The Federal Democratic Republic of Nepal
Ministry of Education

PREPARATORY SURVEY REPORT
ON
THE PROJECT FOR IMPROVEMENT OF MEDICAL EQUIPMENT IN TRIBHUVAN UNIVERSITY TEACHING HOSPITAL
IN
THE FEDERAL DEMOCRATIC REPUBLIC OF NEPAL

June 2016

JAPAN INTERNATIONAL COOPERATION AGENCY

THE CONSORTIUM OF
BINKO INTERNATIONAL LTD.
AND
SYSTEM SCIENCE CONSULTANTS 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 Binko International Ltd. and System Science Consultants Inc.

The survey team held a series of discussions with the officials concerned of the Government of Nepal, and conducted a field investigation. 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 Nepal for their close cooperation extended to the survey team.

June, 2016

Takao TODA
Director General,
Human Development Department
Japan International Cooperation Agency

SUMMARY

1. Overview of the Country

The Federal Democratic Republic of Nepal (hereinafter referred to as "Nepal") is a landlocked country in South Asia, located to the south of the Himalayas. Surrounded by China and India, its area is 14.7 million km^2, which corresponds to approximately 1.8 times the area of Hokkaido. The elevation varies from about 100m around Terai plains to 8,000m in the vicinity of the Himalayas.

As of 2014, the population of Nepal is 28.17 million; more than 80% of the people live in rural areas but, due to the recent rapid urbanization, more than 1.14 million people are concentrated in the capital city, Kathmandu[1]. The population consists of more than 30 ethnic groups from Tibet, India, Burma, etc.; half of the population is Parbate Hindu while others are Magars, Tharus, Tamangs, Newars, etc. The official language is Nepalese, but each ethnic language is utilized in people's lives. The population flow has increased but social discrimination including against women in the lower caste still exists because of the persistent social habits stemming from the caste system, even though such discrimination is banned by Nepal's constitution. Hinduism, which used to be the state religion prior to the movement for democracy in early 2006, is the majority religion in Nepal (81.3%), followed by Buddhism (9.0%) and Islam (4.4%).

In the late 1990s, Nepal was politically unstable because of the Nepalese government fighting a civil war against Maoist rebels. After the comprehensive peace agreement was concluded between Maoist rebels and the government in 2006, the first Nepalese Constituent Assembly election was held in 2008; consequently the assembly formally abolished the Kingdom of Nepal and declared a federal democratic republican system. Discussions about the establishment of a new constitution continued for some years before the assembly approved the new constitution on 20 September 2015.

Regarding the economic situation, nominal Gross Domestic Product (GDP) in 2014/15 was approximately 21,350 million dollars, 762 dollars per capita; Nepal is positioned as one of the Least Developed Countries (LDCs). On the other hand, however, the country's economic growth is stable, marking 3 to 5 % after 2000. The main industries are agriculture and forestry, trade and wholesale trade In 2014/15, the growth rate in the fishery industry marked 6.5%, in transportation and telecommunication 5.2%; and in education, 4.9%. Additionally, in the health and social work sector, the growth rate was more than 10% which was 5.5 points higher than the previously recorded rate[2]. With such stable growth, the number of people living on less than 1.90 dollars per day dramatically decreased to 14.6% in 2010 from 47.1% in 2003[3].

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[1] Calculated from the data collected in 2014. Source: World Development Indicators (Accessed in April 2016).

[2] Central Bureau of Statistics, National Planning Commission Secretariat, Government of Nepal, *National Accounts of Nepal* [http://cbs.gov.np/sectoral_statistics/national_accounts/national_accounts_of_nepal] (Accessed in April 2016)

[3] The World Bank, *World Development Indicators – Nepal* [http://data.worldbank.org/country/nepal] (Accessed in

The Human Development Index of Nepal ranks 145 out of 188; as an LDC, Nepal has many issues.

2. Background and Outline of the Project

In the country's development plan, *An Approach Paper to the Thirteenth Plan (FY 2013/14-2015/16)*, the Government of Nepal (hereinafter referred to as "GON") strategize to give priority to the improvement of healthcare so that the country will get out of the status of a least developed country by 2022. Additionally, in *the Nepal Health Sector Program II (2010-2015) (hereinafter referred to as "NHSP-2")* established in 2010, the GON has cited as priorities provision of healthcare services of stable quality to the poor and vulnerable people in urban areas and availability of healthcare services affordable for all people. Improvement of healthcare services provided in public healthcare facilities in urban areas and eventual improvement of healthcare services provided in Kathmandu are considered as priorities.

In Kathmandu, the capital city of Nepal with a population of over a million, population inflow has been growing due to rapid urbanization, and has caused some issues with the provision of healthcare services at public healthcare facilities such as long hours of waiting and lack of necessary tests. Accordingly, as a top referral hospital, Tribhuvan University Teaching Hospital (hereinafter referred to as "TUTH") is strikingly crowded and there is a pressing need to improve its equipment to meet the patient demand. Besides, as pointed out in NHSP -2, lack of healthcare personnel both in quality and quantity is also a long-standing problem. Even though TUTH is only a public hospital in Kathmandu that provides clinical training to incumbent medical staff such as medical doctors and nurses, there is a limit to the training given at TUTH for lack and superannuation of medical equipment.

Furthermore, a Post Disaster Needs Assessment (PDNA) was conducted by the GON just after the 7.8-magnitude Gorkha Earthquake occurred on 25 April, 2015, and in the assessment, reconstruction of health facilities including primary healthcare facilities and improvement of Nepal's healthcare system are listed in the medium- and long-term strategy. After the Gorkha Earthquake, TUTH established Incidence Command Centre led by the executive director and has been carrying out relief activities for those affected by the earthquake. In fact, during just eight days after the earthquake, TUTH accepted more than 1,300 victims (the third most numbers of the victim acceptance in Nepal) and performed about 300 cases of surgery (the first most cases of surgeries in Nepal). In addition, while other public hospitals were closed, it was only a few hours after the earthquake that TUTH started to accept patients; operations of all the departments at TUTH restarted as usual five days after the earthquake. Considering the above situation, TUTH will have a great role as a medical hub in Nepal also in the future.

Based on the above, the GON requested to the Government of Japan (hereinafter referred to as "GOJ") for the Project for Improvement of Medical Equipment in Tribhuvan University Teaching Hospital (hereinafter referred to as "the Project") in order to replace a part

April 2016)

of the exhausted/aged medical equipment of TUTH and to procure new medical equipment that a national top referral hospital should own under the Japan's Grant Aid scheme. This will improve the healthcare services provided by TUTH as well as reinforce the function of practical training to the medical staff at TUTH. Consequently, the Project will dedicate to enhance the healthcare services and health human resources in Nepal.

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

In response to the Nepal's request, the GOJ decided to conduct the Preparatory Survey for the Project, and the Japan International Cooperation Agency (JICA) sent a survey team to Nepal from 15 September to 10 October, 2015. Following further analysis in Japan, explanatory mission of the draft of Outline Design was sent to Nepal from 18 to 27 February, 2016.

TUTH has narrowed down their request to 24 items of medical equipment and related devices through consultation at the time of the Preparatory Survey. These items have been evaluated with the seven selection criteria; intended use, necessity in terms of demand, urgency of improvement, technical level, operation system, maintenance system and operation and maintenance cost. Additionally, some equipment which requires advanced maintenance will be procured with maintenance contracts; a soft component (technical assistance) for the maintenance of the medical equipment to the end-users at TUTH. Reinforcement of the new MRI room and CSSD, waterproofing work of the new MRI room and Intensive Care Unit are also included in the Project.

Table i　Summary of Planned Equipment

Department	Equipment	Purpose	Q'ty	Maintenance contract
Dept. of Radiology	Magnetic Resonance Imaging (MRI), 1.5T	To signal the changes of atomic nuclei of patient's body and organs by irradiating electromagnetic waves to establish images of patient's biological information such as tumor tissues, blood circulatory system, etc.	1	CMC
	Ultrasonograph, Observation	To check condition and function of patient's tissue, to diagnose lesions etc. by application of ultrasound to parts of patient's body such as abdomen.	2	
	Ultrasonograph for ICU	To check condition and function of patient's organs and vessels, to diagnose lesions, etc. by application of ultrasound to parts of patient's body such as abdomen and chest.	3	
	Ultrasonograph, Examination	To check condition and function of patient's organs and vessels, to diagnose lesions qualitatively, etc. by application of ultrasound to patient's body; and utilized to collect patient's living tissue for biopsy if necessary.	2	
	Digital Mammograph	To take X-rays of patient's breast and to collect their living tissue for biopsy.	1	CMC
CSSD	High Pressure Steam Sterilizer, Large	To sterilize steel surgical instruments and linens with high pressure steam in a short period of time.	2	AMC
	High Pressure Steam Sterilizer, Medium	To sterilize steel surgical instruments and linens with high pressure steam in a short period of time.	2	AMC

Department	Equipment	Purpose	Q'ty	Maintenance contract
Orthopedic Dept.	C-Arm X-ray Machine	To X-ray images of patient's lesions during orthopedic operations, neuro surgery, urology, etc.	2	CMC
	Video Arthroscope Set	For observation and treatment of lesions situated in joints of the lower limbs such as knee joints.	2	
Dept. of Endoscopy	Video Bronchoscope Set	For observation, biopsy and cytology of bronchi for the purpose of diagnosis of lung and bronchial disease.	1	
Dept. of Anesthesia	Ventilator, Adult	To replace or support respiratory function of patient with respiratory failure.	4	
	Patient Monitor, OT	To manage patient's biological information such as blood pressure, pulsation, respiration, electrocardiogram, etc., during his/her operation.	3	
	Patient Monitor, ICU	To manage patient's biological information such as blood pressure, pulsation, respiration, electrocardiogram, etc., in ICU.	3	
	Anaesthesia Machine	To deliver anesthetic into a patient to maintain a coma-like state during his/her operation.	4	
	Hand Washing Device	Utilized by doctors and nurses to wash their hand before and after operations to remove sources of infection.	1	
Pediatrics Dept.	Patient Monitor, NICU/PICU	To manage biological information of neonatal and pediatric patients in NICU/PICU such as blood pressure, pulsation, respiration, electrocardiogram, etc.	6	
	Ventilator, Pediatric and Neonate	To replace or support respiratory function of neonatal/pediatric patient with respiratory failure.	5	
Dept. of Surgery	Laparoscopic Set for Gastrointestinal Surgery, Adult	To observe and treat gastrointestinal diseases in esophagus, stomach, large intestine, etc., by making a few incisions in the patient's abdomen and insert cannulas, forceps etc. into the abdominal cavity through the incisions.	1	
	Micromotor Drill for Craniofacial Surgery	For surgery on skull, face, cervical spine, spine, etc.	1	
Dept. of Pediatric Surgery	Laparoscopic Set for Gastrointestinal Surgery, Pediatrics	To observe and treat pediatric gastrointestinal diseases such as gastrointestinal obstruction, etc., by making a few incisions in the patient's abdomen and insert cannulas, forceps etc. into the abdominal cavity through the incisions.	1	
Dept. of Obstetrics/ Gynecology	Patient Monitor, Recovery and Emergency	To manage patient's biological information such as blood pressure, pulsation, respiration, electrocardiogram, etc. in Recovery Room or in the Department of Emergency	3	
	Laparoscopic Set for Gynaecology	To treat uterine fibroids and endometriosis, etc. by inserting cannulas and forceps into the abdominal cavity through incisions on the patient's abdomen.	1	
Dept. of Pathology	Immunohistochemical Stainer	To automatically create samples to find immunoreactivity of blood and tissues under a microscope for pathological diagnosis such as histocompatibility, virus infection, tumors, etc.	1	AMC
	Immunofluorescence Microscope with Teaching Head	To morphologically observe samples of cells and antibodies labeled with a fluorescent dye and diagnose diseases of skin and kidney.	1	

Note:

- CSSD=Central Sterilization Supply Department ・ICU=Intensive Care Unit
- PICU=Pediatric Intensive Care Unit ・NICU=Neonatal Intensive Care Unit
- CMC=Comprehensive Maintenance Contract: A type of maintenance contract that includes periodic visit maintenance work (periodic inspection), on-call repair and free replacement of spare parts.
- AMC=Annual Maintenance Contract: Periodic visit maintenance for medical equipment. A maintenance contract that includes paid services for on-call repair and spare parts replacement (payment of actual costs).

4. Project Schedule and Cost Estimate

When the Project is implemented under the Japan's Grant Aid Scheme, the period will be 12.5 months; it will take about 5.5 months for the detail design and bidding process and 7.0 months for the works of rehabilitation and procurement. Moreover, the period of Soft Component (Technical Assistance) of the Project will last 12.5 months from its beginning. The total cost to be borne by Nepalese side is estimated at approximately five million Japanese yen (about 4.6 million Nepal Rupees).

5. Project Evaluation

5－1 Relevance

From the viewpoints stated below, this Project is recognized as highly relevant to Nepal's overall goal of aiming to improve the healthcare services and quality of health human resources. Therefore, it is relevant to implement the Project under Japan's Grant Aid scheme.

(1) Beneficiaries of the Project

TUTH provides healthcare services as the top referral hospital in Nepal, and is a core teaching hospital to educate medical staff before and after graduation. In terms of the provision of healthcare services, the direct beneficiaries will be 500,000 outpatients and inpatients and indirect ones will be the whole Nepalese population of 28.17 million (2014). In terms of the practical education of medical staff, medical and nursing students as well as resident doctors who receive training at TUTH will be the beneficiaries.

Moreover, while providing healthcare services to patients, TUTH offers treatment and hospitalization for free of charge to the patients when they are admitted as the poor by TUTH[4]. This service will be continued after the completion of the Project.

Therefore, the entire project is expected to be highly beneficial to the people of Nepal.

(2) Role as the Top Referral Hospital

Even though TUTH is the top national referral hospital in Nepal, patients are faced with issues such as long waiting hours and lack of necessary tests mainly because of three reasons; rapid population increase due to urbanization that brought about an increase of outpatients every year, lack of medical equipment to meet patient demand, and functional deterioration of medical equipment for superannuation. Additionally, TUTH is a teaching hospital to provide practical training to medical staff before and after graduation, but there is a limit to the training given at TUTH because of the lack and superannuation of medical equipment.

The Project will enhance the quantity and quality of healthcare services that TUTH provides as the top national referral hospital through the replacement and new procurement of medical equipment. Further, the procurement of an MRI (1.5T), a Digital Mammograph, an

[4] 10 % of all the beds in TUTH can be offered for free to the poor patients.

Immunohistochemical Stainer, etc., will enable TUTH to deal with more cases of image diagnosis and pathological examination and to increase the opportunities for practical training for medical staff as a teaching hospital; the procurement is expected to ease congestion and to enhance the quality of practical training at TUTH. Additionally, considering TUTH's performance that about 300 surgeries including emergency cases were performed during just eight days after the Gorkha Earthquake, TUTH will also have a significant role as a medical hub in Nepal also in the future.

Therefore the enhancement of the quantity and quality of healthcare services provided by TUTH through the Project is very important in the improvement of healthcare services, training medical human resources and preparedness for future disasters in Nepal, and judged to be highly necessary.

(3) Consistency with the Nepal's Health Sector Policy and Plan

The Project is consistent with Nepal's health sector policy and plan since it aims to improve and reinforce "the provision of quality healthcare services to the poor and vulnerable people in urban areas" which is targeted in APTP, Nepal's development plan, and in NHSP-2, the health sector plan.

(4) Consistency with Japan's Aid Policy

In Japan's regional development cooperation policy, "Aid towards basic human needs such as health, hygiene, education, etc." is clarified as a part of the development assistance to the South Asia region. Additionally, "Improvement of education and healthcare services" is one of the development issues among "Poverty reduction in rural areas" in Japan's Country Aid Policy to Nepal.

The purpose of the Project is to enhance the quantity and quality of healthcare services provided by TUTH through replacement of medical equipment that decreased in functionality because of age and new procurement of medical equipment to meet the demand of healthcare services. Therefore, the Project can be judged to be consistent with Japan's aid policy to Nepal.

5－2 Effectiveness

Nepal's overall project is recognized as effective since the implementation of the Project can be expected to realize the quantitative and qualitative effects as stated below:

(1) Quantitative Effects

In order to evaluate quantitatively the improvement of healthcare services provided by TUTH after completion of the Project, quantitative indicators are to be set under the Project.

Table ii　Quantitative Indicators

Indicators	Baseline (Actual value in 2015)	Target (2020, 3 years after project completion)
1) Number of examination conducted with MRI (1.5T) per year (Tests/year)	0	960
2) Number of examination conducted with Digital Mammograph per year (Tests/year)	0	720
3) Number of examination conducted with Ultrsonograph per year (Tests/year)	3,500	4,000
4) Duration of pathological diagnosis by using Immunohistochemical Stainer (days/diagnosis)	14	5

Source: Survey Team

(2) Qualitative Effects

The qualitative effects expected through the implementation of the Project are listed below.

1) To improve TUTH's healthcare services by covering more diseases that can be diagnosed and treated at TUTH utilizing the medical equipment to be procured.
2) To provide knowledge and practical experience about various types of diseases in the field of medical education by increasing the number of diseases that can be diagnosed and treated at TUTH.

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6. References

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ABBREVIATIONS

Abbreviations	Official Name
A/P	Authorization to Pay
AMC	Annual Maintenance Contract
APTP	An Approach Paper to the Thirteenth Plan
B/A	Banking Arrangement
BME	Biomedical Engineer
BS	British Standards
CE	Conformité Européenne
CMC	Comprehensive Maintenance Contract
CSSD	Central Sterilization Supply Department
CT	Computed Tomography
DAC	Development Assistance Committee
E/N	Exchange of Notes
ENT	Ear, Nose and Throat
FDA	Food and Drug Administration
G/A	Grant Agreement
GAVI	Global Alliance for Vaccines and Immunization
GDP	Gross Domestic Product
GMP	Good Manufacturing Practice
GQP	Good Quality Practice
HDI	Human Development Index
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
ICU	Intensive Care Unit
IMF	International Monetary Fund
IOM	Institute of Medicine
ISO	International Organization for Standardization
JICA	Japan International Cooperation Agency
JIS	Japan Industrial Standards
MoE	Ministry of Education
MoHP	Ministry of Health and Population
MRI	Magnetic Resonance Imaging
NHSP-2	Nepal Health Sector Program II

Abbreviations	Official Name
NICU	Neonatal Intensive Care Unit
ODA	Official Development Assistance
PICU	Pediatric Intensive Care Unit
SWAp	Sector-Wide Approach
TUTH	Tribhuvan University Teaching Hospital
TUV	TÜV Rheinland
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
WHO	World Health Organization

CHAPTER 1
BACKGROUND OF THE PROJECT

Chapter 1　Background of the Project

1－1　Background of the Request

In Kathmandu, the capital city of the Federal Democratic Republic of Nepal (hereinafter referred to as "Nepal") with a population of over a million, population inflow has been growing due to rapid urbanization, and has caused some issues with the provision of healthcare services at public healthcare facilities such as long hours of waiting and lack of necessary tests. Tribhuvan University Teaching Hospital (hereinafter referred to as "TUTH"), a top referral hospital in Nepal, has built and expanded through Japan's Grant Aid such as *the Teaching Hospital Project for Tribhuvan University in the Kingdom of Nepal (1982)* and *the Project for the Expansion of Tribhuvan University, Institute of Medicine and the Teaching Hospital in the Kingdom of Nepal (1990-92)*; however, both the facilities and equipment have been exhausted/aged. Nowadays TUTH is strikingly crowded; its number of outpatients has increased from approximately 420 thousand (2011/12) to 500 thousand (2014/15) and its number of beds has increased 663 nowadays from 300 when it constructed. The above situation has brought about a pressing need to improve its equipment to meet the patient demand. Besides, lack of healthcare personnel both in quality and quantity is also a long-standing problem. Even though TUTH is only a public hospital in Kathmandu that provides clinical training to incumbent medical staff such as medical doctors and nurses, there is a limit to the training given at TUTH for lack and superannuation of medical equipment.

In the country's development plan, An Approach Paper to the Thirteenth Plan (FY 2013/14-2015/16), the Government of Nepal (hereinafter referred to as "GON") strategize to give priority to the improvement of healthcare so that the country will get out of the status of a least developed country by 2022. Additionally, in the Nepal Health Sector Program II (2010-2015) (hereinafter referred to as "NHSP-2") established in 2010, the GON has cited as priorities provision of healthcare services of stable quality to the poor and vulnerable people in urban areas and availability of healthcare services affordable for all people. Improvement of healthcare services provided in public healthcare facilities in urban areas and eventual improvement of healthcare services provided in Kathmandu are considered as priorities.

Furthermore, Post Disaster Needs Assessment (PDNA) was conducted by the GON just after the Gorkha Earthquake of magnitude 7.8 (occurred in 25 April, 2015), and in the assessment, reconstruction of health facilities including primary healthcare facilities and improvement of the Nepal's healthcare system are listed in a medium- and long-term strategy. After the Gorkha Earthquake, TUTH established Incidence Command Centre led by the executive director and has been carrying out relief activities for those affected by the earthquake. In fact, during just eight days after the earthquake, TUTH accepted more than 1,300 victims (the third most numbers of the victim acceptance in Nepal) and performed about 300 cases of surgery

(the first most cases of surgeries in Nepal). In addition, while other public hospitals were closed, it was only a few hours after the earthquake that TUTH started to accept patients; operations of all the departments at TUTH restarted as usual five days after the earthquake. Considering the above situation, TUTH will have a great role as a medical hub in Nepal also in the near future.

Based on the above situation, the GON requested to the Government of Japan (hereinafter referred to as "GOJ") to for a Project for Improvement of Medical Equipment in Tribhuvan University Teaching Hospital (hereinafter referred to as "the Project"). The initial request by the GON is shown below:

≪Medical Equipment：21 items≫

Magnetic Resonance Imaging, Ultrsonograph, Digital Mammograph, High Pressure Steam Sterilizers, C-Arm X-ray Machine, Video Bronchoscope Set, Ventilators, High-end Patient Monitors, Laparoscopic Sets, Immunohistochemical Stainer, Immunofluorescence Microscope, HLA Genotyping Machine, etc.

≪Construction/Facility≫

Construction of a new CSSD Building, Renewal of elevators and lifts

Basically the above request was made in June 2014; until the time of the Preparatory Survey of the Project, the Gorkha Earthquake occured and it became necessary to confirm its influence on existing buildings at TUTH. Therefore, the Survey Team decided to conduct a series of survey to determine the degree of damage by the earthquake.

1－2　Natural Conditions

(1) Geographical Features

Nepal is a landlocked country in South Asia, located to the south of the Himalayas. Surrounded by China and India, its area is 14.7 million km^2, which corresponds to approximately 1.8 times of the area of Hokkaido. The elevation varies from about 100m on the Terai plains to 8,000m in the vicinity of the Himalayas. Kathmandu, where TUTH is located, is at an altitude of about 1,300m. The road from Kolkata, India to Kathmandu has been built so that semitrailers can pass through although the road is winding and has poorly-paved points.

(2) Temperature

Except for the northern alpine region, Nepal has a subtropical climate and the year is divided into two seasons; a wet season (monsoon), which is hot and humid, and a dry season, which has extreme temperature difference between day and night. The wet season is from June to September and the dry season is from October to May. With the mean maximum temperature of about 30 degrees Celsius and the mean minimum temperature of about 2 degrees Celsius, the

temperature difference between the wet and dry seasons is large.

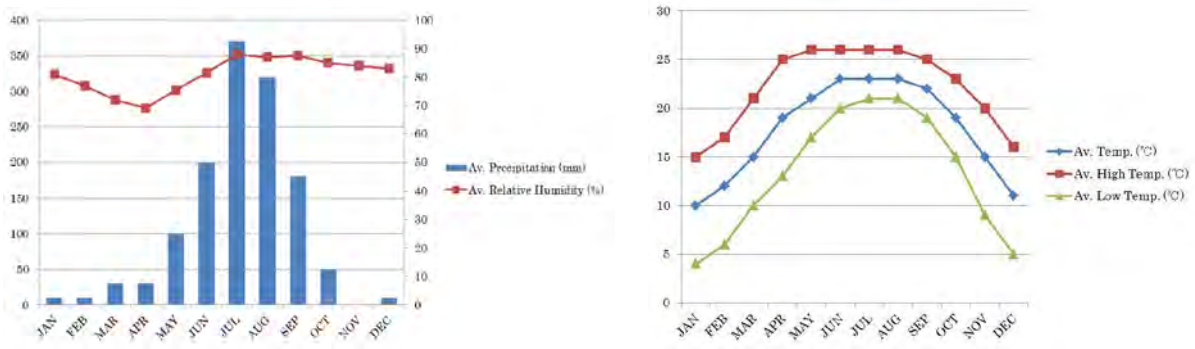


Figure 1-1　Climate in Kathmandu

Source: http://www.weatherbase.com (Accessed in April 2016)

(3) Natural Disaster

Nepal is situated in the area where the Indo-Australian Plate goes under the Eurasian plate and is prone to earthquakes. One of the recent earthquakes is the Gorkha Earthquake which caused extensive damage. In addition, damage brought about by floods and landslides increases during monsoon seasons; meanwhile a number of natural disasters have been reported such as droughts in summer and extra cold spells in winter. Table 1-1 is a list of natural disasters that had a relatively large effect on people in Nepal.

Table 1-1　Disasters occurred in Nepal after 2005

Month/Year	Disaster	Affected Areas	Death (persons)	Victims (persons)	Damage Amount (thousand USD)
April/2015	Earthquake	Gorkha District	8,969	5,621,790	3,860,000
August/2014	Landslide	North East Nepal	171	476	15,000
May/2012	Flood	Kaski District	72	N/A	1,000
August/2009	Flood	Sunsari District	117	257,724	60,000
July-August/2007	Flood	Whole Nepal	214	640,658	2,400

Source: http://www.emdat.be/database (Accessed in April 2016)

1－3　Environmental and Social Consideration

As the Project is for renewal and new procurement of medical equipment for an operating medical facility, it does not have any factors causing environmental or social impacts.

1－4　Others

(1) Issues driven from Gendered Stigma

In Nepal, the maternal mortality rate has rapidly improved since 2000, but the people poorly understand women's reproductive health rights; many younger women still suffer from a

uterine prolapse (UP) because they get pregnant at a young age and their pelvic muscles have not developed sufficiently, inappropriate birthing practices, returning to farm work a few days after giving birth, malnutrition, etc[5]. The GON has reported that there are more than 18,000 women have had a UP in Nepal, but less than 10% of them can access medical facilities for treatment[6]; the number of hospitalizations and treatment of younger patients are low. In the context of Nepal, it is embarrassing to tell others that a woman has had a UP; even though they recovered from it after surgery/treatment, their family members may start to hate them. Once they acquire social stigma, they can be the targets of violence[7].

Table 1-2 Inpatient Number of Uterine Prolapse by Age Group

Unit: person(s)

Year \ Age Group	15～19	20～29	30～39	40～49	50～59	60 and over	Annual Total
2011/12	5	59	191	349	333	350	1,289
2012/13	3	42	112	198	264	335	954
2013/14	1	23	119	167	198	303	811

Source: Annual Report 2068/69, Annual Report 2069/70, and Annual Report 2070/71

As a part of the improvement of women's reproductive health rights, the GON formulated the *Uterine Prolapse Treatment and Surgery Operational Guideline 2065* in 2008; since then, separate funds have been allocated for UPs. Accordingly, approximately 39,000 women were screened for UPs in 2013/14, and less than 10,000 of them were diagnosed as having a UP and received treatment/surgery. Moreover, the GON initiated training on UP surgery at the National Health Training Center; this training includes how to utilize laparoscopic sets for surgery[8].

A Laparoscopic Set for Gynaecology to be procured under the Project is utilized for surgical treatment of diseases such as ovarian cysts, cervical cancers and UPs; this procurement can realize stable provision of gynaecological surgeries at TUTH, the top referral hospital. In Nepal where prejudice and discrimination against women with UPs is prevalent, the priority is to improve their access to medical facilities; however, it is expected that the social and customary burdens on them may be mitigated gradually if TUTH continues to stably provide gynaecological surgery under the above governmental policy on reproductive health rights of Nepalese women.

[5] Uterine prolapse is a condition of uterus coming out from the vagina. Generally, this symptom is experienced by a menopausal woman. Having uterine prolapse hinders a patient's life since it brings about chronical pains, difficulties in work, walking and sitting.
[6] Annual Report 2068/69 (2011/12), Annual Report 2069/70 (2012/13), and Annual Report 2070/71 (2013/14).
[7] Amnesty International, 2014, *Unnecessary Burden: Gender Discrimination and Uterine Prolapse in Nepal*, London.
[8] Department of Health Services, 2014, *Annual Report 2070/71 (2013/14)*.

(2) Issues related to Female-specific Disease

In Nepal, like other LDCs, the number of deaths due to non-communicable diseases such as myocardial infarctions and strokes has increased in the last ten years. Even though cancers (malignant tumors) have not been ranked in the Top-10 causes of death, its morbidity has also increased every year; in particular, the percentage of female-specific cancer morbidity is 22 to 35 per cent of the total (Table 1-3). The Ministry of Health and Population (hereinafter referred to as "MoHP") in Nepal formulated a national guideline on cervical cancer screening and prevention as a part of improvement of women's reproductive health rights, and the Female Health Division initiated cervical cancer screening and prevention program in 2013/14.

Table 1-3 Morbidity Number of Cancers and Percentage of Female-specific Cancers

Unit: Persons

Type / Year	Breast	Cervical	Lung	Other	Total	Percentage	
						Breast Only	Breast & Cervical
2011/12	1,176	1,081	1,478	4,668	8,403	13.99%	26.85%
2012/13	2,184	1,430	1,537	5,172	10,323	21.15%	35.00%
2013/14	1,598	1,326	1,949	8,264	13,137	12.16%	22.25%

Source: Annual Report 2068/69, Annual Report 2069/70, and Annual Report 2070/71

On the other hand, there is neither a governmental policy nor a program for breast cancer screening and prevention in Nepal. A few mammographs are in operation for breast cancer screening but they are installed in a private hospital that charges patients a lot or in a public hospital in the suburbs of Kathmandu where patients need to pay for transportation.

Accordingly, TUTH's procurement of a Digital Mammograph and Ultrasonographs through the Project will improve the current situation regarding breast cancer screening and prevention. In fact, a digital mammograph is useful to detect the early stages of breast cancer; similarly, an ultrasonograph is also useful to detect breast cancer in younger women from their 20s to 30s. As the top national referral hospital, TUTH provides affordable examination fees: 800 NPR for a mammograph and 450 NPR for ultrasonography. Consequently, the procurement of said equipment will contribute to increasing opportunities for Nepalese women to receive diagnosis for breast cancer at affordable examination fees.

The procurement of a Digital Mammograph and Ultrasonographes to TUTH can reduce the risk of death due to breast cancers and contribute to NHSP-2's goal to "provide equal opportunity for all to receive quality health care services free of charge or at affordable prices". Further, if the installation of a digital mammograph is confirmed as valid in a way such as the number of deaths due to breast cancer is reduced, the procurement is expected to improve women's reproductive health rights in Nepal in parallel to the nation's effort for screening and prevention of cervical cancers.

CHAPTER 2
CONTENTS OF THE PROJECT

Chapter 2　Contents of the Project

2－1　Basic Concept of the Project

2－1－1　Overall Goal

To enhance the quality and quantity of healthcare services, and medical education in Nepal.

2－1－2　Project Goal

To improve the quality and quantity of healthcare services and medical education provided at Tribhuvan University Teaching Hospital (TUTH).

2－1－3　Project Objective

The Project will replace a part of the exhausted/aged medical equipment of TUTH and procure new medical equipment that a top referral hospital should own.

2－2　Outline Design of the Japanese Assistance

2－2－1　Design Policy

(1) Scope of the Japanese Assistance

Under the Project, medical equipment necessary for diagnosis and treatment will be provided to TUTH, the top referral hospital in Nepal. Works for building reinforcement, waterproofing and rehabilitation will also be carried out for the installation of some of the equipment to be procured.

1)　Policy of Equipment Plan

The target departments of the equipment provision will be the Image Diagnostic Department, the Central Sterilization Supply Department, the Anesthetic Department, the Intensive Care Unit[9], the Department of Surgery and Pediatric Surgery, the Obstetrics and Gynecology Department, the Pediatric Department, the Endoscopy Department, the Pathological Laboratory and the Department of Emergency. For the development of the equipment plan, multidimensional evaluation will be conducted concerning the current conditions of the existing equipment, demand and urgency of equipment improvement in clinical and training aspects, technical level of the facility, operation and maintenance systems, financial capacity, and prospect of maintenance services and procurement of spare parts and consumables before decisions are made about the specifications and quantity of the equipment and the scope, scale and contents of the technical assistance (soft component) to be provided. Details are as shown below.

[9] Hereinafter referred to as “ICU”.

i. Equipment will be renewed if the functions have significantly deteriorated due to superannuation or it frequently breaks down and the repair cost causes financial pressure on the facility.
ii. Equipment will be increased if the number is insufficient to keep up with the medical activities that have recently been more active.
iii. Medical equipment that can be used at the technical level of TUTH's medical doctors and engineers will be procured.
iv. Equipment to be procured will be those whose operation and maintenance can be conducted with the existing facility operation budget and those with sustainability in terms of finance and personnel.
v. Medical equipment that a teaching hospital needs for the training of medical staff will be provided.
vi. For devices with windings that can be easily affected by voltage fluctuations such as motors and transformers, and precision medical devices for which damage by sudden stop has to be avoided, automatic voltage regulator or uninterruptible power supply will be planned.
vii. Equipment that are not frequently used and of which urgent improvement is not considered necessary will not be improved.
viii. Inexpensive equipment that can be procured by Nepalese side will not be procured.
ix. Equipment for which there is no maintenance service base or agency in Nepal or neighboring countries will not be procured.
x. To help smooth start-up and effective utilization of the procured medical equipment and maintain them in good condition for a long period of time, technical assistance (soft component) will be provided for the establishment of a maintenance system.

2) Policy of Facility Rehabilitation

The basic principles for the facility rehabilitation under the Project are as shown below.

i. For the facilities where MRI (1.5T) will be introduced, rehabilitation work will be conducted in consideration of the flows of patients and medical staff.
ii. External feeder circuits for the rehabilitation of the New MRI Room will be included in the scope of the Project.
iii. Floors on which heavy equipment will be installed, such as floors of the New MRI Room and the Central Sterilization Supply Department, will be reinforced as appropriate to support the weight of the equipment.
iv. For the locations where equipment to be procured will be installed in a severely deteriorated building with a leaking roof or breakage, waterproofing and rehabilitation works shall be carried out for the sustainable utilization of the procured equipment.

v. At the time of the site survey for the Project, a survey was conducted to check the impacts that the Gorkha Earthquake had caused on the target facilities (Survey to Determine the Degree of Damage by the Earthquake[10]). It was found that the remaining rate of seismic performance (***R***[11]) of the target facility was 94% or higher. As the survey result shows that the target facility has enough earthquake resistance, seismic strengthening works of structures will not be carried out under the Project. (See Table 1 in next page.)

vi. The result of the Survey to Determine the Degree of Damage by the Earthquake indicated that the expansion joints of the pass ways connecting the target facilities and the main building needs strengthening. Considering such factors as the urgency of the work and the level of difficulty of the work to be conducted by the Nepalese side, the work will not be included in the scope of the Project. However, the recipient country will be requested to perform rehabilitation works of the parts so that the facility will be operated in a sustainable manner.

[10] Survey to determine the possibility of reuse of facilities after earthquake and to restore the facilities. The survey was carried out according to the "Technical Guideline for Determination of the Degree of Damage by the Earthquake and Restoration of Damaged Buildings to Determine Possibility of Reuse and Restore Buildings" of the Japan Building Disaster Prevention Association.

[11] It is a method to show the remaining earthquake resistance after earthquake. 100% is the earthquake resistance of the superstructure defined in the architectural plan of the target facility.

Table 2-1 Remaining Rate of Seismic Performance ***R***

Buildings	Department	Date of Survey	Remaining Rate of Seismic Performance ***R***	Equipment to be procured	Problems	Outline of Rehbilitation
Block A ('80s)	Outpatient New MRI room	24-Sep	**98.3 (Slight Damaged)**	MRI		**GF MRI Room** - Floor Reinforcement (180kg→4t/m2) - Waterproofing Work on the top of Block A, especially the area of the above MRI Room
Image Diagnosis (OOC *1)	Outpatient New MRI room	20-Sep	**99.0 (Slight Damaged)**	(MRI)	- No original drawings - Floor reinforcement (2t/m2) is necessary but impossible since there is no structural calculation sheet. - 9 serious and large water leakages on the ceiling and walls, caused by deformation of parapets and deterioration of waterproofing on the roof. - Pertial demolish and reconstruction are recommended.	No equipment installation planned under the Project.
Block B ('80s)	Medical Examination・ Admin. Laboratory	22-Sep	**99.3 (Slight Damaged)**	Immunohistochemical Stainer, Immunofluorescence Microscope with Teaching Head, Ultrasonographs, Digital Mammograph,Video Bronchoscope Set		
Block C ('80s)	Operation Theater (OT), Delivery, Doctor's Cabin	18-Sep	**95.7 (Slight Damaged)**	Ventilator(Adult), Patient Monitor, Laparoscopic Set, Micromotor Drill for Craniofacial Surgery, Anesthesia Machine, C-Arm X-ray Machine	- Cracks on the expansion joints (Exp. J) of the pass way.	Exp. J repairs by Nepali side
Block D ('80s)	Laundry, Kitchen, Ward	23-Sep	**97.8 (Slight Damaged)**			
ANX 3 ('90s)	ICU, OT, CSSD	21-Sep	**99.3 (Slight Damaged)**	High Pressure Steam Sterilizer, Ventilator(Adult), Patient Monitor, Laparoscopic set, Micro-motor Drill, Anesthesia machine, C-Arm X-ray Machine	**GF CSSD** Area that existing autoclaves installed requires floor reinforcement. **1F ICU** The ceiling has 6 traces of water leakage which are already fixed. However, 2 out of 6 are not fixed properly so water leaks from the two leakages.	**GF CSSD** Floor reinforcement of the area for the instllation of new autoclaves **Roof of Annex 3** Waterproofing
ENT (OOC *1)	ENT			(High Pressure Steam Sterilizer)	- The present CSSD is on 3F at ENT and was planed as a ward initially. - Therefore, floor reinforcement (300 kg/m2) is necessary if the room is continued to be utilised as CSSD. - The reinforcement is impossible, however, since there is no structural calculation sheet.	No equipment installation planned under the Project.
Pediatrics (OOC *1)	Pediatrics	22-Sep	**96.1 (Slight Damaged)**	Ventilator (Pediatrics), Patient Monitor, Laparoscopic Set, Anaesthesia Machine	Serious water leakages at the Exp.J and pent house.	Roof waterproofing and Exp. J repairs by Nepali side
Emergency (OOC *1)	Emergency	27-Sep	**94.1 (Slight Damaged)**	C-Arm X-ray Machine		

(*1) OOC: Owner's Own Construction

(2) Policy on the Natural and Environmental Condition

1) Climate Condition

Almost of the whole land of Nepal is in the subtropical climate zone and the year is divided into a wet season (monsoon), which is hot and humid, and a dry season, which has extreme temperature difference between day and night. The wet season is from June to September and the dry season is from October to May. TUTH, the target facility of the Project, is located in Kathmandu, the capital city of Nepal, at an altitude of about 1,300 meters. With the mean maximum temperature of about 30 degrees C and the mean minimum temperature of

about 2 degrees Celsius, the temperature difference between day and night is large. Considering such climate conditions, the following policy will be adopted for the Project.

Equipment Plan

Out of the equipment that will be procured under the Project, MRI (1.5T) will have to be managed in the environment at about 20 degrees Celsius throughout the year. Therefore, installation of air conditioner units will be planned for the laboratory, the control room and the machinery room.

Facility Rehabilitation

As the rehabilitation works of the Project will mostly be indoor works such as interior rehabilitation and reinforcement works, it is considered that weather will cause little impact on the works. However, as the exterior waterproofing works for Block A and Annex 3 will be carried out outdoors, they will not be carried out in the monsoon season if at all possible.

2) Natural Disasters

Nepal is situated in the area where earthquakes occur frequently. One of the recent earthquakes is the Gorkha Earthquake which caused extensive damage. In addition to the regular healthcare services, the target facility of the Project, TUTH, carried out relief activities and performed operations for the disaster victims with traumatic or burn injury after the earthquake, and will likely to accept disaster victims in case of similar disasters in the future. Therefore, TUTH should be fully developed in terms of functions and safety so that the hospital can fulfill its functions as the top referral hospital in Nepal. For this, the following policy will be adopted to prepare for natural disasters.

Equipment Plan

i. Major equipment items – MRI (1.5T), high pressure steam sterilizers and a digital mammograph – will be anchored so that they will not fall at the time of an earthquake.
ii. To catch up with the increase of tests and operations when disaster victims are accepted, equipment such as MRI (1.5T), ultrasonographs, C-Arm X-ray Machine, video arthroscope set and anaesthesia machines will be added to improve the test processing speed as well as to be capable of emergency surgeries.

(3) Policy on the Social and Economic Condition

1) Construction schedule in accordance with the local circumstances

Dashain is the biggest festival of the year in Nepal held throughout the country for about two weeks in September and October every year. The holiday is about seven days and,

as many people go back to their home town to celebrate the festival, regular business is suspended for about 10 days including the travel time. There is also another festival called Tihar in November, when regular business is suspended for about a week. Therefore, the facility rehabilitation of the Project will not be scheduled during the holiday periods.

2) Construction schedule to ensure safety of users

As the facility rehabilitation of the Project will be carried out while TUTH is providing regular healthcare services, patients and medical staff should be kept away from the construction sites whenever possible so that safety of facility users will be ensured. Therefore, the period, methods, etc. of the constructions in the target area will be determined through discussion with the implementation agency.

(4) Policy concerning Procurement/Construction Situation

1) Equipment plan

According to the Japan's Grant Aid Scheme, the Equipment to be procured under the Project will be made in Japan or in the recipient country. However, depending on such factors as price advantage, level of operation skills of medical staff and state of the maintenance system, procurement of products made in the third countries may also be considered. As for the maintenance system, products will basically be procured on condition that there are local agents of manufacturers of medical equipment that provides continuous maintenance services in Nepal and TUTH can obtain maintenance services, spare parts and consumables in a stable manner.

2) Facility Rehabilitation Plan

i. Building Code, Permits and Licenses, etc.

For the facility rehabilitation of the Project, there is no need to obtain building permit or any other permit from the government authorities of Nepal.

For floor reinforcement, ground improvement will be conducted to 20kN/m^2 up to the supporting soil 2.0 meters below ground level in accordance with international standards such as Japan Industrial Standards (JIS) and British Standards (BS) so that the floors will have enough loading capacity for such heavy equipment as MRI and high pressure steam sterilizers.

For the floor reinforcement in Block A and Annex 3, some of the existing floor slabs will be removed and restored. As National Building Code of Nepal does not specify rules for rehabilitation, the restoration work will be carried out according to the structural design of each building.

ii. Construction and Procurement Situations

The facility required rehabilitation works under the Project is mostly made of reinforced concrete and concrete blocks. For finishing, cement mortar and paints and dressed bricks will be used for both exterior and interior walls, vinyl floor tiles, terrazzo, etc. for interior floors, and asphalt waterproofing materials for roof waterproofing. These materials are commonly used in Nepal and local production and imported products can be locally procured.

As the use of local contractors is assumed, materials and equipment that are locally available and will not pose a problem for maintenance will be preferentially adopted.

(5) Policy for the Use of Local Suppliers and Procurement /Construction Methods

As the Project will be carried out as a grant aid project, a medical equipment supplier will be a Japanese company, though a local contractor will be used for facility rehabilitation. The Supplier will select the contractor after carefully examining their capacity to take orders and technical capabilities. On the other hand, in order to ensure the accuracy of construction including quality control of materials and equipment and waterproofing, and the safety of asbestos removal, Japanese procurement supervisors will supervise rehabilitation works on the Consultant side and the Supplier will dispatch waterproofing work supervisors and equipment work supervisors to the site.

1) Facility Rehabilitation and Floor Reinforcement

Compared with the 1980-1990s, when the target facility was constructed, the capacity of the local contractors to carry out construction works has tremendously improved in terms of technical capability and labor force for construction and they are considered to have capabilities to carry out the rehabilitation works. They are also considered to be able to carry out other works for arrangement of reinforcement, concrete formwork and placing, and local workmen are considered to have adequate skills to handle the works if concrete covering, spans, etc. are adjusted. Concerning steel-frame works, they are used to handling lightweight materials although they do not often carry out complicated heavyweight steel frame constructions. In consideration of such situation, the traditional methods used by the local contractors will be preferentially adopted for the Project.

On the other hand, as asbestos tiles are used for some of the existing floors that have to be removed for the floor reinforcement work in Block A, particular specifications will be created in accordance with “Chapter 9 Environmentally-Friendly Rehabilitation Works, Section 1 Asbestos-Containing Building Material Treatment Work” of the Public Architectural Rehabilitation Work Standard Specifications, supervised by the Ministry of Land, Infrastructure, Transport and Tourism, so that adequate consideration will be given to safety.

2) Waterproofing Work

The roofs of Block A and Annex 3 are severely deteriorated due to aging and parapet gutters are completely clogged at six locations of Annex 3, causing leaks in the roof of ICU. There will also be other difficulties with roof waterproofing works such as removal of air conditioning outdoor units. Therefore, Japanese engineer will be dispatched during the waterproofing works.

Asphalt will be used as a waterproof material both for Block A and Annex 3, in the same construction method as that was used for the original construction.

(7) Policy concerning Maintenance Capabilities

Although the MoHP has Logistic Management Division, which is also in charge of procurement and maintenance of medical equipment, actual maintenance of the equipment installed in medical facilities are done by each hospital and this is also the case with the target facility of the Project, TUTH.

The maintenance of the medical equipment at TUTH is carried out by two members – a Biomedical Engineer (BME) and a maintenance staff. As these two people cannot deal with all maintenance work of the existing equipment, maintenance of advanced medical equipment used in the Image Diagnostic Department, operation theaters, ICU, etc. is carried out under a comprehensive maintenance contract[12] or an annual maintenance contract[13], according to the medical equipment procurement standards[14] of the MoHP.

Considering the difficulty and importance of the maintenance services of the equipment to be procured as well as the above-described current situation of TUTH, equipment that requires high-level maintenance and influences largely on the healthcare services when having defects will be covered by a maintenance contract such as CMC or AMC in addition to the manufacturers' guarantee[15] that usually comes with products. (See Table 2.) For equipment with CMC coverage, a regular service contract will be added during the product guarantee period of the first year so that the equipment will be covered by a maintenance contract equivalent to CMC.

[12] A type of maintenance contract that includes periodic visit maintenance work (periodic inspection), on-call repair and free replacement of spare parts. Hereinafter referred to as CMC.
[13] Periodic visit maintenance for medical equipment. A maintenance contract that includes paid services for on-call repair and spare parts replacement (payment of actual costs). Hereinafter referred to as AMC.
[14] According to the specifications determined by the MoHP, 2-year CMC and subsequent 3-year AMC have to be entered into after the delivery, according to the importance of the maintenance of each equipment.
[15] Medical equipment manufacturer's guarantee. Including on-call repair and free replacement of spare parts, the guarantee is for a year after the installation of the product at a medical facility. Periodic inspections are not usually included.

Table 2-2 Equipment to be procured with Maintenance Contract

Equipment	Contents of Maintenance Contract	Period in Total
MRI (1.5T) C-Arm X-ray Machine Digital Mammograph	Year 1: Manufacturer's warranty + Periodical Check-up Year 2-3: CMC	3 years
High Pressure Steam Sterilizer, Large High Pressure Steam Sterilizer, Medium Immunohistochemical Stainer	Year 1: Manufacturer's warranty Year 2-3: AMC	3 years
Ultrasonograph Laparoscopic sets, Ventilators, Patient Monitors, Anaesthesia Machine and Others	Manufacturer's warranty (1 year)	1 year

(8) Policy concerning Grades and Specifications of Equipment

The existing equipment of the target facility are medical equipment procured with the country's budget and support from NGOs, etc. and medical equipment made in Japan, which was procured through Japan's grant aid projects from the early 1980s to the early 1990s. The latter is still in use even after the end of the service life. Some of the equipment has been operated for about 30 years as the country and the target facility have been making self-help efforts for repair, procurement of spare parts and purchase of consumable supplies. It also seems to indicate that the facility has accumulated operational skills and maintenance capabilities at the same level as the neighboring countries.

Considering such situations, the grades and specifications of the equipment to be procured will be as follows:

i. Grades required for the healthcare services to be provided at a tertiary medical facility
ii. Medical equipment whose specifications are basically at the same level as or higher than the existing equipment
iii. Medical equipment that can be operated with the technical level of the medical staff of TUTH
iv. Medical equipment that can be maintained in Nepal

(9) Policy concerning Spare Parts and Consumables

Based on the basic policy of a Grant Aid project, spare parts for maintenance purposes will not be covered by the Project.

However, consumables will be provided in the quantity required for the six months from the delivery of the equipment so that TUTH can provide regular healthcare services, for many of the consumables have to be procured from Japan or a third country through a local agent of a medical equipment manufacturer and it takes three to six months from ordering to delivery. It is also expected that procurement of consumables with the next year's budget will not happen until six months after the delivery of the equipment. Therefore, it is considered appropriate to plan

provision of consumables so that healthcare services with the procured equipment can be provided without delay during the six months' period. The consumables for initial operation training and operation training provided by the Supplier will be included in those required for the six months' period.

(10) Policy concerning Technical Assistance (Soft Component) after Installation Work

After equipment installation, technical assistance (soft component) for the use and maintenance of equipment will be provided to the medical doctors, nurses, engineers, BMEs and other maintenance staff of the target facility, TUTH, so that the equipment procured under the Project will be used smoothly and continuously. The technical assistance will be provided over a year in two sessions to improve the learning level of the training.

(11) Policy concerning the Whole Schedule

The following matters will be taken into consideration when the schedule of the Project is determined so that it will be reasonable and efficient both for the Supplier and the local contractors.

- Waterproofing works for Block A and Annex 3, which are included in facility rehabilitation, will not be carried out in a wet season (June-September). Such matters as construction period, method and hours will be determined according to the standard construction schedule appropriate for the construction method.
- The construction schedule will be developed in compliance with work rules defined by the local labor standard act, safety regulations of the Nepal National Building Code 114 (NBC 114_CONSTRUCTION SAFETY9), etc.
- Under the Project, medical equipment will be carried in and installed and facilities will be rehabilitated in the target departments of TUTH. Therefore, construction works will be dispersedly carried out on the premise. As these processes will be carried out while TUTH is operating as usual, the construction schedule will be determined in consideration of such issues as safety management for TUTH users, storage of materials and equipment, and management of workmen.
- The construction will not be scheduled during a festival or a holiday, when many local workmen will not be available and the work will not likely to progress.

2－2－2　Basic Plan

2－2－2－1 Overall Plan

Through procurement of new equipment, the Project is to renew equipment whose functions have significantly deteriorated due to superannuation and to compensate the quantitative shortage of equipment as healthcare services expand, as well as for facility

rehabilitation associated with procurement of such equipment. The following table (Table 3) shows the target departments of the equipment improvement and rehabilitation works.

Table 2-3 Overview of the Equipment Procurement and Rehabilitation Work

Destination	Planned Equipment	Rehabilitation Plan
Department of Radiology	MRI (1.5T); Ultrasonograph, Observation; Ultrasonograph, Examination; Digital Mammograph	Rehabilitation work on MRI Room
		Waterproofing of Block A
Department of Endoscopy	Video Bronchoscope Set	
Central Sterilization Supply Department (CSSD)	High Pressure Steam Sterilizer, Large High Pressure Steam Sterilizer, Medium	Floor reinforcement of CSSD
Department of Operation, ICU	Patient Monitors; Ultrasonograph for ICU; Ventilator, Adult; Ventilator, Pediatric and Neonate; Hand Washing Device	Waterproofing of Annex 3
Department of Surgery, Department of Pediatric Surgery	C-Arm X-ray Machine; Video Arthroscope Set; Micromotor Drill for Craniofacial Surgery; Anaesthesia Machine; Laparoscopic Set for Gastrointestinal Surgery, Adult; Laparoscopic Set for Gastrointestinal Surgery, Pediatrics	
Department of Obstetrics and Gynecology	Patient Monitor, Recovery and Emergency; Laparoscopic Set for Gynaecology	
PICI/NICU*	Ventilator, Pediatric and Neonate; Patient Monitor, NICU/PICU	
Emergency Department	Ultrasonograph for ICU; Patient Monitor, Recovery and Emergency; Anaesthesia Machine	
Department of Pathology	Immunohistochemical Stainer; Immunofluorescence Microscope with Teaching Head	

Note: * PICU/NICU =Pediatric Intensive Care Unit/ Neonatal Intensive Care Unit

2－2－2－2　Consideration of the Nepal's Request

TUTH has narrowed down their request to 24 items of medical equipment and related devices through consultation at the time of the Preparatory Survey. These items have been evaluated with the seven selection criteria shown in Table 2-4 from the viewpoints of necessity and appropriateness, and decisions on procurement and quantity have been made for the Project in a comprehensive manner. The results of the consideration for each equipment are as shown in *Table 2-5 Consideration of Requested Equipment*.

Concerning the locations of equipment installation that needs rehabilitation, foundation reinforcement or waterproofing, necessity and appropriateness of such works is also described in detail in *2-2-2-3 Overview of Consideration of Requested Equipment and Installation Locations*.

Table 2-4 Selection Criteria for Requested Equipment

Points to Consider		Criteria	
Necessity	① Purpose of use	○	TUTH needs the equipment to provide appropriate healthcare services as a tertiary medical facility.
		×	The equipment does not meet the level of the healthcare services provided by TUTH.
	② Necessity in terms of demand	○	The equipment is necessary for the activities of TUTH as a tertiary medical facility or teaching hospital.
		×	The equipment is not necessary for the activities as a tertiary medical facility or teaching hospital. The activities of the equipment can be carried out by other existing equipment. Or it is considered the equipment can be purchased with TUTH's budget.
	③Urgency of improvement	○	The original functions of the equipment are impaired due to superannuation, failures, etc., or the equipment has not been installed although it is required for the provision of high-quality healthcare services expected from a tertiary medical facility or teaching hospital.
		×	Other equipment with similar functions has already been installed and therefore the equipment does not have to be urgently procured for the provision of healthcare services as a tertiary medical facility or teaching hospital.
Appropriateness	④ Technical level	○	TUTH's medical staff can handle the equipment with the current level of clinical techniques.
		×	The equipment has never been used in TUTH and medical staff has to acquire high-level techniques to use it.
	⑤ Operation system	○	Co-medicals have been placed or are expected to be placed for appropriate operation, use and management of the equipment.
		×	There is no plan for the placement of medical staff for appropriate operation, use and management of the equipment.
	⑥Maintenance system	○	TUTH's engineers can easily maintain the equipment and there are no issues with maintenance, repair and procurement of spare parts and consumables through a local agent of the manufacturer.
		×	It is difficult for TUTH's engineers to carry out maintenance; and maintenance and procurement of spare parts and consumables are not expected to be handled properly by a local agent of the manufacturer.
	⑦Operation and maintenance cost	○	Renewal of the existing equipment will not put pressure on the budget of Nepal, or the operation and maintenance costs will not increase much in case of new procurement.
		×	The equipment will be a new addition and is likely to require high operation and maintenance cost.
Comprehensive judgment		○	As the equipment is as deemed to have a high degree of necessity and appropriateness through the consideration of the above-described criteria, it has been selected for the Project.
		×	As the equipment is deemed to have a low degree of necessity and appropriateness through the consideration of the above-described criteria, it has not been selected for the Project.

Table 2-5 Consideration of Requested Equipment

Department	Equipment	Requested Q'ty	Necessity			Appropreateness				Comprehensive judgement	Planning Q'ty
			① Purpose of use	② Necessity in terms of demand	③ Urgency of improvement	④ Technical level	⑤ Operation system	⑥ Maintenance System	⑦ Operation and Maintenance Cost		
Radiology	MRI	1	○	○	○	○	○	○	○	○	1
	Ultrasonograph, outpatient	4	○	○	○	○	○	○	○	○	1
	Ultrasonograph, detail examination	2	○	○	○	○	○	○	○	○	2
	Digital Mammographe	1	○	○	○	○	○	○	○	○	1
CSSD	High Pressure Steam Sterilizer, Large	1	○	○	○	○	○	○	○	○	2
	High Pressure Steam Sterilizer, Medium	3	○	○	○	○	○	○	○	○	2
	Repair and imprivement of CSSD's lift	1	○	○	×	○	○	○	○	×	0
Operation Theater (OT)	High Pressure Steam Sterilizer, Medium	1	○	○	×	○	○	○	○	×	0
	Ventilator, Adult	8	○	×	×	○	○	○	○	○	0
	Advanced Patient Monitor	7	○	○	○	○	○	○	○	○	3
	Hand Washing Device	0	○	○	○	○	○	○	○	○	1
Intensive Care Unit (ICU)	Ultrasonograph	1	○	○	○	○	○	○	○	○	1
	Ventilator, Adult	7	○	○	○	○	○	○	○	○	4
	Advanced Patient Monitor	4	○	○	○	○	○	○	○	○	1
ENT* OT・ICU	Advanced Patient Monitor	8	○	○	○	○	○	○	○	○	2
	Anaesthesia Machine	3	○	○	○	○	○	○	○	○	3
Surgery	C-Arm X-ray Machine	2	○	○	○	○	○	○	○	○	2
	Video Arthroscope Set	2	○	○	○	○	○	○	○	○	2
	Laparoscopic Set for Gastrointestinal Surgery, Adult	1	○	○	○	○	○	○	○	○	1
	Micromotor Drill for Craniofacial Surgery	1	○	○	○	○	○	○	○	○	1
	Advanced Patient Monitor	7	○	○	×	○	○	○	○	○	0
	Anaesthesia Machine	1	○	×	×	○	○	○	○	○	0
Periatric Surgery	Laparoscopic Set for Gastrointestinal Surgery, Pediatrics	1	○	○	○	○	○	○	○	○	1
OB/GY	Ultrasonograph, outpatient	1	○	○	○	○	○	○	○	○	1
	Advanced Patient Monitor	3	○	○	○	○	○	○	○	○	2
	Cardiotocograph	2	○	×	×	○	○	○	○	×	0
	Laparoscopic Set for Gynaecology	1	○	○	○	○	○	○	○	○	1
PICU/NICU**	Ventilator, Pediatric and Neonate	10	○	○	○	○	○	○	○	○	5
	Advanced Patient Monitor	10	○	○	○	○	○	○	○	○	6
Emergency	Ultrasonograph, outpatient	2	○	○	○	○	○	○	○	○	2
	Advanced Patient Monitor	7	○	○	○	○	○	○	○	○	1
	Anaesthesia Machine	1	○	○	○	○	○	○	○	○	1
Endoscopy	Video Bronchoscope Set, 3-channel	1	○	×	×	○	○	○	○	×	0
	Video Bronchoscope Set, 5-channel	1	○	○	○	○	○	○	○	○	1
Pathology	Immunohistochemical Stainer	1	○	○	○	○	○	○	○	○	1
	Immunofluorescence Microscope with Teaching Head	1	○	○	○	○	○	○	○	○	1
	HLA Genotyping machine for Transplant surgery	1	○	×	○	×	○	○	○	×	0
New facility	New CSSD building with equipment	1	○	×	×	○	○	○	×	×	0
Ward	Patient Monitor	36	○	×	○	○	○	○	○	×	0
TUTH	Elevator	2	○	○	○	○	○	○	×	×	0

Note: *ENT=Ear, Nose and Throat

** PICU/NICU =Pediatric Intensive Care Unit/ Neonatal Intensive Care Unit

2－2－2－3　Overview of the Consideration of Requested Equipment and its Installation Locations

(1) Department of Radiology

1) MRI (1.5T)

Under the Project, a 1.5T (Tesla[16]) MRI will be installed in the Department of Radiology. Although the department has 6-year-old 0.3T MRI (as of September 2015), its image processing capability is low and the department cannot perform tests for many patients or provide accurate diagnosis. From the beginning, TUTH requested the introduction of high-field 3.0T MRI with high magnetic field strength as an appropriate model for its diagnosis and research activities. However, the conclusion was made that the provision of medium-field 1.5T would be appropriate for the following four reasons:

i. 1.5T MRI is the standard type that is commonly used in Japan. Considering the current demand for healthcare services at TUTH, it is good enough for its diagnosis and research activities.
ii. Almost all diseases subjected for precise diagnosis in TUTH can be diagnosed by 1.5T MRI except a few types of cancers. Comparing 0.3T most of the diseases can be diagnosed with 1.5T.
iii. Maintenance and operation cost for 3.0T is slightly higher compared with 1.5T. For sustainable operation and maintenance of the equipment, revenue and expenditure should be carefully planned.
iv. Considering the roles of a teaching hospital that provides clinical training to medical students and doctors, such practical training can be fully conducted with 1.5T MRI.

As for the location for installation, the room where MRI was originally planned to be installed (current CT scanner room) was deemed inappropriate for the equipment installation because it is in the Image Diagnosis Building, which is 16-year-old but severely damaged with many issues such as leaks. (See Table 2-6). Therefore, after discussion with TUTH, the decision was made to relocate outpatient rooms of the Psychiatry Department, which is now located in Block A, next to the Image Diagnosis Building, and use the space for the installation of the equipment after rehabilitating the space as a new MRI room. MRI is one of the most important equipment planned in the Project, and there are concerns that Block A, which was constructed over 30 years ago, might have leaks in the future due to aging. Therefore, waterproofing work for the roof of Block A will be included in the rehabilitation works and will be carried out under the Project.

[16] International standard unit for magnitude of magnetic force. Larger Tesla can create more detailed images.

Table 2-6 Decision of MRI Provision to the Existing Image Diagnosis Building

Item	Appropriateness	Consideration
Judgment of degree of damage	○	The building has an irregular shape and has large wall quantity for its area. Therefore, the building only has some cracks and the remaining earthquake resistance (***R***) is 99.0.
Leaks	X	Ceilings and walls have some extensive leaks. There are leaks in a total of nine locations in the 100m^2 area. Outer wall lifting is also found all around. It is deemed to require wall rehabilitation works as well as waterproofing of the roof.
Structural reinforcement	X	There is no general drawing, structural drawing or structural calculation. For reinforcement works, digging of the area and investigation of foundation, footing beams, floors and other structures have to be investigated.
Interior construction	X	All walls are structural walls and the walls of the room are 50cm thick important structural walls. Relocation of the walls requires extreme caution.

Source: Survey Team

2) Ultrasonographs

For the Department of Radiology, one Ultrasonograph, observation and two of Ultrasonograph, examination will be provided.

Although TUTH performs about 250 ultrasound examinations every day with five ultrasonographs running at full capacity, patients have to wait for three to four days to get examination and the number of examinations conducted does not keep up with the patients' demand. In case ultrasonographs break down in other departments such as the Department of Emergency, the units in the Department of Radiology are lent out, causing even longer waiting time for patients. However, as four of the five units are relatively new and mostly working well and there is only limited space for the ultrasound examination room, one unit that is old and frequently breaks down will be renewed under the Project.

The Department of Radiology also performs ultrasound guided needle aspiration. Without a dedicated device for this test, the department uses a small portable ultrasonograph that has long been used for general checkups and is past its service life which cannot keep aspiration accuracy. Therefore, there is a great need for a device that can ensure aspiration accuracy. As the number of needle aspiration tests has been increasing, the end users have acquired adequate skills and the ultrasound examination room has two sections dedicated for needle aspiration. Therefore, provision of the device will be highly appropriate. Based on the above, two of Ultrasonograph, examination will be provided under the Project as requested.

Based on TUTH's original request and results of the site survey, an ultrasonograph will be provided to each of the ICU and the Department of Obstetrics/Gynecology and two ultrasonographs to the Department of Emergency (five units in total), in addition to those provided to the Department of Radiology. The background of the plan will be described later.

3) Digital Mammograph

A digital mammograph with X-film was donated in 2005. When the equipment worked properly, it was used for diagnostic services for about eight cases a day, over 1,700 a year. However, it started to break down frequently about two years ago. Despite repeated repairs, the mammograph were suspended to use at the time of the survey in September 2015 because of decline in function due to aging and shortage of spare parts. Therefore, patients have to take tests at an examination center or other private medical facilities and it is causing their financial burden. A mammograph is a diagnostic device effective in early detection of breast cancer and is one of the devices that tertiary medical facilities should have. To recover the medical functions of the department, one Digital Mammograph that can process images electronically and does not need storage space for films will be provided under the Project.

(2) Central Sterilization Supply Department

TUTH's Central Sterilization Supply Department (hereinafter referred to as CSSD) is located on the west side of the first floor of Annex 3, which was constructed under Japan's Grant Aid project in the 1990s. The original operations of CSSD include cleaning and sterilization of steel instruments (so-called "regeneration processing), distribution of such instruments to other departments, and preparation, sterilization, storage and distribution of medical materials such as gauze and absorbent cotton. Although it has been about 25 years since its construction, the space of the present CSSD is about 360 m^2, which is large enough for the current number of beds that the CSSD should deal with (about 450 beds[17])[18].

However, at the time of the site survey, CSSD did not fulfill those functions and their activities were limited to regeneration processing of the operation instruments, tools and materials collected from the Department of Obstetrics/Gynecology after they were used for caesarean sections as well as other operations for medical materials. As for the conditions of the existing equipment, although three medium-size high pressure steam sterilizers and a large-size high pressure steam sterilizer were installed at the time of the completion of Annex 3, only one medium-size high pressure steam sterilizer operates with frequent failures and three other machines do not operate because of unrepairable failures. Two middle-size high pressure steam sterilizers were also installed several years ago, but only one of them operates.

As described above, even if the two middle-size high pressure steam sterilizers that barely work operate 24 hours at full capacity, it is impossible to carry out regeneration processing for all the medical instruments, tools and materials used in the hospital. Recent years, a medium-size

[17] The number of beds is the total after reduction of the bed numbers in such departments as the ENT Department, the Ophthalmology Department, the Pediatric Department and the Department of Neonates where their sterilization work is not in the scope of the present CSSD. These are dealt with at a sterilization room at the ENT building, etc.
[18] It is said that the standard size of CSSD for a general hospital with 400 to 599 beds is 0.8m^2 per bed. (Source: "Medical Instruments Series 8 – Details of Hospital Equipment Standards", edited by Hirokawa et al., 1987, p.155)

high pressure steam sterilizer installed at each department for backup has always been used for regeneration of instruments, etc. since the construction.

Considering such a situation, the Project will provide two medium-size high pressure steam sterilizers of about 250L that can respond to immediate sterilization demand, two large-size high pressure steam sterilizers of about 400L that can sterilize large volume, and floor reinforcement works for installation. Accordingly, the CSSD will cover the sterilization demand for about 6,500L from the inpatients' wards with 450 beds and eight main operation theaters in addition to the existing backup middle-size high pressure steam sterilizers in each department. Through the procurement, the regeneration process will be handled during the day shift hours.

Although a lift was originally requested, it was found out at the time of the site survey that the existing lift could be repaired with replacement of inexpensive parts and it has been excluded from the Project.

(3) Operation Department, Intensive Care Unit (ICU)

The Operation Department of TUTH has the main operation theaters (a total of eight rooms) in Block C (constructed in the 1980s) and on the first floor of Annex 3 and the New Operation Theaters (a total of five rooms including two minimally invasive operation rooms) on the third floor of the ENT building[19]. ICU is located on the first floor of Annex 3 and in the ENT building and has a total of 19 beds. Both departments are controlled by the Anesthetic Department of TUTH.

1) Equipment for the Main Operation theater

At first, a medium-size high pressure steam sterilizer, eight ventilators for adults and seven advanced patient monitors were requested for the main operation theater. In the site survey, several doctors and several nurses of the Anesthetic Department were interviewed and it was confirmed that there is no problem with the technical level of the medical staff concerning the requested equipment and that there are adequate human resources. Status of operation and grades of the existing equipment, environment of the preparation rooms of the Operation Department, etc. were also investigated through a survey of the main operation theater. As a result, it was found that three exhausted advanced patient monitors in the main operation theater often break down and need renewal. Although the item was not requested, but it was also found during the site survey that the hand washing device of one of the two sinks installed in the preparation rooms of Block C and Annex 3 is partially broken due to superannuation and the sink would not regain its original functions even with repair and other maintenance work. As hand wash before operation is important to prevent nosocomial

[19] TUTH has 17 operation rooms in total, including 14 rooms for major operations and three rooms for minimally invasive operations.

infection, renewal of the hand washing device for operation will be included in the Project.

The Operation Department has two middle-size high pressure steam sterilizers. One of them is old and needs frequent repair, while the other one that was donated by another donor at the time of the Gorkha Earthquake works properly. Considering that a total of four high pressure steam sterilizers will be provided to CSSD, directly below the main operation theater, it is appropriate that the procurement of medium-size high pressure steam sterilizers for the Operation Department is excluded from the Project. Ventilators for adults will not be renewed under the Project as all the existing ventilators work properly.

As discussed above, for the main operation theater, three advanced patient monitors and a hand washing device for operation will be provided, and medium-size high pressure steam sterilizers and ventilators for adults have been excluded.

Based on the original request from TUTH and results of the site survey, advanced patient monitors will be provided to ICU (one unit), ICU of the ENT building (two units), the Department of Obstetrics/Gynecology (two units), PICU/NICU (six units) and the Department of Emergency (one unit), in addition to those provided to the main operation theater (15 units in total). The background of the plan will be described later.

2) Equipment for ICU

ICU requested an ultrasonograph, seven ventilators for adults and four advanced patient monitors. As a result of the site survey, it was found that ICU frequently uses an ultrasonograph but does not have one and that they have to borrow one from other departments to conduct tests when necessary. In order to improve the promptness of tests, it is appropriate to provide an ultrasonograph to ICU. As for the advanced patient monitors for adults, as a result of the site survey, it was found that there is only a ventilator in the main ICU and the number is desperately short for 11 beds. Therefore, a total of four ventilators for adults will be provided under the Project so that there will be one for about every two beds. Although 11 advanced patient monitors have been installed, it was found during the site survey that there is a great need to renew the one that is past service life. Therefore, an ultrasonograph, four ventilators for adults and an advanced patient monitor will be provided to ICU.

As a result of the survey, it was found that the leaks of the ICU room cannot be overlooked as ICU serves important functions of a tertiary medical facility. As further leaks are expected in the future, waterproofing work for the roof of ICU (Annex 3) will be included in the Project.

3) Equipment for the Operation Theater and ICU in the ENT Building

There is only one anaesthesia machine in the New Operation Theater of the ENT building. Considering that the use of the New Operation Theater has been increasing since the

Gorkha Earthquake and the level of operations performed in the new operation theater is the same as that of those performed in the main one, anaesthesia machines should be installed in all the three rooms where major operations are performed. Therefore, a total of three anaesthesia machines will be provided to the operation theater in the ENT building.

Eight advanced patient monitors were requested for the eight beds in the ICU in the ENT building. However, major operations are performed in only three of the five operation rooms and advanced patient monitors are not as frequently used as in the ICU next to the main operation theater. Therefore, it is deemed appropriate to provide two monitors for the eight beds under the Project.

As discussed above, three anaesthesia machines and two advanced patient monitors will be provided to the operation theater and ICU in the ENT building. Based on the original request from TUTH, an anaesthesia machine will also be provided to the Department of Emergency and a total of four anaesthesia machines will be provided under the Project.

(4) Department of Surgery/ Pediatric Surgery

In TUTH, surgical and pediatric operations are performed at the Operation Department. Therefore, seven advanced patient monitors and an anaesthesia machine that were included in the original request will be excluded from the Project on the presumption that the machines will be shared with the Operation Department. The other equipment included in the request – two C-arm X-ray machines, two video arthroscope sets, a laparoscopic set for gastrointestinal surgery for adult, a laparoscopic set for gastrointestinal surgery for pediatrics and a micromotor drill for craniofacial surgery – will also be planned in the Project for the following reasons:

- One of the two existing C-arm X-ray machines is out of order. C-arm X-ray machines are often used for neuro-surgery and urological surgery and, based on the trend of diseases treated at TUTH, the number of operations with the machines is expected to increase. Therefore, two C-arm X-ray machines will be provided as originally requested.
- TUTH has no video arthroscope set and borrows the device with commission from other medical facilities to perform operations. On the other hand, TUTH has an increasing number of poor patients with traumatic injury as urbanization progresses rapidly. If operations are performed with leased devices as currently done, it continues to place financial burden on the patients. Therefore, two video arthroscope sets will be provided under the Project as originally requested.
- TUTH performs about 300 laparotomies every year, but laparotomies for digestive system can be replaced with laparoscopic surgeries so that the patients' hospitalization will be shortened and risk of postoperative infection will be avoided. Pediatric laparoscopic surgeries are currently performed with an adult laparoscopic set for

gastrointestinal surgery, causing physical strain on the pediatric patients. Therefore, an adult laparoscopic set and a pediatric laparoscopic set for gastrointestinal surgery will be provided to reduce physical strain on the patients undergoing surgery at TUTH.

- Although TUTH does not have a micromotor drill for craniofacial surgery, an increasing number of operations are performed with a borrowed micromotor drill in the Orthopedic Department and the Department of Neuro-surgery and about 180 surgeries have been performed in the recent years. As a dental microturbine is currently used, it takes long to cut and form bones, causing physical burden on the patients. Therefore, the equipment will be provided under the Project.

(5) Department of Obstetrics/Gynecology

At TUTH, the Department of Obstetrics/Gynecology performs laparoscopic surgeries for fallopian tube disorders and ovarian cysts (about 300 cases a year) in addition to general checkups. However, with no ultrasonograph or laparoscopic set for gynaecology, they borrow the devices to provide diagnosis and treatment when the Image Diagnostic Department or the Operation Department does not use the devices. As the advanced patient monitor installed in the Obstetric Recovery Room (two beds) has been used for eight years, past service life, the functions are significantly deteriorated. Therefore, an ultrasonograph, two advanced patient monitors and a laparoscopic set for gynaecology will be provided under the Project.

Two cardiotocographs that were originally requested will be excluded from the Project as existing equipment can be used.

(6) Pediatric Intensive Care Unit (PICU), Neonatal Intensive Care Unit (NICU)

At the time of the site survey, PICU and NICU had a total of 12 beds (six each), seven ventilators and eight advanced patient monitors. However, two ventilators had functional decline due to superannuation and the monitors were past service life. Although 10 pediatric and neonate ventilators and 10 advanced patient monitors were originally requested based on the plan to expand PICU and NICU to about 10 beds each, it was confirmed during the site survey that the expansion is scheduled after the delivery of the equipment procured under the Project. Therefore, five pediatric and neonate ventilators and six advanced patient monitors will be provided, based on the current number of beds.

(7) Department of Emergency

The Department of Emergency of TUTH has two small rooms for ultrasound diagnosis. In there, emergency patients get ultrasound examination when required. The two rooms have exhausted/aged ultrasonographs and, in case they break down, examinations are conducted with an ultrasonograph borrowed from the Image Diagnostic Department. However, as the

ultrasonographs in the Image Diagnostic Department are always in full operation, it takes long to borrow one and the rooms for ultrasound diagnosis of the Department of Emergency are congested.

On the other hand, as the operation theater of the Department of Emergency does not have an anaesthesia machine, they cannot perform emergency operations that require the device. Moreover, although advanced patient monitors are used in the postoperative follow-up room for patients who require caution, one of the three existing monitors is out of order and has to be renewed.

In view of such present situation, TUTH requested two ultrasonpgraphs, seven advanced patient monitors and an anaesthesia machine. In order to maintain functions of the Department of Emergency of a tertiary medical facility, two ultrasonpgraphs for ICU, an advanced patient monitor and an anaesthesia machine will be provided under the Project.

(8) Department of Endoscopy

When the original request of TUTH was checked during the site survey, it was found that two different types of video bronchoscope sets – a 3-channel video bronchoscope set and a 5-channel video bronchoscope set – were requested. TUTH performs two to three examinations with a regular bronchoscope set each day, but the existing bronchoscopes are exhausted/aged and do not always work. Moreover, one to two patient(s) need treatment with a 5-channel video bronchoscope set each day, TUTH borrows the device from a private hospital for the treatment of diseases such as bronchostenosis and thorax. Considering such a situation, only one 5-channel video bronchoscope set will be provided under the Project.

(9) Department of Pathology

The number of specimens that the Department of Pathology of TUTH deals with has been increasing over the last three years and the department currently performs about 8,500 histopathologic tests and about 6,000 cytology tests a year. However, as they manually prepare specimens, it is desired to prepare the specimen automatically and fastly by an immunohistochemical stainer. Moreover, as the Department of Pathology does not have immunofluorescence microscopes with teaching head, the medical students of TUTH do not have opportunities for clinical training of fluorescent antibody techniques. As the device is not used in Nepal, all the tests that require fluorescent antibody techniques have to be outsourced to laboratories in a neighboring country, India, and it consumes the patients time and money. Therefore, an immunohistochemical stainer and an immunofluorescence microscope with teaching head will be provided under the Project. Considering the functions of TUTH as a teaching hospital, the immunofluorescence microscope should have teaching head.

With regard to HLA Genotyping machine for Transplant surgery that was originally

requested, the maintenance system is not expected to be established as a relatively small number of tests require the device and the local agent of the manufacturer does not have much maintenance experience. Therefore, the device will not be provided under the Project.

(10) Construction of New CSSD with Equipment

Construction of a new CSSD building and provision of new equipment will be excluded from the Project.

In TUTH, CSSD was constructed in current Annex 3 in the 1990s under Japan's Grant Aid project. Later, as TUTH continued to expand, the ENT building with an operation theater was constructed in a location away from current CSSD. Therefore, a request was made for construction of a CSSD building and provision of high pressure sterilizers, washing machines and other devices in the center of all the operation theaters in TUTH.

As a result of the site survey, it was found that the construction site of the new CSSD building proposed by TUTH was far from the pediatric building, the cancer center and the ENT building. It would create long outdoor traffic lines and cause many issues in infection control. As an alternative, TUTH also requested renovation of the space for the Sterilization Supply Department near the operation theater on the third floor of the ENT building as new CSSD. However, it was deemed difficult to provide equipment under this grant aid project as there is a concern about the maximum load weight and there is no structural calculation sheet. Moreover, as adequate operation personnel are already secured in the existing CSSD and it was deemed medically efficient and effective to consolidate sterilization processes of medical materials in the existing CSSD, first priority was given to equipment renewal to match the current size of CSSD with 600 beds.

(11) Patient Monitor for Inpatient Ward

TUTH requested patient monitors so that they would be installed in the postoperative care room, surgical ICU and other related rooms (including inpatients' ward). However, during the site survey, it was found that healthcare services can be provided with the existing patient monitors. Therefore, according to the equipment selection criteria, patient monitors have been excluded from the Project.

(12) Elevators

The original request included the renewal of two exhausted/aged elevators in TUTH. As a result of the site survey, it was found that the elevators can be repaired with the replacement of inexpensive parts, etc. Therefore, it will not be included in the Project.

2－2－2－4　Equipment Plan

According to the result of the consideration of the requested equipment, facilities and installation locations, the equipment to be procured and installation locations have been determined as shown in the following table.

Table 2-7 List of Equipment and its Distribution

Code No.	Description	Q'ty	Block A		Block B				Annex 3											ENT Bldg.	Emergency Bldg.	Surgical OPD Bldg.
			GF		GF			1F	GF	1F												
			Dept. of Endoscopy	Dept. of Radiology				Dept. of Pathology	CSSD	Dept. of Orthopedics	OB/GY		GIE	Pediatric Dept.		Anaesthesia Dept.					Emergency Dept.	Birthing Center
			Endoscopy Room	New MRI Room	USG Room	Image Diagnostic Room	Mammogram Room	Pathological Laboratory	Central Sterilization Room	Main OT No. 1-3	Main OT No. 6	Obstetric Recovery	Main OT No. 7	Main OT No. 8	NICU/PICU	Main OT (Share)	OT Preparation Yard	ICU	Post OT	ENT Post OT		
1	Magnetic Resonance Imaging (MRI), 1.5T	1		1																		
2	Ultrasonograph, Observation	2			1																	1
3	Ultrasonograph for ICU	3																1			2	
4	Ultrasonograph, Examination	2				2																
5	Digital Mammograph	1					1															
6	High Pressure Steam Sterilizer, Large	2							2													
7	High Pressure Steam Sterilizer, Medium	2							2													
8	C-Arm X-ray Machine	2								2												
9	Video Arthroscope Set	2								2												
10	Video Bronchoscope Set	1	1																			
11	Ventilator, Adult	4																	4			
12	Ventilator, Pediatric and Neonate	5													5							
13	Patient Monitor, OT	3														3						
14	Patient Monitor, ICU	3																1		2		
15	Patient Monitor, NICU/PICU	6													6							
16	Patient Monitor, Recovery and Emergency	3										2									1	
17	Laparoscopic Set for Gynaecology	1									1											
18	Laparoscopic Set for Gastrointestinal Surgery, Adult	1											1									
19	Laparoscopic Set for Gastrointestinal Surgery, Pediatrics	1												1								
20	Micromotor Drill for Craniofacial Surgery	1								1												
21	Anaesthesia Machine	4														3					1	
22	Immunohistochemical Stainer	1						1														
23	Immunofluorescence Microscope with Teaching Head	1						1														
24	Hand Washing Device	1															1					
I	Structure Rehabilitation and Interior Work	1		1																		
II	Reinforcement of the Floor of CSSD	1							1													
III	Waterproofing Work for Block A	1		1																		
IV	Waterproofing Work of ICU	1																1				

Note: * CSSD = Central Sterilization Supply Department
** PICU/NICU =Pediatric Intensive Care Unit/ Neonatal Intensive Care Unit
*** Shaded column in the above table requires rehabilitation works.

In the above table, the advanced patient monitors for the main operation theater, ICU, ICU of the ENT building, the Department of Obstetrics/Gynecology, PICU/NICU and the Department of Emergency will be patient monitors for the Operation Theater, patient monitors for ICU, patient monitors for NICU/PICU and monitors for the recovery room/emergency patients, according to the intended use.

3－2－2－5 Rehabilitation and Electrical Plan

(1) Rehabilitation Works required for the Project

The Project includes facility rehabilitation work, floor reinforcement works and waterproofing works. The details are as shown in the following table:

Table 2-8 Overview of the Facility Rehabilitation Required for the Project

Equipment to be installed	Maximum loading capacity	Planned installation site	Major rehabilitation works
MRI (1.5T) , machine room	4 t, 1.5 t/m^2	North-west part of Block A	Waterproofing (about 550m^2), floor reinforcement and interior works
High pressure steam sterilizer	800kg, 400kg/m^2	CSSD room in Annex 3	Floor reinforcement in the planned installation space
Ventilator, advanced patient monitor, etc. (equipment for ICU)	-	Annex 3	Roof waterproofing work for about 400m^2 (Most problems are in the locations with interior downpipes.)

(2) Electrical Planning for MRI (1.5T)

In the Project, the medical equipment whose current value is the most among the Equipment to be procured under the Project is an MRI (1.5T) and its peripheral devices. Accordingly, the Survey Team measured 24-hour current changes of three transformer units installed in the primary substation which was built in the 1980s.

Table 2-9 shows the maximum instantaneous current values of each transformer at the primary substation. Demand factors on each circuit breaker capacity vary from 10 to 26 per cent. Since the maximum current value of the MRI (1.5T) to be procured under the Project is less than 145A (120 KVA), it is possible for every transformer to deal with the above equipment. However, Transformer No.1 already provides electricity to large-scale medical equipment such as general X-ray machines, an MRI with a permanent magnet, etc. Moreover, the main capacity of the circuit breaker of Transformer No.3 is small such as 400A and its demand factor is also the highest among the three. Additionally, the engineer of the Maintenance Department at TUTH requested to supply electricity from Transformer No.2 to the MRI (1.5T) in consideration with the power consumption of the whole facility at TUTH. Therefore, the Survey Team planned to take Transformer No.2 for the power supply to the MRI (1.5T) and its peripheral devices.

Considering the risk of temporary unavailability of an MRI examination by connecting

both of the existing and new MRIs to one transformer, it is reasonable to connect the new MRI to Transformer No.2. Further, an uninterruptible power supply (UPS) will be installed in the machine room next to the new MRI room in Block A because there are frequent power failures in Kathmandu.

Table 2-9 24-hour Current Changes of three transformers at Substation No.1

Transformer	Circuit breaker capacity	Maximum instantaneous current value	Demand factor
No.1	300KVA, 800A	142.5A (24 Sept. 2015, 0:10 pm~)	17.8%
No.2	300KVA, 1,000A	95.2A (28 Sept. 2015, 10:02am~)	9.5%
No.3	300KVA, 400A	105.0A (30 Sept. 2015, 07:03am~)	26.3%

Source: Survey Team

2－2－3　Outline Design Drawings

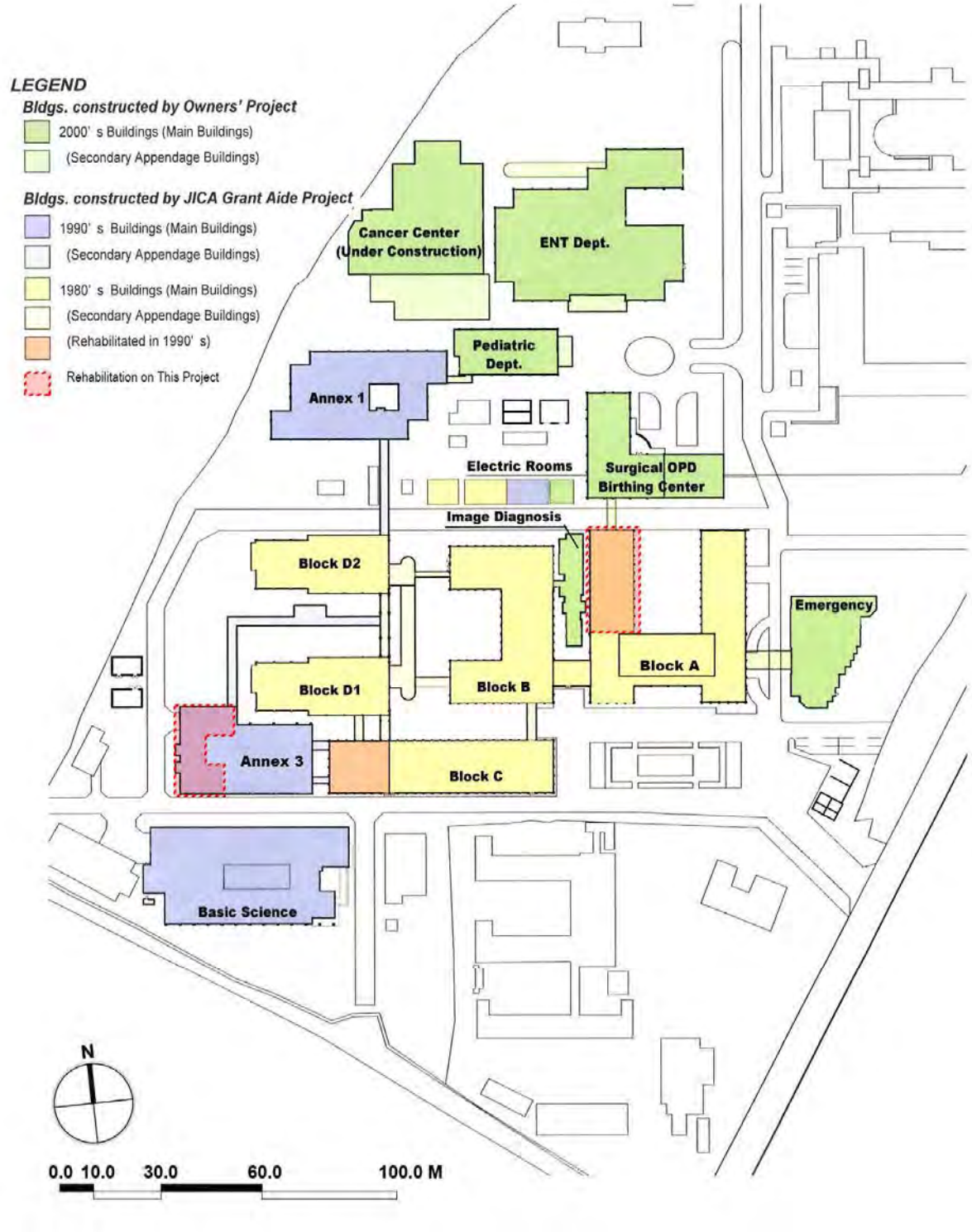


Figure 2-1　Site Plan

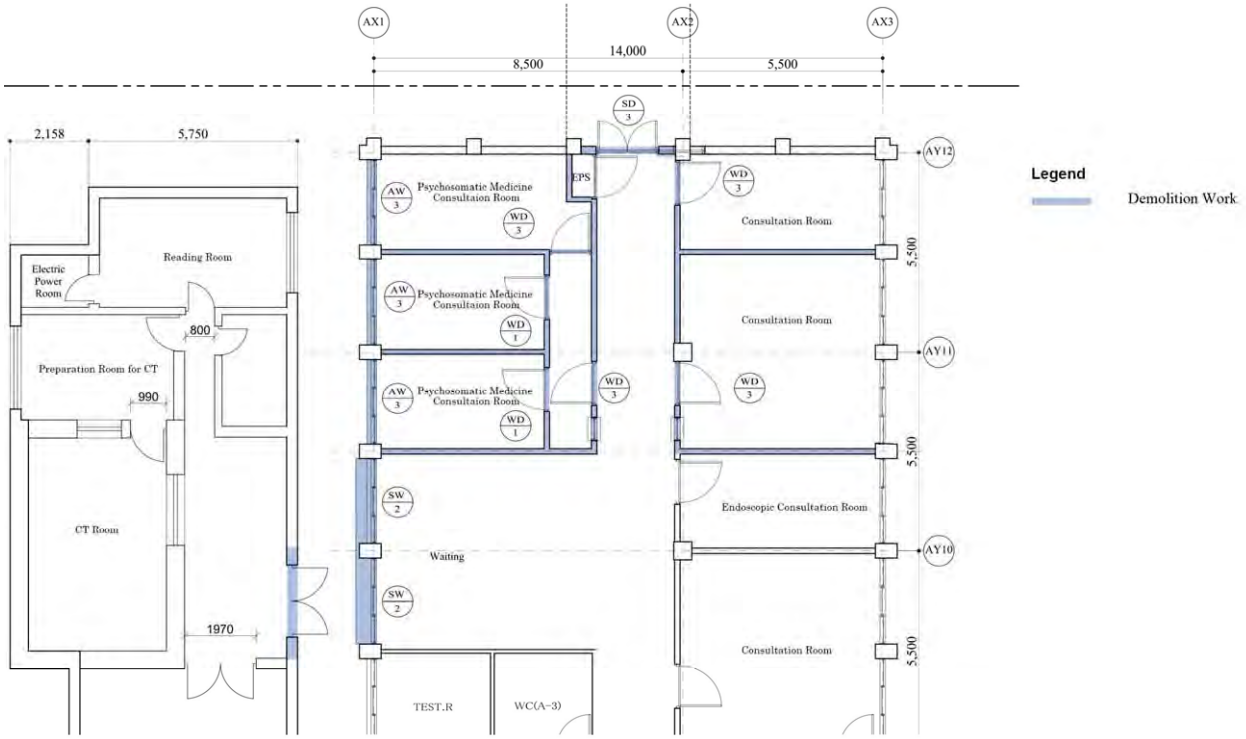


Figure 2-2a Area for New MRI Room before Rehabilitation

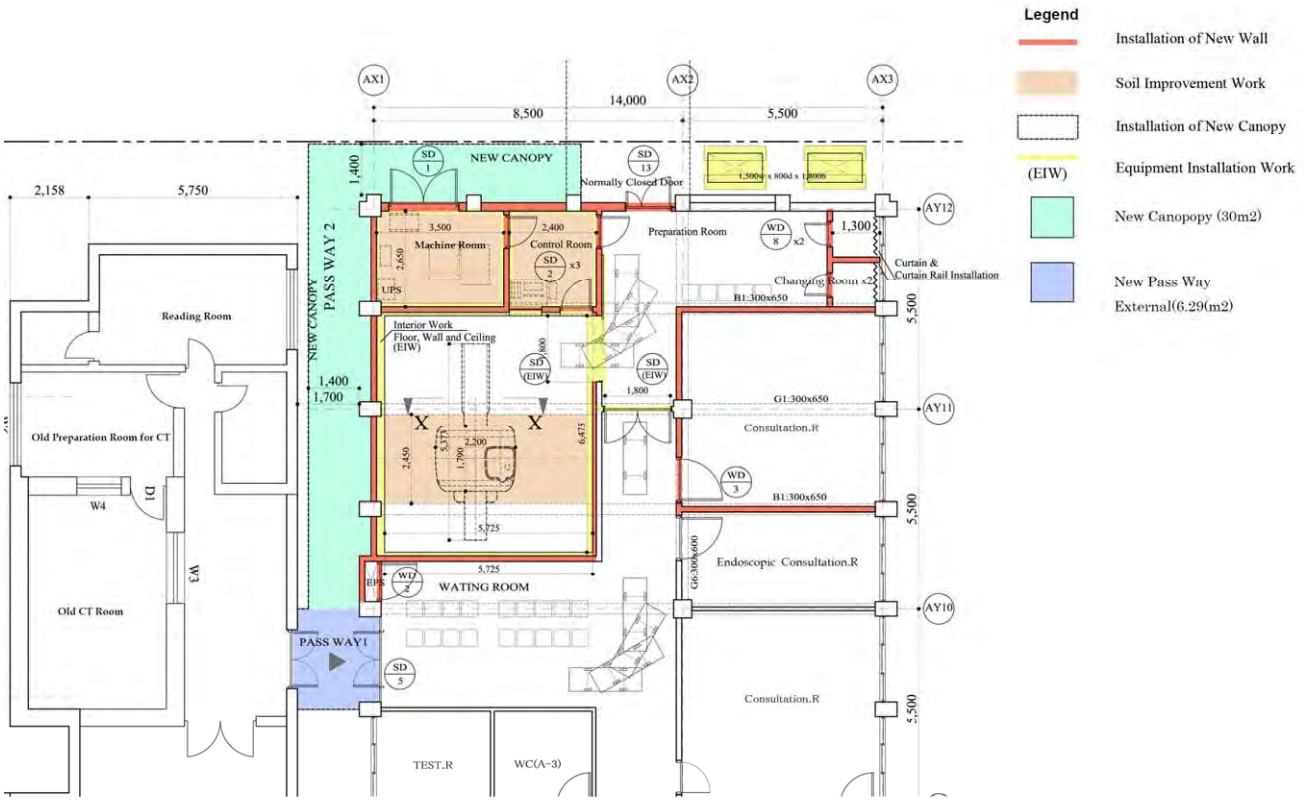


Figure 2-2b Area for New MRI Room after Rehabilitation

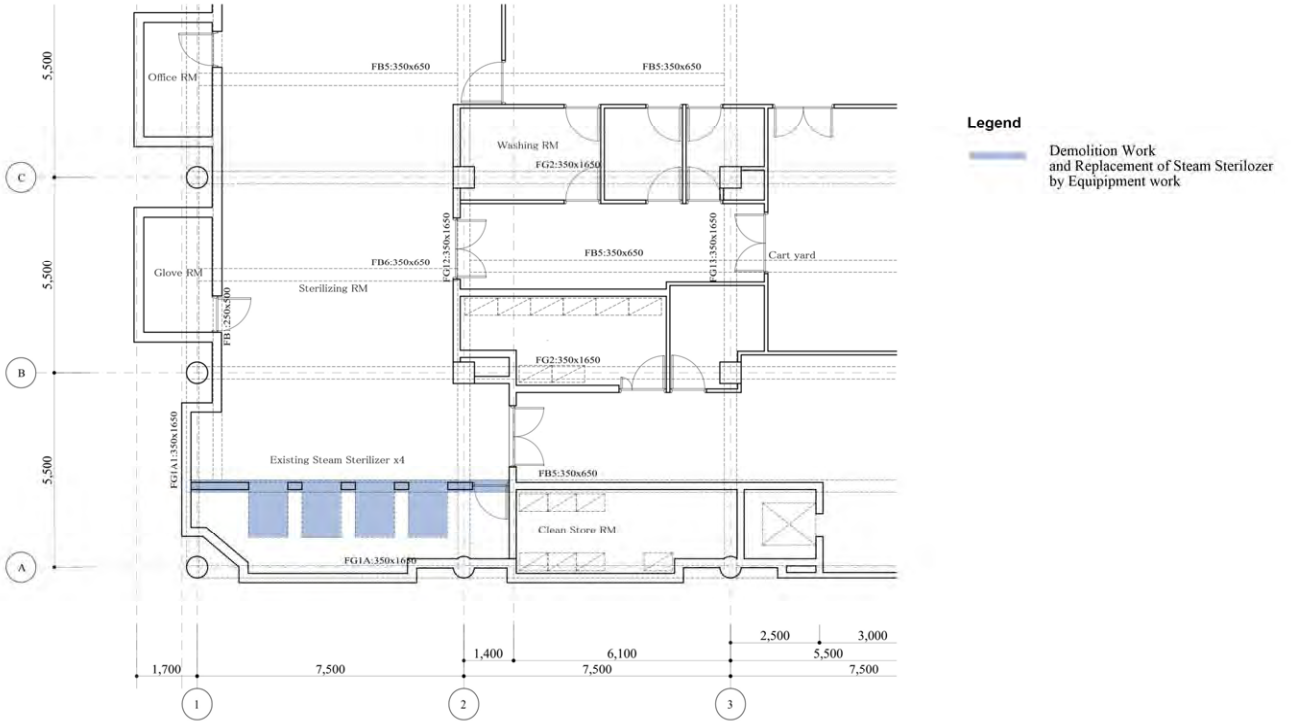


Figure 2-3a Area of Floor Reinforcement of CSSD before Rehabilitation

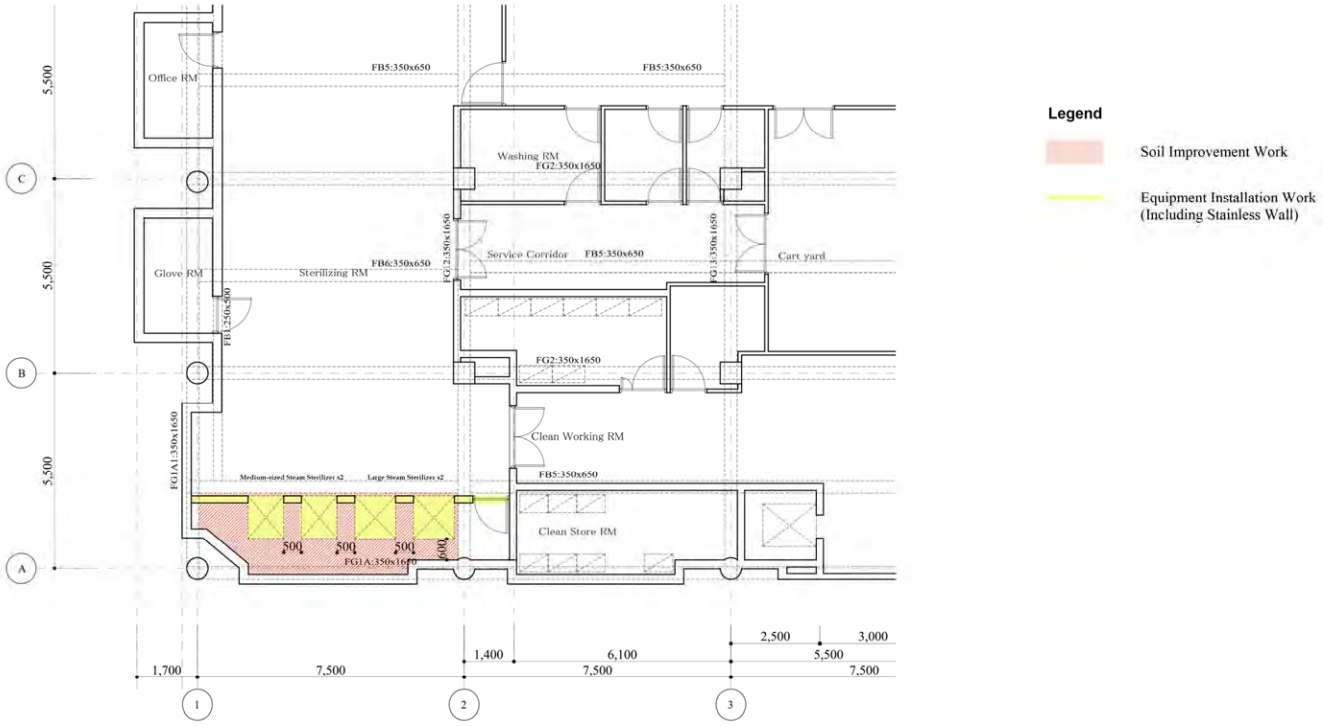


Figure 2-3b Area of Floor Reinforcement of CSSD after Rehabilitation

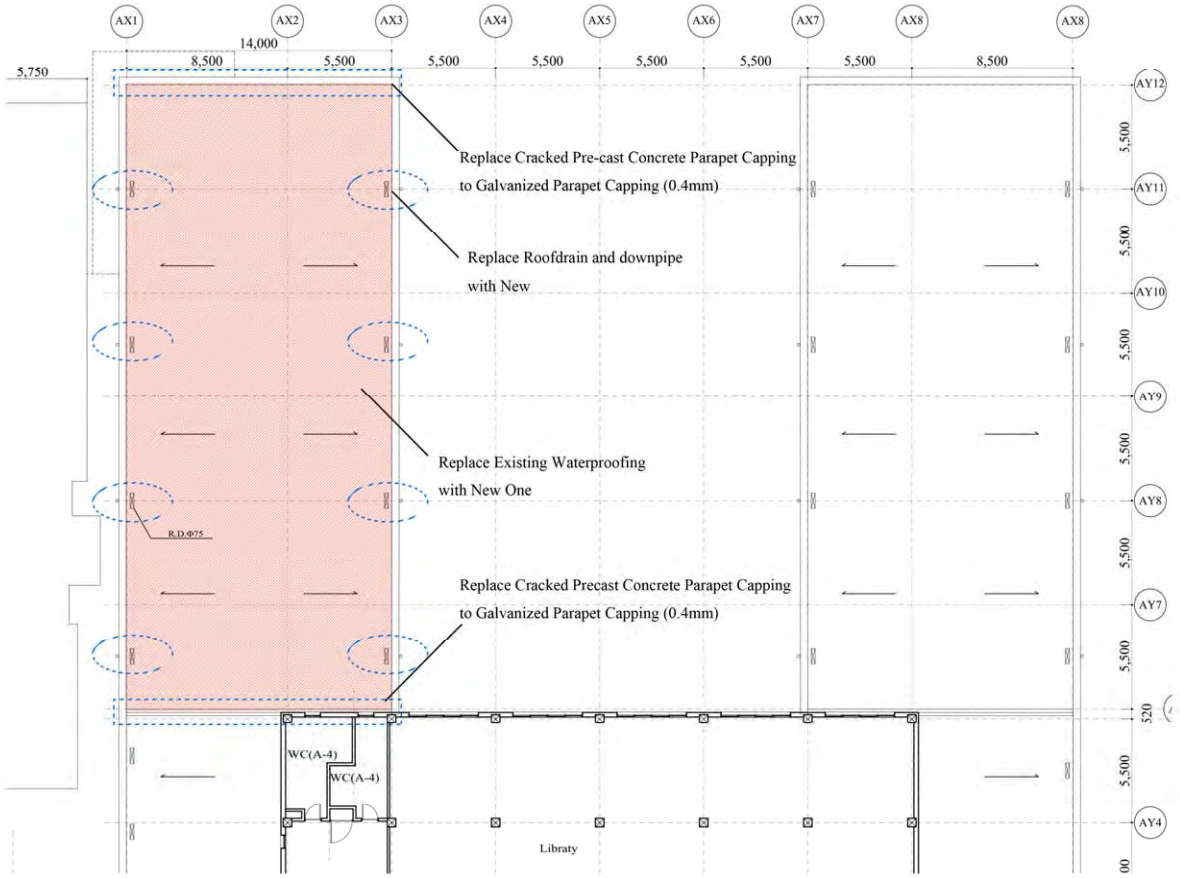


Figure 2-4 Roof Waterproofing of Block A

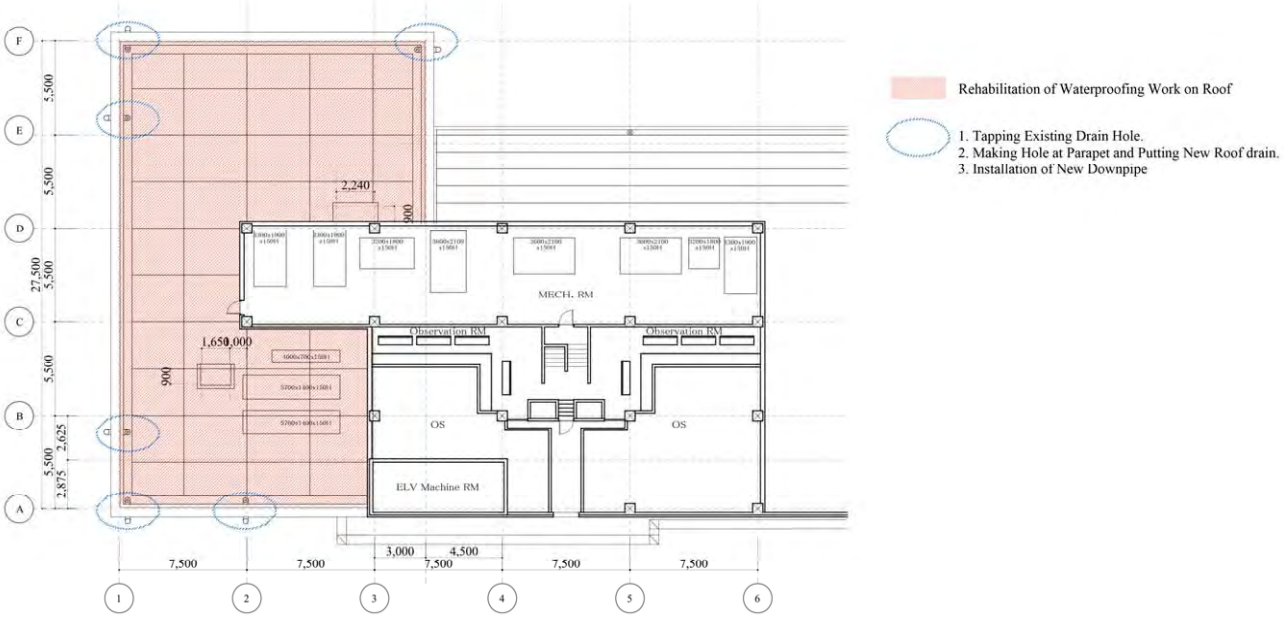


Figure 2-5 Roof Waterproofing of Annex 3 (above ICU)

2－2－4　Implementation Plan

2－2－4－1　Implementation Policy

(1) Basic Points for Project Implementation

The Project shall be carried out within the framework of Japan's Grant Aid cooperation. Thus, after the Government of Japan approves the Project at a Cabinet meeting, the Governments of Japan and Nepal shall sign an Exchange of Notes (E/N), and the Government of Nepal and JICA shall sign a Grant Agreement (G/A). Then, the executing agency at the Nepalese side shall conclude a consultancy agreement with the Consultant in charge of the project implementation, and a supplier's contract with the Supplier that is a Japanese corporate body. The Consultant shall obtain JICA's verification for the Consultant Agreement, and commence Detail Design, duties for the tender, and supervision of the Project implementation. The Supplier shall obtain JICA's verification for the Supplier's Contract before actually procuring the equipment.

The Project shall contain a facility rehabilitation plan and supervision of the implementation of maintenance contracts for some of the equipment, so the following matters shall be taken into account when the project implementation is supervised.

(i) To avoid interference with one another, the Nepalese executing agency, the Consultant and supplier shall consider the implementation schedule, define the works to be carried out by the Japanese and Nepalese sides, set out the starting time of each stage and adjust the completion time.

(ii) To avoid delay in the whole implementation schedule, the Consultant shall send one facility rehabilitation supervisor a few times to the project site to oversee its progress. The rehabilitation works are planned to be done by a local contractor under the supervision of the Japanese supplier; the rehabilitation applies to the rooms where medical equipment such as the MRI (1.5T) is to be delivered and installed, and it is critical to manage the rehabilitation progress.

(iii) To allow the target hospital to operate and engage in healthcare activities while the Project is in progress, the delivery and installation of the planned equipment, and initial operation training shall be completed within a short period of about one month, and thus multiple installation teams shall be organized. Especially, it shall be made obligatory in the tender documents that the Supplier must study the target facility at least one month before the commencement of the delivery to make sure the route of delivery and installation site of the equipment to be procured.

(iv) To ensure basic operation and appropriate maintenance of the planned equipment, multiple engineers shall be sent to Nepal from Japan or third countries to provide operating engineers of the target facility with initial operation training of the supplier.

(v) As some pieces of the planned equipment accompany manufacturers' three-year maintenance contracts, the Consultant shall be sent once a year for three years to confirm if such maintenance contracts are effectively performed.

(2) Project Implementation System

The Project shall be carried out by the following four parties.

(i) The Nepalese executing agency

The responsible agency for the Project shall be the Ministry of Education (hereinafter referred to as "MoE") of Nepal, while the executing agency shall be Tribhuvan University Teaching Hospital (TUTH).

(ii) The Consultant

The Project shall be carried out as Japan's Grant Aid project. As regulated by the grant aid cooperation scheme, a Japanese consultant shall conclude a consultancy agreement with the Nepalese executing agency. Based on the agreement, the Consultant shall provide guidance, advice and coordination services and perform duties necessary for the smooth implementation of the Project in a fair manner throughout the entire stages of the Project including tendering and procurement.

(iii) The Supplier and Local Constructor

According to the grant aid cooperation scheme, a Japanese trading company selected through the tender process shall procure the equipment. The Supplier is required to arrange facility rehabilitation works prior to the delivery of the equipment under an agreement with a local constructor.

(iv) Japan International Cooperation Agency (JICA)

JICA shall conclude a G/A with the Nepalese executing agency and supervise the project implementation to ensure that it will be appropriately carried out under the grant aid cooperation scheme. JICA shall consult with the executing agency if necessary, and facilitate the project implementation.

2－2－4－2　Implementation Conditions

(1) Local Situations and Regional Characteristics

1) Medical equipment dealer

In Kathmandu, the capital city of Nepal, there are local agents of medical equipment manufacturers of Japan and Europe, which deal with equipment planned under the Project as well as spare parts and consumables. It is also possible to locally obtain maintenance services under maintenance contracts. These agencies have experiences of repairing large diagnostic

imaging units, such as MRI (0.3T), 128-slice CT scanner[20] and angiographic imaging device, and medical equipment used in operation theaters and ICU.

If no local agent of medical equipment manufacturer deals with the particular medical equipment, spare parts or consumables, these can be procured from manufacturers that have local agents in neighboring India. In this case, medical equipment dealers in Nepal offer maintenance services under maintenance contracts with the supervision of local agents in India.

Therefore, maintenance of the planned equipment can be fully available by utilizing local knowledge.

2) Local Constructor

In Kathmandu, where the target facility is located, there are many constructors with extensive experience of low-rise RC buildings. As the facility rehabilitation works under the Project use local construction methods, and locally procurable materials and equipment, it will be possible to use these constructors for the rehabilitation works.

(2) Notes on Procurement of the Equipment

As the Project intends to procure/provide equipment and rehabilitate facilities, procurement is expected to take about 13 months after the conclusion of the E/N and G/A. This period shall include the tendering process to select a supplier and the period up to the delivery of the planned medical equipment. The following matters shall be taken into account to avoid any delay of the schedule.

- To avoid interference with healthcare services and other ordinary operations of TUTH, personnel of TUTH concerned, the Consultant and the Supplier shall fully discuss the schedule, procedures and arrangements for the delivery and installation of the equipment before planning the schedule. They shall regularly hold meetings to manage the schedule.
- The Supplier shall study TUTH at least one month ahead of the commencement of facility rehabilitation and delivery of the Equipment; confirm the delivery routes, places to store the Equipment, scheduled installation places, the conditions of electricity, water supply and drainage, and other conditions; and prepare a timetable for the delivery/installation of the equipment.
- Installation of MRI (1.5T) shall involve transfer and rehabilitation of the present outpatient rooms of Department of Psychiatry. Thus, the parties in charge of the installation, transfer and rehabilitation shall fully discuss with TUTH personnel in charge of facility management and take due consideration to avoid interference with the

[20] CT is an abbreviation of computed tomography. CT scanner refers to X-ray computerized transverse axial tomography.

operation of the hospital.

(3) Notes on Facility Rehabilitation

1) Safety Control

The facility rehabilitation works under the Project involves high-place works such as waterproofing work, though these works are all small-scale. Tenderers of the Project shall be required to prepare a safety control plan and a safety implementation plan in compliance with the “The Guidance for the Management of Safety for Construction Works in Japanese ODA Projects” published by JICA.

2) Removal Work of Asbestos-containing Material

Currently, asbestos tiles are used in the Department of Psychiatry (the room where MRI is scheduled to be installed) in Block A, and need to be removed when the work to reinforce the floor structure. Extreme care shall be taken when asbestos is handled to secure the safety of workers, hospital staff, outpatients and any other people nearby.

On December 22, 2014, Nepal’s Ministry of Science, Technology and Environment published a notice (No. 305, Chapter 64) to ban the import, sale distribution and use of all asbestos and asbestos-containing materials. However, no particular safety control measure has been set out for removal work.

Thus, a particular specification shall be created for the removal work of asbestos-containing material in compliance with the “Standard Specifications of Rehabilitation Work of Public Buildings” supervised by Japan’s Ministry of Land, Infrastructure, Transport and Tourism.

3) Material anti-theft measure

Materials and equipment to be used for the facility rehabilitation and waterproofing works shall be kept in temporary enclosure at one place within the premises. As an anti-theft measure, this storage place shall be under 24-hour security under coordination among personnel of TUTH concerned, the Consultant and local constructor.

2－2－4－3　Scope of Works

The Project shall be implemented through Japan’s Grant Aid cooperation scheme under the mutual cooperation between Japan and Nepal. The Japanese and Nepalese sides have discussed obligations of both parties in the procurement/installation of the Equipment and facility rehabilitation. These matters are summarized as follows.

(1) Obligations of the Japanese Side

The Japanese side shall perform the following duties involved in consulting, facility rehabilitation and procurement/installation of the equipment.

1) Consulting services

- Creation of technical specifications of the planned equipment, detailed design documents for facility rehabilitation and tender requirements
- Assistance for works related to selection and contract conclusion with the Supplier
- Supervisory work related to rehabilitation work, delivery/installation of the equipment, initial operation training, maintenance and technical assistance (soft component)

2) Work related to procurement/installation of the Equipment and facility rehabilitation

- Rehabilitation and floor reinforcement of the MRI room and CSSD
- Waterproofing work of Block A and Annex 3
- Procurement and transport of the Equipment
- Delivery, setting/installation, testing, commissioning and initial operation training of the Equipment
- Soft component for thorough understanding of maintenance and operation skills for the Equipment to be procured

(2) Obligations of the Nepalese Side

1) Target facility

- Removal of the existing equipment which is scheduled to be replaced with new ones under the Project
- Transfer of the outpatient room of Department of Psychiatry to an existing building
- Securing of a place to store materials and equipment
- Appropriate use and maintenance of the Equipment to be procured and rehabilitated facility
- Procurement, etc. of spare parts and consumables to utilize the Equipment to be procured

2) Regarding Procedures taken during the Project Implementation

- Payment of fees for banking arrangement (B/A), authorization to pay (A/P) and payments arising from the contract value
- Exemption/Refund from customs duty on import materials and equipment, and related procedures
- Exemption/Refund from domestic tax on service procurement, and related procedures
- Prompt arrangement for inland transport of materials and equipment
- Provision of convenience for the entry and stay of Japanese in Nepal

- All the necessary expenses other than those to be borne by the Japanese side

3) Procedure of Tax Exemption/Refund

In the context of Nepal, exemption and refund of taxes and levies are applicable to equipment and services of maintenance contracts as well as of facility rehabilitation work when they are all procured under Japan's Grant Aid scheme. Exemption of taxes and levies is applicable when the above products and services are procured outside of Nepal; tax refunds are applicable when these are procured domestically in Nepal. In order to advance the procedure smoothly, the Japanese side is required to prepare a list of equipment and rehabilitation work and a list of maintenance contracts as a Master List to be attached to the G/A. Furthermore, the exemption and/or refund should be mentioned in the G/A text. At the same time, the Nepalese side is required to cooperate closely with each related authority in order to make the procedures advance smoothly.

i. Medical Equipment

The procedure for exemption and refund of taxes and levies requires firstly TUTH to submit the Master List to the MoE and the MoHP in order to get it examined/approved by them. Then, the approval is passed to the International Economic Cooperation and Coordination Division (IECCD) and the Revenue Management Division (RMD) of the Ministry of Finance for issuance of permits of tax exemptions and refunds.

When the supplier applies for the exemption and refund of taxes and levies to the Nepal customs office, the documents listed below are required to attach to the above permits:

- For the medical equipment procured outside of Nepal – the invoice for the equipment and a certificate issued by TUTH that states these are to be set/installed and utilized at TUTH shall be attached to the permit of tax and levies exemption;
- For the medical equipment procured domestically in Nepal – the receipts of the equipment and a certificate issued by TUTH that states these are to be set/installed and utilized at TUTH shall be attached to the of tax refund permit.

The exemption and refund of taxes and levies will be realized when customs approve the application. In addition, customs and import duties and sales tax are subject to the procedure of exemption when the medical equipment is procured in Japan and third countries other than Nepal; sales tax onthe medical equipment procured domestically in Nepal is subject to the refund procedure.

ii. Provision of Maintenance Services

Three-year comprehensive maintenance contracts (CMC) or annual maintenance contracts (AMC) applied to advanced medical equipment to be procured under the Project are

positioned as a type of service provision under Japan's Grant Aid scheme. Since the maintenance services are to be procured and conducted within Nepal, sales taxes of the above CMCs and AMCs are, therefore, subject to the refund procedure.

In addition to the Master List, the supplier is required to prepare a certificate issued by TUTH that states thatthe maintenance services are provided at TUTH and the invoices or receipts of the fees for maintenance contracts; the above documents are then submitted to the Inland Revenue Division (IRD) of the Ministry of Finance. The refund will be disbursed after IRD approval. The application deadline of the sales tax refund procedure is within three years of the date of issuance of the invoice/receipt of the maintenance contract fees.

iii. Services of facility rehabilitation works

Facility rehabilitation works, floor reinforcement and waterproofing which are planned under the Project are positioned as a type of service provision under Japan's Grant Aid scheme. Since those services are to be procured and conducted within Nepal, the sales taxes of the above services are, therefore, subject to the refund procedure. In addition to the Master List, the supplier is required to prepare a certificate issued by TUTH that states that the facility rehabilitation services are provided at TUTH as are the invoices or receipts of the work fees; the above documents are then submitted to the IRD. The refund will be disbursed after IRD approval.

2－2－4－4　Consultant Supervision

(1) Policy for Supervision of Procurement and Construction

The Consultant shall fully take into account Japan's Grant Aid cooperation scheme, and objectives and contents of the detailed design, and perform its duties throughout the Project, ranging from the Detail Design, activities related to the tender, and supervision of equipment procurement and facility rehabilitation to the delivery to the executing agency. For supervision of the project implementation, the Consultant shall smoothly and accurately contact and report to personnel in charge at relevant organizations in both countries, and seek to ensure that the equipment procurement and facility rehabilitation will be completed without any delay, but with the predetermined quality.

(2) System of Procurement Supervision, and Contents of Work

To manage the progress of the entire Project and supervise the procurement of the Equipment, the Procurement Supervisor, Resident Procurement Supervisor and Inspection Engineer shall organize a supervisory system, each of whom shall perform the following duties.

1) Procurement Supervisor (Japanese): 1 person

- Procurement Supervisor shall visit Nepal three times to manage the progress of the entire Project and supervise, from Japan, the overall schedule of procurement and construction work.
- Procurement Supervisor shall visit TUTH after the Supplier is determined but before commencement of the rehabilitation work; report on detailed arrangements of the equipment to be procured and facilities, facility rehabilitation and waterproofing work to personnel in charge at TUTH with the presentation of drawings of the rehabilitation work; and obtain their approval. In this process, Procurement Supervisor shall carefully adjust the timing of commencing the rehabilitation by considering the timing of the delivery/installation of the equipment.
- Procurement Supervisor shall hold briefings with personnel concerned at TUTH and on-site personnel of the Supplier in charge of the facility rehabilitation to determine the timing of completing the facility rehabilitation and waterproofing work and the timing of staring the delivery/installation of the equipment. Procurement Supervisor shall also confirm the progress of works undertaken by the Nepalese side to appropriately adjust the timing of the delivery of the equipment.
- Procurement Supervisor shall confirm the documents of delivery and final inspection, sign the documents and prepare documents on the Project completion to obtain the approval of the relevant party on the Nepalese side.

2) Resident Procurement Supervisor (Japanese): 1 person

- Resident Procurement Supervisor shall be sent to Nepal once in time with the arrival of the Equipment at the target facility.
- Resident Procurement Supervisor shall confirm acceptance of the Equipment by the target facility, the Equipment delivered, and the entire installation work including numerical inspections of the Equipment; and supervise initial operation training and works involved in the delivery.

3) Inspection Engineer (Japanese): 1 person

- Inspection Engineer shall be sent to Nepal three times for the following purposes.
- Of all the Equipment to be procured, the MRI (1.5T), the Digital Mammograph, the C-arm X-ray Machine, large and medium-sized High-pressure Steam Sterilizers, and the Immunohistochemical Stainer shall be provided with comprehensive maintenance contract (CMC) or annual maintenance contracts (AMC). Inspection Engineer shall be sent to Nepal each year to confirm the state of maintenance service provision to the above equipment before the expiry of the warranty periods of their manufacturers. If any

defect is found, Inspection Engineer shall instruct the manufacturers or the Supplier to perform maintenance services.

- For equipment procurement, Inspection Engineer shall be present at various inspections including confirmation of drawings, and act as a liaison to contribute to ensuring the quality and work schedule without delay.

(3) System of Construction Supervision for Facility Rehabilitation, and Contents of Work

The Project involves rehabilitation of exhausted/aged facilities of TUTH, such as waterproofing, and rehabilitation and floor reinforcement of the MRI room. In particular, the rehabilitation work for the MRI room includes highly advanced works such as shield work. Thus, for smooth delivery and installation of the equipment, the Consultant shall send a Construction Supervisor to Nepal especially for the rehabilitation work intermittently for two times. The supervisor shall be responsible for coordination of individual works, delivery inspection, supervision of operation training and other duties. For the waterproofing work, it may be desirable for the Supplier to send personnel to supervise the work.

2－2－4－5　Quality Control Plan

(1) The Equipment to be procured

The Project shall procure medical equipment that confirms to JIS, CE, FDA or TUV. The equipment must be manufactured at factories that meet ISO13485, a quality control management standard for medical equipment, or factories that comply with GMP[21], GQP[22] or other standards set forth under the Pharmaceutical Affairs Act, if the equipment is Japanese product. Together with these standards, local agents shall be selected in comprehensive consideration of sales performance to public medical facilities, stock of spare parts and consumables, the number of well-trained service engineers and other factors.

(2) Materials and Equipment for Rehabilitation Work

The following matters shall be taken into account to secure and confirm the quality of materials and equipment to be procured by the Supplier.

(i) Pre-shipment inspections shall be conducted on major materials and equipment. Temporary storage for materials and equipment before they are delivered to the final destinations on site shall be confirmed. The storage shall be a place unaffected by rainfall and sunlight, and containers shall be used to prevent deterioration of the products.

(ii) The parties concerned shall ensure that the facility rehabilitation work will be thoroughly reported to avoid any discrepancy from the designed specifications.

[21] Good Manufacturing Practice.
[22] Good Quality Practice.

2－2－4－6　Procurement Plan

(1) Country of Origin of the Equipment

The Equipment shall be procured principally in Japan or Nepal. However, some of the equipment shall be procured in third countries, if they fall under any of the following five conditions:

(i) Equipment which is not manufactured in Japan.
(ii) Equipment is manufactured in Japan, but competition in the tender will not be effective if the country of origin is confined to Japan, and thus it is highly unlikely to be able to secure a faire tender process.
(iii) Equipment which is considerably expensive because of the transport or other costs if the country of origin is confined to Japan, and thus has no economic rationality.
(iv) Equipment which has to be procured urgently, or there are any other unavoidable reasons.
(v) There is no manufacturer's local agent of the equipment in Nepal or neighboring India, and it will be impossible to appropriately and continuously maintain them.

(2) Countries to procure Spare Parts

Spare parts made in Japan and third countries shall be procured, for which sales agents are available in Nepal, and which can be regularly and easily procured in the market in Nepal. If there is no local agent in Nepal, spare parts of manufacturers which have agencies in India shall be procured.

(3) Transport of the Equipment

Products procured outside Nepal shall clear customs at the Port of Kolkata, India, and be transported by land. For air delivery, products shall be sent to the Kolkata Airport, India, or the Tribhuvan International Airport before the travel by land to the target facility, TUTH.

(4) Materials of the Main Architectural Structure

The quality of the architectural structure required under the Project shall be attainable with cement and reinforcing bars made in Nepal. The materials made in Nepal and India are both distributed in Nepal. The standard of Nepalese-made reinforcing bars is TMT, Fe-500. There are two fresh-concrete plants near Kathmandu, both of which satisfy Japan's standard (JIS5308A) of the delivery time, within 90 minutes. Concrete blocks are also manufactured in the country.

(5) Waterproofing Materials and Work Method

In Nepal, asphalt and urethane coating are used for waterproofing of most buildings and residential houses. Caulking, a necessary process of waterproofing work, is also common, but urethane spraying is not used in the country, though it is beginning to be common at

rehabilitation sites in Japan. Waterproofing materials shall be procured basically in Nepal, but all of them are imports.

Table 2-10 Waterproofing Methods and Materials

Part	Method adopted	Remarks
Roof	Roof asphalt waterproofing, urethane thermal insulation material covered by protection mortar	This is common as a local method.
Eave	Steel structure: roof material: Galvalume coated steel sheet	A local method is available. Care must be taken for welding.
Exterior wall	Face brick masonry Unfaced concrete + mortar + painting	This is common as a local method.
Interior wall	Mortar and painting	This is common as a local method.
	Copper foil (for MRI shield)	Imports (from Japan, etc.)
Floor	Terrazzo	This is common as a local method.
Ceiling	Rock wool sound absorbing board Faced plasterboard Rock wool sound absorbing board Perlite mortar	Imports (from India, etc.)
Fitting, etc.	General glass	Imports (from India, etc.)
	Electromagnetic shielding glass Radiation shielding lead glass	Imports (from Japan, etc.)

Table 2-11 Classification of Materials to be Procured

Work category	Material/equipment	Source country			Remarks
		Nepal	Japan	Third country	
Rehabilitation of Block A GF MRI room, machine room, preparation room, operation room, etc. Rehabilitation of Annex 3 Central sterilization room	Cement	○			Nepalese product is available.
	Aggregate (fine and coarse), cobble	○			To be procured from quarry operators near Kathmandu
	Cement-based solidification material	○		○	To be procured from India
	Cement admixture	○			
	Fresh concrete	○			There are 2 concrete plants in Kathmandu and another one just outside.
	Reinforcing bar	○			Up to 32mm in diameter
	Materials for timbering and scaffolding	○			Imports. It is possible to procure them in Nepal.
	Fitting	○	○		IT is possible to procure them locally. Special fittings for the MRI room shall be procured in Japan.
Roof waterproofing work	Asphalt waterproofing material	○			
Electric work	Lighting fixture (LED fluorescent lamp, etc.)	○			
	Wiring appliance	○			
	Electronic materials	○			
	Hand-hole				
Machinery work	Sanitary ware	○			
	Water supply and drainage pipe	○			

2－2－4－7　Initial Training, Operational Training

For setting of the Equipment and installation work, the Supplier shall make arrangements to send engineers to the target facility through manufacturers of the medical equipment or their local agents, and the engineers shall conduct initial training (including guidance on maintenance) on the Equipment. The Project shall include no operational guidance other than guidance on operation skills of MRI (1.5T) through the technical assistance (soft component).

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

The Project shall provide the soft component for the use and maintenance of the equipment to the end-users such as medical doctors, nurses, engineers, BME and other maintenance staff of TUTH so that the Equipment will be smoothly and continuously operated. The soft component plan is summarized as follows.

(i) The end-users who routinely use medical equipment shall use “designated equipment cards” for through routine inspections and preventive maintenance. The equipment cards shall be designed to be simple so that end-users can simply record the operation times per day, presence of any defect, descriptions of defect (if any), and necessity of repair request.

(ii) Technical transfer and recommendations on maintenance contract shall be made so that appropriate maintenance conditions can be selected for the target facility.

(iii) Training shall be conducted by expert engineers on MRI operating skills, creation and analyses of diagnostic images, data analysis and management, routine inspections and safety control.

The soft component consists of two sessions. The first session shall be conducted immediately after the delivery of the Equipment, and the second session 11 months after the first session. The sessions will continue for about one month each, a total of two months.

The timing of the first session has been determined on the grounds that trainees will have just received initial and ordinary operation training from the Supplier. The training under the soft component is likely to be more effective if it is conducted immediately after they have gained certain knowledge about the equipment.

The second session shall be conducted about 11 months after the delivery on the assumption that trainees will have dealt with some diseases and repair and thus have got used to the equipment by then. It is also a good timing to see if they have smoothly procured consumables, so that it will be possible to see if they have appropriately used the equipment.

2－2－4－9　Implementation Schedule

This Project, if it is to be carried out as a grant aid project of the Government of Japan,

shall follow the procedures given below after the signing and conclusion of an E/N and G/A.

(1) Detail Design and Tender (5.5 months)

The Consultant shall conclude a consultancy agreement with the Nepalese executing agency and create tender documents (including technical specifications of the Equipment and design documents on the facility rehabilitation) while fully taking objectives and contents of the Detail Design into account. Based on these, the Consultant shall conduct a calculation of the Detail Design and obtain an approval of JICA for the predetermined tender price. Accordingly, the Consultant shall discuss with the Nepalese executing agency and obtain its approval for the tender documents.

After the tender documents being approved, the Consultant shall act as a proxy of the executing agency to announce the tender to Japanese trading companies. Then, the preparation period of 60 days shall be given to participants, and the competitive tender shall be held in the witness of Nepalese and Japanese personnel concerned. The tenderer who offers the lowest price which is below the predetermined tender price and a proposal that is considered technically appropriate shall conclude a Supplier's Contract with the Nepalese executing agency.

(2) Supervision of Procurement and Facility Rehabilitation (7.0 months)

Following the conclusion of the Supplier's Contract, the Supplier and a local contractor in charge of construction management shall send their personnel to the target facility, TUTH, to commence equipment procurement and facility rehabilitation. The equipment installation and facility rehabilitation works shall be carried out while TUTH is in service as usual. Thus, the safety control of TUTH users, storage of materials and equipment, management of construction workers and constraints must be taken into account. At the same time, the efficiency of procurement and rehabilitation works by personnel of the Consultant and the Supplier from Japan must also be secured. Accordingly, a total of 7.0 months shall be allowed for the procurement and rehabilitation work. The equipment procurement and facility rehabilitation shall take the following procedures.

1) Equipment Procurement

The Supplier shall conduct product inspections and pre-shipment inspections at factories, and witness pre-shipment inspections by an inspection agency assigned by the Consultant to secure the quality of the equipment. The Consultant shall supervise these inspections. The equipment shall be shipped from Japan or third countries by the designated due dates. To meet the timing of arrival of the equipment at TUTH, personnel in charge of procurement management shall be sent to TUTH, and the installation work shall commence. Then, testing and commissioning shall be performed, and initial operation guidance shall be

provided to medical staff of TUTH who will actually operate the equipment. If assistance appears to be necessary from engineers of medical equipment manufacturers, the Supplier shall make arrangements. At the time of the delivery, the Consultant shall confirm a series of inspections and performance assurance for the procured equipment, and submit a completion certificate of to the Nepalese side.

2) Facility Rehabilitation

All the places subject to the facility rehabilitation under the Project are the location where the equipment shall be placed or installed. The facility rehabilitation requires no particular construction permit from the governmental authority of Nepal, but its efficiency is secured if the Consultant visits TUTH and performs one-off supervision. Therefore, about four months shall be allowed for the entire facility rehabilitation. Because the rehabilitation works must be completed before the arrival of the equipment, it shall commence about 1.5 months before the transport.

(3) Supervision of Technical Assistance (Soft Component) (12.5 months)

In the Project, the soft component shall be provided after the delivery and installation of the equipment, focusing on guidance on maintenance skills for the equipment, methods of selecting requirements to be included in maintenance contracts with manufacturers, and operation skills of MRI (1.5T). The soft component consists of two sessions. The first session shall be conducted immediately after the delivery of the equipment, and the second session 11 months after the first session. The sessions will continue for about one month each, a total of two months.

For the soft component, the Consultant shall select trainees, provide assistance to preparation of instruction guidance and coordinate duties involved.

As a summary of the above-mentioned procedures, the project implementation schedule is presented as follows. The total project term shall be 25.0 months.

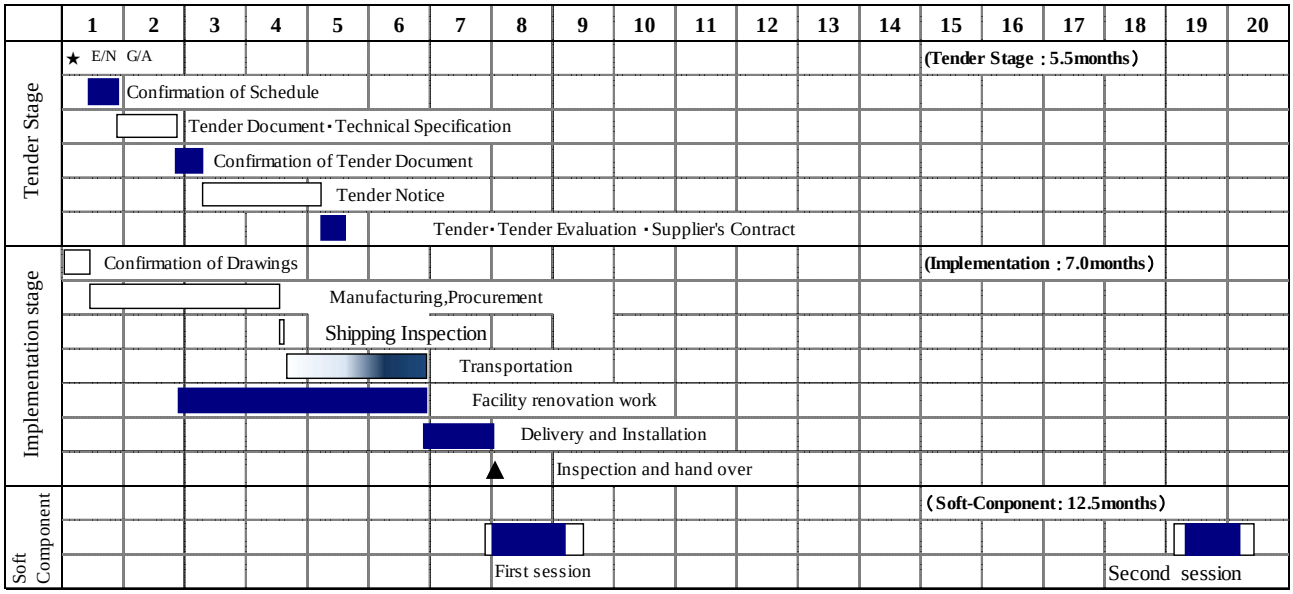


Figure 2-6 Implementation Schedule

Work in Nepal Work in Japan

2－3 Obligations of Recipient Country

The Nepalese side shall assume the following obligations involved in the project implementation.

i. To pay fees for Banking Arrangement (B/A) and Authorization to Pay (A/P).
ii. To provide a space within the premises of the target facility, TUTH, that will be used as an office during the project period.
iii. To remove existing equipment to be replaced with the equipment to be procured under the Project.
iv. To complete arrangements for necessary infrastructure (power outlets, circuit breaker, water supply and drainage, darkroom, etc.) before the installation of the equipment.
v. To carry out procedures for ministerial permits and approvals necessary for the rehabilitation works to prevent leakage of radiation at the location where MRI (1.5T) will be installed. It shall also secure place to transfer the existing department (Department of Psychiatry) which provides healthcare services currently at that location, and complete the transfer before the commencement of the rehabilitation works.
vi. To provide any convenience that facilitates the procedures for the landing, customs clearance, inland transport of materials and equipment to be imported for the Project.
vii. To secure routes to bring in materials and equipment, and provide safe space to provisionally store them.
viii. To arrange exemption from customs duties, value-added tax and other domestic taxes on the procurement of materials and equipment, labor and other goods and services involved in the Project.

ix. To provide any convenience necessary for Japanese and other people from third countries to stay in Nepal for the project implementation, and secure the security of these people.

x. To secure necessary budgets and personnel (medical staff, etc.) so that the Equipment and facility provided and rehabilitated under the grant aid project will be appropriately and effectively utilized and maintained. It shall conclude maintenance contracts with local agents of the medical equipment that particularly requires special skills for maintenance.

xi. To regularly report to the Government of Japan on the state of use and maintenance of the equipment and facility to be provided and rehabilitated under the grant aid project.

xii. To bear all the necessary expenses other than those covered by the grant aid project.

Of the obligations above, works to be carried out by the recipient country are listed in the following table.

Table 2-12 Obligations of the Recipient Country

Equipment	Overview of obligations	Deadline
MRI (1.5T)	Transfer of the existing clinical departments, Securing of the passageway to the MRI room	Two weeks before the commencement of the facility rehabilitation
Digital Mammograph	Removal of existing equipment	One month before introduction/installation of the equipment
High Pressure Steam Sterilizer, Large; High Pressure Steam Sterilizer, Medium	Removal of existing equipment	One month before introduction/installation of the equipment
Immunofluorescence Microscope with Teaching Head	Setting of black-out curtains on the windows, doors, etc., Installation of air conditioners	One month before installation of the equipment
Hand Washing Device	Removal of existing equipment	One month before installation of the equipment

Additionally, for the enhancement of the project effectiveness, it is strongly recommended that the facility rehabilitation mentioned below to be done by the Nepalese side even though they are not prerequisites of the project implementation. The cost for these rehabilitation works are estimated 15,600 thousand NPR.

- Repair of a lift of CSSD
- Rehabilitation of six pass ways of the hospital facility
- Repair of leak in the building of the Pediatric Department

2－4　Project Operation Plan

2－4－1　Operation and Maintenance System

TUTH shall operate and manage the equipment and facility to be provided under the Project. TUTH is a teaching hospital affiliated to the Institute of Medicine (IOM) of Tribhuvan

University and thus is under the control of the MoE. But as Nepal's top referral hospital, TUTH also engages in formulation of the country's healthcare policy, and receives funds from both the MoE and the MoHP. TUTH has a management committee comprising the executive director of TUTH, personnel of the MoHP, directors of Nepalese public hospitals and other persons. It also has a clinical division and a management division under the committee.

Staff of TUTH includes doctors who also teach at IOM, and nurses, a BME and administrative staff employed by TUTH itself. The following table summarizes the workforce of TUTH at the time of the field survey in 2015. To seek higher efficiency in recent years, TUTH outsources catering and cleaning services to contractors appointed for a term of several years through competitive tenders. TUTH basically intends to keep the current operation system to provide healthcare services and clinical education.

Table 2-13 TUTH's Staff Structure, as of September 2015

Staff of Clinical Departments		Administrative Departments	
Medical staff	Number	Staff	Number
Doctors (Total)	225	Administration Staff	92
Professional doctors	161	Executive Director	1
Radiologists	19	Directors	2
General Practitioners	20	Financial Officer, etc.	89
Pharmacists, etc.	25	Maintenance Staff (Incl. BME)	40
Nurses and Midwives	514		
Laboratory technicians	59	Others (Kitchen, Cleaning, etc.)	294
Physiotherapists	7		
Subtotal of Medical Staff	805	Subtotal of Admin. Depts.	426
Staff Number in Total at TUTH		**1,231**	

Source: TUTH

2－4－2 Method of Operation and Maintenance

The equipment and facilities to be procured and rehabilitated under the Project shall be utilized in the following manners. For items (i) and (ii), technical guidance shall be provided through the technical assistance (soft component) scheduled in the Project.

(i) Preventive maintenance through routine inspections

"Equipment cards" shall be created to record the operation times per day, presence of any defect, necessity of repair and other information about individual equipment, and the equipment shall be inspected once a day. This will help to prevent severe malfunction and failure.

(ii) Ensuring to conclude maintenance contracts

Sophisticated medical equipment including large-scale diagnostic imaging units needs maintenance by manufacturers' engineers. TUTH shall take the specifications, maintenance cost and other factors into account, and conclude comprehensive maintenance contracts

(CMC) or annual maintenance contracts (AMC) with local agents of the manufacturers.

(iii) Thoroughly conducting cleaning and inspection

Not only usual cleaning, but regular inspections and cleaning based on weekly and monthly schedules shall apply to the places subject to the rehabilitation works. This will help to minimize wear and tear on the rehabilitated facility.

2－5　Project Cost Estimation

2－5－1　Initial Cost Estimation

(1) Expenses to be borne by Nepal

The cost to be borne by the Nepalese side is estimated 464 thousand NPR as shown in the Table 2-14.

Table 2-14 Expenses to be covered by the Nepalese side

Item	Estimated expenses (thousand NPR)	JPY (thousand JPY)	Remarks
(i) Removal of existing equipment	100	116	High pressure steam sterilizers (4 units), etc.
(ii) Bank fee	364	423	Fees for A/P (0.05%)
Total	464	539	

(2) Cost Estimation Conditions

- Time of estimation　　: October, 2015
- Exchange Rate　: 1USD = 123.31 yen, 1NPR = 1.16 yen
- Procurement/construction period: As shown in the construction schedule
- Others: The Project shall be carried out under Japan' Grant Aid cooperation scheme.

2－5－2　Operation and Maintenance Cost

(1) Cost of Maintenance Contract

Among the planned equipment, the MRI (1.5T), the Digital Mammograph, and the C-arm X-ray Machine shall be procured with CMCs, and the large and medium-sized High Pressure Steam Sterilizers, and the Immunohistochemical Stainer with AMCs. The Project intends the conclusion of the CMCs or the AMCs for two years after the expiry of the manufacturers' warranty periods of these instruments, but the Nepalese side must conclude these CMCs or AMCs at its own expense for appropriate maintenance afterwards. The maintenance cost of the equipment is estimated at NPR 21,764 million per year.

Table 2-15 Estimated Annual Fees of Maintenance Contract

Contracts and Contents	Equipment	Q'ty	Annual Fees	
			Thousand NPR	Thousand JPY
Comprehensive Maintenance Contract Periodical checkups, On-call repair work, Free-charge spare part	MRI (1.5T)	1	15,815	18,346
	Digital Mammograph	1	3,426	3,975
	C-Arm X-ray Machine	2	750	870
Annual Maintenance Contract Periodical checkups, On-call repair work	High Pressure Steam Sterilizer, Medium	2	351	408
	High Pressure Steam Sterilizer, Large	2	421	489
	Immunohistochemical Stainer	1	1,001	1,161
Total (per year)			21,764	25,249

(2) Maintenance Cost

The annual cost of test reagents, consumables and spare parts necessary for appropriate maintenance of the equipment is estimated as follows[23]. On the other hand, maintenance of the equipment to replace existing ones has been already financed by the annual budget of TUTH. Thus, the additional maintenance cost resulting from the Project shall be only for consumables of the equipment to be newly procured, that is, NPR 9.705 million per year.

Table 2-16 Annual Maintenance Fee of the Equipment to be procured under the Project

Category	Equipment	Major Consumables	Maintenance Cost per Year	
			thousand NPR	thousand JPY
For Renewal Equipment	Digital Mammograph, C-Arm X-ray Machine	Films for Digital Printer, etc.	1,466	1,701
	High Pressure Steam Sterilizer (Large, Medium), Hand Washing Device, etc.	Recording paper, Ink cartridge, UV lamps, etc.	76	88
	Ventilator, Anaesthesia Machine, Patient Monitor, etc.	Catheter, Mask, Electrodes, etc.	5,764	6,686
For Newly-deploy Equipment	MRI (1.5T)	Films for Digital Printer, Contrast medium, Electricity charges, etc.	4,445	5,156
	Ultrasonograph (Observation, for ICU, Examination)	Recording paper, Gel, etc.	1,661	1,927
	Video Arthroscope Set, Video Bronchoscope Set	Xenon lamps, UV lamps, etc.	162	188
	Laparoscopic Set for Gynaecology, Laparoscopic Set for Gastrointestinal Surgery	Xenon lamps, etc.	110	128
	Immunohistochemical Stiner, Immunofluorescence Microscope with Teachiing Head	Reagent for staining, Xenon lamps, etc.	3,327	3,859
Total Maintenance Cost, Annual			17,011	19,733
Total Annual Maintenance Cost for Newly-deploy Equipment			9,705	11,258

[23] For this estimation, the electricity fee of MRI (1.5T) to be newly procured has been added to the maintenance cost. Other planned equipment are all replacements of existing ones, and their electricity fees have been ignored because they are already financed by the annual maintenance budget of TUTH and the electricity consumption is relatively small.

Assumptions for the cost estimation:

- No increase in the number of patients
- No price rise
- Consumables at the local market prices

(3) Estimated Cost of Operation and Maintenance

Based on the cost estimation made in the previous section, the increment in the annual operation and maintenance cost minimum necessary after the project implementation will be NPR 9705 for the first three years after the completion of the Project, and NPR 31.094 million in the fourth year and onwards as the cost of maintenance contracts is incurred. It appears, however, that the increment accounts for a small fraction of the overall revenue of TUTH.

The following table shows a trend in revenue of TUTH in the previous four years.

Table 2-17 TUTH's Income of the Past Four Fiscal Years

Unit: thousand NPR

FY / Items	FY2011/12	FY2012/13	FY2013/14	FY2014/15
Income				
Subsidy from MoE	82,087	95,783	141,749	214,678
Subsidy from MoHP	10,000	55,000	280,000	444,000
User charges on health care services	291,510	393,627	509,913	519,759
Others	20,011	22,272	13,685	268,007
Total	403,608	566,682	945,347	1,446,444
Percentage of income increase compared to the previous FY	N/A	40.40%	66.82%	53.01%

Source: TUTH

The revenue of TUTH has been on the increase of in the previous three fiscal years (FY2012/13, FY2013/14 and FY2014/15) by approximately 40 to 67%. The increase is attributable to a substantial increase in subsidies from the relevant ministries and an increase in medical treatment fees thanks to the introduction of sophisticated medical equipment such as an MRI (0.3T) and CT scanners. It is not certain if the budget of TUTH will be increased after the Project. Based on the revenue in FY2014/15, the operation and maintenance cost additionally incurred to TUTH after the project implementation will account for 0.67% of the revenue in the initial three years (NPR 9.705 million / NPR 1,446.444 million) and 2.14% in the fourth year and afterwards (NPR 31.094 million / NPR 1,446.444 million). Therefore, it appears that TUTH will have no particular problem in securing the budget for the operation and maintenance of the equipment.

Meanwhile, MRI (1.5T) to be procured under the Project will bring a higher medical treatment fee per visit and contribute to a financially more stable facility operation. According to

income and expenditure reports of TUTH, the revenue from medical treatments using MRI (0.3T) was NPR 36.68 million (approx. JPY 42.54 million) in FY2013/14, and NPR 30.93 million (approx. JPY 35.87 million) in FY2014/15. The expenses were incurred by imaging films, electricity and annual maintenance contract fees among other things, whose cost rate is estimated at 40% of the corresponding revenue. The instruments currently owned by TUTH are all common models with low processing capacity and have downtime several times a year because they are aged, but still raise revenue of NPR 12.37 – 14.67 million per year. These figures account for 22% and 27% of the maintenance cost of the facility – NPR 54.24 million (FY2013/14) and NPR 40.44 million (FY2014/15), respectively – and considerably contribute to the stable facility management.

MRI (1.5T) is expected to increase revenue further because it requires a shorter inspection time and thus a waiting time, can treat patients who have avoided waiting and gone to public medical facilities, and allows TUTH increase inspection fees because of its higher accuracy.

In the above consideration, the replacement of aged equipment and introduction of new equipment under the Project will improve healthcare services of the TUTH and increase further growth of revenue, and thus the financial sustainability will be secured.

CHAPTER 3
PROJECT EVALUATION

Chapter 3 Project Evaluation

3－1 Preconditions

For the implementation of the Project, Nepal shall carry out the work stipulated in *2-3 Obligations of Recipient Country* of Chapter 2 with appropriate timing during the Consultant's supervision of procurement and facility rehabilitation.

3－2 Necessary Inputs by Recipient Country

After its construction in the 1980s through Japan's Grant Aid, Tribhuvan University Teaching Hospital (TUTH) has provided healthcare services in response to patient demand as the top referral hospital in Nepal and has nurtured health human resources for about 30 years. The Project will replace the superannuated medical equipment as well as newly procure medical equipment for TUTH for reinforcement and improvement of the functions as the top referral hospital and as an institution for medical education. Hence the Project will contribute to enhance the quality and quantity of healthcare services as well as the practical training for medical staff in Nepal. For the achievement of the whole plan, the necessary inputs by the Nepalese side are listed as follows:

(1) To Ensure the Maintenance Cost

For the effective and harmonious utilization of the medical equipment to be procured under the Project, TUTH is required to ensure the maintenance contract fees with manufacturer's local agents and budget to purchase the necessary consumables for a part of the above equipment.

(2) To Continuously Deploy Medical Staff

Most of the medical equipment to be procured under the Project has been requested by doctors and co-medicals practicing medicine and providing practical training at TUTH; therefore, they know how to utilize the above equipment. For the improvement of quality and quantity of healthcare services by the effective and harmonious use of the equipment provided through the Project, TUTH needs to continuously employ the doctors and co-medicals to provide healthcare services as well as practical training also after the completion of the Project.

3－3 Important Assumptions

(1) Continuous Implementation of the Health Policy of Nepal

APTP and NHSP-2 clarify three points so that people in Nepal can equally access the healthcare services: provision of quality healthcare services, increase of health human resources and placing of medical equipment and medicine in accordance with the level of medical facilities. These plan and program are required to be continued since the Project contributes to the policies of GON.

(2) Continuous Supply of Fuel from India

Medical equipment to be procured under the Project is powered by electricity. Basically, all the facilities of TUTH are powered by electricity supplied by the Nepal Electricity Authority, but

during a power failure, diesel-powered generators kick-in to supply electricity to the facilities. Nepal imports from India fuels such as diesel oil, gasoline and gases. Once the supply stops, the hospital function and the provision of healthcare services will be destabilized and the situation will hinder Nepalese people from accessing healthcare services. In addition, such interruptions of the fuel supply can cause a situation where the procured equipment cannot be utilized effectively and smoothly; consequently, the quantity of healthcare provision will decrease and the achievement of the entire project plan will not be realized. Therefore, a continuous supply of fuel from neighboring India is necessary.

3－4　Project Evaluation

3－4－1　Relevance

From the viewpoints stated below, this Project is recognized as highly relevant to Nepal's overall goal of aiming to improve the healthcare services and quality of health human resources. Therefore, it is relevant to implement the Project under Japan's Grant Aid scheme.

(1) Beneficiaries of the Project

TUTH provides healthcare services as the top referral hospital in Nepal, and is a core teaching hospital to educate medical staff before and after graduation. In terms of the provision of healthcare services, the direct beneficiaries will be 500,000 outpatients and inpatients and indirect ones will be the whole Nepalese population of 28.17 million (2014). In terms of the practical education of medical staff, medical and nursing students as well as resident doctors who receive training at TUTH will be the beneficiaries.

Moreover, while providing healthcare services to patients, TUTH offers treatment and hospitalization for free of charge to the patients when they are admitted as the poor by TUTH[24]. This service will be continued after the completion of the Project.

Therefore, the entire project is expected to be highly beneficial to the people of Nepal.

(2) Role as the Top Referral Hospital

Even though TUTH is the top national referral hospital in Nepal, patients are faced with issues such as long waiting hours and lack of necessary tests mainly because of three reasons; rapid population increase due to urbanization that brought about an increase of outpatients every year, lack of medical equipment to meet patient demand, and functional deterioration of medical equipment for superannuation. Additionally, TUTH is a teaching hospital to provide practical training to medical staff before and after graduation, but there is a limit to the training given at TUTH because of the lack and superannuation of medical equipment.

The Project will enhance the quantity and quality of healthcare services that TUTH provides as the top national referral hospital through the replacement and new procurement of medical equipment. Further, the procurement of an MRI (1.5T), a Digital Mammograph, an

[24] 10 % of all the beds in TUTH can be offered for free to the poor patients.

Immunohistochemical Stainer, etc., will enable TUTH to deal with more cases of image diagnosis and pathological examination and to increase the opportunities for practical training for medical staff as a teaching hospital; the procurement is expected to ease congestion and to enhance the quality of practical training at TUTH. Additionally, considering TUTH's performance that about 300 surgeries including emergency cases were performed during just eight days after the Gorkha Earthquake, TUTH will also have a significant role as a medical hub in Nepal also in the future.

Therefore the enhancement of the quantity and quality of healthcare services provided by TUTH through the Project is very important in the improvement of healthcare services, training medical human resources and preparedness for future disasters in Nepal, and judged to be highly necessary.

(3) Consistency with Nepal's Health Sector Policy and Plan

The Project is consistent with Nepal's health sector policy and plan since it aims to improve and reinforce "the provision of quality healthcare services to the poor and vulnerable people in urban areas" which is targeted in APTP, Nepal's development plan, and in NHSP-2, the health sector plan.

(4) Consistency with Japan's Aid Policy

In Japan's regional development cooperation policy, "Aid towards basic human needs such as health, hygiene, education, etc." is clarified as a part of the development assistance to the South Asia region. Additionally, "Improvement of education and healthcare services" is one of the development issues among "Poverty reduction in rural areas" in Japan's Country Aid Policy to Nepal.

The purpose of the Project is to enhance the quantity and quality of healthcare services provided by TUTH through replacement of medical equipment that decreased in functionality because of age and new procurement of medical equipment to meet the demand of healthcare services. Therefore, the Project can be judged to be consistent with Japan's aid policy to Nepal.

3－4－2　Effectiveness

Nepal's overall project is recognized as effective since the implementation of the Project can be expected to realize the quantitative and qualitative effects as stated below:

(1) Quantitative Effects

In order to evaluate quantitatively the improvement of healthcare services provided by TUTH after completion of the Project, quantitative indicators are to be set under the Project.

Table 3-1 Quantitative Indicator

Indicators	Baseline (Actual value in 2015)	Target (2020, 3 years after project completion)
1) Number of examination conducted with MRI (1.5T) per year (tests/year)	0	960
2) Number of examination conducted with Digital Mammograph per year (tests/year)	0	720
3) Number of examination conducted with Ultrsonograph per year (tests/year)	3,500	4,000
4) Duration of pathological diagnosis by using Immunohistochemical Stainer (days/until diagnosis)	14	5

Source: Survey Team

Basis of calculation of each indicator is shown below:

Indicator 1) Number of examination conducted with MRI (1.5T) per year (tests/year)

Procurement of an MRI with higher specifications than the existing one will enable TUTH to diagnose new diseases and realize higher-accuracy diagnosis than before.

TUTH has an MRI (0.3T), the magnetic field strength of which is weak; the Project will procure an MRI (1.5T) that has higher specifications than the existing one. Since the new MRI (1.5T) will enable users to image and diagnose cases that were difficult with the existing one to diagnose as well as cases with complications such as ascites and pleural effusions, the new one may be used for diagnosis of different cases from the cases that the existing one images. Therefore, the baseline data of this indicator is set as 0 (zero) on condition that there is no similar equipment at TUTH. The calculation basis for the target is as follows:

4 tests/day × 240 days/year = 960 tests/year

In the above calculation, the daily examination number of the new MRI is set as four (4). In general, it takes about one hour per MRI examination including preparation; theoretically about seven (7) tests can be conducted in the TUTH's working hour. However, both of the existing and new MRIs will be utilized in parallel after the new MRI procurement. Additionally, the new MRI may need a certain amount of downtime for its periodical maintenance and repair. In consideration with such conditions, the daily test number of the new MRI was set as four. Here, the annual number of working days of TUTH is set as 240; 104 weekend holidays (Fridays and Saturdays) and 21 public holidays are deducted from 365 days.

Indicator 2) Number of examination conducted with Digital Mammograph per year (tests/year)

The procurement of the Digital Mammograph enables TUTH to diagnose breast disease since there is no existing equipment for such diagnosis.

TUTH does not have a digital mammograph as of 2015. Accordingly, its procurement will enable TUTH to provide examination services and to diagnose female-specific breast diseases. The calculation basis for the target is as follows:

3 tests/day × 240 days/year = 720 tests/year

In the above calculation, the daily examination number of the Digital Mammograph is set as three (3). A digital mammograph test takes less than 45 minutes including preparation, and there may be a huge patient demand because approximately 1,700 mammograph tests (7 tests per day) were taken previously. However, three tests per day were set as its daily examination number because some patients who need diagnosis may tend to access other hospitals while any mammograph was not available at TUTH. Additionally, the annual number of working days of TUTH is set as 240 days; 104 weekend holidays (Fridays and Saturdays) and 21 public holidays are deducted from 365 days.

Indicator 3) Number of examination conducted with Ultrsonograph per year (times/year)

The increase in the number of ultrasound examinations by the procurement of ultrasonographs will ease patient congestion at TUTH.

An ultrasound examination is the most popular at TUTH; approximately 50,000 tests are conducted every year, and about 3,500 tests among them are estimated to be conducted in the outpatient ultrasonography room (USG room).

The Project will replace the existing aged ultrasonograph in the USG room with a new one. Even though five ultrasonographs will be operated in the USG room after the procurement, it is reasonable to estimate that three to four times the amount of examinations per day will be conducted by replacing the old machine because the other machines can be dispatched to other departments as occasion demands. The calculation basis for the target is as follows:

16 – 17 tests/day × 240 days/year = 4,000 times/year

Here, the annual number of working days of TUTH is set as 240 days; 104 weekend holidays (Fridays and Saturdays) and 21 public holidays are deducted from 365 days.

Indicator 4) Duration of pathological diagnosis by using Immunohistochemical Stainer (days/until diagnosis)

Since it will be possible to conduct pathological diagnosis of tumors at TUTH, the duration required for such examinations will be shortened compared with when they were sent to India.

TUTH does not own any facility and equipment to conduct pathological diagnosis of tumors as of 2015, so such examinations are always sent to India. Accordingly, patients who need the examinations have to wait for two weeks (14 days) for the diagnosis. The procurement of an Immunohistochemical Stainer will enable TUTH to conduct such examination and shorten the duration to reach a diagnosis to approximately five days.

(2)Qualitative Effects

The qualitative effects expected through the implementation of the Project are listed below. Questions to validate the qualitative effects are shown in Table 3-2 and Table 3-3.

1) To improve TUTH's healthcare services by covering more diseases that can be diagnosed and treated at TUTH utilizing the medical equipment to be procured.
2) To provide knowledge and practical experience about various types of diseases in the field of medical education by increasing the number of diseases that can be diagnosed and treated at TUTH.

Table 3-2 Examples of Qualitative Effects of Medical Services Improvement

Equipment	Questions	Targets
MRI (1.5T)	− Has the time of examination per patient been shortened? − Have high resolution images enabled TUTH to diagnose diseases rapidly and precisely? − Has it become possible to diagnose medical cases that may have complications?	Radiologist, Radiology Technicians
	− Has the waiting time to be examined/diagnosed been shortened?	Patients
Ultrasonograph	− Has it become possible to diagnose diseases such as pancreatic and liver diseases?	Doctors
	− Has the waiting time to be examined been shortened?	Patients
Digital Mammograph	− Has it become possible to conduct image diagnosis of breast diseases? − After the diagnosis of breast diseases, has it become possible to provide medical treatment at TUTH?	Radiologists Doctors
	− After the image diagnosis of breast diseases, has the medical treatment started smoothly?	Patients
Immunohistochemical Stainer	− Has it become possible to conduct pathological diagnosis of tumors? − After the diagnosis of tumors, has the time to start medical treatments become shorter than before?	Pathologists
Video Bronchoscope Set	− Has it become possible to conduct more low-invasive surgeries than open-chest surgeries to treat the same diseases?	Doctors
Laparoscope Set for Gynaecology	− Has it become possible to conduct more low-invasive surgeries in shorter time than before to treat the same diseases?	Doctors

Table 3-3 Examples of Qualitative Effects of Medical Education Improvement

Equipment	Questions	Targets
MRI (1.5T)	− Has the examination time per patient been shortened? − Have high resolution images enabled TUTH to diagnose diseases rapidly and precisely? − Has it become possible to diagnose medical cases that may have complications?	Radiologist, Radiology Technicians
	− Has the opportunity been increased to deepen the understanding of more medical cases?	Medical students
Digital Mammograph	− Regarding examination and diagnosis of breast diseases, has it become possible to train medical students through image diagnosis? − Has it become possible to implement practical trainings regarding medical treatment/interventions after diagnosis?	Radiologists, Doctors
	− Has the opportunity been increased to deepen understanding of more cases of breast diseases after the image diagnosis?	Medical students
Immunohistochemical Stainer	− Has it become possible to conduct practical trainings of pathological diagnosis of tumors?	Pathologists
	− Has the opportunity been increased to deepen understanding of pathological diagnosis by utilizing the Immunohistochemical Stainer?	Medical students
Immunofluorescence Microscope with Teaching Head	− Has the opportunity been increased to provide necessary knowledge for pathological diagnosis?	Pathologists
	− Has it become possible to deepen the necessary knowledge of pathological diagnosis while sharing the pathological images and discussing the cases during practical trainings?	Medical students

APPENDICES

Appendix 1. Member List of the Study Team

(1) Preparatory Survey (15 September to 10 October, 2015：26 days)

	Name	Position	Affiliation
JICA	Mr. Yoshiharu YONEYAMA	Team Leader	Health Group 2, Human Resource Department, JICA
	Dr. Dai YOSHIZAWA	Technical Advisor	Bureau of International Health Cooperation, NCGM
	Mr. Yukihiro KONDO	Cooperation Planning	Health Division 4, Health Group 2, Human Resource Department, JICA
Consultant	Mr. Shinichi KIMURA	Chief Consultant/ Planning of Equipment 1	Binko International Ltd.
	Ms. Yukiko NISHIBARI	Planning of Equipment 2	Binko International Ltd.
	Mr. Hirotaka KOIZUMI	Architectural Design	System Science Consultants Inc.
	Mr. Kenji SAWAI	Equipment Procurement/ Cost Planner	Binko International Ltd.
	Mr. Yoshihiko GIBO	Facility Planning	System Science Consultants Inc.

Note: NCGM=National Center for Global Health and Medicine

(2) Discussion of the Outline Design (18 to 27 February, 2016：10 days)

	Name	Position	Affiliation
JICA	Mr. Tatsuya ASHIDA	Team Leader	Health Group 2, Human Resource Department, JICA
	Dr. Dai YOSHIZAWA	Technical Advisor	Bureau of International Health Cooperation, NCGM
	Mr. Yukihiro KONDO	Cooperation Planning	Health Division 4, Health Group 2, Human Resource Department, JICA
Consultant	Mr. Shinichi KIMURA	Chief Consultant/ Planning of Equipment 1	Binko International Ltd.
	Ms. Yukiko NISHIBARI	Planning of Equipment 2	Binko International Ltd.

Appendix 2. Study Schedule

(1) Preparatory Survey (15 September to 10 October, 2015：26 days)

Date		JICA			Chief Consultant/ Planning of Equipment 1	Planning of Equipment 2	Equipment Procurement/ Cost Planner	Architectural Design	Facility Planning
		Team Leader	Technical Advisor	Cooperation Planning					
		Mr. Yoshiharu YONEYAMA	Dr. Dai YOSHIZAWA	Mr. Yukihiro KONDO	Mr. Shinichi KIMURA	Ms. Yukiko NISHIBARI	Mr. Kenji SAWAI	Mr. Hirotaka KOIZUMI	Mr. Yoshihiko GIBO
15/09/2015	Tue				Haneda→Bangkok→Kathmandu Courtesy call for JICA Nepal Office			Haneda→Bangkok→Kathmandu Courtesy call for JICA Nepal Office	
16/09/2015	Wed				Courtesy call for Ministry of Education and TUTH			Courtesy call for Ministry of Education and TUTH	
17/09/2015	Thu				Courtesy call for IOM Survey at TUTH (Radiology, CSSD)			Courtesy call for IOM Survey at TUTH (Radiology, CSSD)	
18/09/2015	Fri				Survey at TUTH (Medical Service system)			Survey at TUTH (Medical Service system)	
19/09/2015	Sat				Interal meeting, Documentation	Chennai→Mumbai→ Kathmandu		Interal meeting, Documentation	
20/09/2015	Sun				Survey at TUTH (Radiology, CSSD)	Survey at TUTH (CSSD, ICU etc.)		Survey at TUTH (Facility and Infrastructure)	Haneda→Bangkok→ Kathmandu Survey at TUTH
21/09/2015	Mon				Morning: Additional Survery at TUTH (ICU etc.) Afternoon: Documentation			Survey at other similar facilities	Survey at TUTH (M&E and plumbing)
22/09/2015	Tue		Haneda→Bangkok→Kathmandu		Survery at TUTH (Health affairs, Human resource deployment status)		Haneda→Bangkok→ Kathmandu	Survey at TUTH (Facility and Infrastructure)	
			Visit to JICA Nepal Office						
23/09/2015	Wed		Survery at TUTH Courtesy call for University Grant Commission				Survey at TUTH	Survey at Ministry of Construction and local constructors	Survey for TUTH (Elevators)
24/09/2015	Thu		Courtesy call for Ministry of Education, Minstry of of Health and Population, Ministry of Finance, TUTH (IOM) (Explanation and Discussion on the Project)				Survey at TUTH	Survey for TUTH (Facility operation, Management system)	Survey for TUTH（CSSD, M&E and plumbing）
25/09/2015	Fri	Haneda→Bangkok→ Kathmandu	Survey at TUTH, Survey of other donors (WHO, etc.)				Survey of local shipper, export and import duties	Survey at TUTH (Infrastructure)	
26/09/2015	Sat	Interal meeting, Documentation							
27/09/2015	Sun	Survey at Dulikhel Hospital, University of Kathmandu			Survey at TUTH (Survey related to Equipment Planning)		Survey of local agents of manufacturers	Survey at TUTH (Infrastructure)	
28/09/2015	Mon	Survey at Bir Hospital and Paropakar Maternity and Women's Hospital			Survey at Bir Hospital, Paropakar Maternity and Women's Hospital and TUTH		Survey of local shipper, export and import duties	Kathmandu→Bangkok	Survey of local M&E companies
29/09/2015	Tue	Survey at TUTH (Survey on medical services and its situations)					Survey at TUTH (Department of Maintenance)	Bangkok→Haneda	Survey for local M&E companies
		Discussion on Minutes							
30/09/2015	Wed	Signing of Minutes				Survey at TUTH (Finance & Services) Signing of Minutes	Market Survey Signing of Minutes		Survey at TUTH (CSSD and plumbing) Signing of Minutes
01/10/2015	Thu	Visit JICA Nepal Office for Report, Survey at TUTH				Survey at TUTH (Equipment Planning)	Survey of local agents of manufacturers		Market Survey
		Visit Embassy of Japan for Report							←same
02/10/2015	Fri	Kathmandu→Bangkok			Survey at TUTH (Survey for Equipment Planning)		Survey of local agents of manufacturers		Market Survey
03/10/2015	Sat	Bangkok→Haneda			Interal meeting, Documentation				Kathmandu→Bangkok
04/10/2015	Sun				Survey at TUTH (Equipment Planning)	Survey at TUTH (Human Resources)	Survey at TUTH (Equipment procurement)		Bangkok→Haneda
05/10/2015	Mon				Supplement Survey at TUTH	Survey at TUTH (Specifications & Installation)	Supplement Survey at TUTH		
06/10/2015	Tue				Documentation Visit Norvic International Hospital		Documentation Survey of local agents of manufacturers		
07/10/2015	Wed				Supplement Survey of Similar Facilities (Kanti Children's Hospital), Visit UNICEF Nepal Office		Survey at Kanti Children's Hospital and local agents		
08/10/2015	Thu				Intermediate Report of the Survey to TUTH and to JICA Nepal Office				
09/10/2015	Fri				Kathmandu→Bangkok	Kathmandu→Singapore	Kathmandu→Bangkok		
10/10/2015	Sat				Bangkok→Haneda	Singapore→Narita	Bangkok→Haneda		

TUTH: Tribhuvn University Teaching Hospital　　IOM: Institute of Medicine, TUTH　　CSSD: Central Sterilization Supply Department
M&E: Mechanical and Engineering

(2) Discussion of the Outline Design (18 to 27 February, 2016：10 days)

Members / Date			JICA		Consultant	
			Leader & Cooperation Planning	Technical Advisor	Project Manager/ Equipment Planning-1	Equipment Planning-2
			Mr. Tatsuya ASHIDA Mr. Yukihiro KONDO	Dr. Dai YOSHIZAWA	Mr. Shinichi KIMURA	Ms. Yukiko NISHIBARI
1	Feb 18	Thu			Dep : Narita→Bangkok	Dep : Cairo→Kathmandu - Ministry of Finance (IECCD, Revenue Management Division) - DUDBC
2	Feb 19	Fri			Bangkok→Kathmandu	Document Organization
					Meeting, Document Organization	
3	Feb 20	Sat	Dep : Haneda→Bangkok→Kathmandu		Meeting, Document Organization	
			Meeting, Document Organization			
4	Feb 21	Sun	- Survey at TUTH - Visit to Ministry of Education for Courtesy Call, Discussion and Meeting	Dep : Haneda→Bangkok→Kathmandu	- Survey at TUTH - Visit to Ministry of Education for Courtesy Call, Discussion and Meeting - Meeting with local agents of manufacturers	
5	Feb 22	Mon	Visit JICA Nepal Office for Meeting			- Ministry of Finance (Inland Revenue Department, FCGO)
			Document Organization	- Survey at TUTH (on building) - Visit local agents of manufacturers	Document Organization	- Survey at TUTH (on building) - Visit local agents of manufacturers
6	Feb 23	Tue	Visit TUTH for Explanation of Equipment Planning			
7	Feb 24	Wed	Document Organization		Visit TUTH for Explanation of Equipment Planning	
			Visit Police Hospital for additional survey on medical equipment			
8	Feb 25	Thu	Signing of Minutes			
			Visit JICA Nepal Office and Embassy of Japan for Report of DOD Survey			- Visit TUTH for additional survey - Meeting with local agents of manufacturers
9	Feb 26	Fri	Dep: Kathmandu→Bangkok			
10	Feb 27	Sat	Bangkok→Haneda		Bangkok→Narita	Bangkok→Haneda

TUTH: Tribhuvn University Teaching Hospital
DUDBC: Department of Urban Development and Building Construction
FCGO: Financial Comptroller General Office
IECCD: International Economic Cooperation and Coordination Division

Appendix 3. List of Parties Concerned in the Recipient Country

Ministry of Education

Mr. Deepak Sharma	Under Secretary
Dr. Lava Deo Awasthi	Joint Secretary, Chief Planning Division
Mr. Khagaraj Paudyal	Under Secretary, Foreign Co-ordiantion Section

Ministry of Health and Population

Mr. Mahendra Pd. Shrestha	Chief , Policy Planning and International Cooperation Division

Ministry of Finance

Mr. Ram Mani Duwadi	Deputy Director General, Inland Revenue Department
Mr. Dev Narayan Paudel	Director, Refund Division
Mr. Yagya Pd. Dhungel	Under Secretary, Revenue Management Division
Mr. Fadindra Pd. Acharya	Section Officer, International Economic Cooperation Coordination Division
Mr. Kafle	Deputy Financial Comptroller, FCGO

Ministry of Urban Development

Mr. Mani Ram Gelal	Deputy Director General, Building Division, DUDBC
Ms. Mira Gyawali	Senior Division Engineer, DUDBC

University Grants Commission

Dr. Parashar Pd. Koirala	Chairman

Institute of Medicine, Tribhuvan University

Dr. Rakesh Shirivastav	Dean
Dr. Bimal Kumar Sinha	Assistant Dean
Dr. Sharad Raj Onta	Assistant Dean
Mr. Shamkar Pd. Adhikari	Deputy Finance Controller
Mr. Deepak Mohan Adhikari	Chief, Administration Office

Tribhuvan University Teaching Hospital

Dr. Deepak Prakash Mahara	Executive Director
Dr. Dinesh Kafle	Deputy Director
Dr. Prem Khadga	Deputy Director
Dr. Chandra Mani Bhandari	Administration Chief
Mr. Shashi Thapa	Chief, Finance Section

Dr. Kumar K.C.	Senior Medical Recorder, Chief, IT Section
Dr Ram K Ghimire	Head, Department of Radiology
Dr. Shanta Lall Shrestha	Medical Physics, Department of Radiology
Dr. Marhatta M. N.	Department of Anesthesiology
Dr. Robit Kumar Pokharel	Department of Orthopedics
Dr. Karbir Nath Yogi	Department of Orthopedics
Dr. Gita Sayami	Department of Pathology
Dr. Rakesh Pd. Shrivastav	Department of E.N.T.
Dr. Laxman Pd. Shrestha	Department of Paediatrics
Dr. Rameshwar Pd. Pokharel	Department of Paediatric Surgery
Mr. Chanehal Kumar Joshi	Maintenance Head
Mr. Amit Kumar Chaudary	Biomedical Engineer

Bir Hospital

Dr. Ganesh Bahadur Gurung	Vice Chancellor
Dr. Ranga Bahadur Basnet	Rector

Paropakar Maternity and Women's Hospital

Dr. Jageshwor Gautam	Director
Dr. Karishma Malla Uaidya	Pathologist Consultant

Kanti Children's Hospital

Mr. Roshan Bajracharya	Maintenance Officer

UNICEF Nepal Country Office

Mr. Birendra Bahafur Pradhan	Health Section

Embassy of Japan in Nepal

Mr. Masashi Ogawa	Ambassador Extraordinary and Plenipotentiary
Dr. Takaaki Yamagata	Counsellor and Medical Attache
Mr. Eiji Yokoi	Second Secretary, Economic Cooperation Section

Japan International Cooperation Agency (JICA) Nepal Office

Mr. Tsutomu Shimizu	Chief Representative
Mr. Hiroyasu Tonokawa	Senior Representative

Mr. Yamato Kawamata	Representative
Ms. Yuki Daizumoto	Assistant Representative
Mr. Ang Pasang Sherpa	Senior Program Officer
Mr. Krishna Prasad Lamsal	Associate Program Manager

Appendix 4. Minutes of Discussions (M/D)

(1) M/D concluded during the Preparatory Survey

(2) M/D concluded during the Discussion of Outline Design

(1) M/D concluded during the Preparatory Survey

Minutes of Discussions
on the Preparatory Survey for the Project for
Improvement of Medical Equipment in
Tribhuvan University Teaching Hospital

In response to the request from the Government of Nepal (hereinafter referred to as "Nepal"), the Government of Japan (hereinafter referred to as "Japan") decided to conduct a Preparatory Survey for the Project for Improvement of Medical Equipment in Tribhuvan University Teaching Hospital (hereinafter referred to as "the Project"), and entrusted the Preparatory Survey to Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent the Preparatory Survey Team for the Outline Design (hereinafter referred to as "the Team") to Nepal, headed by Mr. Yoshiharu Yoneyama, Deputy Director General and Group Director for Health Group 2, Human Development Department, JICA, and is scheduled to stay from 15th September to 9th October, 2015.

The Team held a series of discussions with the officials concerned of Nepal and conducted a field survey in the Project area. In the course of the discussions, Nepal and the Team have confirmed the main items described in the attached sheets. The Team will proceed to further works and prepare the Preparatory Survey Report.

Kathmandu, 30th September, 2015

Mr. Yoshiharu Yoneyama
Leader, the Preparatory Survey Team
Japan International Cooperation Agency

Dr. Lava Deo Awasthi
Joint Secretary
Ministry of Education

(Witness)
Prof. Dr. Deepak Prakash Mahara
Executive Director
Tribhuvan University Teaching Hospital

(Witness)
Prof. Dr. Sharad Raj Onta
Acting Dean, Institution of Medicine
Tribhuvan University

ATTACHMENT

1. Objective of the Project

   The objective of the Project is to improve the quality and quantity of medical service and education to be provided by Tribhuvan University Teaching Hospital (hereinafter referred to as "TUTH") through procurement of medical equipment.

2. Title of the Preparatory Survey

   The Nepal side and the Team confirmed the title of the Preparatory Survey as "the Preparatory Survey for the Project for Improvement of Medical Equipment in Tribhuvan University Teaching Hospital".

3. Project Site

   The Nepal side and the Team confirmed that the site of the Project is TUTH in Kathmandu, which is shown in Annex 1.

4. Executing Agency and Implementing Agency

   The Nepal side and the Team confirmed the executing agency and implementing agency as follows:

   4-1. The executing agency is the Ministry of Education (hereinafter referred to as "MoE"), which would be the agency to supervise the implementing agency.

   4-2. The implementing agency is TUTH. The implementing agency shall coordinate with all the relevant agencies to ensure smooth implementation of the Project and ensure that the undertakings are taken by relevant agencies properly and on time. The organization charts are shown in Annex 2.

5. Items Requested by Nepal

   5-1. As a result of discussions, the Nepal side and the Team confirmed that the items requested by Nepal are in Annex 3. Equipment necessary for TUTH is requested to Japan based on 3 criteria, which are "Needs of an equipment", "Availability of personnel and budget for maintenance", and "Difficulty of purchasing an equipment by TUTH's own budget". TUTH and the Team discussed priorities based on the criteria and agreed that a list of equipment to be requested to Japan's Grant Aid is suitable.

5-2. The Team will assess the appropriateness of the above requested items through the survey and will report findings to Japan. The final components of the Project would be decided by Japan.

6. Japan's Grant Scheme

The Nepal side understands the Japan's Grant Scheme and its procedures as described in Annex 4, 5 and 6, and necessary measures to be taken by Nepal for smooth implementation of the Project, as a condition for the Japan's Grant to be implemented.

7. Undertakings by Nepal and Japan

The Nepal side and the Team confirmed the undertakings described in Annex 7. The Nepal side assured to take necessary measures for the smooth implementation of the Project. Contents of Annex 7 will be updated as the Preparatory Survey progresses, and will finally be the Attachment to the Grant Agreement.

8. Monitoring during the Implementation

The Project will be monitored every 3 months by the implementing agency using the Project Monitoring Report (PMR), as per attached in Annex 8.

9. Schedule of the Survey

9-1. The Team will proceed with further survey in Nepal until 9th of October.

9-2. The Team will prepare the draft Preparatory Survey Report in English and dispatch a mission to Nepal in order to explain its contents around February 2016.

9-3. If the contents of the draft Preparatory Survey Report is accepted in principle and the undertakings are fully agreed by the Nepal side, the Team will complete the final report in English and send it to Nepal around July 2016.

9-4. The above schedule is tentative and subject to change.

10. Other Relevant Issues

10-1. Post-Earthquake Damage Evaluation

The Nepal side and the Team confirmed that there is no serious damage on the building structures subjected to the Project as the conclusion of

"Post-Earthquake Damage Evaluation" taken by the Team. Summary of the evaluation is shown in Annex 9.

10-2. Repair/Renovation Work for Facilities

The Team strongly recommends repairing and/or renovating the following facilities. Detailed locations are described in Annex 9.

a) Rehabilitation of Six Connecting Pass Ways
b) Waterproofing Work to Expansion Joints of Pediatric Department.
c) Repair of Lift and Elevator Shaft

10-3. Operation and Maintenance of the Equipment

a) Importance of Operation and Maintenance

The Team explained the importance of operation and maintenance of the equipment under the Project considering that proper asset management is necessary to secure the life-span of the equipment and to reduce its maintenance cost. The Nepal side agreed to secure enough budgets necessary for appropriate operation and maintenance of the equipment.

b) Maintenance Contracts on Major Equipment

The Team explained that the importance of the routine maintenance and maintenance service of major equipment such as MRI. Keeping this in view, the Nepal side and the Team agreed to consider inclusion of maintenance service contracts into the Project to the major equipment that needs frequent maintenance.

10-4. Soft Components

The Nepal side and the Team agreed on the necessity of technical assistance as soft components of the Project, which will be provided by Japan's grant aid as soft component, for proper operation and preventive maintenance of the equipment.

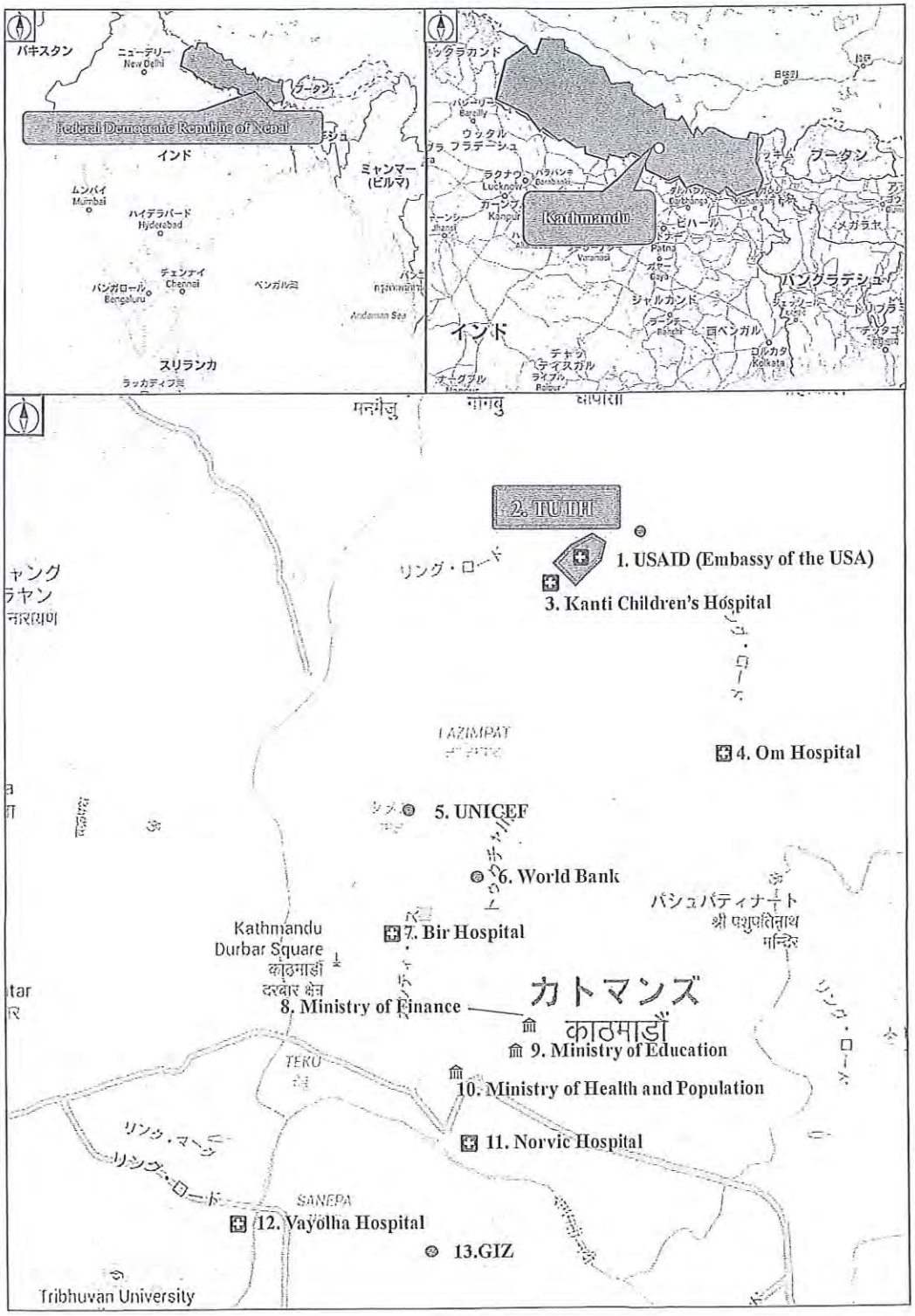
10-5. Procurement of MRI

The Nepal side and the Team agreed to procure the MRI in Block A.

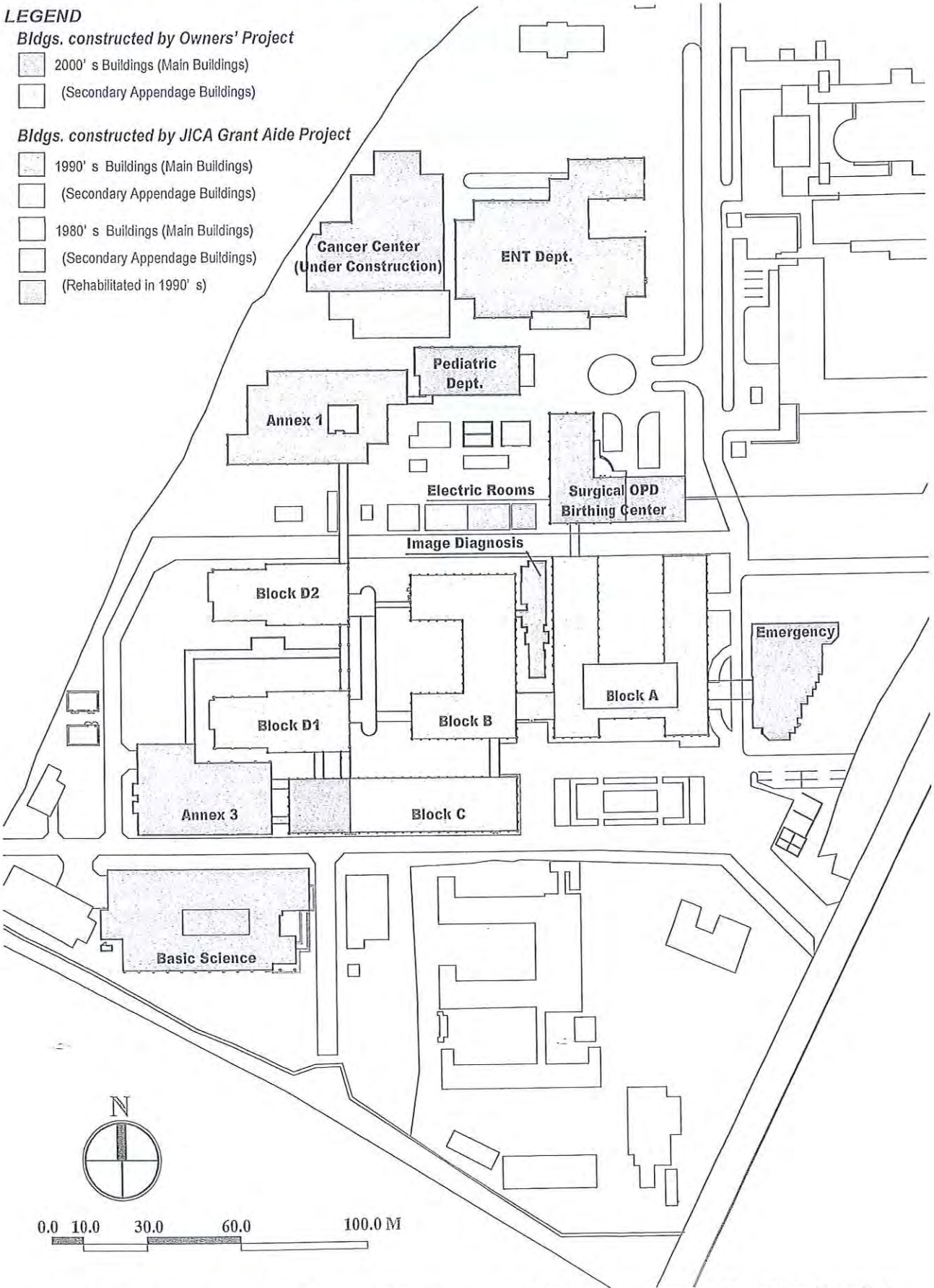
Annex 1. Project Site
Annex 2. Organization Chart
Annex 3. Requested Items
Annex 4. Japan's Grant Aid

Annex 5. Flow Chart of Japan's Grant Aid Procedures
Annex 6. Financial Flow of Japan's Grant Aid
Annex 7. Major Undertakings to be taken by Each Government
Annex 8. Project Monitoring Report (Template, Main Clause)
Annex 9. Summary of Post-Earthquake Damage Evaluation

Annex 1. Project Site

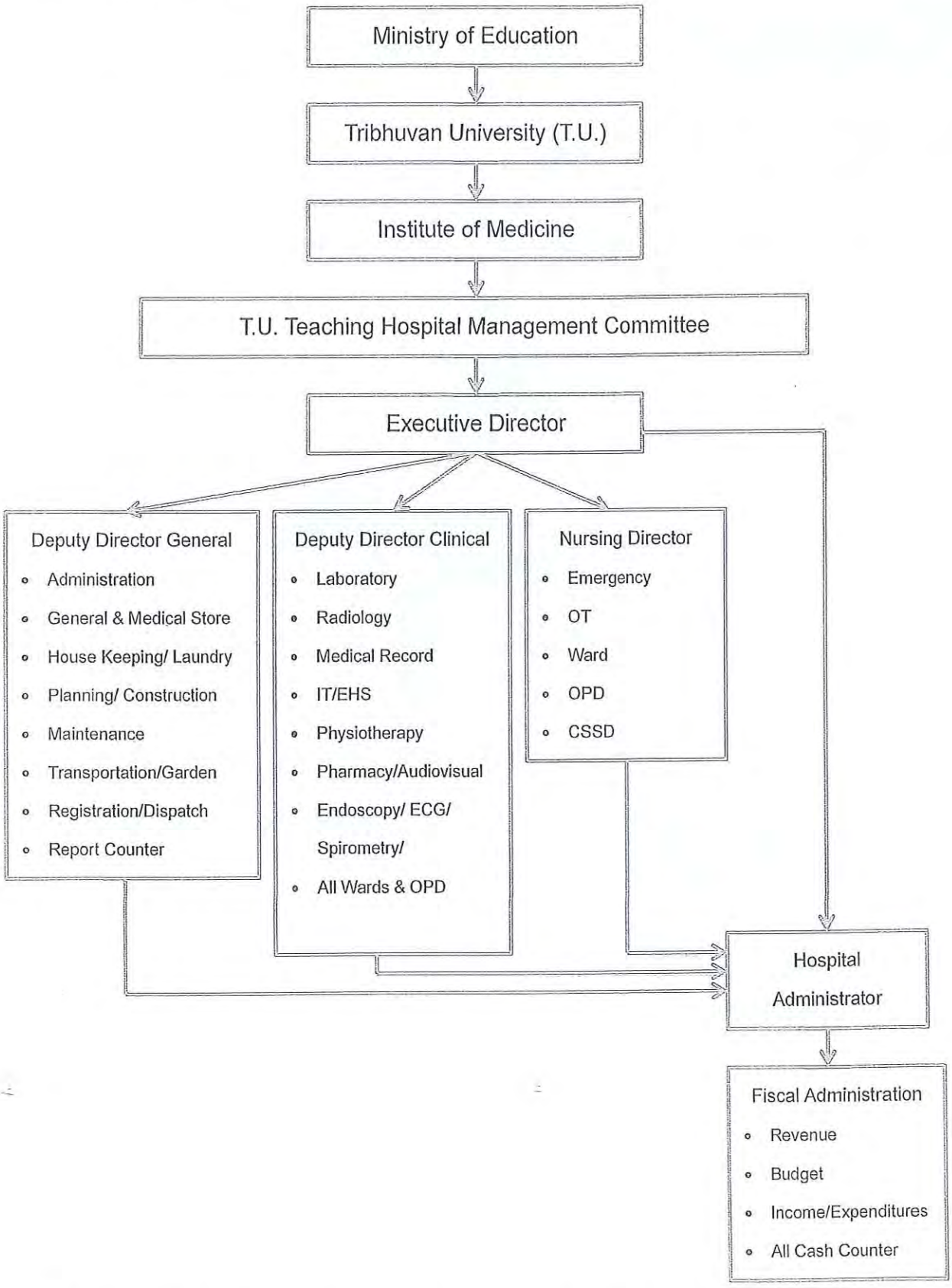


TRIBHUVAN UNIVERCITY TEACHING HOSPITAL
SITE PLAN (2015)



Project for Improvement of Medical Equipment in Tribhuvan University Teaching Hospital

Annex 2. Organization Chart



ECG: Electrocardiogram, OPD: Out Patient Department, OT: Operation Theater, CSSD: Central Sterilization Supply Department

EHS: Extended Hospital Service

Annex 3. Requested Items

No.	Description	Priority	Quantity
1	MRI (Magnetic Resonance Imaging) 1.5Tesla	A	1
	Interior Work for MRI	A	1
	Structure Rehabilitation and Interior Work	A	1
	Waterproofing Work for Block A	A	1
2	USG (Ultrasonograph)	A	3
		B	4
		C	3
3	Degital Manmograph	A	1
4	High Pressure Steam Sterilizer (Large)	A	1
		B	1
	High Pressure Steam Sterilizer (Medium)	A	1
		B	1
	Reinforcement of the Floor of CSSD	A	1
5	Surgical X-ray Unit (C-Arm)	A	2
6	Video Arthroscope Set	A	2
7	Video Bronchoscope, Invasive	B	1
8	Video Bronchoscopy, Ordinary	C	1
9	Ventilator for Adult	A	4
		C	4
10	Ventilator for Pediatric and Neonate	A	3
		B	2
11	Patient Monitor for Ward	C	25
12	Patient Monitor for ICU	A	10
		B	5
		C	20
	Waterproofing Work of ICU	A	1
13	Cardiotocograph (CTG) for Obstetrics	C	1
14	Laparoscopic set for Gynecology	B	1
15	Laparoscopic set for Adult Gastrointestinal Surgery	A	1
16	Laparoscopic set for Pediatric Gastrointestinal Surgery	A	1
17	Micromotor Drill Set for Craniofacial Surgery	A	1
18	Anaesthesia Machine	A	4
		C	1
19	Immunohistochemistry Stainer for Pathology	A	1
20	Immunofluorescence Microscope with Teaching Head	B	1
21	HLA Typing Machine for Transplant Surgery	C	1
22	Hand Washing Device	A	1

Annex 4. Japan's Grant Aid

The Japan's Grant Aid is non-reimbursable fund provided to Nepal to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. The Japan's Grant Aid is not supplied through the donation of materials as such.

Based on a JICA law which was entered into effect on October 1, 2008 and the decision of the government of Japan (hereinafter referred to as the "GOJ"), JICA has become the executing agency of the Japan's Grant Aid t for Projects for construction of facilities, purchase of equipment, etc.

1. Grant Procedures

The Japan's Grant Aid is supplied through following procedures:

- Preparatory Survey
  - The Survey conducted by JICA
- Appraisal &Approval
  - -Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet
- Authority for Determining Implementation
  - -The Notes exchanged between the GOJ and Nepal
- Grant Agreement (hereinafter referred to as "the G/A")
  - -Agreement concluded between JICA and Nepal
- Implementation
  - -Implementation of the Project on the basis of the G/A

2. Preparatory Survey

(1) Contents of the Survey

The aim of the preparatory Survey is to provide a basic document necessary for the appraisal of the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of Nepal necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Japan's Grant Aid Scheme from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.

- Estimation of costs of the Project.

The contents of the original request by Nepal are not necessarily approved in their initial form as the contents of the Japan's Grant Aid project. The Outline Design of the Project is confirmed based on the Guidelines of the Japan's Grant Aid scheme.

JICA requests the government of Nepal to take whatever measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization of Nepal which actually implements the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of Nepal based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA employs (a) Consulting firm(s). JICA selects (a) Firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the Report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the appropriateness of the Project.

3. The Japan's Grant Aid Scheme

(1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes(hereinafter referred to as "the E/N") will be singed between the GOJ and the Government of Nepal to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government of Nepal to define the necessary articles, in accordance with the E/N, to implement the Project, such as payment conditions, responsibilities of the Government of Nepal, and procurement conditions.

(2) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to Nepal to continue to work on the Project's implementation after the E/N and G/A.

(3) Eligible source country

Under the Japan's Grant Aid, in principle, Japanese products and services including transport or those of

Nepal are to be purchased. The Japan's Grant Aid may be used for the purchase of the products or services of a third country, if necessary, taking into account the quality, competitiveness and economic rationality of products and services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals", in principle.

(4) Necessity of "Verification"

The Government of Nepal or its designated authority will conclude contracts denominated in Japanese Yen with Japanese nationals, in principle. Those contracts shall be verified by JICA. This "Verification" is deemed necessary to fulfill accountability to Japanese taxpayers.

(5) Major undertakings to be taken by the Government of Nepal

In the implementation of the Japan's Grant Aid Project, Nepal is required to undertake such necessary measures as Annex. The Japanese Government requests the Government of Nepal to exempt all customs duties, internal taxes and other fiscal levies such as value added tax (hereinafter reffered to as "VAT"), commercial tax, income tax, corporate tax, resident tax, fuel tax, but not limited, which may be imposed in Nepal with respect to the supply of the products and services under the verified contract, since the Japan's Grant Aid fund comes from the Japanese taxpayers.

(6) "Proper Use"

The Government of Nepal is required to maintain and use properly and effectively the facilities constructed and the equipment purchased under the Japan's Grant Aid, to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Japan's Grant Aid.

(7) "Export and Re-export"

The products purchased under the Japan's Grant Aid should not be exported or re-exported from Nepal.

(8) Banking Arrangements (B/A)

a) The Government of Nepal or its designated authority should open an account under the name of the Government of Nepal in a bank in Japan (hereinafter referred to as "the Bank"), in principle. JICA will execute the Japan's Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of Nepal or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the Bank to JICA under an Authorization to Pay (hereinafter reffered to as "A/P") issued by the Government of Nepal or its designated authority.

(9) Authorization to Pay

The Government of Nepal should bear an advising commission of A/P and Payment Commissions paid to the Bank.

(10) Environmental and Social Considerations

The Government of Nepal must carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of Nepal and JICA Guidelines for Environmental and Social Consideration (April, 2010) .

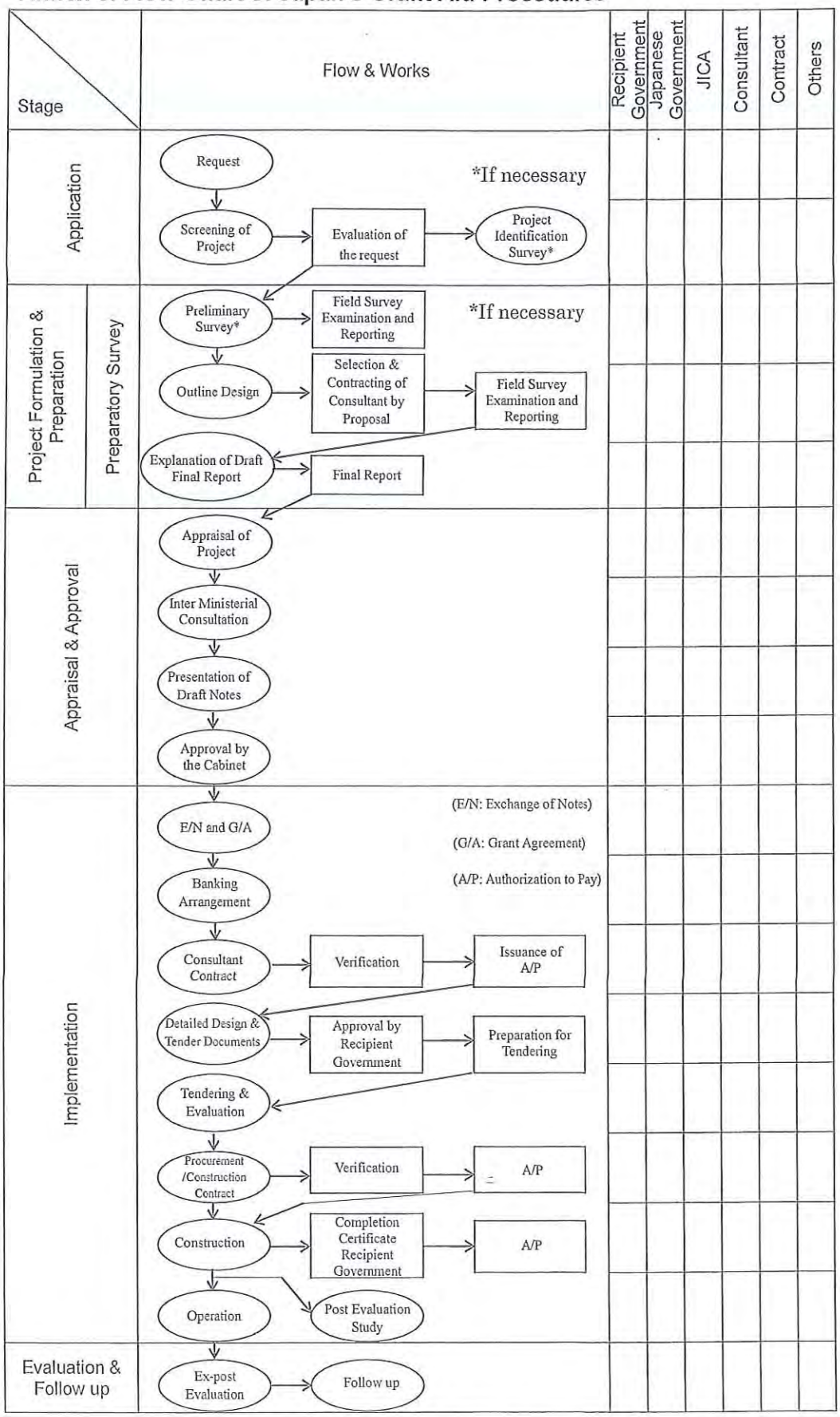
(11) Monitoring

The Government of Nepal must take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and must regularly report to JICA about its status by using the Project Monitoring Report (PMR).

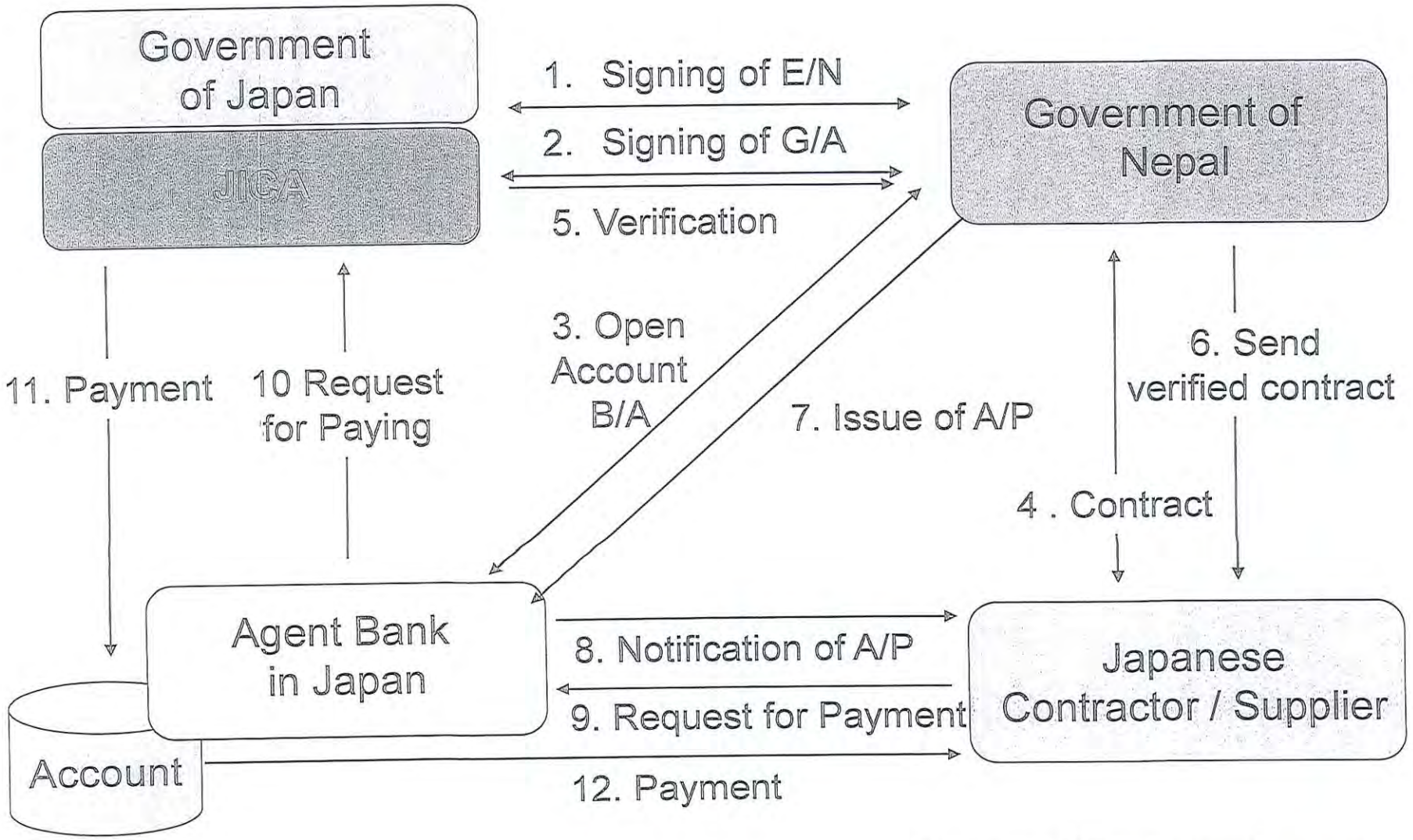
(12) Safety Measures

The Government of Nepal must ensure that the safety is highly observed during the implementation of the Project.

Annex 5. Flow Chart of Japan's Grant Aid Procedures



Annex 6. Financial Flow of Japan's Grant Aid



E/N: Exchange of Notes, G/A: Grant Agreement,
B/A: Banking Arrangement, A/P: Authorization to Pay,

Annex 7. Major Undertakings to be Taken by Government of Nepal

1. Before the Tender

NO	Items	Deadline	In charge	Cost	Ref.
1	To take necessary measures to open Bank Account (Banking Arrangement (B/A))				
	1) To bear the necessary commission charges with Bank Account if required.	Within 1 month after G/A	TUTH/ IOM		
	2) To take necessary procedures among government organizations and Agent Bank in Nepal to open Bank Account (Banking Arrangement (B/A))	Within 1 month after G/A	MOE/ TUTH		

2. During the Project Implementation

NO	Items	Deadline	In charge	Cost	Ref.
1	To bear the following commissions to a bank of Japan for the banking services based upon the B/A				
	1) Advising commission of A/P	Within 1 month after the singing of the contract	TUTH/ IOM		
	2) Payment commission for A/P	Every payment	TUTH/ IOM		
2	To ensure prompt unloading and customs clearance in recipient country				
	1) Tax exemption and customs clearance of the products	During the Project	MOF /MOE		
	2) To take necessary arrangement for internal transportation to the project site	During the Project	MOE		
3	To accord Japanese nationals and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work	During the Project	MOE/ MOF		
4	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the Products and/or the Services be exempted	During the Project	MOF/ MOE		
5	To bear all the expenses, other than those to be borne by the Grant Aid, if any.	During the Project	TUTH /IOM		
6	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities				
	1) Electricity				
	If required, relocation of electrical lines and exchange of the transformers to increase the power receiving capacity.	Before installation of the equipment	TUTH/ IOM		
	2) Water Supply				
	If required, the city water distribution main to the site	Before installation of the equipment	TUTH/ IOM		
	3) Drainage				
	If required, the city drainage main to the site	Before installation of the equipment	TUTH/ IOM		
	4) Others				
	Necessary building utility works to install the equipment, if required.	Before installation of the equipment	TUTH/ IOM		
7	To recruit sufficient staff with appropriate skills and experiences for operation and maintenance of new equipment provided under the Grant Aid	Before installation of the equipment	TUTH/ IOM		
8	To dispose the existing equipment such as autoclaves and secure spaces for daily operation.	During the Project	TUTH		

3. After the Project

NO	Items	Deadline	In charge	Cost	Ref.
1	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid by: 1) Allocation of sufficient budget for operation and maintenance 2) Training of staff on the specialized medical services for the full use of the equipment 3) Contracting with agents for major equipment.	After completion of the procurement	TUTH/ IOM		
2	To appoint and retain sufficient staff with appropriate skills and experiences for operation and maintenance of new equipment provided under the Grant Aid	After completion of the procurement	TUTH/ IOM		

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable)

Major Undertakings to be Covered by the Japan's Grant Aid

No	Items	Deadline	Cost Estimated (Million Japanese Yen)*
1	To construct and repair facilities and provide equipment		
	1) To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country		
	a) Ocean (Air) transportation of the products from Japan (the third country) to the recipient country	During the Project	
	b) Transportation from the port of disembarkation to the project site	During the Project	
	2) To construct and/or repair facilities		
	a) Waterproofing work to the top roof of ICU	1 month before procurement	
	b) Waterproofing work to Block A	1 month before procurement	
	c) Renovation work to a new MRI room	1 month before procurement	
	3) To provide equipment with installation, commissioning and training	During the Project	
2	To implement detailed design, tender support and construction supervision if any (Consultant)	During the Project	
3	Technical assistance as soft components, which will be provided by Japan's grant aid, for proper operation and preventive maintenance of the equipment.	During the Project	
	Total		

*; The cost estimates are provisional. This is subject to the approval of the Government of Japan.

Annex 8. Project Monitoring Report (Template, Main Clause)

Project Monitoring Report
on
Project Name
Grant Agreement No. XXXXXXX
20XX, Month

Organization Information

Authority (Signer of the G/A)	Person in Charge	_____
		(Division) _____
	Contacts	Address: _____
		Phone/FAX: _____
		Email: _____
Implementing Agency	Person in Charge	_____
		(Division) _____
	Contacts	Address: _____
		Phone/FAX: _____
		Email: _____
Responsible Agency	Person in Charge	_____
		(Division) _____
	Contacts	Address: _____
		Phone/FAX: _____
		Email: _____

Outline of Grant Agreement:

Source of Finance	Government of Japan: Not exceeding JPY _____ mil. Government of (_____): _____
Project Title	
E/N	Signed date: Duration:
G/A	Signed date: Duration:

1: Project Description

1-1 Project Objective

1-2 Necessity and Priority of the Project

- Consistency with development policy, sector plan, national/regional development plans and demand of target group and the recipient country.

1-3 Effectiveness and the indicators

- Effectiveness by the project

Quantitative Effect (Operation and Effect indicators)		
Indicators	Original (Yr)	Target (Yr)
Qualitative Effect		

2: Project Implementation

2-1 Project Scope

Table 2-1-1a: Comparison of Original and Actual Location

Location	**Original:** *(M/D)* **Attachment(s):Map**	**Actual:** *(PMR)* **Attachment(s):Map**

Table 2-1-1b: Comparison of Original and Actual Scope

Items	Original	Actual
(M/D) 'Soft component' shall be included in 'Items'.	*(M/D)*	*(PMR)* Please state not only th e most updated schedul e but also other past re visions chronologically. All change of design shal l be recorded regardless of its degree.

(Sample)Table 2-1-1b: Comparison of Original and Actual Scope

Items	Original	Actual
1. Upgrading of the Kukum Highway	length 20km, single lane (3.47m*2), path(1.25m*2) Concrete Pavement 200mm (motor lane only)	length 20km, single lane (3.47m*2), path(1.00m*2) Concrete Pavement 200m m (motor lane only)
2. Replacement of Old Mataniko Bridge	Bridge length 40m, Width 9.5m, path(1.00m*2), compound steel box-girder bridge, Inverted T type-abutment spread foundation	Ditto

(Sample)Table 2-1-1b: Comparison of Original and Actual Scope

Items	Original	Actual
1. Outpatient Department	RC, Double Story Ground floor: Consultation room 6 Reception Satellite Lab. Pharmacy, etc 1st floor: Consultation room 5 Dental Clinic 2	RC, Double Story Ground floor: Consultation room 5 ditto
2. Operation Theatre, Casualty Unit, Maternity Ward	RC, Double Storey Ground Floor: Operation room 2 Casualty Unit 1st Floor: Maternity Ward 50 beds	 ditto Maternity Ward 60 beds

(Sample)Table 2-1-1b: Comparison of Original and Actual Scope

Items	Original	Actual
1. Primary and Secondary Surveillance Radars at Chittagong Int'l Airport	i) OSR/SSR 1 set ii) RDP 1 set iii) VHF Transmitters 2 sets	Ditto
2. Access Control System for Dhaka Int'l Airport	1 set	Ditto
3. Doppler VOR/DME at Saidpur Airport	1 set	Ditto
4. Aerodrome Simulator for Civil Aviation Training Center	1 set	Ditto

5. Baggage Inspection System for Dhaka Int'l Airport	i) Hold Baggage Xray Inspectin system 7sets ii) Hold Baggage Explosive Trace Detecting System 7sets iii) Cabin Baggage Xray Inspection System 2sets	Ditto
6. Airport Fire Fighting Vehicles for Dhaka Int'l Airport	2 sets	3 sets

2-1-2 Reason(s) for the modification if there have been any.

(PMR)

2-2 Implementation Schedule

2-2-1 Implementation Schedule

Table 2-2-1: Comparison of Original and Actual Schedule

Items	Original		Actual
	DOD	G/A	
[M/D] 'Soft component' shall be stated in the column of 'Items'. Project Completion Date*	*(M/D)*		*(PMR)* As of (Date of Revision) Please state not only the most updated schedule but also other past revisions chronologically.

*Project Completion was defined as _____ at the time of G/A.

(Sample)Table 2-2-1: Comparison of Original and Actual Schedule

Items	Original		Actual
	DOD	G/A	
Cabinet Approval	11/2015	-	-
E/N	12/2015	1/2016	24/1/2016
G/A	12/2015	1/2016	24/1/2016 Amended 13/3/2017
Detailed Design	12/2015-4/2016	1/2016-5/2016	1/2016-5/2016
Tender Notice	5/2016	5/2016	1/6/2016
Tender	6/2016	6/2016	15/7/2016
(Lot1) Construction Period	7/2016-11/2018	7/2016-11/2018	8/8/2016-30/11/2018
(Lot2) Installarion of Equipement	7/2016-6/2018	7/2016-6/2018	6/8/2016-30/60/2017
Project Completion Date	11/2018	11/2018	30/11/2018

Defect Liability Period	11/2019	11/2019	30/11/2019

*Project Completion was defined as Check-out of Construction work at the time of G/A.

2-2-2 Reasons for any changes of the schedule, and their effects on the project.

2-3 Undertakings by each Government

2-3-1 Major Undertakings

See Attachment 2.

2-3-2 Activities

See Attachment 3.

2-3-3 Report on RD

See Attachment 4.

2-4 Project Cost

2-4-1 Project Cost

Table 2-4-1a Comparison of Original and Actual Cost by the Government of Japan
(Confidential until the Tender)

Items			Cost (Million Yen)	
	Original	Actual	Original	Actual
Construction Facilities (or Equipment)	'Soft component' shall be included in 'Items'.			Please state not only the most updated schedule but also other past revisions chronologically.
Consulting Services	- Detailed design -Procurement Management -Construction Supervision			
Total				

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar = Yen

Table 2-4-1b Comparison of Original and Actual Cost by the Government of XX

Items			Cost (Million USD)	
	Original	Actual	Original	Actual
				Please state not only the most updated schedule but also other past revisions chronologically.

Total		

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar = (local currency)

(Sample)Table 2-4-1a Comparison of Original and Actual Cost by the Government of Japan
(Confidential until the Tender)

Items			Cost (Million Yen)	
	Original	Actual	Original[1),2)]	Actual
Construction Facilities	1. Outpatient Department 2. Operation Theatre, Casualty Unit, Maternity Ward	Ditto Ditto	1,169.5	1,035.0
Equipment	1) Primary and Secondary Surveillance Radars at Chittagong Int'l Airport 2) Access Control System for Dhaka Int'l Airport 3) Doppler VOR/DME at Saidpur Airport 4) Aerodrome Simulator for Civil Aviation Training Center 5) Baggage Inspection System for Dhaka Int'l Airport 6) Airport Fire Fighting Vehicles for Dhaka Int'l Airport	Ditto	2,374.6	2,110.0
Consulting Services	- Detailed design -Procurement Management -Construction Supervision -Soft Component	Ditto	0.87	0.87
Total			3544.97	3145.87

Note: 1) Date of estimation: October, 2014
2) Exchange rate: 1 US Dollar = 99.93 Yen

(Sample)Table 2-4-1b Comparison of Original and Actual Cost by the Government of Bangladesh

Items			Cost (1,000 Taka)	
	Original	Actual	Original[1),2)]	Actual
Dhaka International Airport	Modification of software of existing Rader Data Processing System	Ditto	8,000	9,240
	Provision of a partition, lighting, air conditioning and electric power supply at transfer hold baggage check point	Ditto	5,000	2,453
	Replacement of five doors in the international passenger terminal building	Ditto	4,000	5,340
Chittagong Int'l Airport	Preparation of the radar site including felling of trees, clearing and grabbing	Ditto	5,000	3,400
Total			22,000	20,433

Note: 1) Date of estimation: October, 2014
2) Exchange rate: 1 US Dollar = 0.887 Bangladesh Taka (local currency)

2-4-2 Reason(s) for the wide gap between the original and actual, if there have been any, the remedies you have taken, and their results.

(PMR)

2-5 Organizations for Implementation

2-5-1 Executing Agency:

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

Original: *(M/D)*
Actual, if changed: *(PMR)*

2-6 Environmental and Social Impacts

- The results of environmental monitoring as attached in Attachment 5 in accordance with Schedule 4 of the Grant Agreement.
- The results of social monitoring as attached in Attachment 5 in accordance with Schedule 4 of the Grant Agreement.
- Information on the disclosed results of environmental and social monitoring to local stakeholders, whenever applicable.

3: Operation and Maintenance (O&M)

3-1 O&M and Management

- Organization chart of O&M
- Operational and maintenance system (structure and the number ,qualification and skill of staff or other conditions necessary to maintain the outputs and benefits of the project soundly, such as manuals, facilities and equipment for maintenance, and spare part stocks etc)

Original: *(M/D)*
Actual: *(PMR)*

3-2 O&M Cost and Budget

- The actual annual O&M cost for the duration of the project up to today, as well as the

annual O&M budget.

Original: *(M/D)*

4: Precautions (Risk Management)

- Risks and issues, if any, which may affect the project implementation, outcome, sustainability and planned countermeasures to be adapted are below.

Original Issues and Countermeasure(s): *(M/D)*	
Potential Project Risks	Assessment
1.	Probability: H/M/L
(Description of Risk)	Impact: H/M/L
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action during the Implementation:
	Contingency Plan (if applicable):
2.	Probability: H/M/L
(Description of Risk)	Impact: H/M/L
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action during the Implementation:
	Contingency Plan (if applicable):
3.	Probability: H/M/L
(Description of Risk)	Impact: H/M/L
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action during the Implementation:
	Contingency Plan (if applicable):
Actual issues and Countermeasure(s)	
(PMR)	

5: Evaluation at Project Completion and Monitoring Plan

5-1 Overall evaluation

Please describe your overall evaluation on the project.

5-2 Lessons Learnt and Recommendations

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

5-3 Monitoring Plan for the Indicators for Post-Evaluation

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

Attachment

1. Project Location Map
2. Undertakings to be taken by each Government
3. Monthly Report
4. Report on RD
5. Environmental Monitoring Form / Social Monitoring Form
6. Monitoring sheet on price of specified materials (Quarterly)
7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (Final Report Only)

Annex 9. Summary of Post-Earthquake Damage Evaluation

Overview

The Team has implemented the Post-Earthquake Damage Evaluation (hereinafter referred to as "PED Evaluation") from 20th to 24th September, 2015 in accordance with the guideline of Japan Building Disaster Prevention Association

1. Objective Buildings

The survey team has selected the object buildings of the PED Evaluation that will be installed the new Equipment of the Project according to the Meeting with TUTH on 16th September.

The selected buildings are as Table 1:

Table 1: Objective Buildings of the PED Evaluation

Classification	Building Name
1980's Japan's Grant Aid Project	Block A, Block B, Block C, Block D
1990's Japan's Grant Aid Project	ICU
Owner's own Construction	Image Diagnoses, Pediatric Ward

2. Evaluation by Sanction and Inclination of the Building

With hearing of the maintenance staff of TUTH and by sight, sanction of the building is not found out. The Team implemented the leveling of the buildings.

3. Evaluation by Rate of Remaining Capacity for Aseismic Performance of the Building (Superstructure)

The Team checked the all the structural column and wall one by one, and calculated the Rate of Remaining Capacity for Aseismic Performance (hereinafter referred to as "RRCAP") in the most damaged floor of the building. As the table 2 shows, the Building Superstructure is more than 92 %. It means that the buildings have small damaged ($80 \leqq R < 95$) or slight damaged ($95 \leqq R < 100$). The result of the survey is summarized in Table 2.

4. Other

1) It is recommended that 1980's and 1990's buildings be waterproofed as soon as possible for the sustainability of the facility. Especially, Roof top of the ICU Department and Block A shall be waterproofed for the infection control.
2) All the connection pass ways have the grave damage of the expansion joints and structural crack. Also some of those are the cause of leaking. So the Team recommends the rehabilitation of those connecting pass ways, especially 6 pass ways which are connecting enter the objective buildings.

5. Conclusion

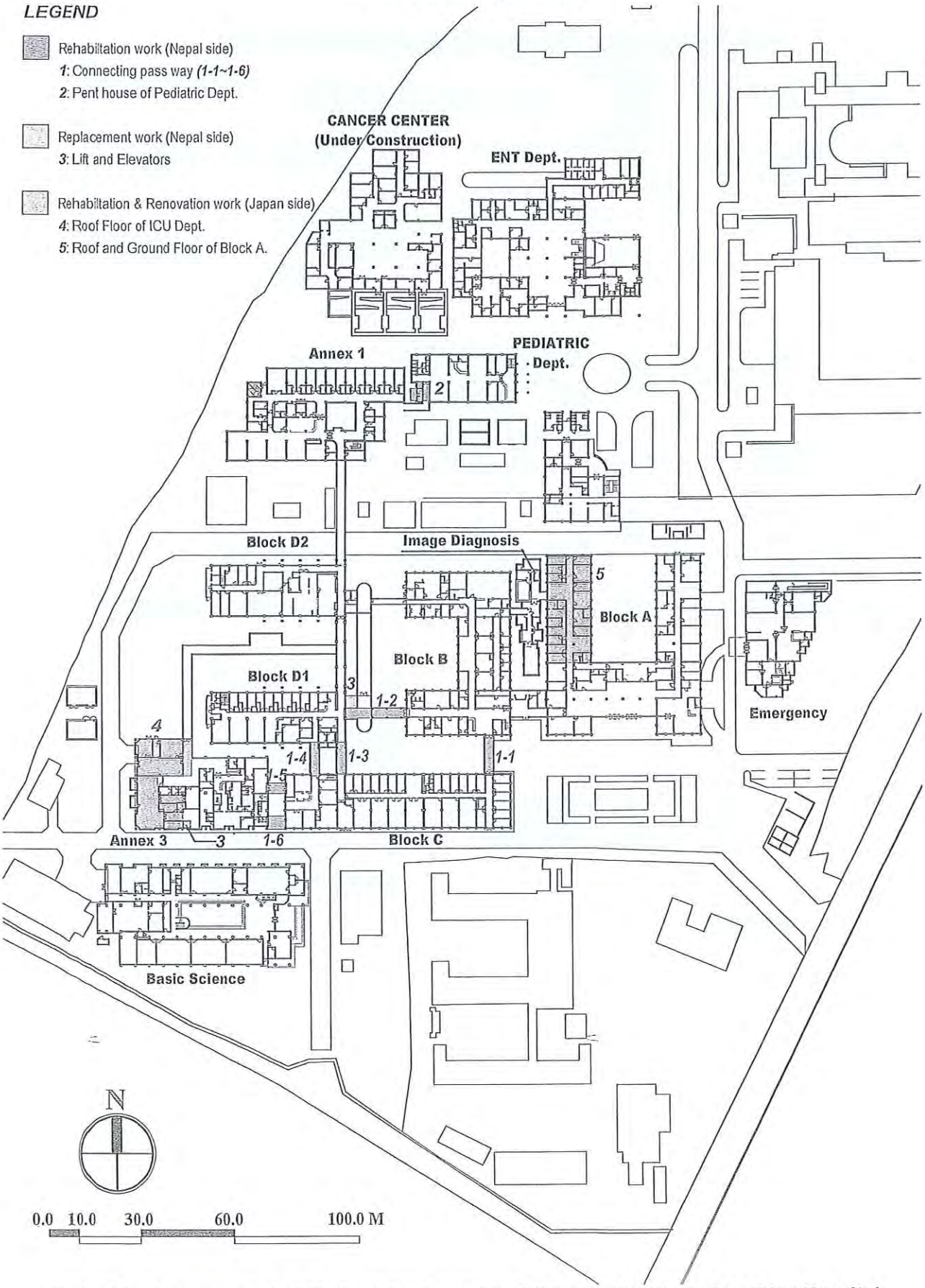
Foundations of all the objective buildings do not need the structural rehabilitation, but some superstructure of targeted building need slight rehabilitation. At the same time, all of TUTH building needs the rehabilitation of waterproofing, structural crack and the expansion joints for the sustainable usage of the facilities to supply one of the best qualities of medical service as the top referral hospital of Nepal.

Table 2. RRCAP of the Objective Building and Rehabilitation Points

Objective Bldg.	Department	Date of Survey	The rate of Remaining Capacity for Aseismic Performance	Equipment to be Procured by Japan's Grant Aid	Issue for the Installation of Required Equipment	Rehabilitation Point
Block A (1980's)	Outpatient New MRI room	2015/9/24	**98.3 (Slight Damaged)**	MRI	Floor Reinforcement (180kg→4tons/㎡) is necessary.	Waterproofing work is necessary
Image Diagnosis (OOC *1)		2015/9/20	**99 (Slight Damaged)**		9 leaking point at ceiling and wall, No original Drawings, Floor Reinforcement (2tons/㎡) is necessary but impossible without structural calculation sheet. Pertial demolish & Reconstruction is recommended	Waterproofing work with expansion joints repair
Block B (1980's)	Medical Examination・ Admin. Laboratory	2015/9/22	**99.3 (Slight Damaged)**	Immunohistochemistry、Immuno-fluorescence microscope with computer and camera, USG, Mammography, Video bronchoscopy		
Block C (1980's)	Operation Theater (OT), Delivery, Doctor's Cabin	2015/9/18	**93.1 (Small Damaged)**	Ventilator(Adult)、Patient Monitor、Laparoscopic set、Micro-motor Drill、Anesthesia machine、C-Arm	Cluck at the Expansion Joints	Waterproofing work with expansion joints repair
Block D (1980's)	Laundry, Kitchen, Ward	2015/9/23	**97.8 (Slight Damaged)**	Laundry	-	
ANX3 (1990's)	ICU, OT, Central Sterlization Supply Department (CSSD)	2015/9/21	**99.3 (Slight Damaged)**	Autoclave、Ventilator(Adult)、Patient Monitor、Laparoscopic set、Micro-motor Drill、Anesthesia machine、C-Arm	4 Leak Point at ICU	Waterproofing work with expansion joints repair
ENT	-			Autoclave	Floor Reinforcement (300 kg/㎡) is necessary but impossible without structural calculation sheet. Also it was planed as Delivery Rooms lately, and I suppose the foundation of the building doesn't have extra capacity.	
Pediatric	Pediatric Ward	2015/9/22	**98.1 (Slight Damaged)**	Ventilator Pediatric 、Patient Monitor、Laparoscopic Set、Anesthesia machine	Leak at the Expansion Joint	
Connecting passway		2015/9/23		-	Rehabilitation of 6 Conecting Passways is strongly reccomended,	Rehabilitate broken columns and expansion joints Waterproofing work

(*1) OOC: Owner's Own Construction

TRIBHUVAN UNIVERCITY TEACHING HOSPITAL
SITE PLAN (2015)



Project for Improvement of Medical Equipment in Tribhuvan University Teaching Hospital

(2) M/D concluded during the Discussion of Outline Design

Minutes of Discussions
on the Preparatory Survey for the Project for
Improvement of Medical Equipment in
Tribhuvan University Teaching Hospital
(Explanation on Draft Preparatory Survey Report)

On the basis of the discussions with the the Government of Nepal (hereinafter referred to as "Nepal") from September 15 to October 9, 2015 during a field survey, and the subsequent technical examination of the results in Japan, the Japan International Cooperation Agency (hereinafter referred to as "JICA") prepared a draft Preparatory Survey Report (hereinafter referred to as "the Draft Report") on the Project for Improvement of Medical Equipment in Tribhuvan University Teaching Hospital (hereinafter referred to as "the Project").

In order to explain the Draft Report and to consult with the concerned officials of the Nepal side on its contents, JICA sent to Nepal the Preparatory Survey Team for the explanation of the Draft Report (hereinafter referred to as "the Team"), headed by Tatsuya ASHIDA, Advisor for Health Team 4, Health Group 2, Human Development Department, JICA, and is scheduled to stay in Nepal from Feb 18 to 26, 2016. As a result of the discussions, the Nepal side and the Team confirmed the main items described in the attached sheets.

Kathmandu, 25th February, 2016

Mr. Tatsuya Ashida
Leader, the Preparatory Survey Team
Japan International Cooperation Agency

Dr. Lava Deo Awasthi
Joint Secretary
Ministry of Education

(Witness)
Prof. Dr. Sharad Raj Onta
Assistant Dean, Institution of Medicine
Tribhuvan University

(Witness)
Prof. Dr. Deepak Prakash Mahara
Executive Director
Tribhuvan University Teaching Hospital

(Witness)
Mr. Mahendra Prasad Shrestha
Chief, Policy Planning and International
Co-operation Division
Ministry of Health and Population

ATTACHMENT

1. Objective of the Project

   The objective of the Project is to improve the quality and quantity of medical services and education to be provided by Tribhuvan University Teaching Hospital (hereinafter referred to as "TUTH") through procurement of medical equipment thereby contributing to the enhancement of medical services and education in Nepal.

2. Significance of the Project

   The Nepal side and the Team confirmed, in the context of post disaster emergency situation, the Project will contribute to enhancing TUTH's seamless provision of health services as the top referral hospital, and to improve the preparedness for the possible disasters in the future.

3. Executing Agency and Implementing Agency

   The Nepal side and the Team confirmed the executing agency and implementing agency as follows:

   3-1. The executing agency is the Ministry of Education (hereinafter referred to as "MOE"), which would be the agency to supervise the implementing agency.

   3-2. The implementing agency is TUTH. The implementing agency shall coordinate with all the relevant agencies to ensure smooth implementation of the Project and ensure that the undertakings are taken by relevant agencies properly and on time.

4. Contents of the Draft Report

   After the explanation of the contents of the Draft Report by the Team, the Nepal side agreed in principle to its contents.

5. Cost Estimation

   The Nepal side and the Team confirmed that the Project cost estimation described in the Draft Report was provisional and would be examined further by the Government of Japan for its final approval.

6. Confidentiality of the Cost Estimation and Specifications

   The Nepal side and the Team confirmed that the Project cost estimation and

technical specifications in the Draft Report should never be duplicated or disclosed to any third parties until all the contracts of the Project are concluded.

7. Japan's Grant Aid Scheme
   The Nepal side had shown full understandings of the Japan's Grant Aid Scheme and the necessary measures to be taken by the Nepal side as described in Annex 4, Annex 5 and Annex 6 of the Minutes of Discussions signed on September 30, 2015.

8. Project Implementation Schedule
   The Team explained to the Nepal side that the expected implementation schedule is as attached in Annex 1.

9. Expected Outcomes and Indicators
   The Nepal side and the Team agreed that key indicators for expected outcomes are as follows. The Nepal side has responsibility to monitor the progress of the indicators and achieve the target in year 2020.
   [Quantitative Effect]
   1. The number of examination conducted with MRI (1.5T) has increased more than the base year.
   2. The number of examination conducted with Digital Mammograph has increased more than the base year.
   3. The number of examination conducted with Ultrasonograph has increased more than the base year.
   4. The time until pathological diagnosis with Immunohistochemical Stainer has decreased compared to the base year.

   [Qualitative Effect]
   1. To improve TUTH's provision of health care services by covering more diseases that can be diagnosed and treated at TUTH through the procurement of medical equipment.
   2. To provide knowledge and practical experience about various types of diseases in the field of medical education by increasing the number of diseases that can be diagnosed and treated at TUTH.

10. Technical Assistance ("Soft Component" of the Project)
    Considering the sustainable operation and maintenance of the provided

medical equipment, following technical assistance is planned to be provided under the Project.

11. Undertakings by the Nepal Side and to be Covered by the Grant Aid

The Nepal side and the Team confirmed the undertakings described in Annex 2. The Nepal side assured to take necessary measures for the smooth implementation of the Project. It is further agreed that the costs are indicative. More accurate costs will be calculated at the Detailed Design stage. Contents of Annex 2 will be updated as the Detailed Design progresses, will be the Attachment to the Grant Agreement, and will finally be used in the contract document.

12. Monitoring during the Implementation

The Project will be monitored and reported every 3 months by the implementing agency using the Project Monitoring Report (PMR), as per attached in Annex 3.

13. Ex-Post Evaluation

JICA will conduct ex-post evaluation 3 years after the project completion with respect to five evaluation criteria (Relevance, Effectiveness, Efficiency, Impact and Sustainability) of the Project. Results of the evaluation will be publicized. The Nepal side is required to provide necessary support including information necessary for the evaluation of the Project.

14. Schedule of the Survey

The Team will complete the Final Report of the Preparatory Survey in accordance with the confirmed items and send it to the Nepal side around July 2016

15. Other Relevant Issues

15-1. Tax Exemption and Budget Allocation

The Nepal side confirmed to take necessary measures for tax exemption as condition of the implementation of the Project. Necessary measures to be taken by the Nepal side with the allocation of adequate budget are described in Annex 4.

15-2. Repair/Renovation Work for Facilities

The Team recommends repairing and/or renovating the following facilities by the Nepal side. Locations are described in Annex 5.

a) Repair of Lift Shafts
b) Rehabilitation of Six Connecting Pass Ways
c) Waterproofing Work to Expansion Joints of Pediatric Department.

15-3. Operation and Maintenance of the Equipment

a) Importance of Operation and Maintenance

The Team explained the importance of operation and maintenance of the equipment under the Project considering that proper asset management is necessary to secure the life-span of the equipment and to reduce its maintenance cost. The Nepal side agreed to secure enough budgets necessary for appropriate operation and maintenance of the equipment.

b) Maintenance Contracts on Major Equipment

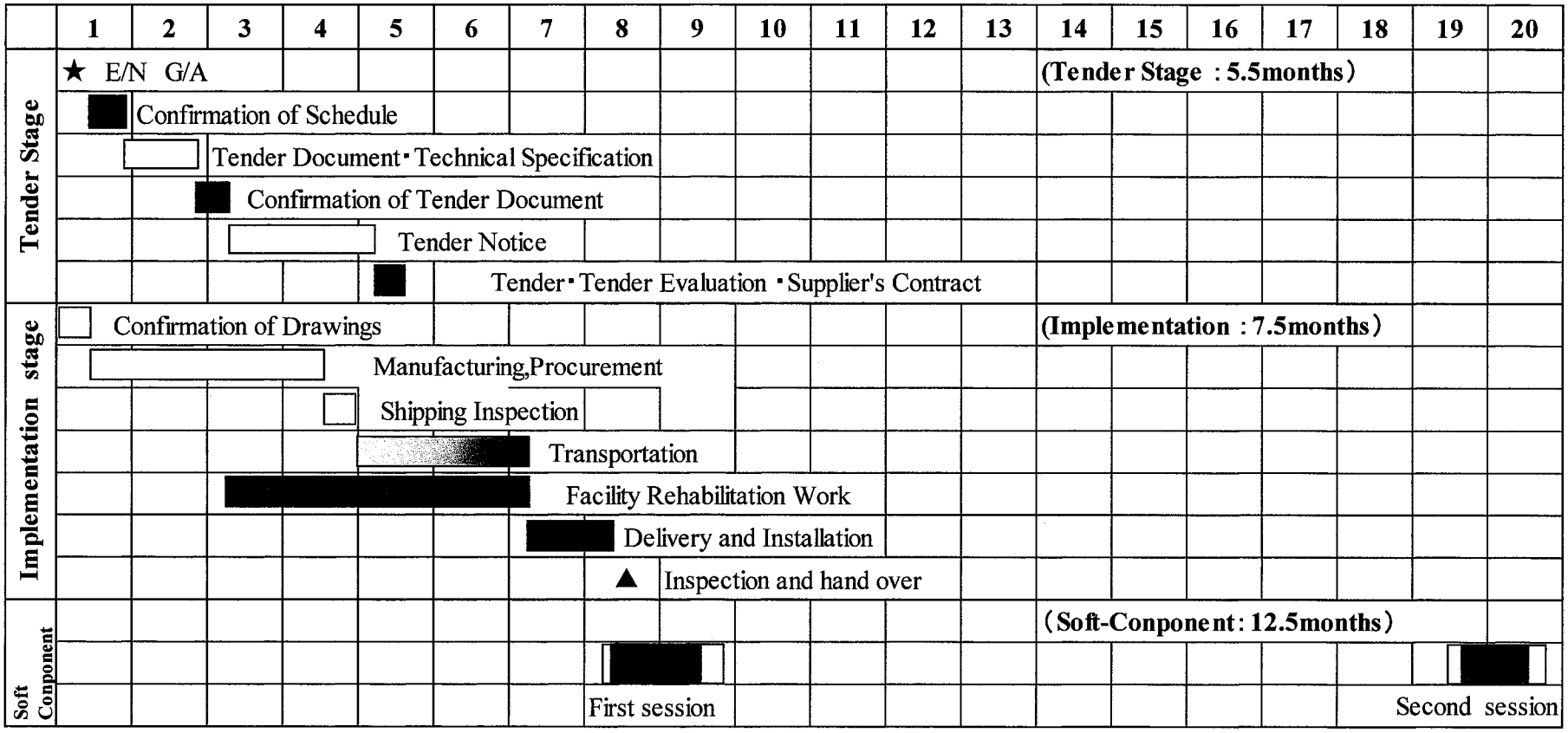
The Team explained that the importance of the routine maintenance and maintenance service of major equipment such as MRI. Keeping this in view, the Nepal side and the Team agreed to include maintenance service contracts into the Project to the major equipment that needs frequent maintenance.

15-4. Procurement of MRI

The Nepal side and the Team agreed to procure the MRI 1.5 tesla into the agreed area in Block A shown in Annex 6.

Annex 1. Implementation Schedule
Annex 2. Major Undertakings
Annex 3. Project Monitoring Report (Template, Main Clause)
Annex 4. Budget Allocation
Annex 5. Repair/Renovation Work for Facilities
Annex 6. Tentative Plan of MRI Room
Annex 7. Equipment List and Other Works

Annex 1. Implementation Schedule



Annex 2. Major Undertakings

Major Undertakings to be Taken by Governments of Nepal

1. Before the Tender

NO	Items	Deadline	In charge	Nepal Rupees (Thousand)	Ref.
1	To take necessary measures to open Bank Account (Banking Arrangement (B/A))			-	
	1) To bear the necessary commission charges with Bank Account if required.	Within 1 month after G/A	MOE/ MOF	-	
	2) To take necessary procedures among government organizations and Agent Bank in Nepal to open Bank Account (Banking Arrangement (B/A))	Within 1 month after G/A	MOE/ MOF	-	
2	To monitor and report every 3 months using the Project Monitoring Report (PMR)	Every three month	TUTH	-	

2. During the Project Implementation

NO	Items	Deadline	In charge	Nepal Rupees (Thousand)	Ref.
1	To bear the following commissions to a bank of Japan for the banking services based upon the B/A				
	1) Bank Commissions for A/P including advising commission and payment commission.	Within 1 month after the singing of the contract / Every payment	MOE/MOF	365	
2	To ensure prompt unloading and customs clearance in recipient country				
	1) Tax exemption and customs clearance of the products	During the Project	MOF/MOE/ MOHP	-	See Equipment List attached on the minutes of discussions signed on Feb 25th, 2016.
	2) To take necessary arrangement for internal transportation to the project site	During the Project	TUTH/Local Agents	-	
3	To accord Japanese nationals and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work	During the Project	MOE/ MOF	-	
4	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the Products and/or the Services be exempted	During the Project	MOF/ MOE	-	
5	To refund VAT tax imposed on equipment and services procured in Nepal.	During the Project	MOE/MOF	To Be Confirmed	See Equipment List attached on the minutes of discussions signed on Feb 25th, 2016.
6	To bear all the expenses, other than those to be borne by the Grant Aid, if any.	During the Project	TUTH /IOM	-	
7	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities				
	1) Electricity				
	If required, relocation of electrical lines and exchange of the transformers to increase the power receiving capacity.	Before installation of the equipment	TUTH/ IOM	-	
	2) Water Supply				
	If required, the city water distribution main to the site	Before installation of the equipment	TUTH/ IOM	-	
	3) Drainage				
	If required, the city drainage main to the site	Before installation of the equipment	TUTH/ IOM	-	

	4) Others				
	Necessary building utility works to install the equipment, if required.	Before installation of the equipment	TUTH/ IOM	-	
8	To recruit sufficient staff with appropriate skills and experiences for operation and maintenance of new equipment provided under the Grant Aid	Before installation of the equipment	TUTH/ IOM	-	
9	To dispose the existing equipment such as autoclaves, a mammograph and hand washing devices by taking necessary measures, and secure spaces for daily operation.	Before installation of the equipment	TUTH	100	
10	To transfer outpatient rooms of the department of psychiatry to other places for the renovation work for new MRI room.	Before installation of the equipment	TUTH	-	
11	To secure sufficient spaces for storing materials and equipment, and to provide enough space within target facilities to be used as an office during the project period.	Before installation of the equipment	TUTH	-	
12	To secure a room for installing immunofluorescence microscope, and to set black-out curtains on the windows, doors and others if necessary. To install air-conditioners at the room.	Before installation of the equipment	TUTH	-	

3. After the Project

NO	Items	Deadline	In charge	Nepal Rupees (Thousand)	Ref.
1	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid by:				
	1) Allocation of sufficient budget for operation and maintenance	From 1st year of the procurement	TUTH/ IOM	17,012	
	2) Training of staff on the specialized medical services for the full use of the equipment	After the Project	TUTH/ IOM	-	
	3) Making Annual/Comprehensive Maintenance Contract with Local Agents	3 years after the Installation	TUTH/ IOM	21,766	
2	To appoint and retain sufficient staff with appropriate skills and experiences for operation and maintenance of new equipment provided under the Grant Aid	After completion of the procurement	TUTH/ IOM	-	

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable)

Major Undertakings to be Covered by the Japan's Grant Aid

No	Items	Deadline	Cost Estimated Japanese Yen(Million)
1	To construct and/or repair facilities and provide equipment		
	1) To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country		
	a) Ocean (Air) transportation of the products from Japan (the third country) to the recipient country	During the Project	
	b) Transportation from the port of disembarkation to the project site	During the Project	
	2) To construct and/or repair facilities		
	a) Waterproofing work to the top roof of ICU	1 month before procurement	
	b) Waterproofing work to Block A	1 month before procurement	
	c) Renovation work to a new MRI room	1 month before procurement	
	3) To provide equipment with installation, commissioning and training	During the Project	
2	To implement detailed design, tender support and construction supervision if any (Consultant)	During the Project	
3	Technical assistance as soft components, which will be provided by Japan's grant aid, for proper operation and preventive maintenance of the equipment.	During the Project	
	Total		

*; The cost estimates are provisional. This is subject to the approval of the Government of Japan.

Annex 3. Project Monitoring Report (Template, Main Clause)

Project Monitoring Report
on
Project Name
Grant Agreement No. XXXXXXX
20XX, Month

Organization Information

Authority (Signer of the G/A)	Person in Charge	_____
	Contacts	(Division) _____ Address: _____ Phone/FAX: _____ Email: _____
Implementing Agency	Person in Charge	_____
	Contacts	(Division) _____ Address: _____ Phone/FAX: _____ Email: _____
Responsible Agency	Person in Charge	_____
	Contacts	(Division) _____ Address: _____ Phone/FAX: _____ Email: _____

Outline of Grant Agreement:

Source of Finance	Government of Japan: Not exceeding JPY _____ mil. Government of (_____): _____
Project Title	
E/N	Signed date: Duration:
G/A	Signed date: Duration:

1: Project Description

1-1 Project Objective

1-2 Necessity and Priority of the Project

- Consistency with development policy, sector plan, national/regional development plans and demand of target group and the recipient country.

1-3 Effectiveness and the indicators

- Effectiveness by the project

Quantitative Effect (Operation and Effect indicators)		
Indicators	Original (Yr)	Target (Yr)
Qualitative Effect		

2: Project Implementation

2-1 Project Scope

Table 2-1-1a: Comparison of Original and Actual Location

Location	**Original:** *(M/D)* **Attachment(s):Map**	**Actual:** *(PMR)* **Attachment(s):Map**

Table 2-1-1b: Comparison of Original and Actual Scope

Items	Original	Actual
(M/D) 'Soft component' shall be included in 'Items'.	*(M/D)*	*(PMR)* Please state not only th e most updated schedul e but also other past re visions chronologically. All change of design shal l be recorded regardless of its degree.

(Sample)Table 2-1-1b: Comparison of Original and Actual Scope

Items	Original	Actual
1. Upgrading of the Kukum Highway	length 20km, single lane (3.47m*2), path(1.25m*2) Concrete Pavement 200mm (motor lane only)	length 20km, single lane (3.47m*2), path(1.00m*2) Concrete Pavement 200m m (motor lane only)
2. Replacement of Old Mataniko Bridge	Bridge length 40m, Width 9.5m, path(1.00m*2), compound steel box-girder bridge, Inverted T type-abutment spread foundation	Ditto

(Sample)Table 2-1-1b: Comparison of Original and Actual Scope

Items	Original	Actual
1. Outpatient Department	RC, Double Story Ground floor: Consultation room 6 Reception Satellite Lab. Pharmacy, etc 1st floor: Consultation room 5 Dental Clinic 2	RC, Double Story Ground floor: Consultation room 5 ditto
2. Operation Theatre, Casualty Unit, Maternity Ward	RC, Double Storey Ground Floor: Operation room 2 Casualty Unit 1st Floor: Maternity Ward 50 beds	 ditto Maternity Ward 60 beds

(Sample)Table 2-1-1b: Comparison of Original and Actual Scope

Items	Original	Actual
1. Primary and Secondary Surveillance Radars at Chittagong Int'l Airport	i) OSR/SSR 1 set ii) RDP 1 set iii) VHF Transmitters 2 sets	Ditto
2. Access Control System for Dhaka Int'l Airport	1 set	Ditto
3. Doppler VOR/DME at Saidpur Airport	1 set	Ditto
4. Aerodrome Simulator for Civil Aviation Training Center	1 set	Ditto

5. Baggage Inspection System for Dhaka Int'l Airport	i) Hold Baggage Xray Inspectin system 7sets ii) Hold Baggage Explosive Trace Detecting System 7sets iii) Cabin Baggage Xray Inspection System 2sets	Ditto
6. Airport Fire Fighting Vehicles for Dhaka Int'l Airport	2 sets	3 sets

2-1-2 Reason(s) for the modification if there have been any.

(PMR)

2-2 Implementation Schedule

2-2-1 Implementation Schedule

Table 2-2-1: Comparison of Original and Actual Schedule

Items	Original		Actual
	DOD	G/A	
【M/D】	*(M/D)*		*(PMR)* As of (Date of Revision)
'Soft component' shall be stated in the column of 'Items'.			Please state not only the most updated schedule but also other past revisions chronologically.
Project Completion Date*			

*Project Completion was defined as _____ at the time of G/A.

(Sample)Table 2-2-1: Comparison of Original and Actual Schedule

Items	Original		Actual
	DOD	G/A	
Cabinet Approval	11/2015	-	-
E/N	12/2015	1/2016	24/1/2016
G/A	12/2015	1/2016	24/1/2016 Amended 13/3/2017
Detailed Design	12/2015-4/2016	1/2016-5/2016	1/2016-5/2016
Tender Notice	5/2016	5/2016	1/6/2016
Tender	6/2016	6/2016	15/7/2016
(Lot1) Construction Period	7/2016-11/2018	7/2016-11/2018	8/8/2016-30/11/2018
(Lot2) Installarion of Equipement	7/2016-6/2018	7/2016-6/2018	6/8/2016-30/60/2017
Project Completion Date	11/2018	11/2018	30/11/2018

Defect Liability Period	11/2019	11/2019	30/11/2019

*Project Completion was defined as Check-out of Construction work at the time of G/A.

2-2-2 Reasons for any changes of the schedule, and their effects on the project.

2-3 Undertakings by each Government

2-3-1 Major Undertakings

See Attachment 2.

2-3-2 Activities

See Attachment 3.

2-3-3 Report on RD

See Attachment 4.

2-4 Project Cost

2-4-1 Project Cost

Table 2-4-1a Comparison of Original and Actual Cost by the Government of Japan
(Confidential until the Tender)

Items			Cost (Million Yen)	
	Original	Actual	Original	Actual
Construction Facilities (or Equipment)	'Soft component' shall be included in 'Items'.			Please state not only the most updated schedule but also other past revisions chronologically.
Consulting Services	- Detailed design -Procurement Management -Construction Supervision			
Total				

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar = Yen

Table 2-4-1b Comparison of Original and Actual Cost by the Government of XX

Items			Cost (Million USD)	
	Original	Actual	Original	Actual
				Please state not only the most updated schedule but also other past revisions chronologically.

Total		

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar = (local currency)

(Sample)Table 2-4-1a Comparison of Original and Actual Cost by the Government of Japan
(Confidential until the Tender)

Items			Cost (Million Yen)	
	Original	Actual	Original[1),2)]	Actual
Construction Facilities	1. Outpatient Department 2. Operation Theatre, Casualty Unit, Maternity Ward	Ditto Ditto	1,169.5	1,035.0
Equipment	1) Primary and Secondary Surveillance Radars at Chittagong Int'l Airport 2) Access Control System for Dhaka Int'l Airport 3) Doppler VOR/DME at Saidpur Airport 4) Aerodrome Simulator for Civil Aviation Training Center 5) Baggage Inspection System for Dhaka Int'l Airport 6) Airport Fire Fighting Vehicles for Dhaka Int'l Airport	Ditto	2,374.6	2,110.0
Consulting Services	- Detailed design -Procurement Management -Construction Supervision -Soft Component	Ditto	0.87	0.87
Total			3544.97	3145.87

Note: 1) Date of estimation: October, 2014
2) Exchange rate: 1 US Dollar = 99.93 Yen

(Sample)Table 2-4-1b Comparison of Original and Actual Cost by the Government of Bangladesh

Items			Cost (1,000 Taka)	
	Original	Actual	Original[1),2)]	Actual
Dhaka International Airport	Modification of software of existing Rader Data Processing System	Ditto	8,000	9,240
	Provision of a partition, lighting, air conditioning and electric power supply at transfer hold baggage check point	Ditto	5,000	2,453
	Replacement of five doors in the international passenger terminal building	Ditto	4,000	5,340
Chittagong Int'l Airport	Preparation of the radar site including felling of trees, clearing and grabbing	Ditto	5,000	3,400
Total			22,000	20,433

Note: 1) Date of estimation: October, 2014
2) Exchange rate: 1 US Dollar = 0.887 Bangladesh Taka (local currency)

2-4-2 Reason(s) for the wide gap between the original and actual, if there have been any, the remedies you have taken, and their results.

(PMR)

2-5 Organizations for Implementation

2-5-1 Executing Agency:

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

Original: *(M/D)*
Actual, if changed: *(PMR)*

2-6 Environmental and Social Impacts

- The results of environmental monitoring as attached in Attachment 5 in accordance with Schedule 4 of the Grant Agreement.
- The results of social monitoring as attached in Attachment 5 in accordance with Schedule 4 of the Grant Agreement.
- Information on the disclosed results of environmental and social monitoring to local stakeholders, whenever applicable.

3: Operation and Maintenance (O&M)

3-1 O&M and Management

- Organization chart of O&M
- Operational and maintenance system (structure and the number ,qualification and skill of staff or other conditions necessary to maintain the outputs and benefits of the project soundly, such as manuals, facilities and equipment for maintenance, and spare part stocks etc)

Original: *(M/D)*
Actual: *(PMR)*

3-2 O&M Cost and Budget

- The actual annual O&M cost for the duration of the project up to today, as well as the annual O&M budget.

Original: *(M/D)*

4: Precautions (Risk Management)

- Risks and issues, if any, which may affect the project implementation, outcome, sustainability and planned countermeasures to be adapted are below.

Original Issues and Countermeasure(s): *(M/D)*	
Potential Project Risks	Assessment
1.	Probability: H/M/L
(Description of Risk)	Impact: H/M/L
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action during the Implementation:
	Contingency Plan (if applicable):
2.	Probability: H/M/L
(Description of Risk)	Impact: H/M/L
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action during the Implementation:
	Contingency Plan (if applicable):
3.	Probability: H/M/L
(Description of Risk)	Impact: H/M/L
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action during the Implementation:
	Contingency Plan (if applicable):
Actual issues and Countermeasure(s)	
(PMR)	

5: Evaluation at Project Completion and Monitoring Plan

5-1 Overall evaluation

Please describe your overall evaluation on the project.

5-2 Lessons Learnt and Recommendations

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

5-3 Monitoring Plan for the Indicators for Post-Evaluation

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

Annex 4. Budget Allocation

1. Renovation of Facilities (Reccomendation)

Item	Stage of the Project	Amounts (Nepal Rupees)	Amounts (Japanese YEN)
Replacement of Motion Control Drive of Old CSSD's Lift	Before the Installation of the Equipment	517,241	600,000
Rehabilitation work of six passways		9,482,759	11,000,000
Repair of Crack and rain leakage of Pediatric Department		3,448,276	4,000,000
TOTAL		13,448,276	15,600,000

2. Annual Fees of Maintenance Contract

Item	Stage of the Project	Amounts (Nepal Rupees)	Amounts (Japanese YEN)
-CMC (Periodical checkups, On-call repair work, Free-charge spare parts) MRI, C-Arm, and Mammograph	3 Years After the Installation / Annually	19,992,241	23,191,000
-AMC (Periodical checkups, On-call repair work) High Pressure Steam Sterilizers, and Immunohistochemical Stainer		1,774,138	2,058,000
TOTAL		21,766,379	25,249,000

3. Annual Operation Costs of New Equipment

Item	Stage of the Project	Amounts (Nepal Rupees)	Amounts (Japanese YEN)
MRI (Films for Digital Printers, Imaging Agent, Electricity Charge), Digital Mammograph (Films for Digital Printers), Ultrasonograph (Recording Papers, Gels), and others.	From 1st Year of the Procurement / Annually	17,012,069	19,734,000

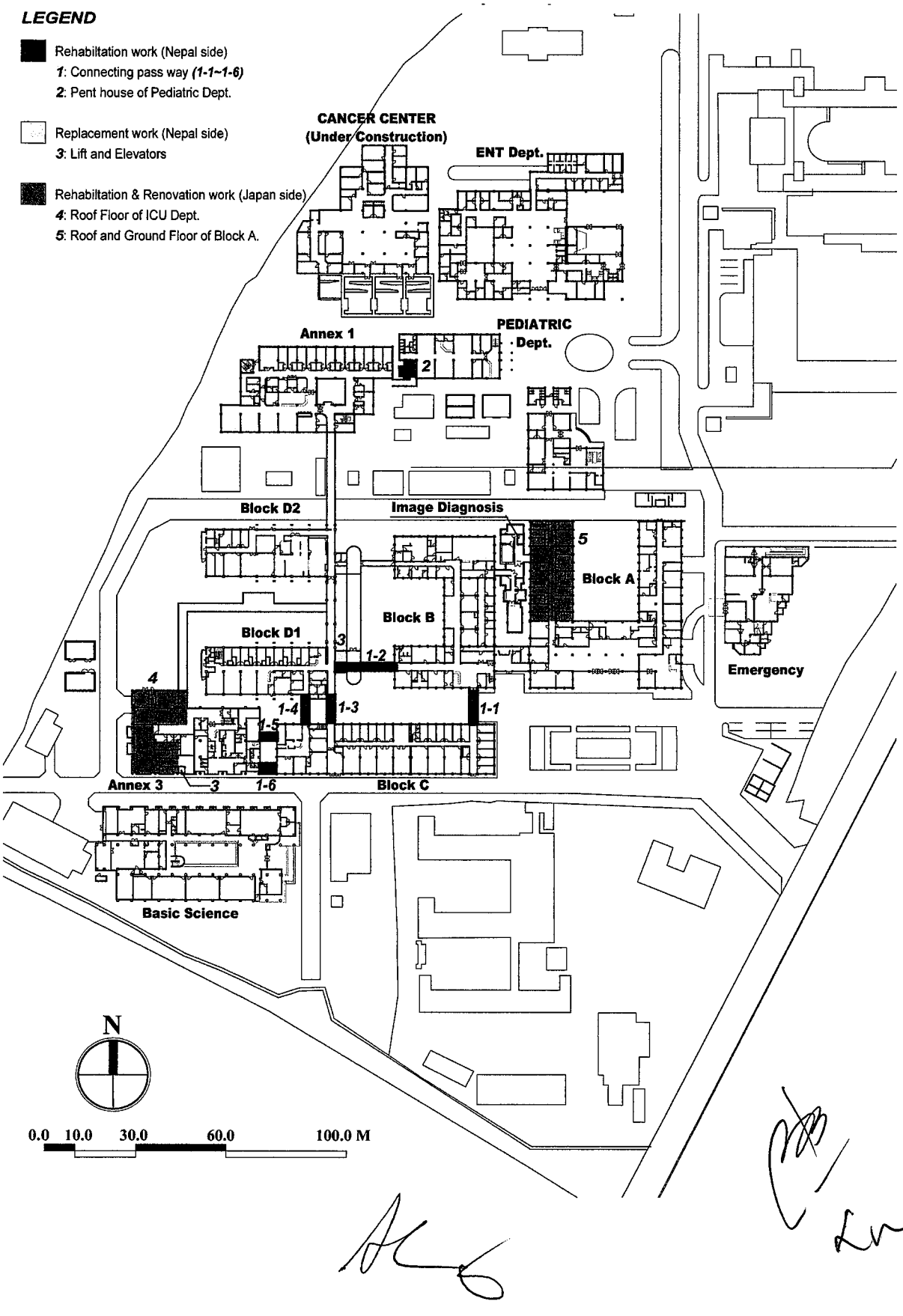
4. Others

Item	Stage of the Project	Amounts (Nepal Rupees)	Amounts (Japanese YEN)
Bank Commissions	Within 1 Month After the Singing of the Contract / Every Payment	364,655	423,000
Removal of Existing Equipment such as autoclaves, a mammograph, and hand washing devices.	Before the Installation of the Equipment	100,000	116,000

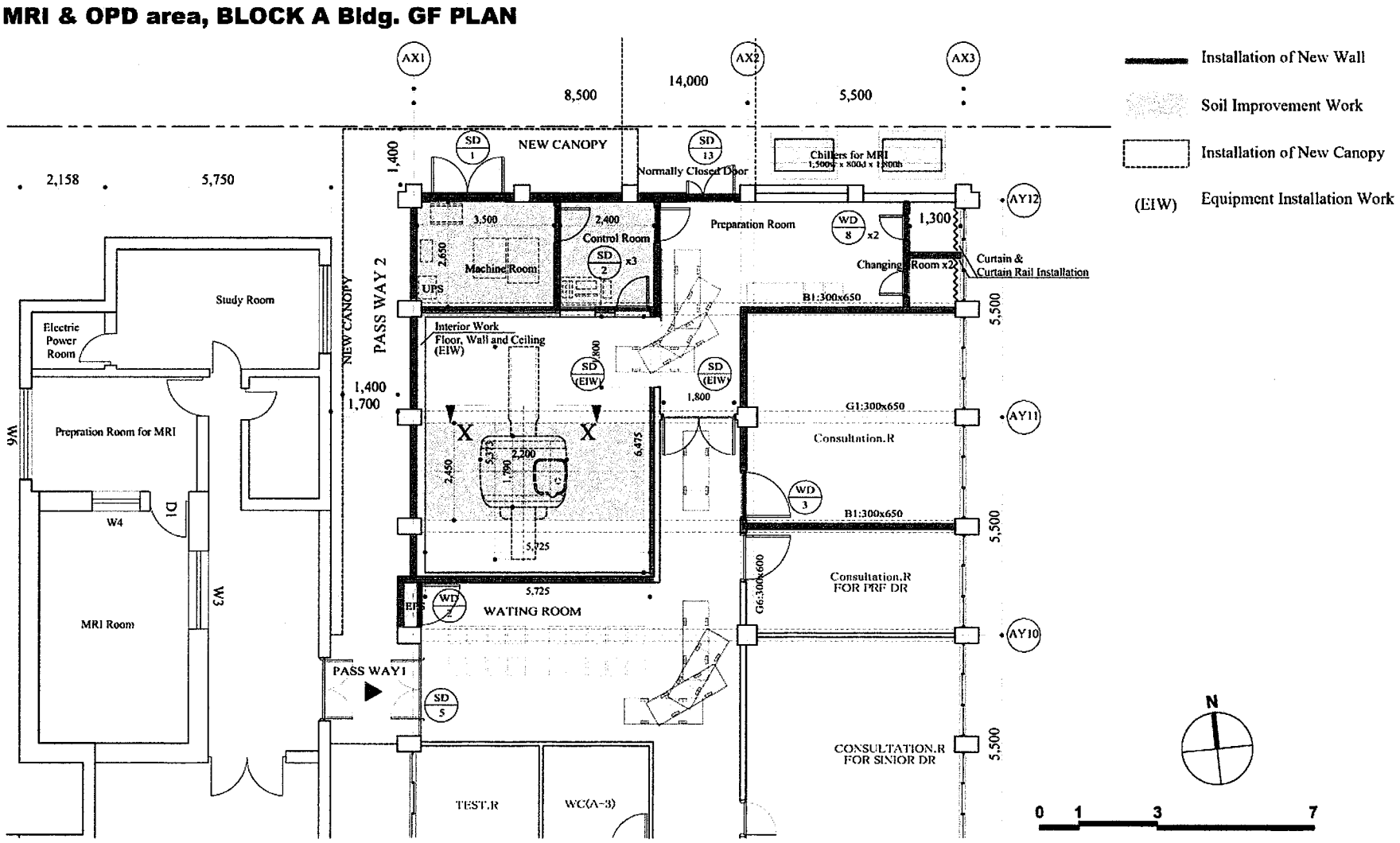
-Time of estimation : October, 2015

-Exchange Rate : 1USD = 123.31 yen, 1NPR = 1.16 yen

Annex 5. Repair/Renovation Work for Facilities



Annex 6. Tentative Plan of MRI Room



Annex 7. List of Equipment and Other Works

Code No.	Description	Q'ty	Block A		Block B				Annex 3											ENT Bldg.	Emergency Bldg.	Surgical OPD Bldg.
			GF		GF			1F	GF	1F												
			Dept. of Endoscopy	Dept. of Image Diagnosis				Dept. of Pathology	CSSD	Dept. of Orthopedics	OB/GY		GIE	Pediatric Dept.		Anaesthesia Dept.						
			Endoscopy Room	New MRI Room	USG Room	Image Diagnostic Room	Mammogram Room	Pathological Laboratory	Central Sterilization Room	Main OT No. 1-3	Main OT No. 6	Obstetric Recovery	Main OT No. 7	Main OT No. 8	NICU/PICU	Main OT (Share)	OT Preparation Yard	ICU	Post OT	ENT Post OT	Emergency Dept.	Birthing Center
1	Magnetic Resonance Imaging (MRI), 1.5T, with CMC	1		1																		
2	Ultrasonograph, Observation	2			1																	1
3	Ultrasonograph for ICU	3																1			2	
4	Ultrasonograph, Examination	2				2																
5	Digital Mammograph, with CMC	1					1															
6	High Pressure Steam Sterilizer, Large, with AMC	2							2													
7	High Pressure Steam Sterilizer, Medium, with AMC	2							2													
8	C-Arm X-ray Machine, with CMC	2								2												
9	Video Arthroscope Set	2								2												
10	Video Bronchoscope Set	1	1																			
11	Ventilator, Adult	4																	4			
12	Ventilator, Pediatric and Neonate	5													5							
13	Patient Monitor, OT	3														3						
14	Patient Monitor, ICU	3																1		2		
15	Patient Monitor, NICU/PICU	6													6							
16	Patient Monitor, Recovery and Emergency	3										2									1	
17	Laparoscopic Set for Gynaecology	1									1											
18	Laparoscopic Set for Gastrointestinal Surgery, Adult	1											1									
19	Laparoscopic Set for Gastrointestinal Surgery, Pediatrics	1												1								
20	Micromotor Drill for Craniofacial Surgery	1								1												
21	Anaesthesia Machine	4														3					1	
22	Immunohistochemical Stainer, with AMC	1						1														
23	Immunofluorescence Microscope with Teaching Head	1						1														
24	Hand Washing Device	1															1					
I	Structure Rehabilitation and Interior Work	1		1																		
II	Reinforcement of the Floor of CSSD	1							1													
III	Waterproofing Work for Block A	1		1																		
IV	Waterproofing Work of ICU	1																1				

Note:

CMC means Comprehensive Maintenance Contract. Each contract shall be concluded annually for 2 years after the end of manufacturers' 1-year warranty.

AMC means Annual Maintenance Contract. Each contract shall be concluded annually for 2 years after the end of manufacturers' 1-year warranty.

CSSD : Central Sterilization Supply Department

PICU/NICU : Pediatric Intensive Care Unit/ Neonatal Intensive Care Unit

Appendix 5. Soft Component (Technical Assistance) Plan

Technical Assistance (Soft Component) Plan for the Project for Improvement of Medical Equipment of Tribhuvan University Teaching Hospital

Consortium of
Binko International Ltd. and
System Science Consultants Inc.

1. Background of Planning Soft Component

1－1 Outline of the Project

The Project for Improvement of Medical Equipment of Tribhuvan University Teaching Hospital (hereinafter referred to as "the Project") intends to replace some exhausted/aged medical equipment of Tribhuvan University Teaching Hospital (hereinafter referred to as "TUTH") with new ones and also procure new medical equipment necessary for TUTH to serve as a top referral hospital in the country. Hence, the Project has set as its goals to reinforce the functions of TUTH as one of the tertiary medical facilities and teaching hospitals in the country, and to improve the healthcare services and educational system of TUTH in terms of quality and quantity through the mitigation of congestion in outpatient and related departments.

1－2 Present State and Issues of TUTH

To achieve the overall goal cited above, the Project will procure sophisticated diagnostic imaging units including a magnetic resonance imaging[1] (1.5T), a digital mammography, and C-arm X-ray machines. However, considering the operation and maintenance system of TUTH for medical equipment, and the knowledge and technical levels of its medical doctors, engineers and other end-users about maintenance and management, it is necessary to conduct initial operation training and operation training by medical equipment suppliers, as well as technical training that focuses on reinforcement of the preventive maintenance capacity.

(1) Present State and Issues of the Maintenance System for Medical Equipment

TUTH has a maintenance department under the management division, and this maintenance department plays a central role in the maintenance system for the facilities and medical equipment. The medical equipment maintenance section of the department is staffed by one biomedical engineer (hereinafter referred to as "BME") and one maintenance staff member, but since the section consists of a small number of staff, actual maintenance of medical equipment at the entire hospital is left to the hands of individual field departments and sections that actually operate medical equipment. Field personnel are aware of the conditions of equipment at hand, but

[1] Hereinafter referred to as "MRI".

do not always keep records before and after the use, and contact BME for repair only when a severe failure has occurred in their equipment. If a repair needs to be outsourced, the troubled instrument could be withheld for a certain period, during which some patients are unable to receive appropriate medical services. Therefore, in order for TUTH to appropriately use and maintain the planned equipment, and continuously provide medical services, it is vital to technically reinforce the maintenance system for medical equipment through preventive maintenance.

TUTH, a teaching hospital affiliated to the Institute of Medicine of Tribhuvan University, normally procures medical equipment that meets the specifications required in tenders of the Ministry of Health and Population (MoHP)[2]. The specifications set forth by MoHP require conclusion of a comprehensive maintenance contract[3] covering two years after the delivery of equipment and an annual maintenance contract[4] covering the subsequent three years with suppliers in accordance with importance of maintenance. Thus, maintenance of medical equipment including large-scale diagnostic imaging units which TUTH recently procured, such as MRI (0.3T), 128-slice CT scanner[5] and angiographic imaging device, together with medical equipment[6] in the operation theaters and ICU[7], has been outsourced to local agencies[8] of medical equipment makers under five-year maintenance contracts. But the medical equipment maintenance department does not have sufficient knowledge about the details and coverage of these outsourced maintenance contracts, and does not know how to incorporate their necessary conditions in these contracts, either. Because of this, various problems have arisen. For example, after the expiry of some five-year maintenance contracts, TUTH has inadvertently signed maintenance contracts including unwanted maintenance items and obliged to pay additional costs to local maintenance agencies. In other cases, TUTH has failed to include necessary items in maintenance contracts and, when failures occurred, has had to have additional negotiation over repair of the troubled instruments with local agencies which refused the repair under the initial contracts.

In these situations, it is necessary to reduce outsourced repairs by, first of all, providing TUTH with technical guidance on preventive maintenance of medical equipment, so that TUTH can minimize failures of equipment, promptly request repair and have troubled instruments repaired at an early stage. It is also necessary for TUTH personnel including maintenance staff to expand

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[2] TUTH is Nepal's top referral hospital but at the same time a teaching hospital of the Institute of Medicine of Tribhuvan University, and thus is under the control of the Ministry of Education. As for medical technology, TUTH engages in formulation of the country's policy in collaboration with MoHP.

[3] Comprehensive maintenance contracts refer to agreements, under which agencies perform maintenance such as regular visits maintenance, on-call repair and free spare parts replacement.

[4] Annual maintenance contracts refer to agreements, under which agencies perform regular visit maintenance. On-call repair and spare parts replacement are included as paid services.

[5] CT is an abbreviation of computed tomography. CT scanner refers to X-ray computerized transverse axial tomography.

[6] These include patient monitors, ventilators and anaesthesia machines.

[7] ICU is an abbreviation of intensive care unit.

[8] In Nepal, biomedical engineers are trained at vocational schools. Most graduates opt to work for companies outside the country or local agencies of foreign manufacturers rather than public healthcare institutions for higher payments.

their knowledge of the coverage and setting of maintenance contracts.

(2) Present State and Issues of the Use of Medical Equipment

The medical staff of TUTH are well versed in the operation and use of existing equipment, and clinically well experienced in individual instruments. Since the 1980s, Japan's grant aid projects have been conducted several times to provide TUTH with medical equipment, which have been used for healthcare services and repaired from time to time. Thus, these end-users of Japan's ODA output are familiar with the operation and use, and well aware of the conditions of the medical equipment. They are also well versed in the general operation and use of advanced medical equipment at the Department of Image Diagnosis.

However, MRI (1.5T) planned to be procured in this Project mounts image construction application software which demands more advanced operational skills than MRI (0.3T) currently owned by TUTH. The end-users at the Department of Image Diagnosis will be required to acquire techniques to appropriately take images with MRI (1.5T) even if they have a lot of clinical experience. In addition, MRI (1.5T) uses stronger magnetic field and electromagnetic waves than MRI (0.3T), causing more image artifacts (confusing images). To prevent image artifacts, operators must acquire knowledge and skills of appropriately positioning patients and selecting appropriate thickness and number of slices. To image blood vessels alone, operators must have knowledge and skills of contrast media and the application software to retrieve biochemical information about blood vessels. Moreover, MRI (1.5T) is an interlocking system consisting of multiple components[9]. Because of all this, anyone would not be able to acquire these knowledge and skills only through initial and ordinary operation training provided by medical equipment suppliers, and would not be able to smoothly operate this instrument. At the same time, because of the stronger magnetic field and electromagnetic waves, meticulous care must be taken at the time of examinations with MRI: that is, operators must ensure that no medical equipment or tools containing metal are present, and check if no metal exists inside or on the surface of patients' bodies. To comply with these safety measures for patients, too, operators need technical assistance in advance. Therefore, the above-mentioned technical assistance will be provided at an initial stage of operations of the equipment.

1－3 Necessity of the Technical Assistance (Soft Component)

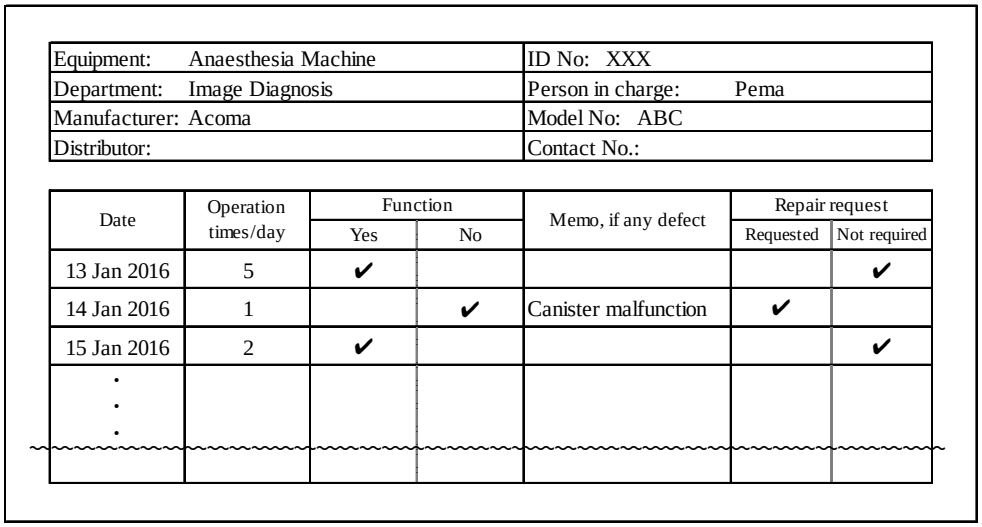
In line with the sections above, and to ensure smooth start-up of the Project and sustainability of equipment to be procured, issues of the target facility, TUTH, have been summarized as follows:

(i) Preventive maintenance including routine inspections is hardly performed thoroughly at TUTH
(ii) TUTH has difficulty in appropriately setting out conditions of maintenance contracts for medical equipment.
(iii) TUTH staff must acquire knowledge and skills of operating MRI (1.5T), running the

[9] These components include the main imaging device, contrast media injector, image printer, and medical image management system.

application software, and conducting routine inspections and safety control.

To improve the situation and resolve the issues, the Project appears to need the technical assistance (soft component) for the operation and maintenance of equipment to maintenance staff including end-users such as medical doctors, nurses, engineers and BME of TUTH. The technical assistance (soft component) is outlined as follows.



Equipment: Anaesthesia Machine	ID No: XXX
Department: Image Diagnosis	Person in charge: Pema
Manufacturer: Acoma	Model No: ABC
Distributor:	Contact No.:

Date	Operation times/day	Function		Memo, if any defect	Repair request	
		Yes	No		Requested	Not required
13 Jan 2016	5	✔				✔
14 Jan 2016	1		✔	Canister malfunction	✔	
15 Jan 2016	2	✔				✔
. . .						

Figure 1. Equipment Card (sample)

(i)' End-users who routinely use medical equipment will use “designated equipment cards” for thorough routine inspections and preventive maintenance. Equipment cards will be designed to be as simple as the sample above, so that end-users can simply record the operation times per day, presence of any defect, descriptions of defect (if any), and necessity of repair request.

(ii)' Technical transfer and recommendations will be made on the selection method of maintenance items for medical equipment, so that appropriate maintenance conditions can be made clear.

(iii)' Training will be conducted by expert engineers on MRI operating skills, creation and analyses of diagnostic images, data analysis and management, routine inspections and safety control.

2. Objectives of Technical Assistance (Soft Component)

Preventive maintenance of the equipment to be procured under the Project will be thoroughly performed to reduce down-time of the medical equipment and enable to continuously use them beyond the expected lifetime. At the same time, end-users will become able to operate the equipment smoothly and effectively, make the most of the functions of the equipment, and perform clinical practices while considering the safety of patients.

3. Outcomes of Technical Assistance (Soft Component)

(A) Each end-user of the equipment to be procured becomes able to manage routine inspections and repair records in accordance with equipment cards, and manage the equipment with the responsibility for the scope ranging from decisions on necessity of repair to the actual process of repair request.

(B) The relevant management sections of TUTH and BME become able to select maintenance items necessary for the medical equipment, and conclude maintenance contracts in the manner that TUTH takes the initiative in setting out maintenance conditions.

(C) Radiological doctors and technologists become able to create and analyze diagnostic images, perform data analyses and management, and appropriately operate MRI (1.5T). They also become able to appropriately conduct routine inspections.

(D) Radiological doctors and other medical staff using MRI (1.5T) deepen their knowledge about risk management unique to the equipment, and become able to appropriately run the equipment and consider the safety of patients.

4. Method of Confirming Degree of Attainment of the Outcomes

The degree of attainment of the outcomes will be confirmed in the following manner. The degree of attainment about the operations of MRI (1.5T) will be particularly confirmed by means of written examinations using images showing selected diseases in consideration of the disease structure in Nepal and diseases of outpatients and inpatients of TUTH.

Table 1. Method of Confirming Degree of Attainment of the Outcomes

Confirmation method	Relevant items in Section 3 "Outcomes of the Technical Assistance (Soft Component)"
(1) Written examinations will be conducted to check the technical level acquired.	All
(2) Simulated presentation examinations will be conducted to check troubleshooting of the equipment by using equipment cards.	(A)
(3) Simulated presentation examinations will be conducted to check the understanding of components of maintenance contracts.	(B)

5. Activities of Technical Assistance (Soft Component) (Input Plan)

5－1 Input Timing and Period

The technical assistance (soft component) consists of two sessions. The first session will be conducted immediately after the delivery of the equipment, and the second session 11 months after the first session. The sessions will continue for about one month each, a total of two months.

The timing of the first session has been determined on the grounds that trainees will have just

received initial and ordinary operation training from equipment suppliers. The training under the soft component is likely to be more effective if it is conducted immediately after they have gained certain knowledge about the equipment.

The second session will be conducted about 11 months after the delivery on the assumption that trainees will have dealt with some diseases and repair and thus have got used to the equipment by then. It is also a good timing to see if they have smoothly procured expendable supplies, so that it will be possible to see if they have appropriately used the equipment.

5－2 Soft Component Activities

(Provisional) activities in the first and second sessions are listed as follows.

As domestic work prior to each session, the Japanese side will confirm if the Nepalese side is ready to receive the sessions, and prepare inspection documents in consideration of the specifications, composition and features of the medical equipment to be procured under the Project. The Japanese side will also prepare implementation and other reports after each session.

(1) Activities and Target Trainees of the First Session

Table 2. (Provisional) Activities in the First Session

Target equipment	Descriptions of training	Trainees
(i) Training on operation		
・MRI (1.5T)	Appropriate imaging methods, knowledge of setting imaging conditions, case studies of imaging with contrast media and general imaging, applied usage of the application software, management of data on the software, image analysis, image processing, explanation about basic operations of the image printer, guidance on operations of the system, guidance on handling, safety control upon the use of the equipment, usage of the manuals, troubleshooting, handling at the time of power-off, understanding of interlocking with UPS equipment, etc.	・Radiological doctors ・Radiological technologists ・Doctors in charge at relevant departments
(ii) Routine inspections and safety control related to MRI (1.5T)		
・MRI (1.5T)	・Methods of routine inspections in accordance with the manuals ・Analysis of backgrounds and factors of accidents using the following case studies, and understanding of remedies Bringing in magnetic materials such as oxygen tanks and stretchers, handling of hairgrips and other metal materials on and inside patients' bodies, burn injury due to the high-frequency magnetic field, and release of helium gas	・Radiological doctors ・Radiological technologists ・Nurses ・BME
(iii) Preventive maintenance, routine inspections and safety control with equipment cards		
・Equipment to be procured	・Appointment of personnel responsible for management of relevant equipment (hereinafter referred to as "personnel responsible for equipment"), clarification of the scope of their responsibility, creation of equipment	・Personnel responsible for equipment

Target equipment	Descriptions of training	Trainees
	cards, creation of a troubleshooting guidebook ・The following items will be included in equipment cards. Times of the use, presence of defect, descriptions of defect, repair request, etc. ・On-the-job training on the usage of equipment cards to raise the awareness of routine inspections ・Procedures of repair request (preparation of letters of request for repair) ・Staff members will report to BME on the reason for repair request and the state of defect in accordance with the procedures of repair request determined by the personnel responsible for equipment. BME will decide if the repair will be made internally or outsourced, and manage the progress of the repair (outsourced agency, diagnosis of the defect, details of repair work, necessity to replace any parts, calculation of repair cost, procedures to secure the budget, expected date to complete the repair, etc.)	・BME
(iv) Maintenance items necessary for the medical equipment, and contracts including necessary conditions		
・Diagnostic imaging equipment ・Clinical examination equipment	Guidance on maintenance items of the equipment and formulation of conditions to be included in maintenance contracts, and advice on methods of selecting warranty parts to be included in maintenance contracts, contract values, formulation of contract documents, etc.	・Management divisions ・BME

(2) The Second Session

As outlined below, the second session will review and reinforce the technical guidance provided in the previous session. Additionally, any problems and issues faced by medical staff of TUTH in their healthcare activities with the equipment procured in the 11 months after the delivery will be clarified. Solutions to these problems and issues will be considered under the supervision of radiological technologists and BME sent out from Japan.

Table 3. (Provisional) Activities in the Second Session

Target equipment	Descriptions of activities	Trainees
(i) Training on operation and safety control		
・MRI (1.5T)	・Appropriate imaging methods and simulated imaging with actual equipment, applied simulation using the application software, simulated image creation, etc. ・Review of safety control, etc. for use of equipment, including the system operations, handling, routine inspections and securing of the safety of patients ・Confirmation of the effect of training by conducting written examinations	・Radiological doctors ・Radiological technologists ・Doctors in charge at relevant departments ・Nurses ・BME
・Equipment to be procured	・Review of handling, routine inspections, safety control upon the use of the equipment, usage of the manuals, troubleshooting, handling at the time of power-off, etc. ・Evaluation of the effect of training (by conducting either written examinations or presentations, depending on the degree of attainment of trainees)	・Doctors in charge at relevant departments ・Engineers ・Nurses ・BME
(ii) Preventive maintenance with equipment cards		
・Equipment to be procured	・Confirmation of the creation and use of equipment cards, letters of request for repair, etc. ・Simulation training on maintenance contracts ・Supplementary training on maintenance of the equipment ・Presentation examinations to confirm the effect of training	・ Personnel responsible for equipment ・ BME
(iii) Extraction of issues through simulations, and consideration of remedies		
・Equipment to be procured	・Review of standardized equipment cards, letters of repair request and other documents created in the first session, and improvement of issues ・Workshop on issues extracted through simulations, and remedies	・Management divisions ・Doctors in charge at relevant departments ・Engineers ・Nurses ・BME

6. Methods of Procuring Resources for the Technical Assistance (Soft Component)

As lecturers (engineers for training) of the technical assistance (soft component), one image diagnostic doctor (0.65MM, an engineer from a third country will be acceptable) will be assigned to guidance on operations of MRI. At the same time, one radiological technologist (2.0MM) will be assigned to guidance on the safety control involving MRI, and one BME (3.1MM) to guidance on other topics. Personnel with technical experience in the relevant fields at medical facilities in Japan or third countries will be appointed to these posts. Nepalese-English interpreters (a total of 2.8MM) will also be locally hired for the training sessions.

Table 4. Personnel Input Plan for the First Session (proposed)

Target equipment	Descriptions of work	Working days		Lecturer
		In Japan	In Nepal	
MRI	・ Preparation in Japan	3		Lecturer 1: Radiological technologist
	・ Air travel (round trip)		3	
	・ Briefing, consultation and report to TUTH		3	
	・ Practical training on imaging, etc.		5	
	・ Guidance on applied usage of the application software		6	
	・ Practical guidance on image creation, etc., and written examinations		4	
	・ Preparation of report after returning to Japan	3		
	Total days (MM)	**6 (0.30)**	**21 (0.70)**	
	・ Preparation in Japan	2		Lecturer 2: Image diagnostic doctor
	・ Air travel (round trip)		3	
	・ Briefing, consultation and report to TUTH		1	
	・ Guidance on basic usage of the application software		3	
	・ Training to find tips on diagnoses		2	
	・ Case studies on various diseases, etc., and written examinations		3	
	・ Preparation of report after returning to Japan	3		
	Total days (MM)	**5 (0.25)**	**12 (0.40)**	
	・ Preparation in Japan	2		Lecturer 3: BME
	・ Air travel (round trip)		1	
	・ Guidance on creation of a rule book on the use of MRI		4	
	・ Guidance on creation of a procedure manual for troubleshooting to quench phenomena		3	
	・ Creation of procedure manuals for preventive maintenance, etc.		3	
	・ Written examinations on the safety control		1	
	・ Preparation of report after returning to Japan	3		
	Total days (MM)	**5 (0.25)**	**12 (0.40)**	
Other pieces of equipment	・ Preparation in Japan	2		Lecturer 3: BME
	・ Air travel (round trip)		2	
	・ Briefing, consultation and report to TUTH		4	
	・ Guidance on creation and use of equipment cards		3	
	・ Guidance on creation of manuals for routine inspections		4	
	・ Creation of procedure manuals for preventive maintenance, etc.		6	
	・ Guidance on procedures, contents and decision on the scope of maintenance to be included in maintenance contracts		1	
	・ Skill examinations to see the degree of attainment		1	
	・ Preparation of report after returning to Japan	2		
	Total days (MM)	**4 (0.20)**	**21 (0.70)**	

Table 5. Personnel Input Plan for the Second Session (proposed)

Target equipment	Descriptions of work	Working days		Lecturer
		In Japan	In Nepal	
MRI	・ Preparation in Japan	3		Lecturer 1: Radiological technologist
	・ Air travel (round trip)		3	
	・ Briefing, consultation and report to TUTH		3	
	・ Practical training on imaging, etc. (practical simulation)		5	
	・ Guidance on applied usage of the application software (guidance on solving problems that have actually arisen in the field)		6	
	・ Practical guidance on image creation, etc., and written examinations (practical training and supplementary guidance)		4	
	・ Preparation of report after returning to Japan	3		
	Total days (MM)	**6 (0.30)**	**21 (0.70)**	
	・ Preparation in Japan	2		Lecturer 3: BME
	・ Air travel (round trip)		1	
	・ Guidance on creation of a rule book on the use of MRI (confirmation of practical use of the rule book, and pointing out of violations of the rule)		4	
	・ Guidance on creation of a procedure manual for troubleshooting to quench phenomena (confirmation of the attainment, supplementary training, corrections to the procedure manual)		3	
	・ Creation of procedure manuals for preventive maintenance, etc. (revisions, additions and corrections to the procedure manuals)		3	
	・ Written examinations on the safety control		1	
	・ Preparation of report after returning to Japan	3		
	Total days (MM)	**5 (0.25)**	**12 (0.40)**	
Other pieces of equipment	・ Preparation in Japan	2		Lecturer 3: BME
	・ Air travel (round trip)		2	
	・ Briefing, consultation and report to TUTH		4	
	・ OJT on the usage of equipment cards (survey on practical use, clarification of problems and supplementary guidance)		3	
	・ Supplementary guidance on creation of manuals for routine inspections (survey on practical use, clarification of problems and guidance on corrections)		4	
	・ Corrections, etc. to procedure manuals for preventive maintenance, etc. (survey on practical use, clarification of problems and corrections to the manuals)		6	

Target equipment	Descriptions of work	Working days		Lecturer
		In Japan	In Nepal	
	・ Supplementary guidance on procedures, contents and decision on the scope of maintenance to be included in maintenance contracts (analyses of existing contracts, extraction of problems and discussion over proposed remedies)		1	
	・ Skill examinations to see the degree of attainment		1	
	・ Preparation of report after returning to Japan	2		
	Total days (MM)	**4 (0.20)**	**21 (0.70)**	

7. Implementation Schedule of the Technical Assistance (Soft Component)

The first session will last for about 1.5 months, starting 7.5 months after the commencement of execution designing and one week before the installation of equipment, and ending five weeks after the end of the installation. The second session will last for about 1.5 months, starting 11 months after the end of the installation. In other words, it will take about 12.5 months to complete the technical assistance (soft component).

Table 6. Implementation Schedule for the Soft Component (proposed)

Year		2017												2018			MM	
Month		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3		
Total month of Project Implementation		6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Japan work	Nepal work
First Session	Lecturer 1 Radiological technologist				Submission of report												0.30	0.70
	Lecturer 2 Image diagnostic doctor				Submission of report												0.25	0.40
	Lecturer 3 BME				Submission of report												0.45	1.10
Second Session	Lecturer 1 Radiological technologist												Submission of report				0.30	0.70
	Lecturer 3 BME												Submission of report				0.45	1.10
Implementation Report for the Soft Conponent					▲													
Completion Report for the Soft Conponent																▲		

In Nepal In Japan

8. Outputs of the Technical Assistance (Soft Component)

8－1 Implementation Report of Technical Assistance (Soft Component)

The report will be submitted around late April 2017, together with the following documents as

outputs of the first session.

(i) Written examinations on the technical attainments and a table of the results of trainees
(ii) Equipment card (proposed)
(iii) Letter of repair request (proposed)

8－2 Completion Report of Technical Assistance (Soft Component)

The report will be submitted around late March 2018, together with the following documents as outputs of the second session.

(i) Written examinations on the technical attainments and a table of the results of trainees
(ii) Abstracts of simulation examinations (presentations) of trainees
(iii) Equipment card
(iv) Letter of repair request

9. Obligations of the Recipient Country

9－1 Obligations of the Recipient Country for the Technical Assistance (Soft Component)

For the implementation of the technical assistance (soft component), the Nepalese side must arrange duties of radiological doctors and technologist, doctors in charge at relevant departments, inspection engineers, nurses and BME to ensure that they can participate in training. Tribhuvan University and TUTH are also required to ideally prepare for payments of daily allowances and travel expenses to trainees, if such preparation is necessary by their regulations. In addition, if there is any change in the procedures to apply for entry visas to Nepal, the Nepalese side will be responsible for cooperating with the Japanese side which will send engineers for the training sessions.

9－2 Obligations of the Recipient Country for Maintenance of Medical Equipment

The technical assistance (soft component) is intended only for medical equipment to be procured under the Project. It aims to help TUTH to reduce down-time of the medical equipment, continuously and appropriately use them beyond the expected lifetime, and constantly provide healthcare services, by ensuring that TUTH will appoint personnel responsible for the equipment and thoroughly manage them with individual equipment cards. This management method will enable TUTH to constantly provide healthcare services if it applies the method to existing equipment in future.

At the same time, to provide more quality healthcare services, TUTH will be required to reflect the information on equipment cards in its medical equipment management inventory, so that it can centrally manage all the medical equipment and tools.

Appendix 6. References

No.	Documents	Size	Pages	Original/ Copy	Issued by	Year	Gifted/ Purchased
1	Souvenir: on the Auspicious Occasion of 5th National Conference 2013	Letter	21	Original	Biomedical Engineering Association of Nepal	2013	Gifted
2	53th Anniversaary of Kanti Children's Hospital 2071	B5	108	Original	Kanti Children's Hospital	2014	Gifted
3	Tribhuvan University Financial Statement General: Fiscal Year 2071/72	A4	60	Copy	TUTH	2015	Gifted
4	Tribhuvan University Financial Statement General: Fiscal Year 2070/71	A4	50	Copy	TUTH	2014	Gifted
5	Tribhuvan University Financial Statement General: Fiscal Year 2069/70	A4	21	Copy	TUTH	2013	Gifted
6	Tribhuvan University Financial Statement General: Fiscal Year 2068/69	A4	44	Copy	TUTH	2012	Gifted
7	National Health Policy: Unofficial translation draft ver 1 (08 Aug 2014)	A4	20	Copy	Ministry of Health and Population	2013	Gifted
8	Pediatric surgery services in TUTH from 2071-2072 (9 months)	Letter	2	Copy	TUTH	2016	Gifted
9	Guideline to Establishment, Operation and Upgrading of Health Organization, 2070	A4	107	Copy (Nepali)	Ministry of Health and Population	2014	Gifted
10	TUTH Biomedical Equipment Inventory Fifth Edition	A4	253	Original	TUTH	2014	Gifted
11	TUTH Biomedical Equipment Inventory Sixth Edition	A4	266	Copy	TUTH	2015	Gifted
12	Trekking Guide: Nepal	A1	1	Original	Himalayan Map House (Pvt. Ltd.)	N/A	NPR 500