint, the Project will be indirectly beneficial to all the coverage population of the three hospitals; 1,884,000 persons of Hoima RRH, 1,777,600 persons of Kabale RRH and 2,307,700 persons of Fort Portal RRH, as many as 5,969,300 persons in total.

(2) Human Security and Urgency

This project aims to contribute to upgrading medical services of the target hospitals, which serve as the leading hospitals among RRHs in the Western Region, through the construction of hospital buildings as well as the supply and installation of medical equipment.

As an extension of that, the Project sets the superior goal that the health conditions of local residents will be improved. It is expected to contribute to the improvement of the basic human needs (BHN) of the local residents, and to contribute to the stability of their livelihood.

(3) Contribution to Middle and Long-term Goals of the Development Projects

NHPII and HSSIP have set the midterm target as “to attain a good standard of health for all people in Uganda in order to promote a healthy and productive life” and have set up “to improve the levels, equity in access and demand to defined services needed for health” as one of the policies to achieve this target. This project will contribute to the achievement of this target and policy.

(4) Feasibility as a Grant Aid Project

This project is to contribute to human security by improving the health and medical services, to

contribute to the reduction of infant mortality, under-five mortality and maternal mortality that has been established as the Millennium Development Goals. In this regard, the Project is consistent with cooperation policies and principles of Japan.

3-4-2 Effectiveness

The following (1) Quantitative Effects and (2) Qualitative Effects are expected by the implementation of the grant aid project.

(1) Quantitative Effects

Quantitative Effects expected by the Project are as follows.

The existing facilities of the target hospitals are aging and their space is not large enough to accept the increasing number of patients. This situation is expected to be improved through the implementation of the Project. Post-implementation project effects shall be confirmed for each hospital based on the current situation in the fiscal year 2011/2012 (from July 2011 to June 2012 according to the Ugandan fiscal year) and evaluated quantitatively with the expected figures set for the fiscal year 2018/2019, three years after the completion of the Project.

① Hoima RRH (target building components: OPD, operation theatre, casualty[*1])

Index	Base Value (2011)	Target Value (2018) (3 years after project completion)
Number of outpatients*[2] (case/year)	117,490	146,900
Number of operations[*3] (case/year)	3,602	4,500
Number of emergency patients (case/year)	3,656	4,600

*1 Maternity ward is included in the target building components but the delivery room is not included, therefore the area will not be incorporated as one of the target sections.

*2 Outpatients: general outpatient, paediatric, obstetrics, surgery, orthopaedic, dental, ENT, diabetes, Gynaecology departments

*3 Dental operations are not included.

② Kabale RRH (target building components: OPD, operation theatre, casualty, maternity ward)

Index	Base Value (2011)	Target Value (2018) (3 years after project completion)
Number of outpatients*[4] (case/year)	112,990	141,200
Number of operations[*5] (case/year)	5,826	7,300
Number of emergency patients (case/year)	1,694	2,100
Number of deliveries (case/year)	5,817	7,300

*4 Outpatients: paediatrics, internal medicine, surgery, orthopaedics, Gynaecology departments

*5 Dental operations are not included.

③ Fort Portal RRH

Procurement of medical equipment is planned for the OPD, operation theatre, casualty and Obstetrics/Gynaecology Departments. However, the construction of facilities is not planned for this hospital, thus it would be difficult to set a specified increase in numbers for each department. Therefore, only the number of outpatients shall be set as the indicator.

Index	Base Value (2011)	Target Value (2018) (3 years after project completion)
Number of outpatients*6 (case/year)	142,867	178,600

*6 Outpatients: general outpatients, paediatric, internal medicine, surgery, orthopaedics, ophthalmology, ENT, dental, Obstetrics/Gynaecology departments

(2) Qualitative Effects

Qualitative effects expected by the Project are as follows.

a) Improvement of healthcare services in rural areas will increase satisfaction of hospital patients.

b) By improving the target hospitals, they will function effectively as the top referral hospitals in the regions, which will lead to the improvement of the referral system.

3-4-3 Conclusion

In conclusion, the validity of the Project to be implemented by grant aid of our country as well as the anticipated effectiveness of the Project will be high.

APPENDICES

Appendix 1　Member List of the Survey Team

Name	Specialty	Title / Organization
Mr. Hirofumi HOSHI	Leader	Chief Representative , JICA Uganda Office
Ms. Masumi OKAMOTO	Cooperation Planner	Health Division 1, Health Group 1, Human Development Department, JICA
Mr. Keiichi IDE	Project Manager / Architectural Planning	Yokogawa Architects & Engineers, Inc.
Mr. Makoto WADA	Construction Planning / Cost Estimation	Yokogawa Architects & Engineers, Inc.
Mr. Yasumichi DOI	Equipment Planning / Cost Planning	INTEM Consulting, Inc.

Appendix 2 Field Survey Schedule in Uganda

	Date	Day	JICA Officers		Consultant Members		
			Leader	Project Coordinator	Chief Consultant/ Architectural Planning	Construction Planning/Cost Estimation	Equipment Planning/Cost Estimation
			Hirofumi Hoshi, Mr.	Masumi Okamoto, Ms.	Keiichi Ide, Mr.	Makoto Wada, Mr.	Yasumichi Doi, Mr.
Survey Days			1	11	17	17	17
1	6/11	Tue			Narita -->		
2	6/12	Wed			Dubai --> Entebbe Meeting with JICA Uganda Office (w/ Ms. Clare)		
3	6/13	Thr			Courtesy call to Ministry of Health (MOH) / Discussions		
4	6/14	Fri			Visiting local general contractors, leading manufacturers of construction materials, etc. to ask for quotation		Visiting equipment distributors, etc. to ask for quotation
5	6/15	Sat			Visiting local general contractors, leading manufacturers of construction materials, etc. to ask for quotation		Visiting equipment distributors, etc. to ask for quotation
6	6/16	Sun			Kampala --> Hoima		
7	6/17	Mon		--> Kampala	Survey of Hoima RRH site Hoima --> Kampala		
8	6/18	Tue		Kampala --> Kabale (On its way, observation of Masaka RRH)			
9	6/19	Wed		Survey of Kabale RRH Site			
10	6/20	Thr		Kabale --> Fort Portal			
11	6/21	Fri		Survey of Fort Portal RRH Site			
12	6/22	Sat		Fort Portal --> Kampala (On its way, observation of Mubende RRH)			
13	6/23	Sun		Data filing / Preparation of draft MD			
14	6/24	Mon		AM: Collecting quotations from the local contractors, equipment suppliers and others PM: Discussion with MOH on draft MD, report the result of site surveys at 3 RRHs			
15	6/25	Tue		AM: Collecting quotations from the local contractors, equipment suppliers and others PM Discussion and signing of MD at MOH Report to Japanese Embassy			Accompanying Chief Consultant
16	6/26	Wed		Entebbe --> Dubai			
17	6/27	Thr		Dubai --> Narita			

Appendix 3　List of Parties Concerned in the Recipient Country

Name	Title, Position
Ministry of Health	
・Mr. S.S. Kyambadde	Acting Permanent Secretary
・Dr. Alidria Ezati Isaac	Director of Health Services
・Dr. Amandua Jacinto	Commissioner, Health Services
・Eng. S.S.B. Wanda	Assistant Commissioner, Health Infrastructure
・Eng. Paul Kaliba	Civil Engineer
・Eng. Mulepo Sitra	Equipment Engineer
Hoima Regional Referral Hospital	
・Dr. Francis W. Mulwanyi	Hospital Director
・Dr. Tom Ediamu	Deputy Director, Consultant, Paediatrician
・Sister Florence Acheng	Senior Principal Nursing Officer
Kabale Regional Referral Hospital	
・Dr. Waynyama John	Acting Hospital Director, Consultant Obstetrics / Gynaecology
・Mr. Tibemanya Davio	Senior Hospital Administrator
・Mr. Kisubi Joseph	Principal Hospital Administrator
・Mr. Tumwesigye Richard	Hospital Administrator
・Mr. Claver B. Maniragaba	Estates Manager
・Mr. Kalule Zephania	Workshop In-charge
Fort Portal Regional Referral Hospital	
・Dr. Kaliisa Kyebambe	Acting Hospital Director
・Mr. Kikwaya Alexander	Principal Hospital Administrator
・Mr. Nabaasa Penninah Mugizi	Senior Hospital Administrator
・Mr. Mulinda Paul	Hospital Administrator
・Ms. Katehangwa Deborah	Senior Nursing Officer
・Ms. Asio Lucy Betti	Senior Nursing Officer
・Mr. Mulungi Simon	Technician
Embassy of Japan	
・Mr. Kazuo Minagawa	Ambassador Extraordinary and Plenipotentiary

Appendix 4 Minutes of Discussions (M/D)

MINUTES OF DISCUSSIONS
ON PREPARATORY SURVEY 2
ON THE PROJECT FOR THE REHABILITAION OF HOSPITALS AND SUPPLY OF MEDICAL EQUIPMENT IN THE WESTERN REGION IN UGANDA
IN THE REPUBLIC OF UGANDA

Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a Preparatory Survey Team (Field Survey I) on the Project for the Rehabilitation of Hospitals and Supply of Medical Equipment in the Western Region in Uganda (hereinafter referred to as "the Project") to the Republic of Uganda (hereinafter referred to as "Uganda") from May to June 2011, a Preparatory Survey Team (Field Survey II) from July to August 2011, and a Draft Report Explanation Team in June 2012. Through discussions, field surveys, and technical examinations of the survey results in Japan, Uganda and JICA agreed on the scope of the Project.

In order to observe construction sites and collect the latest cost information for construction work and procurement of equipment, JICA sent to Uganda a Preparatory Survey 2 Team (hereinafter referred to as "the Team"), which is headed by Dr. Hirofumi Hoshi, Chief Representative, JICA Uganda Office, from 12th June to 26th June, 2013.

In the course of discussions, both parties confirmed the main items described in the attached sheets. The Team will proceed to carry out further work and prepare the Preparatory Survey Report 2.

Kampala, 25th June 2013

Dr. Hirofumi Hoshi
Leader
Preparatory Survey Team
Japan International Cooperation Agency

Mr. S.S.Kyambadde
Ag. Permanent Secretary
Ministry of Health
The Republic of Uganda

ATTACHMENT

1. Scope of Works

The Team conducted the Study in line with the scope of the Project agreed by the previous Preparatory Survey. Both sides confirmed that the major scope of the project had not changed since the submission of the Survey Report for the Project to the Government of Uganda in August 2012.

At the Explanation on Draft Report Survey, the Ugandan Side requested that new 200kVA pole transformers for the Project building at both Hoima RRH and Kabale RRH be included in the scope of the Japanese cooperation. Also, there was another request for solar heater system to save running cost. JICA confirmed the necessity and relevance of these requests and decided both transformer and solar heater system would be included in rehabilitation of the health facilities.

In this survey, Kabale RRH requested an ultra sound scanner instead of two operation tables supposed to be supplied in the latest plan. JICA ensured the necessity and relevance of the ultra sound scanner and the Ugandan side agreed that the Team would convey the request to Japan and consider this matter among the Japanese side.

2. Schedule of the Study

JICA will complete the final report and send it to the Government of Uganda by October 2013 after the estimation work in Japan. Final cost estimation of the Project will be described in the report. The Ugandan side understood that the Project cost estimation provided by the team was not final and was subject to change.

3. Confidentiality of the Project

Both sides confirmed that all information related to the Project including detailed specifications of equipment and other technical information shall not be released to any third parties before the signing of all the contract(s) for the Project.

4. Operation and Maintenance Cost

The Ugandan side agreed to secure and allocate necessary budget and staff for the proper and sustainable operation and maintenance of the facilities and the equipment to be provided under the Project. The Team requested that the Ugandan side should secure the budget under the fiscal year (FY) 2014 budget (from July 2014 to June 2015). The Ugandan side agreed to it.

5. Obligatory Works by the Ugandan side

Three Hospitals and the Team signed the memorandum described in Annex-1 to clarify discussed matters in this survey. The Ugandan side agreed to implement necessary infrastructure works and construction works indicated in the memorandum and the Inception Report attached as Annex-2.

Annex-1 Memorandum of Hoima RRH, Kabale RRH and Fort Portal RRH
Annex-2 Infrastructure and construction works by Japan side and the Uganda side
(the excerpt from the Inception Report)

END

Annex 1-①

Telegrams :
Telephone : 0465 - 40005 / 0465 - 40412/
0465 - 40122
Fax Line : 0465 - 40005
In any correspondence on
this matter please quote Ref. No.....

THE REPUBLIC OF UGANDA

Ministry of Health
HOIMA REGIONAL REFERRAL HOSPITAL
P.O. Box 5, Hoima - Uganda

MEMORUNDUM BETWEEN HOSPITAL MANAGEMENT AND THE JAPANESE SURVEY TEAM HELD ON 17TH JUNE 2013 AT HOIMA REGIONAL REFERRAL HOSPITAL

The Japanese survey team for the rehabilitation of Hoima Regional Referral Hospital explained the inception report and the hospital management fully understood.

1. It was observed that the site is unchanged
2. The construction design will remain the same
3. The hospital management submitted an answered questionnaire to the Japanese survey team
4. The hospital management had planned to procure physiotherapy and orthopeadic equipment this financial year 2012/13 but this has not been done because money was not released by Ministry of Finance.
5. The Japanese survey team confirmed the inventory list, according to the Inventory list the procurement of equipment plan will not change.
6. The hospital management sited shortage of hospital medical staff. The Japanese survey team promised to discuss allocation of staff to Hoima Regional Referral Hospital with the Ministry of Health.

Signed on the 17th day of June 2013

Dr. Mulwanyi Francis W.
Hospital Director
Hoima Regional Referral Hospital

Mr. Keiichi Ide
Project Manager
Survey Team

14

Annex 1 - ②

Tel. 0486 – 22006
Fax: 0486 – 22727
E. mail –hospitalkabale@yahoo.com

OFFICE OF THE HOSPITAL DIRECTOR,
KABALE REGIONAL REF. HOSPITAL,
P. O. BOX 7,
Kabale – Uganda.

Date: 19th June, 2013

THE REPUBLIC OF UGANDA

In any correspondence on.
This subject please quote No.

MEMORUNDUM BETWEEN HOSPITAL MANAGEMENT AND THE JAPANESE SURVEY TEAM HELD ON 19TH JUNE 2013 AT KABALE REGIONAL REFERRAL HOSPITAL

The Japanese Survey team for the rehabilitation of Kabale Regional Referral Hospital explained the inception report and the hospital management fully understood.

1. It was observed that the site is unchanged.
2. The construction design will remain the same.
3. The hospital management submitted an answered questionnaire to the Japanese survey team.
4. The hospital has been operating without ultra sound scan for more than a year. It is very difficult to provide quality care services without an ultra sound scan.
5. The Japanese survey team reviewed the inventory list and according to the list, the management of Kabale Hospital suggests that since the Ministry of Health procured operating tables for the Hospital, the Japanese Government is requested to procure one Ultra Sound Scanner in the project and Operating theatre tables reduced to one instead of three.
6. The hospital management sited shortage of hospital medical staff. The Japanese survey team promised to discuss allocation of staff to Kabale Regional Referral Hospital with the Ministry of Health.

Signed on the 19th day of June, 2013

DR. WANYAMA JOHN

HOSPITAL DIRECTOR
KABALE REGIONAL REFERRAL HOSPITAL

MR. KEIICHI Ide

PROJECT MANAGER
SURVEY TEAM

1/

Annex 1-③

TELEPHONES: GENERAL LINES : 22504
Medical Superintendent : 22651
Maternity Ward : 22105
Blood Bank : 22249
Fax: 0483-22250
0483-22636

THE REPUBLIC OF UGANDA

FORT PORTAL REFERRAL HOSPITAL
P.O.BOX 10
FORT PORTAL
UGANDA

21st June, 2013.

MEMORANDUM BETWEEN HOSPITAL MANAGEMENT AND THE JAPANESE SURVEY TEAM HELD ON 21ST JUNE, 2013 AT FORT PORTAL REGIONAL REFERRAL HOSPITAL

The Japanese survey team for the equipping of Fort Portal Regional referral Hospital explained the inception report and the hospital management fully understood.

1. **The Hospital Management submitted an answered questionnaire to the Japanese survey team.**
2. **The Japanese survey team confirmed the inventory list, according to the inventory list the procurement of equipment plan will not change.**
3. **The Hospital Management sited shortage of hospital medical staff. The Japanese survey team promised to discuss allocation of staff to Fort Portal Regional Referral Hospital with the Ministry of Health.**
4. **The Japanese Government will procure two Autoclaves. The Hospital Management will prepare 30 KVA electrical outlets for two autoclaves by June 2015.**

Signed on the 21st day of June, 2013.

For: DIRECTOR
FORT PORTAL REGIONAL
REFERRAL HOSPITAL
21 JUN 2013
P.O.BOX 10, FORT PORTAL

Dr. Kaliisa Kyebambe O.
For Hospital Director
Fort Portal Reg.Ref.Hospital

Mr. Keiichi Ide
Project Manager
Survey Team

Works of Ugandan Side and Japanese Side

Table-1 Works of Ugandan Side and Japanese Side (Hoima RRH)

Japanese Side Work	Ugandan Side Work
Construction Site	
	1. Securing of a plot for construction site 2. Site preparation, removal of the existing facilities, etc. 1) Demolition and removal of remaining existing facilities (OT, kitchen, container office, warehouse) 2) Cutting of trees in the site and removal of topsoil 3) Removal of the existing power cable, telephone cable, water supply pipe and wastewater pipe passing the site, and rerouting
External Work	
1. Road within the site	1. Roads outside the site 2. Planting in the site
Building Construction	
1. Construction of OPD Block, OT/Maternity Ward and Power Receiving Block	
Infrastructure Improvement	
1. Electric system 1) Installation of a 200kVA pole transformer for the target buildings and installation of trunk cables to the Power Receiving Block 2) Installation of a 50 kVA generator for emergency backup at OPD Block and OT/Maternity Ward	1. Electric system Power incoming installations up to the 200kVA pole transformer
2. Water supply Drawing a branch pipe from the existing water supply pipe after the existing meter to OPD Block and OT/Maternity Block	2. Water supply Connection to the main water supply pipe in the hospital premises
3. Wastewater 1) Installation of septic tank for OPD Block and OT/Maternity Block 2) Installation of a percolation sewerage pipe beyond the above septic tank	3. Wastewater
4. Telephone Installation of cable and handhole to OPD Block	4. Telephone Telephone wiring up to the MDF in OPD Block
Equipment, Furniture and Fixtures	
1. Provision and installation of medical equipment 2. Curtain rail 3. Installation of built-in furniture such as reception counters, bench seats in the waiting space	1. Purchase of bed side tables and mosquito nets and transfer of existing equipment 2. Curtain, venetian blind 3. Purchase of general furniture and transfer of existing furniture

Table-2 Works of Ugandan Side and Japanese Side (Kabale RRH)

Japanese Side Work	Ugandan Side Work
Construction Site	
	1. Securing of a plot for construction site 2. Site preparation, removal of the existing facilities, etc. 1) Demolition and removal of remaining existing facilities (OT, canteen, outpatient toilet, part of OPD) 2) Cutting of trees in the site and removal of topsoil 3) Removal of the existing power cable, telephone cable, water supply pipe and wastewater pipe passing the site, and rerouting
External Work	
1. Road within the site	1. Roads outside the site 2. Planting in the site
Building Construction	
1. Construction of OPD/Casualty Block and OT/Maternity Ward (Architectural work, electrical work, plumbing work, AC/ventilation work)	
Infrastructure Improvement	
1. Electric system 1) Installation of a 200kVA pole transformer for the target buildings and installation of trunk cables to the electrical room in OT/Maternity Ward 2) Piping and wiring between the existing generator (200kVA) the electrical room	1. Electric system Power incoming installations up to the 200kVA pole transformer
2. Water supply Drawing a branch pipe from the existing water supply pipe after the existing meter to water receiving tank adjacent to OPD/Casualty Block and OT/Maternity Ward	2. Water supply Connection to the main water supply pipe in the hospital premises
3. Wastewater Connection from the final pit outside OPD/Casualty Block and OT/Maternity Ward the existing sewerage pit	3. Wastewater
4. Telephone Installation of cable and handhole to OPD/Casualty Block	4. Telephone Telephone wiring up to the MDF in OPD/Casualty Block
Equipment, Furniture and Fixtures	
1. Provision and installation of medical equipment 2. Curtain rail 3. Installation of built-in furniture such as reception counters, bench seats in the waiting space	1. Purchase of bed side tables and mosquito nets and transfer of existing equipment 2. Curtain, venetian blind 3. Purchase of general furniture and transfer of existing furniture

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

Soft Component (Technical Assistance) Plan

August 2012

Consortium of

Yokogawa Architects & Engineers, Inc.

and INTEM Consulting, Inc.

Contents

1. Background of Soft Component

The Project for the Improvement of Health Facilities in Western Uganda (hereinafter called the Project) in the Republic of Uganda (hereinafter called Uganda) is to improve facilities and medical equipment in three regional referral hospitals in Western Uganda. Among the targeted hospitals, Hoima Regional Referral Hospital (hereinafter called "RRH") and Kabale RRH will be assisted through the construction of facilities and procurement of medical equipment, and Fort Portal RRH through the procurement of medical equipment.

Focusing on the improvement of healthcare service as a propriety area in the Health Sector Strategic and Investment Plan: (HSSIP,2010/11−2014/15), the government is deploying efforts for such improvement and conducting activities such as upgrade and expansion of facilities and medical equipment in health facilities across the country. At the same time, with the recognition that the improvement of the maintenance and management system for medical equipment is also important, they are improving the maintenance and management system for medical equipment in regional referral hospitals, e.g., expanding budget for maintenance and management of medical equipment in regional referral hospitals (2009/2010) and implementing Japanese technical cooperation project, "Project on Improvement of Health Service through Health Infrastructure Management" (hereinafter called the Technical Assistance Project).

However, they still do not have a high level of awareness or technique of maintenance and management at the field level, and there is a situation where improper use causes trouble and repair of faulty equipment, maintenance and management of equipment etc. are not sufficiently conducted. It is possible to establish a nationwide management system for medical equipment, as the targeted hospitals of the technical assistance are located all over the country, and also to provide training on how to maintain and manage general-purpose equipment. However, it is difficult to provide guidance on maintenance and management techniques and operational and clinical techniques for rather specialized equipment such as the medical equipment to be procured in the Project.

Therefore, we need to make sure that the targeted equipment will be kept in a decent state and utilized over a long period of time through the provision of technical training on how to maintain and manage the specific equipment procured in the Project.

It has been decided that the equipment plan of the Project will include somewhat advanced equipment for the departments deemed to have sufficient personnel who can utilize such equipment, e.g., those with experience in using such equipment. However, there are cases where such equipment is not owned as existing equipment, and not all the staff members, including non-core staff members (paramedical staff), are proficient in the use of such equipment. Therefore, we need to ensure that such more advanced equipment will be utilized more effectively through the provision of training on clinical knowledge and appropriate usage based on such knowledge.

Currently each department of the targeted hospitals owns a small-size sterilizer to sterilize instruments. In response to the request from the Ugandan side to establish Central Sterilization Supply Department (hereinafter referred to as CSSD) in time with the improvement of operation and emergency departments in the Project, we have considered the need and decided to include large high pressure steam sterilizers in the plan. As all the hospitals have extensive experience in using high pressure steam sterilizers, training

on basic usage etc. will not particularly be required. However, the concept of centralized control by a CSSD is not well established in the whole hospital, and we need to make sure that such equipment will be utilized more appropriately by clarifying the appropriate state of the CSSD of each hospital and providing technical training to improve the system of the hospital.

The purpose of the Project has been defined as, "In Western Uganda, by improving health infrastructure of the targeted hospitals, the health service delivery will be enforced." Achievement of the Project purpose to "improve healthcare service" will be more assured if such healthcare infrastructures as facilities and equipment are improved by the Project; technical training is provided through the plan and soft components; medical techniques and maintenance and management abilities are improved in the targeted hospitals; and the hospital systems are improved.

From such viewpoints, the Ugandan side requested the Japanese side to provide soft components.

2. Objective of Soft Component

2-1. Objective of Soft Component

Technical training will be provided to regional workshop technicians and health professionals (medical doctors, nurses, user trainers etc.) assigned to the hospitals of Hoima RRH, Kabale RRH and Fort Portal RRH, in the presence of the person in charge of the central workshop[1] assigned by the director of the Infrastructure Division, the Clinical Service Department, of the Ministry of Health (hereinafter called the Infrastructure Division of MOH). If the effect of the assistance of the plan continues, the achievement of the following three objectives can be expected.

I. Maintenance and management techniques for procured equipment will be improved and the equipment will be properly managed and operated over a long period of time.
II. Operational and clinical techniques for the effective use of procured equipment will be improved and hospital service will also be improved.
III. At each hospital, roles and functions of the CSSD will be clarified, the operation system will be improved, and prevention of hospital infections will be strengthened.

3. Output of Soft Component

The outputs to be achieved at the completion of soft components are as follows.

I Improvement of Maintenance and Management Techniques for Procured Equipment

The followings will be achieved through the provision of technical training to regional workshop technicians in charge of the targeted hospitals, and user trainers, nurses etc. assigned to the targeted hospitals.

I-① By confirming operation principles, purpose of use etc. of procured equipment and reorganizing and reviewing basic knowledge, such abilities will be better established.

I-② Methods of inspection and maintenance specifically for the procured equipment will be learned and a reasonable maintenance and management plan will be established with the existing system taken into consideration.

I-③ The level of troubleshooting techniques will be improved; e.g., accurate information can be provided to the central workshop or maintenance technicians of manufacturers while fault locations can be identified at the time of a failure.

[1] Workshop: Workshops are in charge of maintenance and management of all infrastructures including facilities and medical equipment at governmental healthcare facilities. There are eight workshops in the country. The capital, Kampala, is covered by the central workshop under the control of the Infrastructure Division of MOH, and the other seven areas are covered by regional workshops. A regional workshop is stationed at each of the target sites of the Project, the three RHHS, controlling maintenance and management of all the health facilities located in its service area. As the central workshop is considered as a referral center for regional workshops and plays such roles as getting a referral of equipment that cannot be repaired at a regional workshop, a nationwide maintenance and management system has been established.

II Improvement of Operational and Clinical Techniques for Effective Utilization of Procured Equipment

The followings will be achieved through the provision of technical training to the personnel (such as medical doctors and nurses) who will operate the procured equipment at the targeted hospitals.

II-① Knowledge about the functions and roles of the procured equipment will be organized.

II-② Appropriate handling techniques with the use of target equipment that are tailored to the situation of the patient will be learned.

III Clarification of Roles and Functions of the CSSD and Improvement of the Operation System

The followings will be achieved through the provision of technical training to such personnel as health professionals and regional workshop technicians concerned in the CSSDs of the targeted hospitals.

III-① An operation system for the CSSD deemed appropriate for each hospital will be organized and improved.

III-② Techniques for operation, maintenance and management of the procured equipment will be improved.

4. Method for Confirming the Degrees of Achievement of Outputs

Achievement of the soft components will be confirmed in the following manner.

Output		Method of Confirming Achievements
I Maintenance Technique	① Confirmation of basic knowledge of procured equipment	Level of understanding will be confirmed by carrying out technical assessment before and after the provision of technical training.
	② Acquirement of methods of daily and periodic maintenance of procured equipment	Manuals for procured equipment etc. will be added to the existing maintenance and management system.
	③ Improvement of failure diagnosis and handling techniques	Failure diagnosis manual etc. will be created.
II Clinical Technique	① Confirmation of functions and roles of procured equipment	Level of understanding will be confirmed by carrying out technical assessment before and after the provision of technical training.
	② Acquisition of appropriate handling techniques with the use of target equipment that are tailored to the situation of the patient	Level of understanding will be confirmed by carrying out technical assessment before and after the provision of technical training.
III CSSD	① Improvement of the system of CSSD	Opinions of hospital staff will be collected and an operation system chart will be created.
	② Improvement of operation and management techniques for procured equipment	Operation manual will be created.

5. Activities of Soft Component (Input Plan)

Activities to achieve each output (Input Plan) are as follows.

(1) Plan of Operation

Output		Plan of Operation	
		Lecturer	Outline of Training
I Maintenance technique	① Confirmation of basic knowledge of procured equipment	Consultant for equipment maintenance technique	Confirmation of operation principles, purpose of use etc., and reorganization and review of basic knowledge
	② Acquirement of methods of daily and periodic maintenance of procured equipment		Acquisition of methods of daily and periodic maintenance of procured equipment Development of a maintenance and management plan
	③ Improvement of failure diagnosis and handling techniques		Acquisition of troubleshooting techniques including identification of fault locations and handling techniques
II Clinical technique	① Confirmation of functions and roles of procured equipment	Consultant for clinical technique	Acquisition of knowledge such as operation principles of procured equipment
	② Acquisition of appropriate handling techniques with the use of target equipment that are tailored to the situation of the patient		Acquisition of patient handling and management methods suited to the condition of the patient
III CSSD	① Improvement of the system of CSSD	Consultant for equipment maintenance technique	Improvement of a suitable operation system of CSSD of each hospital
	② Improvement of operation and management techniques for procured equipment		Acquisition of operation techniques with the use of procured equipment

(2) Lecturers

Consultant for equipment maintenance technique: Japanese, 1 person

Consultant for clinical technique: Ugandan medical doctor, 1 person

Consultant for technical training planning: Japanese, 1 person

As elaborate preparations are required, such as development of a technical training plan, meetings with MOH, targeted hospitals, other related organizations etc., arrangement of venues, arrangement of transportation and scheduling, Consultant for “Technical Training Planning” shall be assigned to conduct such operations.

(3) (Proposed) Curricula

I. Training of Maintenance and Management Techniques

No.		Training Item	Output	Form	Trainee
Day 1	AM	Confirmation of basic knowledge such as operation principles and purpose of use of procured equipment	I-①	Lecture	Regional workshop technicians, user trainers and nurses
	PM	Clarification of daily and periodic maintenance methods	I-②	Lecture	
Day 2	AM	Anaesthesia machine	I-① I-③	Lecture Practical training	Ditto
	PM	Ventilators	I-① I-③	Lecture Practical training	
Day 3	AM	Endoscope and bronchoscope[*1]	I-① I-③	Lecture Practical training	Ditto
	PM	Portable monitor/ECG	I-① I-③	Lecture Practical training	
Day 4	AM	C-arm X-ray unit	I-① I-③	Lecture Practical training	Ditto
	PM	Ultrasonic tomographic equipment[*]	I-① I-③	Lecture Practical training	
Day 5	AM	Infusion pump/syringe pump[*2]	I-① I-③	Lecture Practical training	Ditto
	PM	Defibrillator	I-① I-③	Lecture Practical training	
Day 6	AM	Summary	I-①②③	Lecture	Ditto
	PM	Confirmation of assignment documents and level of settlement	I-①②③	Lecture	

* Bronchoscope[*1] will not be procured for Hoima RRH. Syringe pump[*2] will not be procured for Fort Portal RRH.

II. Training of Clinical Techniques

Day 1	AM	Confirmation of functions and roles of procured equipment	II-①	Lecture	Medical doctors and nurses
	PM	Confirmation of clerical knowledge concerning anaesthesia	II-②	Lecture	
Day 2	AM	Breath control method	II-②	Lecture	Ditto
	PM	Handling of ventilators	II-②	Practical training	
Day 3	AM	Infusion management method	II-②	Lecture	Ditto
	PM	Handling of syringe pump and infusion pump	II-②	Practical training	
Day 4	AM	Methods of general management and postoperative management of patients in severe condition	II-②	Lecture	Ditto
	PM	Handling of portable monitor/ECG	II-②	Practical training	
Day 5	AM	Method of patient management during operation	II-②	Lecture	Ditto
	PM	Handling of anaesthesia machine	II-②	Practical training	
Day 6	AM	Summary	II-①②	Lecture	Ditto
	PM	Confirmation of assignment documents and level of settlement	II-①②	Lecture	

III. Training of techniques for CSSD

Day 1	AM	Clarification of the concept of CSSD	III-①	Lecture	Hospital administrators, regional workshop technicians, user trainers and nurses
	PM	Operation methods of procured equipment	III-②	Practical training	Regional workshop technicians, user trainers and nurses

6. Method for Procuring Resources for the Implementation of Soft Component

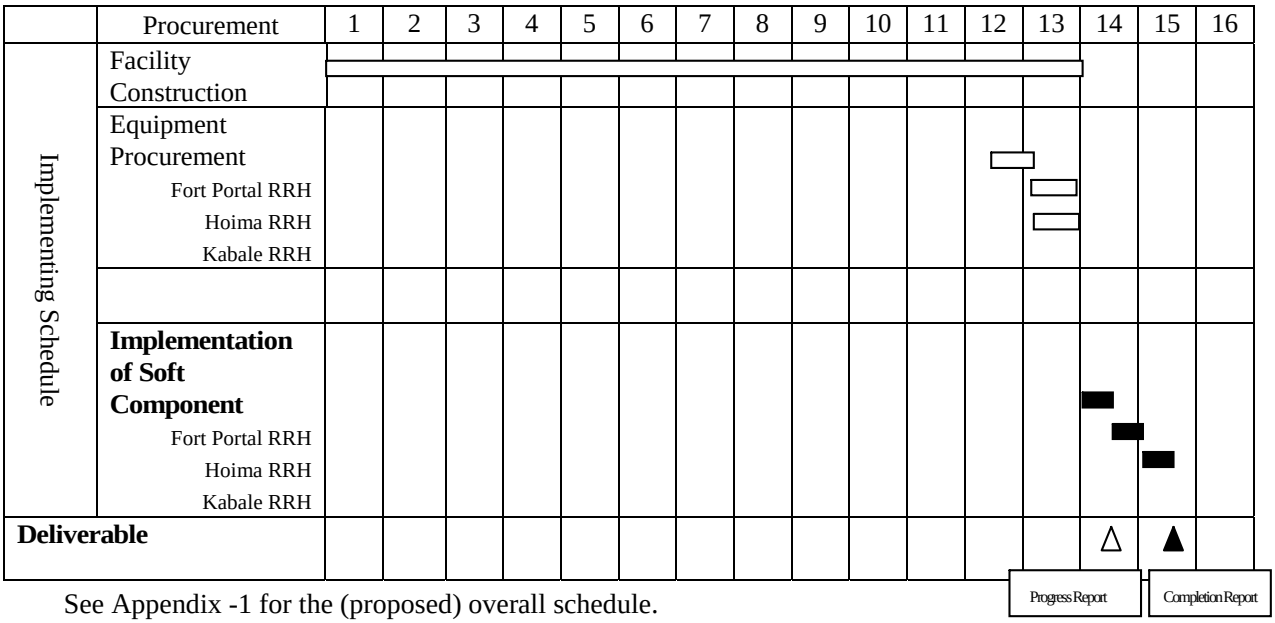
For the implementation of the soft components, Japanese consultants who have professional knowledge specifically in the equipment procured in the Project shall be in charge of "Training of Equipment Maintenance Techniques" and "Training of CSSD". Regarding "Clinical Training", as an expert with high-level techniques has been identified in Uganda, the Ugandan consultant with high-level techniques shall be hired and carry out clinical training to promote the continuing effort in the future.

The person in charge of technical training planning will check the contents of technical training, overall schedule etc., before the implementation of the soft components through consultation with the persons concerned in the plan in the Infrastructure Division of MOH, the central workshop, targeted hospitals, regional workshops etc.

7. Implementing Schedule of Soft Component

(Proposed) implementing schedule at this stage is as follows. The final implementing schedule will be determined after considering the requests from the Ugandan side with the Japanese consultant for equipment maintenance technique and the Ugandan consultant for clinical technique.

(Proposed) Overall Schedule



See Appendix -1 for the (proposed) overall schedule.

The implementation sites will be Fort Portal RRH, Hoima RRH and Kabale RRH, which are the targeted hospitals of the Project. Practical training shall be carried out with procured equipment immediately after the completion of the equipment procurement process in the grant aid.

8. Deliverable of Soft Component

Other than the completion report to the client and the Japanese side, the following documents will be the deliverables of the soft components.

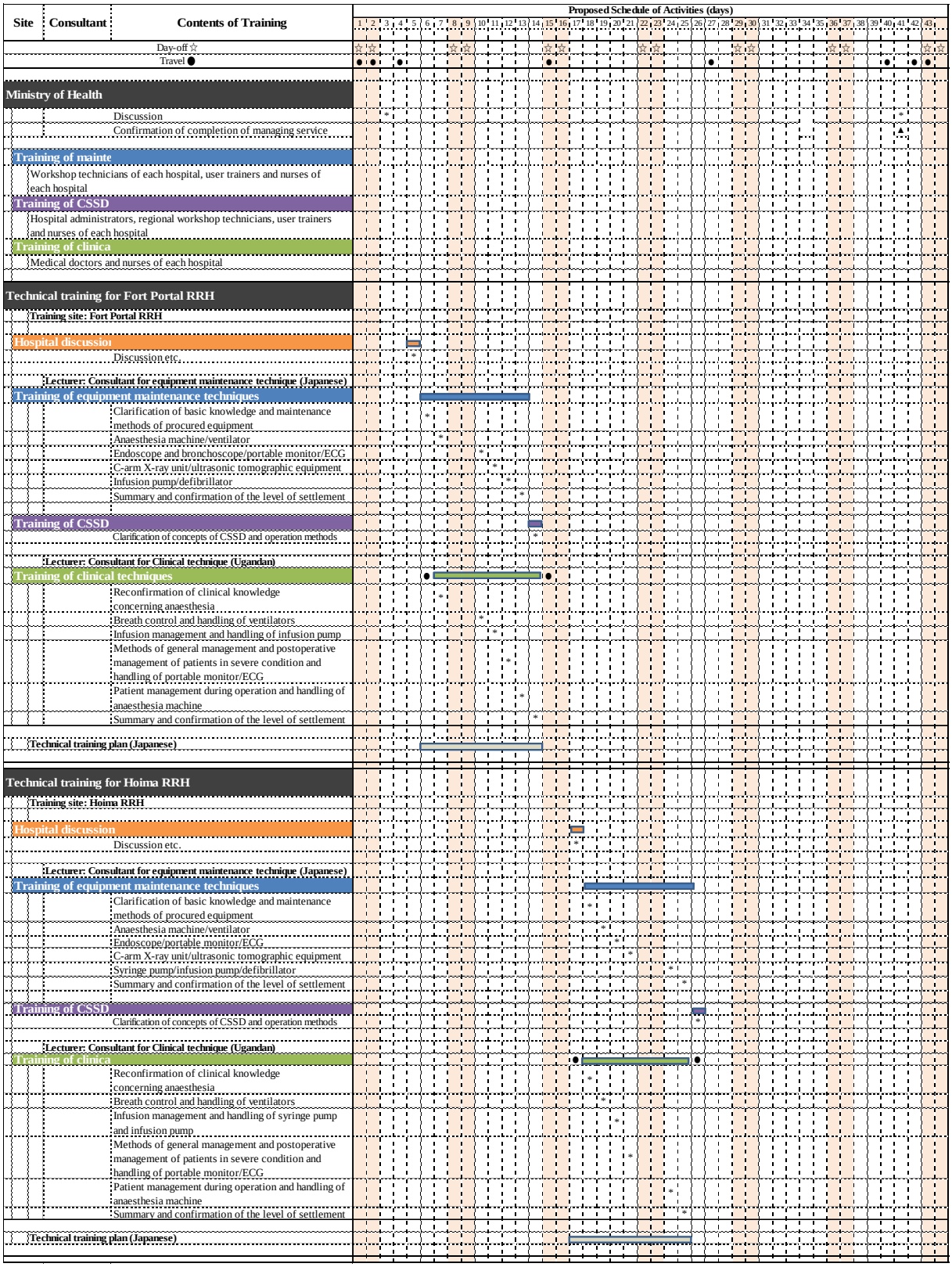
① Training materials

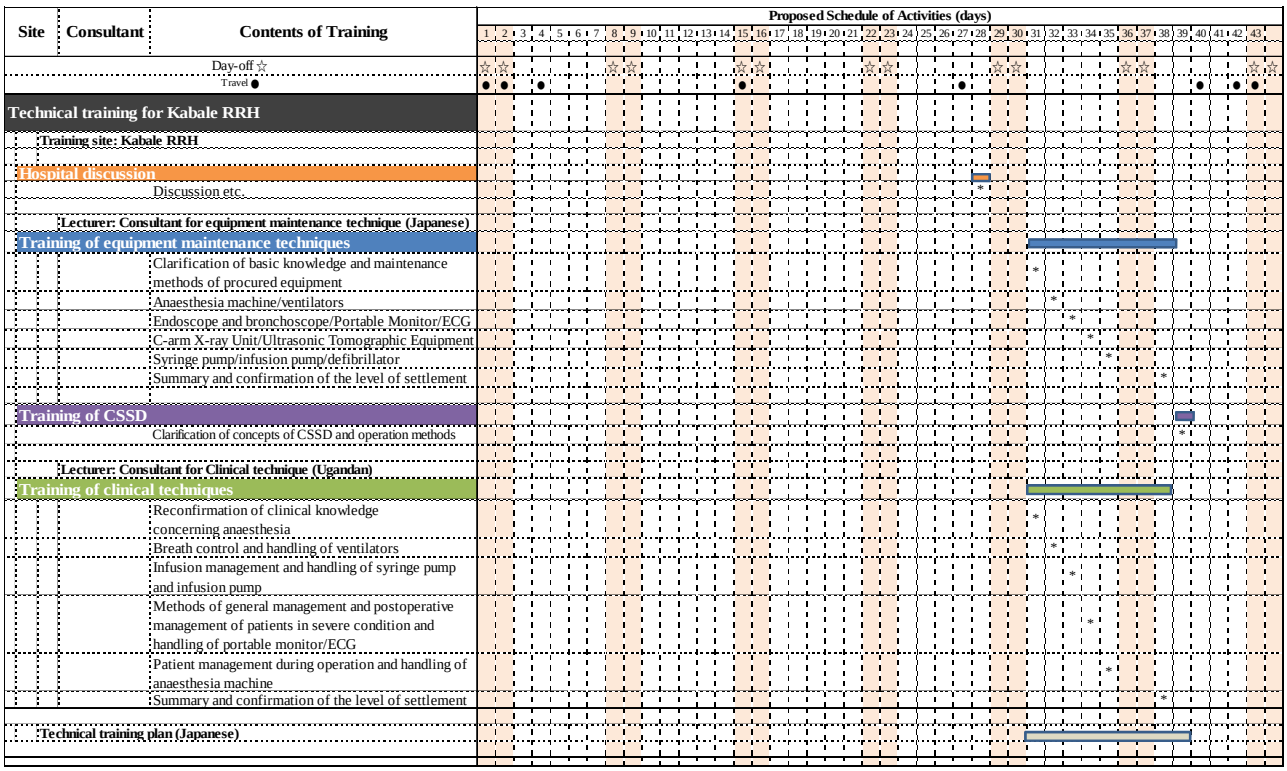
② Reports

9. Responsibility of Implementing Agencies of Recipient Country

Persons concerned in the plan in the Infrastructure Division of MOH, the central workshop, targeted hospitals, regional workshops etc. are required to select trainees and ensure they will participate in the technical training, as well as coordinating the schedule of the technical training and providing the venues. Persons in charge in the Infrastructure Division of MOH and targeted hospitals are also required to make efforts to retain the effect and improve techniques, such as participating in the training as needed, developing an operational system based on the acquired techniques so that procured equipment can be properly operated for a long time, and conducting similar training continuously.

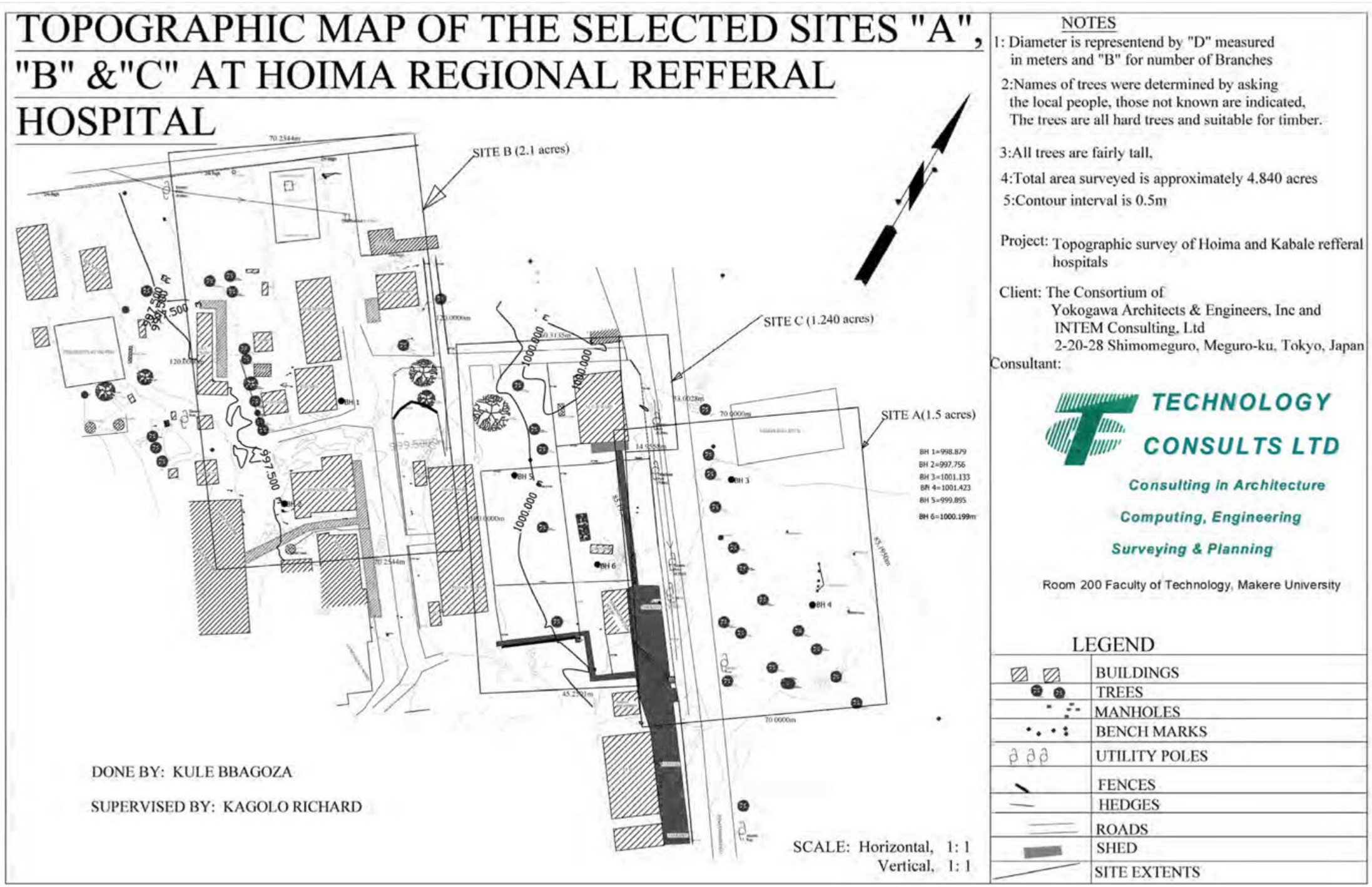
Appendix-1 (Proposed) Implementing Schedule



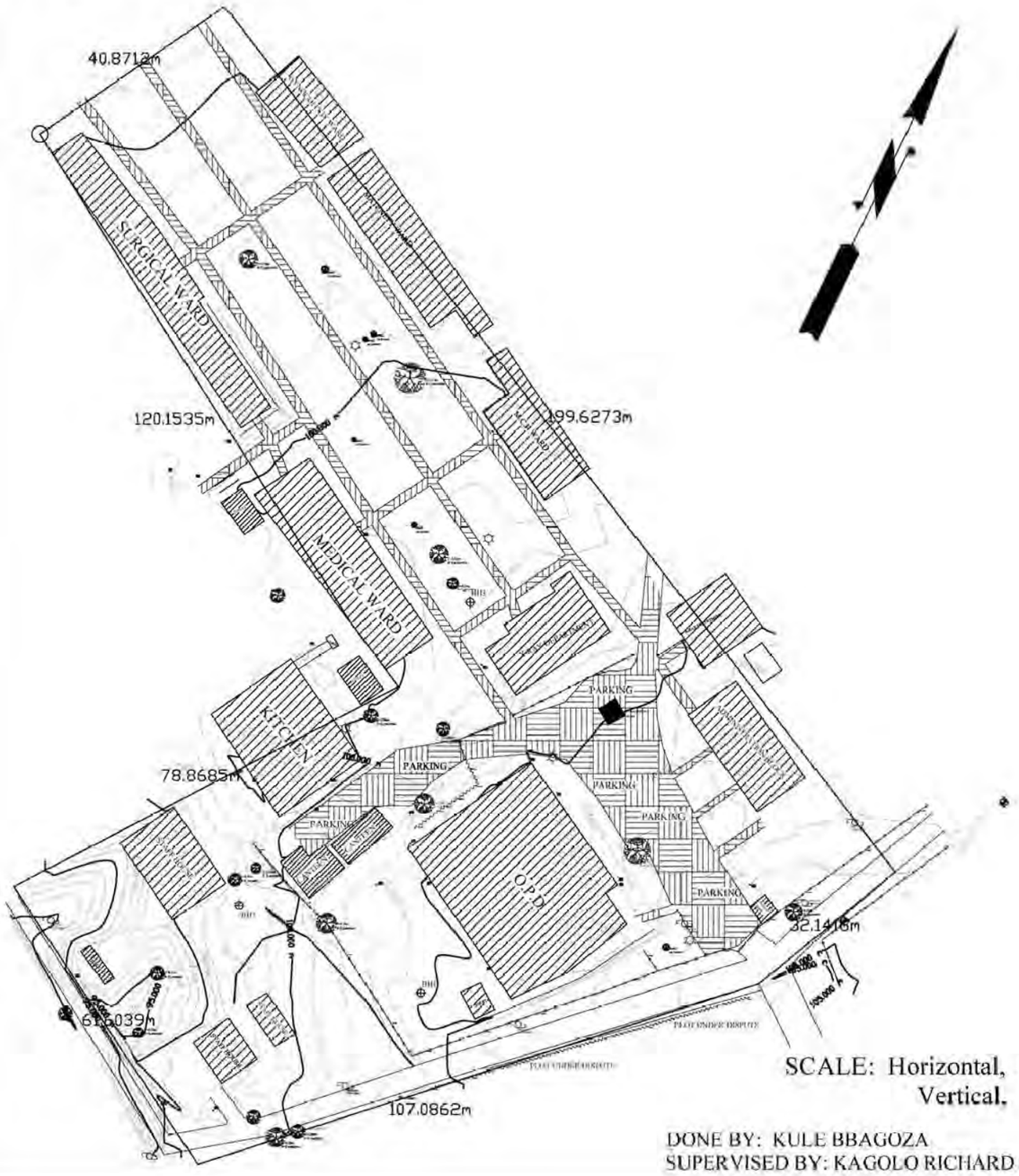

Site
Consultant
Contents of Training
Proposed Schedule of Activities (days)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43
Day-off ☆
Travel ●
Technical training for Kabale RRH
Training site: Kabale RRH
Hospital discussion
Discussion etc.
Lecturer: Consultant for equipment maintenance technique (Japanese)
Training of equipment maintenance techniques
Clarification of basic knowledge and maintenance methods of procured equipment
Anaesthesia machine/ventilators
Endoscope and bronchoscope/Portable Monitor/ECG
C-arm X-ray Unit/Ultrasonic Tomographic Equipment
Syringe pump/infusion pump/defibrillator
Summary and confirmation of the level of settlement
Training of CSSD
Clarification of concepts of CSSD and operation methods
Lecturer: Consultant for Clinical technique (Ugandan)
Training of clinical techniques
Reconfirmation of clinical knowledge concerning anaesthesia
Breath control and handling of ventilators
Infusion management and handling of syringe pump and infusion pump
Methods of general management and postoperative management of patients in severe condition and handling of portable monitor/ECG
Patient management during operation and handling of anaesthesia machine
Summary and confirmation of the level of settlement
Technical training plan (Japanese)

Appendix 6 References

6-1 Topographic Map



TOPOGRAPHIC MAP OF THE SELECTED SITE AT KABALE REGIONAL REFFERAL HOSPITAL



SCALE: Horizontal, 1: 1
Vertical, 1: 1

DONE BY: KULE BBAGOZA
SUPERVISED BY: KAGOLO RICHARD

NOTES

1. Diameter is representend by "D" measured in meters and "B" for number of Branches

2. Names of trees were determined by asking the local people, those not known are indicated. The trees are all hard trees and suitable for timber.

3. All trees are fairly tall.

4. Total area surveyed is approximately 3.731 acres

Project: Topographic survey of Hoima and Kabale refferal Hospitals

Client: The Consortium of
Yokogawa Architects & Engineers, Inc and
INTEM Consulting, Ltd
2-20-28 Shimomeguro, Meguro-ku, Tokyo, Japan

Consultant:

TECHNOLOGY CONSULTS LTD
Consulting in Architecture
Computing, Engineering
Surveying & Planning
Room 200 Faculty of Technology, Makere University

LEGEND

	BUILDINGS		
	TREES	⊕ BH1	BoreHole 1(102.4metres
	MANHOLES	⊕ BH2	BoreHole 2(99.2metres)
	BENCH MARKS	⊕ BH3	BoreHole 3(101.0metres
	FENCES		
	HEDGES		
	ROADS		
	UTILITY POLES		
	SITE EXTENTS		

Geotechnical Investigation Report for Sites in Hoima Regional Referral Hospital (HRRH)

The Consortium of Yokogawa Architects and Engineers Inc. and Intem Consulting Ltd.
JAPAN

M/s Technology Consults Ltd
KAMPALA, UGANDA.
P O Box 26690, Kampala (U)
Tel: +256-414-540618
Email: techcons@teco.co.ug

October 2011

3.3 RESULTS AND DISCUSSION

3.3.1 Summary of Field Inspection

The soil strata in the boreholes comprised of mainly silty clayey gravel from 0 – 1.0m and molten clayey silty rocky material between 1.0 – 12.5m as shown in the logs in the Attachments at the end of the report. Based on the SPT results, the soil characteristics have in the main been categorized as described in Table 3.2.

3.3.2 Evaluation of the Soil Bearing Capacity Based on SPT

The soil bearing capacity was evaluated using the SPT 'N' value method. The maximum pressures the soils are capable of resisting have been estimated from the field N-values using empirical relations. For purposes of computing the soil's bearing capacity, the following assumptions were made;

i. The Peck et al., (1967) relationship between N-values and unconfined compressive strength is valid.
ii. The maximum allowable settlement in non-cohesive soils is 25mm.
ii. The design N-values are derived from the statistical average of all values within a depth zone equal to the footing width below the founding depth.

Results of N-values and Levels of stiffness (consistency) are shown in Table 3.2. The bearing capacity evaluations were carried based on the SPT values and the results are given in Table 3.3. For cohesive soils, the relationship q_u = 13.27 x Design N-value is used for evaluation of the Unconfined Compressive Strength q_u, the cohesion $C_u = q_u/2$ and q_{ult} = 5.14 x Cu. q_{all} is evaluated using a factor of safety of 3. Allowable bearing capacity with settlement limited to approximately 25mm for cohesion less soils read off directly from the Chart (Published by Terzaghi and Peck, 1967); For high water table, the allowable bearing capacity should be halved or multiplied by a correction factor for the water table.

Table 3.2: SPT Values for Strata and Soils Description

Bore Hole No.	Sampling Level	Depth (m)	Range of SPT blows	Consistency	Soil Description (By Visual Inspection)
BH 1	I	1.0 – 1.5	5 – 12	Firm	Reddish brown clayey silt.
	II	2.0 – 2.5	11 – 34	Dense	Brownish Molted Clayey Silt.
	III	3.0 – 3.5	19 – 46	Very Hard	Grayish/Reddish brown Molted Clayey Silt.
	IV	4.5 – 5.0	28 - >50		Yellowish brown Molted Clayey Silty Rocky Material.
	V	6.0 – 6.5	20 – 50		
	VI	7.5 – 8.0	23 – 55		
	VII	9.0 – 9.5	34 - >50		Darkish brown molted rocky material.

Table 3.2: SPT Values for Strata and Soils Description (Continued)

Bore Hole No.	Sampling Level	Depth (m)	Range of SPT blows	Consistency	Soil Description (By Visual Inspection)
BH 2	I	1.0 – 1.5	21 – 52	Very Dense	Yellowish brown silty clayey gravel.
	II	2.0 – 2.5	8 – 14	Very Stiff	Yellowish brown clayey silt.
	III	3.0 – 3.5	11 – 31	Hard	Yellowish brown molted clayey silt.
	IV	4.5 – 5.0	16 – 38	Very Hard	Grayish brown molted clayey silt.
	V	6.0 – 6.5	15 – 36		
	VI	7.5 – 8.0	21 – 43		Cream clayey silt.
	VII	9.0 – 9.5	15 - 24	Hard	Brownish yellow clayey sandy silt.
	VIII	10.5 – 11.0	43 - >50	Very Hard	Brownish yellow molted clayey silt.
	IX	12.0 – 12.5	>50		Blackish/brownish yellow clayey silty rocky material.

Table 3.2: SPT Values for Strata and Soils Description (Continued)

Bore Hole No.	Sampling Level	Depth (m)	Range of SPT blows	Consistency	Soil Description (By Visual Inspection)
BH 5	I	1.0 – 1.5	5 – 8	Firm	Reddish brown silty clayey gravel.
	II	2.0 – 2.5	5 – 7	Firm	Yellowish/Reddish brown gravelly clayey silt.
	III	3.0 – 3.5	13 – 28	Hard	Brownish molted clayey silt with some stones.
	IV	4.5 – 5.0	24 – >50	Very Hard	Yellowish molted clayey silt.
	V	6.0 – 6.5	35 – >50		Yellowish grey molted silt.
	VI	7.5 – 8.0	10 – >50		Brownish molted clayey silt.
	VII	9.0 – 9.5	42 - >50		Darkish brown molted clayey silty rocky material.
	VIII	10.5 – 11.0	>50		
	IX	12.0 – 12.5	>50		

Table 3.2: SPT Values for Strata and Soils Description (Continued)

Bore Hole No.	Sampling Level	Depth (m)	Range of SPT blows	Consistency	Soil Description (By Visual Inspection)
BH 6	I	1.0 – 1.5	5 – 13	Firm	Yellowish brown sily clayey gravel.
	II	2.0 – 2.5	6 – 8	Firm	Yellowish/Reddish brown gravelly clayey silt.
	III	3.0 – 3.5	9 – 15	Very Stiff	Yellowish brown clayey silt.
	IV	4.5 – 5.0	16 – 40	Very Hard	Cream molted clayey silt.
	V	6.0 – 6.5	13 – 18	Hard	Yellowish brown clayey silt with some sands.
	VI	7.5 – 8.0	12 – 50	Very Hard	Black/Brownish grey clayey sandy silty rocky material.
	VII	9.0 – 9.5	43 –>50		Black/Brown clayey silt with rock particles rocky
	VIII	10.5 – 11.0	49 – >50		Brownish silt.
	IX	12.0 – 12.5	>50		Blackish/Grayish brown silty rocky material.

Table 3.3: EVALUATION OF BEARING CAPACITY BASED ON FIELD SPT VALUES

BH No.	Depth (m)	Predominant Soil Fraction	Measured SPT N-value N	Correction Factor C_N	Corrected SPT N-value $N_1 = C_N N$	Correction Factor for Water Table C_W	Unconfined Compressive Strength q_u (kPa)	Undrained Cohesion C_u (KPa)	Ultimate Bearing Capacity Q_{ult} (KPa)	Allowable Bearing Capacity read off from Chart Q_{all} (KPa)	Allow Bearing Capacity Q_{all} (KPa)
BH1	1.00	Reddish brown Clayey Silt.	17	2.93	50	1.15	660	330	1696	-	565
	2.00	Brownish Molted Clayey Silt.	55	2.07	114	0.93	1510	755	3880	-	1293
	3.00	Grayish/Reddish brown Molted Clayey Silt.	81	1.69	137	0.83	1815	908	4666	-	1555
	4.50	Yellowish brown Molted Clayey Silty Rocky Material.	>60	1.38		0.74				-	REFUSAL
	6.00	Yellowish Molted Clayey Silt.	83	1.19	99	0.69	1315	658	3381	-	1127
	7.50	Yellowish brown Molted Clayey Silty Rocky Material.	98	1.07	105	0.65	1389	695	3570	-	1190
	9.00	Darkish brown molted rocky material.	>60	0.98		0.63				-	REFUSAL

Table 3.3: EVALUATION OF BEARING CAPACITY BASED ON FIELD SPT VALUES (Continued

BH No.	Depth (m)	Predominant Soil Fraction	Measured SPT N-value N	Correction Factor C_N	Corrected SPT N-value $N_1 = C_N N$	Correction Factor for Water Table C_W	Unconfined Compressive Strength q_u (kPa)	Undrained Cohesion C_u (KPa)	Ultimate Bearing Capacity Q_{ult} (KPa)	Allowable Bearing Capacity read off from Chart Q_{all} (KPa)	Allowable Bearing Capacity Q_{all} (KPa)
BH2	1.00	Yellowish brown silty clayey gravel.	91	2.93	266	1.15	3533	1766	9079	-	3026
	2.00	Yellowish brown clayey silt.	24	2.07	50	0.93	659	329	1693	-	564
	3.00	Yellowish brown molted clayey silt.	50	1.69	84	0.83	1121	560	2880	-	960
	4.50	Grayish brown molted clayey silt.	64	1.38		0.74				-	REFUSAL
	6.00	Grayish brown molted clayey silt.	60	1.19	72	0.69	951	475	2444	-	815
	7.50	Cream clayey silt.	82	1.07	88	0.65	1162	581	2987	-	996
	9.00	Brownish yellow clayey sandy silt.	43	0.98	42	0.63	556	278	1430	-	477
	10.50	Brownish yellow molted clayey silt.	>60	0.90		0.61				-	REFUSAL
	12.00	Blackish/brownish yellow clayey silty rocky material.	>60	0.84		0.60				-	REFUSAL

Table 3.3: EVALUATION OF BEARING CAPACITY BASED ON FIELD SPT VALUES (Continued)

BH No.	Depth (m)	Predominant Soil Fraction	Measured SPT N-value N	Correction Factor C_N	Corrected SPT N-value $N_1 = C_N N$	Correction Factor for Water Table C_W	Unconfined Compressive Strength q_u (kPa)	Undrained Cohesion C_u (KPa)	Ultimate Bearing Capacity Q_{ult} (KPa)	Allowable Bearing Capacity read off from Chart Q_{all} (KPa)	Allowable Bearing Capacity Q_{all} (KPa)
BH5	1.00	Reddish brown silty clayey gravel.	15	2.93	44	0.90	582	291	1496	-	499
	2.00	Yellowish/Reddish brown gravelly clayey silt.	13	2.07	27	0.77	357	178	917	-	306
	3.00	Brownish molted clayey silt with some stones.	41	1.69	69	0.70	919	459	2362	-	787
	4.50	Yellowish molted clayey silt.	>60	1.38		0.65				-	REFUSAL
	6.00	Yellowish grey molted silt.	>60	1.19		0.61				-	REFUSAL
	7.50	Brownish molted clayey silt.	>60	1.07		0.59				-	REFUSAL
	9.00	Darkish brown molted clayey silty rocky material.	>60	0.98		0.58				-	REFUSAL
	10.50		>60	0.90		0.57				-	REFUSAL
	12.00		>60	0.84		0.56				-	REFUSAL

Table 3.3: EVALUATION OF BEARING CAPACITY BASED ON FIELD SPT VALUES (Continued)

BH No.	Depth (m)	Predominant Soil Fraction	Measured SPT N-value N	Correction Factor C_N	Corrected SPT N-value $N_1 = C_N N$	Correction Factor for Water Table C_W	Unconfined Compressive Strength q_u (kPa)	Undrained Cohesion C_u (KPa)	Ultimate Bearing Capacity Q_{ult} (KPa)	Allowable Bearing Capacity read off from Chart Q_{all} (KPa)	Allowable Bearing Capacity Q_{all} (KPa)
BH6	1.00	Yellowish brown sily clayey gravel.	23	2.93	67	0.90	893	446	2295	-	765
	2.00	Yellowish/Reddish brown gravelly clayey silt.	16	2.07	33	0.77	439	220	1129	-	376
	3.00	Yellowish brown clayey silt.	24	1.69	41	0.70	538	269	1382	-	461
	4.50	Cream molted clayey silt.	65	1.38	90	0.65	1189	595	3057	-	1019
	6.00	Yellowish brown clayey silt with some sands.	35	1.19	42	0.61	-	-	-	550	338
	7.50	Black/Brownish grey clayey sandy silty rocky material.	74	1.07	79	0.59	1049	524	2696	-	899
	9.00	Black/Brown clayey silt with rock particles rocky material.	>60	0.98		0.58				-	REFUSAL
	10.50	Brownish silt.	>60	0.90		0.57				-	REFUSAL
	12.00	Blackish/Grayish brown silty rocky material.	>60	0.84		0.56				-	REFUSAL

4. Conclusions

4.1 INTRODUCTION

This study was conducted during August and September in respect of testing suitability of a site in Hoima, to hold and suitably sustain loads that are to be imparted by storied structures to be built. The objective was to conduct a geotechnical investigation on the materials at the site.

Based on the findings from the study, the following were obtained:

1. The drilling was done and loggings that show the soil stratigraphy were determined and are given in the annex of the report.
2. Information on the water table level was obtained and given in the logging diagrams.
3. Bearing capacity of the soils was determined based on Field SPT values. In addition, information of the level of stiffness of the soil was determined and is given.
4. For the samples from various depths, the grain size distribution was obtained and showed the percentage of material that passes sieve number 200 which is an indicator of level of permeability and clay content in the soil.
5. The plasticity was also ascertained based on the PL and PI values followed by the Swell potential of the soils.
6. The natural moisture content (NMC) was obtained for all the samples as indicated in the results.
7. The Unconfined compressive strength was determined on remoulded samples and the results and also given.
8. As regards compressibility, the soil settlement variation with time and level of loading can be studied and ascertained from the Change in dial reading against log time plots given.

Client : **Contractor: TECO**

BORE HOLE RECORD

PROJECT	: **HOIMA HOSPITAL**	**BOREHOLE NO**	: **BH1** **DRILL POINT(DP1)**
LOCATION	: **BOMA GROUND**	**WATER TABLE**	: **6.5M**
ELEVATION	:	**TEST METHOD**	: **BS 5930: 1990**
COORDINATES	:	**DATE**	: **Start: 10/08/2011 & End: 11/08/2011**

Ground Water	Depth m	Description of the Strata	Legend	Level	Samples & Tests Depth (m)	Type	No	SPT Blows	SPT N	Remarks
	0.00	Darkish silty clayey gravel with roots.								
	0.50	Brown silty clayey gravel.		-0.50	0.50				–	
	1.00	Reddish brown clayey silt.		-1.00	1.00	D	1	5 5 12	**17**	
	1.50			-1.50	1.50					
	2.00	Brownish Molted Clayey Silt.		-2.00	2.00	D	2	11 21 34	**55**	
	2.50			-2.50	2.50					
	3.00	Grayish/Reddish brown Molted Clayey Silt.		-3.00	3.00	D	3	19 35 46	**81**	
	3.50			-3.50						
	4.00			-4.00	4.00					
	4.50	Yellowish brown Molted Clayey Silty Rocky Material.		-4.50	4.50	D	4	28 >50	**>60**	
	5.00			-5.00	5.00					
	5.50			-5.50						
	6.00			-6.00	6.00	D	5	20 33 50	**83**	
▼	6.50			-6.50	6.50					
	7.00			-7.00						
	7.50			-7.50	7.50	D	6	23 43 55	**98**	
	8.00			-8.00	8.00					
	8.50			-8.50	8.50					
	9.00	Darkish brown molted rocky material.		-9.00	9.00	D	7	34 >50	**>60**	
	9.50	Rock sample.		-9.50	9.50					
	10.00			-10.00	10.00					

▼ Ground Water Table

Sample Types

D : Disturbed sample

SPT: Standard Penetration Test

1) Ground water table (GWT) was encountered at 9.5m but not so much.

Logged By: Robinson Onen

Checked By:Nancy Kajwalo

Client : **Contractor: TECO** Sheet No:1 of 1

BORE HOLE RECORD

PROJECT : HOIMA HOSPITAL		BOREHOLE NO : BH2	DRILL POINT (DP2)
LOCATION : BOMA GROUND		WATER TABLE : 6.5 m	
ELEVATION : 1143 m		TEST METHOD : BS 5930: 1990	
COORDINATES : N01° 25.713' E031° 21.327'		DATE : Start: 09/08/2011 & End: 10/08/2011	

Ground Water	Depth m	Description of the Strata	Legend	Level	Depth (m)	Type	No	SPT Blows	SPT N
	0.00								
	0.50			1142.50	0.50				–
	1.00	Yellowish brown silty clayey gravel.		1142.00	1.00	D	1	21 39 52	**91**
	1.50			1141.50	1.50				
	2.00			1141.00	2.00	D	2	8 10 14	**24**
	2.50	Yellowish brown clayey silt.		1140.50	2.50				
	3.00			1140.00	3.00	D	3	11 19 31	**50**
	3.50	Yellowish brown molted clayey silt.		1139.50	3.50				
	4.00			1139.00					
	4.50			1138.50	4.50	D	4	16 26 38	**64**
	5.00			1138.00	5.00				
	5.50			1137.50	5.50				
	6.00	Grayish brown molted clayey silt.		1137.00	6.00	D	5	15 24 36	**60**
	6.50			1136.50	6.50				
	7.00			1136.00	7.00				
	7.50			1135.50	7.50	D	6	21 39 43	**82**
	8.00			#	8.00				
	8.50	Cream clayey silt.		1134.50	8.50				
	9.00			1134.00	9.00	D	7	15 19 24	**43**
	9.50			#	9.50				
	10.00	Brownish yellow clayey sandy silt.		1133.00	10.00				–
	10.50			1132.50	10.50	D	8	43 >50	**>60**
	11.00			1132.00	11.00				
	11.50	Brownish yellow molted clayey silt.		1131.50	11.50				
	12.00			1131.00	12.00				
	12.50	Blackish/brownish yellow clayey silty rocky material.		1130.50	12.50	D	9	>50	**>60**

Ground Water Table

Sample Types

D : Disturbed sample

SPT: Standard Penetration Test

1) Ground water table (GWT) encountered at 10.5m.

2) After 24hrs waater table rose up by 4.0m.

Logged By: Robinson Onen

Checked By:Nancy Kajwalo

Client : **Contractor:** TECO CONSULTANTS

BORE HOLE RECORD

PROJECT : HOIMA HOSPITAL		BOREHOLE NO : BH5	DRILL POINT (DP5)
LOCATION : HOIMA HOSPITAL		WATER TABLE : 4.0 m	
ELEVATION : 1143 m		TEST METHOD : BS 5930: 1990	
COORDINATES : N01° 25.702' E031° 21.286'		DATE : Start: 31/08/2011 & End: 1/09/2011	

Ground Water	Depth m	Description of the Strata	Legend	Level	Tests Depth (m)	Type	No	SPT Blows	N	Remarks
	0.00	Dark brown silty clayey gravel with vegetation roots.								Ground Water Table Sample Types D : Disturbed sample SPT: Standard Penetration Test
	0.50			1142.50	0.50					
	1.00	Reddish brown silty clayey gravel.		1142.00	1.00	D	1	5 8 7	15	
	1.50			1141.50	1.50					
	2.00	Yellowish/Reddish brown gravelly clayey silt.		1141.00	2.00	D	2	5 6 7	13	1) Ground water table (GWT) encountered at 7.5m.
	2.50			1140.50	2.50					
	3.00	Brownish molted clayey silt with some stones.		1140.00	3.00	D	3	19 28 13	41	2) After 48hrs waater table rose up to 4.0m.
	3.50			1139.50	3.50	U	1			
▼	4.00			1139.00						
	4.50	Yellowish molted clayey silt.		1138.50	4.50	D	4	24 >50	>60	
	5.00			1138.00	5.00					
	5.50			1137.50	5.50					
	6.00	Yellowish grey molted silt.		1137.00	6.00	D	5	35 >50	>60	
	6.50			1136.50	6.50					
	7.00			1136.00	7.00					
	7.50	Brownish molted clayey silt.		1135.50	7.50	D	6	10 40 >50	>60	
	8.00			1135.00	8.00					
	8.50			1134.50	8.50					
	9.00	Darkish brown molted clayey silty rocky material.		1134.00	9.00	D	7	42 >50	>60	
	9.50			1133.50	9.50					
	10.00			1133.00	10.00					
	10.50			1132.50	10.50	D	8	50 >50	>60	
	11.00			1132.00	11.00					
	11.50			1131.50	11.50					
	12.00			1131.00	12.00	D	9	>50	>60	
	12.50			1130.50	12.50					

Logged By: Robinson Onen

Checked By:Nancy Kajwalo

BORE HOLE RECORD

PROJECT : HOIMA HOSPITAL		BOREHOLE NO : BH6	DRILL POINT (DP6)
LOCATION : HOIMA HOSPITAL		WATER TABLE : 4.0 m	
ELEVATION : 1143 m		TEST METHOD : BS 5930: 1990	
COORDINATES : N01° 25.700' E031° 21.306'		DATE : Start: 02/09/2011 & End: 03/09/2011	

Ground Water	Depth m	Description of the Strata	Legend	Level	Tests Depth (m)	Type	No	SPT Blows	SPT N	Remarks
	0.00	Black top soil with vegetation roots.								
	0.50			1142.50	0.50					
	1.00	Yellowish brown sily clayey gravel.		1142.00	1.00	D	1	5 10 13	23	
	1.50			1141.50	1.50					
	2.00			1141.00	2.00	D	2	6 8 8	16	1) Ground water table (GWT) encountered at 7.5m.
	2.50	Yellowish/Reddish brown gravelly clayey silt.		1140.50	2.50					
	3.00			1140.00	3.00	D	3	12 9 15	24	2) After 48hrs waater table rose up to 4.0m.
	3.50	Yellowish brown clayey silt.		1139.50	3.50					
▼	4.00			1139.00		U	1			
	4.50			1138.50	4.50	D	4	16 25 40	65	
	5.00	Cream molted clayey silt.		1138.00	5.00					
	5.50			1137.50	5.50					
	6.00			1137.00	6.00	D	5	13 17 18	35	
	6.50	Yellowish brown clayey silt with some sands.		1136.50	6.50					
	7.00			1136.00	7.00					
	7.50			1135.50	7.50	D	6	12 24 50	74	
	8.00	Black/Brownish grey clayey sandy silty rocky material.		1135.00	8.00					
	8.50			1134.50	8.50					
	9.00			1134.00	9.00	D	7	43 >50	>60	
	9.50	Black/Brown clayey silt with rock particles rocky material.		1133.50	9.50					
	10.00			1133.00	10.00			–	–	
	10.50			1132.50	10.50	D	8	49 >50	>60	
	11.00	Brownish silt.		1132.00	11.00					
	11.50			1131.50	11.50					
	12.00			1131.00	12.00	D	9	>50	>60	
	12.50	Blackish/Grayish brown silty rocky material.		1130.50	12.50					

Ground Water Table

Sample Types

D : Disturbed sample

SPT: Standard Penetration Test

Geotechnical Investigation Report for Sites in Kabale Regional Referral Hospital (KRRH)

The Consortium of Yokohama Architects and Engineers Inc. and Intem Consulting Ltd.
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October 2011

3.3 RESULTS AND DISCUSSION

3.3.1 Summary of Field Inspections

The soil strata in the boreholes comprised of mainly silty clays from 0.5 up to 7.5 and whitish grey chalky material to weathering rock from 9.0 to 15m as shown in the logs in Appendix 2.

3.3.2 Evaluation of the Soil Bearing Capacity Based on SPT

The soil bearing capacity was evaluated using the SPT 'N' value method. The maximum pressures the soils are capable of resisting have been estimated from the field N-values using empirical relations. For purposes of computing the soil's bearing capacity, the following assumptions were made;

i. The Peck et al., (1967) relationship between N-values and unconfined compressive strength is valid.
ii. The maximum allowable settlement in non-cohesive soils is 25mm.
ii. The design N-values are derived from the statistical average of all values within a depth zone equal to the footing width below the founding depth.

Results of N-values and Levels of stiffness (consistency) are shown in Table 3.2. The bearing capacity evaluations were carried based on the SPT values and the results are given in Table 3.3. For cohesive soils, the relationship q_u = 13.27 x Design N-value is used for evaluation of the Unconfined Compressive Strength q_u, the cohesion $C_u = q_u/2$ and q_{ult} = 5.14 x Cu. q_{all} is evaluated using a factor of safety of 3. Allowable bearing capacity with settlement limited to approximately 25mm for cohesion less soils read off directly from the Chart (Published by Terzaghi and Peck, 1967); For high water table, the allowable bearing capacity should be halved or multiplied by a correction factor for the water table.

Table 3.2: SPT Values for Strata Soils

Bore Hole No.	Sampling Level	Depth (m)	Total SPT N-Values	Consistency	Soil Description (By Visual Inspection)
BH 1	I	1.0 - 1.5	14	Firm	Silty Clays
	II	2.0 - 2.5	16	Firm	
	III	3.0 - 3.5	18	Stiff	
	IV	4.5 - 5.0	27	Very Stiff	Silty Clays
	V	6.0 - 6.5	28	Very Stiff	
	VI	7.5 - 8.0	30	Hard	Gravelly Silty Clay
	VII	9.0 - 9.5	34	Hard	Lateritic Gravelly Clay

Bore Hole No.	Sampling Level	Depth (m)	Total SPT N-Values	Consistency	Soil Description (By Visual Inspection)
BH 2	I	1.0 - 1.5	17	Firm	Silty Clay
	II	2.0 - 2.5	22	Firm	
	III	3.0 - 3.5	25	Very Stiff	
	IV	4.5 - 5.0	29	Very Stiff	
	V	6.0 - 6.5	54	Very Hard	
	VI	7.5 - 8.0	58	Very Hard	Gravelly Silty Clay
	VII	9.0 - 9.5	62	Very Hard	Lateritic Gravelly Clay
BH3	I	1.0 - 1.5	>50	Very Hard	Silty Clayey Gravel
	II	2.0 - 2.5	>50		Silty Clayey Lateritic Gravel
	III	3.0 - 3.5	42	Hard	Gravelly Silty Clay
	IV	4.5 - 5.0	35		Silty Clay
	V	6.0 - 6.5	37		Silty Clayey Chalky material
	VI	7.5 - 8.0	>50	Very Hard	Gravelly Silty Clay
	VII	9.0 - 9.5	>50		Gravelly Clay (weathering rock).

TP no	Depth m	Predominant Soil Fraction	Total SPT N-Value	Unconfined Compressive Strength qu (kPa)	Undrained Cohesion Cu (kPa)	Ultimate bearing capacity (Kpa)	Allowable bearing capacity (Kpa)
BH1	1.0-1.5	Silty Clays	14.0	183.40	91.70	471.34	157.11
	2.0-2.5	Silty Clays	16.0	209.60	104.80	538.67	179.56
	3.0-3.5	Silty Clays	18.0	235.80	117.90	606.01	202.00
	4.5-5.5	Silty Clays	27.0	353.70	176.85	909.01	303.00
	6.0-6.5	Silty Clays	28.0	366.80	183.40	942.68	314.23
	7.5-9.0	Gravelly silty Clays	30.0	393.00	196.50	1010.01	336.67
	9.0-9.5	Gravelly silty Clays	34.0	445.40	222.70	1144.68	381.56
	15.5-16.0	Gravelly Chalky material	75.0	982.50	491.25	2525.03	841.68

TP no	Depth m	Predominant Soil Fraction	Total SPT N-Value	Unconfined Compressive Strength qu (kPa)	Undrained Cohesion Cu (kPa)	Ultimate bearing capacity (Kpa)	Allowable bearing capacity (Kpa)
BH2	1.0-1.5	Silty Clays	17.0	222.70	111.35	572.34	190.78
	2.0-2.5	Silty Clays	22.0	288.20	144.10	740.67	246.89
	3.0-3.5	Silty Clays	25.0	327.50	163.75	841.68	280.56
	4.5-5.5	Silty Clays	29.0	379.90	189.95	976.34	325.45
	6.0-6.5	Silty Clays	54.0	707.40	353.70	1818.02	606.01
	7.5-9.0	Gravelly silty Clays	58.0	759.80	379.90	1952.69	650.90
	9.0-9.5	Gravelly silty Clays	62.0	812.20	406.10	2087.35	695.78

TP no	Depth m	Predominant Soil Fraction	Total SPT N-Value	Unconfined Compressive Strength qu (kPa)	Undrained Cohesion Cu (kPa)	Ultimate bearing capacity (Kpa)	Allowable bearing capacity (Kpa)
BH3	1.0-1.5	Silty Clays	>50	_	**REFUSAL**		>700
	2.0-2.5	Silty Clays	>50	_	**REFUSAL**		>700
	3.0-3.5	Silty Clays	42.0	550.20	275.10	1414.01	471.34
	4.5-5.5	Silty Clays	35.0	458.50	229.25	1178.35	392.78
	6.0-6.5	Silty Clays	37.0	484.70	242.35	1245.68	415.23
	7.5-9.0	Gravelly silty Clays	>50	_	**REFUSAL**		>700
	9.0-9.5	Gravelly silty Clays	>50	_	**REFUSAL**		>700

4. Conclusions

4.1 INTRODUCTION

This study was conducted during August and September in respect of testing suitability of a site in Hoima, to hold and suitably sustain loads that are to be imparted by storied structures to be built. The objective was to conduct a geotechnical investigation on the materials at the site.

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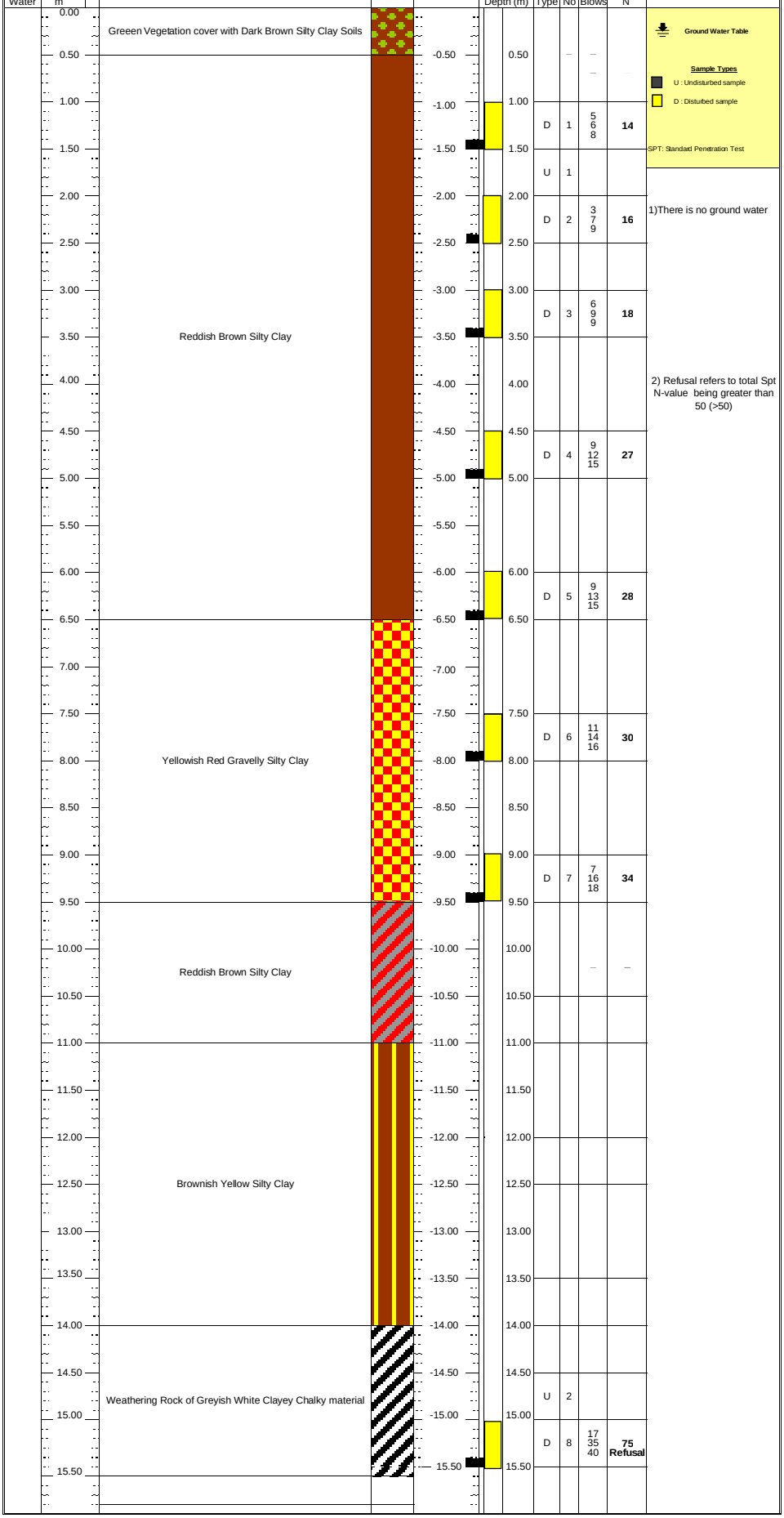
3. Bearing capacity of the soils was determined based on Field SPT values. In addition, information of the level of stiffness of the soil was determined and is given.
4. For the samples from various depths, the grain size distribution was obtained and showed the percentage of material that passes sieve number 200 which is an indicator of level of permeability and clay content in the soil.
5. The plasticity was also ascertained based on the PL and PI values followed by the Swell potential of the soils.
6. The natural moisture content (NMC) was obtained for all the samples as indicated in the results.
7. The Unconfined compressive strength was determined on remoulded samples and the results and also given.
8. As regards compressibility, the soil settlement variation with time and level of loading can be studied and ascertained from the Change in dial reading against log time plots given.

Client : YOKOHAMA **Contractor:** TECO

BORE HOLE RECORD

PROJECT	: KABALE HOSPITAL	**BOREHOLE NO**	: BH01
LOCATION	: KABALE.	**WATERTABLE**	: Nil
ELEVATION	:	**TEST METHOD**	: BS 5930: 1990
COORDNATES	:	**DATE**	: Start: 14/09/2011 & End: 15/09/2011



Logged By: Ivan Masuba

Checked By: Eng Remegie G.

Client : YOKOHAMA **Contractor:** TECO

BORE HOLE RECORD

PROJECT	: KABALE HOSPITAL	BOREHOLE NO	: BH02
LOCATION	: KABALE	WATER TABLE	: Nil
ELEVATION	:	TEST METHOD	: BS 5930: 1990
COORDINATES	:	DATE	: Start: 15/09/2011 & End: 15/09/2011

Ground Water	Depth m	Description of the Strata	Legend	Level	Samples & Tests Depth (m)	Type	No	SPT Blows	SPT N	Remarks
	0.00	Green vegetation cover with blackorganicsoils of Silty Clay								Ground Water Table Sample Types U : Undisturbed sample D : Disturbed sample SPT: Standard Penetration Test
	0.50			-0.50	0.50	–	–	–	–	
	1.00	Dark Brown Silty Clay		-1.00	1.00	D	1	7 8 9	17	
	1.50			-1.50	1.50					
	2.00	Brownish Red Silty Clay		-2.00	2.00	D	2	9 11 11	22	1) No ground want was encountered
	2.50			-2.50	2.50					
	3.00			-3.00	3.00	D	3	10 12 13	25	
	3.50			-3.50	3.50					
	4.00	Yellowish Red Silty Clay		-4.00	4.00					2) Refusal refers to total Spt N-value being greater than 50 (>50)
	4.50			-4.50	4.50	D	4	11 14 15	29	
	5.00			-5.00	5.00					
	5.50			-5.50	5.50					
	6.00			-6.00	6.00	D	5	12 19 35	54 Refusal	
	6.50	Yellowish Red Gravelly Silty Clay		-6.50	6.50					
	7.00			-7.00						
	7.50			-7.50	7.50	D	5	14 21 37	58 Refusal	
	8.00	Yellowish Red Lateratic Gravelly Clay		-8.00	8.00					
	8.50			-8.50	8.50					
	9.00			-9.00	9.00	D	6	15 23 39	62 Refusal	
	9.50	Greyish Yellow and Red Chalky Silty Clay material		-9.50	9.50					
	10.00			-10.00	10.00					
	10.50			-10.50	10.50					
	11.00			-11.00	11.00					
	11.50			-11.50	11.50					
	12.00			-12.00	12.00					
	12.50			-12.50	12.50					
	13.00			-13.00	13.00					
	13.50	Light Yellowish Grey Chalky Clay(weathering rock)		-13.50	13.50					
	14.00			-14.00	14.00					
	14.50			-14.50	14.50					
	15.00			-15.00	15.00					

Logged By: Ivan Masuba

Checked By: Eng Remegie G.

Client : YOKOHAMA **Contractor:** TECO

BORE HOLE RECORD

PROJECT	: KABALE HOSPITAL	BOREHOLE NO	: BH3
LOCATION	: KABALE	WATER TABLE	: Nil
ELEVATION	:	TEST METHOD	: BS 5930: 1990
COORDINATES	:	DATE	: Start: 16/09/2011 & End: 16/09/2011

Ground Water	Depth m	Description of the Strata	Legend	Level	Samples & Tests Depth (m)	Type	No	SPT Blows	SPT N	Remarks
	0.00	Vegetation cover with Dark Brown Silty Clay								Ground Water Table Sample Types U : Undisturbed sample D : Disturbed sample SPT: Standard Penetration Test
	0.50			-0.50	0.50			–	–	
	1.00	Brown Silty Clayey Gravel with some big boulders		-1.00	1.00	D	1	45 >50 >50	Refusal	
	1.50			-1.50	1.50					
	2.00	Yellowish Red Silty Clayey Lateratic Gravel		-2.00	2.00	D	2	46 55 >50	Refusal	1)There is no ground water
	2.50			-2.50	2.50					
	3.00	Yellowish Red Gravelly Silty Clay		-3.00	3.00	D	3	11 19 23	42	
	3.50			-3.50	3.50					
	4.00	Yellowish Red Silty Clay		-4.00	4.00					2)Refusal refers to total Spt N-value being greater than 50 (>50)
	4.50			-4.50	4.50	D	4	9 14 21	35	
	5.00			-5.00	5.00					
	5.50	Greyish red silty Clayey Chalky material(weathering rock)		-5.50						
	6.00			-6.00	6.00	D	4	10 15 22	37	
	6.50			-6.50	6.50					
	7.00			-7.00						
	7.50			-7.50	7.50	D	5	45 >50 >50	Refusal	
	8.00	Very hard surface of Greyish Red Gravelly Silty Clay		-8.00	8.00					
	8.50			-8.50	8.50					
	9.00			-9.00	9.00	D	6	50 >50 >50	Refusal	
	9.50			-9.50	9.50					
	10.00			-10.00	10.00			–	–	
	10.50	Very Hard weathering rock		-10.50	10.50					
	11.00			-11.00	11.00					
	11.50			-11.50	11.50					
	12.00			-12.00	12.00					
	12.50			-12.50	12.50					
	13.00			-13.00	13.00					
	13.50	Very Hard Rock bed was encountered		-13.50	13.50					
	14.00			-14.00	14.00					
	14.50			-14.50	14.50					
	15.00			-15.00	15.00					

Logged By: Ivan Masuba

Checked By: Eng Remegie G.