REPUBLIC OF UGANDA

MINISTRY OF HEALTH

PREPARATORY SURVEY REPORT
ON
THE PROJECT FOR IMPROVEMENT OF REGIONAL REFERRAL HOSPITALS IN NORTHERN UGANDA
IN
THE REPUBLIC OF UGANDA

OCTOBER 2017

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

YOKOGAWA ARCHITECTS & ENGINEERS, INC.
INTEM CONSULTING, INC.

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PREFACE

Japan International Cooperation Agency (JICA) decided to conduct the preparatory survey and entrust 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, 2017

Mitsuko Kumagai
Director General
Human Development Department
Japan International Cooperation Agency

SUMMARY

① Overview of the Country

The Republic of Uganda (hereinafter referred to as “Uganda”) is a landlocked country in eastern Africa, surrounded by the Republic of Kenya, the United Republic of Tanzania, the Republic of Rwanda, the Democratic Republic of the Congo, and the Republic of South Sudan. The country is approximately 241,000 km^2 (almost same size as Honshu Island of Japan) and has a population of approximately 41.48 million (World Bank, 2016). While classified as being in the savannah climate area, most of the country has an elevation of 1,000 to 1,200 m above sea level, and its average yearly temperature is around 21 °C to 25 °C, which makes the climate less harsh. Due to being directly below the Equator, the difference of temperature between summer and winter is quite subtle.

Even though its GDP growth is expected to be 5.1% in 2017 and 5.8% in 2018, the nominal GDP per capita still remains at as low level as US$ 615 (World Bank, 2016). The GDP composition ratio (2015) is 26.3% primary industry, 22.3% secondary industry, and 51.4% tertiary industry, where almost 80% of its labour population is dedicated to the agriculture sector.

② Background, History and Outline of the Project

The Ministry of Health (MOH) has been making efforts to achieve the Millennium Development Goals (MDGs) in the health sector from 2000 to 2015. Consequently, the under-five mortality rate has decreased to the MDGs target, and the infant mortality rate has decreased to almost that of the target. On the other hand, the maternal mortality ratio has not yet come close to the target level set in the MDGs (2015), and there are still many improvements to be made. Also, medical indices for Northern Uganda are still inferior to national averages.

In Uganda, the medical infrastructure facilities and equipment, the basis of satisfactory medical services, are insufficient. To meet these issues, the Government of Uganda (GOU) has, based on the Health Sector Development Plan (HSDP) 2015/16-2019/2020, promoted the establishment of the referral system [(National Referral Hospital (NRH) - Regional Referral Hospital (RRH) - General Hospital (GH) - Health Centre (HC)] through improvement of the functions of basic medical facilities, strengthening of the maintenance management systems, and improving the regional medical systems.

In Northern Uganda, further improvement and expansion of facilities and equipment is urgently required as the number of patients in each RRH is increasing. Acholi (Gulu), Lango (Lira), and West Nile (Arua) have suffered the most from the civil war that lasted for about 20 years, starting in the 1980s, and they now accept many refugees from neighbouring countries with unstable public security. Though Gulu, Lira, and Arua RRHs have been remodelled several times since they were constructed in the 1930s, their facilities are remarkably aged, suffering constant lack of necessary medical equipment for medical services. For this reason, it is urgent to improve the health service system in Northern Uganda through improvement of facilities and equipment at RRHs. Also, humanitarian needs

are an extremely high priority for rehabilitation of Northern Uganda and for refugee aid. In this regard, the necessity of the Project for Improvement of Regional Referral Hospitals in Northern Uganda, which will be based on the HSDP, is very high.

③ Outline of the Survey Results and Description of the Project

Under the circumstances mentioned above, the GOU requested a Grant Aid for the Project for Improvement of Regional Referral Hospitals in Northern Uganda in August 2011. Responding to the request from the GOU, the Government of Japan (GOJ) decided to conduct a preparatory survey, and the Japan International Cooperation Agency (JICA) dispatched a survey team in November 2016 and February 2017. During the two field surveys, the survey team examined the relevance and necessity of the requested facilities and equipment, evaluated their priorities, and gathered the data and information necessary for the review and analysis in Japan. Following the analysis in Japan and the explanatory mission of the Preparatory Survey Report (draft) in August 2017, the Preparatory Survey Report was compiled in October 2017.

The outline of the assistance components for the three RRHs is listed below.

Outline of the Assistance Components for Gulu RRH

Component		Description
Theatre/Casualty/ Maternity Ward	GF 1,208.89 m^2	OT: OT (3), Recovery room, Operation theatre, etc. Casualty: Resuscitation room, Minor operation room (1) etc. ICU: ICU, Anteroom, etc.
	1F 1,260.11 m^2	Maternity bed rooms (81 beds), NICU (2), Delivery room (5), etc.
Total	2,469.00 m^2	
Equipment		Ward: Dressing cart, Examination light, Nebulizer, etc. Central Clinical Dept.: Anaesthesia Machine, Ventilator, Autoclave (stand alone), Operating light (ceiling mount), etc. Imagery Dept.: Ultrasound machine (cardiac) Others: Ultrasonic therapy machine, Electric tools and supplies, etc.

Outline of the Assistance Components for Lira RRH

Component		Description
OPD/Casualty Block	GF 980.30 m^2	OPD: Laboratory, Pharmacy, Imagery, etc. Casualty: Resuscitation room, Minor operation room, etc. MCH: Clinic, Office, etc.
	1F 1,022.56 m^2	OPD: Clinics, Dental clinic, etc. MCH: Clinic, Vaccine store, etc.
Subtotal	2,002.86 m^2	
Power House	GF 17.31 m^2	Power house, Generator house
Delivery Suite	GF 278.98 m^2	Delivery room (6), NICU, etc.
Generator House	GF 13.78 m^2	Generator house
Total	2,312.93 m^2	
Equipment		Ward: Patient trolley, Weight scale, Wheel chairs, Pulse oximeter, etc. Central Clinical Dept.: Anaesthesia Machine, Infusion pump, Autoclave (Large), etc. Imagery Dept.: Fluoroscopy X-ray machine, General X-ray machine, Ultrasound machine (cardiac) Others: Rotor machine, Short wave diathermy, Ultrasonic therapy machine

Outline of the Assistance Components for Arua RRH

Component		Description
OPD/Casualty Block	GF 865.97 m^2	OPD: Laboratory, Pharmacy, Imagery, etc. Casualty: Resuscitation room, Minor operation room, etc.
	1F 897.20 m^2	OPD: general OPD Clinic, Dental clinic, Patient toilet, etc.
Subtotal	1,763.17 m^2	
Power House	GF 17.31 m^2	Power house, Generator house
Total	1,780.48 m^2	
Equipment		Ward: Suction machine (electrical), Patient trolley, Glucometer, Pulse oximeter, etc. Central Clinical Dept.: Anaesthesia Machine, Electric Surgical Unit, Autoclave (stand alone), Operating light (ceiling mount), etc. Imagery Dept. Fluoroscopy X-ray machine, Ultrasound machine (cardiac) Others: Refrigerator for drug, Short wave diathermy, Ultrasonic therapy machine

④ Project Schedule and Cost Estimation

The detailed design will take about four months, the tender procedure will take about four months, the construction works including procurement and installation of the equipment will take about 16 months at Gulu RRH, about 14 months at Lira RRH, and about 12 months at Arua RRH. The technical assistance on the operation and management of equipment (soft component) is expected to be held twice and will take about one month each, which will be carried out after the installation of equipment for the first session and in about six months after handover for the second session.

The total amount to be borne by Uganda for the Project is estimated as 35.2 million yen. In addition to the above expenses, the charges relevant to B/A and A/P and the cost for income and corporate taxes on the Japanese consultant, contractors, and sub-contractors will be necessary.

⑤ Project Evaluation

The relevance of the Project is confirmed in respect of the following:

(1) Relevance

- The population covered by the project is as large as 6.84 million (2.39 million for Gulu RRH, 2.31 million for Lira RRH and 2.14 million for Arua RRH) based on the population estimate in 2016. In addition to the beneficiary population, the Project is also expected to benefit the Internally Displaced Persons and refugees from the Republic of South Sudan and the Democratic Republic of the Congo.
- The Project will contribute to the achievement of the goals set in the National Development Plan II (NDP II) and HSDP.
- The policy of the Project is in line with the Japanese Country Assistance Policy for the Republic of Uganda, and fits the humanitarian needs of the rehabilitation of Northern Uganda and the support of refugees from its neighbouring countries.
- The Project aims at securing the satisfactory health of residents of Northern Uganda and solving the existing disparity between regions through amelioration of accessibility and quality of medical services in Northern Uganda, which accordingly will contribute to achievement of the goals set in the Sustainable Development Goals (SDGs), and the achievement of Universal Health Coverage (UHC), which is a trend in the global health, in Uganda.

(2) Effectiveness

The following 1) Quantitative Effects and 2) Qualitative Effects are expected by the implementation of the Project.

1) Quantitative Effects

Quantitative Effects expected by the Project are as follows.

The average values of each RRH are calculated with data from 2011/12 to 2015/16, which is set as the baseline. The target value is set in 2022/23, three years after the completion of the Project, in consideration of the population increases, etc. in the target areas.

a) Gulu RRH (target departments: OT, Casualty, ICU, Maternity)

Indicator	Baseline (Average number in 2011/12-2015/16)	Target (2022/23) (3 years after project completion)
Number of Operations (cases/year)	1,543	1,800
Number of Emergency Patients (persons/year)	5,445	6,300
Number of ICU Patients (persons/year)	-	200
Number of Deliveries (cases/year)	4,768	5,500

b) RRH (target departments: OPD, MCH, Casualty, Maternity)

Indicator	Baseline (Average number in 2011/12-2015/16)	Target (2022/23) (3 years after project completion)
Number of Outpatients*1 (persons/year)	121,345	144,000
Number of MCH Patients*2 (persons/year)	67,736	80,400
Number of Emergency Patients (persons/year)	4,800	5,400
Number of Deliveries (cases/year)	5,804	6,800

*1: This number consists of the patients of General OPD clinic, Orthopaedics clinic, Ophthalmology clinic, ENT clinic, and Dental clinic.

*2: This number consists of the patients of Maternity care, Family planning, Cancer check-up, Perinatal HIV transmission prevention pack, early childhood diagnosis, and Vaccination.

c) Arua RRH (target departments: OPD, Casualty)

Indicator	Baseline (Average number in 2011/12-2015/16)	Target (2022/23) (3 years after project completion)
Number of Outpatients*3 (persons/year)	96,208	116,000
Number of Emergency Patients (persons/year)	5,315	6,400

*3: This number consists of the patients of General OPD clinic, Medical OPD clinic, Diabetes clinic, Nutrition clinic, Palliative care clinic, Paediatric clinic, Surgery clinic, Orthopaedics clinic, Ophthalmology clinic, ENT clinic, Dental clinic, and Maternity clinic.

2) Qualitative Effects

Qualitative effects expected by the Project are as follows.

a) Through strengthening functions of the three RRHs as the top referral hospitals in each sub-region, the access to and quality of health care service in Northern Uganda will be improved.
b) Through construction of facilities and procurement of equipment, inconveniences such as congestion and sanitation will be improved, thereby increasing credibility and satisfaction with the hospitals among those in Northern Uganda, including refugees.

In conclusion, as described above, the relevance of the Project as well as its anticipated effectiveness is high.

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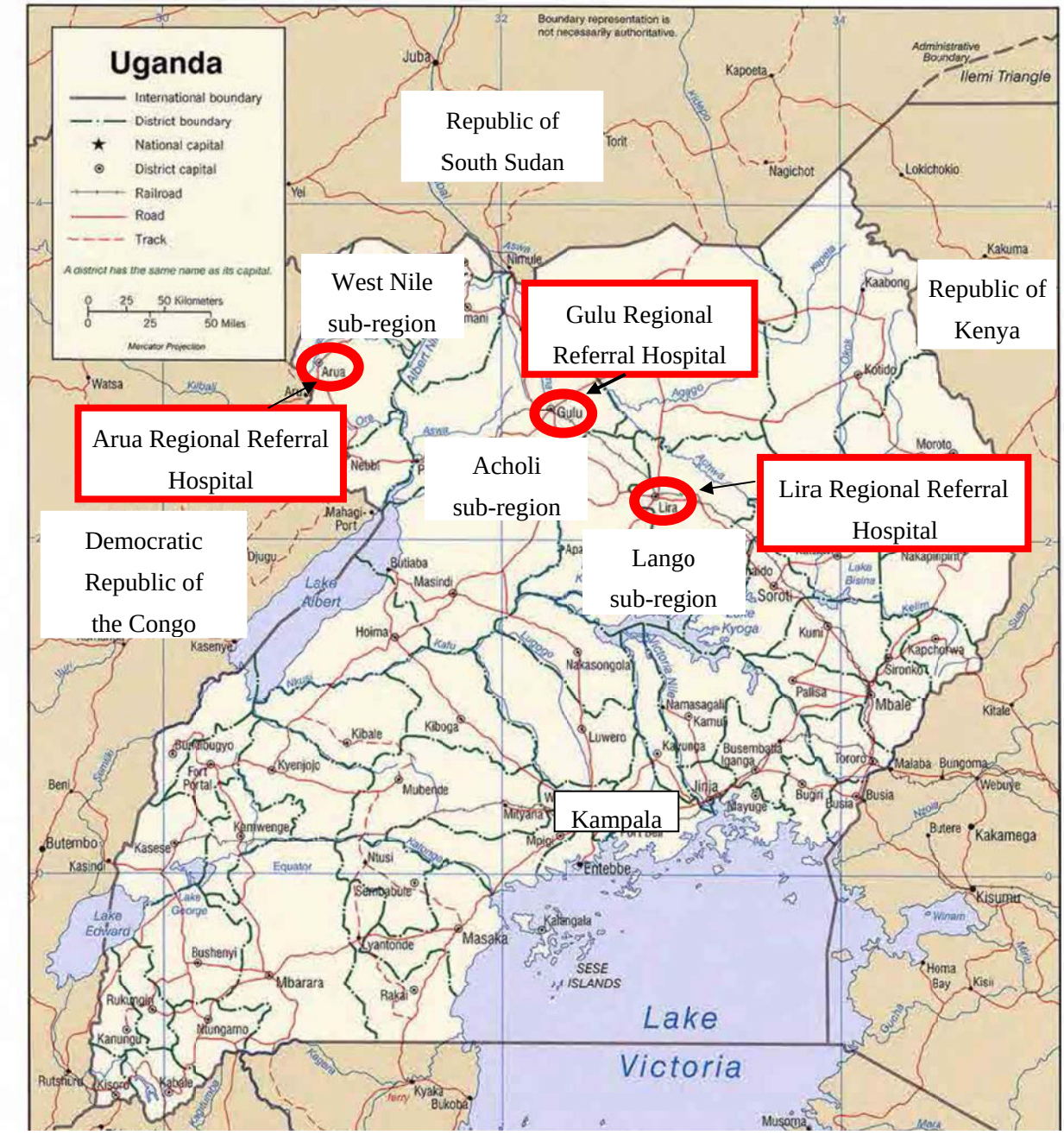
APPENDICES

MAP


Uganda
International boundary
District boundary
National capital
District capital
Railroad
Road
Track
A district has the same name as its capital.
0 25 50 Kilometers
0 25 50 Miles
Mercator Projection
Boundary representation is not necessarily authoritative.
Administrative Boundary
Ilemi Triangle
Republic of South Sudan
Republic of Kenya
Democratic Republic of the Congo
West Nile sub-region
Acholi sub-region
Lango sub-region
Gulu Regional Referral Hospital
Arua Regional Referral Hospital
Lira Regional Referral Hospital
Kampala
Juba
Kapoeta
Torit
Nagichot
Lokichokio
Yei
Nimule
Kakuma
Kaabong
Kotido
Moroto
Arua
Gulu
Lira
Watsa
Nebbi
Mahagi-Port
Djugu
Butiaba
Masindi
Lake Albert
Hoima
Kasenye
Soroti
Kumi
Kapchorwa
Sironko
Pallisa
Mbale
Kitale
Nakasongola
Luwero
Namasagali
Kamuli
Kibale
Kiboga
Kyenjojo
Fort Portal
Mubende
Kamwenge
Kasese
Butembo
Kasindi
Beni
Equator
Ntusi
Sembabule
Entebbe
Mityana
Mpigi
Jinja
Iganga
Busembatia
Kayunga
Bugiri
Busia
Tororo
Malaba
Bungoma
Webuye
Butere
Kakamega
Kisumu
Lake George
Lake Edward
Bushenyi
Ibanda
Mbarara
Rakai
Lyantonde
Masaka
Kalangala
SESE ISLANDS
Lake Victoria
Rukungiri
Ntungamo
Kanungu
Rutshuru
Kisoro
Kabale
Kyaka
Bukoba
Musoma
Homa Bay
Kisii

PERSPECTIVE VIEW

PERSPECTIVE RENDERING - DELIVERY SUITE

PERSPECTIVE RENDERING - OPD / CASUALTY BLOCK

THE PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF REGIONAL REFERRAL HOSPITALS IN NORTHERN UGANDA

LIRA REGIONAL REFERRAL HOSPITAL

PERSPECTIVE RENDERING - OPD / CASUALTY BLOCK

LIST OF FIGURES AND TABLES

ABBREVIATIONS

Abbreviations	English
A/P	Authorisation to Pay
ART	Antiretroviral Therapy
AVR	Automatic Voltage Regulator
B/A	Banking Arrangement
CDF	Capital Development Fund
CEmOC	Comprehensive Emergency Obstetric Care
CPAP	Continuous Positive Airway Pressure
CR System	Computed Radiography System
DAC	Development Assistance Committee
E/N	Exchange of Notes
ENT	Eye Nose and Throat
G/A	Grant Agreement
GDP	Gross Domestic Product
GF	Ground Floor
GH	General Hospital
GHI	Global Health Initiative
GOJ	Government of Japan
GOU	Government of Uganda
HC	Health Centre
HCII	Health Centre Grade II
HCIII	Health Centre Grade III
HCIV	Health Centre Grade IV
HSDP	Health Sector Development Plan
HSSIP	Health Sector Strategic and Investment Plan
ICU	Intensive Care Unit
IDPs	Internally Displaced Persons

JICA	Japan International Cooperation Agency
JIS	Japan Industrial Standards
MCH	Maternal and Child Health
M/D	Minutes of Discussions
MDGs	Millennium Development Goals
MMR	Maternal Mortality Ratio
MoFPED	Ministry of Finance, Planning and Economic Development
MOFA	Ministry of Foreign Affairs
MOH	Ministry of Health
NDPII	Second National Development Plan
NGO	Non-Governmental Organisations
NICU	Neonatal Intensive Care Unit
NMEP	National Medical Equipment Policy
NRH	National Referral Hospital
NWSC	National Water and Sewerage Corporation
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
RC	Reinforced Concrete
RRH	Regional Referral Hospital
SDGs	Sustainable Development Goals
UHC	Universal Health Coverage
UNABCEC	Uganda National Association of Building and Civil Engineering Contractors
UNHCR	United Nations High Commissioner for Refugees
UPS	Uninterruptible Power Supply
URA	Uganda Revenue Authority
UShs	Ugandan Shilling(s)
VAT	Value Added Tax
WHO	World Health Organization

CHAPTER 1 Background of the Project

1-1 Background, History and Outline of the Requested Japanese Grant Aid Project

The infant mortality rate and, under-five mortality rate are higher than the national average in Northern Uganda, which need to be improved. Development of health infrastructure claimed as the most important task of the "Health Sector Development Plan" (HSDP) (from 2015/16 to 2019/20) needs to be implemented accordingly.

Through the improvement of facilities and equipment in line with the principle of Uganda, the projects for the rehabilitation of hospitals and supply of medical equipment were successively implemented as Japanese Grant Aid projects in the Eastern region in 2006-2007, the Central region in 2010-2012 and the Western region in 2014-2015.

Under such circumstances, the Government of Uganda (GOU) requested in 2011 a grant aid for rehabilitation of three Regional Referral Hospitals (RRHs) in Northern Uganda following the project in Western Uganda. This request aims at enforcement of regional referral system by strengthening hospital functionality and improving medical service through upgrade of facilities and equipment at the three RRHs.

The outline of the request is given in Table 2-4.

Responding to the request from the GOU, the Government of Japan (GOJ) decided to conduct a preparatory survey and the Japan International Cooperation Agency (JICA) dispatched the team for the first preparatory survey (Field Survey 1) in November 2016. The survey team confirmed the requested contents and examined their relevance and necessity. The GOU and the survey team discussed and concluded the priority of facilities of the request.

Priorities of medical equipment in each department were submitted. Almost all of the departments in the three target RRHs had some requests and through the surveys at each hospital it was verified that the hospitals are in short of the equipment.

After the review and analysis in Japan of Field survey 1, JICA sent a team for Field Survey 2 in February 2017. The survey team discussed the draft facility plan and equipment plan considered in Analysis 1 in Japan and then gathered necessary references and visited relevant institutions to determine adequate outline design.

Following Analysis 2 in Japan and explanatory mission of the Preparatory Survey Report (draft) in August 2017, the Preparatory Survey Report was compiled in October 2017.

1-2 Natural Conditions

(1) Survey of Natural Conditions

1) Topographic Survey

The parts of land which are considered as candidate premises of the facility construction of the Project in each RRH according to the result of the field survey 1 and analysis in Japan were topographically analysed in field survey 2 by a consigned domestic company with theodolite.

Each site was found out with height gaps of about 0.5 to 1.0 m around the planned building areas. The topographic maps of the sites of the three RRHs made by the consigned company are attached in Appendix 7.

2) Geotechnical Investigation

Likewise as the topographic survey, the parts of land considered as candidate construction sites in each RRH were geotechnically investigated by a consigned domestic company in 3 points in Gulu and Arua and 4 points in Lira through boring survey, standard penetration test and soil test.

It is confirmed that there is enough bearing strength in each construction sites in depth 1.5-2.2 m, with data for Gulu RRH the N figure of around 50 in depth 1.0-1.45 m, for Lira RRH the N figure of around 30 in depth 2.75-3.2 m and for Arua RRH the N figure of around 20 in depth 1.0-1.45 m.

The Geotechnical Investigation Report of the construction sites of the three RRHs is attached in Appendix 7.

3) Underground Obstacles Investigation

Likewise as the topographic survey and geotechnical investigation, the parts of land considered as candidate construction sites in each RRH were dug for test pits with 1.5m by 1.5m with 2.0 m in depth by a consigned onsite company in three spots each in Gulu and Arua and four spots in Lira to find no obstacles in the test pits. The Underground Obstacles Investigation Report of the construction sites of the three RRHs is attached in Appendix 7.

4) Water Quality Certificate of Analysis

During the field survey 2, the survey team collected samples of tap water in each RRH and asked the National Water and Sewerage Corporation (NWSC) for the water quality test. Compared to the thresholds in the standard for potable water of the Uganda [US 201 (2008) (English): Drinking (potable) water (2nd Edition)], exceeding chromaticity was detected from the samples taken in Lira RRH and exceeding chromaticity, suspended solids and turbidity were detected from the samples taken in Arua RRH.

Considering each sample is temporarily kept in the elevated reservoirs, as the reasons of over-standard items could be attributed to the dust invasion and insufficient clean-up in the reservoir, the Survey Team also obtained the results of water samples taken regularly from water supply by NWSC. According to the test results, chromaticity in Lira municipality water supply is slightly over the threshold; as for Arua municipality water supply, items are all within the thresholds except for some areas far from Arua RRH. Since the World Health Organization (WHO) does not list any standard for chromaticity in tap water in Guidelines for drinking-water quality (2011), the Ministry of Health (MOH) does not consider this result problematic.

Other test items have indicated numerical values within the range of the above-mentioned

standard for potable water, and it is not considered necessary in the Project to do special treatment for the use of tap water of each city.

The Water Quality Certificate of Analysis of the samples taken in the three RRHs and water quality test conducted regularly by NWSC are attached in Appendix -7.

(2) Climatologic Condition Survey

All the three cities of Gulu, Lira and Arua are categorised as savannah climate and have a rainy season from late March to middle of November. Each RRH is located at 1,000 to 1,100 m above sea level, and throughout year it has agreeable climate with temperature around 21 to 25 ℃ even though it is located right on the Equator. Though the maximum temperature reaches over 30 ℃ in dry season from December to February, it is cool with the average temperature around 26 to 28 ℃ in the rainy season. Facility planning shall be considered with special attention to items such as roof form suitable for precipitation in rainy season and ventilation system making the most use of pleasant climate.

Table 1-1 Monthly Climate Data in Gulu (Temperature, Precipitation)

	1	2	3	4	5	6	7	8	9	10	11	12
Avg. Temperature (℃)	24.0	24.0	23.0	23.0	22.0	22.0	21.0	21.0	21.0	22.0	22.0	23.0
Max. Temperature (℃)	31.0	32.0	30.0	29.0	28.0	27.0	26.0	27.0	27.0	28.0	29.0	30.0
Min. Temperature (℃)	17.0	17.0	17.0	17.0	17.0	17.0	16.0	16.0	16.0	17.0	16.0	16.0
Avg. Precipitation (mm)	10.0	40.0	80.0	170.0	200.0	140.0	160.0	220.0	170.0	160.0	90.0	40.0

Table 1-2 Monthly Climate Data in Lira (Temperature, Precipitation)

	1	2	3	4	5	6	7	8	9	10	11	12
Avg. Temperature (℃)	24	24.6	24.5	23.7	23.2	22.6	22.2	22.4	22.8	23.2	23.2	23.4
Max. Temperature (℃)	33.0	33.0	32.0	29.9	28.5	28.0	27.1	27.6	28.6	29.6	30.4	30.9
Min. Temperature (℃)	16.2	17	17.5	17.5	17.2	16.7	16.1	16.2	16.1	16.1	16.1	15.8
Avg. Precipitation (mm)	25.5	45.4	90	158.6	183.2	111.2	129.8	177.8	159	156.9	95.7	40.2

Table 1-3 Monthly Climate Data in Arua (Temperature, Precipitation)

	1	2	3	4	5	6	7	8	9	10	11	12
Avg. Temperature (℃)	23.0	24.0	24.0	22.0	22.0	22.0	21.0	21.0	21.0	21.0	22.0	23.0
Max. Temperature (℃)	30.0	31.0	30.0	28.0	27.0	27.0	26.0	26.0	27.0	27.0	28.0	29.0
Min. Temperature (℃)	17.0	17.0	18.0	17.0	17.0	17.0	16.0	16.0	16.0	16.0	17.0	17.0
Avg. Precipitation (mm)	10.0	40.0	80.0	130.0	140.0	120.0	150.0	190.0	160.0	180.0	100.0	40.0

1-3 Environmental and Social Considerations

The Project is categorised as Category C (a project likely to have minimal or no adverse environmental impacts) according to "JICA Guidelines for Environmental and Social Considerations" (April 2010), from the following considerations: not located in a sensitive area, nor has it sensitive characteristics, nor falls into sensitive sectors under the Guidelines, and its potential adverse impacts on the environment are not likely to be significant.

CHAPTER 2 Contents of the Project

2-1 Basic Concept of the Project

2-1-1 Overall Goal and Project Purpose

In Uganda, it is one of the priority issues that the health infrastructures such as medical facilities and utility systems, medical equipment, etc. as the basis for providing high-quality health care services have not yet developed sufficiently. Based on policies such as the HSDP, the GOU has promoted the establishment of the referral system [National Referral Hospital [(NRH) - Regional Referral Hospital (RRH) - General Hospital (GH) - Health Centre (HC)] through improvement of the functions of basic medical facilities, strengthening of the maintenance management systems, and improving the regional medical systems.

Meanwhile, further improvement and expansion of facilities and equipment is urgently required in Northern Uganda, because of the increasing number of patients in each RRH. Acholi (Gulu), Lango (Lira), and West Nile (Arua) sub-regions have suffered the most from the civil war that lasted for about 20 years, starting in the 1980s, and they now accept many refugees from neighbouring countries with unstable public security.

Though all the three RRHs have been remodelled several times since they were constructed in the 1930s, their facilities are remarkably aged, suffering constant lack of necessary medical equipment for medical services. For this reason, it is urgent to improve the health service system in Northern Uganda through improvement of facilities and equipment at RRHs. The Project will contribute to humanitarian needs, which are extremely high in priority for rehabilitation of Northern Uganda and refugee support, and for the improvement of maternal and child health (MCH) and non-communicable diseases and achievement of Universal Health Coverage (UHC) which are listed in Goal 3 of Sustainable Development Goals (SDGs), and resolution of regional gaps which is listed in Goal 10.

In this circumstance, the GOU claims in the HSDP that the accessibility and quality of the service shall be improved (Overall Goal). The Project is to strengthen the functions of Gulu, Lira and Arua RRHs through construction of facilities and procurement of equipment, thereby contributing to improving access to and health care services in Northern Uganda.

2-1-2 Outline of the Project

The Project aims to achieve the goal through construction of facilities and procurement of equipment of the three RRHs in Northern Uganda and strengthening of the capacity of operation and maintenance of equipment. The assistance components of the Project are the construction of a new Theatre/Casualty/Maternity Ward at Gulu RRH, a new Outpatient Department (OPD) /Casualty Block and a new Delivery Suite at Lira RRH, and a new OPD/Casualty Block at Arua RRH, as well as procuring the medical equipment at the three 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 and maintenance of equipment realising efficient medical activities. The outline of the assistance components for the three RRHs is listed below.

Table 2-1 Outline of the Assistance Components for Gulu RRH

Component		Description
Theatre/Casualty/ Maternity Ward	GF 1,208.89 m^2	OT: OT (3), Recovery room, Operation theatre, etc. Casualty: Resuscitation room, Minor operation room (1) etc. ICU: ICU, Anteroom, etc.
	1F 1,260.11 m^2	Maternity bed rooms (81 beds), NICU (2), Delivery room (5), etc.
Total	2,469.00 m^2	
Equipment		Ward: Dressing cart, Examination light, Nebulizer, etc. Central Clinical Dept.: Anaesthesia Machine, Ventilator, Autoclave (stand alone), Operating light (ceiling mount), etc. Imagery Dept.: Ultrasound machine (cardiac) Others: Ultrasonic therapy machine, Electric tools and supplies, etc.

Table 2-2 Outline of the Assistance Components for Lira RRH

Component		Description
OPD/Casualty Block	GF 980.30 m^2	OPD: Laboratory, Pharmacy, Imagery, etc. Casualty: Resuscitation room, Minor operation room, etc. MCH: Clinic, Office, etc.
	1F 1,022.56 m^2	OPD: Clinics, Dental clinic, etc. MCH: Clinic, Vaccine store, etc.
Subtotal	2,002.86 m^2	
Power House	GF 17.31 m^2	Power house, Generator house
Delivery Suite	GF 278.98 m^2	Delivery room (6), NICU, etc.
Generator House	GF 13.78 m^2	Generator house
Total	2,312.93 m^2	
Equipment		Ward: Patient trolley, Weight scale, Wheel chairs, Pulse oximeter, etc. Central Clinical Dept.: Anaesthesia Machine, Infusion pump, Autoclave (Large), etc. Imagery Dept.: Fluoroscopy X-ray machine, General X-ray machine, Ultrasound machine (cardiac) Others: Rotor machine, Short wave diathermy, Ultrasonic therapy machine

Table 2-3 Outline of the Assistance Components for Arua RRH

Component		Description
OPD/Casualty Block	GF 865.97 m^2	OPD: Laboratory, Pharmacy, Imagery, etc. Casualty: Resuscitation room, Minor operation room, etc.
	1F 897.20 m^2	OPD: general OPD Clinic, Dental clinic, Patient toilet, etc.
Subtotal	1,763.17 m^2	
Power House	GF 17.31 m^2	Power house, Generator house
Total	1,780.48 m^2	
Equipment		Ward: Suction machine (electrical), Patient trolley, Glucometer, Pulse oximeter, etc. Central Clinical Dept.: Anaesthesia Machine, Electric Surgical Unit, Autoclave (stand alone), Operating light (ceiling mount), etc. Imagery Dept. Fluoroscopy X-ray machine, Ultrasound machine (cardiac) Others: Refrigerator for drug, Short wave diathermy, Ultrasonic therapy machine

2-2. Outline Design of the Japanese Assistance

2-2-1 Design Policies

(1) Basic Principles

1) Strengthening of the hospital function

The objective of the Project is to strengthen the hospital functions of Gulu, Lira and Arua RRHs to the essential levels required of RRHs in order to promote the improvement of the referral system in Northern Uganda. The role of RRHs in the Health Sector Strategic and Investment Plan (HSSIP) (2010/11 – 2014/15) must be considered for this purpose.

In the Japanese assistance, the priority is set for the improvement of the facilities with remarkable aging and inadequate function among the facilities of the three RRHs. The selection of the equipment items from among those requested by the three RRHs will be based on the viewpoint of strengthening hospital functions.

2) Consideration for the facility master plan

The facility master plans have been prepared for Gulu RRH and Lira RRH. The one for Arua RRH is under preparation now though, the survey team collected information on the outline of the master plan from the planning consultant. Even if the facility master plans are reviewed in future, their zoning plans would be little changed so that they can be the useful references for planning the layout of the project facilities.

3) Determination of the size of the planned facilities

In principle, the scale andr size of the planned facilities of the target hospitals will be determined based on the performance data on diagnosis and treatment in the past five years and 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. Stairs and ramps will be used for vertical movement instead of elevators that may require maintenance expenses.

5) Structural design

The Ugandan standards for earthquake resistance and wind force resistance will be adopted. 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 (heavy seasonal rains and earthquakes, etc.) as possible.

6) Technical and fiscal sustainability

The facility plan and equipment plan will be made in consideration of the technical and fiscal sustainability of the hospitals, based on their managerial capabilities (the number of medical and

healthcare professionals, their technical levels, financial affordability, state of procurement of consumables and replacement parts, etc.). The construction materials are to be selected with preference to those meeting the criteria for sturdiness, low maintenance requirements, availability in the local markets, and ease of replacement or repairs.

7) Plot plan and construction plan to enable the provision of sustainable medical service delivery

Candidate lots for the construction of project buildings have been proposed by the three RRHs, which are surrounded by the existing hospital buildings. Therefore, the construction plans will be developed to least interfere with medical services of each hospital during the construction work periods.

8) Equipment plan

Medical equipment will be procured in order to improve the situations where the function as RRHs cannot be fulfilled due to the shortage and deterioration of the equipment. Upon planning the equipment, in principle, the equipment components will comply with the standard equipment list made in 2009 as the National Medical Equipment Policy (NMEP 2009, MOH), and the equipment will be selected based on 18 criteria regarding the maintenance and sustainability. The plan will accordingly conform to the current situation as well as the future plan of each RRH.

9) Soft components (Technical Assistance)

The contents of technical assistance will be planned to support the three RRHs to effectively utilise the provided equipment and to strengthen maintenance and management.

10) Coordination with supports by other donors

The project will be designed not to duplicate the activities of other donors.

(2) Policies to Natural Conditions

According to the climatologic data of the project site areas in the past 30 years, annual average temperature is 2122 to 25 °C, the maximum monthly average temperature is 31 to 33 °C, recorded in February at all the three areas, which can be said rather moderate and comfortable climate for equator regions, because the sites are located in highland areas. Based on their climatic conditions, the facility plans will be drawn in principle to intake sufficient breeze to secure natural ventilation, and the air conditioning system is planned for certain rooms which definitely require proper air control, such as the operation theatres and X-ray rooms, etc..

Also, geotechnical surveys (boring survey) at the hospital premises indicate there are stiff clay strata, on which the foundations with single footing will be planned.

(3) Policies to Socio-economic Customs

By researching electrical supply data at the local branches of UMEME in Gulu, Lira and Arua,

the Survey Team confirmed that necessary electricity will be provided on the condition that each RRH equips receiving transformers for the project facilities. In consideration of frequent power failure and voltage fluctuations, emergency generator system, automatic voltage regulator (AVR) system, and uninterruptible power source (UPS) system, etc. will be included in the plan, in order to avoid interruption of medical activities due to power failure or equipment malfunction due to voltage fluctuation to the maximum extent.

Information of tap water supply system collected at NWSC proves that water pressure at Gulu RRH and Arua RRH is high enough to dispense without water reservoir tank but at Lira RRH hydraulic pressure is not enough and water shall be provided from water reservoir tank to elevated tank. Electric supply plan and water provision plan will get accordingly in alignment with these findings.

(4) Policies to Construction and Procurement Situations

The project sites are all located several hundred kilometres away from Kampala. Construction planning will be made in consideration that all of construction materials, equipment items, skilled labours, and construction machines shall be carried from Kampala.

(5) Policies to Employing Local Contractors

Major construction companies in Uganda are registered with the Uganda National Association of Building and Civil Engineering Contractors (UNABCEC). As of 2016, 96 companies are registered in UNABCEC. Member companies are classified by sales amount in five ranks.

There are some local construction companies that have experiences in construction works associated with Japanese Official Development Assistance (ODA) projects. These companies are all classified as A-ranked major companies by UNABCEC. In order to secure construction capabilities, when local companies are employed as subcontractors of the Japanese enterprises, it is essential to select the companies that have experiences with Japanese ODA projects, and to establish a direct management system by the Japanese engineers to provide technical instructions especially on the construction processes, quality management and safety management.

(6) Policies concerning Capability of Proper Management and Maintenance

1) Facilities

In principle, construction materials that may need minimum maintenance will be selected. Each RRH has a local facility and equipment maintenance workshop where electricians and plumbers are always positioned. In consideration of the number of maintenance staff and their technical levels, ease of maintenance shall be considered first in selecting the utility systems not to select complicated ones compared to the existing systems.

2) Medical equipment

The local workshops in each hospital are deployed with at least one Biomedical Engineer, under whom are deployed at least 4 staff members such as engineers in charge of maintenance

and management of equipment. Procurement of the equipment will be planned according to the personnel on site and their skills. Each hospital has some repair tools and inspection equipment, and they are maintained so that they can handle simple repairs, since the machines equipped at present are of simple structure, but they are not sufficient for high-level medical equipment to be required in RRHs. Therefore, the provision of maintenance tools will be included in the Planned Equipment List, to deal with the maintenance of higher-level medical equipment to be procured in the Project. Instructions on initial operation and daily operation training, routine maintenance, and troubleshooting will be given by the manufacturers' agent on handover.

(7) Policies for setting Grade of Facilities and Equipment

1) Facility plan

The designs of the facilities 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 plan

According to the standard equipment list presented by MOH and priorities presented by the hospitals, equipment plan will be made with prior attention to renewal and maintenance of the equipment items which are expected to run short in necessary activities. As the standard equipment list in NMEP only follows a minimum of basic necessities and needs updating, some items not on the list will be also included with due consideration of the hospitals present situation such as manpower and capabilities.

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

1) Policy to the method of construction

Conventional construction methods in Uganda will preferentially selected to improve the construction efficiency of workers and shorten the construction period. Also, materials will be selected taking into account of the availability of materials in the Ugandan market in order to ease the management and maintenance of the facilities and systems after the completion of the Project.

2) Policy to the method of procurement

The equipment and instruments used for these planned facilities will be procured locally as much as possible considering the affordability and easiness of maintenance after completion. Quality and stored quantity shall also be considered so that work schedule and quality of buildings should not be affected. If the local procurement is difficult, however, with consideration for work schedule and price comparison, procurement from a third country or Japan can be an option.

All the project sites are situated inconvenient in procuring concrete ingredients (sand, gravel and cement) and road leading to sand extraction site is not paved, which may affect traffic of delivering trucks. It is important to plan feasible procurement management.

3) Policy to the construction period

In the Project, the followings will be considered in deciding construction schedule:

1) Most of the equipment and machines will be delivered from distant places.
2) Part of the construction materials and many of the utility appliances are to be procured from Japan or third countries.
3) The biggest amongst the planned construction site is about 2,500 m^2.
4) The distances between the planned construction sites are more than 250 km each.
5) All the sites are more than 340 km distant from Kampala.

The work schedule will be planned for each site in consideration of the size of the facilities and construction conditions mentioned above, and the project schedule of the contract with a construction company shall be will be set as 16 months according to the longest construction schedule for the Theatre/Casualty/Maternity Ward at Gulu RRH.

Medical equipment and machines should be procured, installed and handed over in accordance with the construction schedule.

2-2-2 Basic Planning (Facility Plan/ Equipment Plan)

(1) Outline of the Project

1) Outline of the Request from the GOU

The outline of the project requested by the GOU in August 2011 is as follows:

Table 2-4 Description of the Request from the GOU

Hospital	Component
Guru RRH	1. Construction of a new operation theatre (5 operation rooms) 2. Construction of OPD with Casualty Unit 3. Reconstruction of Wards (Male, Female and Paediatric Medical and Surgical Wards @60 beds) 4. Construction of Emergency and ICU Department 5. Re-equipping the hospital including ambulance and multi-purpose vehicle 6. User training on procured equipment
Lira RRH	1. Reconstruction of OPD with Casualty Unit 2. Construction of Female, Male and Paediatric Medical Wards (50 beds) 3. Equipment including ambulance and multi-purpose vehicle 4. User training on procured equipment
Arua RRH	1. Construction of OPD with Casualty Unit 2. Construction of Maternity Ward (50 beds) 3. Equipment, ambulance and multi-purpose vehicle 4. User training on procured equipment

In response to the request from the GOU, the GOJ decided to conduct a preparatory survey, and JICA dispatched a field survey team for the first preparatory survey (Field survey 1) to the sites in November 2016.

2) Field Survey 1

a. Facilities

In Field Survey 1, the survey team confirmed the requested contents and examined their relevance and necessity. As the result of Field Survey 1, the GOU and the survey team prioritised the necessity concerning the facilities listed as below:

Table 2-5 Priorities of Facilities

Hospital		Gulu				Lira				Arua	
		(1) Maternity, Theatre, Casualty			(2) OPD	(1) OPD + Casualty		(2) Maternity		(1) OPD + Casualty	(2) Maternity Ward
Priority by each hospital		**A**			**B**	**A**		**B**		**A**	**B**
Findings by JICA Survey team		**Maternity**	**Theatre**	**Casualty**	**OPD**	**OPD**	**Casualty**	**Delivery**	**Ward**	**OPD + Casualty**	**Maternity Ward**
	Function of the facility	**A**	**A**	**C**	**C**	**A-**	**B**	**A+**	**C**	**B**	**C**
		Minimal function. Theater cannot be used.	No good separation of sterile and non-sterile areas. No good function of sterilization room or changing room.	Functioning good, including observation beds.	Function scattered, but each building is functioning good.	Functioning, but scattered. No good environment regarding waiting space.	Using old main theater. Located in inpatient area, far from OPD.	Concerns regarding nosocomial infection	Functioning good with necessary facility and equipment.	Main OPD buildings and MCH are separated. Complicated patient flow.	Functioning good including operating theatre, Neonatal ward, 10 delivery beds.
	Aging level of the facility	**A+**	**A**	**A**	**B**	**A+**		**A+**		**A-**	**C**
		Renovated in 2010, but not in good condition inside.	Renovated recently, but not in good condition inside.	Built in 1930s. Old.	Built in 1930s.	Built in 1930s. Old.		Built in 1920s. Old.		Built in 1930s. Maintained in good condition.	Built in 1930s. Renovated in recent years with good condition.
	Insufficiency of the space	**A+**	**A**	**B**	**A**	**A+**	**C**	**A+**	**B**	**B**	**C**
		Absolute lack of the space, e.g. beds in the corridor.	Small as a teaching hospital. Corridor, changing room also has no enough space.	Currently enough space to accommodat e patients.	Not overcrowded.	Absolute lack of space.	Not too congested.	Only 4 delivery beds. Extremely small space between beds.	Lack of space, but not so highly urgent.	Small space in consultation room or corridor. Relatively enough space for waiting area.	Enough space.
	Overall assessment by JICA team	**A**	**A**	**B**	**A-**	**A**	**A-**	**A+**	**B**	**B**	**C**
Tentative Prioritization		**A**	**A**	**A**	**B**	**A**	**A**	**A**	**C**	**B+**	**C**
Remarks			*1							*2	

*1 MOH suggested the need to include ICU in Theatre and Casualty complex of Gulu RRH. The Team pointed out the need for capacity development for ICU operation to be conducted by MOH.

*2 MOH expressed great need of OPD + Casualty complex of Arua RRH to be included in the Project.

b. Equipment

Each department submitted priority list of the equipment. All the three RRHs presented the requests from almost all the departments. As the result of field survey at three RRHs it proves all the hospitals suffer from lack of the equipment items as well as the request from the three RRHs.

3) Field Survey 2

In the light of analysis conducted in Japan concerning Field Survey 1, JICA dispatched a second survey team for the Field Survey 2 to the sites in February 2017.

a. Facilities

Based on the draft facility plans studied through the analysis in Japan, the survey team had discussions with MOH and the three RRHs, while conducting field surveys to collect additional data. The requested facilities list attached to the Minutes of Discussions (M/D) as a result of discussion is as below:

Table 2-6 List of Requested Facilities attached to the M/D of Field Survey 2

Hospital	Facility	Contents
Gulu RRH	Theatre/Casualty/Maternity Ward	(Maternity) 1) 75 to 81 patient beds 2) six delivery rooms 3) one kangaroo care room 4) one NICU (Theatre) 5) one surgical operation room 6) one orthopaedic operation room 7) one obstetrics/gynaecology operation room 8) one recovery space (Casualty) 9) one resuscitation room for 12 to 15 beds 10) one triage room/clinic 11) one minor operation theatre connected to the Theatre (Others) 12) one ICU[1] for four to six beds 13) CSSD adjacent to the Theatre and also accessible from other departments 14) one connection corridor between the new building and the imagery building
Lira RRH	OPD Complex	(OPD) 1) one pharmacy/dispensary 2) one satellite laboratory 3) two paediatric consultation rooms 4) one male consultation room 5) one female consultation room 6) one diabetic consultation room 7) one dental clinic 8) one ENT clinic

[1] The level of this ICU will be set in between the level which provides intensive monitoring of the patients and the level which provides intensive care for the patients with one organ failure. The level will be almost the same as the level of High Dependency Units in Hoima RRH and Kabale RRH built in the Project for the Rehabilitation of Hospitals and Supply of Medical Equipment in the Western Region in Uganda

		9) one MARPs room 10) one treatment room 11) one orthopaedic consultation room 12) one physiotherapy/occupational consultation room 13) two specialized clinics (MCH) 14) one office for in charge 15) one palpation room with six couches 16) one treatment room 17) one EID point treatment room 18) one immunization room, 19) family planning 20) cervical cancer screening (X-Ray) 21) one X-Ray room 22) one ultra sound room (Casualty) 23) one resuscitation room with 10 – 12 beds 24) one minor operation theatre (Others) 25) Waiting space for MCH attached to OPD complex
	Delivery Complex	1) six delivery suites 2) one new born baby room (NICU) 3) one sterilisation room 4) one nurse station 5) changing/wash rooms for nurses
Arua RRH	the OPD/ Casualty Block	(OPD) 1) four general OPD consultation rooms 2) one medical outpatient consultation room 3) two paediatric rooms 4) one surgical outpatient consultation room 5) one ENT and ophthalmology consultation room 6) one gynaecology consultation room 7) one dental room 8) one adolescence room 9) two HCT rooms 10) one MARPs room (Casualty) 11) one resuscitation room with 10-15 beds 12) one minor operation theatre

b. Equipment

The number of the equipment items requested is 263 items for 21 departments at Gulu RRH, 208 items for 24 departments at Lira RRH and 201 items for 16 departments at Arua RRH. In addition, MOH requested mammography and fetal Doppler devices.

In the discussion with MOH and each hospital on equipment, the survey team interviewed about duplicate of equipment, usage experience and technical level of the users and frequency of usage, while deselecting the locally affordable items at cheap price, and made the final “Planned Equipment List”. However, as some equipment such as CT scan, PEA Phacoemulsification and aspiration (for cataract surgery in ophthalmology) needs further consideration of their validity to be included in the Project, the additional analysis was done in Japan in terms of coordination with clinical technique in each hospital, maintenance costs and sustainability. The priority of the equipment is assigned high when newly constructed buildings need it. The priority of equipment in each department is also designated through discussion.

4) Components of the Japanese Assistance

a. Facility

The findings in Field Survey 2 determined necessary number of consultation rooms, considering the usage condition of the present facilities in line with the above mentioned “Design conditions for planning the size of facilities”. The survey team also decided “Outline Design of the Cooperation Project” based on the usage condition of premises and other design policy.

Through the review and narrowing-down of the Requested Facilities List presented during Field Survey 2 from the viewpoint of the influence on achievement of the project purpose, the connecting walkway which will connect the Theatre/Casualty /Maternity Ward and the existing imagery building in Gulu RRH, as well as the MCH waiting room adjacent to the newly built OPD/Casualty Block in Lira RRH, they will be built by the GOU. Through the analysis in Japan, the connecting walkways between the Delivery Suite and the existing obstetrics and NICU buildings in Lira RRH, as well as the connecting walkway between the OPD/Casualty Block and the existing connecting corridor in Arua RRH, which were not included in the above-mentioned Requested Facilities List, are also designed as the undertakings to be taken by GOU.

b. Equipment

The equipment list was examined with considering the discussion and priority in Field Survey 2 and decided equipment to be procured. In this examination, necessary equipment was narrowed down according to the in the clause 2-2-2 (4) Layout Planning. For “Examination List of Requested Equipment”, see Table 2-12.

(2) Layout Planning

1) Gulu RRH

The existing X-Ray rooms and Operation Theatre Block will be removed and the space between the existing Surgical and Medical wards and also the existing MCH and Private ward will be spared. The building will be arranged to lie in east and west at long axis to mitigate effect of sunlight to interior heat environment. A new road will be paved to the existing hospital road, which will make the site approachable for ambulances. The Project will also make patient transportation possible by connecting with a walkway (to be constructed by the Ugandan side) to the Imaging Block which was constructed in 2015 with support of the Italian Corporation.

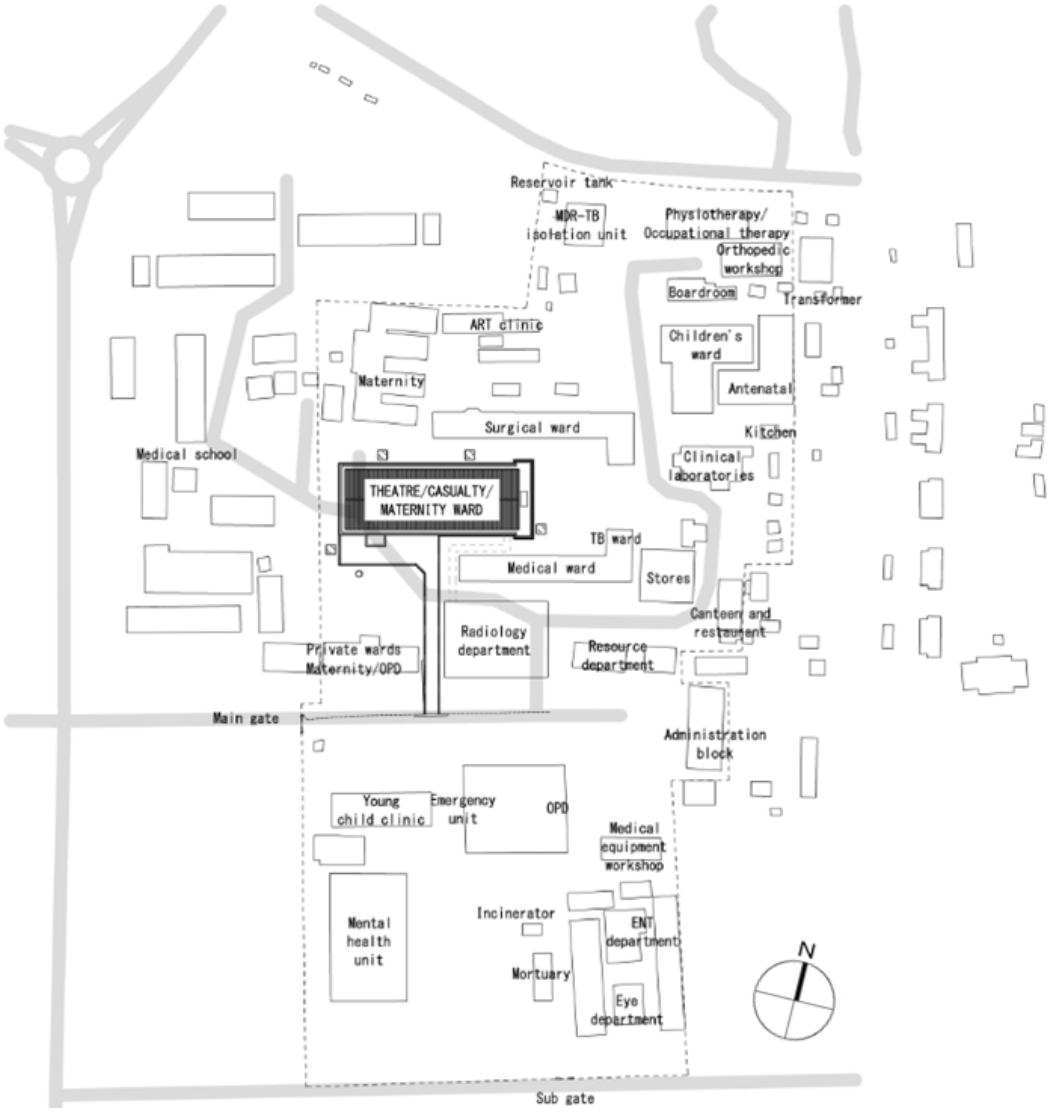


Figure 2-1 Gulu RRH: Layout Planning

2) Lira RRH

The OPD/Casualty Block will be located in empty lots after demolishing the existing OPD and MCH Department Buildings. The building long axis will be deployed in parallel to frontal road to utilise the premises effectively. The MCH Waiting Unit the cost of which is to be borne by the Ugandan side will be constructed adjacent to the .OPD/Casualty Block.

The Delivery Suite will be set up so that crossing point of lines extended from the front entrances of the existing Obstetrics and NICU wards. The Delivery Suite will be connected by a walkway (to be constructed by the Ugandan side) to be utilised integrally as the Maternity ward.

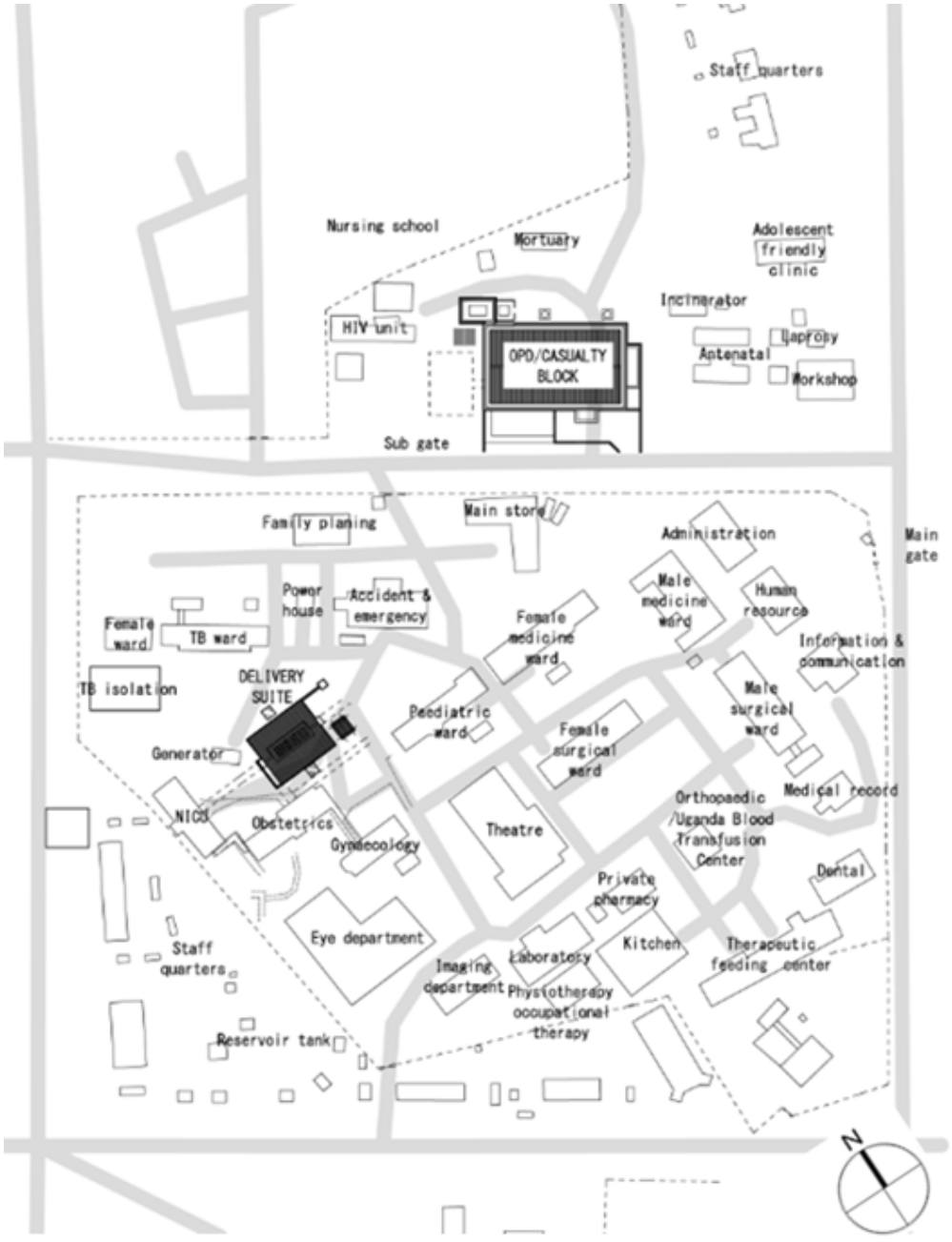


Figure 2-2 Lira RRH: Layout Planning

3) Arua RRH

The OPD/Casualty Block will be located in empty lots after demolishing the existing OPD/Casualty Block. The building at long axis will be deployed in parallel to long axis and at a right angle to short axis of the existing building. The empty lots will be spared with enough space between the existing Administration Building and the MCH Building to be constructed in future. Exterior walkway between the OPD/Casualty Block and the existing walkway is to be constructed by the Ugandan side.

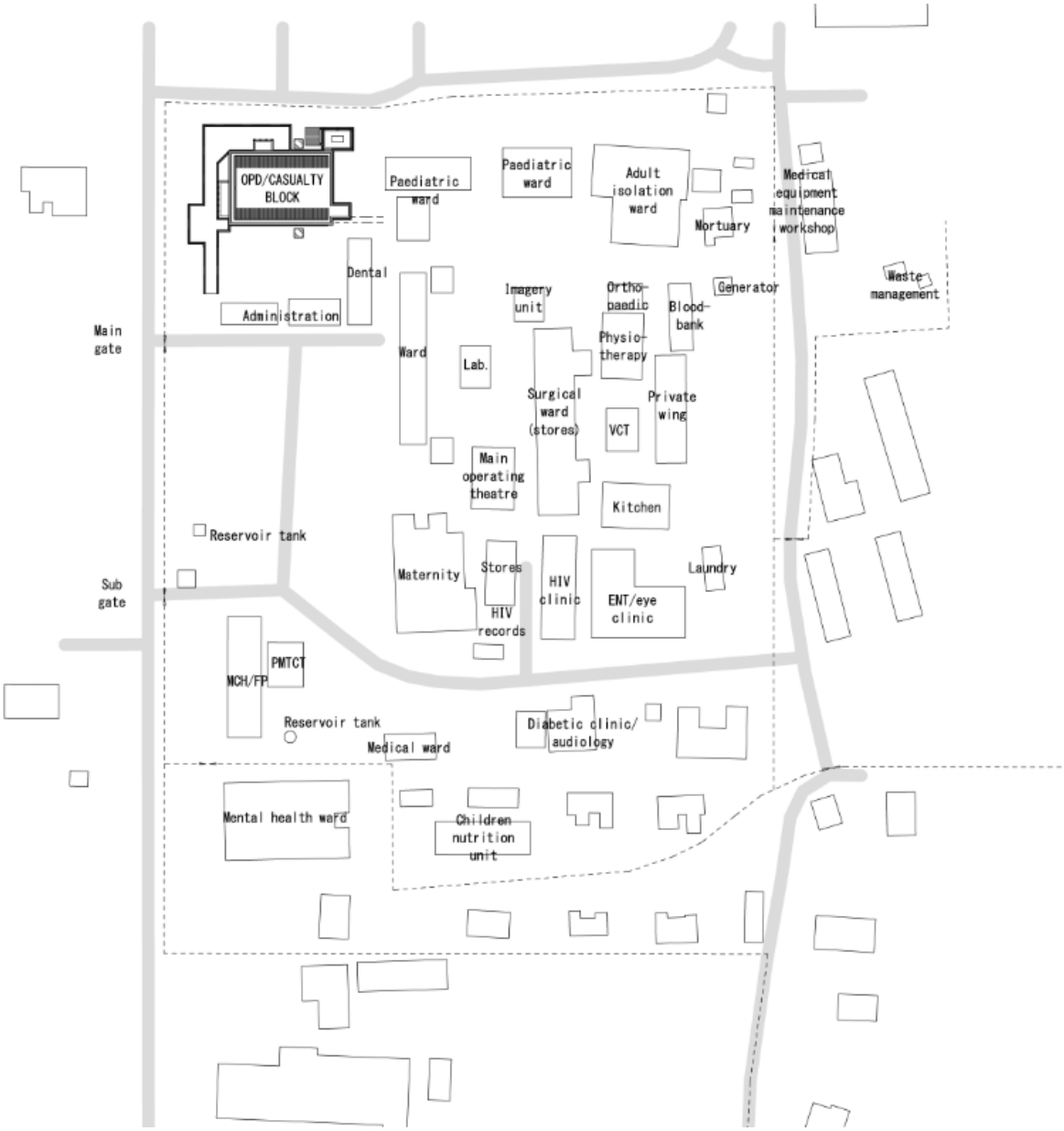


Figure 2-3 Arua RRH: Layout Planning

(3) Architectural Planning

1) Floor Plan

a. Design conditions for planning the size of facilities

The target year is set in the year which is five years after the completion of the facilities. The size of major rooms of each department to be calculated in the Project is estimated based on the performance of the target departments in the past five years (number of patients and surgical operations, etc.), taking into consideration the population increase in the catchment area of each RRH.

Since the number of patients is assumed to be proportional to population, the population in 2024/25 is estimated first, which is five years after the facilities were placed in service. Since the data collected in the field survey covers 2011/12 to 2015/16, a span of five years, the population in the catchment area of each hospital in the intermediate years 2013/14 is set as 1, and the population growth rate in 2024/25 is estimated. The population growth rate of 2014-2015 is estimated from the population of 2015, as estimated by the GOU from the census conducted in 2014 as well as the "2016 Statistical Abstract". This growth rate is then applied to 2013-2014 and the population of 2013/2014 is estimated. The population growth rate of 2015-2016 is estimated from the population of 2015 and 2016, as estimated by the GOU in the "2016 Statistical Abstract". This is then used as the growth rate after 2016 to predict the population in 2024/25. This is done for the population of every district included in the catchment area of each hospital.

b. Gulu RRH

1. Assumed population increase

District	Census population	Population estimate in 2016 Statistical Abstract		2014/15 -2015/16 Population growth rate	2013/14 Population estimate	2015/16 -2016/17 Population growth rate	2024/25 Population estimate	2013/14 -2024/25 Population growth rate
	2014	2015	2016					
	A	B	C	D=B/A	F=A/D	G=C/B	H=C*G^8	I=H/F
Agago	227,486	230,900	234,500	1.015	224,122	1.016	265,396	
Amuru	190,516	190,700	195,300	1.001	190,332	1.024	236,328	
Gulu	443,733	447,400	460,900	1.008	440,096	1.030	584,645	
Kitgum	204,012	206,700	209,600	1.013	201,359	1.014	234,314	
Lamwo	134,050	135,600	137,000	1.012	132,518	1.010	148,733	
Nwoya	128,094	144,900	159,500	1.131	113,237	1.101	343,795	
Pader	183,723	180,600	183,500	0.983	186,900	1.016	208,441	
Adjumani	232,813	226,600	228,100	0.973	239,196	1.007	240,463	
Moyo	137,489	141,600	144,600	1.030	133,497	1.021	171,005	
Nebbi	385,220	407,400	420,400	1.058	364,248	1.032	540,501	
Total	2,267,136	2,312,400	2,373,400		2,225,506		2,973,620	1.336

↓

Rate: 1.34

2. Planning the number of main rooms

The sizes of Operation Theatre, Casualty Unit, Maternity Ward, delivery rooms, NICU, etc. are estimated, based on the assumed 1.34 population growth rate from 2013/14 to 2024/25 in the catchment area of Gulu RRH.

i) Operation theatre

The number of required operation theatres is calculated based on the number of annual operations in the past five years, assuming that the working days of the operation theatres are 250 days/year, and the average number of operations per room is three operations per day.

Estimated annual number of operations

Year	2011/12	2012/13	2013/14	2014/15	2015/16	Average
No. of operations	1,120	1,564	1,483	1,454	2,093	1,543

Estimation of required number of rooms

Annual No. of operations	Rate of population increase	Annual working day	No. of operations per bed/day.	Required No. of rooms	**Planned No. of rooms**
A	B	C	D	E=A*B/C/D	
1,543	1.34	250	3	2.76	**3**

ii) Casualty unit

The number of required resuscitation beds is calculated based on the number of casualty patients in the past five years, assuming that the working days of the casualty unit are 365 days/year, opening hours are 24 hrs/day (1,440 min/day), and the average recovery time is 840 minutes per patient.

Estimated annual number of casualty patients

Year	2011/12	2012/13	2013/14	2014/15	2015/16	Average
No. of patients	4,984	5,957	6,493	7,104	2,685	**5,445**

Estimation of required number of beds

Annual No. of casualty patients	Rate of population increase	Recovery time per patient (min)	Annual working day	Opening hours (min)	Required No. of beds	**Planned No. of beds**
A	B	C1	D1	E1	F1=A*B*C1/ D1/E1	
5,445	1.34	840	365	1440	11.66	**12**

iii) ICU

In accordance with "Oh's Intensive Care Manual" and hearing with the ICU doctors at St. Mary's Hospital Lacor Hospital, the number of required ICU beds is estimated as five beds, which is 1 % of the total number of hospital beds (approx. 450 beds)

iv) Maternity Ward

The number of required Maternity beds is calculated assuming that the working days of Maternity are 365 days/year, and that on average one inpatients stays for 3.2 days in Maternity Ward, based on the results of the late five years at Gulu RRH.

Estimated Annual No. of Patients

Year	2011/12	2012/13	2013/14	2014/15	2015/16	**Average**
Number of patients	6,606	6,188	6,667	7,013	7,673	**6,829**
Maternity	6,606	6,188	6,667	7,013	5,255	
GYN					2,418	

Estimation of Required Number of beds

Annual No. of patients	Rate of population increase	Average length of stay	Annual working day	Set bed occupancy rate	Required No. of beds	**Planned No. of beds**
A	B	C	D	E	F=A*B*C/D/E	**G**
6,829	1.34	3.2	365	100%	80.23	**81**

v) Delivery

The required number of delivery beds is estimated based on the number of delivery in the past five years, assuming that the average number of delivery per bed is four deliveries per day.

Estimated Annual No. of deliveries

Year	2011/12	2012/13	2013/14	2014/15	2015/16	**Average**
Number of deliveries	5,063	4,694	4,631	4,627	4,824	**4,768**

Estimation of Required Number of Beds

Annual No. of deliveries	Rate of population increase	Annual working day	No. of deliveries per bed/day	Required No. of beds	**Planned No. of beds**
A	B	C	D	E=A*B/C/D	
4,768	1.34	365	4	4.38	**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 (Architectural Design Data Corpus and others by the Architectural Institute of Japan (AIJ)).

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 2-7 Floor Areas of Gulu RRH

Operation Theatre / Casualty / Materity Ward GF		
Dept.	Room Name	Floor Area(m2)
Operation Theatre	Anteroom	15.02
	Operation Hall	186.29
	Staff Corridor	11.83
	Staff	18.39
	Staff	18.39
	Office	12.82
	Attendant Toilet	9.49
	Doctor	9.91
	Doctor	9.91
	Sterilized Material	14.02
	Sterilization	25.96
	Sluice/Laundry	22.85
	Operating Room	31.71
	Operating Room	33.06
	Operating Room	33.06
	Subtotal	452.71
ICU	Anteroom	12.76
	Staff	15.07
	Staff	14.49
	ICU	84.47
	Office	12.89
	Subtotal	139.68
Casualty	Office	6.48
	Triage / Clinic / Resuscitatio	138.56
	Anteroom	8.22
	Minor Operation Theatre	29.68
	Staff Corridor	23.11
	Office	13.78
	Staff	12.73
	Staff	12.74
	Duty	14.03
	Subtotal	259.33
Common	Fire Hydrant Pump Room	7.12
	Power House	21.35
	Other Common	328.70
	Subtotal	357.17
GF Subtotal		1208.89

Operation Theatre / Casualty / Materity Ward 1F		
Dept.	Room Name	Floor Area(m2)
Maternity Ward	Corridor	19.00
	Office	18.50
	Attendant Room	18.00
	Wash Room	3.96
	W.C.	53.54
	Corridor / Nurses Station	131.23
	Store	8.00
	Staff	20.58
	Staff	21.00
	10-Bed Room	60.00
	8-Bed Room	48.00
	8-Bed Room	48.00
	10-Bed Room	60.00
	10-Bed Room	60.00
	10-Bed Room	60.00
	8-Bed Room	48.00
	8-Bed Room	48.00
	Kangaroo Care Room (9-Bed	60.00
	Anteroom	6.74
	Nicu 1	23.26
	Anteroom	6.74
	Nicu 2	23.27
	Labor	59.59
	Corridor	46.61
	Delivery 1	19.83
	Delivery 2	18.00
	Delivery 3	18.00
	Delivery 4	18.00
	Delivery 5	18.00
	Sluice / Sterilization	18.00
	Duty	18.49
	Subtotal	1080.34
Common	Other Common	179.77
1F Subtotal		1260.11
Total		2469.00

4. Components of each building

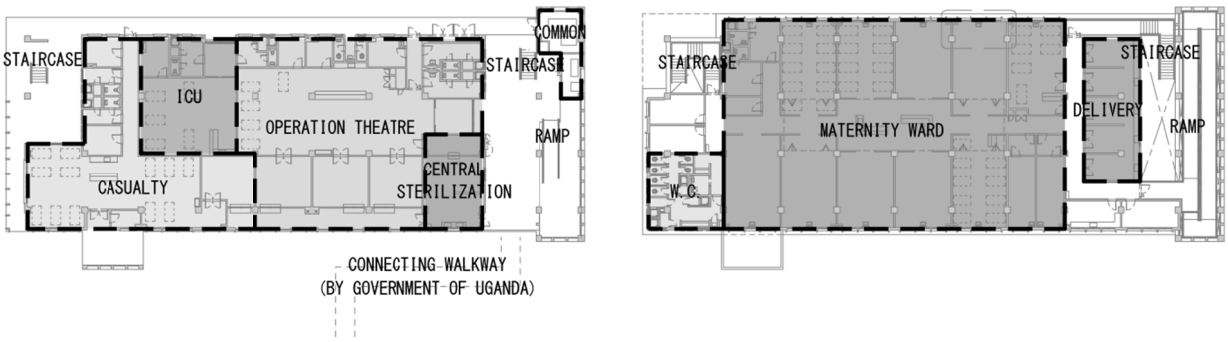
Based on the discussions with MOH and Gulu RRH as well as the site surveys, facilities at Gulu RRH is planned to construct the Theatre/Casualty/Maternity Ward.

Building	Floor	Room
Theatre/Casualty /Maternity Ward	GF	Operation Dept.: Operating rooms (3 rooms), Recovery space, Doctor room, Anaesthetist room, Staff locker rooms (men/women), Anteroom, Operation hall, Nurse station-1, Central sterilized supply rooms, etc. Casualty Unit: Triage/ Clinic, Resuscitation (12 beds), Minor Operation Theatre, Nurse station, Office (-cum-guard station), Staff rooms (men/women), Duty, Anteroom, etc. Maternity Unit: Entrance, Corridor, Staircase, Ramp, etc. ICU: ICUs (5 beds), Anteroom, Staff rooms (men/women), Nurse station, etc. Common: Power house, Generator house, Fire hydrant pump room, etc.
	1F	Maternity Unit: 8-bed rooms (2 rooms), 9-bed rooms (4 rooms), 10-bed Rooms (4 rooms), Nurse station, Labour room, NICU (2 rooms) , NICU anteroom, Sterilisation room, Staff rooms, Staff toilet, Duty, Linen Storage, Patients toilet, Corridor, Staircase, Ramp, etc.

5. Zoning plan

As the site is located in the existing hospital premises, a two-story building will be planned for the better use of land. Though elevators are used in facilities other than hospitals in Gulu municipality, their maintenance costs will be considerably high and electric power down occurs frequently. Instead, ramps and stairways will be planned for the vertical migration. The Operation Unit, Casualty Unit and ICU will be placed on GF and the Maternity Ward will be placed on 1F.

A ramp will be designed in the building for the convenient transfer of stretchers and wheelchairs. This ramp will be placed near the entrance of the Operation Dept. in consideration of good connection to the Operation Dept. in case Caesarean section is needed. The stairs to serve as the main entrance to the Maternity Unit will be placed at the opposite side of the building.



GF 1F

Figure 2-4 Gulu RRH: Zoning of the Theatre/Casualty/Maternity Ward

c. Lira RRH

1. Assumed population increase

District	Census population	Population estimate in 2016 Statistical Abstract		2014/15-2015/16 Population growth rate	2013/14 Population estimate	2015/16-2016/17 Population growth rate	2024/25 Population estimate	2013/14-2024/25 Population growth rate	2016/17-2024/25 Population growth rate
	2014	2015	2016						
	A	B	C	D=B/A	F=A/D	G=C/B	H=C*G^8	I=H/F	J=H/C
Alebtong	225,327	232,600	238,600	1.032	218,281	1.026	292,520		
Amolatar	146,904	151,400	156,500	1.031	142,542	1.034	203,996		
Apac	368,786	378,200	390,000	1.026	359,606	1.031	498,665		
Dokolo	182,579	187,300	192,500	1.026	177,977	1.028	239,648		
Kole	241,878	245,200	252,300	1.014	238,601	1.029	317,024		
Lira	410,516	417,200	428,400	1.016	403,939	1.027	529,530		
Otuke	105,617	107,900	112,500	1.022	103,382	1.043	157,109		
Oyam	388,011	392,700	403,800	1.012	383,378	1.028	504,672		
Abim	109,039	113,500	120,400	1.041	104,753	1.061	193,051		
Kaberamaido	215,026	222,200	231,000	1.033	208,084	1.040	315,178		
Nakasongola	181,799	186,100	191,500	1.024	177,597	1.029	240,740		
Total	2,575,482	2,634,300	2,717,500		2,518,141		3,492,134	1.387 ↓ **Rate: 1.39**	1.285 ↓ **Rate: 1.29 (Casualty)**

2. Planning the number of main rooms

The sizes of OPD, MCH and delivery rooms are estimated, based on the assumed 1.39 population growth rate from 2013/14 to 2024/25 in the catchment area of Lira RRH.

i) OPD

The number of required consultation rooms is calculated based on the number of patients in the past five years, assuming that the working days of OPD are 300 days/year, opening hours are eight hrs/day (480 min/day), and the average consultation time is eight minutes per patient at the General OPD, ENT and Ophthalmology, and 20 minutes per patient at Orthopaedics and Dental clinics.

Estimated annual number of patients

Clinics	2011/12	2012/13	2013/14	2014/15	2015/16	**Average**
General OPD	90,978	117,160	97,486	81,803	122,450	**101,975**
Orthopaedics	4,447	1,546	5,543	5,434	4,043	**4,203**
ENT		1,602	2,327	2,410	1,797	**2,034**
Ophthalmology	6,270	9,157	10,875	13,362	9,053	**9,743**
Dental	2,633	2,974	3,641	3,801	3,900	**3,390**
Total	104,328	132,439	119,872	106,810	141,243	**121,345**

Estimation of required number of rooms

Consultation room	Clinics	Annual No. of outpatients	Rate of population increase	Consultation time per patient (min)	Annual working day	Opening hours (min)	Required No. of rooms*	**Planned No. of rooms**
		A	B	C	D	E	F=A*B*C/D/E	
General OPD	General OPD	101,975	1.39	8	300	480	7.87	**8**
	Subtotal						7.87	
Orthopaedics	Orthopaedics	4,203	1.39	20	300	480	0.81	**1**
ENT+ Ophthalmology	ENT	2,034	1.39	8	300	480	0.16	**1**
	Ophthal-mology	9,743	1.39	8	300	480	0.75	
	Subtotal						0.91	
Dental	Dental	3,390	1.39	20	300	480	0.65	**1**
Total								**11**

*In the case of dental it is the required number of examination tables

ii) Maternal and Child Health (MCH)

The number of required consultation rooms is calculated based on the number of patients in the past five years, assuming that the working days of MCH department are 300 days/year, opening hours are eight hrs/day (480 min/day), and the average consultation time is eight minutes per patient for prenatal care, family planning, cancer check-up, perinatal HIV transmission prevention pack, early childhood diagnosis, and two minutes per patient for vaccination.

Estimated annual number of patients

Clinics	2011/12	2012/13	2013/14	2014/15	2015/16	**Average**
Maternity care	12,080	15,571	16,641	18,421	16,592	**15,861**
Family planning	3,895	4,710	3,566	4,751	2,836	**3,952**
Cancer check-up	1,447	10,084	8,845	9,736	7,510	**7,524**
Perinatal HIV transmission prevention pack, early childhood diagnosis	4,093	4,899	4,997	4,111	3,074	**4,235**
Vaccination	36,063	30,695	33,496	37,529	43,038	**36,164**
Total	57,578	65,959	67,545	74,548	73,060	**67,736**

Estimation of required number of rooms

Consultation room	Annual No. of patients	Rate of population increase	Consultation time per patient (min)	Annual working day	Opening hours (min)	Required No. of rooms*	**Planned No. of rooms**
	A	B	C	D	E	F=A*B*C/D/E	
Maternity care	15,861	1.39	8	300	480	1.22	**2**
Family planning	3,952	1.39	8	300	480	0.31	**1**
Cancer check-up	7,524	1.39	8	300	480	0.58	**1**
Perinatal HIV transmission prevention pack, early childhood diagnosis	4,235	1.39	8	300	480	0.33	**1**
Vaccination	36,164	1.39	2	300	480	0.70	**1**
Total							**6**

iii) Casualty Unit

Statistical data of the annual number of patients is not obtained since the Casualty unit of Lira RRH was just started in July 2016. Therefore, the number of monthly patients in 2016/17 is assumed about 400 (4,800 annual patients) based on the monthly patient data since August 2016, and the required number of resuscitation beds is estimated using the population ratio (1.29) in 2024/25 against 2016/17.

Estimated Annual No. of Casualty Patients

Month/Year	Aug. 2016	Sept.	Oct.	Nov.	Dec.	**Monthly No. of patients**
Patients	143	74	333	499	396	**400**

Estimation of Required Number of Beds

Annual No. of casualty patients	Assumed rate of patient increase	Recovery time per patient (min)	Annual working day	Opening hours (min)	Required No. of beds	**Planned No. of beds**
A	B	C1	D1	E1	F1=A*B*C1/ D1/E1	
4,800	1.29	840	365	1,440	9.90	**10**

iv) Delivery rooms, etc.

The required number of delivery beds is estimated based on the number of delivery in the past five years, assuming that the average number of delivery per bed is four deliveries per day.

Estimated Annual No. of deliveries

Year	2011/12	2012/13	2013/14	2014/15	2015/16	**Average**
Number of deliveries	5,023	5,535	5,715	6,009	6,739	**5,804**

Estimation of Required Number of Beds

Annual No. of deliveries	Rate of population increase	Annual working day	No. of deliveries per bed/day	Required No. of beds	**Planned No. of beds**
A	B	C	D	E=A*B/C/D	
5,804	1.39	365	4	5.53	**6**

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 2-8 Floor Areas of Lira RRH

OPD / Casualty Block GF		
Dept.	Room Name	Floor Area(m2)
OPD	Entrance / Waiting	180.61
	Staircase	24.39
	Ramp	67.59
	Store	10.96
	Reception	49.96
	Laboratory	37.47
	Pharmacy	37.47
	X-Ray 1	23.36
	X-Ray Control	14.11
	X-Ray 2	23.36
	Ultrasonic	15.43
	Subtotal	484.71
MCH	MCH 1	16.55
	MCH 2	16.86
	MCH 3	16.55
	MCH 4	20.27
	MCH 5	19.30
	Subtotal	89.53
Casualty	Office	6.40
	Triage / Clinic / Resuscitatio	151.56
	Staff	12.00
	Staff	12.00
	Duty	12.00
	Sluice/ Sterilization	12.40
	Ante- Room	3.94
	Minor Operation Theatre	30.47
	Subtotal	240.77
Common	Fire Hydrant Pump Room	12.47
	Handicapped Toilet	5.93
	Womens Toilet	23.74
	Mens Toilet	21.42
	Other Common	101.73
	Subtotal	165.29
GF Subtotal		980.30

OPD / Casualty Block 1F		
Dept.	Room Name	Floor Area(m2)
OPD	Corridor / Waiting	293.27
	Staircase	23.45
	Ramp	82.52
	Store	16.53
	HCT	16.00
	Clinic 1 (Dental)	62.24
	Clinic 2	18.73
	Clinic 3	18.73
	Clinic 4	18.73
	Treatment	37.47
	Clinic 5	18.73
	Clinic 6	18.73
	Staff	18.73
	Staff	20.27
	Clinic 7 (Ent)	39.00
	Clinic 8	18.73
	Treatment	18.73
	Clinic 9	18.73
	Clinic 10	18.73
	Marps	0.59
	Office	18.73
	Subtotal	797.37
MCH	MCH 6	49.96
	MCH 7	15.02
	MCH 8	16.98
	Staircase / Corridor	65.34
	Subtotal	147.30
Common	Handicapped Toilet	5.93
	Womens Toilet	23.74
	Mens Toilet	21.42
	Other Common	26.80
	Subtotal	77.89
1F Subtotal		1022.56
Total		2002.86

Power House		
Common	Power House	17.31

Generator House		
Common	Generator House	13.78

Delivery Suite		
Dept.	Room Name	Floor Area(m2)
Delivery Suite	Corridor	48.60
	Sluice/ Sterilization	37.61
	Ante- Room	5.43
	NICU	34.55
	Staff	20.30
	Staff	17.31
	Delivery 1	19.77
	Delivery 2	18.91
	Delivery 3	18.91
	Delivery 4	18.91
	Delivery 5	18.91
	Delivery 6	19.77
Total		278.98

4. Components of each building

Based on the discussions with MOH and Lira RRH as well as the site surveys, facilities construction at Lira RRH is planned to consist of four buildings: OPD/Casualty Block, Delivery Suite, Power house and Generator house. The Power house is planned as a separate block to avoid the noise and vibrations during the operation of the generator system.

The Delivery Suite will be connected to the existing two maternity wards via a roofed connecting walkway (to be constructed by the Ugandan side), to strengthen the integrated function with the existing wards.

Building	Floor	Room
OPD/ Casualty Block	GF	Casualty Unit: Emergency first-aid room、Triage/ Clinic, Resuscitation (12 beds), Minor Operation Theatre, Nurse station, Office (-cum-guard station), Staff rooms (men/women), Duty, Anteroom, etc. OPD Unit: Entrance, Reception (including record storage), Laboratory, Pharmacy, 2 X-ray room, X-ray control room, Ultrasonic laboratory, Patient waiting room, Corridor, Staircase, Ramp, Patient toilet, etc. MCH Unit: Clinic
	1F	OPD Unit: General OPD consultation room (4 rooms), Paediatric consultation room, Specialized OPD consultation room, Common treatment room, Gynaecological consultation room, Gynaecological treatment room, Dental clinic, Staff rooms, Patient waiting room, Corridor, Ramp, etc. MCH Unit: Clinic, Vaccine storage
Power House	GF	Power ・ Generator house
Delivery Suite	GF	Delivery room (6 beds), NICUs (including anteroom), Staff rooms, Sterilisation/Laundry, etc.
Generator House	GF	Generator house

5. Zoning plan

i) OPD/Casualty Block

Based on the similar considerations for Gulu RRH, a two-story building will be planned, and ramps and stairways will be planned for the vertical migration instead of elevators.

The OPD will be situated on the north side in GF and the Casualty on the south side. In 1F OPD clinics will be situated on the north and south sides, while patient waiting space and corridor will be designed by the central ramp. Staff corridor will be designed as much as possible on the exterior window side of the clinic and treatment rooms for the purpose of separating circulations of staffs and patients.

MCH will be situated on the west side of GF and 1F. The construction of the MCH waiting and a walkway connecting to the MCH will be borne by the Ugandan side.

Patient toilets will be installed in an independent house in order to minimize the offensive

odours into the hospital buildings.

GF 1F

Figure 2-5 Lira RRH: Zoning of the OPD/Casualty Block

ii) Delivery Suite

The Delivery Suite will be connected to the two existing Maternity Wards via a connecting walkway to use the new delivery rooms and the existing Maternity Wards integrally so as to enable effective operation of the Delivery Suite.

d. Arua RRH

1. Assumed population increase

District	Census population	Population estimate in 2016 Statistical Abstract		2014/15-2015/16 Population growth rate	2013/14 Population estimate	2015/16-2016/17 Population growth rate	2024/25 Population estimate	2013/14-2024/25 Population growth rate
	2014	2015	2016					
	A	B	C	D=B/A	F=A/D	G=C/B	H=C*G^8	I=H/F
Arua	785,189	799,500	820,500	1.018	771,134	1.026	1,009,624	
Koboko	208,163	213,000	221,100	1.023	203,436	1.038	298,031	
Maracha	186,176	189,000	192,600	1.015	183,394	1.019	223,981	
Yumbe	485,582	506,900	534,300	1.044	465,161	1.054	814,120	
Zombo	240,368	245,700	252,400	1.022	235,152	1.027	313,013	
Total	1,905,478	1,954,100	2,020,900		1,858,276		2,658,769	1.431

↓

Rate: 1.43

2. Planning the number of main rooms

The sizes of OPD and Casualty unit are estimated based on the assumed 1.43 population growth rate from 2013/14 to 2024/15 in the catchment area of Arua RRH.

i) OPD

The number of required consultation rooms is calculated based on the number of patients in the past five years, assuming that the working days of OPD are 300 days/year, opening hours are eight hrs/day (480 min/day), and the average consultation time is eight minutes per patient

at the General OPD, Medical OPD, Paediatrics, ENT and Ophthalmology, and 20 minutes per patient at Diabetes, Nutrition, Palliative care, Surgery, Orthopaedics, OBS/GYN, Cancer screening and Dental departments. Also, it is preconditioned that more than one departments share the consultation rooms

Estimated Annual No. of Patients

Department	2011/12	2012/13	2013/14	2014/15	2015/16	**Average**
General OPD	23,271	69,341	37,210	34,015	28,515	**38,470**
Medical OPD	1,364	472	925	1,396	720	**975**
Diabetes	3,877	858	2,133	5,477	4,755	**3,420**
Nutrition	-	-	-	2,625	728	**1,677**
Palliative care	15,864	674	1,408	1,389	1,048	**4,077**
Paediatrics	31,766	30,864	27,202	15,263	12,423	**23,504**
Surgery	543	517	1,534	1,545	1,597	**1,147**
Orthopaedics	2,760	980	1,378	1,829	2,281	**1,846**
ENT	4,903	2,933	6,823	5,424	6,797	**5,376**
Ophthalmology	5,241	3,137	9,868		10,977	**7,306**
OBS/GYN	1,447	-	525	1,021	350	**836**
Dental	9,938	858	11,734	10,296	5,044	**7,574**
Total	100,974	110,634	100,740	80,280	75,235	**96,208**

Estimation of Required Number of Rooms

Consultation room	Department	Annual No. of patients	Rate of patient increase	Consultation time per patient (min)	Annual working day	Opening hours (min)	Required No. of rooms*	**Planned No. of rooms**
		A	B	C	D	E	F=A*B*C /D/E	
General OPD	General OPD	38,470	1.43	8	300	480	3.06	**4**
	Palliative care	4,077	1.43	20	300	480	0.81	
	Subtotal						3.87	
Medical OPD	Medical OPD	975	1.43	8	300	480	0.08	**1**
	Diabetes	3,420	1.43	20	300	480	0.68	
	Nutrition	1,677	1.43	20	300	480	0.33	
	Subtotal						1.09	
Paediatrics	Paediatrics	23,504	1.43	8	300	480	1.87	**2**
Surgery	Surgery	1,147	1.43	20	300	480	0.23	**1**
	Ophthalmology	1,846	1.43	20	300	480	0.37	
	Subtotal						0.59	
ENT+ Ophthalmology	ENT	5,376	1.43	8	300	480	0.43	**1**
	Ophthalmology	7,306	1.43	8	300	480	0.58	
	Subtotal						1.01	
OBS/GYN	OBS/GYN	836	1.43	20	300	480	0.17	**1**
	Subtotal						0.17	
Dental	Dental	7,574	1.43	20	300	480	1.50	**1**
Total								**11**

*In the case of dental it is the required number of examination tables

ii) Casualty

The number of required resuscitation beds is calculated based on the number of emergency patients in the past five years, assuming that the working days of the casualty unit are 365 days/year, opening hours are 24 hrs/day (1,440 min/day), and the average recovery time is 840 minutes per patient.

Estimated annual number of casualty patients

Year	2011/12	2012/13	2013/14	2014/15	2015/16	**Average**
No. of patients	-	2,777	6,044	6,088	6,352	**5,315**

Estimation of required number of room

Annual No. of casualty patients	Rate of population increase	Recovery time per patient (min)	Annual working day	Opening hours (min)	Required No. of beds	**Planned No. of beds**
A	B	C1	D1	E1	F1=A*B*C1/ D1/E1	
5,315	1.43	840	365	1440	12.15	**12**

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 2-9 Floor Areas of Arua RRH

OPD / Casualty Block GF		
Dept.	Room Name	Floor Area(m2)
OPD	Entrance / Waiting	180.61
	Staircase	24.39
	Ramp	67.59
	Store	10.96
	Reception	49.96
	Laboratory	37.47
	Pharmacy	37.47
	X-Ray 1	23.36
	X-Ray Control	14.11
	X-Ray 2	23.36
	Ultrasonic	15.43
	Corridor	39.99
	Handicapped Toilet	5.93
	Womens Toilet	23.74
	Mens Toilet	21.42
	Subtotal	575.79
Casualty	Office	6.40
	Triage / Clinic / Resuscitatio	151.56
	Staff	12.00
	Staff	12.00
	Duty	12.00
	Sluice/ Sterilization	12.40
	Ante- Room	3.94
	Minor Operation Theatre	30.47
	Subtotal	240.77
Common	Fire Hydrant Pump Room	22.24
	Other Common	27.17
	Subtotal	49.41
GF Subtotal		865.97

OPD / Casualty Block 1F		
Dept.	Room Name	Floor Area(m2)
OPD	Corridor / Waiting	270.25
	Staircase	23.45
	Ramp	82.52
	Store	16.53
	Marps	16.00
	Clinic 1 (Dental)	62.24
	Clinic 2	18.73
	Clinic 3	18.73
	Clinic 4	18.73
	Treatment	37.47
	Clinic 5	18.73
	Clinic 6	18.73
	Staff	18.73
	Staff	19.30
	Clinic 7	20.27
	Clinic 8	18.73
	Clinic 9	18.73
	Clinic 10	18.73
	Clinic 11	18.73
	HCT 1	18.73
	HCT 2	18.73
	Adolescence	19.29
	Subtotal	792.08
Common	Handicapped Toilet	5.93
	Womens Toilet	23.74
	Mens Toilet	21.42
	Other Common	54.03
	Subtotal	105.12
1F Subtotal		897.20
Total		1763.17

Power House		
Common	Power House	17.31

4. Components of each building

Based on the discussions with MOH and Arua RRH as well as the site surveys, facilities construction at Arua RRH is planned to consist of two buildings: the OPD/Casualty Block and the Power Receiving Block. The power receiving block is planned as a separate one to avoid the noise and vibrations during the operation of the generator system.

Building	Floor	Room
OPD/ Casualty Block	GF	Casualty Unit: Emergency first-aid room、Triage/ Clinic, Resuscitation (12 beds), Minor Operation Theatre, Sterilisation room, Nurse station, Office (-cum-guard station), Staff rooms (men/women), Duty, Anteroom, etc. Outpatient Unit: Entrance hall, Reception (including record storage), Laboratory, Pharmacy, 2 X-ray room, X-ray control room, Patient waiting room, Corridor, Staircase, Ramp, Medical supply storage-1, etc. Common Unit: Patient toilet
	1F	General OPD consultation room (4 rooms), Paediatric consultation room, Specialised OPD consultation room, Specialised OPD treatment room, Dental clinic, Medical supply storage-2, Staff toilet, Waiting space, Corridor, Ramp, Patient toilet, etc.
Power House	GF	Power house, Generator house

5. Zoning plan

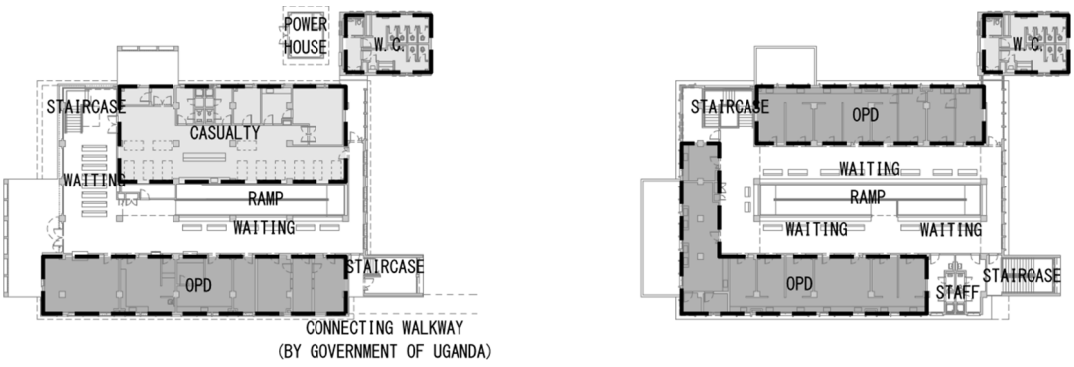
i) OPD/Casualty Block

Based on the similar considerations for Gulu and Lira RRHs, a two-story building will be planned for the better use of land and ramps and stairways will be planned for the vertical migration instead of elevators.

The OPD will be situated on the north side in GF and the Casualty on the south side. In 1F OPD clinics will be situated on the north and south sides, while patient waiting space and corridor will be designed by the central ramp. Staff corridor will be designed as much as possible on the exterior window side of the clinic and treatment rooms for the purpose of separating circulations of staffs and patients.

MCH will be situated on the west side in GF and 1F, and its waiting space will be provided connected to the MCH via a passage.

In order to minimize the offensive odours into the hospital buildings, patient toilets will be installed in an independent house.



GF 1F

Figure 2-6 Arua RRH: Zoning of the OPD/Casualty Block

2) Sectional Plan

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 minor operation theatres, X-ray room and X-ray control room will not be equipped with air conditioners.

In the OPD/Casualty Block at Lira and Arua RRHs, vent grilles above the ramps in the centre of the building and vaulted ceiling will allow air flowing into the building to naturally ventilate the whole building including the ground floors. Small cornices at the height of slabs on the first floor and roof will mitigate the effect of direct sunlight on the inside environment. Polycarbonate roofing will be used in part of the atrium ceilings, which will serve as roof lights.

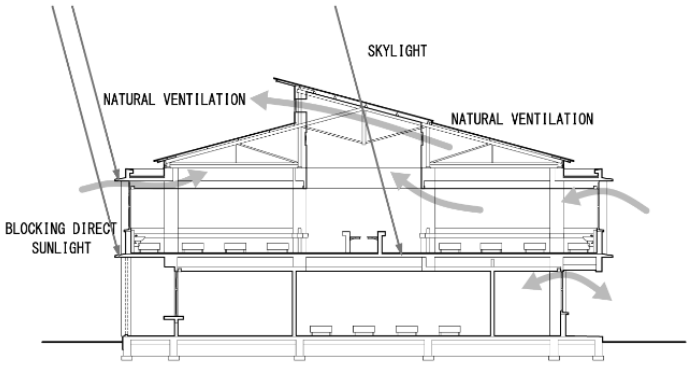


Figure 2-7 Gulu RRH: Section of the Theatre/Casualty/Maternity Ward

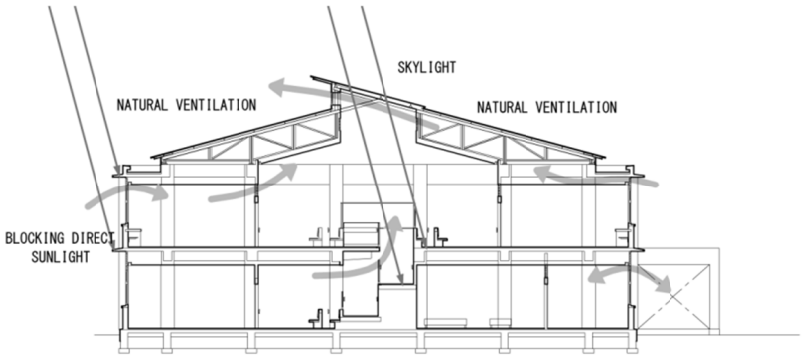


Figure 2-8 Lira and Arua RRHs: Section of the OPD/Casualty Block

3) Structural Plan

a. Structural Design Standard

The Japanese survey team and the officers in charge of architectural planning of the Infrastructure Department, Directorate 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.

b. Design Load

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.

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

where:

Cd : Design horizontal seismic coefficient at the ground level

C : Basic seismic coefficient for the fundamental translational period (C≦0.08)

Z : Seismic zone factor (at Gulu and Arua, Z=0.8; Lira, Z=0.7)

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)

c. 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.

d. Foundation Planning

The design long-term bearing capacity of soils based on the results of boring surveys are summarised as follows:

Site	Embedded length below GL (m)	Type of soil	Long-term bearing capacity (KPa/m^2)
Gulu RRH	2.20	Clay	150
Lira RRH	2.10	Clay	150
Arua RRH	2.50	Clay	112

Accordingly, isolated footing system will be adopted for all the three RRHs.

e. Structural Materials and Construction Methods

1. Concrete

Concrete needs to be manufactured with concrete mixer trucks at each site, because there is no concrete mill in Gulu, Lira and Arua areas that are capable of manufacturing ready mixed concrete. The design strength of concrete (Fc) will be set at 25 N/mm^2.

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.

4) Utility Systems Planning

a. Electrical Planning

1. Poser incoming installations

At Gulu, Lira and Arua RRHs, high tension electric power is received and stepped down to 415-240V through the pole transformer and distributed by three-phase four-line cables to each consumption point. The pole transformer is an asset of the electric company, and the secondary power lines are also connected to other facilities.

The required electric power at the project buildings is estimated to be from 100 to 150 kVA

at the three hospitals, however, each hospital does not have enough margins for the existing transformer and it is impossible to supply electric power to the buildings except the Delivery Suite of Lira RRH. A new pole transformer will be installed in the hospital premises by the Japanese side for the exclusive use of the project building (the required power supply based on the transformer capacity 59 VA/m^2, and power consumption about 15 W/m^2, and adding large capacity power supply for X-ray machines, etc.)

Since the Delivery Suite of Lira RRH will have small floor areas and will be connected to the existing building, it is planned to use the secondary side power source of the existing substation.

The outline of electrical intake configuration at each site is described below.

Table2-10 Electrical Intake Configuration

	Gulu RRH	Lira RRH	Arua RRH
Pressure of incoming transmission line	11 kV	11 kV	33 kV
Primary side cable	3φ 3W 50Hz	3φ 3W 50Hz	3φ 3W 50Hz
Electric company	Umeme	Umeme	Wenreco
Location of the existing transformer	In the hospital premises	In the hospital premises	In the hospital premises
Capacity of the existing transformer	315 kVA	200 kVA	315 kVA
Capacity of the new transformer*	200 kVA	200 kVA	200 kVA

*Through the discussions with the electric companies at each RRH, the newly installed transformer is requested to have 200kVA or more capacity.

2. Generator

In case of power failure, diesel engine generator will be considered as a back-up power source of the life-related medical equipment and lights. At the time of power failure, the power supply will be automatically switched to the diesel engine generator. The solar power generation system requested during the field survey 2 is excluded from the project components because it will be difficult to maintain compared to diesel generator system, the charge volume from the solar panels to the battery is not sufficient to compensate for the power supply at the time of power failure, and the service life of the battery is rather short. The generator system will be designed so that the solar system can be installed by the Ugandan side in the future.

Furthermore, a diesel engine generator will be installed separately from the above system to supply three-phase power such as for X-ray, autoclave, fire pump and the like. The generator is set as a control system activated only at the time of power failure and use of the equipment, so as to minimise fuel consumption.

	Gulu RRH	Lira RRH	Arua RRH
For the life-related medical equipment Diesel engine generator	15 kVA	10 kVA	15 kVA
For three-phase power Diesel engine generator	75 kVA	150 kVA, 50 kVA (NICU)	150 kVA

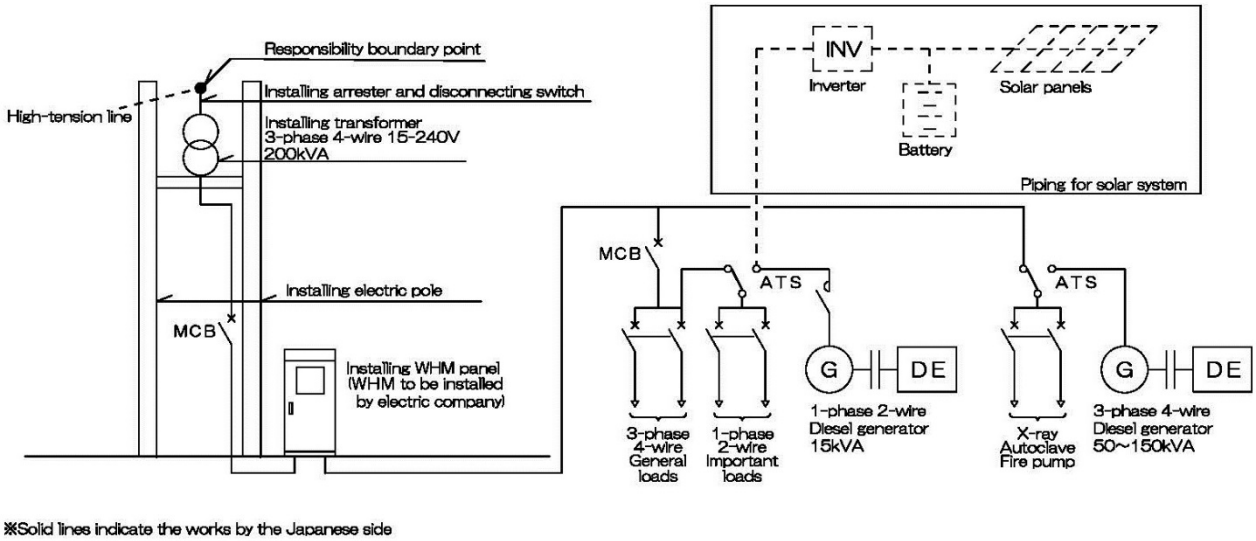


Figure 2-9 Schematic Diagram of Receiving and Transforming Systems

3. Receptacles and lights

Fluorescent lamps that are commonly used locally are planned as light sources, and the design illuminance is set at about 70% of the Japan Industrial Standards (JIS). ICU light 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.

LED lights will be used for the generator circuit to reduce the required generator capacity, and AVR will be deployed to control voltage fluctuation, considering the effect of voltage fluctuation on medical equipment causing breakdown.

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

4. Lightning arrester and grounding device

The existing buildings are equipped with the lightning system. Similarly, a lightning 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. Cable piping for information network

At Gulu RRH, LAN system is not yet established however, empty piping will be planned in

the Theatre/Casualty/Maternity Ward for future establishment by the Ugandan side.

At Lira and Arua RRHs, LAN system is established in the existing hospital buildings. Accordingly, LAN system will be established also in the project building so that the Ugandan side will be able to connect it to the server in the existing building.

Since PC installation is not planned, LAN system is not considered for the Delivery Suite at Lira RRH.

6. 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 space and attendant rooms.

7. Public address system

For the purpose of patient paging, microphones and speakers will be installed for patient call from the consultation rooms and reception desk to the waiting space in the OPD/Casualty Block at Lira and Arua RRHs.

8. Automatic fire alarm system

Detectors and receivers will be installed in the newly built facilities at all the three RRHs. Alarm bells and transmitters will be installed above the fire hydrants.

b. Mechanical Planning

1. Water supply system

The target three RRHs are supplied with city water by NWSC. At Gulu and Arua RRH, a branch pipe will be drawn from the existing water supply pipe in the hospital premises. For the OPD/Casualty Block at Lira RRH, a water pipe will be connected to the public water main with a meter installed near the boundary limit.

According to NWSC, the public water main for Gulu and Arua RRHs has sufficient water pressure. Water will be directly led to the elevated water tank and supplied to each consumption point. At Lira RRH, the water pressure of the public 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 tank on top of the OPD/Casualty Block, and supplied to each consumption point.

The elevated water tank is planned to have sufficient capacity for one-day consumption. The size of water receiving tank at Lira RRH is planned to cover for the half-day consumption.

Since the Delivery Suite of Lira RRH will have small floor areas and will be connected to the existing building, water supply pipe is planned to be connected to the existing elevated tank.

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

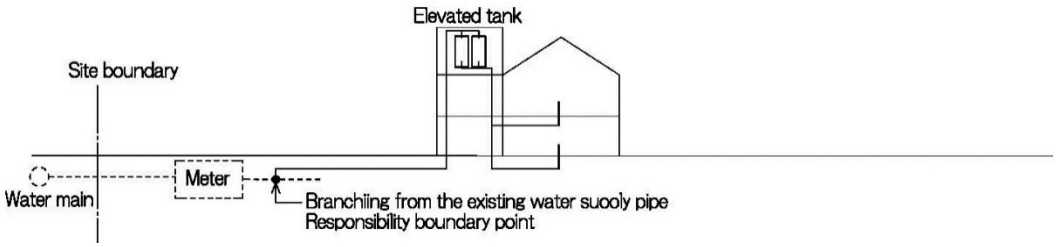


Figure 2-10 Gulu and Arua RRHs: Schematic Diagram of Water Supply System

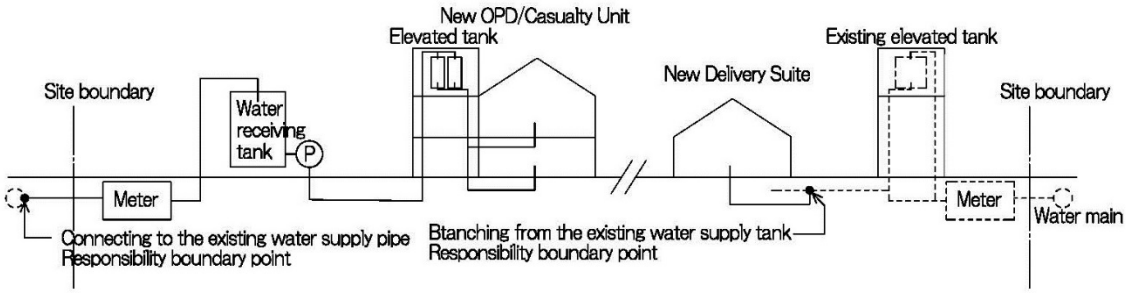


Figure 2-11 Lira RRH: Schematic Diagram of Water Supply System

2. Water sewerage system

As the areas around Gulu, Lira and Arua RRHs are equipped with public sewerage systems, both the soil wastewater and domestic wastewater will be connected to the hospitals' sewerage pipe and discharged into the public main sewer.

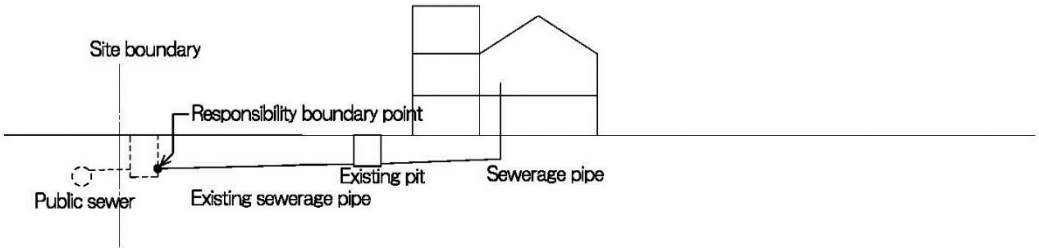


Figure 2-12 Gulu and Arua RRHs: Schematic Diagram of Wastewater Sewerage System

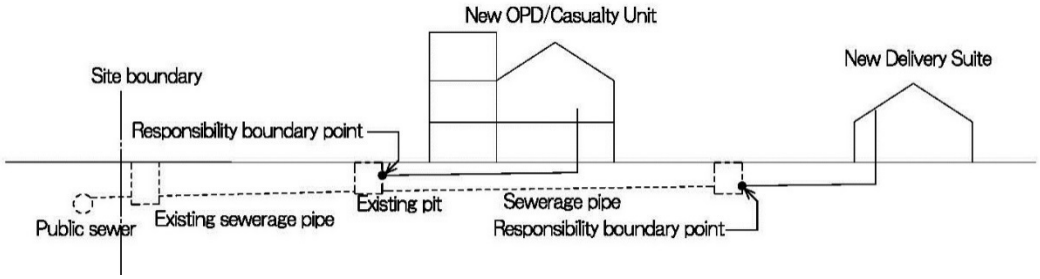


Figure 2-13 Lira RRH: Schematic Diagram of Wastewater Sewerage System

3. Hot water supply system

Hot water supply system will be designed at Gulu, Lira, and Arua RRHs to supply hot water for scrub sinks at the operation theatres, sinks at the deliver rooms as well as patient

and staff showers. A solar panel system will be installed on the roof to take advantage of daytime solar heat.

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 will be installed, to be equipped with a fire hydrant and a pump. Fire extinguisher will be also installed at necessary places.

6. 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 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, ICU, X-ray room and control room, laboratory and pharmacy.

7. Rainwater drainage system

It is planned that rainwater on the roof will be stored in a resin tank on the ground (Ugandan responsibility) and used for washing and cleaning.

8. Medical gas system

A central oxygen supply system will be planned only for Gulu RRH. Oxygen supply pipes will be laid from the oxygen cylinder shed to the operation theatres, ICU and NICU in which outlets are to be installed.

5) Construction Materials Planning

a. 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.

b. 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

i) 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.

ii) The ceilings of general rooms, corridors and waiting halls will be finished with paint on mineral boards.

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

4. Door and window sashes

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

Internal doors for general rooms will be light-gauge steel flush 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.

Following table shows the finishing schedule under consideration at present.

Table 2-11 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	Fair-faced brickwork	Commonly used locally, easy for maintenance
	Paint on mortar substrate	paint on cement mortar substrate	Commonly used locally, easy for maintenance
Floor	Terrazzo in situ	Terrazzo in situ	Durable and easy cleaning, commonly used locally
	Mortar with trowel finish	Mortar with trowel finish	Less expensive than terrazzo in situ, commonly used locally
Interior wall	Paint on mortar substrate	Paint on mortar substrate	Commonly used locally, easy for maintenance
	Tile	Tile	Commonly used locally, easy for cleaning
Ceiling	Paint on gypsum board substrate	Paint on gypsum board substrate	Commonly used locally, easy for maintenance
	Calcium silicate board	Calcium silicate board	Waterproof, relatively easy for cleaning, commonly used locally
	T-bar type acoustic ceiling board	T-bar type acoustic ceiling boar	Commonly used locally, easy for maintenance
Doors & Windows	Steel windows	Aluminium windows	Commonly used locally, good weather durability
	Wooden doors	Light gauge steel doors	Good soundproofing, operability, durability
	Steel doors	Steel doors	Good durability, soundproofing, economical, easy for maintenance
		Stainless steel doors	Good functionality, durability

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. Therefore, to the extent possible, they will be procured locally, while ensuring acceptable levels of quality. On the other hand, procurement from Japan will be also considered for certain equipment required to be of a satisfactory quality for hospitals.

(4) Equipment Planning

The requested equipment was reasonably selected after deliberate discussion and consideration at the onsite meetings, which was verified in Japan according to the following evaluation criteria. As for the equipment to be installed in the existing facilities, validity of its installation will be re-examined considering the findings in the field survey such as size of the rooms, existence of utility and surrounding environments. The equipment is evaluated by each assessment standard to three-level: ○ Reasonable, △ Partially reasonable, × Unreasonable. Assessed with one × or more than three △ means the comprehensive validity of the equipment is low, and such equipment is not considered in the equipment plan. The result of evaluation is shown on the Examination List of Requested Equipment.

1. If the requested equipment is listed in NMEP,
2. If the requested equipment is indispensable for consultancy activities at the hospital,
3. If the requested equipment is expected for enough number of patients for usage,
4. If the user has experience long enough for continuous usage of the requested equipment,
5. If the consumables and spare parts readily available in Uganda (in terms of price and distribution status, etc.),
6. If the requested equipment is installed to the facilities which will be constructed in the Project,
7. As to the requested equipment to be installed in the existing facilities, enough security and necessary utility ensured,
8. As to the equipment to be installed in the existing facilities, if it does not require large scope of construction works for its installation,
9. If the requested equipment is utilised also in other RRHs,
10. If the requested equipment can be maintained and repaired properly by the agencies in Uganda,
11. If the requested equipment is not intended for private use,
12. If the requested equipment is intended for clinical use,
13. If the requested equipment is in accordance with Japanese Scheme of Grant Aid (with the exception of general and office furniture),
14. If the requested equipment is not easily procured by the Ugandan side,
15. If the requested equipment doe not overlap the existing items or those to be supplied by other donors or by the budget of the GOU,
16. If the requested equipment is technically enough appraised (with the exception of high-end and not yet generally accepted equipment),
17. If the requested equipment is not found as general and substitutional,
18. If the requested equipment is highly prioritised in the request list.

[Volume Estimation]

Quantity of the planned equipment chosen in accordance with the above mentioned criteria will be estimated taking into consideration of the frequency of usage and conditions of the existing equipment. For medical equipment to be placed in the project building, volume will be estimated suitable for the facility scale.

[Spare Parts and Consumables]

Basically, expendables and spare parts will not be included in the Project. However, consumables required for initial operations will be included in the Project for about three months, in consideration of the time lag between the equipment installation and the budget formulation for expendables procurement.

[Defect Inspection]

As precision equipment is included, defect inspection will be conducted one (1) year after the hand-over.

[AVR, UPS and generator circuit for equipment]

The situation of power supply in Uganda is not very good; there are frequent power failures and large voltage fluctuations. Therefore, in order to keep stable operation of the procured equipment, it is necessary to install AVR, UPS and generator for power failure. AVR and generator will be installed in each of the new building as facility portion from the viewpoint of cost effectiveness. In addition, the risk that all power sources will not be AVR compliant in case of AVR failures will be solved by setting up spares of AVR. However, for the high-power equipment which uses three-phase 415V power supply (e.g. general X-ray machine, fluoroscopy X-ray machine, etc.), since the total number of equipment units is small, AVR will be installed for each equipment item individually. For the equipment to be installed in the existing building, AVR will be installed for individual equipment not to impair operability of mobile equipment, and not to set up on the floor directly but to set on the table or rack for stand-alone equipment.

UPS will be installed for the equipment with built-in-computer, especially for such equipment that power failures may erase patient data and that even a momentary power failure may cause fatal damage (e.g. biochemistry analyser, CR system, etc.).

Generator circuit for emergency electric power source will be installed for the equipment (mainly equipment for ICU and operation theatres) which give serious impact to a patient in case it stops for a long period.

[Scope of Maintenance Contract]

A three-year maintenance contract shall be covered in the Project for the equipment on which maintenance by the manufacturers and agents is important, in order to prevent the equipment from being inoperable because of troubles incurred relatively soon after its handover. The manufacturer’s warranty period usually lasts for one year covering on-call service, where the company dispatches engineer from the agent in case of trouble on request of user hospital to deal with check-up of the equipment and so on without additional cost. Equipment subject to the maintenance contract which enjoys extension of the coverage duration by two years in addition to this one-year term of warranty, three year of regular maintenance and replacement service of repair parts and exchange parts is decided each in equipment group and included in the contract. The cost of maintenance contract shall be borne by Japan and the procurer is responsible of the service rendered under this maintenance contract. All the consumables required in use such as reagents and disposables shall be prepared at expense of Uganda.

< Selection Criteria >

1. Possibilities of clinically serious damage
   Equipment for which no substitutional method expected in case of breakdown with high risk of causing serious medical accidents

2. High denomination

   Equipment with which there is a difficulty to handle at the Ugandan side requiring high additional cost in case of repair and maintenance check-up.

3. Frequency of troubles while in use

   Equipment such as inspection machines with fine driving parts (with fine structure where sample and test reagent pass through severely thin flow channels) which needs periodic change of consumable parts, calibration of measured data and maintenance and inspections by professional engineer other than ordinary maintenance and inspections

< Equipment and maintenance >

No.	Equipment	Unit	Reason for selection	Regular maintenance menu	Frequency of regular maintenance (times/ year/ number for every 3 years)	Frequency of on-call maintenance (maximum times/ year/ number for every 2 years)	Spare & repair part
6	Anaesthesia Machine	7	Since this device will impede surgical operation in case of breakdown. It shall be guaranteed in the maintenance contract.		0	5	Supported
13	Biochemistry analyser	3	Severely thin tubes which blood and reagent for test passing through need periodical maintenance of measuring circuit.	- Periodic maintenance and replacement of measuring circuit. -Calibration of measurement results	2	5	Supported
25	Computed Radiography (CR) system	2	If troubled, all X-ray inspection data will be unreachable and hospital function will compromise. The constant operation shall be guaranteed in the maintenance contract.		0	3	Supported
62	Fluoroscopy X-ray machine	2	In case of breakdown, fluoroscopic imaging will not be available in all the hospitals and serious damage will be expected. Maintenance contract is indispensable to keep constant operation, avoiding such circumstances,	Check-up of bulbs of X-ray, existence of noises in pictures	1	3	Including repair parts, exchange parts and a bulbs of X-ray
68	Haematology analyser	3	Severely thin tubes which blood and reagent for test passing through need periodical maintenance of measuring circuit.	- Periodic maintenance and replacement of measuring circuit. -Calibration of measurement results	1	5	Supported
146	Ventilator	1	As intended for the patients who have difficulty breathing spontaneously, serious trouble will occur in case of breakdown. The constant operation shall be guaranteed in the maintenance contract.		0	3	Supported

1. Examination List of Requested Equipment

Results of analysis according to the criteria above are shown in the following Examination List of Requested Equipment:

Table 2-12 Examination List of Requested Equipment

No.	Initial	Dept	Req.No.	Equipment Name	Priority	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	Evaluation
				Accident And Emergency																				
1	A	Em	A-Em-1	Patient monitor	1	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
2	A	Em	A-Em-2	Bronchoscope	19	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
3	A	Em	A-Em-3-1	Ventilator	2	○	○	○	△	○	○	–	–	△	△	○	○	○	○	○	○	△	○	×
3	A	Em	A-Em-3-2	Ambubag set	2	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
4	A	Em	A-Em-4	Defibrillator	16	△	○	△	△	○	○	–	–	○	○	○	○	○	○	○	○	○	△	×
5	A	Em	A-Em-5	Oxygen cylinder set	8	○	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
6	A	Em	A-Em-6	Suction machine (electrical)	3	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
7	A	Em	A-Em-7	Nebulizer	4	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
8	A	Em	A-Em-8	Patient trolley	5	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
9	A	Em	A-Em-9	Wheel chair	9	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
10	A	Em	A-Em-10	Operating table	6	○	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
11	A	Em	A-Em-11	Operating light (mobile)	7	○	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
12	A	Em	A-Em-12	Drug trolley	17	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
13	A	Em	A-Em-13	Medicine cupboard	18	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
14	A	Em	A-Em-14	Emergency bed	10	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
15	A	Em	A-Em-15	Examination light	11	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
16	A	Em	A-Em-16	Dressing cart	12	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
17	A	Em	A-Em-17	Dressing instrument set	14	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
18	A	Em	A-Em-18	Diagnosis set	15	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
19	A	Em	A-Em-19	Minor surgery instrument set	13	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
20	A	Em	A-Em-20	Autoclave (desktop)	20	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
	A			Ambulance																				
21	A	Am	A-Am-21	Ambulance	1	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
	A			Dental																				
22	A	Dn	A-Dn-22	Dental chair	1	○	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
23	A	Dn	A-Dn-23	Dental X-ray machine	2	○	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
24	A	Dn	A-Dn-24	Autoclave (desktop)	4	○	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
25	A	Dn	A-Dn-25	Light cure machine	6	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
26	A	Dn	A-Dn-26	Ultrasonic scaler	7	△	△	○	○	○	○	–	–	○	○	○	△	○	○	○	○	△	○	×
27	A	Dn	A-Dn-27	Ultrasonic cleaner	8	△	△	○	○	○	○	–	–	△	○	○	△	○	○	○	○	△	○	×
28	A	Dn	A-Dn-28	Dental implant surgical motor	15	△	△	△	△	△	○	–	–	△	△	○	○	○	○	○	○	△	△	×
29	A	Dn	A-Dn-29	Handpieces oiler	9	△	△	○	○	○	○	–	–	△	△	○	△	○	○	○	○	○	○	×
30	A	Dn	A-Dn-30	Apex locator	10	△	△	○	○	–	○	–	–	△	○	○	△	○	○	○	○	△	△	×
31	A	Dn	A-Dn-31	Dental casting machine	11	△	△	○	△	○	○	–	–	○	○	○	△	○	○	○	○	○	△	×
32	A	Dn	A-Dn-32	Polishing and trimming machine	12	△	△	○	△	○	○	–	–	○	○	○	△	○	○	○	○	○	△	×
33	A	Dn	A-Dn-33	Hydroflasks, Heat cure flasks and articulators	13	△	○	○	△	△	○	–	–	△	△	○	△	○	○	○	○	△	△	×
34	A	Dn	A-Dn-34	Orthopantomogram	14	△	○	△	△	○	○	–	–	△	△	○	○	○	○	○	○	△	△	×
35	A	Dn	A-Dn-35	Pulp tester	5	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
36	A	Dn	A-Dn-36	Dental instrument set	3	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
	A			Occupational Therapy																				
37	A	Oc	A-Oc-37	Large portable mirrow	2	△	△	○	○	○	△	○	○	△	○	○	△	○	○	○	○	△	○	×
38	A	Oc	A-Oc-38	Sewing machines	3	△	△	△	△	○	△	○	○	△	○	○	△	○	○	○	○	△	○	×
39	A	Oc	A-Oc-39	Standing frames for adults and children	6	△	△	○	○	○	△	○	○	○	○	○	○	○	△	○	○	○	△	×
40	A	Oc	A-Oc-40	Walking frames for adults and children	4	△	△	○	○	○	△	○	○	○	○	○	○	○	△	○	○	○	○	×
41	A	Oc	A-Oc-41	Parallel bar for adult and children	1	○	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	△	○	×
42	A	Oc	A-Oc-42	Prone baords	5	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	△	×
	A			Physiotherapy																				
43	A	Pt	A-Pt-43	Short wave diathermy	1	○	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
44	A	Pt	A-Pt-44	Infra red machine	2	○	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
45	A	Pt	A-Pt-45	Ultrasonic therapy machine	3	○	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
46	A	Pt	A-Pt-46	EMS	4	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
47	A	Pt	A-Pt-47	Traction machine for cervical	5	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
48	A	Pt	A-Pt-48	Traction machine for lumber	6	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	×
49	A	Pt	A-Pt-49	TENS	7	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	×
50	A	Pt	A-Pt-50	Traction machine for shoulder	8	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	×
51	A	Pt	A-Pt-51	Stationary bike for adult	9	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
52	A	Pt	A-Pt-52	Exercise mat	10	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
53	A	Pt	A-Pt-53	Wheel chair	11	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
54	A	Pt	A-Pt-54	Balance ball	12	△	△	○	○	○	△	○	○	○	○	○	△	○	△	○	○	○	△	×

No.	Initial	Dept	Req.No.	Equipment Name	Priority	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	Evaluation
55	A	Pt	A-Pt-55	Hand exercise spring	13	△	△	○	○	○	△	○	○	○	○	○	△	○	△	○	○	△	△	×
	A			Imargery																				
56	A	Im	A-Im-56	CT scan	1	○	○	○	△	△	○	－	－	△	△	○	○	○	○	○	○	○	○	×
57	A	Im	A-Im-57	Berium enamel set	6	△	△	△	△	△	○	－	－	△	△	○	○	○	○	○	○	△	△	×
58	A	Im	A-Im-58	Mammograph	4	△	△	○	△	△	○	－	－	△	△	○	○	○	○	○	○	△	○	×
59	A	Im	A-Im-59	Ultrasound machine	2	○	○	○	○	○	○	－	－	○	○	○	○	○	○	○	○	○	○	○
60	A	Im	A-Im-60-1	General X-ray machine	3	○	○	○	○	○	○	－	－	○	○	○	○	○	○	○	○	△	○	○
60	A	Im	A-Im-60-2	CR system	3	△	○	○	△	○	○	－	－	○	○	○	○	○	○	○	○	○	○	○
60	A	Im	A-Im-6032	Fluoroscopy X-ray machine	3	△	○	○	○	○	○	－	－	○	○	○	○	○	○	○	○	○	○	○
61	A	Im	A-Im-61	Hysterosalpingogram set	7	△	○	△	○	○	○	－	－	○	○	○	○	○	○	○	○	○	△	○
62	A	Im	A-Im-62	Electroencephalogram	8	△	△	△	△	○	○	－	－	△	△	○	○	○	○	○	○	○	△	×
	A			Pharmacy																				
63	A	Ph	A-Ph-63	Refrigerator for drug (large)	1	○	○	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
64	A	Ph	A-Ph-64	Medicine cupboard	2	○	○	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
65	A	Ph	A-Ph-65	Autoclave (desktop)	4	△	○	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
66	A	Ph	A-Ph-66	Hot air oven	5	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	×
67	A	Ph	A-Ph-67	Water distillizer	3	○	○	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
68	A	Ph	A-Ph-68	Water bath	6	△	○	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	△	×
69	A	Ph	A-Ph-69	Electrical balance	7	○	○	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	△	○
	A			Orthopeadics																				
70	A	Or	A-Or-70	Plaster cutter (electrical)	1	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
71	A	Or	A-Or-71	Plaster cutter (manual)	14	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	×
72	A	Or	A-Or-72	Pulse oximeter	2	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
73	A	Or	A-Or-73	Oxygen cylinder set	3	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
74	A	Or	A-Or-74	Dressing instrument set	4	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
75	A	Or	A-Or-75	Dressing cart	5	△	○	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
76	A	Or	A-Or-76	Patient trolley	6	△	○	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
77	A	Or	A-Or-77	Drug trolley	7	△	○	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
78	A	Or	A-Or-78	Drum set	8	△	○	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
79	A	Or	A-Or-79	Autoclave (desktop)	9	△	○	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
80	A	Or	A-Or-80	Drip stand	10	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
81	A	Or	A-Or-81	Examination bed	11	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
82	A	Or	A-Or-82	Plaster table	12	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	×
83	A	Or	A-Or-83	Wheel chair	13	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
84	A	Or	A-Or-84	Bed craddle	15	△	△	○	○	○	△	○	○	△	○	○	○	○	○	○	○	△	△	×
85	A	Or	A-Or-85	Warking frame	16	△	△	○	○	○	△	○	○	○	○	○	○	○	△	○	○	△	△	×
86	A	Or	A-Or-86	Orthopedic broun frame for traction	17	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	×
87	A	Or	A-Or-87	C-arm	18	△	○	○	△	○	△	○	○	○	○	○	○	○	○	○	○	○	△	×
88	A	Or	A-Or-88	Orthopedic instrument set	19	△	○	○	△	○	△	○	○	○	○	○	○	○	○	○	○	○	△	×
	A			Laboratory																				
89	A	Lb	A-Lb-89	Hematology analyzer	7	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
90	A	Lb	A-Lb-90	Biochemistry analyzer	8	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
91	A	Lb	A-Lb-91	Refrigerator for drug	1	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
92	A	Lb	A-Lb-92	Centrifuge	2	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
93	A	Lb	A-Lb-93	Shaker	9	○	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	×
94	A	Lb	A-Lb-94	Blood mixer	10	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	×
95	A	Lb	A-Lb-95	Incubator	11	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	×
96	A	Lb	A-Lb-96	Electrical balance	4	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
97	A	Lb	A-Lb-97	Spring balance	3	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
98	A	Lb	A-Lb-98	Autoclave (Laboratory type)	5	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
99	A	Lb	A-Lb-99	Binocular microscope	6	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
100	A	Lb	A-Lb-100	Hemoglobin meter	12	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	×
	A			CSSD and LAUNDRY																				
101	A	Cs	A-Cs-101	Autoclave (stand alone)	1	○	○	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
102	A	Cs	A-Cs-102	Washing machine	1	△	○	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
103	A	Cs	A-Cs-103	Dryer	2	△	○	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
104	A	Cs	A-Cs-104	Roller ironing machine	3	△	△	○	△	○	△	○	○	△	△	○	△	○	○	○	○	△	○	×
105	A	Cs	A-Cs-105	Flat ironning machine	5	△	○	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	△	×
106	A	Cs	A-Cs-106	Laundry trolley	4	△	○	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	△	×
	A			MARTENITY																				
	A			Labour and Delivery room , HDU																				

No.	Initial	Dept	Req.No.	Equipment Name	Priority	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	Evaluation
107	A	OG	A-OG-107	Patient monitor	4	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
108	A	OG	A-OG-108	BP machine for adult	9	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
109	A	OG	A-OG-109	Delivery bed	1	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
110	A	OG	A-OG-110	Infant warmer	3	○	△	△	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	×
111	A	OG	A-OG-111	Patient trollery	2	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
112	A	OG	A-OG-112	Oxygen cylinder set	11	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
113	A	OG	A-OG-113	Wheel chair	12	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
114	A	OG	A-OG-114	Examination light	10	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
115	A	OG	A-OG-115	Delivery instrument set	5	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
116	A	OG	A-OG-116	Suction machine (electrical)	8	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
117	A	OG	A-OG-117	Fetal doppler	7	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
118	A	OG	A-OG-118	Ambu bag set for neonatal	6	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
119	A	OG	A-OG-119	Vacuum extractor	13	△	△	△	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	×
	A			OB/GY																				
120	A	OG	A-OG-120	Patient monitor	4	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
121	A	OG	A-OG-121	Drug trolley	7	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	△	×
122	A	OG	A-OG-122	Dressing cart	8	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	△	△	×
123	A	OG	A-OG-123	Dressing instrument set	5	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	○
124	A	OG	A-OG-124	Examination table for OB&GY	3	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	○
125	A	OG	A-OG-125	Fetal doppler	6	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	○
126	A	OG	A-OG-126	OB/GY examination instrument set	2	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	○
127	A	OG	A-OG-127	BP machine for adult	1	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	○
	A			Theatre																		△		
128	A	OG	A-OG-128	Patient monitor	1	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	○
129	A	OG	A-OG-129	Suction machine (electrical)	2	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	○
130	A	OG	A-OG-130	Anaesthesia Machine	3	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	○
131	A	OG	A-OG-131	Operating light (mobile)	4	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	○
132	A	OG	A-OG-132	Oxygen cylinder set	5	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	○
133	A	OG	A-OG-133	Autoclave (desktop)	7	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	○
134	A	OG	A-OG-134	Caesarean instrument set	6	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	○
	A			Neontal unit																		△		
135	A	OG	A-OG-135	Infant incubator	3	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	○
136	A	OG	A-OG-136	Oxygen cylinder set	6	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	○
137	A	OG	A-OG-137	Baby bed	2	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	○
138	A	OG	A-OG-138	Patient monitor	1	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	○
139	A	OG	A-OG-139	Suction machine (electrical)	7	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	○
140	A	OG	A-OG-140	Infant warmer	5	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	○
141	A	OG	A-OG-141	CPAP	4	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	○
	A			Internal Medicine																		△		
142	A	Me	A-Me-142	Oxygen cylinder set	1	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	○
143	A	Me	A-Me-143	Suction machine (electrical)	2	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	○
144	A	Me	A-Me-144	Autoclave (desktop)	3	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	○
145	A	Me	A-Me-145	Wheel chair	4	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	○
146	A	Me	A-Me-146	Patient monitor	5	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	○
147	A	Me	A-Me-147	Patient trolley	6	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	○
148	A	Me	A-Me-148	HBA1c analyzer	8	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	○
149	A	Me	A-Me-149	Infusion pump	9(2A, 2B)	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	○
150	A	Me	A-Me-150	Nebulizer	10	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	○
151	A	Me	A-Me-151	Diagnosis set	7	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	○
152	A	Me	A-Me-152	Refrigerator (battery type)	12(1A, 1B)	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	○
153	A	Me	A-Me-153	Dressing instrument set	13	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	○
154	A	Me	A-Me-154	Drug trolley	14	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	○
155	A	Me	A-Me-155	Sterilizing box set	15	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	○
156	A	Me	A-Me-156	Examination bed	18	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	○
157	A	Me	A-Me-157	Glucometer	19	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	○
158	A	Me	A-Me-158	Pulse oximeter	20	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	○
159	A	Me	A-Me-159	Weighing scale for adult	21	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	○
	A			Main Operating Theatre																		△		
160	A	Ot	A-Ot-160	Operating table with traction	1 (2A, 1B)	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	○
161	A	Ot	A-Ot-161	Patient monitor	4(2A, 1B)	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	○
162	A	Ot	A-Ot-162	Operating light (mobile)	2(2A, 1B)	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	○

No.	Initial	Dept	Reg.No.	Equipment Name	Priority	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	Evaluation
163	A	Ot	A-Ot-163	Anaesthesia Machine	6	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	○
164	A	Ot	A-Ot-164	Electrical dermatome	5(1A, 1B)	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	○
165	A	Ot	A-Ot-165	Oxygen cylinder set	9	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	○
166	A	Ot	A-Ot-166	Pneumatic tournique	8	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	○
167	A	Ot	A-Ot-167	Patient trolley	7	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	○
168	A	Ot	A-Ot-168	Suction machine (electrical)	3	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	○
169	A	Ot	A-Ot-169	Electro surgical unit	10	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	○
170	A	Ot	A-Ot-170	Instrument set for Operation theatre	11	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	△	△	×
	A			General Surgery																				
171	A	Su	A-Su-171	Patient monitor	5	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
172	A	Su	A-Su-172	Oxygen cylinder set	7	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
173	A	Su	A-Su-173	Suction machine (electrical)	6	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
174	A	Su	A-Su-174	Drug trolley	3	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
175	A	Su	A-Su-175	Screen	8	△	△	○	○	○	△	○	○	○	○	○	△	△	△	△	○	○	△	×
176	A	Su	A-Su-176	Patient trolley	2	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
177	A	Su	A-Su-177	Surgery instrument set	1	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
178	A	Su	A-Su-178	Dressing cart	4	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
	A			Pediatric																				
179	A	Pd	A-Pd-179	Oxygen cylinder set	1	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
180	A	Pd	A-Pd-180	Nebulizer	2	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
181	A	Pd	A-Pd-181	Patient monitor	3	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
182	A	Pd	A-Pd-182	BP machine for neonatal	4	△	○	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
183	A	Pd	A-Pd-183	Pulse oximeter	6	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
184	A	Pd	A-Pd-184	Screen	12	△	○	○	○	○	△	○	○	○	○	○	△	○	△	○	○	○	△	×
185	A	Pd	A-Pd-185	Ambu bag set for neonatal	13	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
186	A	Pd	A-Pd-186	Examination bed	7	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
187	A	Pd	A-Pd-187	Stethoscope for pediatric	8	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	×
188	A	Pd	A-Pd-188	Files trolley	11	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	△	×
189	A	Pd	A-Pd-189	Diagnosis set	10	○	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	△	○
190	A	Pd	A-Pd-190	Thermometer	9	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
191	A	Pd	A-Pd-191	Examination light	5	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
	A			Medical Equipment Workshop			△										△							
192	A	Wo	A-Wo-192	Eletctrical tool set	7	○	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
193	A	Wo	A-Wo-193	Refrigeration tool set	1	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	×
194	A	Wo	A-Wo-194	Oxygen gas analyzer	5	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	×
195	A	Wo	A-Wo-195	Mechanical tool set	6	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	×
196	A	Wo	A-Wo-196	Welding machine with generator	4	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	×
197	A	Wo	A-Wo-197	Plumbing tool set	9	○	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	×
198	A	Wo	A-Wo-198	Drilling machine	3	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
199	A	Wo	A-Wo-199	Carpentry tool set	10	○	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	△	×
200	A	Wo	A-Wo-200	Multimeter	8	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
201	A	Wo	A-Wo-201	Clamp meter	2	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
				OUT PATIENT																				
1	G	Op	G-Op-1	BP machine	1	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
2	G	Op	G-Op-2	Weighing scale for adult	2	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
3	G	Op	G-Op-3	Weighing scale for infant	3	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
4	G	Op	G-Op-4	Height meter	6	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
5	G	Op	G-Op-5	Autoclave (desktop)	5	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
6	G	Op	G-Op-6	Pulse oximeter	7	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
7	G	Op	G-Op-7	Thermometer	8	△	○	○	○	○	△	○	○	○	○	○	○	○	△	○	○	○	△	×
8	G	Op	G-Op-8	Examination light	4	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
	G			EMERGENCY UNIT																				
9	G	Em	G-Em-9	BP machine	10	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
10	G	Em	G-Em-10	Stethoscope	11	△	○	○	○	○	○	–	–	○	○	○	△	○	△	○	○	○	△	×
11	G	Em	G-Em-11	Weighing scale for infant	12	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
12	G	Em	G-Em-12	Thermometer	13	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
13	G	Em	G-Em-13	Pulse oximeter	9	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
14	G	Em	G-Em-14	Oxygen cylinder set	5	○	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
15	G	Em	G-Em-15	Suction machine (electrical)	3	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
16	G	Em	G-Em-16	Mobile X-ray machine	1	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
17	G	Em	G-Em-17	Ultrasound machine (mobile)	2	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○

No.	Initial	Dept	Req.No.	Equipment Name	Priority	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	Evaluation
18	G	Em	G-Em-18	Film viewer	17	△	○	△	○	○	△	–	–	○	○	○	○	○	○	△	○	△	△	×
19	G	Em	G-Em-19	Examination light	18	○	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
20	G	Em	G-Em-20	Infusion pump	19	△	△	○	○	○	○	–	–	△	○	○	○	○	○	○	○	△	△	×
21	G	Em	G-Em-21	Patient monitor	6	△	△	○	○	○	○	–	–	△	○	○	○	○	○	○	○	△	○	○
22	G	Em	G-Em-22	Suction machine (manual)	4	△	△	○	○	○	○	–	–	△	○	○	○	○	○	○	○	△	○	○
23	G	Em	G-Em-23	Operating light (mobile)	16	△	△	○	○	○	○	–	–	△	○	○	○	○	○	○	○	△	△	○
24	G	Em	G-Em-24	Syringe pump	20	△	△	○	○	○	○	–	–	△	○	○	○	○	○	○	○	△	△	×
25	G	Em	G-Em-25	Emergency bed	15	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
26	G	Em	G-Em-26	Operating table	14	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
27	G	Em	G-Em-27	Ambu bag set for adult	21	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
28	G	Em	G-Em-28	Cervical spine fixed color	22	△	△	○	○	○	○	–	–	○	○	○	○	○	△	○	○	△	△	×
29	G	Em	G-Em-29	Patient trolley	8	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
30	G	Em	G-Em-30	Wheel chair	7	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
	G			OPERATING THEATRE																				
31	G	Ot	G-Ot-31	Anaesthesia Machine	1	○	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
32	G	Ot	G-Ot-32	Operating light (ceiling mont)	2	○	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
33	G	Ot	G-Ot-33	Patient monitor	4	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
34	G	Ot	G-Ot-34	Oxygen cylinder set	7	○	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	×	○	×
35	G	Ot	G-Ot-35	Suction machine (electrical)	5	○	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
36	G	Ot	G-Ot-36	Weighing scale for adult, pediatric	15	△	△	○	○	○	○	–	–	○	○	○	○	○	△	○	○	○	△	×
37	G	Ot	G-Ot-37	Operating table with traction	3	○	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
38	G	Ot	G-Ot-38	Electro surgical unit	8	○	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
39	G	Ot	G-Ot-39	Defibrillator	9	△	△	△	△	○	○	–	–	○	△	○	○	○	○	○	○	○	○	×
40	G	Ot	G-Ot-40	Refrigerator for drug (small)	10	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
41	G	Ot	G-Ot-41	Operating light (mobile)	14	△	△	○	○	○	○	–	–	○	○	○	○	○	○	○	○	△	△	×
42	G	Ot	G-Ot-42	Patient trolley	11	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
43	G	Ot	G-Ot-43	Syringe pump	6	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
44	G	Ot	G-Ot-44	Instrument trolley	12	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
45	G	Ot	G-Ot-45	Mayo table	12	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
46	G	Ot	G-Ot-46	Instrument set for Operation theatre	13	△	○	○	○	○	○	–	–	○	○	○	○	○	○	△	○	△	△	×
add	G	Ot	G-Ot-add	Laparoscope set	–	△	△	○	△	○	○	○	○	△	○	○	○	○	○	○	○	△	△	×
add	G	Ot	G-Ot-add	Colonoscope set	–	△	△	○	△	○	○	○	○	△	○	○	○	○	○	○	○	△	△	×
add	G	Ot	G-Ot-add	Gastroscope set	–	△	△	○	△	○	○	○	○	△	○	○	○	○	○	○	○	△	△	×
	G			IMAGING DEPARTMENT																				
47	G	Im	G-Im-47	General X-ray machine	1	○	○	○	○	○	○	–	–	○	○	○	○	○	○	×	○	○	○	×
48	G	Im	G-Im-48	Mobile X-ray machine	5	○	○	○	○	○	○	–	–	○	○	○	○	○	○	×	○	○	○	×
49	G	Im	G-Im-49	CR system	2	△	○	○	○	○	○	–	–	○	○	○	○	○	○	×	○	○	○	×
50	G	Im	G-Im-50	Mammograph	9	△	△	○	△	△	○	–	–	△	△	○	○	○	○	○	○	△	△	×
51	G	Im	G-Im-51	CT scan	4	○	○	○	△	△	○	–	–	△	△	○	○	○	○	○	○	○	○	×
52	G	Im	G-Im-52	Ultrasound machine (mobile)	6	△	○	○	○	○	○	–	–	○	○	○	○	○	○	×	○	○	○	×
53	G	Im	G-Im-53	ECG	7	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
54	G	Im	G-Im-54	Ultrasound machine (cardiac)	3	○	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
55	G	Im	G-Im-55	Film viewer	10	△	○	△	○	○	△	–	–	○	○	○	○	○	○	△	○	△	△	×
56	G	Im	G-Im-56	Fluoroscopy X-ray machine	8	△	○	○	○	○	○	–	–	○	○	○	○	○	○	×	○	○	○	×
	G			ICU																				
57	G	IC	G-IC-57	ICU bed	2	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
58	G	IC	G-IC-58	Patient monitor	3	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
59	G	IC	G-IC-59	Suction machine (electrical)	5	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
60	G	IC	G-IC-60	Oxygen cylinder set	4	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
61	G	IC	G-IC-61	Autoclave (desktop)	6	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
62	G	IC	G-IC-62	Infusion pump	7	△	△	○	△	△	○	–	–	○	○	○	○	○	○	○	○	△	○	×
63	G	IC	G-IC-63	Ventilator	1	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
64	G	IC	G-IC-64	Ambu bag set for adult	8	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
65	G	IC	G-IC-65	Nebulizer	9	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
	G			NICU																				
66	G	NI	G-NI-66	Infant incubator	1	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
67	G	NI	G-NI-67	Photo therapy unit	5	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
68	G	NI	G-NI-68	Patient monitor for neonatal	8	△	○	△	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	×
69	G	NI	G-NI-69	Infusion pump	7	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
70	G	NI	G-NI-70	Pulse oximeter	3	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
71	G	NI	G-NI-71	Infant warmer	4	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	×

No.	Initial	Dept	Req.No.	Equipment Name	Priority	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	Evaluation
72	G	NI	G-NI-72	Examination light	6	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
73	G	NI	G-NI-73	Oxygen cylinder set	2	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
74	G	NI	G-NI-74	BP machine for neonatal	9	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
	G			OB&GY																				
75	G	OG	G-OG-75	Examination table for OB&GY	12	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
76	G	OG	G-OG-76	Examination bed	13	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
77	G	OG	G-OG-77	Ultrasound machine (mobile)	9	○	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
78	G	OG	G-OG-78	Fetal doppler	11	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
79	G	OG	G-OG-79	Autoclave (desktop)	2	○	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
80	G	OG	G-OG-80	Cryosurgery machine	3	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
81	G	OG	G-OG-81	Oxygen cylinder set	5	○	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
82	G	OG	G-OG-82	Suction machine (electrical)	6	○	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
83	G	OG	G-OG-83	Delivery bed	1	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
84	G	OG	G-OG-84	Fetal monitor	14	△	○	○	△	○	○	–	–	△	○	○	○	○	○	○	○	△	△	×
85	G	OG	G-OG-85	Vacuum extractor (manual)	4	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
86	G	OG	G-OG-86	Patient monitor	8	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
87	G	OG	G-OG-87	Infant warmer	10	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
88	G	OG	G-OG-88	Patient trollery	7	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
89	G	OG	G-OG-89	Corpo scope	15	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
90	G	OG	G-OG-90	Speculum set	17	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
91	G	OG	G-OG-91	Curettage instrument set	16	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
92	G	OG	G-OG-92	LEEP machine	18	△	△	○	○	○	○	–	–	○	○	○	○	○	○	○	○	△	△	×
	G			PAEDIATRICS																				
93	G	Pd	G-Pd-93	Oxygen cylinder set	1	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
94	G	Pd	G-Pd-94	Weighing scale for infant	8	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
95	G	Pd	G-Pd-95	Infusion pump	4	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
96	G	Pd	G-Pd-96	Patient monitor	2	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
97	G	Pd	G-Pd-97	Stethoscope for pediatric	7	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
98	G	Pd	G-Pd-98	Examination light	9	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
99	G	Pd	G-Pd-99	BP machine for neonatal	6	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
100	G	Pd	G-Pd-100	Nebulizer	3	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
101	G	Pd	G-Pd-101	Gulcometer	5	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
	G			CSSD and LAUNDRY																				
102	G	Cs	G-Cs-102	Autoclave (stand alone)	1	○	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
103	G	Cs	G-Cs-103	Washing machine	2	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
104	G	Cs	G-Cs-104	Flat ironning machine	3	△	△	○	○	○	△	–	–	○	○	○	△	○	○	○	○	△	○	×
105	G	Cs	G-Cs-105	Dryer	4	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
106	G	Cs	G-Cs-106	Working table for CSSD	7	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
107	G	Cs	G-Cs-107	Laundry trolley	5	△	△	○	○	○	○	–	–	○	○	○	△	○	○	○	○	△	○	×
108	G	Cs	G-Cs-108	Storage cabinet for CSSD	6	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
	G			ENT																				
109	G	EN	G-EN-109	Tonsillectomy instrument set	1	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	×
110	G	EN	G-EN-110	Adenoidectomy instrument set	2	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
111	G	EN	G-EN-111	Laryngoscope	3	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
112	G	EN	G-EN-112	Caldwel luc instrument set	4	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
113	G	EN	G-EN-113	Tracheostomy instrument set	13	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	×
114	G	EN	G-EN-114	Suction machine (electrical)	7	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
115	G	EN	G-EN-115	ENT oprating microscope	9	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
116	G	EN	G-EN-116	Middle ear instrument set	10	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
117	G	EN	G-EN-117	Mastidectomy instrument set	11	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	×
118	G	EN	G-EN-118	Esophagoscope	6	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
119	G	EN	G-EN-119	Bronchoscopy for children	5	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	×
120	G	EN	G-EN-120	Tympanometer	8	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
121	G	EN	G-EN-121	Acoustic Emission Testing machine	12	△	△	○	○	○	△	○	○	△	○	○	○	○	○	○	○	○	△	×
122	G	EN	G-EN-122	Walsham forceps set	14	△	△	○	○	○	△	○	○	△	○	○	○	○	○	○	○	○	△	×
	G			LABORATORY																				
123	G	Lb	G-Lb-123	Binocular microscope	5	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
124	G	Lb	G-Lb-124	Centrifuge	11	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
125	G	Lb	G-Lb-125	Refrigerator for drug	1	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
126	G	Lb	G-Lb-126	Glucometer	10	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
127	G	Lb	G-Lb-127	Water bath	11	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○

No.	Initial	Dept	Req.No.	Equipment Name	Priority	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	Evaluation
128	G	Lb	G-Lb-128	Incubator	12	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
129	G	Lb	G-Lb-129	Safety cabinet	13	△	○	○	○	△	△	○	○	○	○	○	○	○	○	○	○	○	△	×
130	G	Lb	G-Lb-130	Shaker	14	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
131	G	Lb	G-Lb-131	Micropipette set	9	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
132	G	Lb	G-Lb-132	Hematology analyzer	15	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
133	G	Lb	G-Lb-133	Water distillizer	8	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
134	G	Lb	G-Lb-134	Biochemistry analyzer	16	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
135	G	Lb	G-Lb-135	Autoclave (desktop)	6	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
136	G	Lb	G-Lb-136	Hot air oven	7	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
137	G	Lb	G-Lb-137	Deep freezer	2	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
138	G	Lb	G-Lb-138	Refrigerator for bloodbank	4	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
139	G	Lb	G-Lb-139	ELISA system with PCR	3	△	○	○	○	△	△	○	○	○	○	○	○	○	○	○	○	△	○	×
140	G	Lb	G-Lb-140	Eletrolyte analyzer	5	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
141	G	Lb	G-Lb-141	Eye wash station	17	△	△	○	○	○	△	○	○	○	○	○	△	○	△	○	○	○	△	×
142	G	Lb	G-Lb-142	GeneXpert	18	△	△	○	○	△	△	○	○	△	△	○	○	○	○	○	△	○	△	×
	G			DENTAL																				
143	G	Dn	G-Dn-143	Dental chair	1	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
144	G	Dn	G-Dn-144	Dental X-ray machine	2	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
145	G	Dn	G-Dn-145	Dental insturment set	3	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
146	G	Dn	G-Dn-146	Light cure machine	4	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
147	G	Dn	G-Dn-147	Intra oral camera	7	△	△	○	○	○	△	○	○	△	○	○	○	○	○	○	○	○	△	×
148	G	Dn	G-Dn-148	Pulp tester	5	△	○	○	○	○	△	○	○	△	○	○	○	○	○	○	○	○	○	○
149	G	Dn	G-Dn-149	Dental laboratory equipment set	8	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	△	×
150	G	Dn	G-Dn-150	Autoclave (desktop)	6	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
	G			PHARMACY																				
151	G	Ph	G-Ph-151	Storage cabinet for drug storage	4	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
152	G	Ph	G-Ph-152	Refrigerator for drug (large)	1	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
153	G	Ph	G-Ph-153	Dispensary tray	5	△	○	○	○	○	△	○	○	○	○	○	△	○	△	○	○	△	△	×
154	G	Ph	G-Ph-154	Drug trolley	3	△	○	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
155	G	Ph	G-Ph-155	Steel cabinet	2	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
	G			SURGICAL WARD																				
156	G	Su	G-Su-156	Oxygen cylinder set	2	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
157	G	Su	G-Su-157	Patient monitor	4	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
158	G	Su	G-Su-158	Autoclave (desktop)	1	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
159	G	Su	G-Su-159	Examination light	6	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
160	G	Su	G-Su-160	BP machine for adult	9	△	○	○	○	○	△	△	○	○	○	○	○	○	○	△	○	○	○	×
161	G	Su	G-Su-161	Suction machine (manual)	3	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
162	G	Su	G-Su-162	Suction machine (electrical)	11	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
163	G	Su	G-Su-163	Drum set	5	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
164	G	Su	G-Su-164	Diagnosis set	7	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
165	G	Su	G-Su-165	Weighing scale for adult	10	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
166	G	Su	G-Su-166	Pulse oximeter	8	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
	G			INTERNAL MEDICINE																				
167	G	Me	G-Me-167	Gastroscope	12	△	○	○	△	○	△	○	○	△	○	○	○	○	○	○	○	○	△	×
168	G	Me	G-Me-168	BP machine	7	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
169	G	Me	G-Me-169	Weighing scale for adult	11	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
170	G	Me	G-Me-170	Pulse oximeter	9	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
171	G	Me	G-Me-171	Ultrasound machine (mobile)	3	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
172	G	Me	G-Me-172	Oxygen cylinder set	1	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
173	G	Me	G-Me-173	Nebulizer	2	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
174	G	Me	G-Me-174	Diagnosis set	8	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
175	G	Me	G-Me-175	Infusion pump	10	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	×
176	G	Me	G-Me-176	Patient trolley	6	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
177	G	Me	G-Me-177	Wheel chair	14	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
178	G	Me	G-Me-178	Fibroscan	4	△	○	○	○	○	△	○	○	△	△	○	○	○	○	○	○	○	○	×
179	G	Me	G-Me-179	Drug trolley	5	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
180	G	Me	G-Me-180	Suction machine (electrical)	15	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
181	G	Me	G-Me-181	Ventilator	13	△	○	○	△	○	△	○	○	○	△	○	○	○	○	○	○	○	△	×
	G			AMBULANCE																				
182	G	Am	G-Am-182	Ambulance		○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
	G			ORTHOPEDIC CLINICAL																				

No.	Initial	Dept	Req.No.	Equipment Name	Priority	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	Evaluation
183	G	Or	G-Or-183	Plaster cutter (manual)	2	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
184	G	Or	G-Or-184	Plaster cutter (electrical)	1	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
185	G	Or	G-Or-185	Plaster opener	4	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
186	G	Or	G-Or-186	Plaster bender	6	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
187	G	Or	G-Or-187	Splint set	3	△	△	○	○	○	△	○	○	○	○	○	△	○	△	○	○	○	○	×
188	G	Or	G-Or-188	Operating fracture bed	7	△	△	○	○	○	△	○	○	○	○	○	△	○	△	○	○	○	△	×
189	G	Or	G-Or-189	C-arm	5	△	○	○	△	○	△	○	○	○	○	○	○	○	○	○	○	○	△	×
190	G	Or	G-Or-190	Film viewer	8	△	○	△	○	○	△	○	○	○	○	○	○	○	○	△	○	△	△	×
	G			PHYSIOTHERAPY																				
	G	Pt		Electro therapy Section																				
191	G	Pt	G-Pt-191	UV lamp	13(1A, 1B)	○	△	○	○	○	△	○	○	○	○	○	○	○	○	○	△	△	△	×
192	G	Pt	G-Pt-192	Ultrasonic therapy machine	2(1A, 1B)	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
193	G	Pt	G-Pt-193	Short wave diathermy	3	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
194	G	Pt	G-Pt-194	TENS	11	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	×
195	G	Pt	G-Pt-195	EMS	15	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
196	G	Pt	G-Pt-196	Infra red machine	4	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
197	G	Pt	G-Pt-197	Electrical massager	12	△	△	○	○	○	△	○	○	△	○	○	○	○	○	○	○	△	△	×
	G	Pt		Manipulative therapy																				
198	G	Pt	G-Pt-198	Traction bed	1	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
199	G	Pt	G-Pt-199	Therapeutic massage bed	5	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
	G	Pt		Exercise therapy section																				
200	G	Pt	G-Pt-200	Tread mill	6	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
201	G	Pt	G-Pt-201	Suspension Frame	16	△	△	○	○	○	△	○	○	△	○	○	○	○	○	○	○	△	△	×
202	G	Pt	G-Pt-202	Suspension bed	17	△	△	○	○	○	△	○	○	△	○	○	○	○	○	○	○	△	△	×
203	G	Pt	G-Pt-203	Muscle strengthening weights	18	○	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	×
204	G	Pt	G-Pt-204	Exercise mat	19	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
205	G	Pt	G-Pt-205	Posture mirror	20	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
206	G	Pt	G-Pt-206	Hand exercise equipment	24	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	×
207	G	Pt	G-Pt-207	Shulder wheel	25	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
208	G	Pt	G-Pt-208	Stationary bike for adult	8	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
209	G	Pt	G-Pt-209	Stationary bike for children	9	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	△	○	×
210	G	Pt	G-Pt-210	Leg Extension Curl Machine	7	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	×
211	G	Pt	G-Pt-211	Balance ball	10	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	×
212	G	Pt	G-Pt-212	Stares for adult	26	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	×
213	G	Pt	G-Pt-213	Stares for children	27	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	×
214	G	Pt	G-Pt-214	Parallel bar for children	28	○	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	×
215	G	Pt	G-Pt-215	Abdominal strengthening equipment	21	○	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	×
	G	Pt		Hydrotherapy facilities																				
216	G	Pt	G-Pt-216	Warm pack equipment	22	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	×
217	G	Pt	G-Pt-217	Cold pack equipment	23	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	×
218	G	Pt	G-Pt-218	Parallel bar for adult	29	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
219	G	Pt	G-Pt-219	Electrical Oscillatory manipulative bed	14	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	×
	G	Ow		Orthopeadic workshop																				
220	G	Ow	G-Ow-220	Jig saw	5	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
221	G	Ow	G-Ow-221	Oven	9	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	×
222	G	Ow	G-Ow-222	Rotor machine	1	△	○	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
223	G	Ow	G-Ow-223	Dust vacuume machine	3	△	○	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
224	G	Ow	G-Ow-224	Compressor	4	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	×
225	G	Ow	G-Ow-225	Vertical band saw	12	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	△	×
226	G	Ow	G-Ow-226	Pipe bender	2	△	○	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
227	G	Ow	G-Ow-227	Hand drilling machine	6	△	○	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
228	G	Ow	G-Ow-228	Vacuum machine for orthopedic workshop	7	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	×
229	G	Ow	G-Ow-229	Parallel bar for adult	10	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	△	×
230	G	Ow	G-Ow-230	Posture mirror	11	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	△	×
231	G	Ow	G-Ow-231	Polishing machine	8	△	○	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
	G			HOSPITAL WORKSHOP													△							
232	G	Wo	G-Wo-232	Carpentry tool set	5	○	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	×
233	G	Wo	G-Wo-233	Plumbing tool set	4	○	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	×
234	G	Wo	G-Wo-234	Oxygen gas analyzer	7	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	×
235	G	Wo	G-Wo-235	Multimeter	6	△	○	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
236	G	Wo	G-Wo-236	Welding machine with generator	2	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	×

No.	Initial	Dept	Req.No.	Equipment Name	Priority	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	Evaluation
237	G	Wo	G-Wo-237	Engraving machine	8	△	○	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
238	G	Wo	G-Wo-238	Electric safety analyzer	9	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	△	△	×
239	G	Wo	G-Wo-239	Working mat for workshop	10	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	△	×
240	G	Wo	G-Wo-240	Electrical tool set	1	○	○	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
241	G	Wo	G-Wo-241	Mechanical tool set	3	○	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	×
	G			OPTHALMOLOGY																				
242	G	Om	G-Om-242	Eye operationg microscope	1	△	○	○	○	○	△	○	○	○	○	○	○	○	○	△	○	○	△	×
243	G	Om	G-Om-243	Slit lamp (desktop)	4	△	○	○	○	○	△	○	○	○	○	○	○	○	○	△	○	○	△	×
244	G	Om	G-Om-244	Visual field analyzer	2	△	○	○	○	○	△	○	○	○	○	○	○	○	○	△	○	○	△	×
245	G	Om	G-Om-245	Slit lamp (portable)	7	△	○	○	○	○	△	○	○	○	○	○	○	○	○	△	○	○	△	×
246	G	Om	G-Om-246	Ophthalmoscope	8	△	○	○	○	○	△	○	○	○	○	○	○	○	○	△	○	○	△	×
247	G	Om	G-Om-247	Parkins tomometer	11	△	○	○	○	○	△	○	○	○	○	○	○	○	○	△	○	○	△	×
248	G	Om	G-Om-248	Catract operation instrument set	6	△	○	○	○	○	△	○	○	○	○	○	○	○	○	△	○	○	△	×
249	G	Om	G-Om-249	Lid surgery instrument set	10	△	○	○	○	○	△	○	○	○	○	○	○	○	○	△	○	○	△	×
250	G	Om	G-Om-250	Suction machine (electrical)	3	△	○	○	○	○	△	○	○	○	○	○	○	○	○	△	○	○	△	×
251	G	Om	G-Om-251	Magnifying head loop	9	△	○	○	○	○	△	○	○	○	○	○	○	○	○	△	○	○	△	×
252	G	Om	G-Om-252	Autorefracto meter	5	△	○	○	○	○	△	○	○	○	○	○	○	○	○	△	○	○	△	×
	G			MENTAL HEALTH CARE																				
253	G	Mh	G-Mh-253	BP machine for adult	1	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
254	G	Mh	G-Mh-254	Weighing scale for adult	3	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
255	G	Mh	G-Mh-255	Autoclave (desktop)	2	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
256	G	Mh	G-Mh-256	Drum set	7	△	○	○	○	○	△	○	○	○	○	○	△	○	△	○	○	○	○	×
257	G	Mh	G-Mh-257	Oxygen cylinder set	11	△	○	○	○	○	△	△	○	○	○	○	○	○	○	○	○	○	△	×
258	G	Mh	G-Mh-258	ECT (Electroconvulsive Therapy)	6	△	△	○	○	○	△	○	○	△	○	○	○	○	○	○	○	○	○	×
259	G	Mh	G-Mh-259	Pulse oximeter	4	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
260	G	Mh	G-Mh-260	Patient trolley	5	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
261	G	Mh	G-Mh-261	Examination bed	10	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	×
262	G	Mh	G-Mh-262	Infusion pump	8	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	×
263	G	Mh	G-Mh-263	Wheel chair	9	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	×
				Out Patient																				
1	L	Op	L-Op-1	BP machine	1	○	○	○	○	○	○	−	−	○	○	○	○	○	○	○	○	○	○	○
2	L	Op	L-Op-2	Examination bed	3	○	○	○	○	○	○	−	−	○	○	○	○	○	○	○	○	○	○	○
3	L	Op	L-Op-3	Wheel chair	4	△	○	○	○	○	○	−	−	○	○	○	○	○	○	○	○	○	○	○
4	L	Op	L-Op-4	Weighing scale for adult	5	○	○	○	○	○	○	−	−	○	○	○	○	○	○	○	○	○	○	○
5	L	Op	L-Op-5	Gulcometer	6	△	○	○	○	○	○	−	−	○	○	○	○	○	○	○	○	○	○	○
6	L	Op	L-Op-6	Diagnosis set	2	△	○	○	○	○	○	−	−	○	○	○	○	○	○	○	○	○	○	○
7	L	Op	L-Op-7	Patient trollery	7	△	○	○	○	○	○	−	−	○	○	○	○	○	○	○	○	○	△	○
	L			OB/GYN																				
8	L	OG	L-OG-8	Delivery bed	1	○	○	○	○	○	○	−	−	○	○	○	○	○	○	○	○	○	○	○
9	L	OG	L-OG-9	Operating light (mobile)	2	○	○	○	○	○	○	−	−	○	○	○	○	○	○	○	○	○	○	○
10	L	OG	L-OG-10	Oxygen cylinder set	7	○	○	○	○	○	○	−	−	○	○	○	○	○	○	○	○	○	○	○
11	L	OG	L-OG-11	Suction machine (electrical)	11	○	○	○	○	○	○	−	−	○	○	○	○	○	○	○	○	○	△	○
12	L	OG	L-OG-12	Examination bed	5	○	○	○	○	○	○	−	−	○	○	○	○	○	○	○	○	○	○	○
13	L	OG	L-OG-13	Weighing and height scale for adult	8	○	○	○	○	○	○	−	−	○	○	○	○	○	○	○	○	○	○	○
14	L	OG	L-OG-14	BP machine for adult	4	△	○	○	○	○	○	−	−	○	○	○	○	○	○	○	○	○	○	○
15	L	OG	L-OG-15	Caesarean instrument set	3	△	○	○	○	○	○	−	−	○	○	○	○	○	○	○	○	○	○	○
16	L	OG	L-OG-16	Intubation set	13	△	○	△	○	○	○	−	−	○	○	○	○	○	○	△	○	○	△	×
17	L	OG	L-OG-17	Resuscitation set	14	△	○	△	○	○	○	−	−	○	○	○	○	○	○	△	○	○	△	×
18	L	OG	L-OG-18	Autoclave (desktop)	9	△	○	○	○	○	○	−	−	○	○	○	○	○	○	○	○	○	○	○
19	L	OG	L-OG-19	Patient monitor	12	△	○	○	○	○	○	−	−	○	○	○	○	○	○	○	○	○	△	○
20	L	OG	L-OG-20	Examination table for OB&GY	6	△	○	○	○	○	○	−	−	○	○	○	○	○	○	○	○	○	○	○
21	L	OG	L-OG-21	Drum set	10	△	○	○	○	○	○	−	−	○	○	○	○	○	○	○	○	○	△	○
add	L	OG	L-OG-add	Fetal doppler	−	△	○	○	○	○	○	−	−	○	○	○	○	○	○	○	○	○	△	○
	L			Imaging																				
22	L	Im	L-Im-22	CT scan	4	○	○	○	△	△	○	−	−	△	△	○	○	○	○	○	○	○	○	×
23	L	Im	L-Im-23	Fluoroscopy X-ray machine	5	○	○	○	○	○	○	−	−	○	○	○	○	○	○	○	○	○	○	○
24	L	Im	L-Im-24	Ultrasound machine	3	○	○	○	○	○	○	−	−	○	○	○	○	○	○	○	○	○	○	○
25	L	Im	L-Im-25	General X-ray machine	1	○	○	○	○	○	○	−	−	○	○	○	○	○	○	○	○	○	○	○
26	L	Im	L-Im-26	Automatic film processor	2	△	○	△	○	○	○	−	−	○	○	○	○	○	○	△	○	△	○	×
27	L	Im	L-Im-27	Read character	7	△	○	△	○	○	○	−	−	○	○	○	△	○	○	○	○	△	△	×
28	L	Im	L-Im-28	Mobile X-ray machine	6	△	○	○	○	○	○	−	−	○	○	○	○	○	○	○	○	○	○	○

No.	Initial	Dept	Req.No.	Equipment Name	Priority	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	Evaluation
29	L	Im	L-Im-29	CR sytem	8	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
add	L	Im	L-Im-add	Mammograph	–	△	△	○	△	△	○	–	–	△	△	○	○	○	○	○	○	△	△	×
	L			Ambulance																				
30	L	Am	L-Am-30	Ambulance	1	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
	L			Emgency																				
31	L	Em	L-Em-31	Ventilator	4	△	○	△	○	○	○	–	–	○	△	○	○	○	○	○	○	△	○	×
32	L	Em	L-Em-32	Anaesthesia Machine	5	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
33	L	Em	L-Em-33	Autoclave (desktop)	7	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
34	L	Em	L-Em-34	Patient trolley	10	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
35	L	Em	L-Em-35	Suction machine (electrical)	8	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
36	L	Em	L-Em-36	Operating table	2	○	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
37	L	Em	L-Em-37	Patient monitor	6	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
38	L	Em	L-Em-38	Minor surgery instrument set	11	○	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
39	L	Em	L-Em-39	Emergency bed	1	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
40	L	Em	L-Em-40	Diagnosis set	12	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
41	L	Em	L-Em-41	Drum set	9	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
42	L	Em	L-Em-42	BP machine	13	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	△	○
43	L	Em	L-Em-43	Operating light (mobile)	3	△	○	○	○	○	○	–	–	○	○	○	○	○	○	○	○	○	○	○
	L			Sterilisation in Thetre and OBGY																				
44	L	Cs	L-Cs-44	Autoclave (stand alone)	1	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
45	L	Cs	L-Cs-45	Boiler	2	△	△	△	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	×
46	L	Cs	L-Cs-46	Storage cabinet for CSSD	3	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
47	L	Cs	L-Cs-47	Steel cabinet	4	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
	L			Laundry																				
48	L	Cs	L-Cs-48	Washing machine	1	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
49	L	Cs	L-Cs-49-1	Flat ironning machine	2	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	△	△	×
49	L	Cs	L-Cs-49-2	Roller ironing machine		△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	△	×
50	L	Cs	L-Cs-50	Dryer	3	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
	L			Dental																				
51	L	Dn	L-Dn-51	Dental chair	1	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
52	L	Dn	L-Dn-52	Dental X-ray machine	2	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
53	L	Dn	L-Dn-53	Autoclave (desktop)	3	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
54	L	Dn	L-Dn-54	Light cure machine	5	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
55	L	Dn	L-Dn-55	Ultrasonic scaler	6	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	×
56	L	Dn	L-Dn-56	Hot air oven	9	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	△	○	×
57	L	Dn	L-Dn-57	Dental insturment set	4	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
58	L	Dn	L-Dn-58	Sterilizing box set	10	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
59	L	Dn	L-Dn-59	Drum set	11	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
60	L	Dn	L-Dn-60	Pulp tester	7	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
61	L	Dn	L-Dn-61	Intra oral camera	8	△	△	○	○	○	△	○	○	△	○	○	○	○	○	○	○	△	○	×
	L			Peadiatric																				
62	L	Pd	L-Pd-62	Oxygen cylinder set	1	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
63	L	Pd	L-Pd-63	Infant warmer	2	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
64	L	Pd	L-Pd-64	Infant incubator	3	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
65	L	Pd	L-Pd-65	Weighing scale for infant	4	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
66	L	Pd	L-Pd-66	Patient monitor	5	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
67	L	Pd	L-Pd-67	Pulse oximeter	6	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
68	L	Pd	L-Pd-68	BP machine for neonatal	7	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
69	L	Pd	L-Pd-69	Diagnosis set	8	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
	L			Operation Theatre																				
70	L	Ot	L-Ot-70	Anaesthesia Machine	1	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
71	L	Ot	L-Ot-71	Patient monitor	2	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
72	L	Ot	L-Ot-72	Suction machine (electrical)	6	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
73	L	Ot	L-Ot-73	Oxygen cylinder set	5	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
74	L	Ot	L-Ot-74	Operating table with traction	7	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
75	L	Ot	L-Ot-75	Pulse oximeter	3	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
76	L	Ot	L-Ot-76	BP machine digital	4	△	○	○	○	○	△	△	○	○	○	○	○	○	○	○	△	○	○	×
77	L	Ot	L-Ot-77	Glucometer	8	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
78	L	Ot	L-Ot-78	Drum set (large)	13	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
79	L	Ot	L-Ot-79	Drum set (medium)	14	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	△	×
80	L	Ot	L-Ot-80	Drum set (small)	15	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	△	×

No.	Initial	Dept	Req.No.	Equipment Name	Priority	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	Evaluation
81	L	Ot	L-Ot-81	Operating light (mobile)	9	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
82	L	Ot	L-Ot-82	Autoclave (desktop)	10	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
83	L	Ot	L-Ot-83	Patient trolley	11	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
84	L	Ot	L-Ot-84	Laparotomy instrument set	12	△	△	○	△	○	△	○	○	△	○	○	○	○	○	○	○	△	△	×
85	L	Ot	L-Ot-85	Instrument trolley	16	△	○	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	△	×
	L			Sugery Ward																				
86	L	Su	L-Su-86	Autoclave (desktop)	2	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
87	L	Su	L-Su-87	Suction machine (manual)	11	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
88	L	Su	L-Su-88	BP machine	12	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
89	L	Su	L-Su-89	Examination bed	8	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
90	L	Su	L-Su-90	Drip stand	7	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
91	L	Su	L-Su-91	Patient trolley	3	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
92	L	Su	L-Su-92	Wheel chair	4	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
93	L	Su	L-Su-93	Drum set	6	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
94	L	Su	L-Su-94	Oxygen cylinder set	1	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
95	L	Su	L-Su-95	Dressing cart	9	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
96	L	Su	L-Su-96	Drug trolley	10	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
97	L	Su	L-Su-97	Resuscitation set	5	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
98	L	Su	L-Su-98	Gulcometer	13	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
99	L	Su	L-Su-99	Dressing instrument set	14	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
100	L	Su	L-Su-100	Pulse oximeter	15	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
101	L	Su	L-Su-101	Weighing scale for adult	16	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	×
	L			ENT			△																	
102	L	EN	L-EN-102	ENT oprating microscope	9	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
103	L	EN	L-EN-103	ENT examination instrument set	1	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
104	L	EN	L-EN-104	Mastidectomy instrument set	8	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	×
105	L	EN	L-EN-105	Tonsillectomy instrument set	7	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
106	L	EN	L-EN-106	Bronchoscope	2	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
107	L	EN	L-EN-107	ENT chair	6	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
108	L	EN	L-EN-108	Tympanometer	3	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
109	L	EN	L-EN-109	BP machine	5	△	○	○	○	○	△	○	○	○	○	○	○	○	△	△	○	○	○	×
110	L	EN	L-EN-110	Audiometer	4	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
	L			Laboratory																				
111	L	Lb	L-Lb-111	Hematology analyzer	3	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
112	L	Lb	L-Lb-112	Biochemistry analyzer	4	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
113	L	Lb	L-Lb-113	Refrigerator for bloodbank	1	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
114	L	Lb	L-Lb-114	Binocular microscope	5	○	○	○	○	○	△	△	○	○	○	○	○	○	○	×	○	○	○	×
115	L	Lb	L-Lb-115	Centrifuge	10	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
116	L	Lb	L-Lb-116	Incubator	7	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
117	L	Lb	L-Lb-117	Autoclave (desktop)	6	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
118	L	Lb	L-Lb-118	Voltex mixer	11	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	△	○	×
119	L	Lb	L-Lb-119	Weighing scale (max5kg)	9	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	×
120	L	Lb	L-Lb-120	Water distillizer	8	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
121	L	Lb	L-Lb-121	Refrigerator for drug	2	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
	L			Internal Medicine																				
122	L	Me	L-Me-122	Oxygen cylinder set	2	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
123	L	Me	L-Me-123	Nebulizer	4	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
124	L	Me	L-Me-124	Suction machine (electrical)	6	○	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
125	L	Me	L-Me-125	Patient trolley	5	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
126	L	Me	L-Me-126	Syringe pump	8	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
127	L	Me	L-Me-127	Infusion pump	7	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	×
128	L	Me	L-Me-128	Drip stand	3	○	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
129	L	Me	L-Me-129	Ultrasound machine (mobile)	1	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
	L			ICU			△																	
130	L	IC	L-IC-130	Syringe pump	1	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
	L			Pharmacy			△																	
131	L	Ph	L-Ph-131	Refrigerator for drug (large)	1	○	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
132	L	Ph	L-Ph-132	Refrigerator for drug (small)	2	○	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
133	L	Ph	L-Ph-133	Working table for pharmacy	5	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
134	L	Ph	L-Ph-134	Drug trolley	6	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
135	L	Ph	L-Ph-135	Storage cabinet for pharmacy	8	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○

No.	Initial	Dept	Req.No.	Equipment Name	Priority	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	Evaluation
136	L	Ph	L-Ph-136	Water distillizer	4	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
137	L	Ph	L-Ph-137	Autoclave (desktop)	3	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
138	L	Ph	L-Ph-138	Medicine cupboard	7	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
	L			Medical Equipment			△																	
139	L	Wo	L-Wo-139	Oscilloscope (portable)	7	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
140	L	Wo	L-Wo-140	Hygrothermograph	9	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	△	×
141	L	Wo	L-Wo-141	Tachometer	8	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	△	×
142	L	Wo	L-Wo-142	Insulation resistance tester	1	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
143	L	Wo	L-Wo-143	Earth mege tester	3	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
144	L	Wo	L-Wo-144	Clamp meter	2	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
145	L	Wo	L-Wo-145	Welding machine with generator	5	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	×
146	L	Wo	L-Wo-146	Electrical tool set	6	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
147	L	Wo	L-Wo-147	Pipe bender	4	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	×
	L			Orthopedic workshop			△										△							
148	L	Ow	L-Ow-148	Broad belt sander	4	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
149	L	Ow	L-Ow-149	Vacuum machine for orthopedic workshop	3	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	×
150	L	Ow	L-Ow-150	Welding hot jet	5	△	△	○	○	○	△	○	○	△	○	○	△	○	○	○	○	○	△	×
151	L	Ow	L-Ow-151	Welding Mirror	2	△	△	○	○	○	△	○	○	△	○	○	△	○	○	○	○	○	○	×
152	L	Ow	L-Ow-152	Rotor machine	1	△	△	○	○	○	△	○	○	○	○	○	△	○	○	○	○	○	○	○
	L			Orthopedic			△																	
153	L	Or	L-Or-153	Plaster cutter (electrical)	1	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
154	L	Or	L-Or-154	Plaster cutter (manual)	2	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
155	L	Or	L-Or-155	Plaster bender	6	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
156	L	Or	L-Or-156	Plaster opener	8	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
157	L	Or	L-Or-157	Operating fracture bed	9	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	△	○	×
158	L	Or	L-Or-158	Bone fracture set	7	△	△	○	△	○	△	○	○	○	○	○	○	○	○	○	○	○	△	×
159	L	Or	L-Or-159	Splint (Thomas type)	3	△	△	○	○	○	△	○	○	○	○	○	△	○	△	○	○	○	○	×
160	L	Or	L-Or-160	Splint (Browne type)	4	△	△	○	○	○	△	○	○	○	○	○	△	○	△	○	○	○	○	×
161	L	Or	L-Or-161	Bone drill (electrical)	10	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	×
162	L	Or	L-Or-162	Wheel chair	5	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
	L			Opthalomology																				
163	L	Om	L-Om-163	Eye operationg microscope	2	△	○	○	○	○	△	○	○	○	○	○	○	○	○	△	○	○	△	×
164	L	Om	L-Om-164	Catract operation instrument set	3	△	○	○	○	○	△	○	○	○	○	○	○	○	○	△	○	○	△	×
165	L	Om	L-Om-165	Autoclave (desktop)	4	△	○	○	○	○	△	○	○	○	○	○	○	○	○	△	○	○	△	×
166	L	Om	L-Om-166	Slit lamp (desktop)	6	△	○	○	○	○	△	○	○	○	○	○	○	○	○	△	○	○	△	×
167	L	Om	L-Om-167	Anaesthesia Machine	5	△	○	○	○	○	△	○	○	○	○	○	○	○	○	△	○	○	△	×
168	L	Om	L-Om-168	Instrument trolley	11	△	○	○	○	○	△	○	○	○	○	○	○	○	○	△	○	○	△	×
169	L	Om	L-Om-169	Kerato meter	7	△	○	○	○	○	△	○	○	○	○	○	○	○	○	△	○	○	△	×
170	L	Om	L-Om-170	Trial lens set	10	△	○	○	○	○	△	○	○	○	○	○	○	○	○	△	○	○	△	×
171	L	Om	L-Om-171	Weighing scale for adult	9	△	○	○	○	○	△	△	○	○	○	○	○	○	○	△	○	○	△	×
172	L	Om	L-Om-172	BP machine	8	△	○	○	○	○	△	△	○	○	○	○	○	○	○	○	○	○	△	×
173	L	Om	L-Om-173	Phaco emulsification machine	1	△	△	○	△	○	△	○	○	○	○	○	○	○	○	○	○	△	△	×
	L			Physiotherapy																			△	
174	L	Pt	L-Pt-174	Ultrasonic therapy machine	2	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
175	L	Pt	L-Pt-175	Short wave diathermy	1	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
176	L	Pt	L-Pt-176	Infra red machine	3	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
177	L	Pt	L-Pt-177	Exercise mat	5	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
178	L	Pt	L-Pt-178	Stationary bike for adult	6	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○
179	L	Pt	L-Pt-179	Balance ball	7	△	△	○	○	○	△	○	○	○	○	○	○	○	△	○	○	○	△	×
180	L	Pt	L-Pt-180	Traction bed	4	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	×
181	L	Pt	L-Pt-181	Electrical massager	8	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	×
182	L	Pt	L-Pt-182	Refrigerator	9	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	×
	L			Mental Health																				
183	L	Mh	L-Mh-183	Drug trolley	4	△	△	○	○	○	△	△	○	○	○	○	○	○	○	○	○	○	○	×
184	L	Mh	L-Mh-184	Medicine cupboard	3	△	△	○	○	○	△	△	○	○	○	○	○	○	○	○	○	○	○	×
185	L	Mh	L-Mh-185	Examination bed	2	△	△	○	○	○	△	△	○	○	○	○	○	○	○	○	○	○	○	×
186	L	Mh	L-Mh-186	Chito forceps	6	△	△	○	○	○	△	△	○	○	○	○	○	○	○	○	○	○	○	×
187	L	Mh	L-Mh-187	Drum set	5	△	△	○	○	○	△	△	○	○	○	○	○	○	○	○	○	○	○	×
188	L	Mh	L-Mh-188	Autoclave (desktop)	1	△	△	○	○	○	△	△	○	○	○	○	○	○	○	○	○	○	○	×
189	L	Mh	L-Mh-189	Drip stand	7	△	△	○	○	○	△	△	○	○	○	○	○	○	○	○	○	○	△	×
	L			Pathology																				

No.	Initial	Dept	Reg.No.	Equipment Name	Priority	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	Evaluation
190	L	Mo	L-Mo-190	Refrigerator for mortuary	2	△	△	○	○	○	△	○	○	○	△	○	○	○	△	○	○	○	△	×
191	L	Mo	L-Mo-191	Patient trolley with cover	1	△	△	○	○	○	△	○	○	○	△	○	○	○	△	○	○	○	△	×
192	L	Mo	L-Mo-192	Mortuary instrument set	4	△	△	○	○	○	△	△	○	○	○	○	○	○	○	○	○	○	△	×
193	L	Mo	L-Mo-193	Patient stretcher	3	△	△	○	○	○	△	△	○	○	○	○	○	○	△	○	○	△	△	×
	L			NMCH																				
194	L	NM	L-NM-194	Examination bed	1	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
195	L	NM	L-NM-195	Examination light	7	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
196	L	NM	L-NM-196	Speculum set	8	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○	○
197	L	NM	L-NM-197	Uterine sounds set	13	△	△	○	○	○	△	△	○	○	○	○	○	○	○	○	○	○	△	×
198	L	NM	L-NM-198	Uterine elevator instrument set	14	△	△	○	○	○	△	△	○	○	○	○	○	○	○	○	○	○	△	×
199	L	NM	L-NM-199	Drum set	5	△	△	○	○	○	△	△	○	○	○	○	○	○	○	○	○	○	○	○
200	L	NM	L-NM-200	Steel cabinet	9	△	△	○	○	○	△	△	○	○	○	○	○	○	○	○	○	○	○	○
201	L	NM	L-NM-201	Deep freezer	4	△	△	○	○	○	△	△	○	○	○	○	○	○	○	○	○	○	○	○
202	L	NM	L-NM-202	Refrigerator for vaccines	3	△	△	○	○	○	△	△	○	○	○	○	○	○	○	○	○	○	○	○
203	L	NM	L-NM-203	Cooling box for vaccine	6	△	△	○	○	○	△	△	○	○	○	○	△	○	○	○	○	○	○	×
204	L	NM	L-NM-204	Weighing scale for infant	10	△	△	○	○	○	△	△	○	○	○	○	○	○	○	○	○	○	△	○
205	L	NM	L-NM-205	BP machine for adult	2	△	△	○	○	○	△	△	○	○	○	○	○	○	○	○	○	○	○	○
206	L	NM	L-NM-206	Weighing and height scale for adult	10	△	△	○	○	○	△	△	○	○	○	○	○	○	○	○	○	○	△	○
207	L	NM	L-NM-207	Patient trolley	11	△	△	○	○	○	△	△	○	○	○	○	○	○	○	○	○	○	△	×
208	L	NM	L-NM-208	Wheel chair	12	△	○	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	△	○

2. Planned Equipment List

Equipment chosen in the considerations above is shown in the following Planned Equipment List:

Table 2-13 Planned Equipment List

Gulu RRH

No.	Item No.	Description	Q'ty	OPD	Carualty	OT	X-ray	ICU	NICU	OBS/GYN	Paediatrics	Sterilisation	ENT	Laboratory	Dental	Pharmacy	Surgical ward	Medical	Ambulance	Orthopaedics	Physiotherapy	Prosthetic	EQP maintenance	Neurology
1	Req-3	Adenoidectomy and Tonsillectomy instrument set	2										1											
2	Req-4	Ambu bag set for adult	2		1			1																
3	Req-5	Ambu bag set for neonatal	3																					
4	Req-6	Ambubag set	1																					
5	Req-7	Ambulance	3																1					
6	Req-8	Anaesthesia Machine	7		1	1																		
7	Req-10	Audiometer (Screening)	1																					
8	Req-11	Autoclave (desktop)	20	1				1		1				1	1		1							1
9	Req-12	Autoclave (Laboratory type)	1																					
10	Req-13	Autoclave (stand alone)	3									1												
11	Req-16	Baby bed	2																					
12	Req-20	Binocular microscope	2											1										
13	Req-21	Biochemistry analyzer	3											1										
14	Req-26	BP machine	13	4	2													2						
15	Req-29	BP machine for adult	10																					1
16	Req-30	BP machine for neonatal	6						1		2													
17	Req-31	Broad belt sander	1																					
18	Req-32	Esophagoscope	3										1											
19	Req-35	Caesarean instrument set	3																					
20	Req-36	Caldwel luc instrument set	1										1											
21	Req-40	Centrifuge	3											1										
22	Req-43	Clamp meter	2																					
23	Req-47	Colpo scope	1							1														
24	Req-48	CPAP	1																					
25	Req-49	CR system	2																					
26	Req-51	Cryosurgery machine	1							1														
27	Req-54	Curettage instrument set	3							3														
28	Req-55	Deep freezer	2											1										
29	Req-57	Delivery bed	16							6														
30	Req-59	Delivery instrument set	5																					
31	Req-61	Dental chair	3												1									
32	Req-63	Dental instrument set	5												1									
33	Req-66	Dental X-ray machine	3												1									
34	Req-66-2	Dental X-ray CR	3												1									
35	Req-67	Diagnosis set	12														1	1						
36	Req-69	Dressing cart	6																					
37	Req-70	Dressing instrument set	7																					
38	Req-71	Drilling machine	1																					
39	Req-72	Drip stand	10																					
40	Req-73	Drug trolley	12													2		2						
41	Req-74	Drum set	8														1							
42	Req-79	Dryer	3									1												
43	Req-80	Dust vacuume machine	1																			1		
44	Req-81	Earth mege tester	1																					
45	Req-82	ECG	1				1																	
46	Req-85	Electrical balance	2																					
47	Req-86	Electrical dermatome	1																					
48	Req-89	Electrical tool set	2																				1	
49	Req-90	Electro surgical unit	3			2																		
50	Req-93	Eletrolyte analyzer	1											1										
51	Req-95	Emergency bed	36		12																			
52	Req-97	EMS	2																		1			
53	Req-98	Engraving machine	1																				1	
54	Req-99	ENT chair	1																					
55	Req-100	ENT examination instrument set	1																					

Lira RRH

No.	Surgical	OBS/GYN	X-ray	Ambulance	Casualty	Sterilisation	Dental	Paediatrics	OT	Surgical ward	ENT	Surgical Ward	Medical	ICU	Pharmacy	EQP maintenance	Prosthetic	Orthopaedics	Physiotherapy	MCH
1											1									
2																				
3																				
4																				
5				1																
6					1				1											
7											1									
8		1			1		1		1	1		1			1					
9																				
10						1														
11																				
12																				
13												1								
14	3				1					1										
15		2																		2
16								1												
17																	1			
18											1									
19		2																		
20																				
21												1								
22																1				
23																				
24																				
25			1																	
26																				
27																				
28																				1
29		4																		
30																				
31							1													
32							3													
33							1													
34							1													
35	5				1			1												
36										2										
37										2										
38																				
39										3			5							
40										1					1					
41		1			1		1		1	1										1
42						1														
43																				
44																1				
45																				
46																				
47																				
48																1				
49																				
50																				
51					12															
52																				
53																				
54											1									
55											1									

Arua RRH

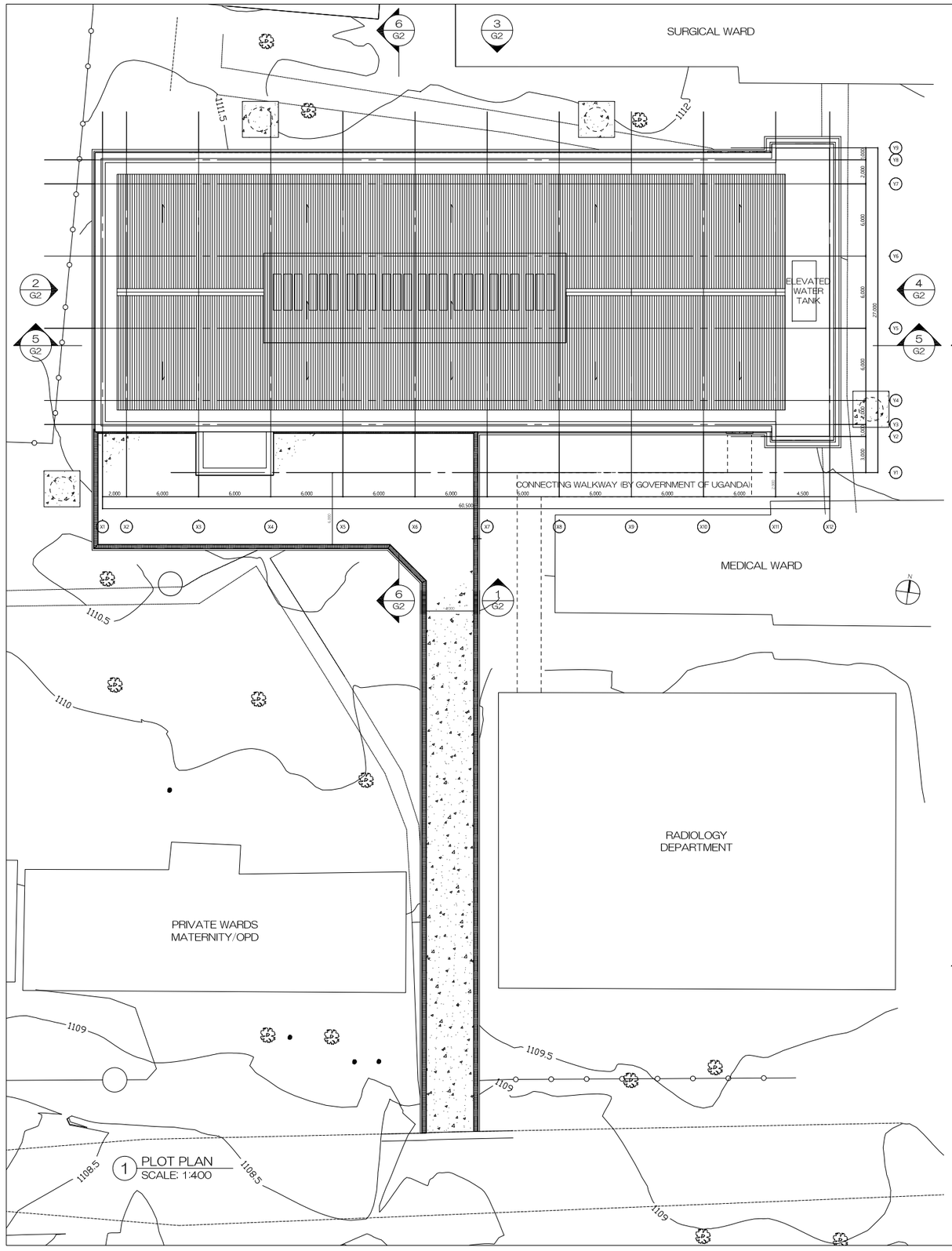
No.	Casualty	Ambulance	Dental	Occupational therapy	Physiotherapy	X-ray	Pharmacy	Oothopaedics	Laboratory	Sterilisaton	Obstetrics	Medical	OT	Surgery	Paediatrics	EQP Maintenance
1																
2																
3											1				2	
4	1															
5		1														
6	1										1		1			
7																
8	1		1				1	1			1	1				
9									1							
10										1						
11											2					
12									1							
13									1							
14																
15											5					
16															2	
17																
18	1															
19											1					
20																
21									1							
22																1
23																
24											1					
25						1										
26																
27																
28																
29											6					
30											5					
31			1													
32			1													
33			1													
34			1													
35	1											1			1	
36	1							1						2		
37	1							1			2	1				
38																1
39								2								
40	1							1				2		2		
41								1								
42										1						
43																
44																
45																
46							1		1							
47													1			
48																
49													1			
50																
51	12															
52					1											
53																
54																
55																

No.	Item No.	Description	Q'ty	Gulu RRH																					Lira RRH																				Arua RRH															
				OPD	Carualty	OT	X-ray	ICU	NICU	OBS/GYN	Paediatrics	Sterilisation	ENT	Laboratory	Dental	Pharmacy	Surgical ward	Medical	Ambulance	Orthopaedics	Physiotherapy	Prosthetic	EQP maintenance	Neurology	Surgical	OBS/GYN	X-ray	Ambulance	Casualty	Sterilisation	Dental	Paediatrics	OT	Surgical ward	ENT	Surgical Ward	Medical	ICU	Pharmacy	EQP maintenance	Prosthetic	Orthopaedics	Physiotherapy	MCH	Casualty	Ambulance	Dental	Occupational therapy	Physiotherapy	X-ray	Pharmacy	Oothopaedics	Laboratory	Sterilisaton	Obsterics	Medical	OT	Surgery	Paediatrics	EQP Maintenance
56	Req-101	ENT oprating microscope	2										1																						1																									
57	Req-103	Examination bed	29							2															11	2								1										9								1				1			2	
58	Req-104	Examination light	17	4	1				1		2						1																											1	1										1				5	
59	Req-106	Examination table for OB&GY	6							2																2																													2					
60	Req-107	Exercise mat	3																		1																						1						1											
61	Req-110	Fetal doppler	6							2																1																													3					
62	Req-116	Fluoroscopy X-ray machine	2																								1																							1										
63	Req-118	General X-ray machine	2																								1																							1										
64	Req-120	Glucometer	17								1			2											11								1	1																						1				
65	Req-122	Hand drilling machine	1																			1																																						
66	Req-126	HBA1c analyzer	1																																																					1				
67	Req-127	Height meter	1	1																																																								
68	Req-128	Hematology analyzer	3											1																						1																	1							
69	Req-130	Hot air oven	1											1																																														
70	Req-133	Hysterosalpingogram set	1																																															1										
71	Req-134	ICU bed	5					5																																																				
72	Req-135	Incubator	2											1																						1																								
73	Req-136	Infant incubator	10						4																							2																							4					
74	Req-137	Infant warmer	4							1																						1																							2					
75	Req-138	Infra red machine	3																		1																						1						1											
76	Req-139	Infusion pump	5						1		2																																													2				
77	Req-141	Instrument trolley	3			3																																																						
78	Req-142	Insulation resistance tester	1																																					1																				
79	Req-145	Jig saw	1																			1																																						
80	Req-149	Laryngoscope	1										1																																															
81	Req-154	Light cure machine	3												1																1																1													
82	Req-158	Mayo table	3			3																																																						
83	Req-160	Medicine cupboard	5																																				1						1						3									
84	Req-161	Micropipette set	2											2																																														
85	Req-162	Middle ear instrument set	1										1																																															
86	Req-163	Minor surgery instrument set	3																										2																1															
87	Req-164	Mobile X-ray machine	2		1																						1																																	
88	Req-166	Multimeter	2																				1																																					1
89	Req-168	Nebulizer	10					1			2							2																			1								1											1			2	
90	Req-171	Operating light (ceiling mont)	4		1	3																																																						
91	Req-172	Operating light (mobile)	9																							2			1				2												1										1		2			
92	Req-173	Operating table	7		1	2																							1				1												1												1			
93	Req-174	Operating table with traction	3			1																											1																								1			
94	Req-178	Orthopedic instrument set	1																																																	1								
95	Req-179	Oscilloscope (portable)	1																																					1																				
96	Req-182	Oxygen cylinder set	47		3			1	1	2	4						2	3								2						5	3	2			2								2							1			5	2	2	1	4	
97	Req-185	Parallel bar for adult	1																		1																																							
98	Req-186	Patient Bed	86							86																																																		
99	Req-189	Patient monitor	27		2	2		2		2	1						1									1			2			1	1												2										5	1	2	1	1	
100	Req-194	Patient trolley	32		2	5				2								2						1	1				2				2	1			2								2							2			2	2	2	2		
101	Req-197	Photo therapy unit	1						1																																																			
102	Req-198	Pipe bender	1																			1																																						
103	Req-199	Plaster bender	2																	1																						1																		
104	Req-200	Plaster cutter (electrical)	3																	1																						1										1								
105	Req-201	Plaster cutter (manual)	2																	1																						1																		
106	Req-202	Plaster opener	2																	1																						1																		
107	Req-206	Pneumatic tournique	1																																																						1			
108	Req-208	Polishing machine	1																			1																																						
109	Req-209	Posture mirror	1																		1																																							
110	Req-211	Pulp tester	3												1																1																1													

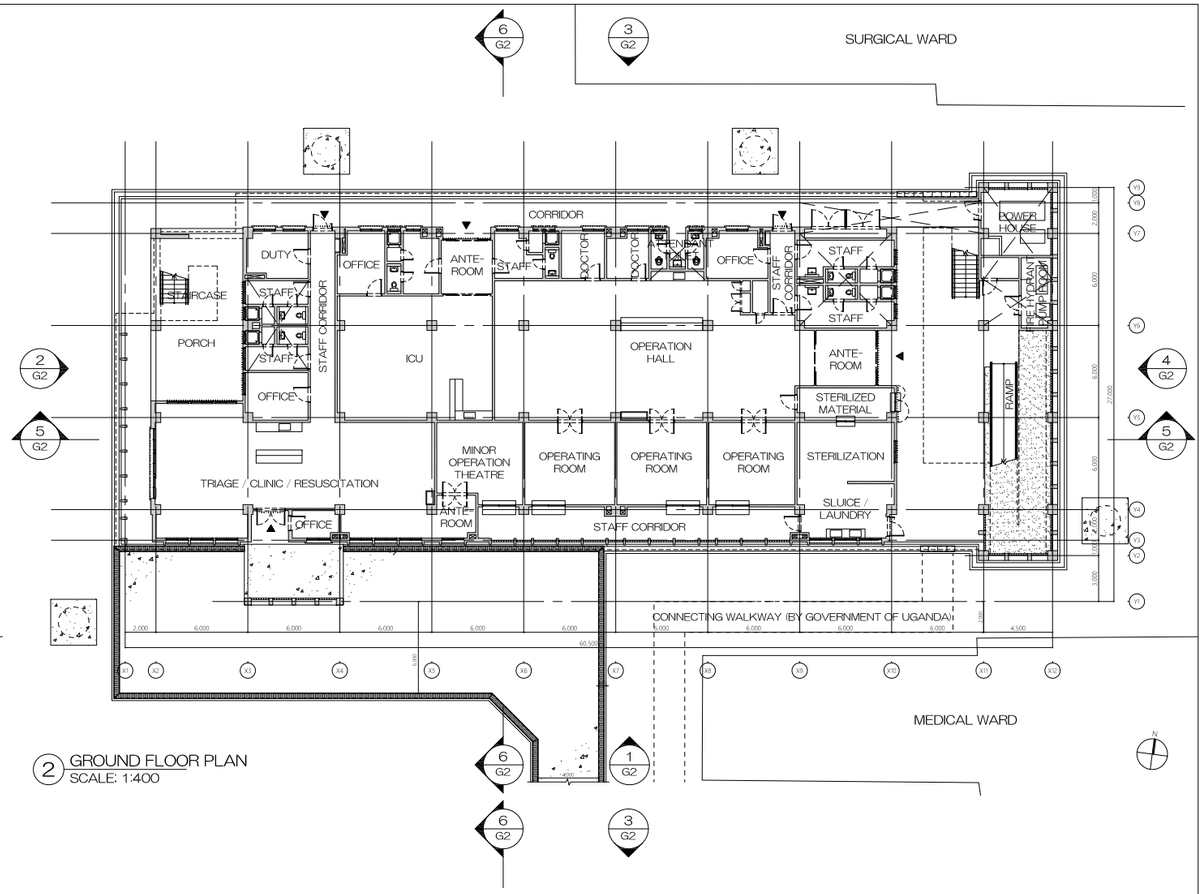
No.	Item No.	Description	Q'ty	Gulu RRH																						Lira RRH																					Arua RRH															
				OPD	Carualty	OT	X-ray	ICU	NICU	OBS/GYN	Paediatrics	Sterilisation	ENT	Laboratory	Dental	Pharmacy	Surgical ward	Medical	Ambulance	Orthopaedics	Physiotherapy	Prosthetic	EQP maintenance	Neurology	Surgical	OBS/GYN	X-ray	Ambulance	Casualty	Sterilisation	Dental	Paediatrics	OT	Surgical ward	ENT	Surgical Ward	Medical	ICU	Pharmacy	EQP maintenance	Prosthetic	Orthopaedics	Physiotherapy	MCH	Casualty	Ambulance	Dental	Occupational therapy	Physiotherapy	X-ray	Pharmacy	Oothopaedics	Laboratory	Sterilisaton	Obstetrics	Medical	OT	Surgery	Paediatrics	EQP Maintenance
111	Req-212	Pulse oximeter	29	8	2				1								1	2						1								3	3	1																		1				1			5	
112	Req-217	Refrigerator (battery type)	2																																								1												1				
113	Req-218	Refrigerator for bloodbank	3										1																						1																	1							
114	Req-220	Refrigerator for drug (large)	4																																			2												2									
115	Req-221	Refrigerator for drug (medium)	7										2		2																				1															1		1							
116	Req-222	Refrigerator for drug (small)	3		1																																	1												1									
117	Req-224	Resuscitation set	1																														1																										
118	Req-226	Rotor machine	2																		1																			1																			
119	Req-231	Shaker	1										1																																														
120	Req-232	Short wave diathermy	3																	1																						1						1											
121	Req-233	Shulder wheel	1																	1																																							
122	Req-236	Speculum set	14						10																																		1											3					
123	Req-240	Spring balance	1																																																	1							
124	Req-244	Stationary bike for adult	4																	2																						1						1											
125	Req-246	Steel cabinet	6												2														2														2																
126	Req-247	Sterilizing box set	2																											1																									1				
127	Req-249	Stethoscope for pediatric	2							2																																																	
128	Req-250-1	Storage cabinet for Gulu CSSD	1								1																																																
129	Req-250-2	Storage cabinet for Lira CSSD	1																										1																														
130	Req-251	Storage cabinet for drug storage	1												1																																												
131	Req-252	Storage cabinet for pharmacy	1																																			1																					
132	Req-253	Suction machine (electrical)	31		2	3		1		4			1				1	1								2			2				3				1								2										4	1	2	1		
133	Req-254	Suction machine (manual)	4		2												1																	1																										
134	Req-255	Surgery instrument set	1																																																						1		
135	Req-258	Syringe pump	3		1																															1	1																						
136	Req-261	Therapeutic massage bed	2																	2																																							
137	Req-263	Thermometer	7		2																																																						5	
138	Req-266	Traction bed	1																	1																																							
139	Req-267	Traction machine for cervical	1																																													1											
140	Req-270	Tread mill	1																	1																																							
141	Req-272	Tympanometer	2									1																						1																									
142	Req-275	Ultrasonic therapy machine	3																	1																						1						1											
143	Req-277	Ultrasound machine (cardiac)	3			1																				1																							1										
144	Req-278	Ultrasound machine (mobile)	4		1					1								1																			1																							
145	Req-282	Vacuum extractor	1						1																																																		
146	Req-285	Ventilator	1				1																																																				
147	Req-293	Washing machine	3								1																		1																								1						
148	Req-294	Water bath	1										1																																														
149	Req-295	Water distillizer	4										1																						1			1												1									
150	Req-296	Weighing and height scale for adult	3																						2																		1																
151	Req-298	Weighing scale for adult	9	2													1	1						1	3																															1				
152	Req-300	Weighing scale for infant	5	1	1						2																																	1																
153	Req-304	Wheel chair	17		2													2							2									1								1		1	2				2			2			1	1				
154	Req-306	Working table for CSSD	2								2																																																
155	Req-307	Working table for pharmacy	1																																			1																					

2-2-3 Outline Design Drawings

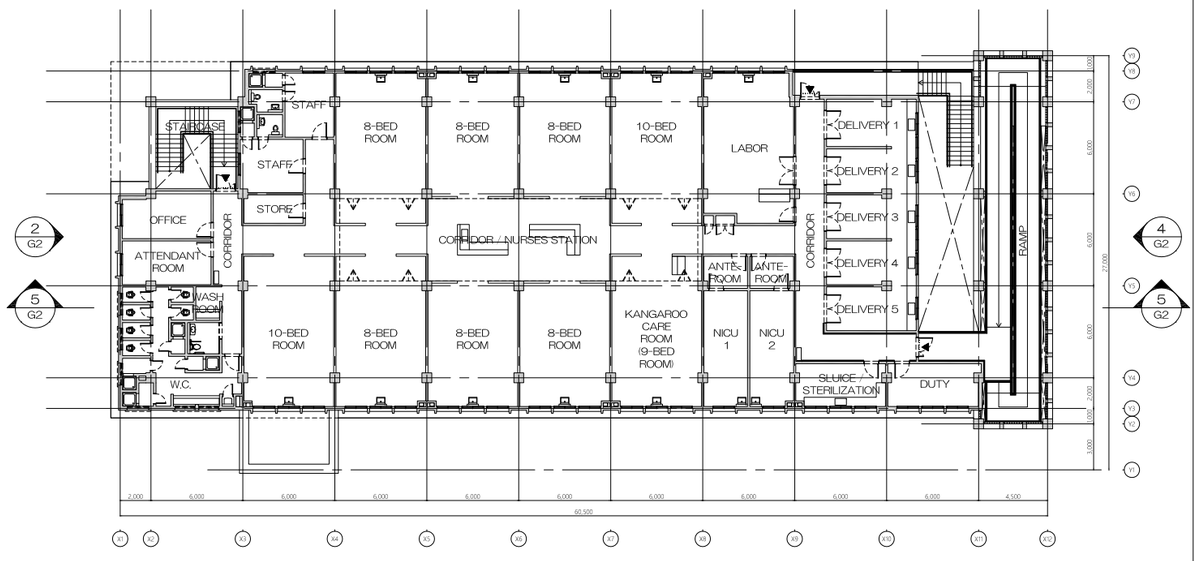
Gulu RRH:	Plot Plan, Floor Plans
	Exterior Elevations, Building Sections
Lira RRH:	OPD/Casualty Block Plot Plan, Floor Plans
	OPD/Casualty Block Exterior Elevations, Building Section
	Delivery Suite Plot Plan, Floor Plan, Exterior Elevations, Building Sections
Arua RRH:	Plot Plan, Floor Plans
	Exterior Elevations, Building Sections



1 PLOT PLAN
SCALE: 1:400



2 GROUND FLOOR PLAN
SCALE: 1:400



3 FIRST FLOOR PLAN
SCALE: 1:400

CONSULTANT
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AND INTEM CONSULTING, INC.

PROJECT
THE PREPARATORY SURVEY FOR
THE PROJECT FOR IMPROVEMENT OF
REGIONAL REFERRAL HOSPITALS
IN NORTHERN UGANDA

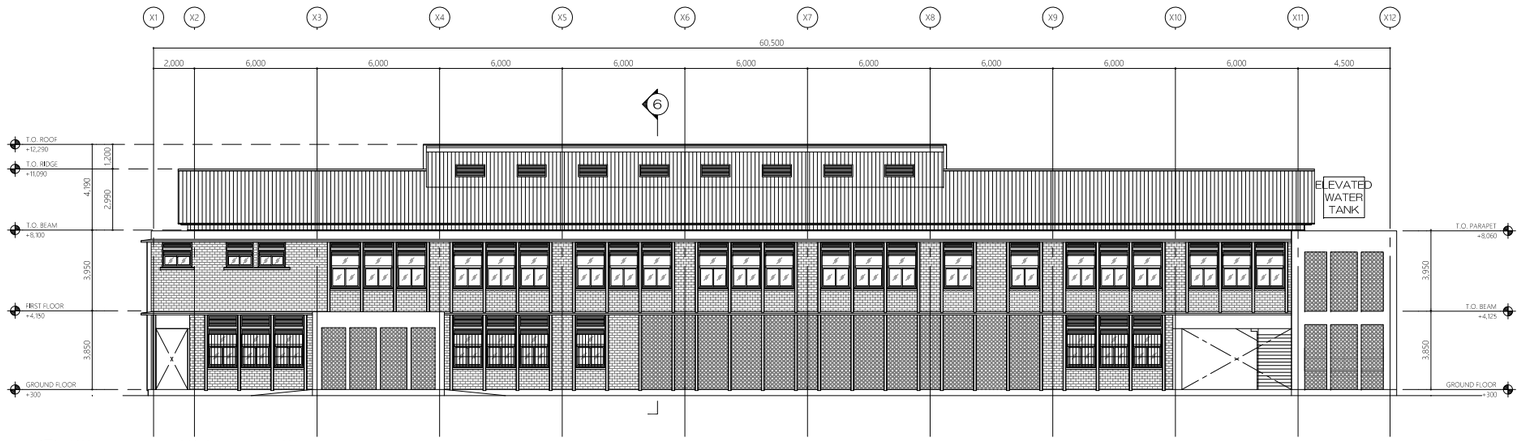
TITLE
PLOT PLAN AND FLOOR PLANS

SITE
GULU REGIONAL REFERRAL HOSPITAL

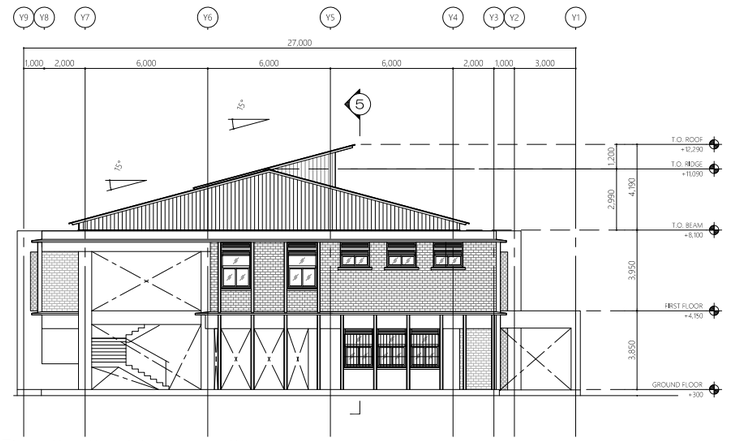
BLOCK
THEATRE / CASUALTY / MATERNITY WARD

DRAWING NO.
G1

SCALE
1:400

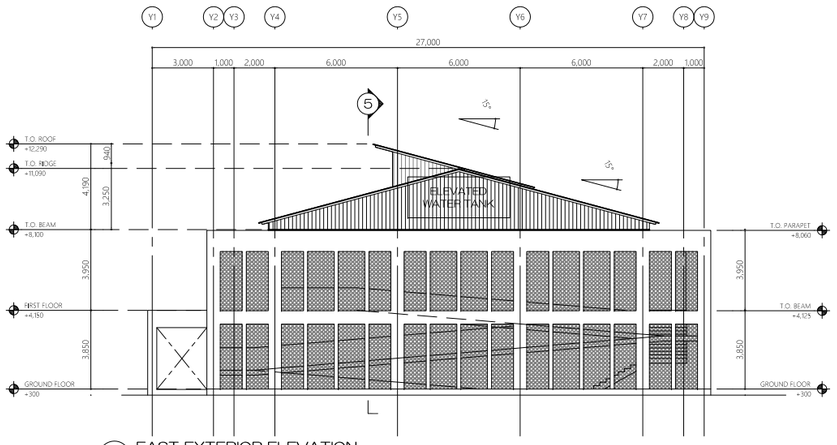


1 SOUTH EXTERIOR ELEVATION
SCALE: 1:300

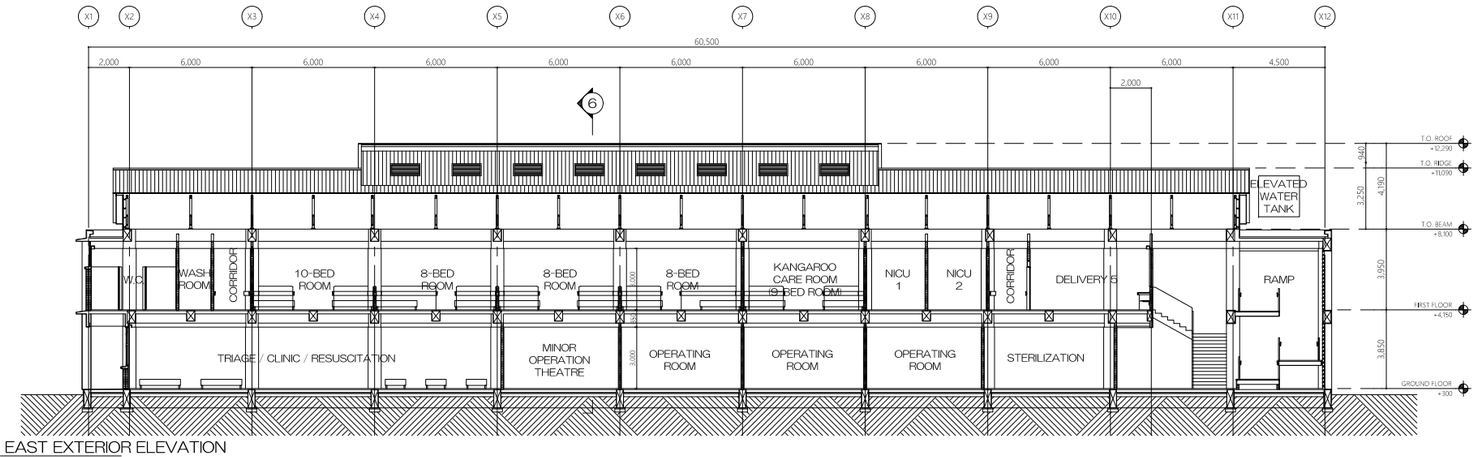


2 WEST EXTERIOR ELEVATION
SCALE: 1:300

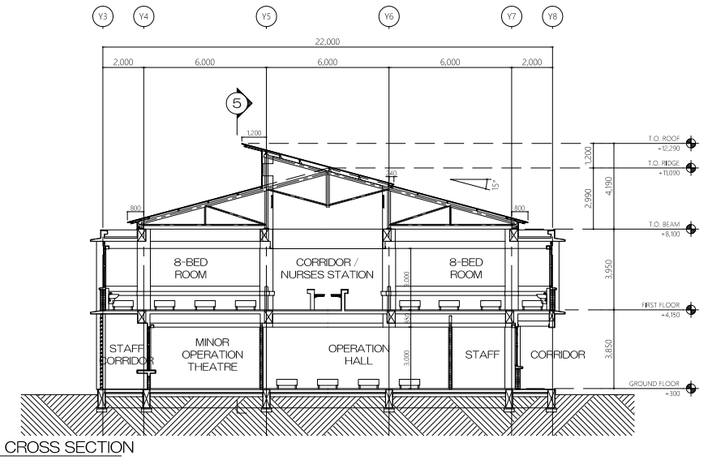
3 NORTH EXTERIOR ELEVATION
SCALE: 1:300



4 EAST EXTERIOR ELEVATION
SCALE: 1:300



4 EAST EXTERIOR ELEVATION
SCALE: 1:300



6 CROSS SECTION
SCALE: 1:300

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YOKOGAWA Architects & Engineers, Inc. INTEM Intem Consulting, Inc.

PROJECT
THE PREPARATORY SURVEY FOR
THE PROJECT FOR IMPROVEMENT OF
REGIONAL REFERRAL HOSPITALS
IN NORTHERN UGANDA

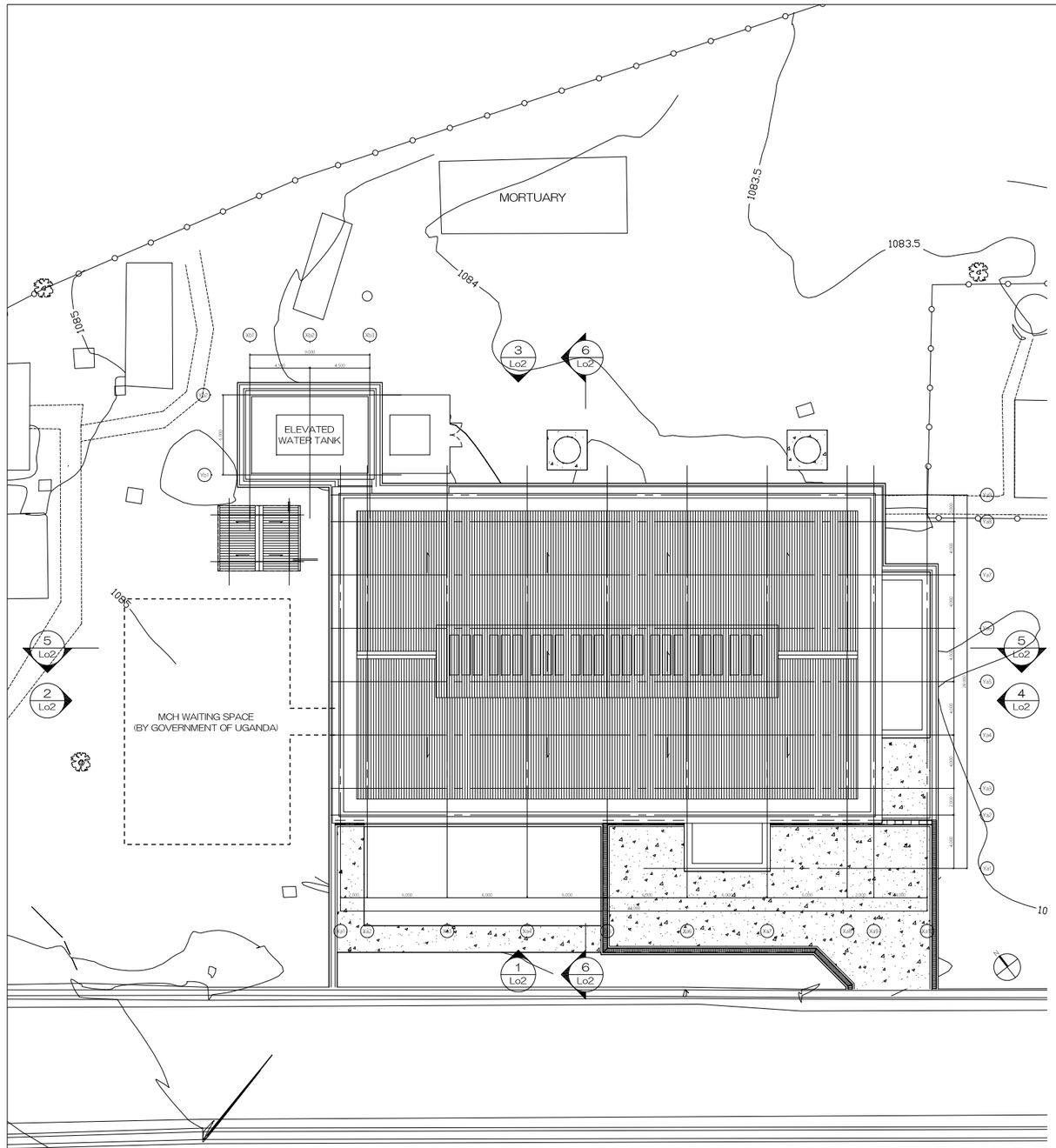
TITLE
EXTERIOR ELEVATIONS AND BUILDING SECTIONS

SITE
GULU REGIONAL REFERRAL HOSPITAL

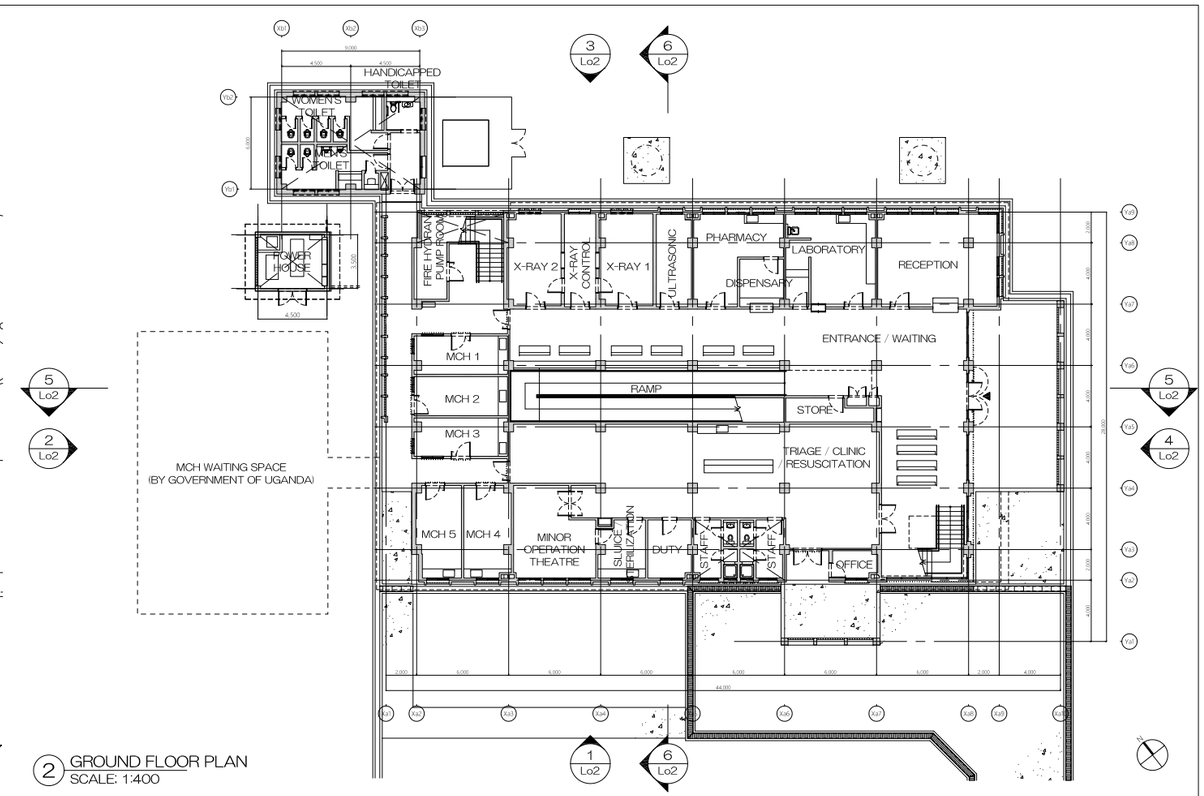
BLOCK
THEATRE / CASUALTY / MATERNITY WARD

DRAWING NO.
G2

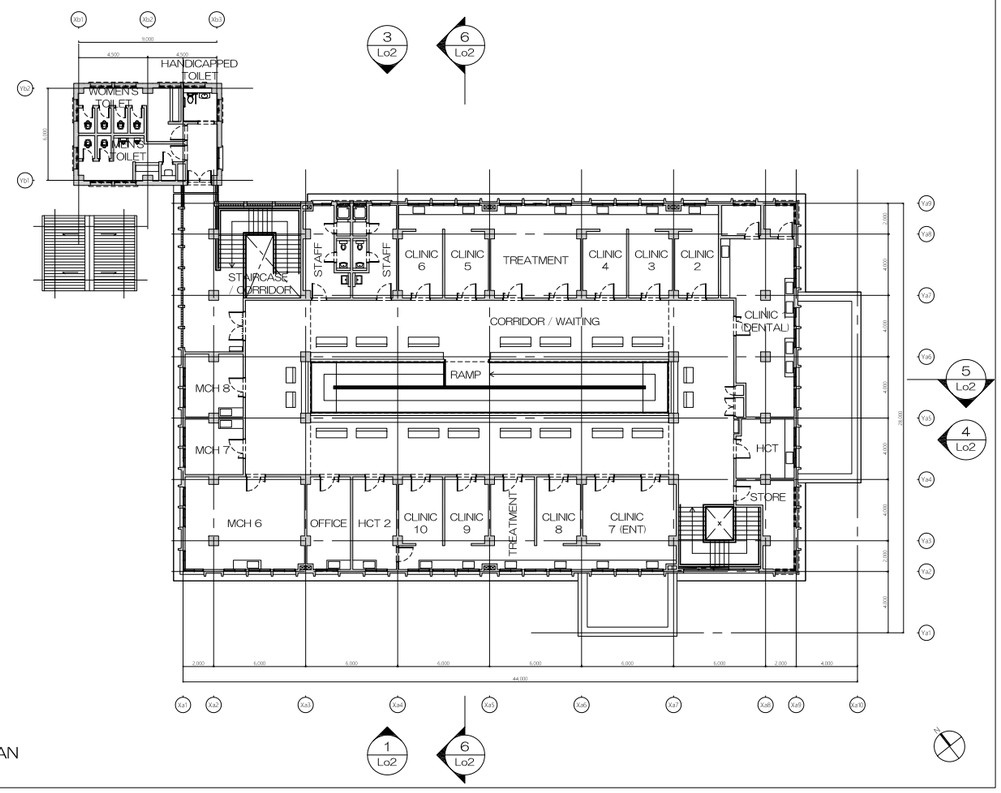
SCALE
1:300



1 PLOT PLAN
SCALE: 1:400



2 GROUND FLOOR PLAN
SCALE: 1:400



3 FIRST FLOOR PLAN
SCALE: 1:400

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PROJECT
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THE PROJECT FOR IMPROVEMENT OF
REGIONAL REFERRAL HOSPITALS
IN NORTHERN UGANDA

TITLE
PLOT PLAN AND FLOOR PLANS

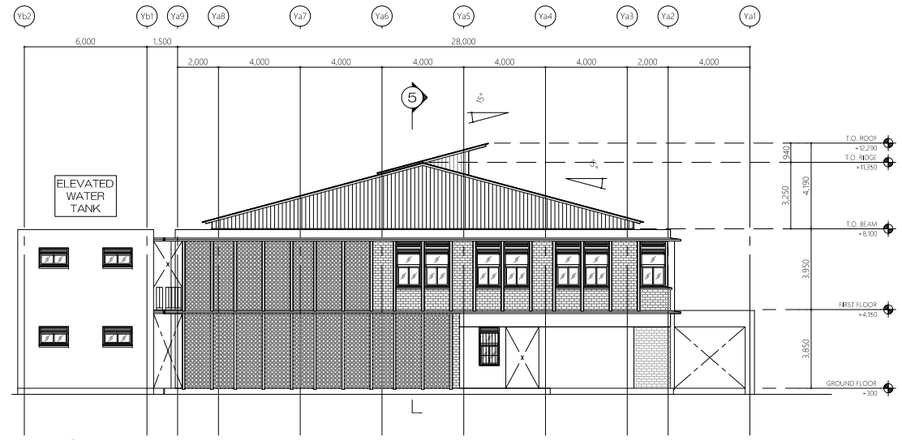
SITE
LIRA REGIONAL REFERRAL HOSPITAL

BLOCK
OPD / CASUALTY BLOCK

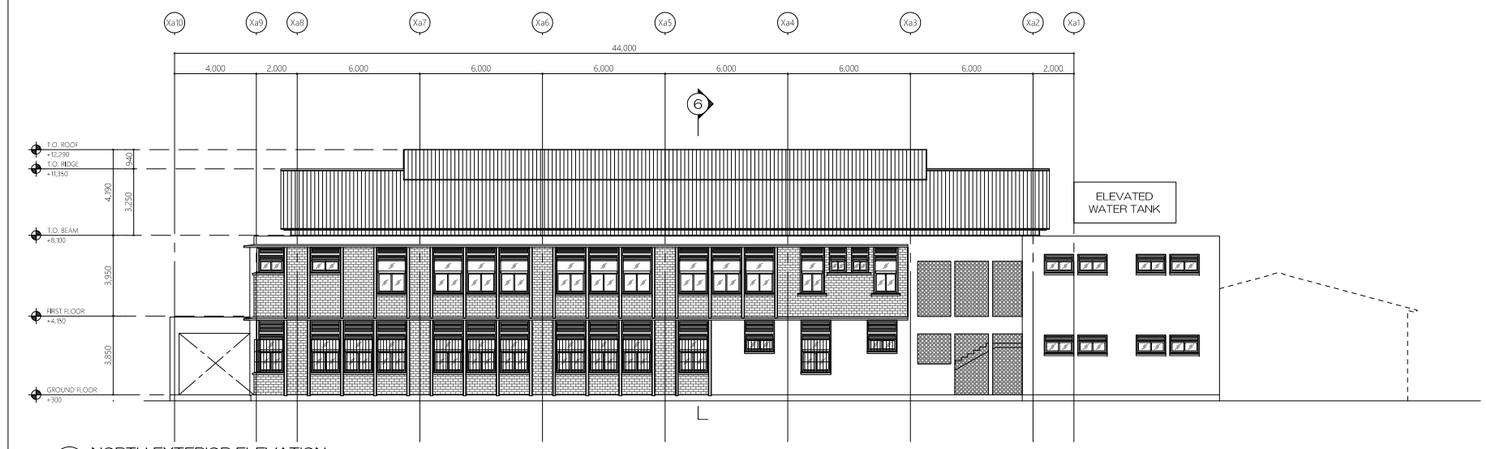
DRAWING NO.
Lo1

SCALE
1:400

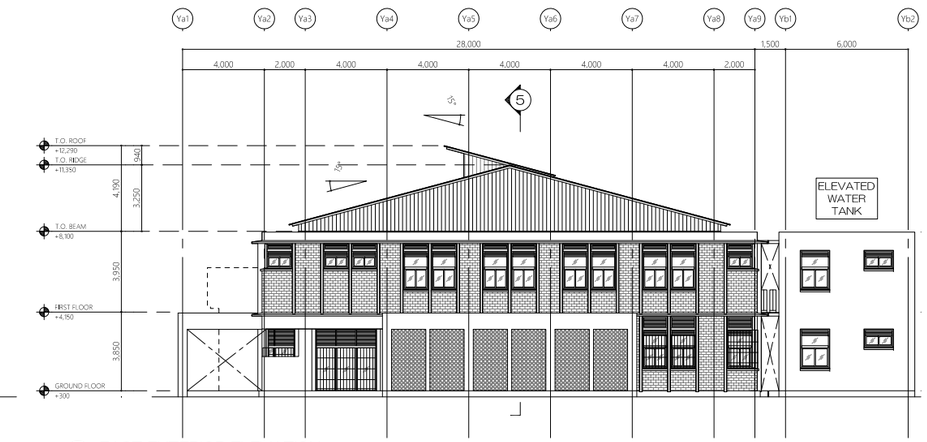
1 SOUTH EXTERIOR ELEVATION
SCALE: 1:300



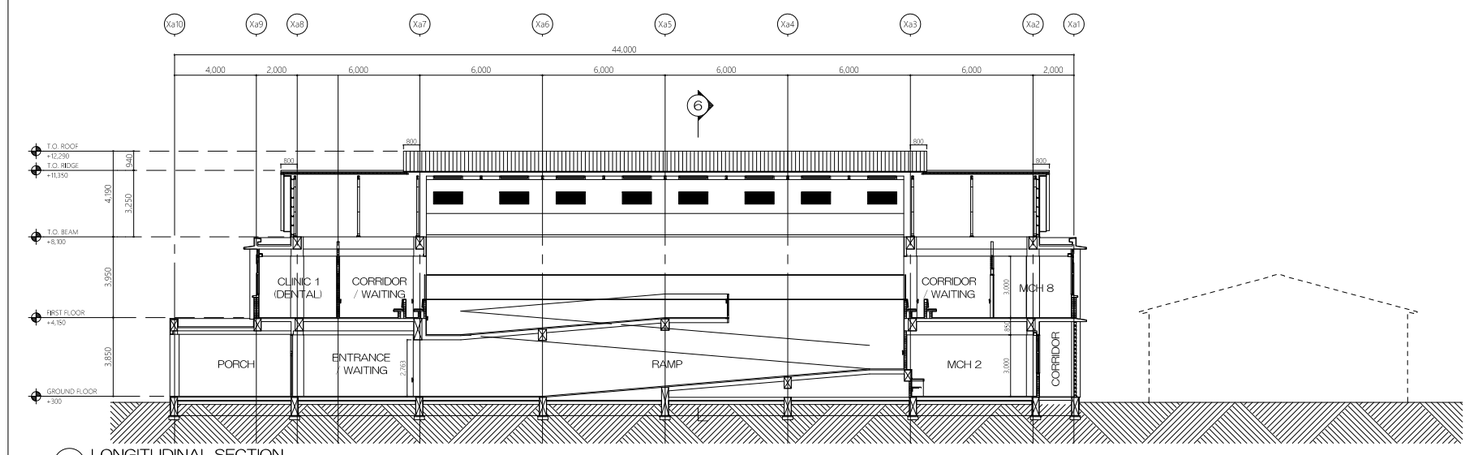
2 WEST EXTERIOR ELEVATION
SCALE: 1:300



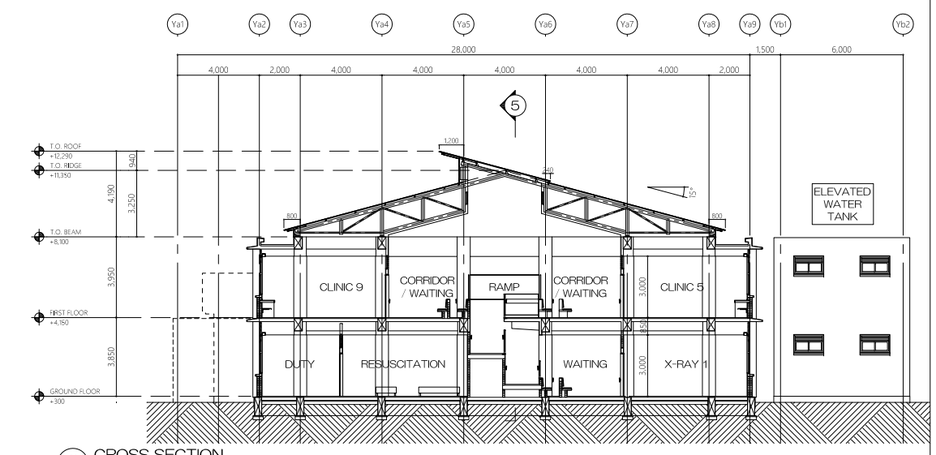
3 NORTH EXTERIOR ELEVATION
SCALE: 1:300



4 EAST EXTERIOR ELEVATION
SCALE: 1:300



5 LONGITUDINAL SECTION
SCALE: 1:300



6 CROSS SECTION
SCALE: 1:300

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YOKOGAWA Architects & Engineers, Inc. INTEM Consulting, Inc.

PROJECT
THE PREPARATORY SURVEY FOR
THE PROJECT FOR IMPROVEMENT OF
REGIONAL REFERRAL HOSPITALS
IN NORTHERN UGANDA

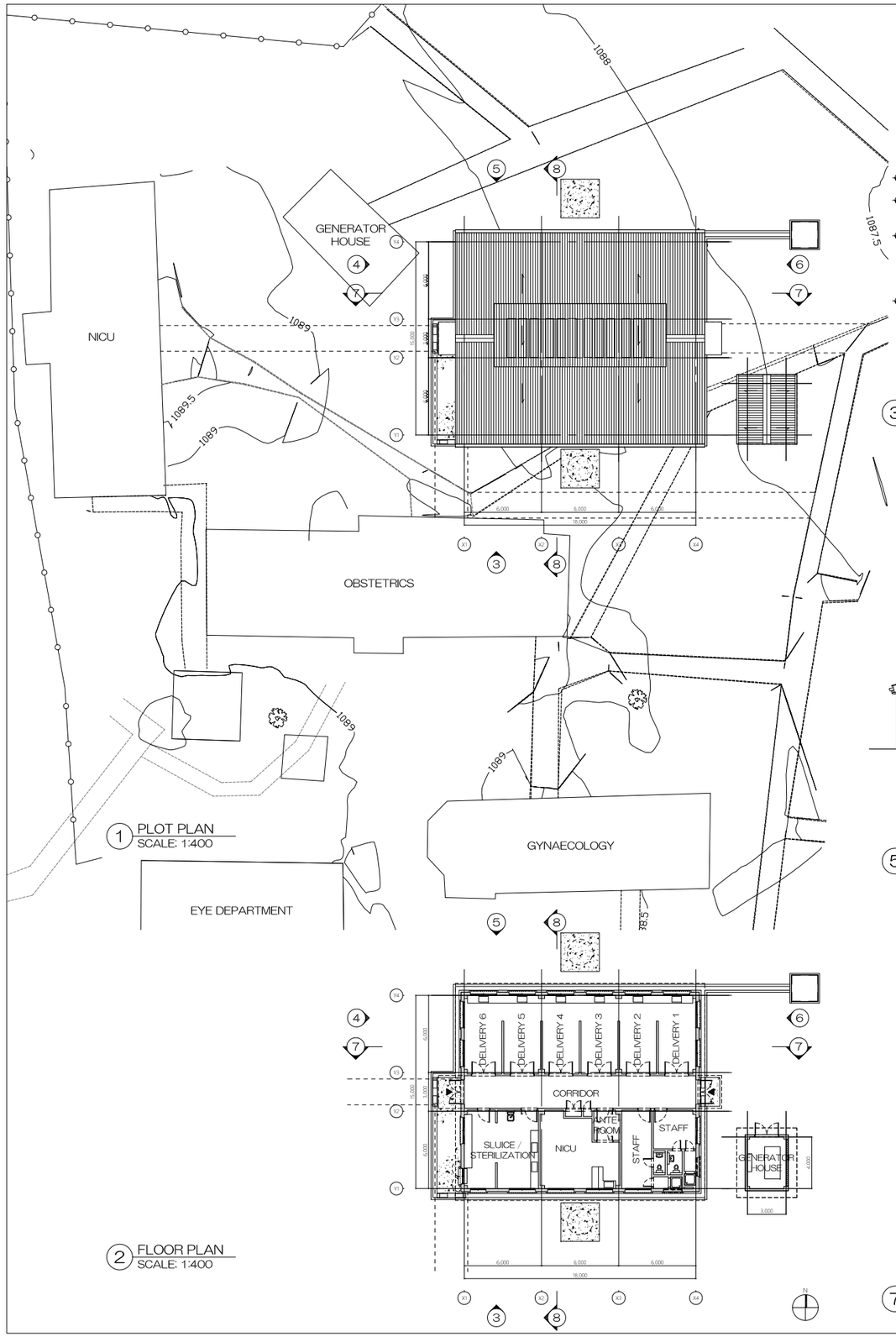
TITLE
EXTERIOR ELEVATIONS AND BUILDING SECTIONS

SITE
LIRA REGIONAL REFERRAL HOSPITAL

BLOCK
OPD / CASUALTY BLOCK

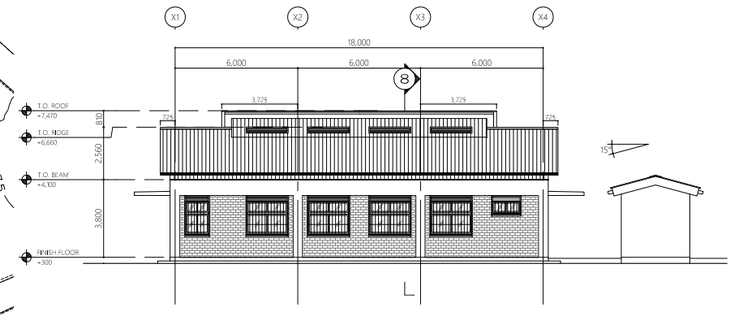
DRAWING NO.
Lo2

SCALE
1:300

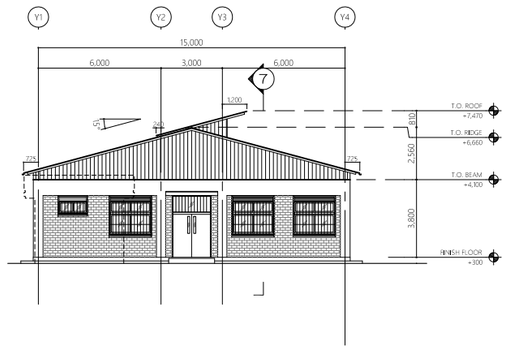


1 PLOT PLAN
SCALE: 1:400

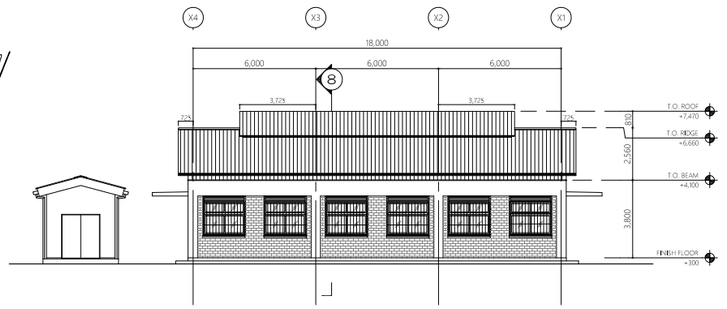
2 FLOOR PLAN
SCALE: 1:400



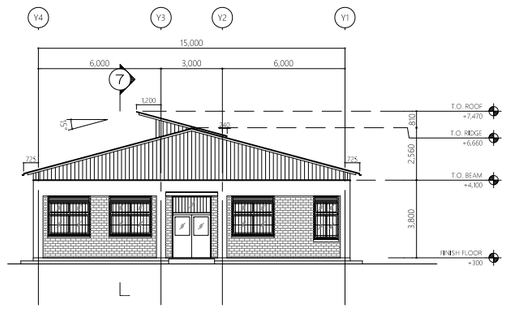
3 SOUTH EXTERIOR ELEVATION
SCALE: 1:300



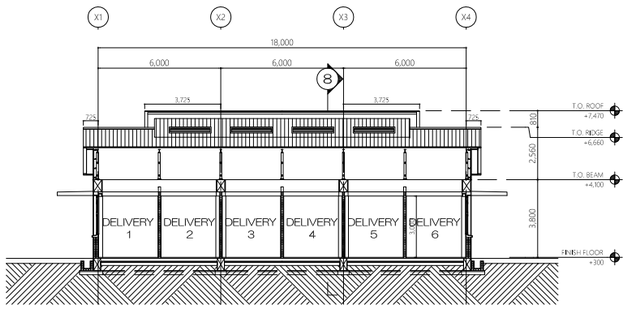
4 WEST EXTERIOR ELEVATION
SCALE: 1:300



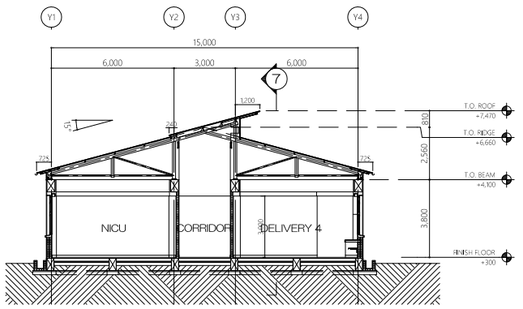
5 NORTH EXTERIOR ELEVATION
SCALE: 1:300



6 EAST EXTERIOR ELEVATION
SCALE: 1:300



7 LONGITUDINAL SECTION
SCALE: 1:300



8 CROSS SECTION
SCALE: 1:300

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PROJECT
THE PREPARATORY SURVEY FOR
THE PROJECT FOR IMPROVEMENT OF
REGIONAL REFERRAL HOSPITALS
IN NORTHERN UGANDA

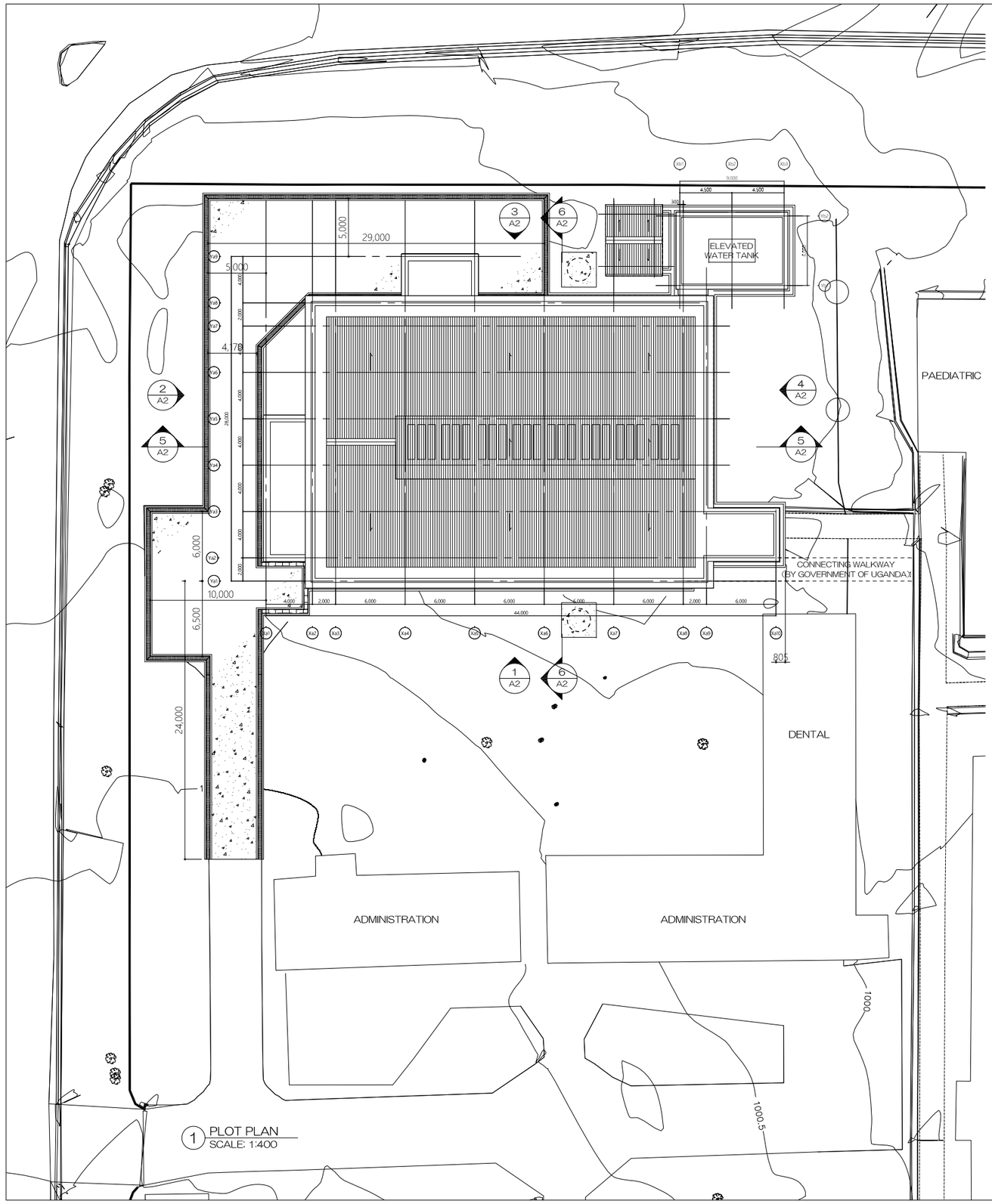
TITLE
PLANS, EXTERIOR ELEVATIONS, AND BUILDING SECTIONS

SITE
LIRA REGIONAL REFERRAL HOSPITAL

BLOCK
DELIVERY SUITE

DRAWING NO.
Ld1

SCALE
VARIES



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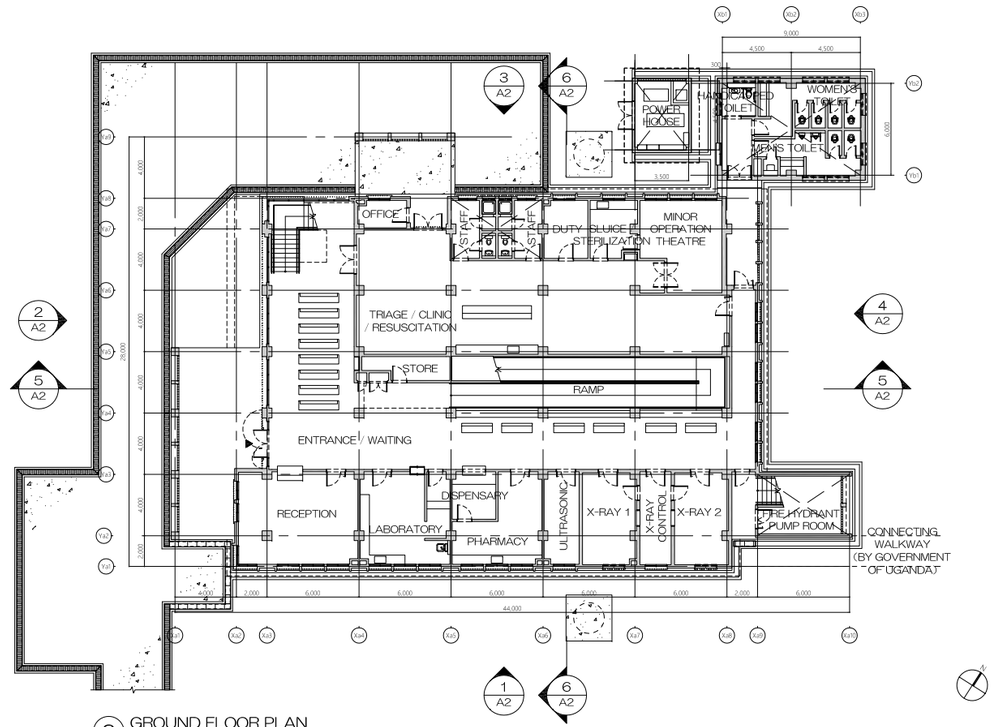

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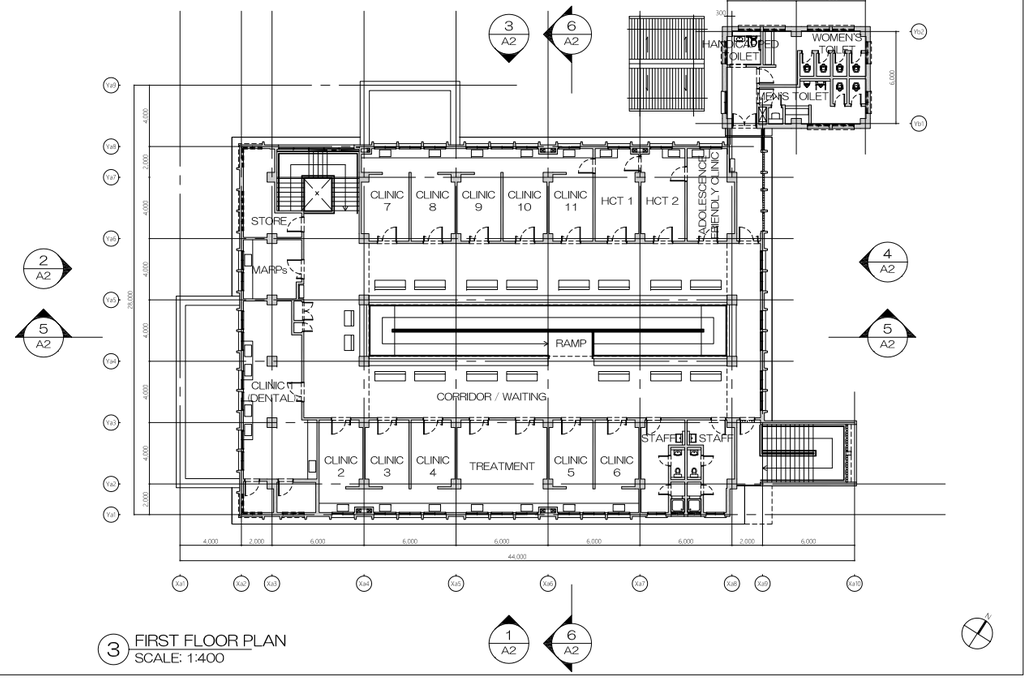


3 FIRST FLOOR PLAN
SCALE: 1:400

CONSULTANT
THE CONSORTIUM OF
YOKOGAWA ARCHITECTS & ENGINEERS, INC
AND INTEM CONSULTING, INC.

PROJECT
THE PREPARATORY SURVEY FOR
THE PROJECT FOR IMPROVEMENT OF
REGIONAL REFERRAL HOSPITALS
IN NORTHERN UGANDA

TITLE
PLOT PLAN AND FLOOR PLANS

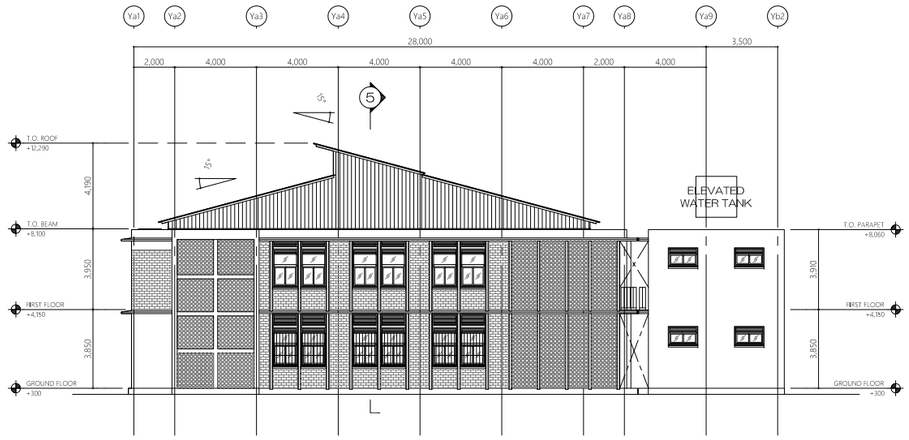
SITE
ARUA REGIONAL REFERRAL HOSPITAL

BLOCK
OPD / CASUALTY BLOCK

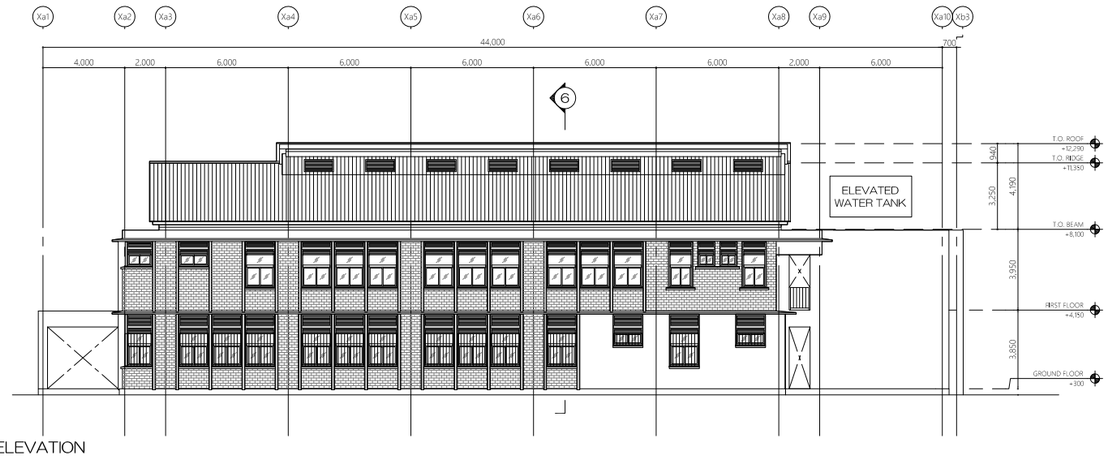
DRAWING NO.
A1

SCALE
1:400

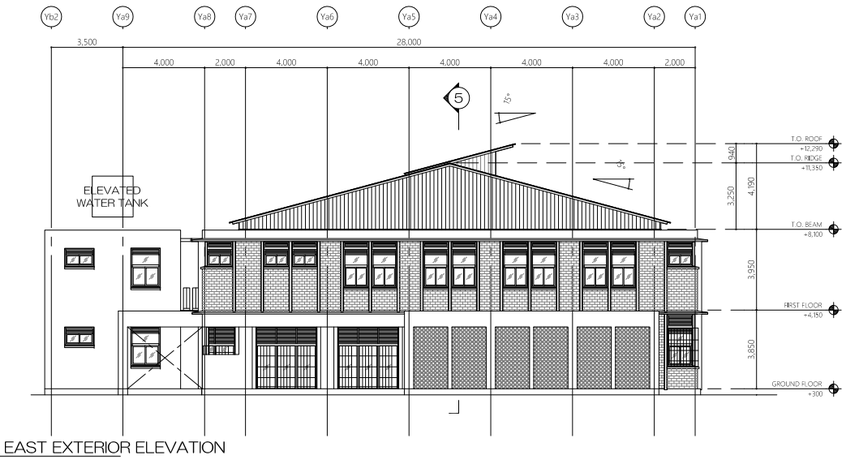
1 SOUTH EXTERIOR ELEVATION
SCALE: 1:300



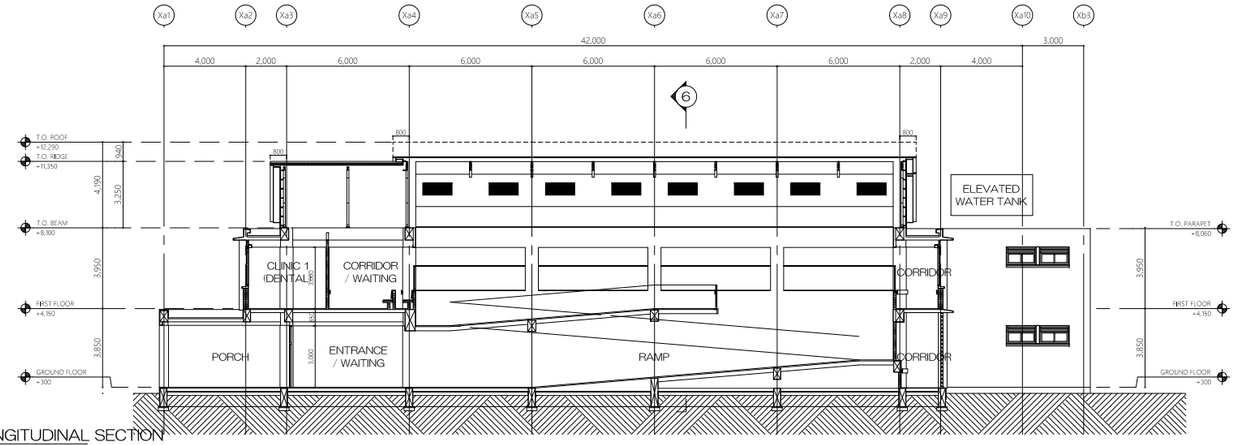
2 WEST EXTERIOR ELEVATIONS
SCALE: 1:300



3 NORTH EXTERIOR ELEVATION
SCALE: 1:300



4 EAST EXTERIOR ELEVATION
SCALE: 1:300



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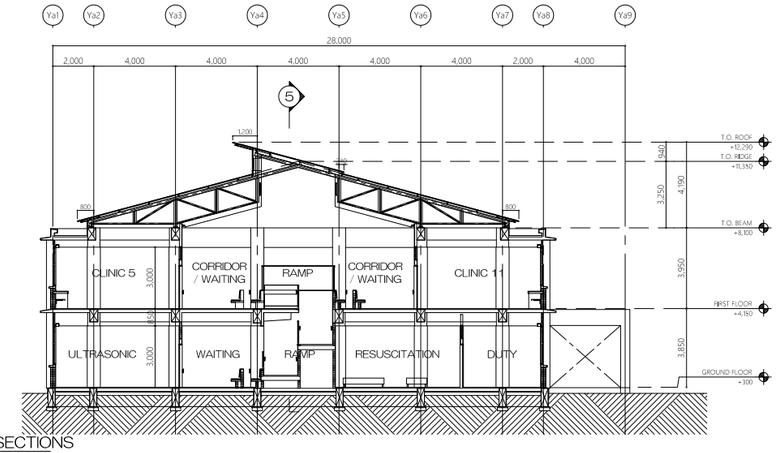


6 CROSS SECTIONS
SCALE: 1:300

CONSULTANT
THE CONSORTIUM OF
YOKOGAWA ARCHITECTS & ENGINEERS, INC
AND INTEM CONSULTING, INC.
YOKOGAWA Architects & Engineers, Inc. INTEM Consulting, Inc.

PROJECT
THE PREPARATORY SURVEY FOR
THE PROJECT FOR IMPROVEMENT OF
REGIONAL REFERRAL HOSPITALS
IN NORTHERN UGANDA

TITLE
EXTERIOR ELEVATIONS AND BUILDING SECTIONS

SITE
ARUA REGIONAL REFERRAL HOSPITAL

BLOCK
OPD / CASUALTY BLOCK

DRAWING NO.
A2

SCALE
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 the Theatre/Casualty/Maternity Ward at Gulu RRH, the OPD/Casualty Block and the Delivery Suite at Lira RRH and the OPD/Casualty Block at Arua RRH as well as supply and installation of medical equipment for each 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 conducted in accordance with agreement 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.

The executing agency for the Project is MOH, under which the Infrastructure Department, Directorate of Clinical Services of MOH as well as Gulu RRH, Lira RRH and Arua RRH will serve for the implementation of the Project. The executing agencies will cooperatively implement the responsibilities to be undertaken by the GOU.

(2) Consultant

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

1) Detailed design and 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 Japanese assistance 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 Cooperation Implementation 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 executing 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.

(6) Policy for Supervision of Equipment Procurement

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. Some equipment is packed at the factory which cannot be opened at the shipping port. In such a case, the entrusted and neutral inspection agency will inspect the equipment at the factory.

All the equipment procured in the Project will be inspected at each site. Final handing over should be conducted at each site in the presence of the Ugandan side responsible person, the supplier and the consultant. The names of models, origin of product, names of manufacturers, stickers attached or not and operation will be checked following the items in the contract documents.

2-2-4-2 Implementation Conditions

(1) Observations for Construction

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

1) Temporary facilities

The planned construction sites at the three RRHs are located within the hospital premises where the existing single to four-story buildings spread. The lot at Gulu RRH premises is a sloped land that climbs loosely toward the north, while that at Lira RRH and Arua RRH premises are almost flat.

Since the site of Theatre/Casualty/Maternity Ward at Gulu RRH is next to the existing Surgical and Medical Wards, the site will be temporarily surrounded with fences for safety

during the construction period. As the site is too narrow to spare any space for the construction, an empty lot at the southern part of the site, which is adjacent to open road on the south and convenient for conveyance of materials and machinery through a gate along the boundary line, will be allocated as a makeshift yard.

Since the site of OPD/Casualty Block at Lira RRH faces the HIV Unit and Antenatal Unit, temporary fences will be placed around the north, east and west side of the site to separate the site from the existing buildings. On the south side a temporary fence will be placed to separate from the open road for general citizen. A makeshift gate will be constructed for conveyance of work vehicles. The Delivery Suite to be deployed in the middle of the hospital site, where the existing Sanatorium, Obstetrics Ward, and Generator House are located, will be temporarily surrounded with fences for safety during the construction period. A makeshift gate will be built at the northern part of the construction site for conveyance. As the both sites are too narrow to spare any preparatory space for construction, an open space in front of the Duty rooms at the east side will be used as a makeshift yard.

Since the site of OPD /Casualty Block at Arua RRH faces the existing Administration Block and Paediatric Ward, makeshift fences will be placed at the east and south sides to distinguish the construction site. Along the west and north are surrounded with existing walls. A makeshift gate will be built at the northern wall of the construction site for conveyance. Since the construction site is too narrow to spare any preparatory space for the construction, an open space at the east side of the hospital premises will be used as a makeshift yard. Conveyance between the construction site and the yard will be via general roads.

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 will be poured by carts or by hand buckets relayed by persons standing in lines, etc. instead of pouring from buckets lifted by cranes. Since the amount of concrete that can be poured a day is limited, the construction schedules should accordingly have sufficient allowances.

3) Safety management

The planned construction sites at the three RRHs are situated in the hospital premises. Therefore, cautions must be secured in terms of the safety of the third persons, by installing the hoardings of the construction site to clearly separate the construction area. Since the temporary facilities space including the site office, material yard, work yard and concrete mixing space is separated from the construction site, flow lines of construction work machinery and material trucks between the yard and site may intersect with visiting patients, family attendants and hospital staffs. Also transportation of construction materials between the yard and the site are routed through public roads, which involves high risks of traffic accidents involving civilians.

As a countermeasure to that, safety measures will be considered such as posting guards at all the temporary gates to control traffic control.

(2) Observations for Equipment Procurement

The equipment procurement will be scheduled carefully to match the construction work schedule, and to realise efficient procurement and installation schedule. In addition, as to the equipment to be installed at the existing facilities, it is necessary to adopt a process that will not interfere with present medical services as much as possible, and to carefully consider the adjustment with the Ugandan side.

2-2-4-3 Scope of Works

(1) Construction work

To implement this project, works of Ugandan side and Japanese side are defined clearly. The following tables show the works at each RRH to be undertaken by each government.

1) Gulu RRH

Table 2-14 Works of Ugandan Side and Japanese Side (Gulu 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 (main OT block, radiology block, medical ward toilet, 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 3. Securing of temporary yard.
External Work	
1. Road within the construction site	1. Roads outside the site 2. Planting in the site
Building Construction	
1. Construction of the Theatre/Casualty/Maternity Ward (Architectural, electrical, plumbing, ventilating and air- conditioning)	1. Construction of connecting walkway between the Theatre/Casualty/Maternity Ward and the Imaging ward
Infrastructure Improvement	
1. Electric system 1) Installation of a 200 kVA pole transformer for the project buildings and installation of trunk cables to the Power Receiving Block 2) Installation of 75 kVA and 15 kVA generators for emergency backup at the Theatre/Casualty /Maternity Ward	1. Electric system Power incoming installations up to the 200 kVA pole transformer
2. Water supply Drawing a branch pipe from the existing water supply pipe after the existing meter to the Theatre /Casualty/Maternity Ward	2. Water supply Connection to the main water supply pipe in the hospital premises
3. Wastewater Connection from the Theatre/Casualty/Maternity Ward to the sewerage pit in the hospital premises	3. Wastewater
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. Renovation of the existing buildings and improvement of its utility systems to install equipment (Dental, physiotherapy, prosthetics, pharmacy) 2. Procurement and installation of mosquito nets and transfer of existing equipment 3. Procurement and installation of curtains and venetian blinds 4. Purchase of general furniture and transfer of existing furniture

2) Lira RRH

Table 2-15 Works of Ugandan Side and Japanese Side (Lira 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 (OPD, MCH building) 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 3. Securing of temporary yard
External Work	
1. Road within the construction site	1. Roads outside the site 2. Planting in the site
Building Construction	
1. Construction of the OPD/Casualty Block and Power house 1, and the Delivery Suite and Power house 2 (Architectural, electrical, plumbing, ventilating and air- conditioning)	1. Construction of MCH Waiting 2. Construction of a connecting walkway between the Delivery Suite and the existing Obstetrics Ward and NICU
Infrastructure Improvement	
1. Electric system 1) Installation of a 200kVA pole transformer for the project buildings and installation of trunk cables to the OPD/Casualty Block 2) Installation of 150kVA and 10kVA generators for the OPD/Casualty Block and a 50kVA generator for the Delivery Suite for the purpose of emergency backup	1. Electric system Power incoming installations up to the 200kVA pole transformer
2. Water supply Drawing a branch pipe from the water main to the OPD/Casualty Block Drawing water from the existing water supply piping in the hospital premises to the Delivery suite	2. Water supply Installing a water meter on the branch pipes drawn from the main water supply pipe
3. Wastewater Connection from the OPD/Casualty Block and the Delivery suite to the sewerage pit in the hospital premises	3. Wastewater
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. Repairs of the existing building and improvement of its utility systems to install new medical equipment (Laundry, Sterilisation) 2. Interconnection between the existing and newly constructed buildings (for CR system) 3. Transfer of existing equipment 4. Procurement and installation of curtains, venetian blinds 5. Purchase of general furniture and transfer of existing furniture

3) Arua RRH

Table 2-16 Works of Ugandan Side and Japanese Side (Arua 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 (OPD/Casualty Block) 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 3. Securing of temporary yard.
External Work	
1. Road within the construction site	1. Roads outside the site 2. Planting in the site
Building Construction	
1. Construction of the OPD/Casualty Block and the Power house (Architectural, electrical, plumbing, ventilating and air- conditioning)	1. Construction of a connecting walkway between the OPD/Casualty Block and the existing Paediatric Ward
Infrastructure Improvement	
1. Electric system 1) Installation of a 200kVA pole transformer for the project buildings and installation of trunk cables to the Power House 2) Installation of 150kVA and 15kVA generators for emergency backup at the OPD/Casualty Block	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 the OPD/Casualty Block	2. Water supply Connection to the main water supply pipe in the hospital premises
3. Wastewater Connection from the OPD/Casualty Block to the sewerage pit in the hospital premises	3. Wastewater
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. Renovation of existing buildings and facilities for installation of equipment (Laundry, Sterilisation) 2. Interconnection between the existing and newly constructed buildings (for CR system) 3. Transfer of existing equipment 4. Procurement and installation of curtains, venetian blinds 5. Purchase of general furniture and transfer of existing furniture

(2) Equipment Procurement and Installation

To implement procurement of construction materials, responsibility of each government is shown in the following table.

Table 2-17 Procurement Scope of Each Government

Items	Japan	Uganda
☐ Equipment work		
- Procurement	○	
- Installation	○	
- Trial run and adjustment	○	
- Operation guidance	○	
- Legal procedures and inspections concerning installation		○
☐ Utility work		
- Utility systems work in the new buildings	○	
- Equipment layout, utility system plan in the existing building	○	
- Utility systems work in the existing building		○
- LAN system wiring in the existing building, and between the existing building and the new building		○
- Check of utility systems work in the existing building	○	
- Connection of power, etc. to the equipment in the new building and the existing building	○	
☐ Securing equipment storage		○
☐ Transportation and customs clearance		
- Transportation to the site	○	
- Customs clearance		○
- Tax exemption		○
☐ Procedures for B/A and payment of commission fees		○
☐ Provision of convenience to the Japanese and/or physical persons of third countries concerned to the Project necessary for their embarkation, disembarkation and stay in Uganda		○
☐ Effective use and management of the procured equipment		○
☐ Application for and acquisition of permits necessary for the Project implementation		○
☐ Payment of all the costs of related tasks that are not covered by the Japanese Grant Aid		○

2-2-4-4 Consultant Supervision

(1) Facility Construction Supervision Plan

For the prompt and proper accomplishment of the services, the Consultant will organise 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:

1. 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.

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

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

4. 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 Ugandan side.

(2) Supervision of construction works

One resident representative of the consultant (an architect) will be posted to supervise construction works of Gulu and Lira RRHs, and another resident representative will be posed to supervise Arua RRH. 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, 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)

(3) Project Implementation Diagram

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

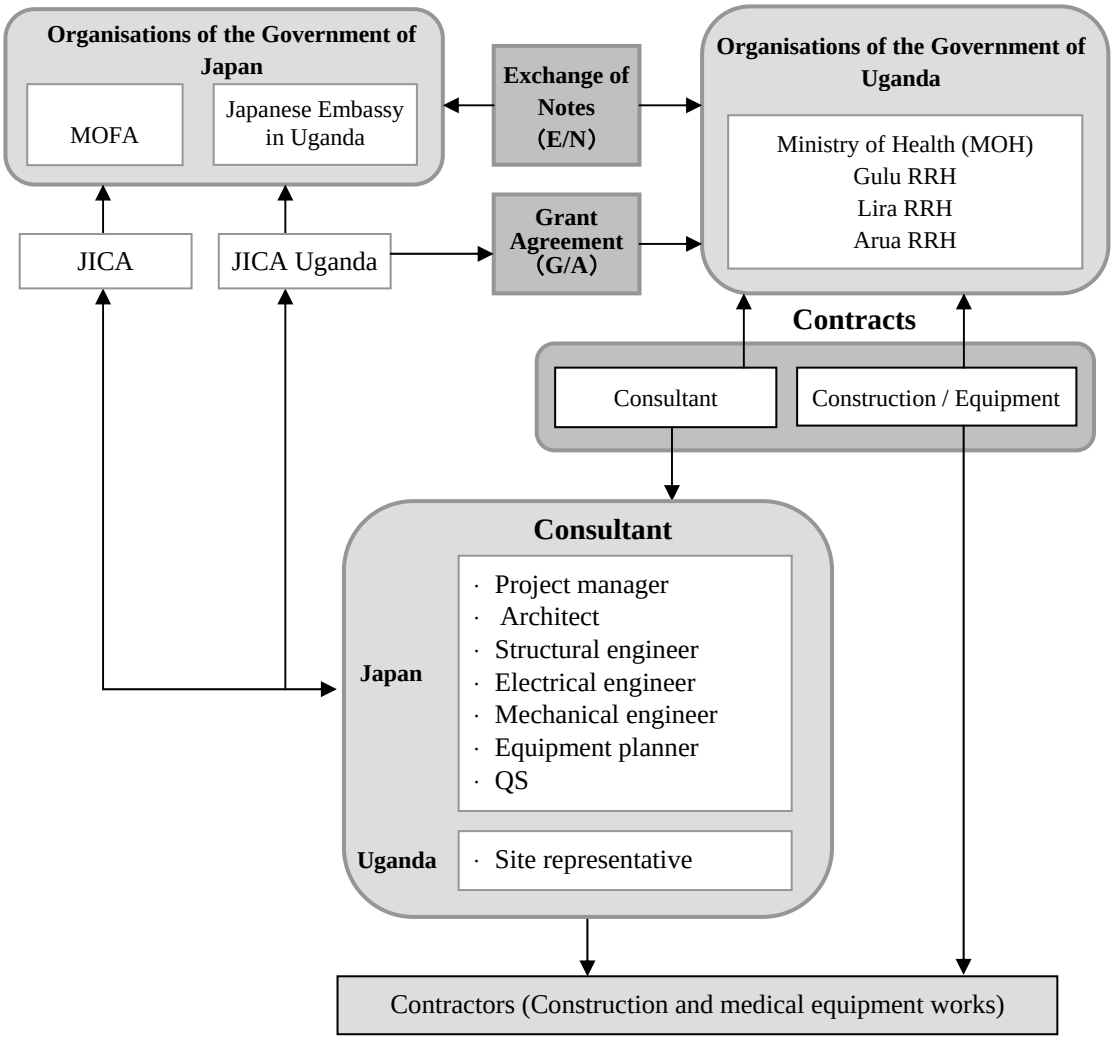


Figure 2-14 Project Implementation System Diagram

(4) Procurement supervision plan

Confirmation and verification of the equipment fabrication drawings after the bidding, and pre-shipment review and inspection of the equipment by the third-party organisation before shipment will be conducted in Japan. Acceptance inspection and handover will be done in Uganda. The Consultant members will comprise: an inspection engineer for inspection in Japan and a resident supervisory engineer for inspection at site.

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 three 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 to be used in the three sites.
- During the construction work period, concrete mixing samples will be taken every day on which casting work is done and once every 50 m^3 of concrete cast for tests on slump, chloride content in fresh concrete and concrete strength. Compressive tests of the samples will be conducted at each site using the compression tester brought from Japan. Calibration of the tester shall be checked and adjusted before use to confirm its accuracy.
- 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:

1. Equipment and materials whose cleanliness is easy to maintain, that are easily cleaned, and that are robust and durable will be procured, because 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.

2. 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.

3. 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 Ugandan market and easily available are regarded as the locally procured ones.

4. Since sand for concrete aggregate cannot be extracted near the three sites, sand shall be brought from the nearest extraction site at Nakitoma which is about 170 km away from Kampala in a direction to Gulu. Sand extraction site is located along Kampala – Gulu national road, on forest premises about one or two kilometres away on the end of an unpaved narrow road. Extraction steps will be as follows: pulling up delivering truck alongside the extraction site loaded with several workers necessary for extraction; digging out sand beneath two to three metres of surface soil and piling up on the truck; and transporting the sand to the construction site. The distance from the extraction site to Gulu is about 170 km, to Lira about 185 km and to Arua about 350 km. Surface asperity of unpaved roads especially in rainy season making transportation difficult and long distance from the extraction site to the construction sites elevate procurement costs. These factors

will be considered into the procurement plan.

5. Since gravel for concrete aggregate cannot be found around the construction sites except for manually crushed gravel sold alongside roads and supply volume is far from enough, gravel shall be transported from Gayaza quarry near Kampala. The transportation distance from the quarry to Gulu is about 340 km, to Lira about 350 km and to Arua about 520 km, and these long distances to the construction sites elevate procurement costs. These factors will be considered into the procurement plan.

6. Cement of quality manufactured in Uganda is by either of two, Hima Cement of the west or Tororo Cement of the east. Cement used for concrete at the three construction sites is planned to be of Tororo Cement, which is located nearer to the sites. While nearer situated, distance from the plant to each planed site is still long; to Gulu is about 410 km, to Lira about 270 km and to Arua about 590 km, and these long distances to the construction sites elevate procurement costs. These factors will be considered into the procurement plan.

Table 2-18 Procurement of Products and Materials

Materials and Equipment	Market in Uganda		Procurement Countries			Reason to be procured in Japan
	Situation	Import	Uganda	3rd countries	Japan	
(Construction materials)						
1. Aggregate (sand, crushed stone)	○		○			
2. Cement	○		○			
3. Reinforcement bar	○		○			
4. Structural steel	○	Kenya, South Africa	○			
5. Brick	○		○			
6. Plywood, lumber	○		○			
7. Wall tile	○	UAE	○			
8. Wooden door and window sash	○		○			
9. Steel door and window sash	○		○		○	Light-gauge steel door and stainless steel door: focusing on quality
10. Aluminium door and window sash	○		○			
11. Finishing hardware	○	India	○			
12.Glass	○		○			
13. Folded plate for roofing	○	UAE	○			
14.Finishing material	○		○			
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	○		○		○	Medical sink: unavailable locally
14. Elevated water tank	○				○	focusing on quality
15. Fire hydrant	○		○			
16. Air conditioner	○		○			
17. Fan	○		○			
18. Spiral duct	○		○			

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

It will take about five weeks for shipping 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 – Gulu: approx. 340 km, Kampala – Lira: approx. 340 km, Kampala – Arua: approx. 470 km). Roads from Kampala to each site are mostly paved and in good conditions.

(3) Equipment

As the areas of the target RRHs have no local agent dealing with hospital materials and machinery, correspondence with local agents in Kampala is necessary for procurement and repair.

Regarding the planned equipment in the project, there is no product which made in Uganda. Therefore, it is necessary for the Project to procure Japanese or third countries' product which can be technically supported by Ugandan agent. On the other hand, there are many agents specialised in medical equipment in Kampala. By conducting agent survey in the preparatory survey, it was found that they can procure most of the equipment and spare parts which have planned in the project. It is also confirmed that after sales services are available in Uganda for wide range of medical equipment, to be offered directly by local agents or by manufacturers through local agents.

Besides, if a limitation which allows only Japanese manufacturers to procure is put for the procurement plan, fairness in bidding may be impaired since only a few manufacturers can offer. Thus, procurement of third countries' manufacturers can be applied in the project. Even if the limitation is opened for third countries' manufacturers, it is important to keep the quality of equipment. In order not to be selected only by the equipment price, some limitations such as allowing procurement only from the Development Assistance Committee (DAC) or the Organisation for Economic Co-operation and Development (OECD) countries are necessary as well as allowing procurement only of manufacturers which can be procured in Ugandan market and can be received repair/after-sales services from its agent considering penetration levels.

2-2-4-7 Operation Guidance Plan

Special consideration will be necessary for operating and maintaining the equipment to be planned 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 sending a skilful engineer from the equipment maker or its local agent 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 understand the equipment sufficiently through the guidance.

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

Soft component will be planned in order to strengthen more effective equipment operation and maintenance management activities at the target facilities. The contents of soft component are composed of: I) Training in Clinical Techniques, II) Training in CR system and III) Training in maintenance management, and the target of training is medical staffs (doctor and nurse), technicians from regional workshops and user trainer in each RRH. The outline of training is as bellow.

(1) Training in Clinical Techniques

1) Back ground

The equipment plan will be examined concerning the implementation system of Ugandan side (human resources, budget, etc.). There are some equipment items that RRH staffs have experiences in the past but do not use them for a long period because of some reasons such as failure of the equipment. Thus, it is necessary for users to relearn technique for clinical use.

2) Contents

(Just after hand over)

-Confirmation of principle and purpose of use, re-learning basic knowledge

-Training method of applying real case in practice

(Half a year after handover)

-Resolution of unclear points re-confirmation of principles, and purpose of the equipment

-Re-training method of applying real case in practice and resolution of unclear points

3) Method

The training will be conducted with the supplied equipment items on their functions and purposes, as well as appropriate technique according to the patient conditions, targeting nurses and doctors in each department.

(2) Training in CR system

1) Back ground

CR system will be planned in place of the existing system using films in radiation diagnosis. This system is an alternative of classic method, and the conventional technology may be applied

without major technical obstacle. On the other hand, there are some differences such as data management method, image sharing method, and image editing technology. In order to understand these differences to enable effective operation of obtained data, it will be necessary to implement comprehensive training.

2) Contents (Just after handover)
- Training operation method of digital data including receiving, storage and search method
- Formulating rules to store digital data
- Training efficient editing techniques for obtained images

3) Method

The training will be conducted with the supplied equipment items targeting radiology technician and doctors in other departments which share images.

(3) Training in maintenance management

1) Back ground

In some past projects, the supplier and technicians from the agent conducted instructions for operation and maintenance. However the knowledge and technique are likely to become ambiguous as time passed. As a result, the equipment is operated in inappropriate manner in some cases or a slight breakdown remains ignored. Therefore, this soft component which will be implemented in six months after the equipment installation, can contribute to significantly resolve and improve these issues by re-training the operation method including clinical technique and the maintenance method.

2) Contents (Half a year after handover)
- Re-training method of preparation and operation on ineffectively used equipment
- Re-training maintenance method on insufficiently maintained equipment
- Training inspection and maintenance techniques with damaged equipment

3) Method

The training will be conducted with the supplied equipment items on their usage and maintenance technique targeting the medical staffs (doctors and nurses) of the three RRHs and technicians from the regional workshops.

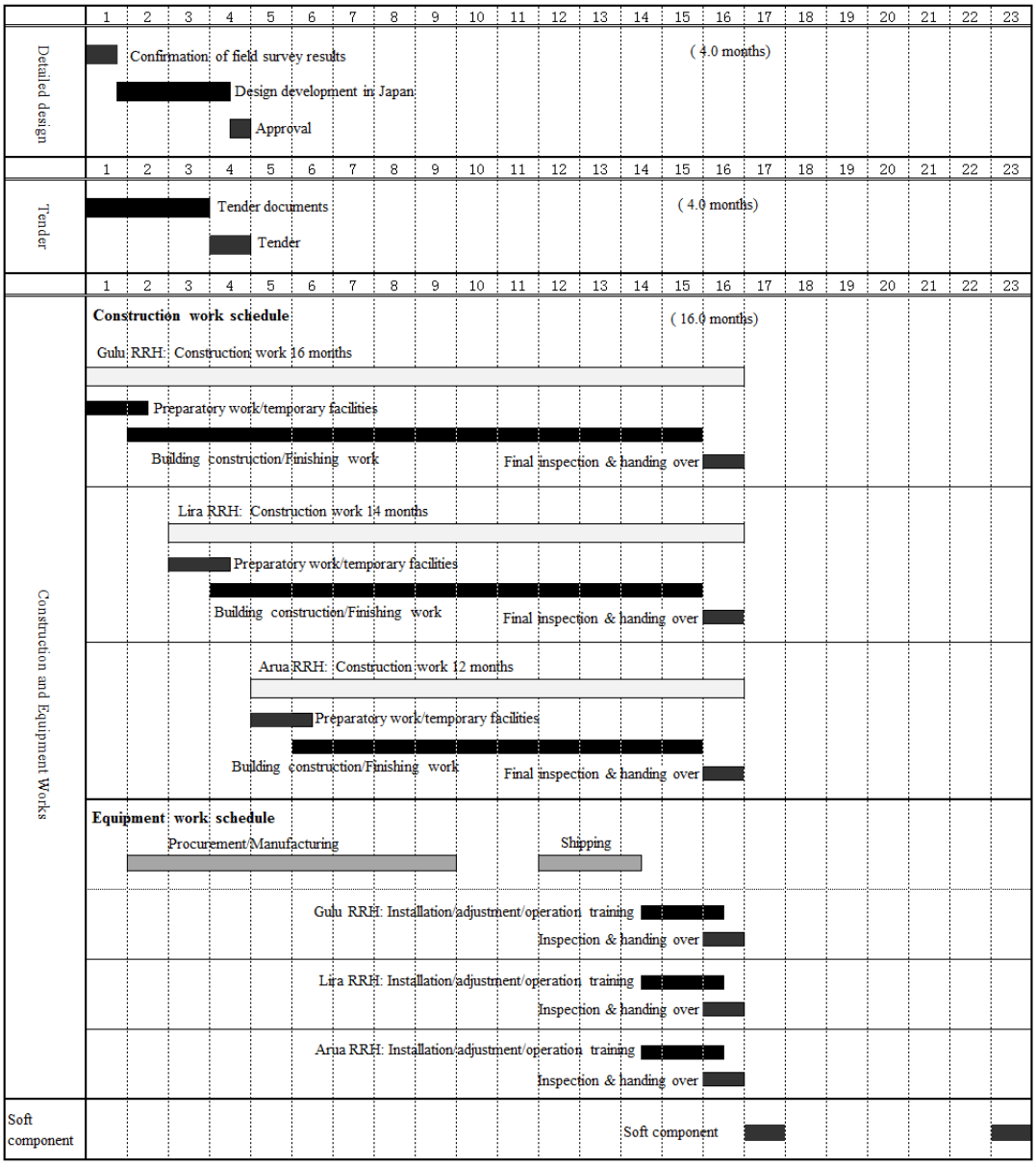
Details of the soft component are described in Annex 6.

2-2-4-9 Implementation Schedule

The detailed design will take about four months, the tender procedure will take about four months, the construction works including procurement and installation of the equipment will take about 16 months at Gulu RRH, about 14 months at Lira RRH and about 12 months at Arua RRH. The technical assistance on the operation and management of equipment (soft component) is expected to be held twice and will take about one month each, which will be carried out after the installation of equipment for the first session and in about six months after handover for the second one. 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 2-19 Project Implementation Schedule



2-3 Obligations of the Recipient Country

(1) Formalities

Major procedural matters to be carried out by the Ugandan side which have been agreed with MOH are as follows:

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 and/or physical persons of third countries 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 and/or physical persons of third countries who are employed to execute provision of facilities and equipment, and execution of other works according to the verified contract
6) Procedures, contracts and installation fees for power supply, water supply and sewage for the project facilities.
7) Provision of land necessary for construction work (temporary material yard)
8) Securing of the budget required for effective use and maintenance of the facilities and equipment constructed and procured in the Project

(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 executing agency of Uganda. In case of local procurements, Value Added Tax (VAT) will be exempted. The process presumed for the exemption of VAT is as follows:

1) Items whose duties and taxes be exempted will be agreed upon among the Consultant, Uganda Revenue Authority (URA) and MOH in the detailed design phase, which shall be reflected in the tender documents.

2) Contractor decided in the bidding will make a master list in line with the above 1).

3) JICA Uganda Office will make an announcement to the Ministry of Finance, Planning and Economic Development (MoFPED) of Uganda on the Japanese contractor and sub-contractor who apply the exemption.

4) MoFPED will issue a letter to URA to acknowledge tax exemption of the above mentioned contractor. The contractor shall submit this letter in applying for the exemption.

In case local agents refuse to accept this exemption process, the Japanese contractor and

sub-contractor shall temporarily pay the VAT and later file a return to URA. The Japanese contractor will be exempted from income and corporate tax, which will be borne by MOH as the executing agency. For this purpose, MOH agree that it should budget for counterpart funds to cover the tax payment.

The evidence documents which presumably are to be requested as vouchers by the Ugandan side shall be duly prepared in accordance with local accountancy law.

(3) Related Construction Work

1) Gulu RRH

a) Before the commencement of the works by the Japanese side

1. Transfer of functions from the existing Operation Theatre.
   Transfer of operational functions from the existing Operation Theatre to ENT and ophthalmology clinic.

2. Demolition and removal of the existing facilities in the site (existing Operation Theatre, X-ray room, nurse office, medical ward toilet and laundry room)

3. Cutting of trees in the construction site and removal of topsoil

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

b) During the works by the Japanese side

5. Improvement of infrastructure for the Project
   Power incoming installations up to the newly installed 200 kVA pole transformer

6. Repairs of the existing building and improvement of its utility systems to install new medical equipment (dental, physiotherapy, prosthetics, pharmacy)

c) After the completion of the works by the Japanese side

7. Procurement of general furniture and supplies
   - Purchase of general furniture and supplies
   - Transfer of existing equipment

8. 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

9. Construction of a connecting walkway

2) Lira RRH

a) Before the commencement of the works by the Japanese side

1. Transfer of functions from the existing OPD Unit and MCH/OPD Unit

Transfer of functions from the existing OPD Unit and MCH/OPD Unit to Health Centres (HC) in the neighbourhood.

2. Demolition of and removal of the existing facilities in the site (a part of the existing OPD Unit and MCU/OPD Unit)

3. Cutting of trees in the site and removal of topsoil

4. Removal and rerouting of the existing power cable, telephone cable, water supply pipe and wastewater pipe passing the site

5. Relocation of the existing incinerator

b) During the works by the Japanese side

6. Improvement of infrastructure
   Power incoming installations up to the newly installed 200kVA pole transformer

7. Repairs of the existing building and improvement of its utility systems to install new medical equipment (laundry, sterilisation)

8. LAN system wiring in the existing building and between the existing building and the new building (for CR system)

c) After the completion of the works by the Japanese side

9. 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 outpatients and ambulances, and a security house.

10. Construction of a road outside the construction site
    - Paving of a hospital road along the east of the OPD/Casualty Block.
    - Construction of an access road to staff houses on the south of the OPD/Casualty Block.

11. Procurement of general furniture and supplies
    - Purchase of general furniture and supplies
    - Transfer of existing equipment

12. Functional transfer from the existing facilities to the new facilities
    i) Functional transfer from the moved OPD Unit to the new OPD Unit
    ii) Functional transfer from the existing delivery rooms to the new delivery rooms

13. Construction of MCH Waiting (18m*12m)

14. Construction of a connecting walkway between the new delivery rooms to the existing Obstetrics and NICU

15. Remodelling of the existing delivery rooms to bed rooms

16. Remodelling of the existing NICU to bed rooms

3) Arua RRH

a) Before the commencement of the works by the Japanese side

1. Transfer of functions from the existing OPD block
   Transfer of operational functions from the existing OPD block to the HC in the neighbourhood.

2. Demolition of and removal of the existing facilities in the site (existing OPD block)

3. Cutting of trees in the construction site and removal of topsoil

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

b) During the works by the Japanese side

5. Improvement of infrastructure
   Power incoming installations up to the newly installed 200kVA pole transformer

6. Repairs of the existing building and improvement of its utility systems to install new medical equipment (laundry, sterilisation)

7. LAN system wiring in the existing building and between the existing building and the new building (for CR system)

c) After the completion of the works by the Japanese side

8. Procurement of general furniture and supplies
   - Purchase of general furniture and supplies
   - Transfer of existing equipment

9. Functional transfer from the existing facilities to the new facilities
   - Functional transfer from the existing OPD unit to the new OPD/Casualty Block

10. Construction of a connecting walkway

2-4 Project Operation Plan

(1) Operation Plan

The project management plan will be formulated based on the current staff and budget of the three target RRHs. The Project is scheduled to be completed and handed over to the Ugandan side in December 2019, about two years from now. The three target RRHs should plan to increase medical staff in the departments to be strengthened by the Project and implement seminars and training of current staff to ensure smooth hospital operation after handover.

1) Staff allocation plan

The shortage of health professionals is an urgent issue especially for the three target RRHs

that are located relatively far from Kampala. To respond to this issue, MOH pursues securing and developing human resources in promoting HSDP, through such policies as to increase salary and to provide staff accommodation.

Currently, staff accommodation and nurse dormitory are being constructed in the three target RRHs. Through such efforts the employment conditions of medical staff are improving, and it can be expected to increase staff members required along with the increase of patients.

2) Staff training plan

The three target RRHs endeavour to upgrade the capability of hospital staff through the in-hospital trainings as well as those at the national referral hospitals (Mulago RRH), 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 the operation and management system of the three target RRHs expected to improve through the implementation and after the completion of the Project.

a) Gulu RRH

An ICU Department with five beds will be established through the Japanese assistance. It has been agreed that medical staff who have sufficient skills shall be posed at ICU, and Gulu RRH plans to train the doctors and nurses at Mulago NHR or Jinja RRH both of which have the ICU Department

b) Lira RRH

There will be no department to be newly established in Lira RRH through the Project, and the main target is the improvement of current clinical functions. Therefore, there is no necessity to provide special trainings for the management and maintenance after the completion of the Project.

c) Arua RRH

There will be no clinical departments to be newly established in Arua RRH through the Project, and the main target is the improvement of current clinical functions. Therefore, there is no necessity to provide special trainings for the management and maintenance after the completion of the Project.

(2) Maintenance Plan

1) Health Infrastructure Workshop

The Infrastructure Department, Directorate 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 12 areas and a workshop is located in each area; the central workshop being in Kampala (under MOH) and the other 11 workshops in the regional areas (under RRHs). The workshop will be responsible for routine management and maintenance, and when necessary, engineer from the agent will deal

with repairs and maintenance of the equipment.

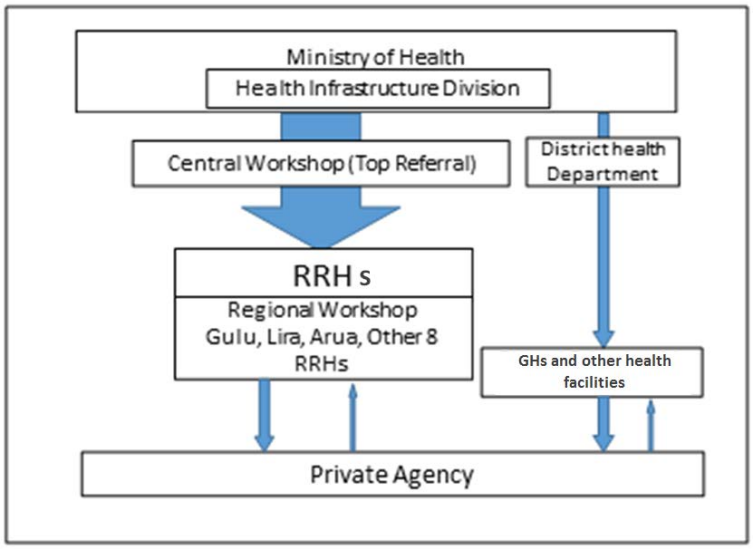


Figure 2-15 Outline of Maintenance and Management System

2) Budget for Maintenance and Management at the Target Hospitals

Maintenance and management of health infrastructure became managed by the government budget 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 used for maintenance and repairing works. In the year 2008/2009, the Capital Development Fund (CDF) was established for major construction and renovation of facilities and procurement of equipment at the RRHs, which will be continued for 15 years. Owing to the CDF, the budget of each RRH has been increased considerably. In addition, CDF is used for such equipment that requires expensive maintenance and repairs costs. It has been agreed that the equipment to be procured through the Japanese Assistance will be maintained with the recurrent budget and CDF.

3) Facility Management and Maintenance Plan

The three target RRHs have regional workshops in which several electrical, electronic and mechanical technicians are regularly appointed, and serve facility maintenance under the management of the principal hospital administrator. Repairs of failures that cannot be handled within the hospital are commissioned to external specialised engineers.

Facilities to be constructed in the Project will not be provided with such building equipment that requires special expertise, and can be maintained with the current maintenance system. However, in accordance with the expansion of the hospital facilities through the implementation of the Project, there will be 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 is important that the workshop technicians understand the components of the facilities during the construction work, so that they will fully understand the contents of facility maintenance manual by the time

of completion. It is also important to establish such a system that they always grasp the conditions of the facilities, and can consult with the hospital administrator when any troubles or abnormality are detected.

4) Equipment Maintenance Plan

In the workshops at the three RRHs, one Biomedical Engineer and at least four staff members are deployed. They will maintain the equipment with present repair tools and inspection machines in each workshop and with those to be provided through the Project.

Also, maintenance contract shall be included for three years at expense of Japan so that the equipment will not be inoperable because of troubles incurred relatively soon after its handover. The manufacturer's warranty usually lasts for one year covering on-call service, where the engineer from the agent on hospital's request will deal with repairs of the equipment and so on without additional cost. The maintenance contract will specify the extension of on-call service period for two years, provision of regular maintenance service for three years, service for discount of repair parts and replacement parts, etc. for each equipment item.

It has been agreed that the equipment not covered by the maintenance contract shall be taken care of at expense of Uganda by some maintenance contracts or enough allocation of budget available in case of breakdown.

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 division of works are estimated based on the calculation conditions as specified in (2), when the Project is implemented through the Japan's Grant Aid. This cost estimation is provisional.

(1) Costs to be borne by the Ugandan Side

The total expenses amounts to approximately 35.2 million yen.

In addition to the above expenses, the charges relevant to B/A and A/P and the cost for income and corporate taxes on the Japanese consultant, contractors, and sub-contractors will be necessary.

1) Gulu RRH

Costs to be borne by the Ugandan Side for Gulu RRH (1,000 UShs)

Item	Cost
1. Transfer of functions from the existing Operation Theatre	6,000
2. Demolition and removal of the existing facilities (existing Operation Theatre, old X-ray room, nurse office, medical ward toilet and laundry room)	46,600
3. Cutting of trees in the construction site and removal of topsoil	6,000
4. Clearance of the existing infrastructures in the construction site and their rerouting	6,000
5. Improvement of infrastructure for the Project (Power incoming installations up to 200kVA pole transformer to be installed by the Japanese side)	1,550
6. Repairs of the existing building and improvement of its utility systems to install new medical equipment (dental, physiotherapy, prosthetics, pharmacy)	11,000
7. Purchase of general furniture and supplies as well as transferring existing furniture into the new building	31,000
8. Functional transfer from the existing facilities to the new facilities (the Theatre/Casualty/Maternity Ward)	6,000
9. Construction of connecting walkway	50,700
Total	164,850

(Equivalent to approx. 5.31million yen)

2) Lira RRH

Costs to be borne by the Ugandan Side for Lira RRH (1,000 UShs)

Item	Cost
1. Transfer of functions from the existing Operation Theatre	6,000
2. Demolition and removal of the existing facilities (a part of the existing OPD Unit and MCH/OPD Unit)	37,300
3. Cutting of trees in the construction site and removal of topsoil	6,000
4. Clearance of the existing infrastructures in the construction site and their rerouting	6,000
5. Relocation of the existing incinerator	15,500
6. Improvement of infrastructure for the Project (Power incoming installations up to 200kVA pole transformer to be installed by the Japanese side)	1,550
7. Repairs of the existing building and improvement of its utility systems to install new medical equipment (sterilisation)	6,500
8. LAN system wiring in the existing building and between the existing building and the new building (for CR system)	10,000
9. Construction of a fence along the west border of the OPD/Casualty Block. Construction of a gate and a gatehouse for the OPD/Casualty Block.	155,000
10. Paving of the hospital roads and construction of an access road to staff houses	93,200
11. Procurement of general furniture and supplies as well as carrying existing furniture into the new building	31,000
12. Functional transfer to the new building	6,000
13. Construction of MCH Waiting (18m*12)	342,000
14. Construction of connecting walkway Between the new delivery rooms and the existing Obstetrics Unit and NICU	46,600
15. Remodelling of the existing delivery rooms to bed rooms	15,500
16. Remodelling of the existing NICU to bed rooms	15,500
Total	793,650

(Equivalent to approx. 25.56 million yen)

3) Arua RRH

Costs to be borne by the Ugandan Side for Arua RRH (1,000 UShs)

Item	Cost
1. Transfer of functions from the existing OPD unit	6,000
2. Demolition and removal of the existing facilities (existing OPD unit)	31,100
3. Cutting of trees in the construction site and removal of topsoil	6,000
4. Clearance of the existing infrastructures in the construction site and their rerouting	6,000
5. Improvement of infrastructure for the Project (Power incoming installations up to 200kVA pole transformer to be installed by the Japanese side)	1,550
6. Repairs of the existing building and improvement of its utility systems to install new medical equipment (laundry, sterilisation)	12,000
7. LAN system wiring in the existing building and between the existing building and the new building (for CR system)	10,000
8. Procurement of general furniture and supplies as well as carrying existing furniture into the new building	31,000
9. Functional relocation from the existing building to the new building (the OPD/Casualty Block)	6,000
10. Construction of a connecting walkway	25,000
Total	134,650

(Equivalent to approx. 4.31million yen)

(2) Calculation Conditions

1) Time of Estimation : as of March 2017
2) Conversion Rate : 1.00 US$ = 115.63 yen
: 1.00 US$ = 3,588.60 UShs
: 1 USh = 0.0322 yen
3) Construction Period : 16 months
4) Other Conditions:

Project implementation intended to be in compliance with the Grant Aid scheme of the GOJ.
The application of the contingency and its ratio will be determined by the GOJ.

2-5-2 Operation and Maintenance Costs

(1) Gulu, Lira and Arua RRHs

Costs for utility charges, equipment repair and consumables after the completion of the Project are assumed to increase at all the three RRHs due to the construction of new buildings and procurement of medical equipment. Tables below show approximation of increased amount of operation and maintenance costs at each hospital.

Oxygen plants were completed at Gulu and Lira and the one at Arua RRH is expected to be completed during 2017/2018 fiscal year. So, the oxygen gas fee is not anticipated.

As fixed telephone lines are not drawn in the three RRHs and currently only mobile phones are used. Since fixed telephone lines are neither planned to be drawn for the Project an increase of telephone charges is not anticipated. The increase of operation and maintenance costs in each hospital for the second year onwards is assumed to be about 4-6 % of its budget for the fiscal year 2015/16, and it can be bearable in consideration of the increasing tendency of the budget for each hospital.

1) Increased amount of annual operation and maintenance costs of Gulu RRH

(In UShs)

Item	Initial fiscal year	2nd and 3rd years
1. Electricity charge	45,941,000	45,941,000
2. Fuel cost of generator	26,697,706	26,697,706
3. Water charge	22,443,485	22,443,485
4. Building maintenance cost	0	7,407,000
Sub-total 1.–4. (facility maintenance cost)	95,082,191	102,489,191
5. Equipment maintenance cost	82,317,518	141,717,518
A. Repairs	0	59,400,000
B. Consumables	82,317,518	82,317,518
Total 1. -5.	177,399,709	244,206,709
Total (in million UShs)	approx. 177	approx. 244

1. Electricity charge --- 45,941,000UShs/year

The total annual electricity charge at Gulu RRH is 122,509,512Ushs currently.

The total floor areas of the building to be constructed in the Project will be 2,469m^2 which shares about 25% of the floor areas of the entire hospital.

With an assumption that the equipment to be provided in the Project will consume about 1.5 times electric power of the equipment per equal floor areas of the existing building, the total electricity charge after the Project is estimated at 45,941,000 UShs/year.

2. Fuel cost of generator --- 26,697,706UShs/year

Out of the hearing at the site during the field surveys, power failures occur twice a day, each lasting about 1 hour on average. Fuel cost is estimated based on this assumption. 15 kVA + 75 kVA power generation is planned for the Project.

Fuel cost of generator

	Charge (UShs)	Consumption (litres)	Operation hours (h)	Operation days	Annual consumption (litres)	Total (UShs)
15kVA generator	4,844	4.2	2	365	3,066	14,851,704
75kVA generator	4,844	13.4	0.5	365	2,445.5	11,846,002
Total						26,697,706

*Fuel consumption of a generator is estimated for about 50% output.

*The operation hours of 75kVA generator is assumed about 25% of the 15kVA generator, because the 75kVA generator is to be only started at the time of power failure while the equipment is under operation.

3. Water charge --- 22,443,485UShs/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	17
Total	17

- Price structure

Metered charge (average) 3,617UShs/m^3

Water charge

	Charge (UShs)	Water supply	Day	City water consumption rate	Total (UShs)
Newly built facilities					
Metered charge (water supply)	3,617	17	365	1	22,443,485

4. Building maintenance cost --- 7,407,000UShs/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 of similar cases in Japan. The building maintenance cost is presumed to 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	2,469.00	-	-	1.0	7,407,000
Total						7,407,000

5. Equipment maintenance cost

The equipment maintenance cost will consist of A. Repairs (for asking repairs to the maker agent, purchasing spare parts) and B. Consumables

(In UShs)

Item	Initial fiscal year	2nd year and after
A. Repairs	0	59,400,000
B. Consumables	82,317,518	82,317,518
Total	82,317,518	141,717,518

The repair costs of the equipment to be procured through the Project, after the manufacturer's one-year warranty period is over, are assumed to be equal to the present equipment repair costs. Since the average budget from 2014 to 2017 was 59.4 million UShs, calculated from the repair cost of each RRH listed in the Health Sector Ministerial Policy Statement for Financial Year 2015/2016 (2016, MOH) and 2016/2017, the repair cost is estimated at 59.4 million UShs for the second year and onward. The above-cited costs do not include periodic maintenance by the agent engineer, and basically include only on-call maintenance or purchase of spare parts at the time of failure of the equipment.

B. Costs for consumables are expected to be as shown below.

No.	Equipment Name	Q'ty	Consumables and Spare parts	Q'ty/year		Unit Price (UShs)	Sub-total (UShs)
6	Anaesthesia Machine	1	Anaesthesia gas	1	Set	32,070	32,070
			CO2 absorber	1	Bottle	123,470	123,470
10	Autoclave (Large)	1	Main filter	1	Pc.	97,814	97,814
			Pre-filter	1	Pc.	152,333	152,333
			Recording paper	3	Rolls	52,114	156,342
			Recording ink	1	Pcs.	112,245	112,245
			Salt	1	Set	22,449	22,449
12	Binocular microscope	1	Immersion oil	1	Pc.	48,105	48,105
13	Biochemistry analyser	1	Reagent	1	Set	8,017,500	8,017,500
18	Esophagoscope	1	Lamp	2	Pcs.	224,490	448,980
23	Colpo scope	1	Lamp	2	Pcs.	224,490	448,980
31	Dental Unit	1	Vacuum Tip	10	Pcs.	96,210	962,100
			Cartridge rotor	10	Pcs.	481,050	4,810,500
35	Diagnosis set	2	Lump for ophthalmoscope	1	Pcs.	80,175	160,350
			Lump for otoscope	1	Pcs.	80,175	160,350
45	ECG	1	Recording paper	3	Rolls	80,175	240,525
			Patient cable	1	Set	288,630	288,630
			Chest electrode	1	Set	36,079	36,079
			Limb electrode	1	Set	83,382	83,382
			ECG Cream	2	Pcs.	17,639	35,278
49	Electro Surgical Unit	2	Electrode tips	10	Pcs.	32,070	641,400
			Mini plate	10	Pcs.	16,035	320,700
50	Electrolyte Analyser	1	Reagent	1	Set	3,207,000	3,207,000
61	Fetal Doppler	2	Ultrasonic gel	10	Pcs.	22,449	448,980
			Fuse	1	Pc.	8,980	17,960
64	Glucometer	3	Test strip	1000	Pcs.	1,283	3,849,000
68	Haematology analyser	1	Reagent	1	Set	1,603,500	1,603,500
73	Infant Incubator	4	Air micro filter	2	Pcs.	56,123	448,984
			Access port cover set	5	Pcs.	52,916	1,058,320
			Adhesive collar for probe	1	Set	448,980	1,795,920
76	Infusion pump	3	Infusion set (20drops/ml)	2	Sets	128,280	769,680
			Infusion set (60drops/ml)	4	Sets	160,350	1,924,200
84	Micropipette set	2	Tips	5000	Pcs.	145	1,450,000
89	Nebulizer	5	Medicine cup	5	Pcs.	14,432	360,800
			Aerosol mask for adult	10	Sets	6,414	320,700
			Aerosol mask for child	5	Sets	6,414	160,350
			Mouth pieces	5	Pcs.	6,414	160,350
			Air filter	1	Pc.	4,811	24,055
			Corrugated hose	1	Pc.	48,105	240,525
90	Operating light (ceiling mounted)	4	Handle	1	Pc.	240,525	962,100
99	Patient monitor	10	Probe for adult	1	Pc.	1,282,800	12,828,000
			Probe for infant	1	Pc.	1,282,800	12,828,000
			Disposable electrode	50	Sets	2,406	1,203,000
			Recording paper	2	Pcs.	14,432	288,640
101	Photo Therapy Unit	1	Eye mask	100	Pcs.	10,423	1,042,300
			Blue light fluorescent lamp	10	Pcs.	24,053	240,530
111	Pulse oximeter	15	Battery	4	Pcs.	4,811	288,660
132	Suction machine (electrical)	13	Suction tube with adaptor	1	Set	44,898	583,674
			Filter	2	Pcs.	102,624	2,668,224
			Suction bottle	1	Pc.	256,560	3,335,280
142	Ultrasonic therapy machine	1	Gel	1	Bottle	192,420	192,420
143	Ultrasound Machine (Cardiac)	1	Recording paper	5	Pcs.	160,350	801,750
			Gel	2	Pcs.	192,420	384,840
144	Ultrasound Machine (Mobile)	3	Recording paper	5	Pcs.	160,350	2,405,250
			Gel	2	Pcs.	192,420	1,154,520

145	Vacuum Extractor	1	Suction tube	1	Sets	104,228	104,228
			Suction catheter	20	Sets	2,085	41,700
			Suction bottle	2	Pcs.	192,420	384,840
146	Ventilator	1	Patient circuit set (adult)	2	Sets	1,202,625	2,405,250
			Patient circuit set (infant)	2	Sets	1,443,150	2,886,300
			Bacteria filter	2	Pcs.	24,053	48,106
				Total			82,317,518

2) Increased amount of annual operation and maintenance costs of Lira RRH

(In UShs)

Item	Initial fiscal year	2nd and 3rd years
1. Electricity charge	47,244,000	47,244,000
2. Fuel cost of generator	58,169,174	58,169,174
3. Water charge	26,332,195	26,332,195
4. Building maintenance cost	0	6,938,790
Sub-total 1.–4. (facility maintenance cost)	131,745,369	138,684,159
5. Equipment maintenance cost	64,442,834	130,942,834
A. Repairs	0	66,500,000
B. Consumables	64,442,834	64,442,834
Total 1. – 5.	196,188,203	269,626,993
Total (in million UShs)	approx. 196	approx. 270

1. Electricity charge --- 47,244,000 UShs/year

The total annual electricity charge at Lira RRH is 136,940,490 UShs currently.

The total floor areas of the building to be constructed in the Project will be 2,312.93m^2 which shares about 23% of the floor areas of the entire hospital.

With an assumption that the equipment to be provided in the Project will consume about 1.5 times electric power of the equipment per equal floor areas of the existing building, the total electricity charge after the Project is estimated at 47,244,000 UShs/year.

2. Fuel cost of generator --- 58,169,174UShs/year

Out of the hearing at the site during the field surveys, power failures occur twice a day, each lasting about 1 hour on average. Fuel cost is estimated based on this assumption. 10kVA + 150kVA ＋ 50kVA (NICU) power generation is planned for the Project.

Fuel cost of generator

	Charge (UShs)	Consumption (litres)	Operation hours (h)	Operation days	Annual consumption (litres)	Total (UShs)
10kVA generator	4,844	3.4	2	365	2,482	12,022,808
150kVA generator	4,844	27	0.5	365	4,297.5	23,868,810
50kVA generator (NICU)	4,844	6.3	2	365	4,599	22,277,556
Total						58,169,174

*Fuel consumption of 10kVA generator is estimated assuming for about 50% output.

*The operation hours of 150kVA generator is assumed about 25% of the 10kVA generator, because the 150kVA generator is to be started only at the time of power failure while the equipment is under operation.

*Fuel consumption of 50kVA generator is estimated assuming for about 25% output.

3. Water charge --- 26,332,195 UShs/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	19
Total	19

- Price structure

Metered charge (average) 3,797UShs/m^3

Water charge

	Charge (UShs)	Water supply	Day	City water consumption rate	Total (UShs)
Newly built facilities					
Metered charge (water supply)	3,797	19	365	1	26,332,195

4. Building maintenance cost --- 6,938,790UShs/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 similar cases in Japan. The building maintenance cost is presumed to 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	2,312.93	-	-	1.0	6,938,790
Total						6,938,790

5. Equipment maintenance cost

The equipment maintenance cost will consist of A. Repairs (for asking repairs to the maker agent, purchasing spare parts) and B. Consumables

(In UShs)

Item	Initial fiscal year	2nd year and after
A. Repairs	0	66,500,000
B. Consumables	64,442,834	64,442,834
Total	64,442,834	130,942,834

The repair costs of the equipment to be procured through the Project, after the manufacturer's one-year warranty period is over, are assumed to be equal to the present equipment repair costs.

Since the average budget from 2014 to 2017 was 66.5 million UShs, calculated from the repair cost of each RRH listed in the Health Sector Ministerial Policy Statement for Financial Year 2015/2016 (2016, MOH) and 2016/2017, the repair cost is estimated at 66.5 million UShs for the second year and onward. The above-cited costs do not include periodic maintenance by the agent engineer, and basically include only on-call maintenance or purchase of spare parts at the time of failure of the equipment.

B. Costs for consumables are expected to be as shown below.

No.	Equipment Name	Q'ty	Consumables and Spare parts	Q'ty/year		Unit Price (UShs)	Sub-total (UShs)
6	Anaesthesia Machine	1	Anaesthesia gas	1	Set	32,070	32,070
			CO2 absorber	1	Bottle	123,470	123,470
10	Autoclave (Large)	1	Main filter	1	Pc.	97,814	97,814
			Pre-filter	1	Pc.	152,333	152,333
			Recording paper	3	Rolls	52,114	156,342
			Recording ink	1	Pcs.	112,245	112,245
			Salt	1	Set	22,449	22,449
13	Biochemistry analyser	1	Reagent	1	Set	8,017,500	8,017,500
18	Esophagoscope	1	Lamp	2	Pcs.	224,490	448,980
25	CR System	1	Dry film	2	Box	3,207,000	6,414,000
31	Dental Unit	1	Vacuum Tip	10	Pcs.	96,210	962,100
			Cartridge rotor	10	Pcs.	481,050	4,810,500
35	Diagnosis set	7	Lump for ophthalmoscope	1	Pcs.	80,175	561,225
			Lump for otoscope	1	Pcs.	80,175	561,225
54	ENT Chair	1	Lamp	1	Pc.	19,242	19,242
61	Fetal Doppler	1	Ultrasonic gel	10	Pcs.	22,449	224,490
			Fuse	1	Pc.	8,980	8,980
64	Glucometer	13	Test strip	1000	Pcs.	1,283	16,679,000
68	Haematology analyser	1	Reagent	1	Set	1,603,500	1,603,500
73	Infant Incubator	2	Air micro filter	2	Pcs.	56,123	224,492
			Access port cover set	5	Pcs.	52,916	529,160
			Adhesive collar for probe	1	Set	448,980	897,960
89	Nebulizer	1	Medicine cup	5	Pcs.	14,432	72,160
			Aerosol mask for adult	10	Sets	6,414	64,140
			Aerosol mask for child	5	Sets	6,414	32,070
			Mouth pieces	5	Pcs.	6,414	32,070
			Air filter	1	Pc.	4,811	4,811
			Corrugated hose	1	Pc.	48,105	48,105
91	Operation light (mobile)	5	Handle	1	Pc.	240,525	1,202,625
99	Patient monitor	5	Probe for adult	1	Pc.	1,282,800	6,414,000
			Probe for infant	1	Pc.	1,282,800	6,414,000
			Disposable electrode	50	Sets	2,406	601,500
			Recording paper	2	Pcs.	14,432	144,320
111	Pulse oximeter	7	Battery	4	Pcs.	4,811	134,708
132	Suction machine (electrical)	8	Suction tube with adaptor	1	Set	44,898	359,184
			Filter	2	Pcs.	102,624	1,641,984
			Suction bottle	1	Pc.	256,560	2,052,480
142	Ultrasonic therapy machine	1	Gel	1	Bottle	192,420	192,420
143	Ultrasound Machine (Cardiac)	1	Recording paper	5	Pcs.	160,350	801,750
			Gel	2	Pcs.	192,420	384,840
144	Ultrasound Machine (Mobile)	1	Recording paper	5	Pcs.	160,350	801,750
			Gel	2	Pcs.	192,420	384,840
				Total			64,442,834

3) Increased amount of annual operation and maintenance costs of Arua RRH

(In UShs)

Item	Initial fiscal year	2nd year and after
1. Electricity charge	33,715,169	33,715,169
2. Fuel cost of generator	38,720,514	38,720,514
3. Water charge	23,763,690	23,763,690
4. Building maintenance cost	0	5,341,440
Sub-total 1.–4. (facility maintenance cost)	96,199,373	101,540,813
5. Equipment maintenance cost	79,681,055	194,381,055
A. Repairs	0	114,700,000
B. Consumables	79,681,055	79,681,055
Total 1. – 5.	175,880,428	295,921,868
Total (in million UShs)	approx. 176	approx. 296

1. Electricity charge --- 33,715,169UShs/year

The electricity charge at Arua RRH is estimated based on the average electricity charge per square meter of Gulu and Lira RRHs, being 12,624Ushs/m^2, since the total annual electricity charge could not be confirmed.

The total floor areas of the building to be constructed in the Project will be 1,780.48m^2 which shares about 10% of the floor areas of the entire hospital.

With an assumption that the equipment to be provided in the Project will consume about 1.5 times electric power of the equipment per equal floor areas of the existing building, the total electricity charge after the Project is estimated at 33,715,169Ushs/year.

2. Fuel cost of generator --- 38,720,514UShs/year

Out of the hearing at the site during the field surveys, power failures occur twice a day, each lasting about 1 hour on average. Fuel cost is estimated based on this assumption. 15kVA + 150kVA power generation is planned for the Project.

Fuel cost of generator

	Charge (UShs)	Consumption (litres)	Operation hours (h)	Operation days	Annual consumption (litres)	Total (UShs)
15kVA generator	4,844	4.2	2	365	3,066	14,851,704
150kVA generator	4,844	27	0.5	365	4,927.5	23,868,810
Total						38,720,514

*Fuel consumption of a generator is estimated for about 50% output.

*The operation hours of 150kVA generator is assumed 25% of the 15kVA generator, because the 150kVA generator is to be started only at the time of power failure while the equipment is under operation.

3. Water charge --- 23,763,690UShs/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	18
Total	18

- Price structure

Metered charge (average) 3,617UShs/m^3

Water charge

	Charge (UShs)	Water supply	Day	City water consumption rate	Total (UShs)
Newly built facilities					
Metered charge (water supply)	3,617	18	365	1	23,763,690

4. Building maintenance cost --- 5,341,440UShs/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 of similar cases in Japan. The building maintenance cost is presumed to 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	1,780.48	-	-	1.0	5,341,440
Total						5,341,440

5. Equipment maintenance cost

The equipment maintenance cost will consist of A. Repairs (for asking repairs to the maker agent, purchasing spare parts) and B. Consumables.

(In UShs)

Item	Initial fiscal year	2nd year and after
A. Repairs	0	114,700,000
B. Consumables	79,681,055	79,681,055
C. Maintenance contract	0	0
Total	79,681,055	194,381,055

The repair costs of the equipment to be procured through the Project, after the manufacturer's one-year warranty period is over, are assumed to be equal to the present equipment repair costs. Since the average budget from 2014 to 2017 was 114.7 million UShs, calculated from the repair cost of each RRH listed in the Health Sector Ministerial Policy Statement for Financial Year 2015/2016 (2016, MOH) and 2016/2017, the repair cost is estimated at 114.7 million UShs for the second year and onward. The above-cited costs do not include periodic maintenance by the

agent engineer, and basically include only on-call maintenance or purchase of replacement parts at the time of failure of the equipment.

B. Costs for consumables are expected to be as shown below.

No.	Equipment Name	Q'ty	Consumables and Spare parts	Q'ty/year		Unit Price (UShs)	Sub-total (UShs)
10	Autoclave (Large)	1	Main filter	1	Pc.	97,814	97,814
			Pre-filter	1	Pc.	152,333	152,333
			Recording paper	3	Rolls	52,114	156,342
			Recording ink	1	Pcs.	112,245	112,245
			Salt	1	Set	22,449	22,449
12	Binocular microscope	1	Immersion oil	1	Pc.	48,105	48,105
13	Biochemistry analyser	1	Reagent	1	Set	8,017,500	8,017,500
18	Esophagoscope	1	Lamp	2	Pcs.	224,490	448,980
24	CPAP	1	Mask	20	Pcs.	48,105	962,100
			Circuit	1	Set	152,333	152,333
			Chamber	10	Pcs.	28,863	288,630
25	CR System	1	Dry film	2	Box	3,207,000	6,414,000
31	Dental Unit	1	Vacuum Tip	10	Pcs.	96,210	962,100
			Cartridge rotor	10	Pcs.	481,050	4,810,500
35	Diagnosis set	3	Lump for ophthalmoscope	1	Pcs.	80,175	240,525
			Lump for otoscope	1	Pcs.	80,175	240,525
49	Electro Surgical Unit	1	Electrode tips	10	Pcs.	32,070	320,700
			Mini plate	10	Pcs.	16,035	160,350
61	Doppler	3	Ultrasonic gel	10	Pcs.	22,449	673,470
			Fuse	1	Pc.	8,980	26,940
64	Glucometer	1	Test strip	1000	Pcs.	1,283	1,283,000
66	HBA1c Analyser	1	Test strip	1000	Sets	6,254	6,254,000
68	Haematology analyser	1	Reagent	1	Set	1,603,500	1,603,500
73	Infant Incubator	4	Air micro filter	2	Pcs.	56,123	448,984
			Access port cover set	5	Pcs.	52,916	1,058,320
			Adhesive collar for probe	1	Set	448,980	1,795,920
76	Infusion pump	2	Infusion set (20drops/ml)	2	Sets	128,280	513,120
			Infusion set (60drops/ml)	4	Sets	160,350	1,282,800
89	Nebulizer	4	Medicine cup	5	Pcs.	14,432	288,640
			Aerosol mask for adult	10	Sets	6,414	256,560
			Aerosol mask for child	5	Sets	6,414	128,280
			Mouth pieces	5	Pcs.	6,414	128,280
			Air filter	1	Pc.	4,811	19,244
			Corrugated hose	1	Pc.	48,105	192,420
91	Operation light (mobile)	4	Handle	1	Pc.	240,525	962,100
99	Patient monitor	12	Probe for adult	1	Pc.	1,282,800	15,393,600
			Probe for infant	1	Pc.	1,282,800	15,393,600
			Disposable electrode	50	Sets	2,406	1,443,600
			Recording paper	2	Pcs.	14,432	346,368
111	Pulse oximeter	7	Battery	4	Pcs.	4,811	134,708
132	Suction machine (electrical)	10	Suction tube with adaptor	1	Set	44,898	448,980
			Filter	2	Pcs.	102,624	2,052,480
			Suction bottle	1	Pc.	256,560	2,565,600
142	Ultrasonic therapy machine	1	Gel	1	Bottle	192,420	192,420
143	Ultrasound Machine (Cardiac)	1	Recording paper	5	Pcs.	160,350	801,750
			Gel	2	Pcs.	192,420	384,840
				Total			79,681,055

(2) Financial Conditions

1) Budget Allocation to Health Sector

The following table shows budgets of the GOU and donors to the health sector.

Table 2-20 Government Expenditure on Health Sector

Year	2011/12	2012/13	2013/14	2014/15	2015/16
GOU expenditure on health sector (billion UShs)	593.02	630.77	710.82	748.64	818.86
Donors and GHI aid (billion UShs)	206.10	221.43	416.67	532.50	451.94
Total (billion UShs)	799.11	852.20	1,127.48	1,281.14	1,270.80
Health expenditure per capita (in UShs)	25,142	23,756	32,214	37,130	36,830
Percentage of health sector expenditure in total government expenditure (%)	8.3	7.8	8.7	8.5	6.4

Source: AHSPR 2015/16

Note: GHI (Global Health Initiative) is an international support agency in USA for HIV/AIDS and infectious disease control.

Government health expenditure has been steadily increasing. Donor aid is also increasing, however, health sector expenditure in total government expenditure has reduced in recent years, and it declined to 6.4% in 2015/16.

Counter funds for joint projects with donors are not included in the above government expenditure, but are distributed separately according to the scale and necessary amount of each project.

2) Budget Allocation to Each Hospital

RRHs belong to MOH; however, being the semi-autonomous institutions, their management costs are directly allocated by MoFPED. The amount of CDF at each RRH stay in the range from about 500 to 1,500 million UShs since the establishment of CDF in 2008/2009, and the works at each target RRH in the Project under the responsibility of the GOU are expected to be financed by this CDF.

The following tables indicate budgets and expenditures at all the three RRHs during the past three years.

1. Gulu RRH

(In million UShs)

	2013/14	2014/15	2015/16
Total budget	4,132	4,170	4,363
Capital development fund (CDF)	1,201	1,470	1,058
Recurrent budget	930	2,700	3,705
Total expenditure	4,132	4,043	4,363

Source: Reply to the Questionnaire

The increase in operation and maintenance expenses for the second year onwards of the Project calculated in the previous clause are estimated as approx. 244 million UShs (approx. 7.8 million yen). This increased amount is calculated approximately 5.6% of the total amount of the budget 4,363 million UShs in 2015/16. This amount seems to be affordable by Gulu RRH, in consideration of the increasing tendency of its budget.

2. Lira RRH

(In million UShs)

	2013/14	2014/15	2015/16
Total budget	4,060	5,087	5,910
Capital development fund (CDF)	600	1,000	600
Recurrent budget	3,460	4,087	5,310
Total expenditure	4,177	6,281	5,791

Source: Reply to the Questionnaire

The increase of the operation and maintenance expenses for the second year onwards of the Project as calculated in the previous clause are estimated as 270 million UShs (approx. 8.7 million yen). This increased amount is calculated up to 4.6 % of the total amount of the budget 5,910 million UShs in 2015/16. This amount seems to be affordable by Lira RRH in consideration of the increasing tendency of its budget.

3. Arua RRH

(In million UShs)

	2013/14	2014/15	2015/16
Total budget	4,936	5,427	6,529
Capital development fund (CDF)	796	999	729
Recurrent budget	4,140	4,428	5,800
Total expenditure			

Source: Reply to the Questionnaire

The increase of the operation and maintenance expenses for the second year onwards of the Project as calculated in the previous clause are estimated as 296 million UShs (approx. 7.8 million yen). This increased amount is calculated up about 4.5% of the total amount of the budget of 6,529 million UShs in 2015/16. This amount seems to be affordable by Arua RRH in consideration of the increasing tendency of its budget.

CHAPTER 3 Project Evaluation

3-1 Preconditions

The GOU needs to consider the issues mentioned below to achieve satisfactory implementation of the Project. The matters for which the Ugandan side is responsible will be carried out in cooperation among MOH (the Infrastructure Department, Directorate of Clinical Services) and Gulu, Lira, and Arua RRHs according to each scope of responsibility. The construction sites of the new facilities in the three RRHs are located within the present hospital premises. Thus, there will be no need for the acquisition of new land for the construction sites.

The Project is considered to belong to Category C (a project likely to have minimal or no adverse environmental impacts) according to "JICA Guidelines for environmental and social considerations" (published in April 2010). Therefore, the environmental assessment is not considered to be carried out.

MOH	- Procedures for exemption of duties and prompt customs clearance - Procedures for exemption of VAT - Procedures for the B/A and issuance of A/P - Budgeting for counterpart funds to cover income and corporate taxes on the Japanese contractor
Gulu RRH Lira RRH Arua RRH	- Acquisition of the permission for construction (Each RRH will apply and acquire the permission to the district office with support of the Infrastructure Department, Directorate of Clinical Services of MOH) - Demolition and removal of the existing facilities (Gulu RRH: existing Operation Theatre, X-ray Room and Nurse Station, etc. Lira RRH: existing OPD, part of MCH Ward, and relocation of existing incinerator Arua RRH: existing OPD - Cutting of 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

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 GOU needs to tackle

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

Increased amount of maintenance and operation cost necessary from the second year after the implementation of the Project are estimated at approx. 244 million UShs in Gulu RRH, approx. 270 million UShs in Lira RRH, and approx. 296 million UShs in Arua RRH. In order to achieve

the effect of the Project, each RRH should secure sufficient current budget which afford the increasing maintenance costs mentioned above, and to rightly operate and maintain the facilities constructed and equipment procured through the Project.

2) Recruitment of personnel necessary for operation and maintenance

As shortage of personnel engaging in medical service in local hospitals is a common issue in the target hospitals, each hospital takes various measures such as in-house training and recruitment of interns to secure and train its staffs. In order to keep the effect of the Project, it is important that each hospital should continuously make efforts to recruit personnel necessary for its operation and maintenance.

3) Capacity improvement of personnel for appropriate operation and maintenance

In order for each RRH to continuously implement appropriate operation and maintenance, the maintenance management system of infrastructure should be reinforced, and skills of workshop staffs and healthcare professionals of each RRH on the operation and maintenance of healthcare infrastructure need to be improved. In addition, JICA technical cooperation "Project on Improvement of Health Service through Health Infrastructure Management, Phase 2" and technical assistance (soft component) regarding the Project is planned to improve operation and maintenance skills in the hospitals. Each RRH should 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.

(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 Phase 2" currently in progress, activities to improve the quality of healthcare services by strengthening the healthcare infrastructure management is underway. This technical cooperation project is working on activities for the improvement of operation and maintenance of medical equipment at the hospitals and medical equipment maintenance workshops, including Gulu, Lira, and Arua RRHs. Collaboration with this technical cooperation project is very important for the emergence and sustainability of the effect of the Project.

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 GOU has been working on human resource development in the health sector and reinforcement of health infrastructures through NDP II and the succeeding HSDP.

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 it is important to continuously secure and train staffs in line with NDP II and HSDP. It is also 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.

In order for each RRH to continue appropriate operation, it is critical for them to secure budget allocation from the government.

For the achievement of the Project to be sustained, actions for stable and appropriate national finance should be taken, and budget necessary for hospital operation must be secured continuously.

3-4 Project Evaluations

3-4-1 Relevance

(1) Beneficiaries of the Project

Beneficiary population of the Project is 2.39 million for Gulu RRH (eight districts in Acholi), 2.31 million for Lira RRH (eight districts in Lango), and 2.14 million for Arua RRH (nine districts in West Nile) based on the population estimate in 2016, which means in total 6.84 million people will enjoy the result of the Project.

The Internally Displaced Persons (IDPs) in the northern border zone estimated as two million in number are considered to be back to their land, but many of them still remain in Northern Uganda. The refugees from the Republic of South Sudan are settled in the residential area instead of refugee camp and receive social service same as the people of Uganda. As these refugees do not want to go back to their land, some of them are assumed to be settled in Uganda (The Mid-term Review of JICA's Assistance for Northern Uganda, 2014).

In addition to the beneficiary population estimated in 2016, the Project is also expected to benefit the IDPs and refugees from the Republic of South Sudan and the Democratic Republic of the Congo. According to the United Nations High Commissioner for Refugees (UNHCR), as of September 1, 2017, refugees from the Republic of South Sudan are 284,927 people in Yunbe, 233,654 in Ajmani, 226,540 in Arua, 180,533 in Moyo County in Western Nile Area, and 30,296 in Lamwo in Acholi Area.

(2) Consistency with the Development Plan of Uganda

The Project will contribute to the "Resource development in the Health Sector" in the clause 568 of the UHC in the clause 570 and the "Development of Health Infrastructure" in the clause 571 of the Second National Development Plan (NDPII), and also the development plan of the health sector in HSDP.

(3) Consistency with Japan's ODA Policy

The Project will conform to the Priority Areas (3) Improvement of living conditions (health and water supply) of the Country Assistance Policy for the Republic of Uganda (July 2014) by the Japanese Ministry of Foreign Affairs (MOFA), which state "To improve basic livelihoods, Japan aims to enhance and expand the facilities and equipment of rural referral hospitals, together with its management skills." The Priority Areas (4) Peace building in Northern Uganda, states that "Japan aims to build infrastructure for improving basic livelihoods to support the return and resettlement of IDPs in Northern Uganda, and contribute to closing the regional gap between northern and central/southern regions." In terms of developing medical infrastructure in Northern Uganda, the Project will also conform to the Priority (4).

In the "Basic Design for Peace and Health" (September 2015) by MOFA, it is stated "Japan will seek to help achieve universal health coverage (UHC) that ensures affordable access to basic health services for all whenever they need them throughout their lives" in its Policy Goal, and in "C. Achieving UHC that will 'leave no one behind'" in its Basic Policies, it is stated "UHC, which will not leave any individual behind, is therefore important as it focuses on each and every individual, especially poor people, children, women, persons with disabilities, senior citizens, refugees and internally displaced persons ethnic and indigenous people, and otherwise vulnerable groups." The Project will contribute to the achievement of UHC in the Northern region where many refugees and IDPs stay. Furthermore, "Supporting the development of basic health infrastructure, including the construction of health care facilities and the provision of medical devices and products" is stated as one of the specific measure in the Seamless utilization of essential health and medical services: promotion of UHC throughout life. The Project, which will construct facilities and procure medical equipment at the three RRHs in Northern Uganda, will highly consistent with the "Basic Design for Peace and Health".

(4) Consistency with the Trend of International Health Cooperation

Among the efforts from 2000 to 2015 to achieve MDGs, the WHO proposed achievement of UHC. UHC is to ensure everyone receives the quality health services related to health promotion, prevention, treatment and function recovery whenever they need them at affordable cost. The achievement of UHC will also contribute to the goal 3 of Sustainable Development Goals (SDGs) from 2016 to 2030 which aims at ensuring a healthy life to people of all ages and enhancing welfare. In goal 3, the health target 3.8 states that "Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all."

The achievement of UHC needs to improve 1) physical, 2) economic and 3) social and cultural accessibility of health service. The Project will not only improve physical accessibility but also lead to realise sustainable and high quality medical services through the facilities and equipment improvement; thus be regarded contributing much for the achievement of UHC.

3-4-2 Effectiveness

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

(1) Quantitative Effects

Quantitative Effects expected by the Project are as follows.

The average values of each RRH are calculated with data from 2011/12 to 2015/16, which is set to be baseline. The target value is set in 2022/23, three years after the completion of the Project, in consideration of the population increases, etc. in the target areas.

1) Gulu RRH (target departments: OT, Casualty, ICU, and Maternity)

Indicator	Baseline (Average number in 2011/12-2015/16)	Target (2022/23) (3 years after project completion)
Number of Operations (case/year)	1,543	1,800
Number of Emergency Patients (person/year)	5,445	6,300
Number of ICU Patients (person/year)	-	200
Number of Deliveries (case/year)	4,768	5,500

2) Lira RRH (target departments: OPD, MCH, Casualty, Maternity)

Indicator	Baseline (Average number in 2011/12-2015/16)	Target (2022/23) (3 years after project completion)
Number of Outpatients*1 (person/year)	121,345	144,000
Number of MCH Patients*2 (person/year)	67,736	80,400
Number of Emergency Patients (person/year)	4,800	5,400
Number of Deliveries (case/year)	5,804	6,800

*1: This number consists of the patients of General OPD clinic, Orthopaedics clinic, Ophthalmology clinic, ENT clinic, and Dental clinic.

*2: This number consists of the patients of Maternity care, Family planning, Cancer check-up, Perinatal HIV transmission prevention pack, early childhood diagnosis, and Vaccination. This indicator has been modified as shown in the above-cited baseline and target figures after signing the Minutes of Discussions on the Explanatory Mission of the Draft Preparatory Survey Report in August 2017 in order to evaluate the effect more accurately. This modification is to be agreed with the Ugandan side during the Detailed Design Stage.

3) Arua RRH (target departments: OPD, Casualty)

Indicator	Baseline (Average number of 2011/12-2015/16)	Target (2022/23) (3 years after project completion)
Number of Outpatients*3 (person/year)	96,208	116,000
Number of Emergency Patients (person/year)	5,315	6,400

*3: This number consists of the patients of General OPD clinic, Medical OPD clinic, Diabetes clinic, Nutrition clinic, Palliative care clinic, Paediatric clinic, Surgery clinic, Orthopaedics clinic, Ophthalmology clinic, ENT clinic, Dental clinic and Maternity clinic.

(2) Qualitative Effects

Qualitative effects expected by the Project are as follows.

1) Through strengthening functions of the three RRHs as the top referral hospital in each sub-region, the access to and quality of health care services in Northern Uganda will be improved.

2) Through construction of facilities and procurement of equipment, the inconvenience such as the congestion and the dirty environment will be improved; thereby credibility and satisfaction of the hospitals for the people in Northern Uganda including refugees will be boosted.

3-4-3 Conclusion

In conclusion, as described above, the relevance of the Project as well as its anticipated effectiveness is high.