Nepal

Ministry of Health and Population

PREPARATORY SURVEY REPORT ON THE PROJECT FOR THE IMPROVEMENT OF MEDICAL EQUIPMENT IN ADVANCED PUBLIC HOSPITALS IN THE NEPAL

January 2022

Japan International Cooperation Agency

International Techno Center Co., Ltd.

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Preface

Japan International Cooperation Agency (JICA) decided to conduct the preparatory survey and entrust the survey to International Techno Center Co.,Ltd.

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

I hope that this report will contribute to the promotion of the project and 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.

January, 2022

Jun Sakuma
Director General
Human Development Department
Japan International Cooperation Agency

Summary

Summary

1. Overview of the country

Nepal is a landlocked country located in the southern foothills of the Himalayas, bordered by the Tibet Autonomous Region of the People's Republic of China to the north and India to the east, west, and south, with a land area of 147,000 ㎢. It is bordered by the Himalayas on the border with China and has an alpine climate, while the Terai, a hot and humid plain, stretches along the border with India. Nepal has a total population of 29.1 million (2020). The official language is Nepali, but English is also used by the government, businesses, and educational institutions. A total of 81.3% of the population is Hindu, 9.0% Buddhist, and 4.4% Muslim. The country's ethnic groups include the Parvateh Hindus, who make up about half of the population, and more than 100 other ethnic groups such as the Magar, Talu, Tamang, and Newar (according to the 2011 census). The monarchy was abolished in 2008 and the country became a federal democratic republic. The main industry is agriculture. In 2015, a new constitution was promulgated and seven states and 753 local governments were established. In addition, the textile industry and tourism, especially in the Himalayas, are flourishing.

The 2015 earthquake in Nepal killed 8,702 people, injured 22,303 people, destroyed 498,852 houses, and partially destroyed 256,697 houses, and caused extensive human and material damage.

2. Project background, history, and overview

The Government of Nepal's Fifteenth Five-Year Plan (2019/20-23/24) sets the goal of "providing quality health care to all citizens, from basic health services to higher-order health services. In order to achieve this goal, the Government of Nepal has formulated the Health Sector Strategy (2015-2020), NHSS, and is working to resolve issues. Non-Communicable Diseases (NCDs) accounted for more than 80% of all inpatient admissions in the country's health facilities in 2015/16, and the number of new outpatients with NCDs exceeded the number of patients with infectious diseases. Nepalese people have access to public hospitals in the country at relatively low cost, and the poor can receive services free of charge under the insurance system. On the other hand, the medical equipment required for specialized diagnosis and treatment of NCDs is outdated and insufficient for the number of patients, resulting in inadequate provision of diagnostic and treatment services for NCDs in public hospitals.

Based on the above, "The Project for the Improvement of Medical Equipment in Advanced Public Hospitals" (hereinafter referred to as the "Project") is designed to provide advanced public hospitals in the country with medical equipment that will contribute to strengthening health services for NCDs, and is positioned as a high priority project in achieving the NHSS.

3. Summary of Survey Results and Project Description

In response to a request from the Government of Nepal, the Government of Japan decided to conduct a preparatory survey for cooperation, and the Japan International Cooperation Agency (JICA) conducted a field survey and briefing on the schematic design of the Project from March 23, 2020 to January 30, 2022. The survey was conducted both remotely and by dispatching a field survey team due to the impact of the spread of the novel coronavirus infection.

In addition to the remote interviews, the team visited 8 advanced public hospitals (Human Organ Transplant Center, Patan Hospital, Paropakar Maternity and Women's Hospital, National Trauma Center, Bir Hospital, Shahid Gangalal National Heart Centre, Kanti Children's Hospital and Manmohan Cardiothoracic Vascular & Transplant Center) in the Kathmandu Valley and confirm the current situation and hold discussions with the directors and doctors involved from September to October in 2021.

Based on the results of the survey, eight facilities in the Kathmandu Valley will be selected for cooperation in the Project, and medical equipment essential for the diagnosis and treatment of NCDs will be procured. The medical equipment to be procured under the Project is as follows. MRI, CT, and X-ray will be provided with a one-year manufacturer's warranty period and a two-year maintenance contract and renovation of existing facilities necessary for installation and operation.

Facility	MRI	CT	X-ray	Portable X-ray	C-arm	Ventilator	Patient Monitor	Infusion Pump	Syringe Pump
Human Organ Transplant Center	–	–	–	–	–	3	3	30	30
Patan Hospital	–	–	1	1	–	3	3	20	20
Paropakar Maternity and Women's Hospital	–	–	1	1	–	3	3	5	5
National Trauma Center	–	–	–	–	1	3	3	15	15
Bir Hospital	–	–	1	1	1	3	3	15	15
Shahid Gangalal National Heart Centre	–	–	–	1	–	3	3	25	40
Kanti Children's Hospital	1	1	–	–	–	3	3	20	20
Manmohan Cardiothoracic Vascular & Transplant Center	–	–	1	1	–	3	3	5	20
Total number of units	1	1	4	5	2	24	24	135	165

4. Construction period

The implementation of the Project is expected to take 14 months from the date of the consultant contract. The entire project is expected to be completed in 3 years (36 months) after the provision of the equipment, as the Project will be covered by a 1-year manufacturer's warranty period and a 2-year maintenance contract.

5. Project Evaluation

5.1 Relevance

In Nepal, due to the rapid change in disease structure from infectious diseases to NCDs, NCDs account for about 60% of all deaths, making the fight against NCDs an urgent issue. In response, the Government of Nepal has made access to and utilization of quality health services one of the key issues in the 15th Five-Year National Development Plan, Development Plan 2019, and Health Sector Strategy (2015-2020), and is working to improve health services. However, the provision of diagnostic and treatment services for NCDs in public hospitals is inadequate due to age-related breakdowns of medical equipment and lack of function in public medical facilities that provide tertiary care in Nepal. The Project aims to improve the quality of medical services at tertiary care facilities in Nepal by providing medical equipment essential for the diagnosis and treatment of NCDs, with the aim of strengthening medical services for NCDs. In addition, the quality of medical services for NCDs will be improved and Nepal's medical services will be strengthened by providing support for maintenance and management systems through maintenance contracts. As described above, the effects of the implementation of the Project are expected to contribute to the resolution of NCDs issues in Nepal, and the relevance of the Project is high.

5.2 Effectiveness

By introducing the medical equipment needed for diagnosis and care for NCDs in the services of advanced hospitals will be improved. The following effects can be expected.

(1) Quantitative Effects

Indicators	Baseline (2019)	Target (2025)
① Number of MRI examinations in Kanti children's hospital (Cases/year)	0	600
② Number of X-ray examinations in Bir hospital (Cases/year)	44,000	47,000

(2) Qualitative Effects

- It is expected that the quality of health services in Nepal will be improved by improving the quality of diagnostic and treatment services in each advanced public hospital where the medical equipment will be provided.
- By procuring MRI, it will be possible to diagnose new and more accurate definitive diagnoses of diseases such as cancer.

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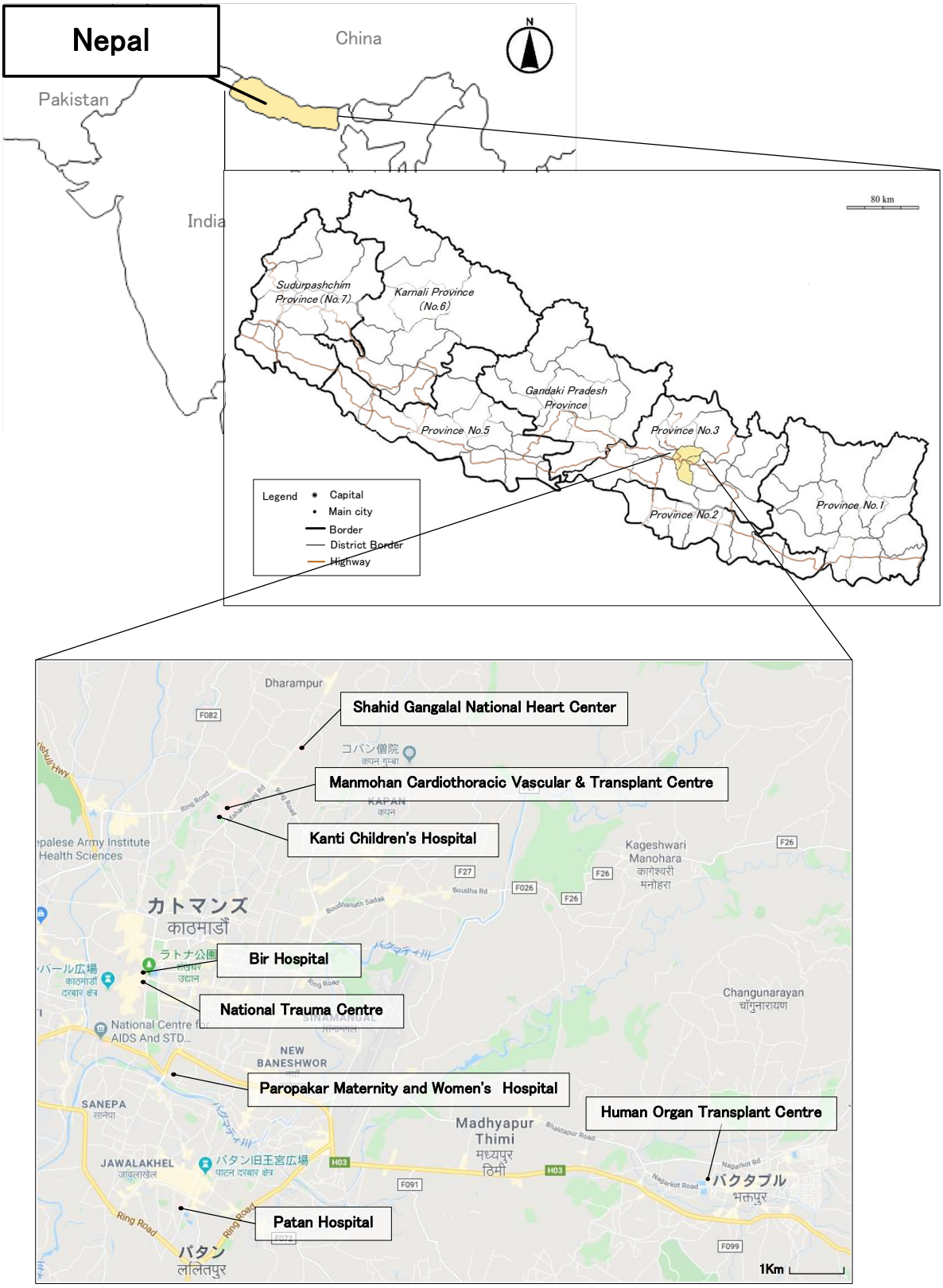
Location map



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Abbreviations

AMC	Annual Maintenance Contract
A/P	Authorization to Pay
B/A	Banking Arrangement
CMC	Comprehensive Maintenance Contract
COVID-19	Coronavirus Disease 2019
CT	Computed Tomography
E/N	Exchange of Notes
G/A	Grant Agreement
IECCD	International Economic Cooperation and Coordination Division
INGO	International Non-Governmental Organization
IRD	Inland Revenue Division
JICA	Japan International Cooperation Agency
NCDs	Non-Communicable Diseases
NHSS	Nepal Health Sector Strategy
NPR	Nepal Rupee
MRI	Magnetic Resonance Imaging
UNDP	United Nations Development Programme
UPS	Uninterruptible Power Supply
WHO	World Health Organization

Chapter 1: Background of the Project

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1.1 Background

The Government of Nepal's Fifteenth Five-Year Plan (2019/20-23/24) sets the goal of "providing quality health care to all citizens, from basic health services to higher-order health services." In order to achieve this goal, the Government of Nepal has formulated the Health Sector Strategy (2015-2020), NHSS, and is working to resolve issues. NCDs accounted for more than 80% of all inpatient admissions in the country's health facilities in 2015/16, and the number of new outpatients with NCDs exceeded the number of patients with infectious diseases. Nepalese people have access to public hospitals in the country at relatively low cost, and the poor can receive services free of charge under the insurance system. On the other hand, the medical equipment required for specialized diagnosis and treatment of NCDs is outdated and insufficient for the number of patients, resulting in inadequate provision of diagnostic and treatment services for NCDs in public hospitals.

Based on the above, the project is designed to provide advanced public hospitals in the country with medical equipment that will contribute to strengthening health services for NCDs, and is positioned as a high priority project in achieving the NHSS.

1.2 COVID-19 Situation

In Nepal, the first case of Coronavirus Disease 2019 (COVID-19) was identified in January 2020. The government of Nepal immediately issued an order to set up a system to isolate and treat infected patients in hospitals in the country, and gradually expanded the number of medical facilities that can handle COVID-19 diagnosis and treatment. Patan Hospital, Bir Hospital, and Kanti Children's Hospital, which are the target of this plan, used more than half of their critical care beds to accept critical patients.

As of December 2021, the total number of people infected with COVID-19 in Nepal is about 820,000 (including 11,000 deaths). By the end of 2021, two rapid increases in the number of infected people occurred, and the shortage of critical care beds and oxygen supply became an issue. The government of Nepal has taken measures by implementing several behavioral regulations since 2021. Japan and other international organizations have been providing support to tertiary care facilities, including the supply of equipment such as ventilators and oxygen concentrators.

1.3 Natural Conditions

Nepal has a subtropical climate, which is divided into two seasons: the rainy season (June to September) with high temperatures and humidity, and the dry season (October to May) with notable temperature differences between day and night. In consideration of the impact on the transportation and storage of equipment, it is necessary to avoid the rainy season for the installation of equipment. In addition, the maximum temperature in the Kathmandu Valley, where the facility is located, exceeds 30 degrees Celsius, so consideration should be given to the deployment of air conditioners and other measures to ensure that the planned equipment is used at an appropriate temperature.

1.4 Environmental and Social Considerations

The Project is to procure medical equipment for a medical facility that is in operation, and falls under Category C of JICA's Environmental and Social Consideration Guidelines. It is highly unlikely that the implementation of this project will have any impact on the environment, such as air, water or soil quality, or society, such as the human rights of local residents.

Chapter 2: Contents of the Project

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2.1 Basic Concept of the Project

In Nepal, basic health indicators are improving, including declining child and maternal mortality rates and increasing immunization coverage. On the other hand, the proportion of deaths due to NCDs in the country has been increasing rapidly over the past decade, with NCDs accounting for 60% of all deaths and more than 80% of all hospital admissions in health facilities. The Government of Nepal has identified the rapid change in disease structure from communicable diseases to NCDs as a priority issue for the NHSS and is working to resolve this issue.

The 8 facilities targeted for cooperation in the Project are public tertiary care facilities, all of which play a central role in advanced medical services for the diagnosis and treatment of NCDs in the country. Due to the relatively low cost of medical services at the public facilities, all the facilities receive patients from all over Nepal and are dealing with a large number of outpatients and inpatients on a daily basis.

As for diagnostic services for NCDs, all facilities provide CT and X-ray, and some also provide MRI, although all facilities have patients who require MRI, but there is a shortage of MRI due to insufficient maintenance. In addition, CT and X-ray are 5 to 10 years old and are not fully capable of providing diagnostic services due to the problems of malfunctions and lack of function caused by age-related deterioration.

The provision of medical equipment for diagnostic and treatment services for NCDs to the facilities targeted for cooperation under the Project is a high priority in achieving the goals set by Nepal. In addition, Japan's Country Development Cooperation Policy for Nepal (September 2016) lists "poverty reduction and improvement of quality of life" as a priority area and "improvement of quality of health services" as a development issue. JICA's Country Analysis Paper on Nepal (August 2020) also identifies "improvement of health services" as a priority development issue. The Project is in line with these policies and analysis.

In addition, due to the spread of Covid-19, the use of ICU (intensive care unit)-related equipment for both NCDs and severe cases of Covid-19 is very tight. By increasing the number of medical equipment and replacing the equipment through the Project, patients with underlying NCDs will be able to continue to receive diagnosis and treatment services under COVID-19 pandemic.

Based on the above, the Project aims to improve the quality of health and medical services, mainly by strengthening the diagnosis and treatment system for NCDs patients, and thereby contribute to the improvement of the quality of life in Nepal, through the provision of medical equipment to 8 advanced public hospitals located in the country.

2.2 Outline Design of the Japanese Assistance

2.2.1 Design Policy

2.2.1.1 Basic Policy

The project will procure essential medical equipment for the provision of diagnostic and treatment services for NCDs in eight advanced public hospitals in the Kathmandu Valley. It will also include retrofitting of existing buildings for the installation and commissioning of some of the procured equipment. This will strengthen the diagnostic and treatment services at advanced public hospitals and improve the provision of quality health services to the people in Nepal.

2.2.1.2 Policy on Facilities Selection for Japanese Assistance

The target facilities for the project were selected based on the following criteria: (1) hospital classification (public or private), (2) relevance (whether it contributes to the strengthening of the diagnosis and treatment system for NCDs in Nepal), (3) implementation system, (4) operation and maintenance system, (5) scale of renovation and repair required for the facilities, (6) beneficiary population, and (7) support from other donors.

2.2.1.3 Policy on Natural Environmental Conditions

Nepal is divided into two seasons: the rainy season (June to September) with high temperature and humidity, and the dry season (October to May) with notable temperature differences between day and night. In consideration of the impact on the transportation and storage of equipment, the installation of equipment will be carried out in the rainy season. In addition, since the maximum temperature in the Kathmandu Valley, where the facility is located, exceeds 30 degrees Celsius, an air-conditioning system will be installed to ensure that the planned equipment is used under the appropriate temperature.

2.2.1.4 Policy on Socioeconomic Conditions

In Nepal, tests such as MRI, CT, and X-ray are generally available at private medical facilities, mainly in Kathmandu, but the cost of the tests is high. Public facilities provide healthcare

services at low cost or free of charge to the public, and the poor can apply to receive some services free of charge. Depending on the primary disease and symptoms, MRI, CT, and X-ray are also included in the free services.

2.2.1.5 Policy on Procurement Conditions

In accordance with the scheme of the Grant Aid Project, in principle, products from Nepal and Japan are eligible for procurement, but since the equipment planned to be procured in the Project is not manufactured in Nepal, Japanese products will be procured. However, if competition in the bidding process is not expected due to the limited number of suppliers, products from third countries will be considered for pressure control. In addition to the procurement of materials for the renovation of the facility in Nepal, the procurement of materials necessary to ensure the performance of the facility will be assumed to be from Japan.

2.2.1.6 Policy on Equipment Selection, Grade and Specification

The medical equipment to be procured under the Project shall be of a grade that meets the level of medical services required of advanced public hospitals. The specifications shall be similar to the functions of the existing equipment, and shall be commensurate with the technical level of the medical personnel at the target facilities, and shall be capable of being maintained in Nepal.

2.2.1.7 Policy on Operation and Maintenance

As described in Section 2.1.5, "Maintenance Management and Maintenance Contracts for Medical Equipment," according to the government of Nepal’s regulations, maintenance contracts are basically attached to the equipment when they are procured, and CMC or AMC is attached. In particular, for MRI, CT, and X-ray, many medical facilities conclude maintenance contracts with medical equipment agents and request maintenance management and repairs. The MRI, CT, and X-ray to be procured under the Project will be provided with a two-year maintenance contract in addition to the one-year manufacturer's warranty period. After the maintenance contract expires, the government of Nepal will continue the maintenance contract and maintain the equipment.

2.2.1.8 Policy on Facility Renovation

Renovation of the existing facilities is necessary to introduce some diagnostic imaging

equipment to be installed in the Project. In principle, the removal of existing equipment and existing facilities such as lighting and air conditioning will be borne by the client, while the Japanese side will bear the cost of facility renovation for the safe operation of the provided equipment, including shield construction, power supply and air conditioning equipment.

2.2.1.9 Policy on the Use of Local Contractors (Construction companies, Consultants)

Materials for shield construction will be procured from Japan. Installation work is going to be carried out by local contractors. Technical guidance by Japanese supervisors of shield contractors is planned to ensure proper construction. In addition, local consultants will be utilized to confirm the progress of the construction work to be borne by the Recipient country and to coordinate with the Japanese construction work to ensure smooth progress.

2.2.1.10 Policy on Safety Measures

No special notes have been identified as security threats to be considered.

2.2.2 Basic Plan

2.2.2.1 Overview

The Project will procure MRI, CT, X-ray, Portable X-ray, C-arm, Ventilator, Patient Monitor, Infusion Pump and Syringe Pump for eight tertiary care facilities in the Kathmandu Valley to strengthen medical services for diagnosis and treatment of NCDs. For MRI, CT, and X-ray, we will carry out the necessary facility renovation work for installation and operation of the equipment. In addition to the one-year warranty period, a two-year maintenance contract will be attached to the MRI, CT, and X-ray, and the contract will be supervised to ensure that the equipment is properly maintained and managed until the end of the contract.

2.2.2.2 Target facilities and equipment plan

The survey was conducted based on the criteria described in "2-1-2 Policy on Facilities Selection for Japanese Assistance", and it was confirmed that all eight hospitals in the Kathmandu Valley are tertiary care facilities under the Ministry of Health and Population, and they are the key facilities for diagnosis and treatment of NCDs in Nepal, mainly in the Kathmandu Valley. In all the facilities, there were some issues in providing services due to the aging or lack of equipment, and the possibility of strengthening the diagnosis and treatment services for NCDs by improving the equipment was observed, and it was also confirmed that

there was a system for maintaining the equipment after the implementation of the Project.

Based on these results, and after consultation with the Ministry of Health and Population, the target facilities for the Project are eight hospitals in the Kathmandu Valley (Table 1).

Table 1 Target facilities

Facility	Hospital Classification	Location (Province, District)	
Human Organ Transplant Center	Specialized hospital	Sate3	Bhaktapur
Patan Hospital	Academic Hospital	Sate3	Lalitpur
Paropakar Maternity and Women's Hospital	Specialized hospital	Sate3	Kathmandu
National Trauma Center	Central Specialized Hospital	Sate3	Kathmandu
Bir Hospital	Central Specialized Hospital	Sate3	Kathmandu
Shahid Gangalal National Heart Centre	Specialized hospital	Sate3	Kathmandu
Kanti Children's Hospital	Specialized hospital	Sate3	Kathmandu
Manmohan Cardiothoracic Vascular & Transplant Center	Specialized hospital	Sate3	Kathmandu

The equipment to be provided to each facility was confirmed through consultation with the Ministry of Health and Population and each target facility. As a result of the interviews with the target facilities regarding the equipment requests for NCDs services, many requests were raised for diagnostic imaging equipment such as MRI, CT, and X-ray, as well as equipment for the treatment of critically ill and post-operative patients in ICUs, operating rooms, and emergency rooms. In particular, the necessary number of Ventilators, Patient Monitors, Infusion Pumps, and Syringe Pumps to deal with patients infected with COVID-19 has increased, and equipment is in short supply. Since securing equipment is an urgent issue in maintaining the treatment service delivery system, requests have been made by many target facilities. Based on this information, and after consultation with the Ministry of Health and Population, it was decided to plan for support of MRI, CT, X-ray, Portable X-ray, C-arm, Ventilator, Patient Monitor, Infusion Pump, and Syringe Pump, which are essential for improving diagnostic and treatment services for NCDs. MRI was requested by Paropakar Maternity and Women's Hospital, National Trauma Center, Bir Hospital, and Kanti Children's Hospital. All of the facilities were confirmed to be suitable for MRI provision, but the proposed MRI installation sites for Paropakar Maternity and Women's Hospital, National Trauma Center, and Bir Hospital were under conditions that required detailed confirmation of building information regarding safety, such as the second floor or a basement floor under the proposed site, but the necessary information and materials were not available. On the other hand, Kanti Children's Hospital was selected as the target for the MRI after discussions with the Ministry of Health and Population,

because this site could be safely renovated and repaired for the installation of the equipment (Table 2).

Table 2 Equipment list

Facility	MRI	CT	X-ray	Portable X-ray	C-arm	Ventilator	Patient Monitor	Infusion Pump	Syringe Pump
Human Organ Transplant Center	–	–	–	–	–	3	3	30	30
Patan Hospital	–	–	1	1	–	3	3	20	20
Paropakar Maternity and Women's Hospital	–	–	1	1	–	3	3	5	5
National Trauma Center	–	–	–	–	1	3	3	15	15
Bir Hospital	–	–	1	1	1	3	3	15	15
Shahid Gangalal National Heart Centre	–	–	–	1	–	3	3	25	40
Kanti Children's Hospital	1	1	–	–	–	3	3	20	20
Manmohan Cardiothoracic Vascular & Transplant Center	–	–	1	1	–	3	3	5	20
Total number of units	1	1	4	5	2	24	24	135	165

For MRI and CT, a standard superconducting 1.5 Tesla MRI and a multi-slice 128-slice CT will be installed in consideration of the functions required for the diagnosis of NCDs, as shown in Table 3. Both equipment will be equipped with emergency power supply and UPS in consideration of the power situation in Nepal. The general radiography system, mobile radiography system, and C-arm will be equipped with digital specifications that enable clearer images to be taken with lower radiation doses to improve diagnostic accuracy. Ventilators, Patient Monitor, Infusion pump, and Syringe Pump will be the same as the existing equipment in the cooperating facilities.

Table 3 Equipment specifications

Number	Equipment name	Main specifications or configuration	Number of units	Adequacy of purpose of use and equipment level
1	MRI	1. Static magnetic field strength: 1.5 Tesla 2. Bore inner diameter: 60cm~65cm 3. Static magnetic field stability: 0.1 ppm/hr or less 4. Patient table: Motorized height adjustment 5. Console CPU: 6-core dual or higher 6. Console RAM: 32 GB or more 7. DICOM: 3.0 or more 8. Maximum gradient field strength: 30 mT/m or higher 9. Maximum slew rate: 100 mT/m/ms or more 10. Number of recipients: 8 or more 11. Slice thickness: 0.1mm~100mm	1	Imaging of tumor tissue and other biological information of the patient without radiation exposure.

Number	Equipment name	Main specifications or configuration	Number of units	Adequacy of purpose of use and equipment level
1	UPS 75KVA	1.Capacity:75KVA 2.3 phase 3 wire Input 220V Output 220V	1	Provide power so that the MRI can be safely shut down in the event of a power failure.
	Emergency power supply	1. Generator output: 30KVA, 380V, 50Hz 2. Fuel: Light oil 3. Fuel tank: 100L or more	1	Provide power to the MRI so that it can operate and shut down safely in the event of a power failure.
	Cooling device	1. Cooling capacity: 37 kW or more 2. Cooling method: Air cooling type 3. Operating ambient temperature range: -20~45 degrees 4. Power supply: 3-phase 220V	1	MRI magnets are cooled to maintain their superconducting state.
	Injector	1. Flow rate setting: 0.1~10.0ml 2. Maximum pressure: 150psi 3. Scan time: 0~30 minutes 4. Memory: More than 400 memories	1	Safely injecting contrast media into an MRI patient.
2	CT	1. Scanning area: Whole body 2. Number of slices: 128 3. Minimum scan cycle: 0.35 seconds or less 4. Gantry tilt: ±30 degrees or more 5. X-ray tube capacity: 7.0 MHU or more 6. X-ray tube voltage: 80 to 135 kV or more 7. X-ray tube current: 10 to 500mA or more 8. Patient table load: 220 kg or more	1	X-rays are taken from 360 degrees in all directions, and a transverse image of the area is created by computer processing.
	UPS	1. Capacity:120KVA 2. 3 phase 3 wire Input 220V Output 220V	1	Provide power so that CTs can be safely shut down in the event of a power failure.
	Emergency power	1. Generator output: 150KVA, 380V, 50Hz 2. Fuel: Light oil 3. Fuel tank: 250L or more	1	Supply power so that CTs can be operated and safely shut down in the event of a power failure.
	Injector	1. Flow rate setting: 0.1~10.0ml 2. Maximum pressure: 150psi 3. Scan time: 0~30 minutes 4. Memory: More than 400 memories	1	Safely inject contrast media into CT patients.
	ECG Monitor	1. ECG, respiration, SPO2, NIBP, IBP, body temperature 2. ECG: 30~250bps or more range 3. Respiration: 3~120bps or more range 4. SPO2:50~100% or more range 5. NIBP:12~260mmHG or more range IBP: 10~250mmHG or more range 6. Display: 10-inch color 7. Battery life: more than 1 hour	1	Monitor the CT patient's ECG, Respiration, SPO2, etc.
	Dry imager	1. Recording method: Laser 2. Pixel size:100 ㎛ or less 3. Input interface: DICOM 4. Film loading: Daylight 5. Number of trays: 3 6. Max. throughput: 160 sheets per hour or more	1	Print the CT image.

Number	Equipment name	Main specifications or configuration	Number of units	Adequacy of purpose of use and equipment level
3	X-ray	1. Type: High frequency inverter 2. Tube voltage: 40~125kV or more 3. Tube current: 10~500mA or more 4. mAs value: 0.5~500mAs or more 5. X-ray tube capacity: 200kHU or 6. FPD device: Cassette FPD device: Cassette, complete with software	4	It is used for multipurpose X-ray diagnosis of extremities, chest and abdomen.
4	Portable X-ray	1. Type: Inverter type 2. Tube voltage: 100kVA or more 3. Tube focus size: 0.7~1.2mm 4. Projector lamp 5. FPD unit: Integrated body, 12-inch monitor or larger FPD unit: Integrated body, 12-inch monitor or more	5	Movable radiography equipment. X-ray imaging outside the radiology department, such as in wards and outpatient clinics.
5	C-arm	1. Type: High frequency inverter type 2. Tube voltage: 110kVA or more 3. Tube current: 20mA or more 4. Tube current (fluoroscopic): 5mA or more 5. Tube capacity: 100kHU 6. C-arm swivel angle: 380 degrees or more 7. Camera type: CCD 8. Monitor: 2 monitors	2	Movable X-ray fluoroscopy system. Fluoroscopic imaging is used in conjunction with surgical procedures in operating rooms.
6	Ventilator	1. Respiratory mode: SIMV, Assist/CMV, CPAP/PSV, PEEP, BIPAP, NIV, Apnea Ventilation equivalent 2. Ventilation volume: 20~2000ml or more 3. Respiratory rate: 2~80 breaths per minute 4. PEEP: 0~20 cmH2O or more 5. Inhalation pressure: 5~50 cmH2O or more 6. Pressurization aid: 1~30cmH2O or more range 7. Oxygen concentration: 21~100	24	To replace or assist the respiratory function of patients who are no longer able to adequately oxygenate by spontaneous breathing
7	Patient Monitor	1. ECG, respiration, SPO2, NIBP, IBP, body temperature 2. ECG: 30~250bps or more range 3. Respiration: 3~120bps or more range 4. SPO2:50~100% or more range 5. NIBP:12~260mmHG or more range IBP: 10~250mmHG or more range 6. Display: 10-inch color 7. Battery life: more than 1 hour	24	Monitor the patient's biometric information such as pulse, ECG, and blood pressure.

2.2.2.3 Renovation plan

Facility renovation work will be performed for the MRI, CT, and X-ray to be procured under the Project. Three facilities will be renovated, and the removal work will vary depending on the facility and installation location. The client will be responsible for the preliminary preparations, including the removal of existing equipment, lighting equipment, and air conditioning equipment, so that the installation work can begin. Shield work, interior finishing work, and facility work related to equipment installation shall be planned as part of the installation work, and the Japanese side shall bear the repair work. For procurement, materials necessary to ensure performance are assumed to be procured from Japan.

(1) Outline of renovation

A. MRI

The existing emergency room of Kanti Children's Hospital shall be renovated into a new MRI room. Since the room is used as a patient room, it is thought that it does not have the structure to install heavy equipment as it is, and in order not to affect the existing structure, it is planned to raise it by passing stainless steel, which is a non-magnetic material, over the existing large beam to distribute the load. Therefore, a part of the floor needs to be sloped at the introduction. Since the MRI is a newly installed device and has special components, a backup power system should be considered in the facility plan.

B. CT

It is planned to replace the existing CT room at Kanti Children's Hospital. The existing CT room, lighting, electrical outlets, air conditioning, and fittings are to be removed at the Nepal side's expense, and X-ray shielding work is planned to be conducted. However, there is no guarantee that the brick wall and slab thickness alone will be sufficient to shield the new equipment. Therefore, the radiography room that generates X-rays is planned to be uniformly shielded using lead equivalent 2-mm boards and shielded fittings procured in Japan. As for electric power, as in the case of MRI equipment, a backup plan shall be considered.

C. General X-ray system General radiography equipment

The equipment will be procured for Patan Hospital, Paropakar Maternity and Women's Hospital, Bir Hospital, and Manmohan Cardiothoracic Vascular & Transplant Center. Patan Hospital and Paropakar Maternity and Women's Hospital will install the equipment in their existing X-ray rooms, and after removal of existing equipment and facilities, the equipment will be refurbished with a uniform lead equivalent of 2 mm for X-ray shielding. In the case of Bir Hospital and Manmohan Cardiothoracic Vascular & Transplant Center, no renovation work will be carried out at the expense of the Japanese side, as they will be installed in the X-ray rooms under construction and renovation.

(2) Facility Work for Renovation

The primary power supply, telephone and fire alarm systems, and water supply and drainage systems, which are expected to be supplied and branched from the existing facilities, shall be constructed at the expense of the Recipient Country.

In addition, the distribution voltage will be 400/230V, 3-phase, 4-wire, 50Hz, which is the Nepalese standard. In order to ensure stable operation of precision equipment in Nepal, where power quality is unstable and power outages are common, UPS for large equipment (MRI, CT) that will immediately switch over and continue supplying power in the event of a commercial power outage will be installed.

As for the emergency power generator, the one in the existing facility will not be used, but will be installed as part of this project in order to provide the equipment, and we plan to build our own system to switch to emergency power using the generator after the power is supplied from the UPS.

In addition, packaged air conditioners for processing will be installed in the relevant rooms in consideration of the heat generation load from each diagnostic imaging device. The packaged air conditioners will be of the wall-hung type, which is commonly used in the area and is easy to procure and maintain, because of the convenience of operation and maintenance and the need to accommodate each diagnostic imaging device. However, since magnetic packaged air conditioners cannot be installed in the MRI room, a ceiling-mounted duct-type air conditioner will be installed in the corridor in front of the room to air condition the room. Similarly, for the equipment in the MRI room, non-magnetic materials shall be used in principle in the areas where non-magnetic materials need to be used in order not to interfere with the performance of electromagnetic shielding.

2.2.3 Outline Design Drawing

The renovation work for the placement of MRI, CT, and X-ray to be procured under the Project is as follows.

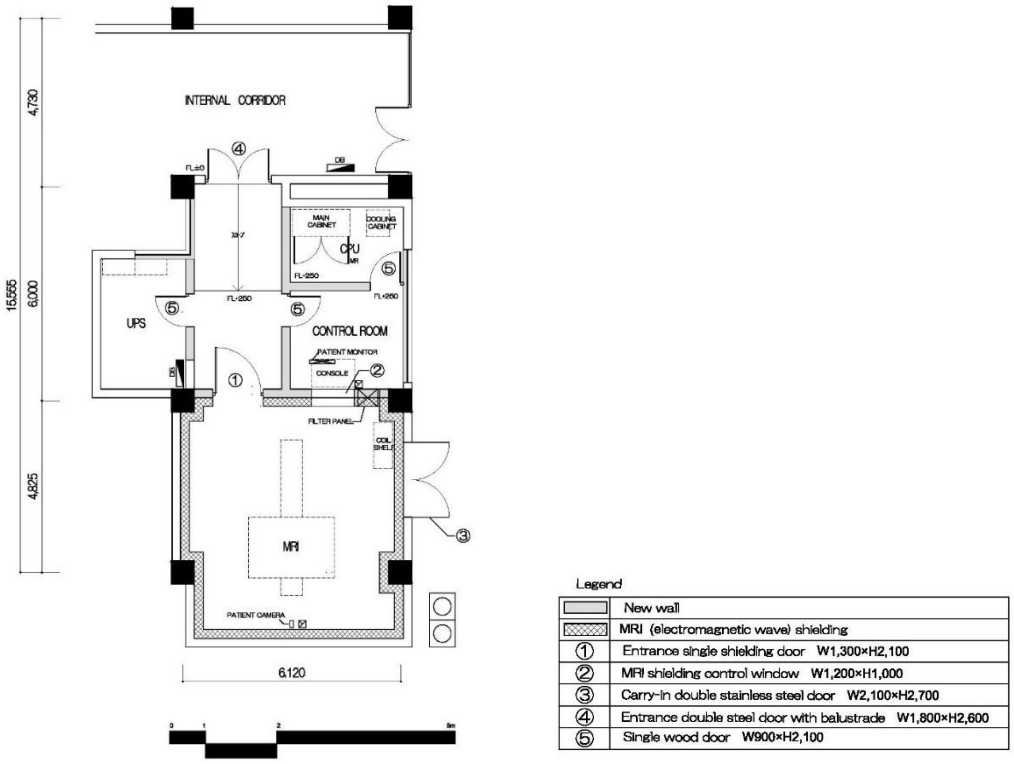


Figure 1 MRI, Kanti Children's Hospital

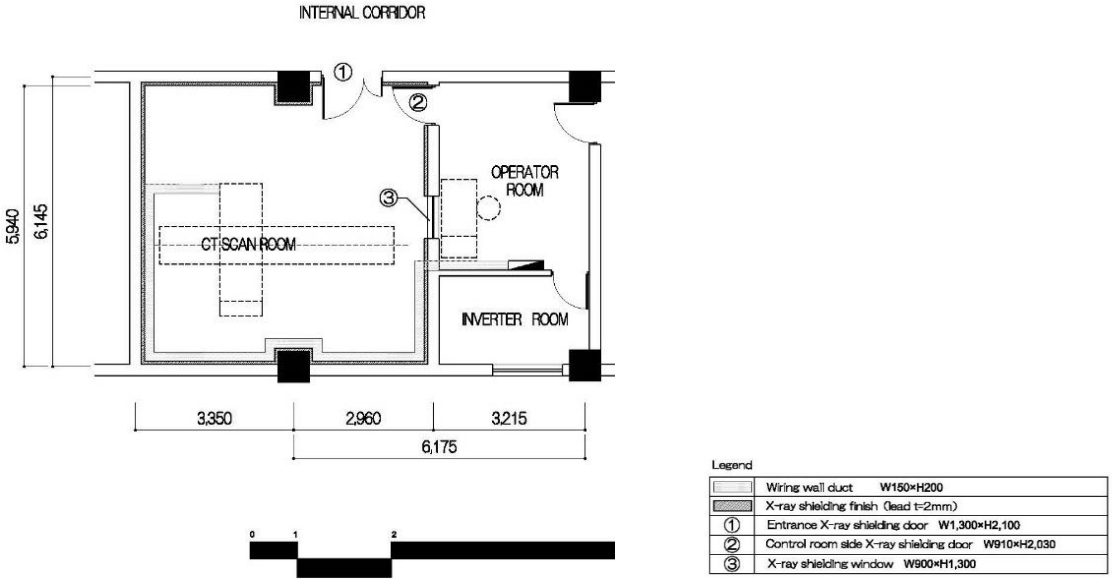


Figure 2 CT, Kanti Children's Hospital

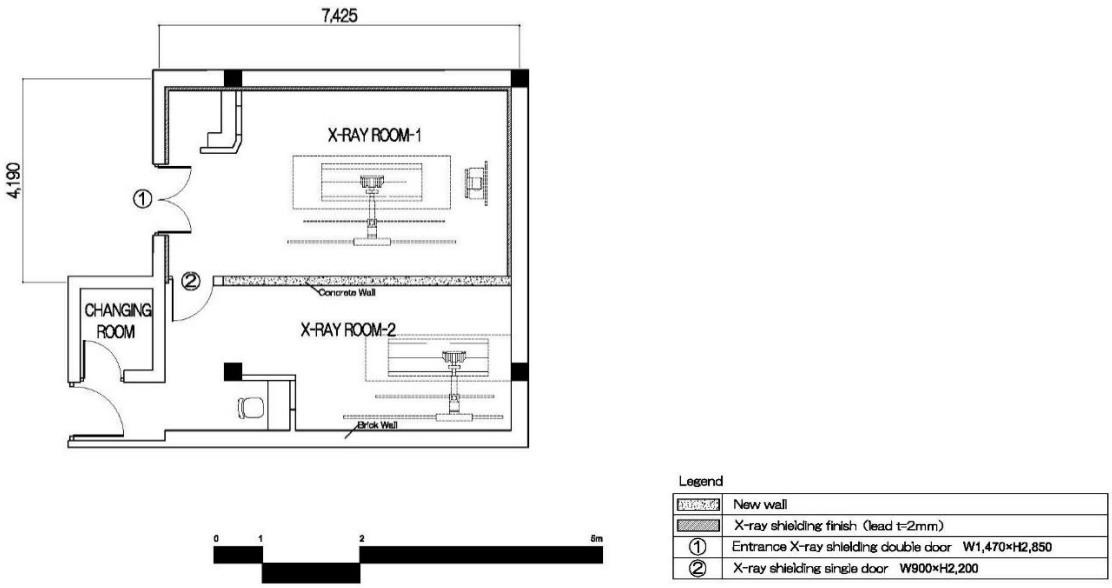


Figure 3 X-ray, Patan Hospital

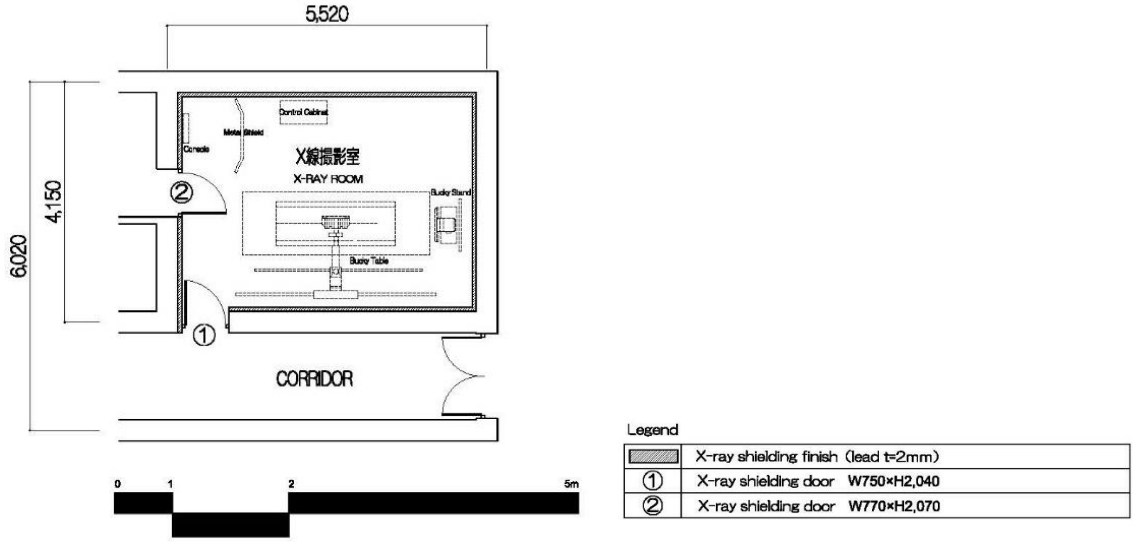


Figure 4 X-ray, Paropakar Maternity and Women's Hospital

2.2.4 Implementation Plan

2.2.4.1 Implementation Policy

(1) Basic Items for Project Implementation

The Project shall be implemented in accordance with the framework of the Grant Aid Scheme of the Government of Japan. After approval by the Cabinet of the Government of Japan, the Exchange of Notes (E/N) between the Government of Japan and the Government of Nepal for the Project shall be concluded, and the Grant Agreement (G/A) between the Government of

Nepal and JICA will be concluded immediately. The Japanese consultant recommended by JICA shall conclude a Consultant Agreement with the Ministry of Health and Population of Nepal. This contract shall be effective upon concurrence by JICA. The Consultant shall carry out bidding related works and procurement supervision based on this contract. As for the procurement of equipment, the contractor selected by the bidding process shall conclude a contract with the Ministry of Health and Population of Nepal for the supply of equipment, which shall also be issued upon concurrence by JICA.

The equipment supplier will dispatch agency technicians for each piece of equipment to provide technical guidance on procurement, delivery, installation, operation, and maintenance of the equipment to the users of the equipment: physicians, radiographers, radiology technicians, nurses, and bio-medical engineers in charge of maintenance.

(2) Project Implementation Structure

The executing agency for the Project is the Ministry of Health and Population, and the implementation agencies are eight hospitals in the Kathmandu Valley: Human Organ Transplant Center, Patan Hospital, Paropakar Maternity and Women's Hospital, National Trauma Center, Bir Hospital, Shahid Gangalal National Heart Centre, Kanti Children's Hospital and Manmohan Cardiothoracic Vascular & Transplant Center.

2.2.4.2 Implementation Conditions

In the Project, the E/N, G/A, and Banking Arrangement (B/A) of the Grant Aid projects are signed by the Ministry of Finance, and the Authorization to Pay (A/P) under the B/A is also issued by the Ministry of Health and Population.

All taxes on the importation of materials and equipment under the Project shall be exempted. The tax exemption procedure for the Project shall be carried out by the International Economic Cooperation and Coordination Division (IECCD) and Revenue Management Division of the Ministry of Finance after the equipment has been reviewed and approved by the Ministry of Health and Population.

Maintenance services are eligible for tax refunds and are conducted by the Inland Revenue Division (IRD) of the Ministry of Finance. Renovation services are tax refundable and are provided by the IRD of the Ministry of Finance.

2.2.4.3 Scope of Works

(1) Classification in Procurement Process

(a) Government of Japan

- Procurement of equipment
- Marine and land transportation to the subject facility
- Installation and setting of equipment
- Commissioning, initial operation training, and operation training for procured equipment
- Maintenance contract for MRI, CT, and X-ray equipment

(b) Government of Nepal

- Arrangement of B/A, A/P and handling charge for payment
- Exemption or refund of taxes on the procurement of imported equipment/materials and services
- Removal of existing equipment and repair at the location where the equipment is to be installed in the Project
- Provision of primary facilities (power supply, telephone line (for equipment maintenance), water supply and drainage)
- Provision of information and materials necessary for transportation, installation and setting
- Obtaining the necessary permits for import
- Preparation of the planned installation site for procured equipment
- Provision of a place to unload procured equipment
- Provision of storage space for equipment prior to installation and commissioning
- Securing the delivery route for procured equipment

(2) Classification for Facility Renovation Work

The renovation of each facility for the installation of MRI, CT, and X-ray equipment shall be borne by the Japanese side, but preparations before the renovation, such as removal of existing equipment, will be borne by the Nepal side. The details of the renovation and the responsibility of each side are as follows:

MRI

Item	Burden of Nepal	Japan burden
Removal of existing equipment	○	
Removal of existing walls, ceilings, fixtures, etc.	○	
Removal of existing interior finishing materials (both base materials)	○	
Pulling power from the electrical room to the MRI power panel	○	
Run telephone lines (outside lines) from the existing telephone main wiring to the MRI room	○	
Securing the transport route	○	
Installation of water supply and drainage piping for MRI cooling from the existing water pipe branch point		○
Interior renovation and MRI shield work		○
UPS and generator installation		○
Incidental work required for equipment installation		○
Equipment installation		○

CT

Item	Burden of Nepal	Japan burden
Removal of existing equipment	○	
Removal of lights, fittings, etc.	○	
Securing the transport route	○	
Removal of existing doors	○	
Pulling in power from the electrical room to the CT power panel	○	
Installation of radiation shielding boards and interior work		○
UPS and generator installation		○
Other incidental work required for installation of equipment		○
Equipment installation		○

X-ray

Item	Burden of Nepal	Japan burden
Removal of existing equipment	○	
Securing the transport route	○	
Removal of existing doors	○	
Drawing power from the electrical room to the X-ray power panel	○	
Installation of radiation shielding boards and interior work		○
Incidental work required for equipment installation		○
Equipment installation		○

2.2.4.4 Consultant Supervision

After assisting in the bidding process for the selection of equipment suppliers, the Consultant shall supervise the procurement to ensure the smooth progress of equipment procurement and building renovation. The Consultant shall confirm the consistency between the procured

equipment and the contract, conduct pre-shipment inspection, confirm the status of transportation and customs clearance, conduct final on-site acceptance inspection, and confirm the status of the maintenance contract. The Consultant shall always make efforts to grasp the progress of each process, provide appropriate advice and guidance to the implementing agency in charge in Nepal and the supplier, and report to the relevant organizations in both countries as appropriate.

2.2.4.5 Procurement Plan

(1) Procurement Country

Since the equipment to be procured in the Project is not manufactured in Nepal, in principle, Japanese products are to be procured in accordance with the scheme of a Grant Aid project. However, if competition in the bidding process is not expected due to the limited number of manufacturers, products from third countries shall also be considered for procurement. As for the materials for the construction and renovation, the materials that can be procured in Nepal shall be procured from Nepal, and the materials that are difficult to ensure the quality of shall be procured from Japan. Specifically, non-magnetic materials for MRI shield construction, leaded plasterboard for radiation protection, and leaded fittings shall be procured from Japan.

(2) Transportation

Equipment and materials procured from Japan shall be transported by sea from the Port of Yokohama, and by land from the Port of Kolkata in India to the site. On the way to the sites, the equipment and materials shall be cleared by customs at Birganj on the border between India and Nepal. It will take approximately 40-50 days from Yokohama Port to the target sites. At the time of the survey, there were no restrictions or major changes in the number of days required for land transportation between India and Nepal due to the spread of COVID-19, but transportation conditions shall be checked as appropriate during the procurement supervision period.

2.2.4.6 Operational Guidance Plan

After the equipment is installed, the adjustment and trial operation shall include setting, procurement work, operation check, trial operation, and performance and function inspection. For initial operation guidance, engineers from each equipment manufacturer plan to provide guidance to medical personnel at the cooperating facilities on basic operation, replacement of

consumables, and daily inspections.

In particular, there have been many reports in Japan of MRI incidents such as adsorption accidents due to the introduction of magnetic materials such as metals into the magnetic field, and quench accidents where liquid helium suddenly vaporizes and explodes, lowering the oxygen concentration in the room. A sufficient period of instruction should be given to the maintenance personnel and hospital staff at each hospital. In addition, since MRI, CT, and general radiography systems are subject to maintenance contracts, the technicians of the distributors are expected to handle any malfunctions or problems. The staff in charge of maintenance management at each hospital should be given sufficient orientation on the contents of the maintenance contract, and should be instructed on how to check and contact the agency in case of malfunctions or other problems.

2.2.4.7 Soft Component (Technical Assistance) Plan

No soft component shall be implemented in the Project. All the equipment to be procured is widely used in Nepal, and the grade of the equipment has been selected as maintained in Nepal. For MRI, CT and X-ray which requires a relatively high level of maintenance, a one-year manufacturer's warranty and a two-year maintenance contract shall be attached to the equipment, and manufacturer support will be available for three years after maintenance. If technical issues are identified, the manufacturer's engineers will provide guidance and explanations.

2.2.4.8 Implementation Schedule

The implementation schedule of the Project is shown in Figure 3-5. The equipment procurement period is expected to be completed in about 14 months from the start of implementation design, including the building renovation period. In addition, the MRI, CT, and X-ray equipment to be procured in this project will be subject to a one-year manufacturer's warranty period and a two-year maintenance contract, so the total process will take approximately 50 months.

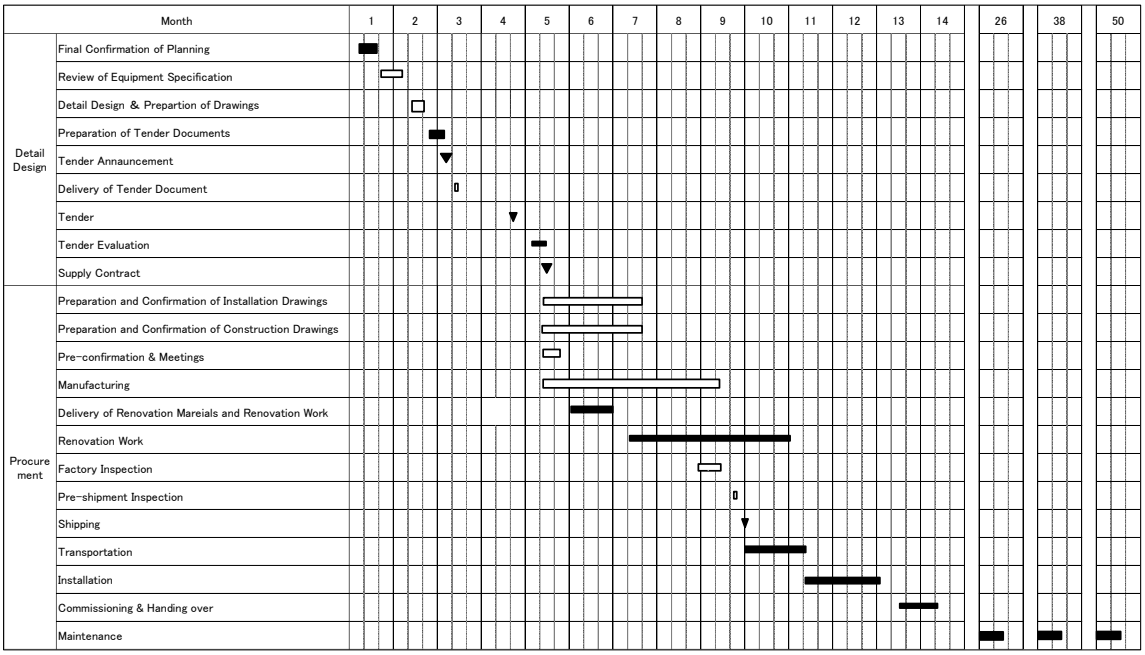


Figure 5 Implementation Schedule

2.2.5 Environmental and social considerations

The Project does not have any environmental or social impact because it is the renewal and replacement of medical equipment for currently active medical facilities.

2.3 Security plan

In the building renovation work in the Project, safety measures shall be taken in accordance with the "Construction Safety Policy for ODA Projects Involving Construction of Facilities" and the "Safety Management Guidance for ODA Construction Work".

2.4 Obligations of Recipient Country

The obligations of the Nepal side for the implementation of the Project are shown in "2.2.4.3 Scope of Works". In particular, the following matters need to be addressed by the Ministry of Health and Population in collaboration with the relevant ministries and agencies and the facilities.

・Expedite B/A signatures and A/P issuance

・Expediting the issuance of other government documents essential for implementation

・Expedite tax exemptions for customs clearance, equipment procurement and maintenance contracts

・Removal of existing equipment until the start of building renovation work, and building renovation at the expense of Nepal
・Completion of construction work up to the start of installation work
・Assignment of medical personnel necessary to operate the procured equipment
・Budgetary measures necessary for the operation and maintenance of procured equipment
・Facilitation and security for consultants and suppliers
・Tax exemption for suppliers

2.5 Project Operation Plan

2.5.1 Staffing

The number of medical personnel mainly involved in the operation of diagnostic imaging equipment at each facility is shown in Table 4. Radiologists is responsible for diagnostic imaging such as MRI, CT, and X-ray, and Medical Imaging Technologists is responsible for conducting MRI and CT examinations. Radiographers is in charge of supporting the implementation of each examination. Each facility has sufficient personnel to operate the provided equipment, and the Kanti Children's Hospital, which is planning to install MRI and CT, plans to increase the number of personnel assigned in conjunction with the equipment installation.

Table 4　Human resource of Radiology department

Facility Name	Number of people assigned		
	Radiologist	Medical Imaging Technologist	Radiographer
Human Organ Transplant Center	3	1	11
Patan Hospital	2	8	13
Paropakar Maternity and Women’s Hospital	6	0	1
National Trauma Center	7	1	14
Bir Hospital	15	9	9
Shahid Gangalal National Heart Centre	3	4	11
Kanti Children's Hospital	7	3	6
Manmohan Cardiothoracic Vascular & Transplant	1	3	9

2.5.2 Operation and Maintenance of the Equipment

The operation and maintenance of the equipment procured under the Project shall be carried out in the following manner:

① Preventive Maintenance through Daily Inspection

Conduct daily equipment inspections using an equipment management chart that records the number of times the equipment is used, whether there are any problems, and whether repairs are required. This prevents major breakdowns, malfunctions, and problems from occurring.

② Management by Maintenance Contract

Maintenance of MRI, CT, and X-ray by the manufacturer's engineers is essential for safe operation and failure handling. Therefore, a CMC or AMC shall be concluded with the local agents for maintenance, taking into consideration the grade and specifications of the equipment and the maintenance cost. Of these nine kinds of equipment procured for the Project, MRI and CT shall be subject to CMC, and X-ray shall be subject to AMC. In the Project, CMC or AMC is planned for two years after the end of the manufacturer's warranty period of the relevant equipment. From the fourth year after the procurement, the contract shall be made by the Nepal side and the cost shall be required to be borne. The cost of the maintenance contract for each piece of equipment is shown in Table 5.

Table 5 Annual fee of maintenance contract

Contract type and details	Target equipment	Quantity	Annual contract fee	
			NPR (thousands)	Japanese yen (thousands)
Comprehensive Maintenance Contract (CMC) Contents: Periodic inspections, on-call repair support, Free of charge for replacement parts	MRI	1	13,400	15,000
	CT	1	10,700	12,000
Annual Maintenance Contract (AMC) Contents: Periodic inspections, on-call repair support	X-ray	4	1,800	2,000

2.6 Project Cost Estimation

2.6.1 Initial Cost Estimation

Expenses borne by Nepal is estimated as shown below.

(1) Expenses borne by Nepal

Item	Expense (NPR)	
Expenses borne by Nepal for Renovation work	6,813,000	(6.1 million Yen)
Others	1,005,000	(0.9million Yen)
Total	7,818,000	(7 million Yen)

(2) Estimation condition

Time of estimation : June, 2021

Exchange rate : 1 USD = 109.97 yen

1 NPR: 1.0757 yen

Implementation period : The period is shown in Figure 3-5

Other : To be estimated in accordance with the Japan grant aid scheme

2.6.2 Operation and Maintenance Cost

The annual cost of spare parts and consumables required for the use and maintenance of the equipment procured under the Project is estimated as shown in Table 6 below. On the other hand, the equipment to be procured for renewal is already covered by the maintenance budgets of the Ministry of Health and Population and each facility. Therefore, the increase in maintenance cost due to the implementation of the Project would be 2,400 thousand Nepal Rupees (NPR) per year for MRI maintenance.

In addition, it is necessary to follow up and investigate the service content and budget during the contract period so that Nepal can continue the maintenance contract after the maintenance contract period of the Project is over.

Table 6 Annual maintenance cost

Classification	Equipment name	Main consumables	Annual maintenance fee	
			NPR (thousands)	Japanese yen (thousands)
New	MRI	(medical) Contrast media	2,400	2,149
Replace	CT	(medical) Contrast media	1,800	1,612
	Ventilator	Circuit (electric)	37,728	33,777
	Patient monitor	Electrode, Cuff	4,935	4,418
	Infusion pump	Infusion line	4,435	3,970
	Syringe pump	Syringe	14,788	13,239
Total annual maintenance and management costs			66,083	59,165
Total excluding annual maintenance costs for renewal equipment			2,400	2,149

Based on the results of the above estimation, the increase in the operation and maintenance cost after the implementation of the Project would be 2,400,000 NPR per year until the third year, and 33,700,000 NPR per year after the fourth year due to the addition of the maintenance contract cost. This is 0.06% of the annual budget of the Ministry of Health and Population

(60,700,000 NPR) and 1.3% of the total budget allocated to the 15 facilities (10,578,206,000 NPR) for the fiscal year 2020/21, so there will be no problem in securing operation and maintenance costs.

Chapter 3: Project Evaluation

Chapter 3: Project Evaluation

3.1 Preconditions

For the smooth implementation of the project, it is essential that the responsibility of the Nepal side shall be fulfilled for the implementation of the project. Especially, the removal of existing equipment and preparations for building renovation of the facility that will house the MRI, CT, and X-ray which will be conducted under the responsibility of the Nepal side, shall be completed in advance to the building renovation or installation of the equipment procured in the project. This is a prerequisite for the smooth implementation of the entire project.

3.2 Necessary Inputs by Recipient Country

The following inputs should be made by the Nepal side.

- Recruit sufficient staff with appropriate skills and experience for operation and maintenance of new equipment
- Allocation of maintenance cost
- Operation and maintenance structure
- Routine check/Periodic inspection

3.3 Important Assumptions

The following assumptions are important for the smooth implementation and sustainable effect of the project.

- Electricity and infrastructure of the project will be maintained without any serious problems
- Not major changes in the health system and patient's consultation behavior due to a pandemic such as COVID-19.

3.4 Project Evaluation

3.4.1 Relevance

About 60% of deaths in Nepal are due to the rapid structural change in diseases from infectious diseases to NCDs. In response to this, the Government of Nepal is working to improve health services by making access and utilization of high-quality health services for the people one of the pillars of the 15th Five-Year National Development Plan and Development Plan 2019, Health Sector Strategy (2015-2020).

The purpose of the Project is to improve the quality of medical services at tertiary care facilities in Nepal by providing medical equipment that is essential for the diagnosis and treatment of NCDs, with the aim of strengthening medical services for NCDs. The Project is expected to contribute to the improvement of the quality of medical services for NCDs and the strengthening of Nepal's medical services by resolving issues related to medical equipment, such as shortage of equipment, lack of functions, and malfunctions due to aging. If the government of Nepal continues its efforts to achieve the target, the effects of the implementation of this project are expected to contribute to the resolution of NCDs issues in Nepal.

3.4.2 Effectiveness

By introducing the medical equipment needed for diagnosis and care for NCDs, the services of advanced hospitals will be improved. The following effects can be expected.

(1) Quantitative Effects

Indicators	Baseline (2019)	Target* (2025)
① Number of MRI examinations in Kanti children's hospital (Cases/year)	0	600
③ Number of X-ray examinations in Bir hospital (Cases/year)	44,000	47,000

The basis for calculating the target for quantitative effects is as follows.

MRI

Kanti Children's Hospital currently does not have MRI, and the Project will introduce a new MRI. Based on interviews at Kanti Children's Hospital, neurological diseases (neurosurgery and neurology) and oncological diseases were identified as diseases that may require MRI examinations. Of these, the target was calculated based on the assumption that the number of patients who would require testing would be approximately 50 per month.

＜Calculation assumptions＞

- MRI examinations are mainly intended for patients with neurological diseases (cerebral neurology, neurology) and oncological diseases
- Approximately 50 patients per month are targeted.

＜Breakdown of calculation＞

・50 tests/month x 12 months = 600 tests/year

X-ray

Bir Hospital provided examination services in 4 X-ray rooms and 4 mobile X-ray units, for a total of 8 units. In 2019, one X-ray machine was out of service for more than six months due to failure, and as of January 2022, it is still out of service. By installing a new X-ray under the Project, a total of 8 units are expected to be available for examination.

＜Calculation assumptions＞

・In 2019, test was conducted with 8 X-ray machines, but one of them had been out of order for more than six months, so we deem that the test was actually conducted with 7.5 machines.

・44,000 tests in 2019

・The equipment that failed is still out of service, and 7 units were used for the test in 2021.

・One unit is planned to be installed in the Project, and the number of tests will be calculated based on the assumption that a total of 8 units will be used for tests as of 2025.

＜Breakdown of calculation＞

・Number of tests in 2019 / Number of units in 2019 ＝ Number of test per 1 unit per year
44,000/7.5＝5,866 tests

・5,866 tests/unit x 8 unit ＝ 46,928 tests (≒47,000 tests)

(2) Qualitative Effects

・It is expected that the quality of health services in Nepal will be improved by improving the quality of diagnostic and treatment services in each advanced public hospital where the medical equipment will be provided.

・By procuring MRI, it will be possible to diagnose new and more accurate definitive diagnoses of diseases such as cancer.

Appendices

1. Member List of the Survey
2. Survey Schedule
3. List of Parties Concerned in the Recipient Country
4. Minutes of Discussions
5. Technical Notes

[Appendices]

Appendix 1. Member List of the Study Team

Mr. Tatsuya Ashida	Team Leader]
	Advisor, Health Team4, Human Development Dept., JICA
Ms. Asumi Endo	Cooperation Planning]
	Health Team4, Human Development Dept., JICA
Mr. Kazuhiro Abe	Project Manager / Equipment Planning I
	International Techno Center Co.,Ltd.
Mr. Atsushi Matsusue	Medical Equipment Planning II
	International Techno Center Co.,Ltd.
Mr. Dai Fujita	Medical Equipment Planning III
	International Total Engineering Corporation
Mr. Hironori Nakajima	Procurement and Cost Planning
	International Total Engineering Corporation
Mr. Tatsuya Matsuoka	Health Planning
	International Total Engineering Corporation
Ms. Haruko Shimomura	Architectural Planning / Facility Planning
	K.ITO Architectural & Engineers Inc.

Appendix 2. Survey Schedule

September 26, 2021 - October 6, 2021

Date	Schedule		
	Equipment Planning II	Equipment Planning III	Architectural Planning / Facility Planning
	Atsushi Matsusue	Dai Fujita	Haruko Shimomura
Sep 13(Mon)	Work on other projects	Departure from Narita	
Sep 14 (Tue)		Arrive in Kathmandu via Doha	
Sep 15 (Wed) ~ Sep 25 (Sat)		Quarantine in hotel, PCR test	
Sep 26 (Sun)	Full day: Visit to Kanti Children's Hospital		
Sep 27 (Mon)	Morning: Visit to Bill's Hospital Afternoon: Visit to National Trauma Center Visit to local agency of medical equipment		
Sep 28 (Tue)	Morning: Visit to Patan Hospital Afternoon: Visit to Paropakar Maternity and Women's Hospital Visit to local agency of transport company		
Sep 29 (Wed)	Morning: Visit to Manmohan Cardiothoracic Vascular and Transplant Center Afternoon: Visit and discussion at Shahid Gangalal National Heart Center Visit and discussion at Human Organ Transplant Center		
Thursday, September 30	A.M.: Web conference with JICA Afternoon: Visit to Ministry of Health and Population, report on field survey results, and discuss contents of technical notes.		
October 1 (Friday)	Morning: Visit to Ministry of Health and Population, technical note signing. Afternoon: Visit to a local agency of medical equipment		
October 2 (Saturday)	Self-quarantine in hotel before PCR test		
October 3 (Sunday)	Self-quarantine in hotel before PCR test		
October 4 (Monday)	PCR test		
Tuesday, October 5	Departure from Kathmandu		
October 6 (Wednesday)	Arrive at Narita via Doha		

Appendix 3. List of Parties Concerned in the Recipient Country

Ministry of Health and Population, Nepal

Dr. Madan Kumar Upadhyaya	Chief Division of Quality standard and Regulation Division

Human Organ Transplant Centre

Dr. Pukar Shrestha	Director
Dr. Krishna Budathoki	Head of Radiology Department, Senior Radiologist
Dr. Kalpana Shrestha	Head of Nephrology Department, Senior Consultant
Dr. Prabesh Neupane	Cardiologist
Dr. Samir Dawadi	Radiologist
Mr. Ranjan shah	Biomedical Engineer

Patan Hospital

Dr. Rabi Shakya	Director
Dr. Imran Ansari	Medical director
Dr. Shreejana Shrestha	Head of Department, Radiology department
Mr. Ganesh Bdr Thapa	In charge of Department, Radiology department
Mr. Lila Raj Acharya	Administrative Officer
Ms. Shanta Dangol Shrestha	Nursing Director
Mr. Tirtha Raj Bhujel	Chief of Administrative officer
Mr. Shiva Chalise	Assistant Prof. Pediatrics
Mr. Birochan Khadka	Biomedical engineer, Bio Medical Department

Paropakar Maternity and Women's Hospital

Dr. Sangeeta Kausal Mishra	Director
Ms. Smriti Kafle	Biomedical Engineer
Mr. Ranu Thapa	Administrative Chief

National Trauma Centre

Dr. Pramod Joshi	Director
Mr. Roshan Pokharel	Biomedical Engineer

Mr. Bikesh Shrestha	Biomedical Technician

Bir Hospital

Dr. Kedar Prasad Ceintury	Director
Dr. Anupama Karki	Deputy Director
Mr. Sagar Mishra	Administrative officer
Mr. Lok Badhadur Bohara	Administrative officer

Shahid Gangalal National Heart Center

Dr. Chandra Mani Adhikari	Director
Ms. Prati Badan Dangol	Matron. Head of Nursing Department
Dr. Krishna Budhathoki	Head of Radiology Department

Kanti Children's Hospital

Dr. Ajit Rayamajhi	Director
Mr. Roshan Bajracharya	Maintenance Officer
Ms. Utkristi Khadka	Biomedical Engineer

Manmohan Cardiothoracic Vascular & Transplant Centre

Dr. Uttam Krishna Shrestha	Executive Director
Mr. Ajay Shankar Shah	In charge of Radiology
Mr. Kundan Raj Satyal	Administrative Chief

Appendix 4. Minutes of Discussions

Minutes of Discussions
on the Preparatory Survey for the Project for
The Project for Improvement of Medical Equipment in the Advanced Public Hospitals
(Explanation on Draft Preparatory Survey Report)

With reference to the minutes of discussions signed between Ministry of Health and Population(hereinafter reffered to as "MOHP") and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on Date and in response to the request from the Government of Nepal (hereinafter referred to as "Nepal") dated November 20, 2020 Preparatory Survey Team (hereinafter referred to as "the Team") from JICA hold the series of meetings for the explanation of Draft Preparatory Survey Report (hereinafter referred to as "the Draft Report") for The Project for Improvement of Medical Equipment in the Advanced Public Hospitals (hereinafter referred to as "the Project").

As a result of the discussions, both sides agreed on the main items described in the attached sheets.

Kathmandu, December 3rd, 2020

Mr. Tastuya Ashida
Leader
Preparatory Survey Team
Japan International Cooperation Agency
Japan

Dr. Bikash Devkota
Chief
Quality Standard and Regulation Division
Ministry of Health and Population
Government of Nepal

(Witness)
Ms. Yeshoda Aryal
Senior Public Health Administrator
Health Coordination Division
Ministry of Health and Population

ATTACHEMENT

1. Objective of the Project

   The objective of the Project is to strengthen the treatment and diagnosis capacity related to NCDs through improvement of Medical Equipment in the Advanced Public Hospitals, thereby contributing to improvement of health care survice.

2. Title of the Preparatory Survey

   Both sides confirmed the title of the Preparatory Survey as "the Preparatory Survey for the Project for The Project for Improvement of Medical Equipment in the Advanced Public Hospitals "

3. Project site

   Both sides confirmed that the sites of the Project are hospitals located in Kathmandu Valley, which is shown in Annex 1. The regional hospitals in peripheral area will be investigated in the preparatory survey. As peripheral hospitals is not scope of the Project, this information of the hospitals in peripheral area will be utilized in the future consideration.

4. Responsible authority for the Project

   Both sides confirmed the authorities responsible for the Project are as follows:
   The Ministry of Health and Population will be the executing agency for the Project (hereinafter referred to as "the Executing Agency"). The Executing Agency shall coordinate with all the relevant authorities to ensure smooth implementation of the Project and ensure that the undertakings for the Project shall be taken care by relevant authorities properly and on time. The organization charts are shown in Annex 2.

5. Contents of the Draft Report

   After the explanation of the contents of the progeress report by the Team, the Nepal side agreed to its contents. JICA will finalize the Preparatory Survey Report based on the confirmed items. The report will be sent to the Nepal side around after the final cost estimation is completed.

6. Cost estimate

   Both sides confirmed that the cost estimate explained by the Team is provisional and

will be examined further by the Government of Japan for its approval.
Both sides confirmed that the cost estimate including the contingency explained by the Team is provisional and will be examined further by the Government of Japan for its approval. The contingency would cover the additional cost against natural disaster, unexpected natural conditions, etc.

7. Confidentiality of the tentative cost estimate and technical specifications
Both sides confirmed that the tentative cost estimate and technical specifications of the Project should never be disclosed to any third parties until all the contracts under the Project are concluded.

8. Procedures and Basic Principles of Japanese Grant
The Nepal side agreed that the procedures and basic principles of Japanese Grant (hereinafter referred to as "the Grant") as described in Annex 3 shall be applied to the Project. In addition, the Nepal side agreed to take necessary measures according to the procedures.

9. Timeline for the project implementation
The Team explained to the Nepal side that the expected timeline for the project implementation is as attached in Annex 5.

10. Expected outcomes and indicators
Both sides agreed that key indicators for expected outcomes are as follows. The Nepal side will be responsible for the achievement of agreed key indicators targeted in year 2024 and shall monitor the progress for Ex-Post Evaluation based on those indicators.

Index (Number of examination per year)	Baseline (2018/19)	Target (2023/24)
MRI	0	500
X-ray	44,000	47,000

11. Ex-Post Evaluation
JICA will conduct ex-post evaluation after three (3) years from the project completion, in principle, with respect to five evaluation criteria (Relevance, Effectiveness, Efficiency, Impact, Sustainability). The result of the evaluation will be publicized. The Nepal side is required to provide necessary support for the data collection.

12. Undertakings of the Project

Both sides confirmed the undertakings of the Project as described in Annex 6. With regard to exemption of customs duties, internal taxes and other fiscal levies as stipulated in (2)-5 of Annex 6, both sides confirmed that such customs duties, internal taxes and other fiscal levies, which shall be clarified in the bid documents by MOHP during the implementation stage of the Project.

The Nepal side assured to take the necessary measures and coordination including allocation of the necessary budget which are preconditions of implementation of the Project. It is further agreed that the costs are indicative, i.e. at Outline Design level. More accurate costs will be calculated at the Detailed Design stage.

Both sides also confirmed that the Annex 6 will be used as an attachment of G/A.

13. Monitoring during the implementation

The Project will be monitored by the Executing Agency and reported to JICA by using the form of Project Monitoring Report (PMR) attached as Annex 7. The timing of submission of the PMR is described in Annex 6.

14. Project completion

Both sides confirmed that the Project completes when all the facilities constructed and equipment procured by the Grant are in operation. The completion of the Project will be reported to JICA promptly, but in any event not later than six months after completion of the Project.

15. Environmental and Social Considerations

The Team explained that 'JICA Guidelines for Environmental and Social Considerations (April 2010)' (hereinafter referred to as "the Guidelines") is applicable for the Project. The Project is categorized as C because the Project is likely to have minimal adverse impact on the environment under the Guidelines.

16. Other Relevant Issues

16-1. 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 including the additional purchase of the consumables and spare parts.

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 and CT. 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. The maintenance contracts on major equipment (maximum three years) is planned to be covered by Japanese grant. The Nepal side will keep to contract after expiry of maintenance contracts by Japanese grant.

16-2. Removal of Existing Equipment

The Nepal side agreed to remove the existing equipment in the target hospitals through appropriate measures in a timely manner to prepare the suitable places where the new equipment is to be installed. The removal will be implemented by Nepal side based on the technical advice done by Japanese Consultants.

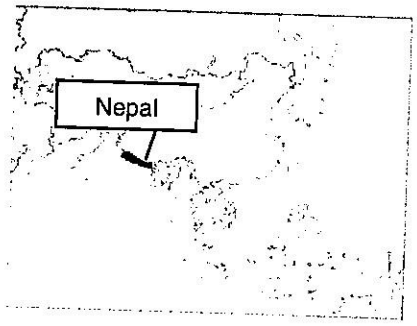
16-3. Allocation of Human Resources for Utilization

The Nepal side agreed to secure sufficient personnel for the utilization of the medical equipment to be provided.

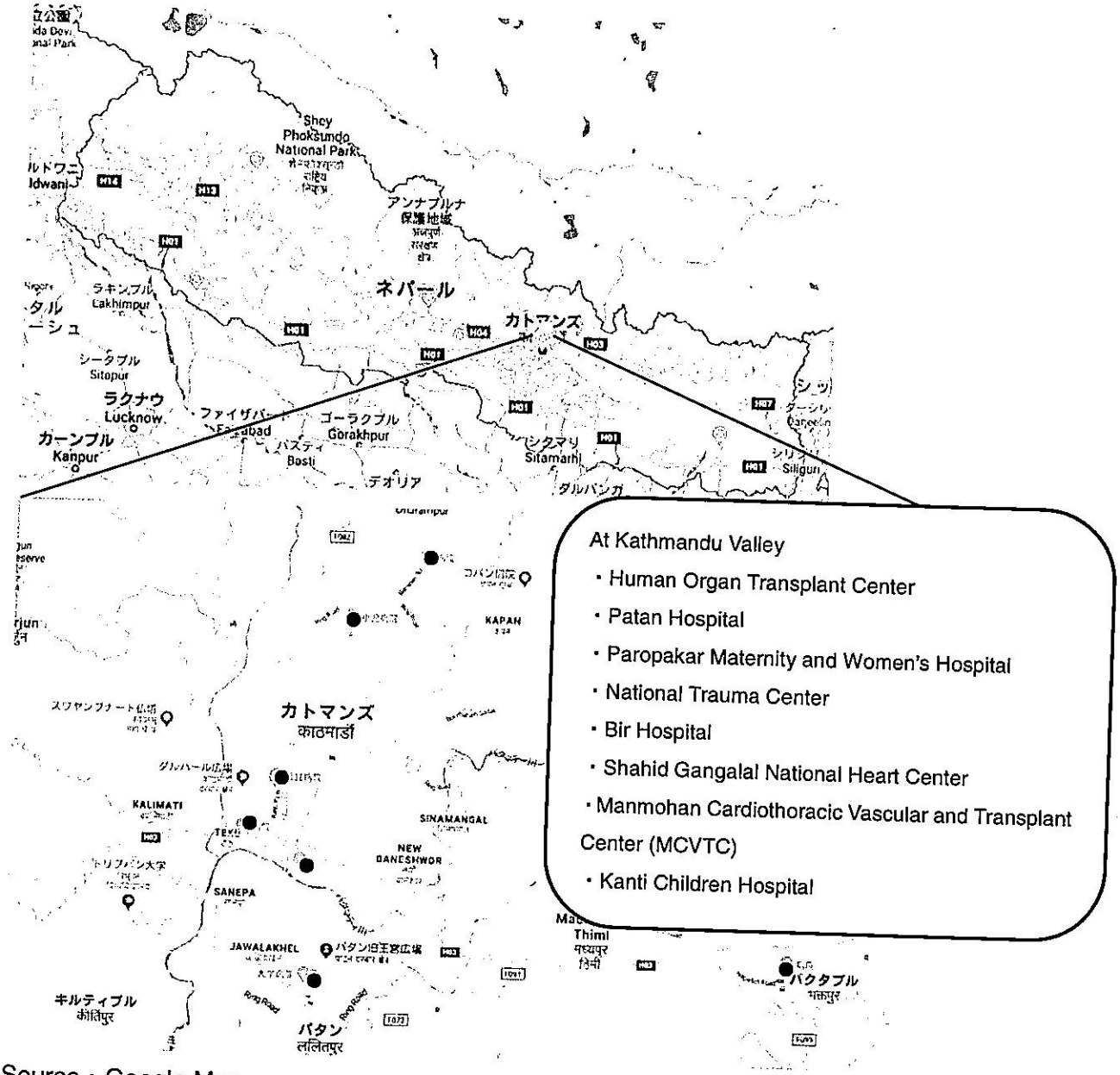
Annex 1 Project Site
Annex 2 Organization Chart
Annex 3 Japanese Grant
Annex4 Item list
Annex 5 Project Implementation Schedule
Annex 6 Major Undertakings to be taken by the Government of Nepal
Annex 7 Project Monitoring Report (template)

Project site

Annex1



Target hospitals

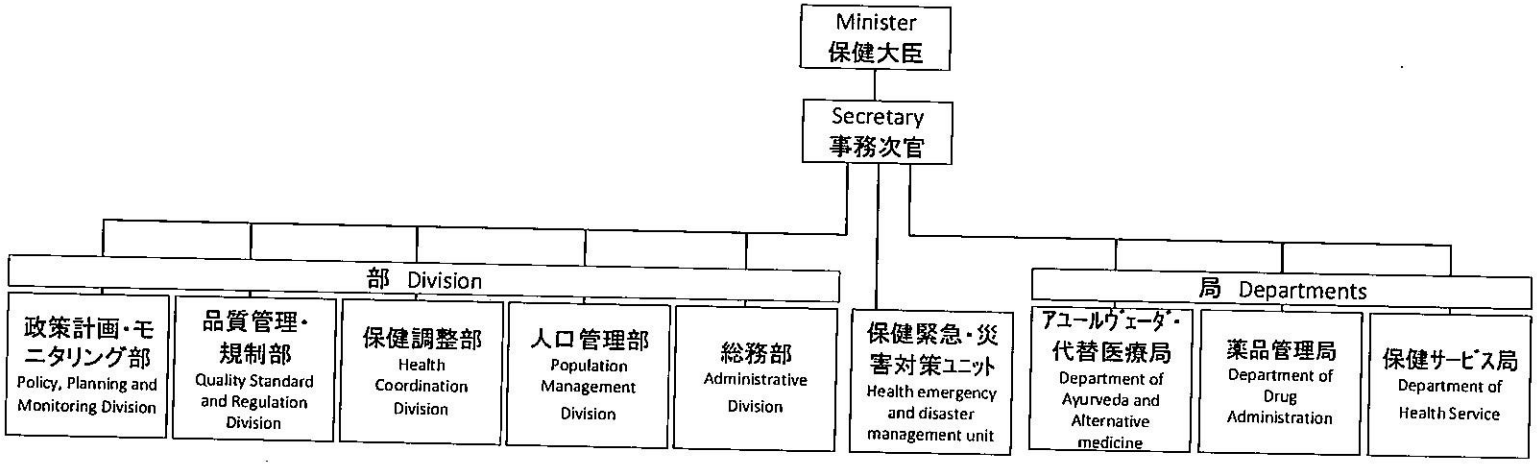


At Kathmandu Valley

- Human Organ Transplant Center
- Patan Hospital
- Paropakar Maternity and Women's Hospital
- National Trauma Center
- Bir Hospital
- Shahid Gangalal National Heart Center
- Manmohan Cardiothoracic Vascular and Transplant Center (MCVTC)
- Kanti Children Hospital

Source : Google Map

Annex2 Organization Chart



JAPANESE GRANT

The Japanese Grant is non-reimbursable fund provided to a recipient country (hereinafter referred to as "the Recipient") to purchase the products and/or 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. Followings are the basic features of the project grants operated by JICA (hereinafter referred to as "Project Grants").

1. Procedures of Project Grants

Project Grants are conducted through following procedures (See "PROCEDURES OF JAPANESE GRANT" for details):

(1) Preparation

- The Preparatory Survey (hereinafter referred to as "the Survey") conducted by JICA

(2) Appraisal

-Appraisal by the government of Japan (hereinafter referred to as "GOJ") and JICA, and Approval by the Japanese Cabinet

(3) Implementation

Exchange of Notes

-The Notes exchanged between the GOJ and the government of the Recipient

Grant Agreement (hereinafter referred to as "the G/A")

-Agreement concluded between JICA and the Recipient

Banking Arrangement (hereinafter referred to as "the B/A")

-Opening of bank account by the Recipient in a bank in Japan (hereinafter referred to as "the Bank") to receive the grant

Construction works/procurement

-Implementation of the project (hereinafter referred to as "the Project") on the basis of the G/A

(4) Ex-post Monitoring and Evaluation

-Monitoring and evaluation at post-implementation stage

2. Preparatory Survey

(1) Contents of the Survey

The aim of the Survey is to provide basic documents necessary for the appraisal of the 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 the Recipient necessary for the implementation of the Project.

- Evaluation of the feasibility of the Project to be implemented under the Japanese Grant 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.
- Confirmation of Environmental and Social Considerations

The contents of the original request by the Recipient are not necessarily approved in their initial form. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant.

JICA requests the Recipient to take 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 executing agency of the Project. Therefore, the contents of the Project are confirmed by all relevant organizations of the Recipient based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA contracts with (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 feasibility of the Project.

3. Basic Principles of Project Grants

(1) Implementation Stage

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 the Recipient to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Recipient to define the necessary articles, in accordance with the E/N, to implement the Project, such as conditions of disbursement, responsibilities of the Recipient, and procurement conditions. The terms and conditions generally applicable to the Japanese Grant are stipulated in the "General Terms and Conditions for Japanese Grant (January 2016)."

2) Banking Arrangements (B/A) (See "Financial Flow of Japanese Grant (A/P Type)" for details)

a) The Recipient shall open an account or shall cause its designated authority to open an account under the name of the Recipient in the Bank, in principle. JICA will disburse the Japanese Grant in Japanese yen for the Recipient to cover the obligations incurred by the Recipient under the verified contracts.

b) The Japanese Grant will be disbursed when payment requests are submitted by the Bank to JICA under an Authorization to Pay (A/P) issued by the Recipient.

3) Procurement Procedure

The products and/or services necessary for the implementation of the Project shall be procured in accordance with JICA's procurement guidelines as stipulated in the G/A.

4) Selection of Consultants

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

5) Eligible source country

In using the Japanese Grant disbursed by JICA for the purchase of products and/or services, the eligible source countries of such products and/or services shall be Japan and/or the Recipient. The Japanese Grant may be used for the purchase of the products and/or services of a third country as eligible, if necessary, taking into account the quality, competitiveness and economic rationality of products and/or services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm, which enter into contracts with the Recipient, are limited to "Japanese nationals", in principle.

6) Contracts and Concurrence by JICA

The Recipient will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be concurred by JICA in order to be verified as eligible for using the Japanese Grant.

7) Monitoring

The Recipient is required to 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 to regularly report to JICA about its status by using the Project Monitoring Report (PMR).

8) Safety Measures

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

9) Construction Quality Control Meeting

Construction Quality Control Meeting (hereinafter referred to as the "Meeting") will be held for quality assurance and smooth implementation of the Works at each stage of the Works. The member of the Meeting will be composed by the

Recipient (or executing agency), the Consultant, the Contractor and JICA. The functions of the Meeting are as followings:

a) Sharing information on the objective, concept and conditions of design from the Contractor, before start of construction.

b) Discussing the issues affecting the Works such as modification of the design, test, inspection, safety control and the Client's obligation, during of construction.

(2) Ex-post Monitoring and Evaluation Stage

1) After the project completion, JICA will continue to keep in close contact with the Recipient in order to monitor that the outputs of the Project is used and maintained properly to attain its expected outcomes.

2) In principle, JICA will conduct ex-post evaluation of the Project after three years from the completion. It is required for the Recipient to furnish any necessary information as JICA may reasonably request.

(3) Others

1) Environmental and Social Considerations

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

2) Major undertakings to be taken by the Government of the Recipient

For the smooth and proper implementation of the Project, the Recipient is required to undertake necessary measures including land acquisition, and bear an advising commission of the A/P and payment commissions paid to the Bank as agreed with the GOJ and/or JICA. The Government of the Recipient shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient with respect to the purchase of the Products and/or the Services be exempted or be borne by its designated authority without using the Grant and its accrued interest, since the grant fund comes from the Japanese taxpayers.

3) Proper Use

The Recipient is required to maintain and use properly and effectively the products and/or services under the Project (including the facilities constructed and the equipment purchased), to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Japanese Grant.

4) Export and Re-export

The products purchased under the Japanese Grant should not be exported or re-exported from the Recipient.

Attachment I

PROCEDURES OF JAPANESE GRANT

Stage	Procedures	Remarks	Recipient Government	Japanese Government	JICA	Consultants	Contractors	Agent Bank
Official Request	Request for grants through diplomatic channel	Request shall be submitted before appraisal stage.	x	x				
1. Preparation	(1) Preparatory Survey Preparation of outline design and cost estimate		x		x	x		
2. Appraisal	(2)Preparatory Survey Explanation of draft outline design, including cost estimate, undertakings, etc.		x		x	x		
	(3)Agreement on conditions for implementation	Conditions will be explained with the draft notes (E/N) and Grant Agreement (G/A) which will be signed before approval by Japanese government.	x	x (E/N)	x (G/A)			
	(4) Approval by the Japanese cabinet			x				
3. Implementation	(5) Exchange of Notes (E/N)		x	x				
	(6) Signing of Grant Agreement (G/A)		x		x			
	(7) Banking Arrangement (B/A)	Need to be informed to JICA	x					x
	(8) Contracting with consultant and issuance of Authorization to Pay (A/P)	Concurrence by JICA is required	x			x		x
	(9) Detail design (D/D)		x			x		
	(10) Preparation of bidding documents	Concurrence by JICA is required	x			x		
	(11) Bidding	Concurrence by JICA is required	x			x	x	
	(12) Contracting with contractor/supplier and issuance of A/P	Concurrence by JICA is required	x				x	x
	(13) Construction works/procurement	Concurrence by JICA is required for major modification of design and amendment of contracts.	x			x	x	
	(14) Completion certificate		x			x	x	
4. Ex-post monitoring & evaluation	(15) Ex-post monitoring	To be implemented generally after 1, 3, 10 years of completion, subject to change	x		x			
	(16) Ex-post evaluation	To be implemented basically after 3 years of completion	x		x			

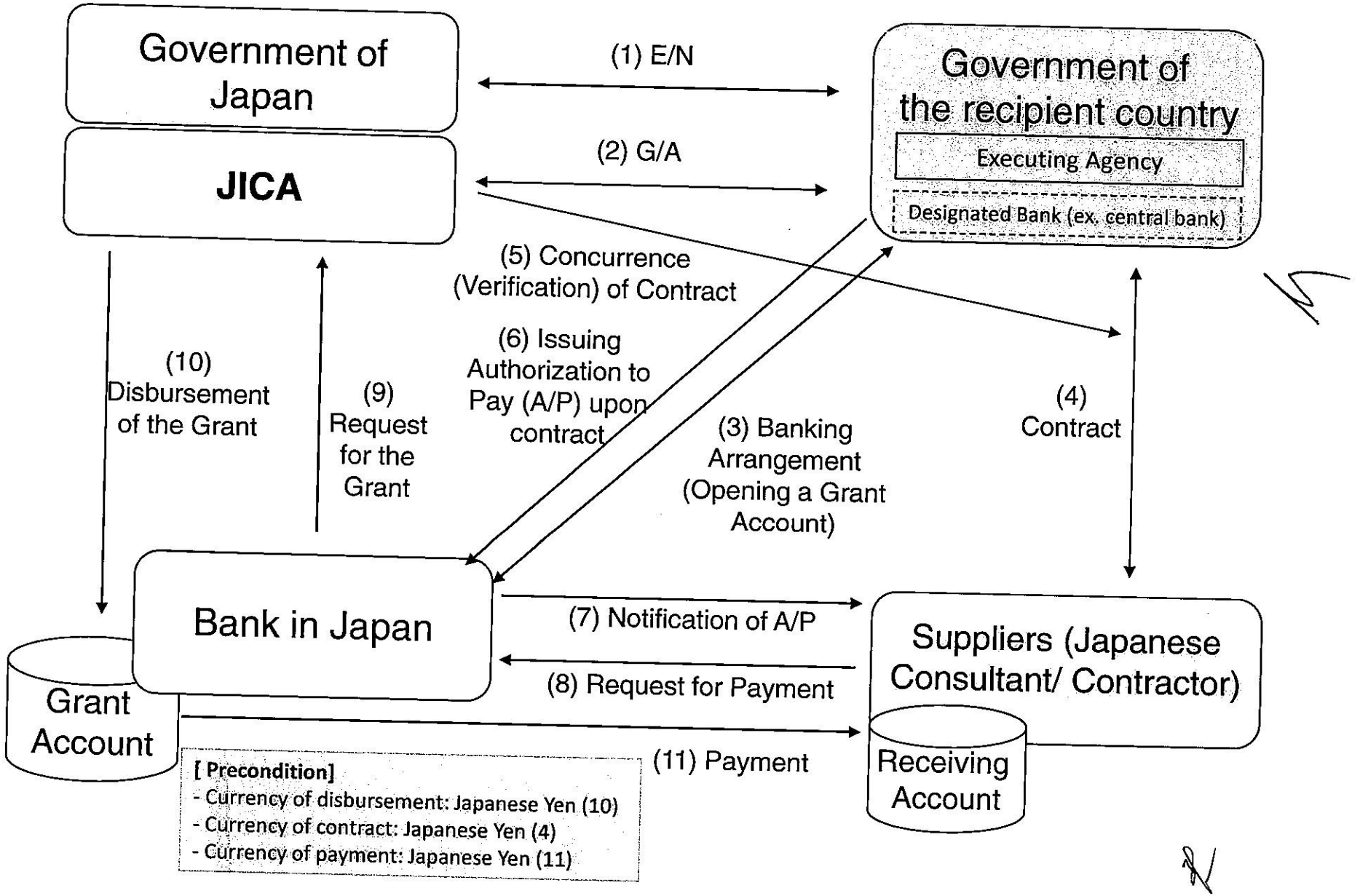
notes:

1. Project Monitoring Report and Report for Project Completion shall be submitted to JICA as agreed in the G/A.

2. Concurrence by JICA is required for allocation of grant for remaining amount and/or contingencies as agreed in the G/A.

Attachment 2

Financial Flow of Japanese Grant (A/P Type)



Annex4

as of Nov 20, 2020

	MRI	CT	X-ray	Portable X-ray	C-arm	Ventilator (Adult)	Patient monitor	Infusion Pump	Syringe Pump
1.Human Organ Transplant Centre	—	—	—	—	—	3	3	30	30
2.Patan Hospital	—	—	1	1	—	3	3	20	20
3.Paropakar Maternity and Women's Hospital	—	—	1	1	—	3	3	5	5
4.National Trauma Centre	—	—	—	—	1	3	3	15	15
5.Bir Hospital	—	—	1	1	1	3	3	15	15
6.Shahid Gangalal National Heart Center	—	—	—	1	—	3	3	25	40
7.Kanti Children's Hospital	1	1	—	—	—	3	3	20	20
8.Manmohan Cardiothracic Vascular & Transplant Centre	—	—	1	1	—	3	3	5	20
Total	1	1	4	5	2	24	24	135	165

Annex 5

Project Implementation Schedule (Tentative)

Year	2021				2022				2023	2024	2025	2026
① International Agreement	★ E/N	★ G/A										
② Detail Design				Sep								
③ Procurement			Sep		Nov							
④ Transportation				Nov		Apr						
⑤ Delivery and Installation					Apr		▲Jun					
⑥ Maintenance Contract						Jun						Jun

▲…Inspection and hand over

Annex 6

Major Undertakings to be taken by the Government of Nepal

1. Specific obligations of the Government of Nepal which will not be funded with the Grant

(1) Before the Bidding

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To sign the banking arrangement (B/A) with a bank in Japan (the Agent Bank) to open bank account for the Grant	within 1 month after the signing of the G/A	MOF		
2	To issue A/P to the Agent Bank for the payment to the consultant	within 1 month after the signing of the contract(s)	MOF		
3	To bear the following commissions to the Agent Bank for the banking services based upon B/A		MOHP/ MOF		
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	MOHP/ MOF		
	2) Payment commission for A/P	every payment	MOHP/ MOF		
10	To submit Project Monitoring Report (with the result of Detailed Design)	before preparation of the bidding documents	MOHP		

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

(2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To issue A/P to the Agent Bank for the payment to the supplier.	within 1 month after the signing of the contract(s)	MOHP		
2	To bear the following commissions to the Agent Bank for the banking services based upon the B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	MOHP		
	2) Payment commission for A/P	every payment	MOF		
3	To ensure prompt customs clearance and to assist the Supplier(s) with internal transportation in the country of the Recipient	during the Project	MOHP		
4	To accord Japanese physical persons and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work	during the Project			
5	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			
6.	To remove or replace existing facility and equipment to install new one.	before or during the Project			
7.	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project	during the Project			
8.	To notify JICA promptly of any incident or accident, which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers	during the installation	MOHP		
9.	To submit Project Monitoring Report				
	1) To submit Project Monitoring Report after each work under the contract(s) such as shipping, hand over, installation and operational training	within 1 month after completion of each work	MOHP		
	2) To submit Project Monitoring Report concerning installation work for MRI and CT	every month during installation of MRI and CT	MOHP		
	3) To submit Project Monitoring Report (final) (including as-built drawings, equipment list, photographs, etc.)	within 1 month after issuance of Certificate of Completion for the works under the contract(s)	MOHP		
10.	To submit a report concerning completion of the Project	within 1 months after completion of the Project	MOHP		
11.	To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of the Project outside the site(s)				
	1) Electricity If required, relocation of electrical lines and exchange of the transformers to increase the power receiving capacity.	before start of the installation			
	2) Water Supply If required, the city water distribution main to the site	before start of the installation			
	3) Drainage If required, the city drainage main to the site	6 months before completion of the installation			

12.	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	MOHP		

(3) After the Project

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid 1) Allocation of maintenance cost 2) Operation and maintenance structure 3) Routine check/Periodic inspection	After completion of the installation			

2. Other obligations of the Government of Nepal funded with the Grant

NO	Items	Deadline	Amount (Million Japanese Yen)*
1	To construct and repair facilities and provide equipment	This part is closed due to the confidentiality	
	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		
	2) To provide equipment with installation, commissioning and training		
2	To implement detailed design, tender support if any (Consultant)		
3	Contingencies : Equipment Installation cost will be changed.		
	Total (estimate)		

*The Amount is provisional. This is subject to the approval of the Government of Japan.

Project Monitoring Report
on
Project Name
Grant Agreement No. XXXXXXX

20XX, Month

Organizational Information

Signer of the G/A (Recipient)	Person in Charge (Designation) _____ Contacts Address: _____ Phone/FAX: _____ Email: _____
Executing Agency	Person in Charge (Designation) _____ Contacts Address: _____ Phone/FAX: _____ Email: _____
Line Ministry	Person in Charge (Designation) _____ Contacts Address: _____ Phone/FAX: _____ Email: _____

General Information:

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

1: Project Description

1-1 Project Objective

1-2 Project Rationale

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

1-3 Indicators for measurement of "Effectiveness"

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr)	Target (Yr)
Qualitative indicators to measure the attainment of project objectives		

2: Details of the Project

2-1 Location

Components	Original *(proposed in the outline design)*	Actual
1.		

2-2 Scope of the work

Components	Original* *(proposed in the outline design)*	Actual*
1.		

Reasons for modification of scope (if any).

(PMR)

2-3 Implementation Schedule

Items	Original		Actual
	(proposed in the outline design)	*(at the time of signing the Grant Agreement)*	

Reasons for any changes of the schedule, and their effects on the project (if any)

2-4 Obligations by the Recipient

2-4-1 Progress of Specific Obligations

See Attachment 2.

2-4-2 Activities

See Attachment 3.

2-4-3 Report on RD

See Attachment 11.

2-5 Project Cost

2-5-1 Cost borne by the Grant(Confidential until the Bidding)

Components			Cost (Million Yen)	
	Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original[1),2)] *(proposed in the outline design)*	Actual
	1.			
Total				

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

2-5-2 Cost borne by the Recipient

Components			Cost (1,000 Taka)	
	Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original[1),2)] *(proposed in the outline design)*	Actual
	1.			

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

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

(PMR)

2-6 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 *(at the time of outline design)* name: role: financial situation: institutional and organizational arrangement (organogram): human resources (number and ability of staff):
Actual *(PMR)*

2-7 Environmental and Social Impacts

- The results of environmental monitoring based on Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- The results of social monitoring based on in Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- Disclosed information related to results of environmental and social monitoring to local stakeholders (whenever applicable).

3: Operation and Maintenance (O&M)

3-1 Physical Arrangement

- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spareparts, etc.)

Original *(at the time of outline design)*
Actual *(PMR)*

3-2 Budgetary Arrangement

- Required O&M cost and actual budget allocation for O&M

Original *(at the time of outline design)*

Actual *(PMR)*

4: Potential Risks and Mitigation Measures

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

Assessment of Potential Risks *(at the time of outline design)*

Potential Risks	Assessment
1. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
2. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
3. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:

	Contingency Plan (if applicable):
Actual Situation and Countermeasures	
(PMR)	

5: Evaluation and Monitoring Plan (after the work completion)

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 of 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. Specific obligations of the Recipient which will not be funded with the Grant
3. Monthly Report submitted by the Consultant

Appendix - Photocopy of Contractor's Progress Report (if any)
- Consultant Member List
- Contractor's Main Staff List

4. Check list for the Contract (including Record of Amendment of the Contract/Agreement and Schedule of Payment)
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) (PMR (final)only)
8. Pictures (by JPEG style by CD-R) (PMR (final)only)
9. Equipment List (PMR (final)only)
10. Drawing (PMR (final)only)
11. Report on RD (After project)

Attachment 6

Monitoring sheet on price of specified materials

1. Initial Conditions (Confirmed)

	Items of Specified Materials	Initial Volume A	Initial Unit Price (¥) B	Initial total Price C=A×B	1% of Contract Price D	Condition of payment	
						Price (Decreased) E=C−D	Price (Increased) E=C+D
1	Item 1	●●t	●	●	●	●	●
2	Item 2	●●t	●	●	●		
3	Item 3						
4	Item 4						
5	Item 5						

2. Monitoring of the Unit Price of Specified Materials

(1) Method of Monitoring : ●●

(2) Result of the Monitoring Survey on Unit Price for each specified materials

	Items of Specified Materials	1st ●month, 2015	2nd ●month, 2015	3rd ●month, 2015	4th	5th	6th
1	Item 1						
2	Item 2						
3	Item 3						
4	Item 4						
5	Item 5						

(3) Summary of Discussion with Contractor (if necessary)

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-
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Attachment 7

Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)
(Actual Expenditure by Construction and Equipment each)

		Domestic Procurement (Recipient Country) A	Foreign Procurement (Japan) B	Foreign Procurement (Third Countries) C	Total D
Construction Cost		(A/D%)	(B/D%)	(C/D%)	
	Direct Construction Cost	(A/D%)	(B/D%)	(C/D%)	
	others	(A/D%)	(B/D%)	(C/D%)	
Equipment Cost		(A/D%)	(B/D%)	(C/D%)	
Design and Supervision Cost		(A/D%)	(B/D%)	(C/D%)	
Total		(A/D%)	(B/D%)	(C/D%)	

Minutes of Discussions
on the Preparatory Survey for the Project for
The Project for Improvement of Medical Equipment in the Advanced Public Hospitals
(Explanation on Draft Preparatory Survey Report - Amendment 1)

With reference to the minutes of discussions (M/D) signed between Ministry of Health and Population(hereinafter reffered to as "MOHP") and the Japan International Cooperation Agency (hereinafter referred to as "JICA") for The Project for Improvement of Medical Equipment in the Advanced Public Hospitals (hereinafter referred to as "the Project") on December 03, 2020, as a result of the further discussions, both sides agreed on the amendment described in the attached sheet of the M/D. Other contents of the M/D remain unchanged.

Kathmandu, February 04, 2021

Ms. Yumiko Asakuma
Chief Representative
Japan International Cooperation Agency
Nepal Office

Dr. Bikash Devkota
Chief
Quality Standard and Regulation Division
Ministry of Health and Population
Government of Nepal

(Witness)
Ms. Yeshoda Aryal
Senior Public Health Administrator
Health Coordination Division
Ministry of Health and Population

Annex 6

Major Undertakings to be taken by the Government of Nepal

1. Specific obligations of the Government of Nepal which will not be funded with the Grant

(1) Before the Bidding

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To sign the banking arrangement (B/A) with a bank in Japan (the Agent Bank) to open bank account for the Grant	within 1 month after the signing of the G/A	MOF		
2	To issue A/P to the Agent Bank for the payment to the consultant	within 1 month after the signing of the contract(s)	MOF		
3	To bear the following commissions to the Agent Bank for the banking services based upon B/A			3 million Rs.	
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	MOHP/ MOF		
	2) Payment commission for A/P	every payment	MOHP/ MOF		
4	To submit Project Monitoring Report (with the result of Detailed Design)	before preparation of the bidding documents	MOHP		

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

(2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To issue A/P to the Agent Bank for the payment to the supplier.	within 1 month after the signing of the contract(s)	MOHP		
2	To bear the following commissions to the Agent Bank for the banking services based upon the B/A			3 million Rs.	
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	MOHP		
	2) Payment commission for A/P	every payment	MOF		
3	To ensure prompt customs clearance and to assist the Supplier(s) with internal transportation in the country of the Recipient	during the Project	MOHP		
4	To accord Japanese physical persons and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work	during the Project	MOHP		
5	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 / MOHP		
6.	To renovate of existing facility and replace of existing equipment to install new one.	before installation of the equipment	MOHP	9.9 million Rs.	
7.	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project	during the Project	MOHP		
8.	To notify JICA promptly of any incident or accident, which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers	during the installation	MOHP		
9.	To submit Project Monitoring Report				
	1) To submit Project Monitoring Report after each work under the contract(s) such as shipping, hand over, installation and operational training	within 1 month after completion of each work	MOHP		
	2) To submit Project Monitoring Report concerning installation work for MRI and CT	every month during installation of MRI and CT	MOHP		
	3) To submit Project Monitoring Report (final) (including as-built drawings, equipment list, photographs, etc.)	within 1 month after issuance of Certificate of Completion for the works under the contract(s)	MOHP		
10.	To submit a report concerning completion of the Project	within 1 months after completion of the Project	MOHP		
11.	To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of the Project outside the site(s)				
	1) Electricity If required, relocation of electrical lines and exchange of the transformers to increase the power receiving capacity.	before start of the installation	MOHP	0.6 million Rs./year.	
	2) Water Supply If required, the city water distribution main to the site	before start of the installation	MOHP		
	3) Drainage If required, the city drainage main to the site	6 months before completion of the installation	MOHP		

12.	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	MOHP		

(3) After the Project

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid 1) Allocation of maintenance cost 2) Operation and maintenance structure 3) Routine check/Periodic inspection	After completion of the maintenance contract	MOHP	**12 million Rs./year.**	

2. Other obligations of the Government of Nepal funded with the Grant

NO	Items	Deadline	Amount (Million Japanese Yen)*
1	To construct and repair facilities and provide equipment	This page is closed due to the confidentiality	
	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		
	2) To provide equipment with installation, commissioning and training		
2	To implement detailed design, tender support if any (Consultant)		
3	Contingencies : Equipment Installation cost will be changed.		
	Total (estimate)		

*The Amount is provisional. This is subject to the approval of the Government of Japan.

Appendix 5. Technical Notes

Technical Notes
on the Preparatory Survey for the Project for improvement of medical equipment in the advanced hospitals

Based on the several preliminary discussions between the Government of Nepal (hereinafter referred to as "Nepal") and Japan International Cooperation Agency (hereinafter referred to as "JICA"), JICA dispatched the Preparatory Survey Team for the Outline Design (hereinafter referred to as "the Team") of the Project for improvement of medical equipment in the advanced hospitals (hereinafter referred to as "the Project") to Nepal. The Team held a series of discussions with the officials of the Ministry of Health and Population (hereinafter referred to as "MoHP") and conducted a field survey. In the course of the discussions, MoHP and the Team (hereinafter referred to as "Both sides") have confirmed the main items described in the attached sheets.

Kathmandu, Nepal, 1th October, 2021

Kazuhiro ABE
Leader
Preparatory Survey Team
International Techno Center Co., Ltd.
Japan

Dr. Madan Kumar Upadhyaya
Division Chief
Quality Standard and Regulation Division
Ministry of Health and Population
Nepal

Government of Nepal
Ministry of Health and Population
Ramshah Path, Kathmandu

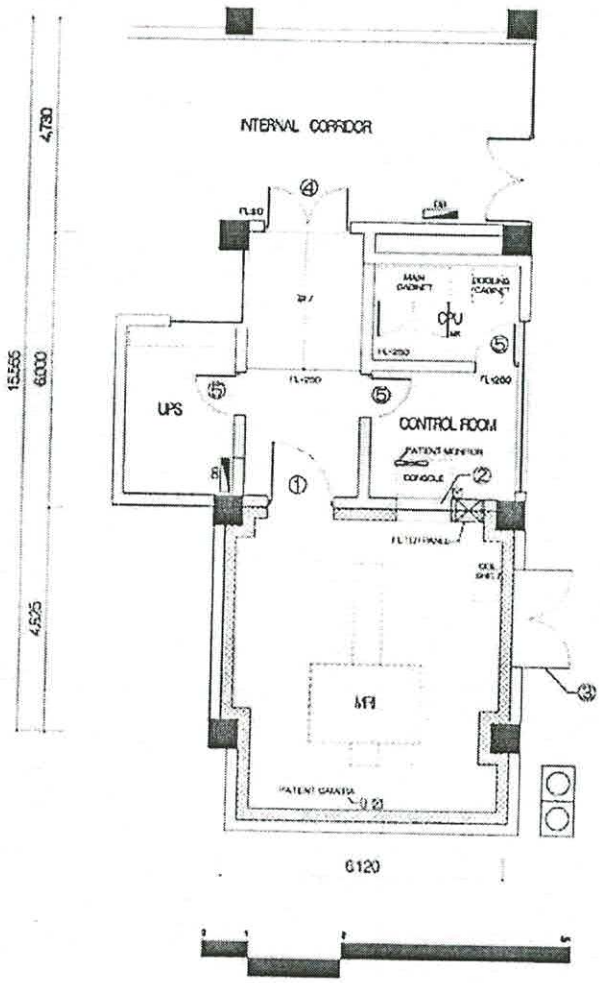
Annex 1 Equipment list

	MRI	CT	X-ray	Portable X-ray	C-arm	Ventilator	Patient monitor	Infusion Pump	Syringe Pump
1 Human Organ Transplant Center	–	–	–	–	–	3	3	30	30
2 Patan Hospital	–	–	1	1	–	3	3	20	20
3 Paropakar Maternity and Women's Hospital	–	–	1	1	–	3	3	5	5
4 National Trauma Center	–	–	–	–	1	3	3	15	15
5 Bir Hospital	–	–	1	1	1	3	3	15	15
6 Shahid Gangalal National Heart Centre	–	–	–	1	–	3	3	25	40
7 Kanti Children's Hospital	1	1	–	–	–	3	3	20	20
8 Manmohan Cardiothracic Vascular & Transplant Center	–	–	1	1	–	3	3	5	20
Total	1	1	4	5	2	24	24	135	165

The page in Annex 2 Specification of the equipment is closed due to the confidentiality.

Annex 3 Outline Design Drawing

1. MRI, Kanti Children's Hospital

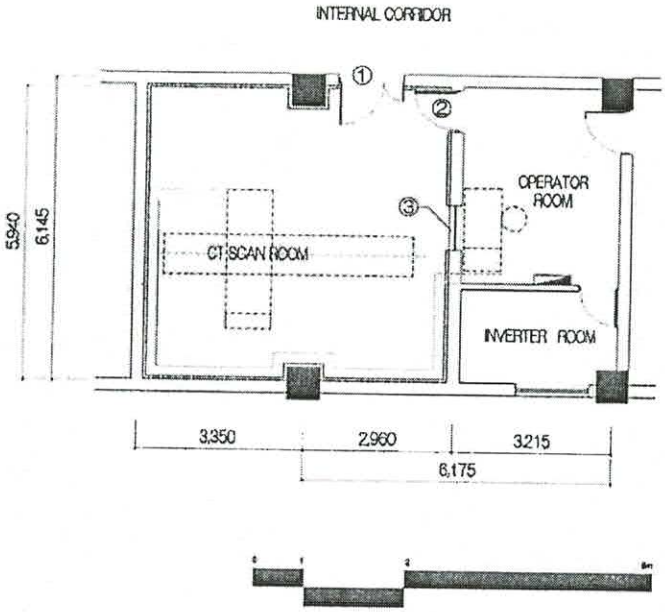


Legend

	New wall
	MRI (electromagnetic wave) shielding
①	Entrance single shielding door W1,300×H2,100
②	MRI shielding control window W1,200×H1,000
③	Carry-in double stainless steel door W2,100×H2,700
④	Entrance double steel door with balustrade W1,800×H2,600
⑤	Single wood door W900×H2,100

Annex 3 Outline Design Drawing

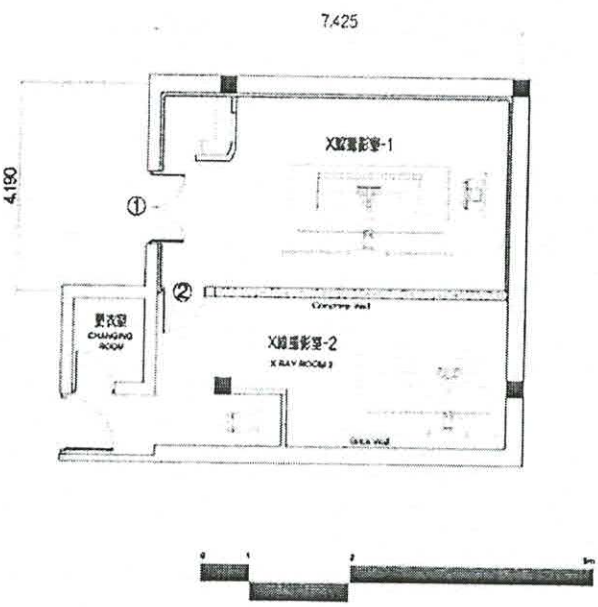
2. CT, Kanti Children's Hospital



Legend

	Wiring wall duct W150×H200
	X-ray shielding finish (lead t=2mm)
①	Entrance X-ray shielding door W1,300×H2,100
②	Control room side X-ray shielding door W910×H2,030
③	X-ray shielding window W900×H1,300

3. X-ray, Patan Hospital (Initial planed layout, To be Edited)

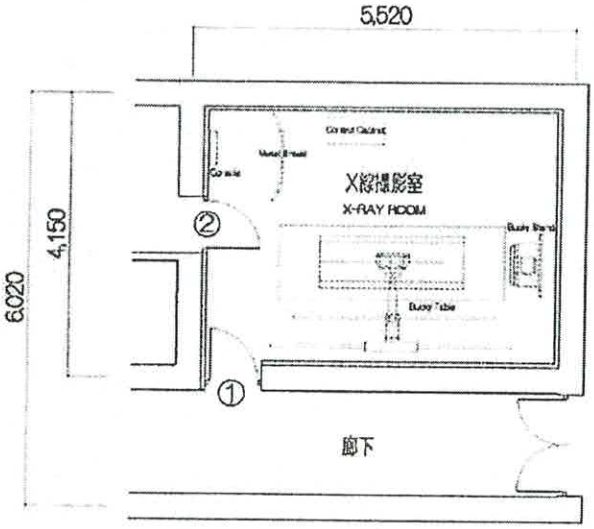


Legend

	New wall
	X-ray shielding finish (lead t=2mm)
①	Entrance X-ray shielding double door W1,470×H2,850
②	X-ray shielding single door W900×H2,200

Annex 3 Outline Design Drawing

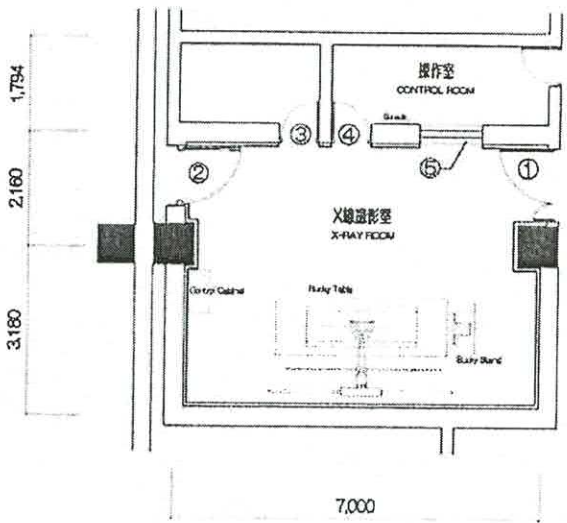
4. X-ray, Paropakar Maternity and Women's Hospital



Legend

	X-ray shielding finish (lead t=2mm)
①	X-ray shielding door W750×H2,040
②	X-ray shielding door W770×H2,070

5. X-ray, Bir Hospital

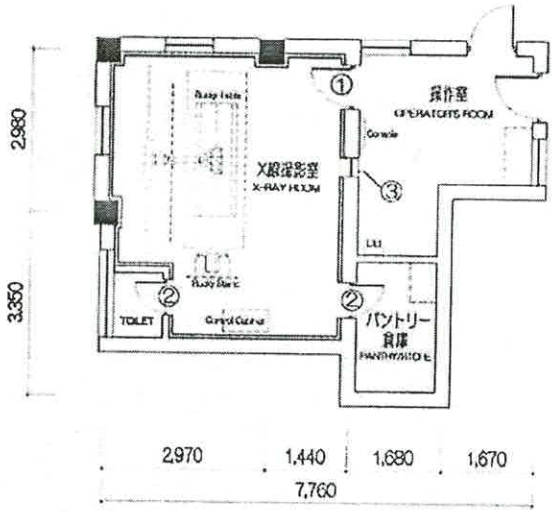


Legend

	X-ray shielding finish (lead t=2mm)
①	Entrance X-ray shielding door W1,530×H2,080
②	X-ray shielding door W1,200×H2,100
③	X-ray shielding door W750×H2,390
④	X-ray shielding door W740×H2,080
⑤	X-ray shielding window W1,200×H1,000

Annex 3 Outline Design Drawing

6. X-ray, Manmohan Cardiothracic Vascular & Transplant Centre (Initial planed layout, To be Edited)



Legend

	X-ray shielding finish (lead t=2mm)
①	X-ray shielding single door W820×H1,940
②	X-ray shielding single door W640×H2,040
③	X-ray shielding window W360×H360

Annex 4 Classification for Renovation Work

1. MRI, Kanti Children's Hospital

Item	Nepal side	Japan side
Removal of existing equipment	○	
Removal of existing walls, ceilings and fittings	○	
Removal of existing interior finishing materials (both base materials)	○	
Securing the transport route	○	
Pulling power from the electrical room to the MRI power panel	○	
Installation of telephone line (external line) from existing MDF to MRI room	○	
Installation of water supply and drainage piping for MRI cooling from the existing water pipe branch point		○
Interior renovation and MRI shield work		○
UPS and generator installation		○
Incidental work required for equipment installation		○
Equipment installation		○

2. CT, Kanti Children's Hospital

Item	Nepal side	Japan side
Removal of existing equipment	○	
Removal of lighting, fittings, and interior finishing materials (including base materials)	○	
Securing the transport route	○	
Removal of existing doors	○	
Pulling in power from the electrical room to the CT power panel	○	
Installation of radiation shielding boards and interior work		○
UPS and generator installation		○
Other incidental work required for installation of equipment		○
Equipment installation		○

3. X-ray , Patan hospital (Initial plan, To be Edited)

Item	Nepal side	Japan side
Removal of existing equipment	○	
Securing the transport route	○	
Removal of existing doors	○	
Pulling power from the electrical room to the x-ray power panel	○	
Installation of radiation shielding boards and interior work		○
Incidental work required for equipment installation		○
Equipment installation		○

Annex 4 Classification for Renovation Work

4. X-ray, Paropakar Maternity and Women's Hospital

Item	Nepal side	Japan side
Removal of existing equipment	○	
Securing the transport route	○	
Removal of existing doors	○	
Pulling power from the electrical room to the x-ray power panel	○	
Installation of radiation shielding boards and interior work		○
Incidental work required for equipment installation		○
Equipment installation		○

5. X-ray, Bir Hospital

Item	Nepal side	Japan side
Securing the transport route	○	
Incidental work required for equipment installation		○
Equipment installation		○

6. X-ray, Manmohan Cardiothracic Vascular & Transplant Centre (Initial plan, To be Edited)

Item	Nepal side	Japan side
Removal of existing equipment	○	
Securing the transport route	○	
Removal of existing doors	○	
Pulling power from the electrical room to the x-ray power panel	○	
Installation of radiation shielding boards and interior work		○
Incidental work required for equipment installation		○
Equipment installation		○