FEDERAL MINISTRY OF HEALTH / NIGERIA CENTRE FOR DISEASE CONTROL
FEDERAL REPUBLIC OF NIGERIA

PREPARATORY SURVEY REPORT
ON
THE PROJECT FOR STRENGTHENING THE DIAGNOSTIC CAPACITY OF NIGERIA CENTRE FOR DISEASE CONTROL
IN
THE FEDERAL REPUBLIC OF NIGERIA

MAY 2018

JAPAN INTERNATIONAL COOPERATION AGENCY

ORIENTAL CONSULTANTS GLOBAL CO., LTD.

FUJITA PLANNING CO., LTD.

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PREFACE

Japan International Cooperation Agency (JICA) decided to conduct the preparatory survey on the Project for Strengthening the Diagnostic Capacity of Nigeria Centre for Disease Control in the Federal Republic of Nigeria, and entrust the survey to the consortium consists of Oriental Consultants Global Company Limited and Fujita Planning Company Limited.

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

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

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

May, 2018

Mitsuko KUMAGAI
Director General,
Human Development Department
Japan International Cooperation Agency

Summary

Summary

1. Background of the Project

The health system of Nigeria is vulnerable and its ability to deliver services is limited. Furthermore, despite the occurrence and epidemic of tropical infectious diseases in the country, including viral hemorrhagic fever such as Ebola hemorrhagic fever, the Nigeria Centre for Disease Control (hereinafter referred to as "NCDC"), which specializes in countermeasures against infectious diseases in Nigeria, suffers from a shortage in containment facilities and instruments required for the safe, rapid and accurate handling of highly pathogenic pathogens, leading to difficulties in testing, research activities and promotion of researcher development. In order to take domestic and international countermeasures against infectious diseases as well as promote actions to deal with issues of priority in the field of infectious diseases specified in the national health policy from now on, the Government of Nigeria requested grant aid from Japan for the expansion of building facility and equipment to strengthen the capacity for diagnosis and research of NCDC.

Contents of the request comprise, as indicated in the table below, the construction of building facility for the establishment of a P3 laboratory with diagnostic capacity of the high risk pathogens within the compound of the National Reference Laboratry of NCDC (hereinafter referred to as "NRL") which plays a central role in the laboratory network in Nigeria, and the procurement of equipment for the new laboratory, as well as equipment for Central Public Health Laboratory of NCDC (hereinafter referred to as "CPHL").

Table-1: Contents of Request in the request form and the preliminary hearing survey

	Contents of request in the request form	Contents of request in the preliminary hearing survey
Building Facility	【New】P3 Laboratory, Water treatment facility, Incinerator, Animal breeding facility, Refrigerator	【New】P3 Laboratory (2-3 rooms including animal experiments), P2 laboratory (2-3 rooms), Bio-bank, Incinerator, Wastewater treatment facility, Air conditioning facility, Electric power supply(Solar panel)
Equipment procurement	【Refurbishment and improvement】Equipment procurement for 6 NCDC Zonal Laboratory, Equipment procurement for Abuja NRL, and Operation of Lagos CPHL	Laboratory equipment for P3 and P2 laboratory : Autoclave, double door, Deep freezer, Biosafety cabinet, Hot air oven, CO2 incubator, Centrifuge, DNA Sequencer, etc.
Soft-component Program	Instruction of equipment maintenance, Technical assistance to each zonal laboratory	

2. Contents of the Project

The Preparatory Survey team was dispatched to Nigeria (Abuja and Lagos) from August 12th, 2017 to September 13th, 2017, in order to implement field survey and to discuss the Project with Federal Ministry of Health (FMOH) and NCDC. During the Survey, the Nigerian side reconfirmed the requested equipment for NRL and CPHL as indicated in the table below.

Table-2: Requested Equipment for NRL and CPHL reconfirmed during the Survey

Equipment procurement	For NRL: Biosafety cabinet, Thermal cycler, Electrophoresis, Transilluminator, Centrifuge, PCR plate, ELISA set, Blood culture device, Real-time PCR, Full automatic microbial culture detection device, DNA sequencer, Microscope fluorescent, Inverted microscope, Mixer, 8-ch micropipette, Biosafety cabinet, Thermocycler, Electrophoresis, Transilluminator, Centrifuge (for microplate), ELISA set, Blood Culture Machine, Real-time PCR, Mass spectrometer, Genomic Sequencer, Fluorescent Microscope, Phase contrast microscope, Magnetic stirrer, 8-Channel Multichannel auto-pipettes, Ultracentrifuge For CPHL: Biosafety cabinet, Autoclave, Incubator, Hot air oven, Bacteria identification device, Centrifuge, Fluorescent microscope with camera, Water distil, Mixer, PCR work station, Centrifuge, micro, refrigerated, Centrifuge, PCR plate, Voltex mixer, Roller mixer, Real-time PCR, Gel electrophoresis, Gel documentation system, Biochemical analyser, Spectrophotometer, Blood cell counter, CD4 counter, Electrophoreses, 8-ch micropipette

It was confirmed that the essential equipment for the establishment of P2 and P3 laboratory of NRL and strengthening the function of CPHL out of the requested equipment would be prioritized. Furthermore, the equipment for CPHL would be also assessed and determined by fully coordinating the scope of the technical cooperation project.

After returning to Japan, the Survey team continued to study and analyze results of filed survey to make an outline design and compile the draft final report. Then, the Survey team was uniterruptedly dispatched to Abuja from February 10th, 2018 to February 17th, 2018, in order to explain the outline design in accordance with the draft final report to the Government of Nigeria.

Subsequently, through discussions of the draft final report, project components and items of both building facility and equipment were confirmed to finalize the outline design compiling this final report. Components of the Project are summarized in the table below, while the soft-component program was confirmed to render the training for operation and maintenance of the air conditioning ventilation system, infectious wastewater treatment and specialized equipment for P2 and P3 laboratory (autoclave, double door, formaldehyde fumigation set, biosafety cabinet, ELISA set, etc.).

Table-3: Summary of Project Components (Building)

Component	Contents
(1) Laboratory (Basement, 2 Stories, 1,805.75m^2)	<Infection control area> 1) P3 Laboratory area: P3 Laboratory 3rooms (Virus, Bacteria, Animal experiments) Bio-bank (P3) 1room, Preparation hall (P3), Service corridor (P3), Ante-room(Male/Female: Shower) 2) P2 Laboratory area: P2 Laboratory 3rooms (including PCR) Bio-bank (P2) 1room, Preparation hall (P2) 3) Service area Bio-bank 1room, Service corridor (P2), Hall, Storage 2 rooms, Sterilization room, Washing room, Machine room (P2/P3 Laboratory water treatment facility, P2/P3 Laboratory air conditioning facility), Electrical room (LV switchboard, Emergency power supply system)

	＜General management area＞ 4) Administrative area: Entrance hall, Corridor, Office, Staff room, Monitoring room, Toilet, Storage
(2)Electrical room (1 Story, 13.5m$^{2)}$	Electrical facility (33kV Panel)
(3)Utility facility	・Air conditioning ventilation system (General air conditioning facility, P2/ P3 Laboratory air conditioning facility) ・Electrical facility (Transformer, Main feeder system, Emergency power supply system, Lightning/ Receptacle outlet system) ・Communication facility (Telephone, LAN) ・Alarm facility (Access control, CCTV, Intercom, Fire alarm, Lighting protection) ・Plumbing facility (Water supply, Sanitation, Drainage (Domestic waste water treatment, Infectious wastewater treatment) ・Fire extinguisher facility (Fire hydrant, Fire extinguisher)
(4) Supplementary facility	Road in site & Parking pavement, Sidewalk, Septic tank
Total 1,819.25m^2	

Source: prepared by the Survey team

Table-4: Summary of Project Components (Equipment)

Equipment	Major specification	Q'ty
Aerosol photometer	For PAO, with constant velocity suction probe	1
Autoclave, double door A	Capacity : 700L or more, Temp. range : 121 - 130℃ or wider, Double door, Drain water sterilization function equipped	1
Autoclave, double door B	Capacity : 200L or more, Temp. range : 121 - 130℃ or wider, Double door, Drain water sterilization function equipped	2
Biosafety cabinet A	Class : II, Internal size : 1,600mm or more, Open type exhaust unit equipped, Pre-filter for animal is equipped, Connectable to Glove box A	1
Biosafety cabinet B	Class : II, Internal size : 1,200mm or more, Open type exhaust unit equipped, Connectable to Glove box B	1
Biosafety cabinet C	Class : II, Internal size : 1,200mm or more, Open type exhaust unit equipped	2
Biosafety cabinet D	Class : II, Internal size : 1,200mm or more	4
Centrifuge, high speed	Self-standing type, Rotation speed : 15,000rpm or more, Rotor : 1.5ml/2.0ml/96hole micro plate with biosafety cup	4
Deep freezer B	Chest type, 450L or more, Lowest temperature : -80℃ or less	10
ELISA set	ELISA reader and washer, Manual type	1
Formaldehyde fumigation set (for laboratory)	Formaldehyde fumigation unit, Decomposition unit, Circulator, Gas density analyser etc.	1
Gel documentation system	UV irradiation device, CCD camera with display	1
Glove box A	Internal size : W1,800xD550xH700mm or more, Material : SUS304, equipped with pass box and dunk	1

Equipment	Major specification	Q'ty
	tank, Animal cage with rack is equipped	
Glove box B	Internal size : W1,800xD550xH700mm or more, Material : SUS304, equipped with pass box and dunk tank, Microscope inverted with CCD camera is equipped.	1
Caging system A	For mice and rats, Cage number: 30 or more, HEPA filter equipped.	1
Caging system B	For mice and rats, Cage number: 30 or more, HEPA filter equipped.	1
Microscope, fluorescent	Research microscope, Fluorescent unit equipped, Eyepiece : 10x, Objective lens : 10x、20x、40x、100x, with CCD camera	1
Microscope, inverted, fluorescent	Inverted microscope, Light source : LED or halogen lamp, Fluorescent unit equipped, Eyepiece : 10x, Objective lens : 10x、20x、40x、100x, with fluorescent function and CCD camera	1
Microvolume spectrophotometer	Minimum sample volume : 1μ or less, Light source : LED, Measuring wavelength : 260nm and 280nm or more	1
Real-time PCR	Excitement wavelength : 4 or more, Detection channel : 4 or more, Reactor vessel : 96 micro plate or more, Temperature rate : 4°C /s or more, Light source : LED	1
Spectrophotometer	UV-VIS, Wavelength width : 1.5nm or less	1
Thermal cycler	Reaction vessel : 96 microplate or more, Temperature rate : 4°C/s or more, Temperature setting range : 5 - 100℃ or wider	2
Ultrapure water system	Ultrapure water and pure water production : 30L/day or more, Water collection tank equipped	1
Working bench A	W3,000 x L1,500 mm or more. Main body material : Wood, Plate : Chemical proof, Plug socket and shelf : Equipped	5
Ultracentrifuge	Revolution speed: 150,000rpm or more, Max. acceleration : 1,000,000g or more, Temperature control range : 0 - 40°C or wider, Angle rotor equipped	1

Source: prepared by the Survey team

3. Implementation Schedule and Initial Cost Estimate of the Project

Duration of the detailed design and tender preparation is 4 months after the signing of agreement for consulting services. Thereafter, process for tendering and contract for the building construction and equipment procurement takes 3.5 months. The period of construction and procurement is 18 months after the signing of contract.

The initial cost for the Project to be born by the Nigerian side is estimated NGN$ 91,179,294.

4. Project Evaluation

4-1. Relevance

(1) Relevance of Benefit and Target of the Project

The Project promotes the diagnosis of tropical infectious diseases, basic research and development of the health care professionals or researchers by expanding facilities/instruments for the laboratory/research and training of NCDC, and then contributes to the improvement of access to the health services of Nigeria.

It is expected that it will promote the improvement of initiatives to infectious disease measures in our nation and West Africa and it is considered that it will bring benefits to 185.99 million people in Nigeria (2016, UNICEF).

NCDC now plays a major role in the research/diagnosis related to infectious disease measures and conducts the tests and diagnoses of the pathogens of the five most significant diseases (viral hemorrhagic fever, yellow fever, cholera, meningitis, measles) among the 41 subjects to IDSR (Intgrated Disease Surveillance and Response) designated by WHO. Major local laboratories including NRL and CPHL (11 facilities), standard virus laboratories (2 facilities) and a laboratory network (10 facilities in total) are established as an inspection system in infectious disease surveillance. As for influenza, fixed-point surveillance is formed with 4 supporting institutions and continuous tests are conducted in existing research facilities. The improvement of NCDC's functions including establishment of P3 laboratory by the Project is considered to contribute to the further enhancement of the capability to tackle infectious diseases in Nigeria and improvement of access to health services.

As planning countermeasures against the threat of an infectious disease epidemic, such as high-risk viral hemorrhagic fever like Ebola hemorrhagic fever or Nigeria's indigenous disease Lassa fever or yellow fever, has recently been an urgent issue for the Nigeria and its neighboring countries, roles expected to NCDC as an important location for these infectious disease measures are significant and it is expected to bring about benefits to Nigeria and its neighboring countries in the future.

(2) Consistency with Nigeria's Health Policy

As described in "National Health Policy 2016," "Nigeria Medical Laboratory Services Policy" and "Nigeria Medical Laboratory Strategic Plan 2015-2019," Nigeria positions various infectious disease measures as priority issues to improve laboratory functions. NCDC is supposed to play a major role in surveillance, prevention and emergency response regarding infectious diseases. And in order to enhance the surveillance capability and epidemiology testing, the preparation of the containment laboratory of BSL-3 is expected. The Project is defined as the embodiment of these priority issues.

(3) Consistency with Japan's Aid Policy

The Project is defined as a project consistent with the development cooperation policy by nation (September 2017) for Nigeria, which sets our nation's basic policy for peace and health, basic policy about the strengthening of countermeasures to infectious diseases leading to international threats and "comprehensive and robust establishment of health care/medical system" as one of the important fields. In particular, with the cooperation policy to support the improvement of local health service, achievement of UHC and

strengthening of laboratories and disease prevention center, the Project is expected to enhance the capability to deal with infectious diseases by developing the health infrastructure.

It also has a great significance in terms of contribution to Goal 3 of the Sustainable Development Goals (SDGs), international support to the enhancement of the capability to deal with infectious diseases in post Ebola and strengthening of the performance of WHO International Health Regulations (IHR) through the improvement of laboratory/diagnosis techniques and enhancement of the research capability. Furthermore, it is expected to serve as a base for the development of human resources to take infectious disease measures presented in TICD VI as well as to contribute to the achievement of a secure health system presented in G7 Ise-Shima Vision for international health and UHC with better preparation for a public health crisis.

4-2. Effectiveness

The verifiable indicators both for the quantitative and qualitative effects are summarized in the table-5 and 6.

(1) Quantitative Effects

Table-5: Indicator of quantitative effects (output by carrying out the Project)

Indicator Name	Indicator Value		Target Value (FY2023) [Three years after the project is completed]
	Standard Year	Standard Value	
Number of researchers/technicians who finished receiving BSL-3 (P3) laboratory training	2017 Result Value	0	25

Table-6: Indicator of quantitative effects (outcome by carrying out the whole project plan)

Indicator Name	Indicator Value		Target Value (FY2023) [Three years after the project is completed]
	Standard Year	Standard Value	
Introduction of new research and diagnostic method using BSL-3 (P3) laboratory	2017 Result Value	NA	3cases
Number of research programs using BSL-3 (P3) laboratory	2017 Result Value	0/year	5 cases/year

(2) Qualitative Effects

1) Improvement of safety/quality of diagnosis/research by expanding facilities/equipment

The development of the physical construction of NRL's facilities/equipment (completed with support from USCDC in 2017) has been conducted partially and limitedly by using existing buildings constructed for other purposes. As facilities/equipment of CPHL have also deteriorated significantly, NCDC's entire laboratory/research facilities are facing insufficient infection prevention measures, countermeasures to crimes/disasters and consideration for the safety and efficiency of work. Specifically, imperfect infection prevention control zones, insufficient airtight/differential control, lack of working space in test/research-related rooms, failure of working lines and defects in arrangement/mounting of equipment are causing large impediment in performing tests/research using highly pathogenic pathogens.

The Project is expected to improve many systems of the facility such as monitoring of interior/exterior access, air conditioning/ventilation, drainage hygiene or infectious wastewater treatment. Furthermore, the rooms which should be adjacent to or cooperated with each other (establishing the preparation hall, P3 laboratory combined with P2 laboratory) or rooms which should be specialized (3 rooms consisting of laboratory for virus and bacteria and P3 laboratory handling animals) will be arranged properly. In other words, the Project will ensure the deployment of proper working lines and equipment and working space.

2) Prevention of public health crisis in Nigeria by dealing with infectious diseases and strengthening surveillance

NCDC arranges a diagnostic system as the infectious diseases surveillance system in cooperation with major local laboratories including NRL and CPHL and standard virus laboratories. Although it ensures certain functions and obtains favorable results from them, their quality and quantity still need to be improved in the strengthening of the quality control of laboratory network, improvement of test accuracy installing the external accuracy assessment system or increase in the number of diagnosis by improving specimen transfer.

It is expected that P3 laboratory, P2/P3 bio-bank (storing specimen/pathogen samples as a major bio-bank) and equipment provided by the Project will be coordinated in future for the technical cooperation project namely ”the Project for strengthening the detection of and countermeasures to threats on public health”, and will generate further synergistic effects concerning specimen transfer and improvement of accuracy assurance.

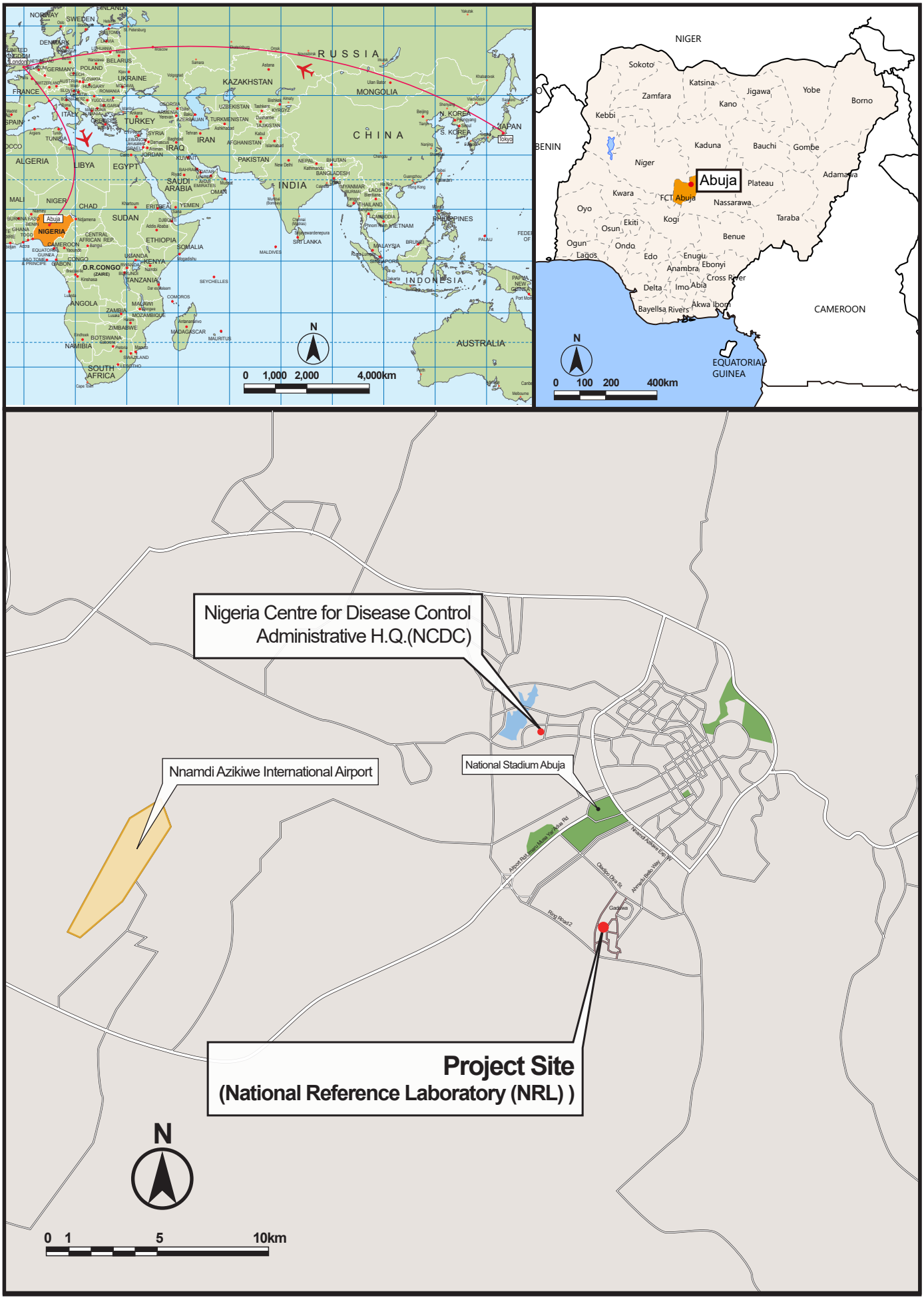
3) Improvement of importance/functionality of NCDC as the center of infectious disease measures in the West African (ECOWAS) area

It was determined in 2015 that NCDC would be RCDC of ECOWAS and the current NCDC CEO has been inaugurated as an interim representative. In the same way, NCDC is also designated as RCC of the West African area of the African community ACDC. It means NCDC is expected to play a major role in the infectious disease measures in the West African area while international laboratory network regarding post-Ebola syndrome is regarded as an important issue.

The Project enables NCDC to install the containment facilities and equipment of BSL-3 arranged at the international level in terms of biosafety and biosecurity and realize safe, rapid and highly accurate tests/research under the proper BSL-3 management. Through the laboratory network, it becomes possible to positively communicate its performance and results inside and outside the country, leading to the wide and international recognition of physical construction and networking strength NCDC has. It is expected that gaining more reliability as a diagnosis/research institution enhances NCDC’s role as the international center of West Africa in infectious disease measures in the medium and long term.

CONTENTS

[Appendices]



Location Map

Perspective

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ABBREVIATIONS

A/P	Authorization To Pay
ACDC	Africa Center For Disease Control And Prevention
AEDC	Abuja Electricity Distribution Company
AFB	Acid-Fast Bacill
AFENET	Africa Field Epidemiology Network
AFMS	Air Filter Maintenance Services International Pty. Ltd
AFRO	WHO Regional Office For Africa
AIDS	Acquired Immunodeficiency Syndrome
AMR	Antimicrobial Resistance
ARI	Acute Respiratory Infection
ASLM	African Society For Laboratory Medicine
ASTM	American Society For Testing And Materials
AU	African Union
AVR	Automatic Voltage Regulator
B/A	Banking Arrangement
BS	British Standard
BSC	Bio-Safety Cabinet
BSL	Bio Safety Level
C/S	Culture & Sensitivity
CAT6	Category 6 Cable
CD4	Cd4 Antigen
CEO	Chief Executive Officer
CHEW	Community Health Extension Worker
CHO	Community Health Officer
CIT	Corporate Income Tax
CLSI	Clinical And Laboratory Standards Institute
CO2	Carbon Dioxide
CPHL	Center Of Public Health Laboratory
DNA	Deoxyribonucleic Acid
DSNO	Disease Surveillance Notification Officers
E/N	Exchange Of Notes
E/U/C	Electrolytes/Urea/Creatinine
ECOWAS	Economic Community Of West African States
EIA	Environmental Impact Assessment
ELISA	Enzyme-Linked Immuno Sorbent Assay
ESR	Erythrocyte Sedimentation Rate
FBC	Full Blood Count
FBS	Fasting Blood Sugar
FCT	Federal Capital Territory
FETP	Field Epidemiology Training Programme
FL	Floor Level
FMEnv	Federal Ministry Of Environment
G/A	Grant Agreement

G7	Group Of Seven
GDP	Gross Domestic Product
GHSA	Global Health Security Agenda
GL	Ground Level
GLASS	Global Antimicrobial Resistance Surveillance System
GNI	Gross National Income
Hb	Haemoglobin
HCV	Hepatitis C
HEPA	High Efficiency Particle Air Filter
HIV	Human Immunodeficiency Virus
HR	Human Resource
IDSR	Integrated Disease Surveillance And Response
IgM	Immunoglobulin M
IHR	International Health Regulation
IMF	International Monetary Fund
INRB	Institut National De Recherche Biomédicale
IP	Internet Protocol
ISO	International Organization For Standardization
JASS	Japanese Architectural Standard Specification
JICA	Japan International Cooperation Agency
JIS	Japanese Industrial Standards
KEMRI	Kenya Medical Research Institute
KFT	Kidney Function Test
KVA	Kilo Volt Ampere
LAN	Local Area Network
LED	Light-Emitting Diode
LFT	Liver Function Test
LGAs	Local Government Areas
LP	Lipid Profile
Mbps	Megabits Per Second
M/C/S	Microscopy, Culture & Sensitivity
MCH	Mean Corpuscular Haemoglobin
MCHC	Mean Cell Hb Concentration
MCV	Mean Corpuscular Volume
MNS	Mental Neurological & Substance Abuse
NA	No Account
NBCN	National Building Code Of Nigeria
NCDC	Nigeria Centre For Disease Control
NFELTP	Nigeria Field Epidemiology And Laboratory Training Programme
NGN	Nigeria Naira
NGO	Non-Government Organization
NHMIS	National Health Management Information System
NIMR	Nigerian Institute of Medical Research
NMIMR	Noguchi Memorial Institute For Medical Research
NMLStP	Nigeria Medical Laboratory Strategic Plan
NPHCDA	National Primary Health Care Development Agency
NPO	Nonprofit Organization

NRL	National Reference Laboratory
NSF	National Sanitation Foundation
OGTT	Oral Glucoses Tolerance Test
PAO	Polyalphalefin
PCR	Polymerase Chain Reaction
PCV	Packed Cell Volume
PEPFAR	U.S. President's Emergency Plan For AIDS Relief
pH	Potential Hydrogen
PHC	Primary Health Care
PHCs	Primary Health Centers
PhD	Doctor Of Philosophy
PIT	Personal Income Tax
PREPARED	Partnership For Building Resilience Against Public Health Emergencies Through Advanced Research And Education
PSA	Prostate Specific Antigen
RBS	Random Blood Sugar
RC	Reinforced Concrete
RCC	Regional Collaborating Center
RCDC	Regional Center For Surveillance And Disease Control
RDT	Rapid Diagnostic Test
Retics	Reticulocyte Count
RRT	Rapid Response Team
RT-PCR	Reverse Transcription Polymerase Chain Reaction
SARS	Severe Acute Respiratory Syndrome
SDGs	Sustainable Development Goals
SLIPTA	Stepwise Laboratory Improvement Process Towards Accreditation
SLMTA	Strengthening Laboratory Management Toward Accreditation
SOP	Standard Operating Procedures
SPD	Surge Protective Device
STIs	Sexually Transmitted Infection
TB	Tuberculosis
TICAD	Tokyo International Conference On African Development
TOR	Terms Of Reference
UHC	Universal Health Coverage
UNICEF	United Nations Children's Fund
UNZA	University Of Zambia
UPS	Uninterruptible Power-Supply System
USCDC	Centers For Disease Control, USA
USD	United States Dollar
VAT	Value Added Tax
VDRL	Venereal Disease Research Laboratory
WB	World Bank
WBC	White Blood Cells
WHO	World Health Organization

Chapter 1 Background of the Project

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1-1 Background and Overview of the Grant Aid

The health system of Nigeria is vulnerable and its ability to deliver services is limited. Furthermore, despite the occurrence and epidemic of tropical infectious diseases in the country, including viral hemorrhagic fever such as Ebola hemorrhagic fever, the Nigeria Centre for Disease Control (hereinafter referred to as "NCDC"), which specializes in countermeasures against infectious diseases in Nigeria, suffers from a shortage in containment facilities and instruments required for the safe, rapid and accurate handling of highly pathogenic pathogens, leading to difficulties in testing, research activities and promotion of researcher development. In order to take domestic and international countermeasures against infectious diseases as well as promote actions to deal with issues of priority in the field of infectious diseases specified in the national health policy from now on, the Nigerian government requested grant aid from Japan for the expansion of building facility and equipment to strengthen the capacity for diagnosis and research of NCDC.

As a result of the preparatory survey conducted after this request, it was confirmed that the project for strengthening the diagnostic capacity of NCDC (hereinafter referred to as "the Project") contributes to improving the access to health services in Nigeria, and to strengthening the identification of those pathogens such as tropical infectious diseases as well as the basic research and surveillance by expanding building facility and equipment for NCDC.

The benefits to 185.99 million Nigerians (2016, UNICEF) were confirmed, and at the same time, the consistency with the health policy of Nigeria was confirmed as the Project also serves as an initiative to deal with issues of priority (surveillance, prevention and emergency response against infectious diseases, and preparation of laboratories to improve the capability to investigate epidemiology) in the field of infectious disease measures as described in "National Health Policy 2016", "Nigeria Medical Laboratory Services Policy", and "Nigeria Medical Laboratory Strategic Plan 2015-2019".

1-2 Actual Conditions of the Project Site

1-2-1 Natural Conditions

(1) Temperature /humidity

Abuja belongs to the savanna climate (Aw). The monthly average low temperature is about 16.9 ℃ (December), the monthly average high temperature is 35.1 ℃ (March). The annual relative average humidity is about 65%, but it varies around 40 to 70% depending on the seasons.

(2) Rainfall

There is a clear rainy and dry season. The dry season starts from November to April, and the rainy season starts from May to October. The annual rainfall is concentrated within the 3 months period of July to September, and the number of rainy days averages 15 days of the month.

(3) Sunshine

It is an area with a high solar altitude located at 9 degrees north latitude. The duration of daylight in the dry season from November to April is about 250 to 280 hours / month. During the rainy period of July to September, the amount of solar radiation decreases to about 150 hours / month. The annual sunshine time in Abuja is about 2,500 hours, which is larger than the world average (2,200 hours).

(4) Wind direction / wind speed

From the end of the dry season, between November and April, a trade wind containing dry sand from the desert called Harmattan blows and gives off fine dust (0.5-10 micrometres).

1-2-2 Field Surveys for Natural Conditions

4 types of natural condition surveys (Topographic survey, geological condition/stratum survey, survey on underground obstacles/buried objects, survey on plumbing/water quality) were conducted to investigate the shape of the site, the geological conditions and bearing capacity, underground obstacles, plumbing/water quality and soil contamination. The purpose, method and the impact of the Project for each survey are described below and the results of surveys are shown in Appendix.

(5) Topographic Survey

Since the Project will construct new building within the existing facility sites, it is necessary to survey the traffic lines among new and existing facilities, implementation of relevant functions, arrangements on plumbing/wastewater facilities, and the demolition of existing structures/facilities. In addition, in order to create the temporary construction plan, it is necessary to survey the shape of the entire existing facility site, the location of each facility/building, the height difference, the location of the new construction sites, and the topographical condition.

Although the new construction site is located on the west side of the existing laboratory and the south and east sides are in close proximity with the neighboring private homes, the site is flat (less than 30 cm in elevation difference) and is not considered to be a factor that will hinder the construction. In this survey, we have conducted topographic measurements and confirmed the current stratum level of the new construction site, the location of existing buildings and structures within or adjacent to the site, and the neighboring roads / land. The survey was conducted with a newly established benchmark.

(6) Geological condition/Stratum Survey

In the construction site of the new facility, we have surveyed the geological conditions and bearing capacity for structural review on the scale, structure type and construction method of the new facility that will be built. A boring (drilling) survey has been conducted at 3 locations to the east and the west of the new construction site. Drilling was carried out to a depth of 15m, while samples were extracted by conducting the standard penetration test. N value and groundwater level were measured, and the indoor soil test was conducted.

As a result of the survey, the groundwater level was confirmed to be located at the excavation depth of around 5.5m. The bearing stratum is a layer of sandy clay that is deeper than GL -1.5m (N = 12 ~ 15).

Based on the measured N value and soil property, spread foundation (individual footing) shall be installed to ensure sufficient bearing capacity for the building scale (2 stories).

(7) Survey on underground obstacles / buried objects

In the past grant aid projects, there were cases that had extended construction periods and incurred an increase in the construction costs due to the discovery of unexpected/unanticipated waste or buried items underground. Therefore, investigation of underground obstacles/buried objects was performed. And in order to clarify items that fall under the responsibility of the client, and in consideration of the process review, drilling and visual observation of observation pits (2m × 3m hole, 3m depth) in 4 locations were conducted. As a result, underground waste, obstacles, buried objects were not confirmed. Also, the observation pit was excavated cautiously so as not to damage the existing underground piping. The area was backfilled after completion of surveys and the site was restored to its original state.

(8) Survey on plumbing / water quality

Surveyed the quality of the water supply and water supply volume of the well water sources and the city water network in order to plan/review the building facility and inspection/research equipment, while checking the plumbing/water quality to confirm the treatment capacity of existing drainage facilities. Water quality tests were conducted in Port Harcourt's laboratory regarding water supply volume measurements, water supply points and drainage paths, plotting to site survey maps of basins, existing drainage surveys, 6 water supply samples, and 3 wastewater samples.

From the survey results, it has been confirmed that the water supply for well water and city water had satisfied the WHO standards in all parameters, and the water supply volume has no issues regarding facility / equipment plan. Regarding the existing wastewater, the number of coliform group bacteria in the treated water had exceeded the standard value, while the function of the existing two-layer septic tank was confirmed to be insufficient. The wastewater (domestic wastewater and treated infectious discharge) in this project is filtered into the soil by the single three-layer treatment method that is not connected to the existing drainage, which prevents hindrance.

1-3 Environmental and Social Considerations

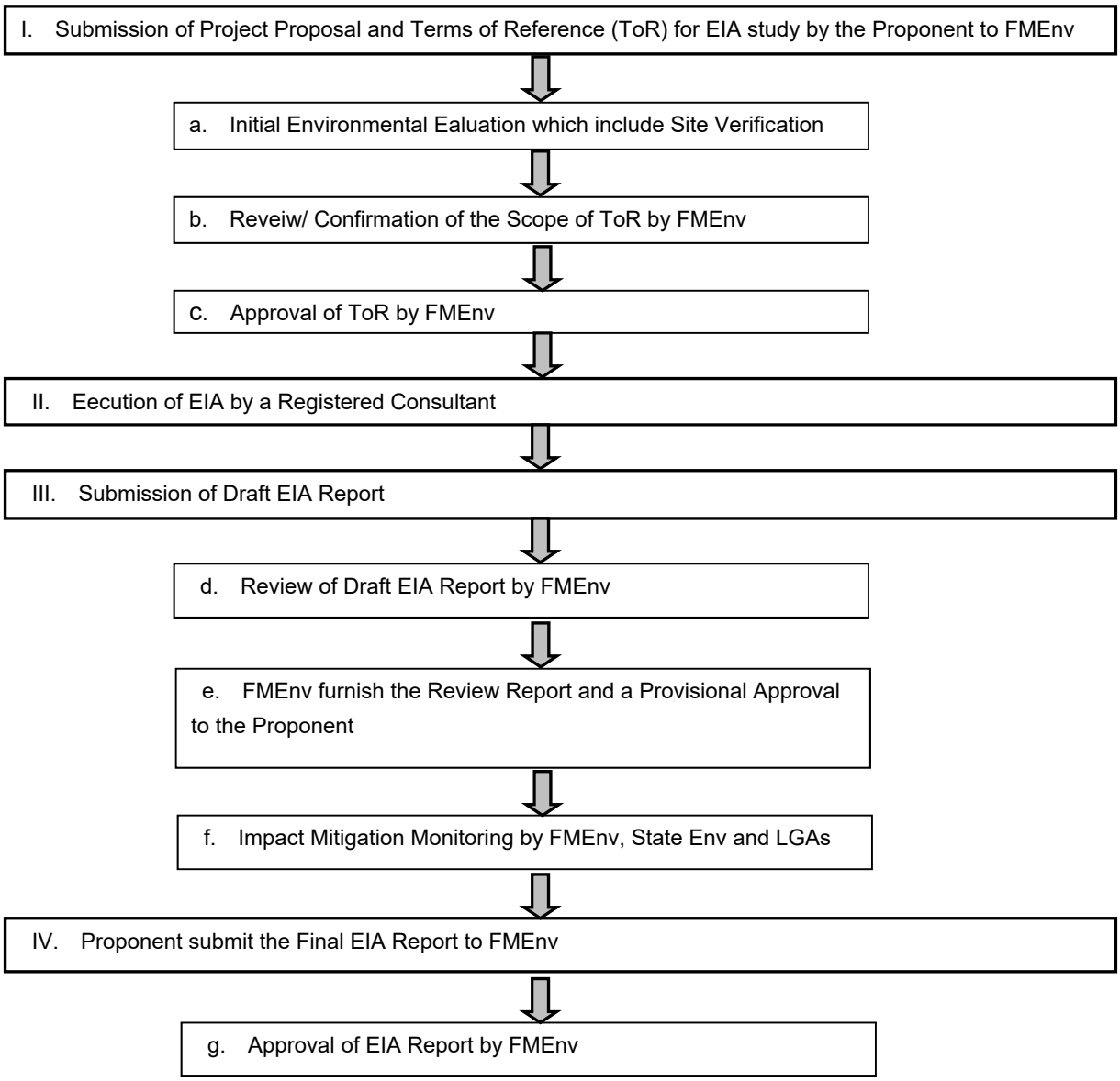
The Project is classified as category C, since it does not apply to influential sectors, characteristics and susceptible regions listed in the “JICA Environmental and Social Considerations Guidelines” (promulgated in April 2010) (hereinafter referred to as “JICA Guidelines”), and also considered to have minimal undesired effects on the environment and society. Environmental review will be omitted after the category classification, while the required environment-related permit application shall be processed according to the country's environmental laws and regulations, and the environmental and social considerations system as an item to be borne by Nigeria.

The formalities of environmental and social considerations for this project are processed in compliance with the “Environmental Impact Assessment (EIA) Sectoral Guidelines (Infrastructures)” edited by the Federal Environmental Protection Agency (FEPA) and the “Environmental Impact Assessment (ACT 86, 1992) Guidelines for Review of EIA report in Nigeria” edited by the Federal Ministry of Environment (FMEnv).

The new building facility is classified as Category - 2 “Public building/Hospital” of “Industry/ Infrastructure,” specified in the same standard (among the 3 categories which are large, medium and small-scale project, it is defined as medium scale), and while the full scale environment impact assessment is not considered necessary, specialized technical judgment by the FMEnv registered consultant shall be required in the future.

Also, since it is a construction activity within the existing environmental facility, environmental impact assessment is required for both existing and new facilities. Meanwhile, by presenting EIA results of existing facilities at the time of construction, it is possible to simplify the application contents and the examining process. In addition, the submission of documents related to environmental impact assessment is also required for the building-related permit process.

The standards on formalities of environmental and social considerations for Nigeria are shown in the Figure 1-1.



Sources: Environmental Impact Assessment (ACT 86, 1992) Guidelines for Review of EIA report in Nigeria

Figure 1-1 EIA (Environmental Impact Assessment) by the Federal Ministry of Environment (FMEnv)

Chapter 2 Contents of the Project

Chapter 2 Contents of the Project

2-1 Basic Concept of the Project

2-1-1 Objectives of the Project

NCDC is a domestic core institute for prevention and control of diseases of public health importance in Federal Republic of Nigeria. It also undertakes key roles for the public health laboratory network. It was assigned one of the Regional Collaborating Centres (RCC) of Africa Centres for Disease Control and Prevention (CDC) by the African Union (AU) and has been acknowledged by member countries of the Economic Community of West African States (ECOWAS) since 2015 to become an international and regional core of the disease control in West Africa.

The Project aims to contribute to the prevention and the control of infectious diseases in Nigeria as well as the neighbouring countries by strengthening capacities for the diagnosis of high risk pathogens, surveillance and research through the establishment of the laboratory of biosafety level 3 (BSL-3) in the compound of the National Reference Laboratory (NRL) of NCDC.

2-1-2 Basic Concept of the Project

The purpose of the Project is to improve and strengthen diagnosis and research capacity of NCDC on mainly infectious diseases, to serve as domestic core laboratory of disease control as well as international and regional laboratory in West Africa. The Project contains the construction of a new building facility for the laboratory and provision of required equipment at NRL site in Gaduwa district (Table 2-1).

The new building facility and equipment will be operated and maintained as a comprehensively functional disease control centre in Nigeria and West Africa by NCDC under the cooperation of the Federal Ministry of Health (FMOH). NCDC will ensure the budget and personnel required, based on the financial and human resource development plan for operating new facilities. For the operation and maintenance capacity of the newly established P3[1] laboratory, the Japanese side will provide technical assistance for the soft component scheme of the Grant-aid assistance. Also, the Japanese side will consider implementing a technical cooperation project for this purpose.

Table 2-1 Cooperating components

Component	Contents
I. Building facility (1)Laboratory (Basement, 2 Stories, 1,805.75m^2)	< Infection control area > 1) P3 Laboratory area: P3 Laboratory 3rooms (Virus, Bacteria, Animal experiments) Bio-bank (P3) 1room, Preparation hall (P3), Service corridor (P3), Ante-room(Male/Female: Shower) 2) P2 Laboratory area: P2 Laboratory 3rooms (including PCR) Bio-bank (P2) 1room, Preparation hall（P2）

[1] 4 different grades of the infectious disease control and management level (biosafety level (BSL)) have been established in compliance with a risk rating of pathogens. The laboratory facility designed for those pathogens rated BSL-2 is call ”P2 laboratory”, while the laboratory for BSL-3 pathogens is called “P3 laboratory”.

	3) Service area Bio-bank 1room, Service corridor (P2), Hall, Storage 2 rooms, Sterilization room, Washing room, Machine room (P2/P3 Laboratory water treatment facility, P2/P3 Laboratory air conditioning facility), Electrical room (LV switchboard, Emergency power supply system) < General management area > 4) Administrative area: Entrance hall, Corridor, Office, Staff room, Monitoring room, Toilet, Storage
(2) Electrical room (1 Story, 13.5m^2)	Electrical facility (33kV Panel)
(3) Utility facility	・Air conditioning ventilation system (General air conditioning facility, P2/ P3 Laboratory air conditioning facility) ・Electrical facility (Transformer, Main feeder system, Emergency power supply system, Lightning/ Receptacle outlet system) ・Communication facility (Telephone, LAN) ・Alarm facility (Access control, CCTV, Intercom, Fire alarm, Lighting protection) ・Plumbing facility (Water supply, Sanitation, Drainage (Domestic waste water treatment, Infectious wastewater treatment) ・Fire extinguisher facility (Fire hydrant, Fire extinguisher)
(4) Supplementary facility	Road in site & Parking pavement, Sidewalk, Septic tank
Total 1,819.25m^2	
II. Equipment procurement Laboratory and Research Equipment	Aerosol photometer, Air flow visualize, Air velocity meter, Autoclave, double door A, Autoclave, double door B, Autoclave, vertical, Autoclave, vertical, biosafety, Biosafety cabinet A, Biosafety cabinet B, Biosafety cabinet C, Biosafety cabinet D, Centrifuge, high speed, Centrifuge, low speed, Centrifuge, mini, CO2 incubator, Computer, Cryotank, Deep freezer A, Deep freezer B, Domestic refrigerator, Electric balance, Electric balance, precision, Electrophoresis, ELISA set, Formaldehyde fumigation set (for biosafety cabinet), Formaldehyde fumigation set (for laboratory), Gel documentation system, Glove box A, Glove box B, Hot air oven, Incubator, Incubator with shaker, Caging system A, Caging system B, Laboratory refrigerator, Laboratory sink, Microscope, Microscope, fluorescent, Microscope, inverted, fluorescent, Microvolume spectrophotometer, Microwave, PAO generator, pH meter, Pipette set, PCR work station, Real-time PCR, Shelf, Spectrophotometer, Thermoblock, Thermal cycler, Transilluminator, UV, Transilluminator, LED, Ultrapure water system, Voltex mixer, Waste liquid tank, Water bath, Working bench A, Working bench B, Ultracentrifuge, etc.
III. Soft-component Program	・Training for operation & maintenance of air conditioning ventilation system inP2/P3 laboratory ・Training for operation & maintenance of equipment for P2/P3 laboratory (autoclave, double door, formaldehyde fumigation set, biosafety cabinet, ELISA set, etc.) ・Training for infectious wastewater treatment (including driving instruction for heat sterilization treatment facility)

Sources : JICA Study Team

2-2 Outline Design of the Requested Japanese Assistance

2-2-1 Design Policy

2-2-1-1 Study of the Requested Contents

The Nigerian side requested the construction of building facility for the establishment of a P3 laboratory with diagnostic capacity of the high risk pathogens within the compound of NRL of NCDC which plays a central role in the laboratory network in Nigeria; and the procurement of equipment for the new laboratory; as well as equipment for Central Public Health Laboratory of NCDC (hereinafter referred to as "CPHL"). The contents of the request in the request form and the preliminary survey hearing are as shown in the Table 2-2.

Table 2-2 Contents of request in the request form and the preliminary hearing survey

	Contents of request in the request form	Contents of request in the preliminary hearing survey
I. Building Facility	【New】P3 Laboratory, Water treatment facility, Incinerator, Animal breeding facility, Refrigerator	【New】P3 Laboratory (2-3 rooms including animal experiments), P2 laboratory (2-3 rooms), Bio-bank, Incinerator, Wastewater treatment facility, Air conditioning facility, Electric power supply(Solar panel)
II. Equipment procurement	【Refurbishment and improvement】 Equipment procurement for 6 NCDC Zonal Laboratory, Equipment procurement for Abuja NRL, and Operation of Lagos CPHL	Laboratory equipment for P3 and P2 laboratory : Autoclave, double door, Deep freezer, Biosafety cabinet, Hot air oven, CO2 incubator, Centrifuge, DNA Sequencer, etc.
III. Soft-component Program	Instruction of equipment maintenance, Technical assistance to each zonal laboratory	

Contents of the requested building facility are as shown below with the results of the field survey, and are noted in Appendix-2 of Technical Notes (T/N), Attachment 7 (List of rooms planned)

- The new laboratory consists of 3 rooms of P3 laboratory (Virus, Bacteria, Animal experiments) and P2 general examination rooms (including PCR room) which are adjacent to each P3 laboratory.
- For animal experiments, the new laboratory consists of only observation space and NCDC acknowledged the space/room for the animal care and storage before the experiments will be prepared within the existing NRL building and/or the compound.
- Bio-bank is considered to include spaces both for non-infectious cell and infectious cell. The room is not planned as the freezing room but equipped with freezers.
- Incineration system will be renovated and upgraded by NCDC. NCDC agreed that the upgraded capacity of the incineration system would suffice for processing those waste generated from the new building and facility of the Project.

- Instead of the requested solar power generation system, the emergency power supply system by diesel generator is considered to be effective because of shortage of panel installation space, additional installation of battery equipment, etc.

Regarding the equipment, the Nigerian side requested the following equipment for NRL and CPHL during the period of the field survey.

Table 2-3 Requested equipment list for NRL and CPHL

Equipment	For NRL: Biosafety cabinet, Thermal cycler, Electrophoresis, Transilluminator, Centrifuge, PCR plate, ELISA set, Blood culture device, Real-time PCR, Full automatic microbial culture detection device, DNA sequencer, Microscope fluorescent, Inverted microscope, Mixer, 8-ch micropipette, Biosafety cabinet, Thermocycler, Electrophoresis, Transilluminator, Centrifuge (for microplate), ELISA set, Blood Culture Machine, Real-time PCR, Mass spectrometer, Genomic Sequencer, Fluorescent Microscope, Phase contrast microscope, Magnetic stirrer, 8-Channel Multichannel auto-pipettes, Ultracentrifuge For CPHL: Biosafety cabinet, Autoclave, Incubator, Hot air oven, Bacteria identification device, Centrifuge, Fluorescent microscope with camera, Water distil, Mixer, PCR work station, Centrifuge, micro, refrigerated, Centrifuge, PCR plate, Voltex mixer, Roller mixer, Real-time PCR, Gel electrophoresis, Gel documentation system, Biochemical analyser, Spectrophotometer, Blood cell counter, CD4 counter, Electrophoreses, 8-ch micropipette

The requested equipment is prioritized and categorized with 2 priority ratings as follows;

A: Essential equipment for the establishment of P2 and P3 laboratory of NRL and strengthening the function of CPHL

B: Necessary equipment for the establishment of P2 and P3 laboratory of NRL and strengthening the function of CPHL. However, further study is required.

The procurement equipment plan will be finalized according to the necessary rooms determined by the facility design. In particular, the equipment for CPHL will be assessed and determined by fully coordinating the scope of the technical cooperation project.

2-2-1-2 Planning of Diagnosis and Research

So far, NCDC has not taken sufficient measures against infectious diseases which have the potential to spread internationally. One reason is that NCDC has not had proper facility/equipment that can safely handle high risk pathogens. Particularly in the department of public health laboratory services of NCDC, survey and research activities have not been done satisfactorily despite existing indigenous viral haemorrhagic fever (Lassa fever) due to a lack of P3 laboratory.
With the Project completed and fully operational, it is expected that the working environment in NRL would be greatly improved. With the installation of P3 laboratory and new equipment, the following laboratory examination and research plans would be made in conjunction with the related technical cooperation project.

- Strengthening diagnosis and surveillance capacity: detecting high risk pathogens such as viruses of Ebola haemorrhagic fever and Lassa fever by Polymerase Chain Reaction (PCR) method. P3 laboratory would be used for the process of DNA extraction from specimens and so on.

- Strengthening research functions and human resource development: carrying out research activities which utilize new techniques such as viral isolation or cell culture in addition to animal experiments. The training in Japan has been planned as supports for research fields in the technical cooperation Project.
- Preparation and supply of diagnosis kits: as part of research, antibodies for testing such as viral haemorrhagic fever are prepared.
- Storing specimens / pathogens samples etc. as a central bio-bank
- Enhancement of quality control for public laboratory network: panel samples 2 used for Proficiency test3are prepared and supplied to support external quality assessment (EQA).

In addition, an action plan related to AMR (Antimicrobial Resistance) has been formulated in NCDC, and the plan to register NRL as a top domestic reference laboratory for AMR to GLASS[4] (The Global Antimicrobial Resistance Surveillance System)[5] is underway.

Figure 2-1 Organogram of EQA committee[6]

2-2-1-3 Basic Policy (Building Facility Plan/Equipment Plan)

(1) Basic Policy of Building Facility Plan

1) Layout and Traffic Lines

- The construction area locates in the east side of the compound of NRL occupying the existing parking area. 4 main areas of the new building facility will be adjacently laid out considering the connectivity with the existing laboratory on the north of the construction area (approx.3,800m^2),.
- Septic tanks will be laid out on the north boundary of the compound to conduct the soak and absorption of the treated sewage as well as the treated infectious discharges.

[2] Design of Molecular Proficiency Testing/External Quality Assessment, 2nd Edition, May, 2013, CLSI
[3] Using Proficiency Testing and Alternative Assessment to Improve Medical Laboratory Quality, 3rd Edition, Sep., 2016, CLSI
[4] Global Antimicrobial Resistance Surveillance System –Manual for Early Implementation-, 2015, WHO
[5] National Action Plan for Antimicrobial Resistance 2017-2022, Nigeria Centre for Disease Control (NCDC)
[6] http: www.who.int/diagnostics_laboratory/en/, "WHO manual for organizing a national external quality assessment programme for health laboratories and other testing sites", WHO

- The traffic line of the pedestrians and vehicles at the existing parking area will be re-planned and fitted to the new approach using the existing entrance gate and access road in the compound.

2) Main Structure/Capacity

- The structure of the new building facility will be designed with the reinforced concrete framing (column and girder) for the partial 2-story and basement floor, which has a structural module of 9.7m x 6.0m and 9.7m x 9.0m. The spread foundation system is applied.
- 3 floor levels including the basement will be considered for the BSL-2, BSL-3 management area, to locate machine rooms both for the infectious discharge treatment system at the basement and for the air-conditioning and ventilation system specified for requirements of the biosafety at the second floor.
- The reinforced concrete structure will be mainly employed to assure the high air tightness in P2 and P3 laboratory and the machine room, and the containment of the biological contaminations.
- The scale and floor area of the new building facility will be determined by the designed number of staffing required for proper practice and operation, the existing facility plan, and the staff deployment plan already provided by NCDC. An appropriate working area will be designed in accordance with particulars of each specific laboratories and rooms.

3) Rooms/ Zoning /Floor Planning

- P3 laboratory comprises of 3 individual rooms namely;
  i) Laboratory for bacteria
  ii) Laboratory for virus
  iii) Laboratory to treat the animal experiments.

  P2 laboratory will also have 3 rooms including 1 PCR room as the auxiliary laboratory of each character of P3 laboratory.
- The zoning will be strictly designed in such a way as to prevent the infection inside the building. This would be done by establishing the general management area and the infection control areas such as BSL-2 and BSL-3 management area. The air-conditioning and ventilation system, sewage and infectious discharge treatment system will be physically and completely isolated in accordance with the zoning previously mentioned.
- "Shower-out" concept will be applied to the man-traffic line in BSL-3 management area. Infectious solid waste will be controlled by the one–direction traffic line at P3 laboratory which gives high pressure steam sterilization with the double door autoclaves equipped inside BSL-3 management area. All waste will be taking out of the management area for disposal.

4) Utility

- The control measures against environmental pollution of neighbouring facilities will be strictly considered in designing the air-conditioning and ventilation system, sewage and infectious discharge system specified for P2 and P3 laboratory. The systems will be physically and completely isolated, well ensured for the containment of the biological contaminations.

・ The access control system for P2 and P3 laboratory and the monitoring and surveillance system will be strictly considered for the new building to care for biosecurity and the prevention of disaster.

5) Soft Component Program

・ In other to strengthen the capacity of NCDC, training programs on the operation and maintenance of the various systems and equipment would be planned for. They include the air-conditioning and ventilation system, infectious discharge system and major equipment of diagnosis and research specified for P2 and P3 laboratory.

(2) Basic Policy of Equipment Plan

・ The sophisticated laboratory equipment shall be selected on the basis of their suitability for the activities carried out in P2 and P3 laboratory.
・ With regard to requested equipment, due consideration is given based on priority, necessity, validity and other selection criteria.
・ Regarding power failure that occurs frequently, a generator installed at the facility will deal with it. However, UPS (uninterruptible power supply) is attached to the equipment that may cause operational problems even in a short time power failure.
・ Ultra-pure water system is utilized to sustain necessary water quality for P3 laboratory.
・ A pre-filter and water softener shall be attached to the autoclave double door and ultra-pure water system.
・ Equipment which NCDC can easily procure and maintain including consumables and spare parts shall be considered.
・ As for consumables, in this Project, many items would be procured for the first time for NCDC, six months consumables would also be attached in consideration of project procurement.
・ In order to proper maintenance and management of after procurement, a 2-year maintenance contract will be included in part of the major equipment.

2-2-1-4 Basic Policy for Determination of Scale and Floor Area

(1) Design Policy for Function of Diagnostic and Research

The scale and components of the new building facility will be determined in order to obtain safe, prompt and accurate practices and operation in terms of the biosafety required in conducting separation of bacteria, viruses from samples, culturing, gene extraction, etc. Future plans to anticipate the enhancement of pathogen management will also be considered in the building facility plan.

It is useful that the concrete plans of the diagnosis and research of NCDC be discussed with the donors (World Bank, USCDC, WHO etc.) in order for NCDC to determine the target pathogens, the content and number of research programs, content of diagnosis and examination, number of samples etc. Based on the current situation, the building facility plan will be developed for treating 5 prioritized diseases initially which are Lassa fever, Yellow fever, Cholera, Meningitis and Measles out of 41 target diseases of the IDSR

(Integrated Disease Surveillance and Response) and will determine the required scale, components and floor area.

The Laboratory will be designed to meet international standards for prevention of infection, for diagnosis and research, and would be in compliance with the WHO biosecurity guidance of laboratory facility (2006), the Safety Management Regulations (revised 3rd edition) of National Institute of Infectious Diseases Japan.

(2) Necessary rooms and Number of planned personnel

Based on the information provided by NCDC with regards to staff deployment and use of the new building facility, necessary rooms and numbers of planned personnel will be considered as indicated in the Table 2-4.

Table 2-4 Necessary rooms and number of planned personnel

Disease Prevention Centre	Room name	Number of staff [person]	Capacity of rooms [person]
①BSL-3 area	P3 Laboratory (Bacteria)	to be confirmed	2-3
	P3 Laboratory (Virus)	to be confirmed	2-3
	P3 Laboratory (Animal experiments)	to be confirmed	5
	Bio-bank (P3)	—	—
②BSL-2 area	P2 Laboratory (1)	to be confirmed	2-3
	P2 Laboratory (2)	to be confirmed	2-3
	P2 Laboratory (PCR)	to be confirmed	2-3
	Bio-bank (P2)	—	—
③Service area	Laboratory kitchen/Washing room	—	—
	Bio-bank 1(P2)	—	—
④Administrative area	Office/Monitoring room	to be confirmed	2-3
	Staff room	to be confirmed	5-6
Total		—	22－29

2-2-1-5 Basic Policy for Natural Conditions

(1) Temperature /humidity

Abuja belongs to the savanna climate (Aw). The average monthly average temperature is about 16.9 ℃ (December), the monthly average high temperature is 35.1 ℃ (March). The annual relative average humidity is about 65%, but it varies around 40 to 70% depending on the seasons.

Basically, the cooling system will be considered for the air conditioned rooms located in BSL-2, BSL-3 and the general management area, while the heating system will not be needed.

Table 2-5 Temperature data in Abuja

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Avrg. temperature（℃）	25.0	26.8	28.4	28.5	26.9	25.1	24.3	23.9	24.4	25.3	25.6	24.7
Avrg. low temperature（℃）	17.6	19.5	21.7	22.7	22.0	20.6	20.4	20.2	19.9	19.9	18.8	16.9
Avrg. high temperature（℃）	32.5	34.2	35.1	34.4	31.8	29.6	28.2	27.7	28.9	30.7	32.5	32.6

Source: Climate data for cities worldwide : https://en.climate-data.org/

(2) Rainfall

There is a clear rainy and dry season. The dry season starts from November to April, and the rainy season starts from May to October. The annual rainfall is concentrated within the 3 months period of July to September, and the number of rainy days averages 15 days of the month.

Because there is a large difference in rainfall during the rainy season and the dry season, it is necessary during design to consider changes in groundwater level, the rainfall intensity on the roof surface, prevention of rainwater inflow into the building, septic tanks, soak and absorption of rainwater, basement planning and the like.

Table 2-6 Rainfall data in Abuja

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Rainfall (mm)	2	8	29	80	155	177	233	280	284	130	10	1
Rainy day (day)	0.1	0.2	1.3	4.2	9.4	12.3	14	16.2	15.9	8	0.3	0.1

Source: Climate data for cities worldwide : https://en.climate-data.org/

(3) Sunshine

It is an area with a high solar altitude located at 9 degrees north latitude. The duration of daylight in the dry season from November to April is about 250 to 280 hours / month. During the rainy period of July to September, the amount of solar radiation decreases to about 150 hours / month. The annual sunshine time in Abuja is about 2,500 hours, which is larger than the world average (2,200 hours). It is essential during the design to consider solar radiation shielding and heat countermeasures.

(4) Wind direction / wind speed

From the end of the dry season, between the end of October and March, a trade wind containing dry sand from the desert called Harmattan blows and gives off fine dust (0.5-10 micrometres). It is essential during the design to consider rainwater inflow into the building and the openings, air supply and exhaust for the laboratory (including exhaust after HEPA filter treatment). The wind-resistant design will be conducted based on the wind pressure referred to the Japanese standards and the local meteorological data in Abuja.

(5) Earthquakes

Although there are few earthquake records in Nigeria, the standard story shear coefficient, which is the design value showing the vibration behaviours of the structure frame and the seismic performance, will be

applied to the design with 50% of the value (C 0 = 0.1) regulated in the Building Standards Act of Japan for the protection and safety of the new building.

2-2-1-6 Basic Policy for Social Conditions

(1) Price Variation

It is essential during the design to consider that during the Ramadan period, workers' work efficiency decreases (about 5/15 to 6/14 of 2018, about 5/5 to 6/3 of 2019) as the inoperable day.

The price variation coefficient has been set to 1.2532 by the following calculation formula applying the monthly variation of price index in order to consider the price escalation assumed from the start date of the cost estimation (September 2017) to the planned date of the bidding (March 2019).

- Variation coefficient : 17.350 ÷ 12 × 3 + 17.456 ÷ 12 × 12+14.125 ÷ 12 × 3 = 25.32 → 1.2532

(2) Safety and Security Control

2 security staff will be locally hired and assigned during the period of construction at the site in order to prevent the construction site from burglary, labor accidents etc. In addition, a security expert will be deployed by the Consultant to supervise periodically the contractor's safety and security measure and maintain in proper state.

2-2-1-7 Basic Policies for Situation of Construction Works / Situation of Equipment Procurement, Authorizations, etc.

Regarding construction works, during the field survey in Abuja and Lagos, more than enough middle-story buildings and construction sites were confirmed, and several local contractors with a certain level of construction technology were also confirmed. However, construction technology in buildings where a higher technical accuracy is required like this Project is considered scarce. Therefore, it is essential during the design to consider carrying out quality control under the technical guidance of the Japanese contractor.

Regarding procurement of equipment in Nigeria, more than 10 biomedical research equipment agencies have been confirmed. Many agencies of European and American manufacturers are also included. Apart from sales, these agencies employ technicians to render such services as installation, operating guidance and maintenance. As for Japanese manufacturers, only one company has been confirmed for a biomedical research equipment agency. It is essential during the procurement of planned equipment to consider utilizing these agencies to secure a suitable and easier maintenance and management plan.

For Nigerian domestic applications, the local Building Standards Law and relevant laws and regulations based on the British Standard (BS) have been developed and applied widely in Nigeria. The building permit system has also been developed, and regulatory compliance systems are being established through checking of the design content by the supervising agency, inspection during construction / inspection after construction.

Evaluation procedures are also carried out in accordance with these laws and standards in the building permit application process of the new building facility. The design considered is based not only on Japan's Building Standards Law, Japan Architectural Institute Building Structural Standards, but also referred and adapted to Nigerian standards. It is also in accordance with the biosafety guidelines edited by WHO as well as USCDC (US Centers for Disease Control and Prevention) for laboratory facilities.

2-2-1-8 Basic Policies for Capacity of Operation and Maintenance

It is essential that the design meets optimum contents. Also the specification and quality of the building facility and equipment should be adequate for strengthening diagnosis and research functions for NCDC, and it should be fit for the management and use of the new facility as well as the operation and maintenance capability.

In addition to analyzing information and data of budgetary and organizational plans as well as staffing allocation provided by NCDC, it is vital to understand that the scale (floor area calculation) of necessary rooms is determined based on the appropriate number of personnel expected for P2 and P3 laboratory in particular.

For the electrical and mechanical installation of the new building facility, it is important that the design satisfy necessary functions and minimize operation and maintenance.

At present, the existing facility has only one electrician in charge of maintenance. This is grossly insufficient both in number and in the expertise required. The existing structure and human resource capabilities are largely insufficient to carry out the operation and maintenance of the special facilities and equipment of P2 and P3 laboratory. Hence NCDC should consider allocating more financial and human resources and establish an implementation structure suitable for the level of the new building facility and equipment. Technical assistances through use of the soft component program of the Project as well as other means or schemes will provide support for improving the operation and maintenance ability of the building facility and equipment.

2-2-1-9 Basic Policy for Grading of Building Facility and Equipment

Considering the nature and quality of the operation and maintenance, the building facility shall use building materials and equipment that would not deteriorate over the years. Except for some special rooms, the facility should be constructed at low cost while ensuring a robust but simple design. Also, specification and quality for regional and international evaluation of NCDC and appropriateness for Grant Aid shall be maintained.

The laboratory will be designed in line with the biosafety guidelines established by WHO and USCDC and meet the international standard with infection prevention measures and diagnosis/research environments. And also, plan will be considered in future for international laboratory certificate submitted by NCDC. Furthermore, additional consideration would be given to facility contents in anticipation of future enhancement of pathogen management.

For inspection and research equipment, it is essential to select equipment of the highest level for operation of

the P3 laboratory. Although basic equipment would be selected as required, high grade equipment would be selected appropriately and their specifications shall conform to the required technical level.

2-2-1-10 Basic Policies of Construction Methods / Procurement Procedures, and Construction Period

(1) Construction Period

The rainy season in Nigeria ranges from May to October. In view of the Project schedule, earth work and foundation work will be carried out during the rainy season. Hence the period of construction should be considered in advance and reflected in the construction plan.

Furthermore, it is also essential to reflect sufficient days into the construction schedule for the trial operation, adjustment and tests related to the air conditioning and ventilation system in P2 and P3 laboratory, as well as the total trial operation days of the BSL-2 and BSL-3 management areas after the installation of the equipment.

(2) Construction Planning

Construction works will be conducted inside the compound of NRL while its existing facilities are in use. During the construction period, the area of the existing facilities are fenced and furnished with temporary entrance/passage to secure the safety of facility users and visitors.

The temporary construction area (temporary office, construction vehicle parking lot, material yard, etc.) during the construction period is indicated in the figure below, which has been confirmed and agreed by NCDC during the preparatory survey. An availability of the space for consultant office within the exisiting building shall be reconfirmed at the beggining of construction stage

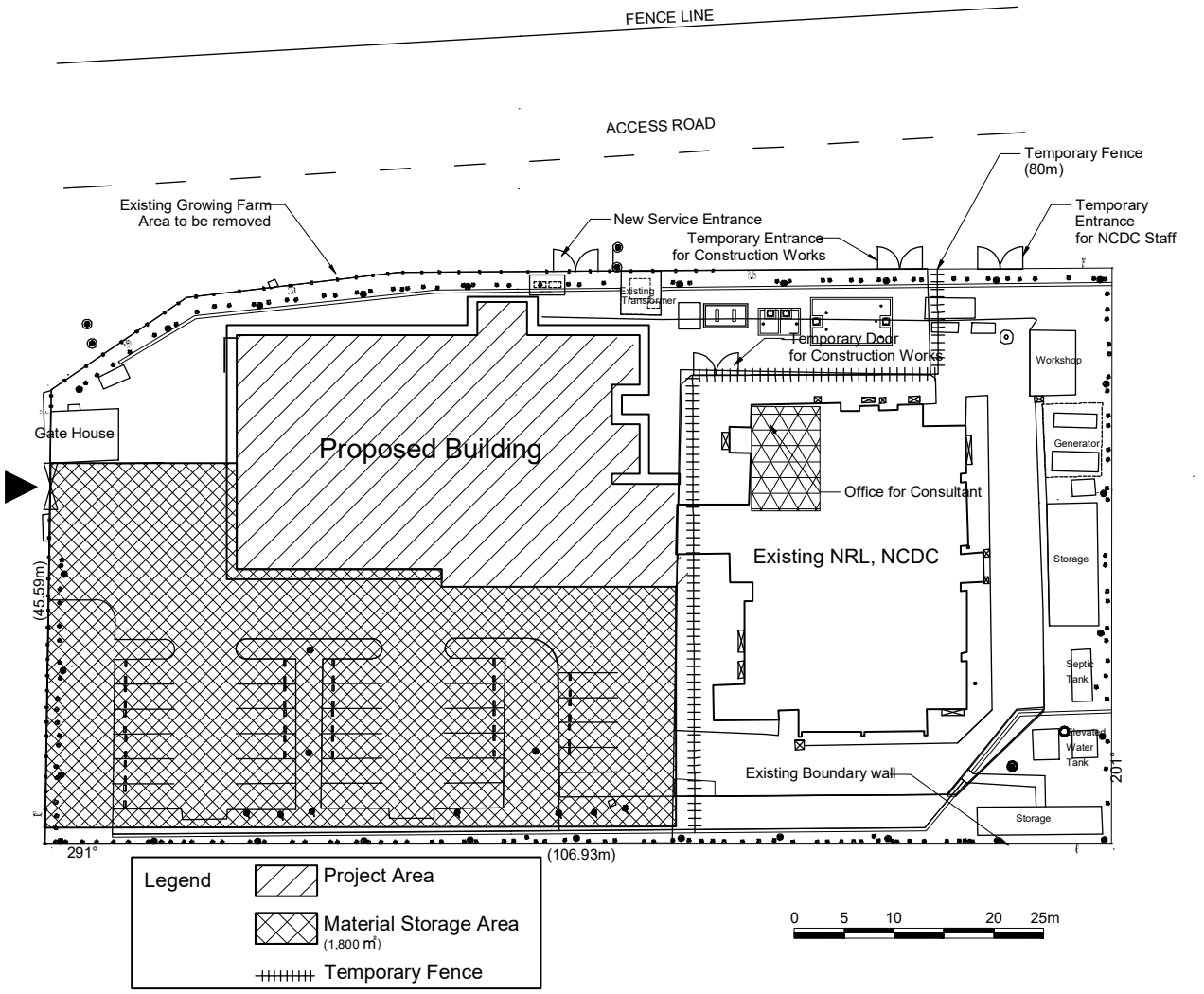


Figure 2-2 Temporary works area

(3) Labour

Skilled and unskilled Workers for most of the construction works can be gotten locally in Nigeria, even though their skills and workmanships are different. Therefore, it is important to control and maintain the quality allowable and equivalent to practices similar to those in Japan under the technical guidances of Japanese contractor. During the project, Japanese contractor will undertake a comprehensive construction management, quality control, and technical guidance (technology transfer) to local subcontractors and workers.

(4) Construction Materials and Equipment

In Abuja, the main building materials (portland cement, aggregates, reinforcements, ready-mix concrete) can be purchased locally. However, most of the reinforcement materials, fittings and finishing materials are imported from overseas and it is possible to purchase the materials through distributors in Abuja and Lagos. It is necessary to ensure homogeneity and quality control. Overall, it was confirmed that the main building materials for the construction work were available locally. Besides the products produced in Nigeria, building materials from Europe, South Africa, China etc. are also widely distributed in the local market and

are readily available, so that a construction plan can be formulated considering these materials as much as possible. Furthermore, procurement of some materials and equipment needed for P2 and P3 laboratory would be made in japan in order to satisfy the required performance such as hardware, finishing, fittings and the air conditioning system and waste water treatment system etc.,

For some equipment, in addition to the standard procurement method (Japan or locally made) in grant aid, consideration would be given to procurement of third country goods which the local agencies can provide maintenance services.

The furniture is basically based on local procurement. Since its price tends to be high in Africa, however, a preferred alternative plan would be made to procure them from Japan.

(5) Procurement of Materials and Equipment

The cargo containing construction materials and equipment from a third country or Japan will be transported by sea to the Lagos Port in southwestern Nigeria (approx. 60 days). Then, after going through the customs clearance procedure (1 to 2 months), the cargo will be conveyed by land transportation to Abuja where the Project site is located. The distance from the Lagos Port to Abuja is about 750km of land transportation, which takes about 1 week due to the poor transportation and unpaved roads.

In the Nigerian customs clearance system, preliminary registration procedures for the Conformity Assessment Program (SONCAP) as well as a set of shipping documents are required. According to the Nigerian regulation related to the insuring scheme, a C&F (Cost and Freight) procedure is common to apply for trading such as imports of foreign products, in which case the Nigerian side will likely undertake necessary documentations to the concerned governmental agency in order for the Japanese side to cover the related insurance to the shipment by the grant.

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

2-2-2-1 Site Layout Plan

(1) Site Conditions

The construction site is about 1,200m^2, and located within the compound of NCDC/NRL (about 6,006m^2). The site is surrounded by roads and private housing area. The site is almost flat, and there is no problem accessing from the existing gates.

- East side: Existing houses
- West side: Road (Entrance gate side, Width of planned road 20m)
- Southside: Existing houses
- North side: Road (Width of planning road 20m)
- All existing structures would be removed or relocated by NCDC, the Nigerian side shall also remove and cart away all existing trees/plants and the electrical lighting poles within the project site area. Existing pavement and kerbstone at parking area shall be removed by the Japanese side.

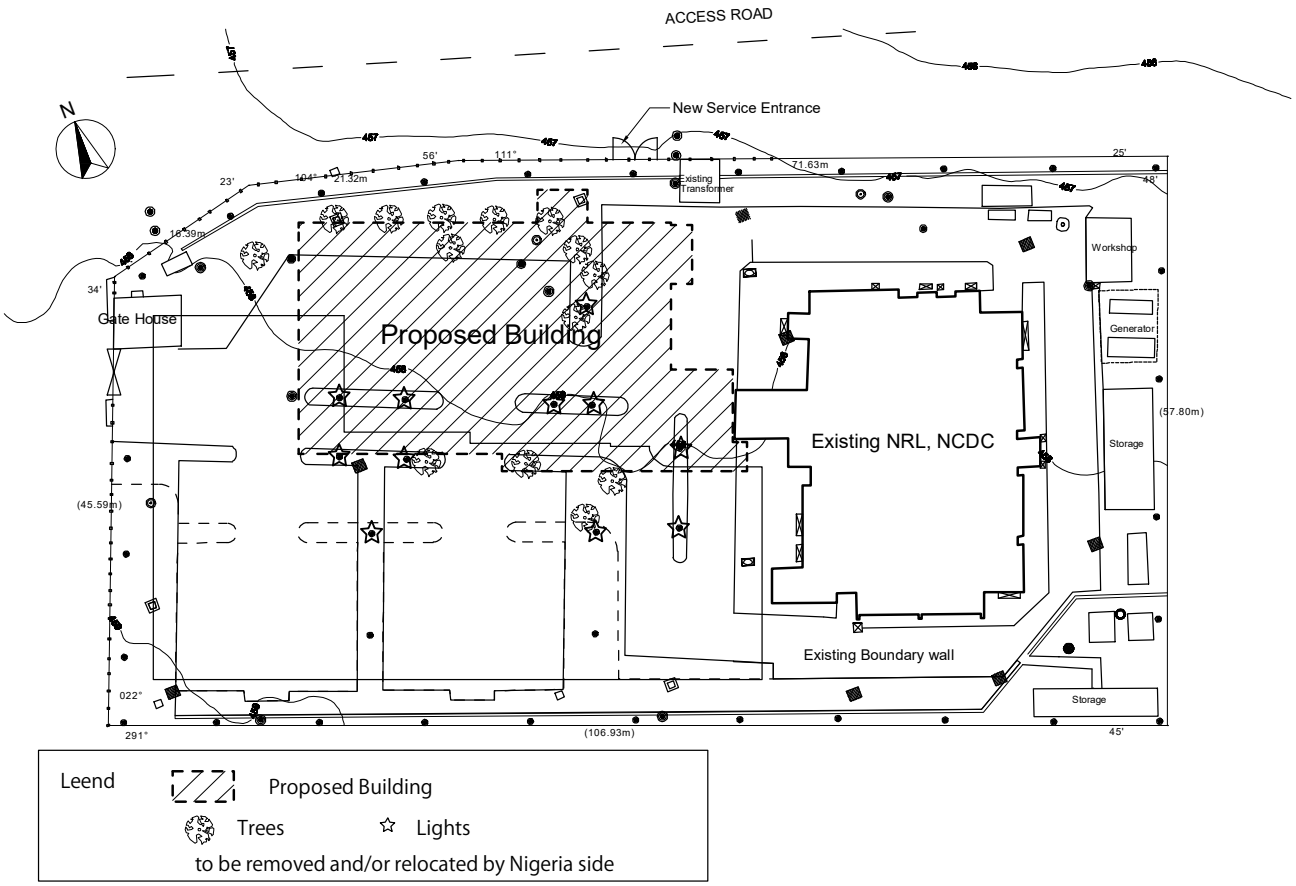


Figure 2-3 Site and existing building

(2) Layout and Zoning Plan

Zoning plan will be developed for the 4 main areas of the new building facility. This includes arrangement of traffic lines and layout. Planning is especially important in the areas of biosafety and security in other to secure particularly the containment of the biological contaminations and to control infection inside those areas in conformity with the structure and facility planning.

- BSL-2 management area (P2 Laboratory 3rooms, Bio-bank)
- BSL-3 management area (P3 Laboratory 3rooms, Bio-bank)
- Service area (Laboratory kitchen, Washing room, Service corridor)
- Administrative area (including the connection corridor with the existing building)

It is planned that the service area shall be operated and considered as the part of BSL-2 management area, and that the common entrance both for the existing and the new building will be furnished to maintain connectivity of the traffic lines for “men and goods“ between the 2 separated buildings.

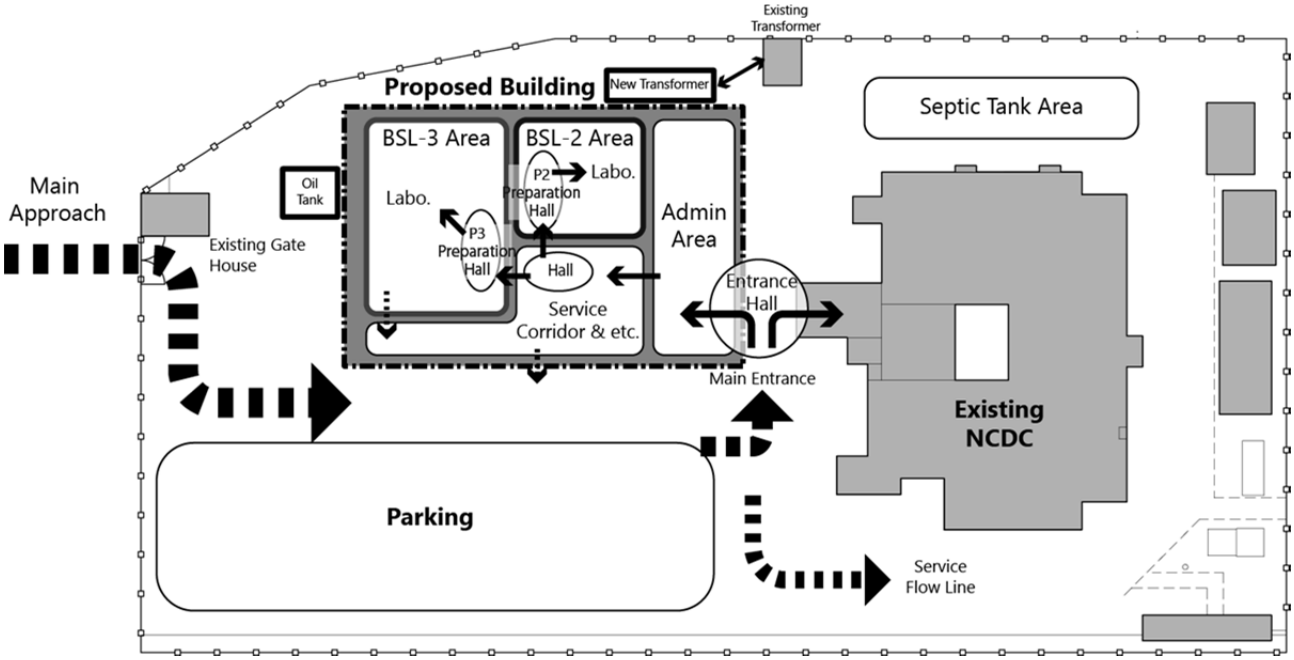


Figure 2-4 Placement and zoning plan and flowline plan

2-2-2-2 Architectural Plan

(1) Basic Components

Principal rooms in the 4 main areas of the new building facility are indicated as follows.

① BSL-2 management area
- Preparation hall (P2)
- Anteroom
- P2 Laboratory 3 rooms (Basic laboratory 2 rooms, PCR laboratory)
- Bio-bank (P2)

② BSL-3 management area
- Preparation hall (P3)
- Anteroom (including Shower room)
- P3 Laboratory 3 rooms (Bacteria, Virus, Animal experiments)
- Bio-bank (P3)

③ Service area (BSL-2 management area)
- Hall 1
- Hall 2
- Laboratory kitchen, Washing room
- Bio-bank 1
- Service corridor (P2)

④ Administrative area
- Office
- Monitoring room
- Staff room
- Machine room (Basement)
- Machine room (1st floor)

(2) Contents of Facility Components

The facility components of this Project are as shown in the table below.

Table 2-7 Contents of facility components

Stair	Rooms
Basement	Machine room 1, Steam Boiler room, Reservoir room, Pit for plumbing
Ground floor	P3 Laboratory 1・2・3 (w/anterooms), P2 Laboratory1・2・PCR (w/anteroom), Preparation hall (P2・P3), Hall 1・2, Storage (Animal・Reagent), Laboratory kitchen・Washing room, Bio-bank (P2・P3・1), Service corridor (P2・P3), Anterooms (Male/Female) Entrance hall 1・2, Corridor, Office, Monitoring room, Staff room, Toilet (Male/Female), Storage 1, Staircase EPS, Electrical room 1
First floor	Air conditioning room 1・2, Ventilation machine room 1・2・3・4, Electrical room 2 (w. muffler chamber)
Supplementary Facility	Septic tank, Oil tank

(3) Floor Planning

The design policy of the floor planning is indicated as follows.

- For biosecurity plan, the bullet-proof glass will be furnished at the openings on the outer periphery of wall, and that the security control system will be furnished with the surveillance cameras and biometric access control (electric locks).

- For the prevention of biological contamination and infection, the plan is to place the machine rooms specialized for the air conditioning and ventilation system at the upper level of P2 and P3 laboratory, and another machine room specialized for the sewage and infectious discharge treatment system will be placed at the lower level of P2 and P3 laboratory.

- Floor planning, layout of rooms will be developed in accordance with the traffic lines of “men and goods” examined at the each level of the infection control areas.

1) Planning of Rooms in BSL-2 and BSL-3 Management Area

The infection control areas, which are the core of the new building facility, will be located at the first floor, strictly and physically dividing the area per biosafety levels rated General, BSL-2 and BSL-3. P3 laboratory with 3 rooms (virus, bacteria and animal experiments), P2 laboratory with 3 rooms will be laid out in the area, of which each rooms are connected with the preparation halls through the ante rooms equipped along the traffic lines. “Men and goods” for the laboratory will be conveyed inside the area along the traffic line which starts at the general management area through BSL-2 management area, and ends at BSL-3 management area. The equipment for use in common would be situated between rooms and laboratories. They would be laid out at the ante rooms and/or the preparation halls which are the common space placed at the each biosafety level.

It is planned that the service area and the machine rooms for those systems specialized for P2 and P3 laboratory will be considered as BSL-2 management area.

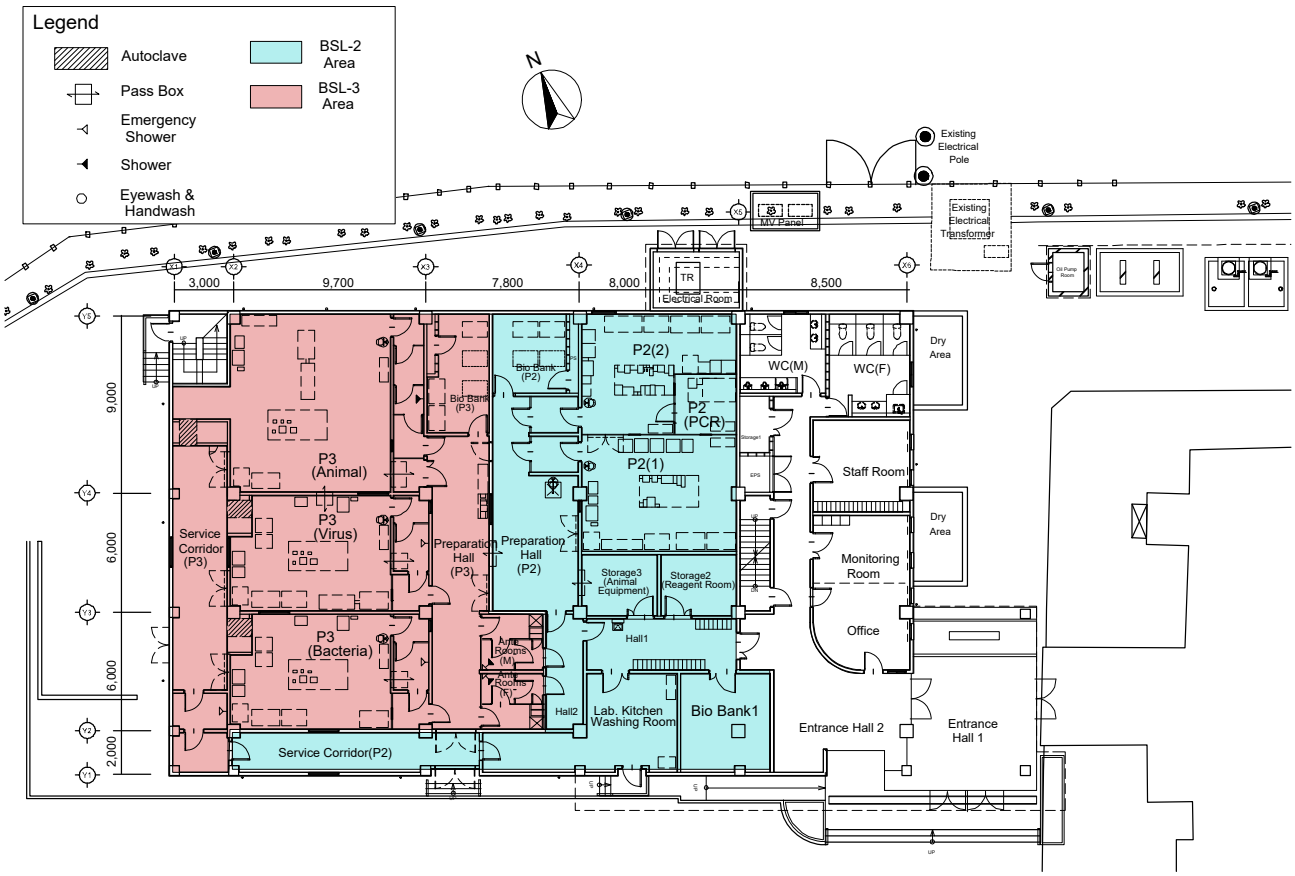


Figure 2-5 Plan of BSL-2 and BSL-3

a. P2 and P3 Laboratory

The specification of the laboratory facility will be firmly determined by Laboratory Biosafety Manual, WHO. It is of utmost importance in the planning of the laboratory, that the containment of the biological contaminations in the infection control areas should be strictly secured. The following technical considerations would be applied:

i) Establishment of the traffic lines for “men and goods” in the area.

ii) High accuracy of the barometric pressure and the air flow control.

iii) Introduction of the laboratory equipment required for the specific biosafety levels such as safety cabinets, glove boxes and autoclaves

iv) Introduction of the advanced system for air conditioning and ventilation comprising of higher order controlling system and high efficiency air filters units.

Entrance and exit for each room of the laboratory shall be through the adjacent ante-rooms of which differential pressure and air flow are mechanically controlled and regulated. The hand wash basin shall be furnished at the entrance of the ante rooms.

See-through windows shall be furnished on the partition walls dividing each room of the laboratory in order for staff working inside to observe each other visually and to secure appropriate countermeasures against the accidents, biological emergency and the like.

The specification of openings in the infection control area is a key issue to secure an accurate control of air pressure and air flow as well as a safe fumigation of the formalin gas etc. It is planned that those doors located on the boundary line between the general and BSL-2 management area shall be specified with the high efficiency airtightness, and that the doors and windows located inside BSL-3 management area shall also be specified with the high efficiency airtightness.

It is planned that “area-shower-out” concept is applied along the man-traffic line in the BSL-3 management area. Other than the above, “room-shower-out” concept is individually applied for P3 laboratory for animal experiments.

It is planned that the double doored autoclaves equipped in each rooms of P3 laboratory are introduced to secure necessary sterilization and treatment of infection control before disposing the infectious solid and liquid waste.

Samples will be conveyed by the appointed staff from the reception located at the existing building directly to the research staff of P2 and P3 laboratory through the pass box furnished at the hall-1.

The capacity of each room of P2 and P3 laboratory will be convenient for 2 to 3 research staff, except P3 laboratory for animal experiments of which the capacity will be 5 staff at the maximum. It is planned that the laboratory for animal experiments will have a certain area for observation after experiments, and that breeding area/ room will be provided by NCDC in the existing building.

The standard module of P2 and P3 laboratory will be planned with 8.0m×6.0m and 8.0m×9.0m for animal experiments, which suffice to install the island laboratory table giving suitable work space of 1.2m to 1.3m around as well as the large size equipment such as the safety cabinet etc. along the interior wall line.

Wall, ceiling and floor slab in the infection control areas will be basically planned with reinforced concrete structure except those partition walls furnished at the ante rooms. Interior finishing for the wall and ceiling in the area will be specified with chemical resistance paints, while the floor finishing will be specified with chemical resistance floor sheet.

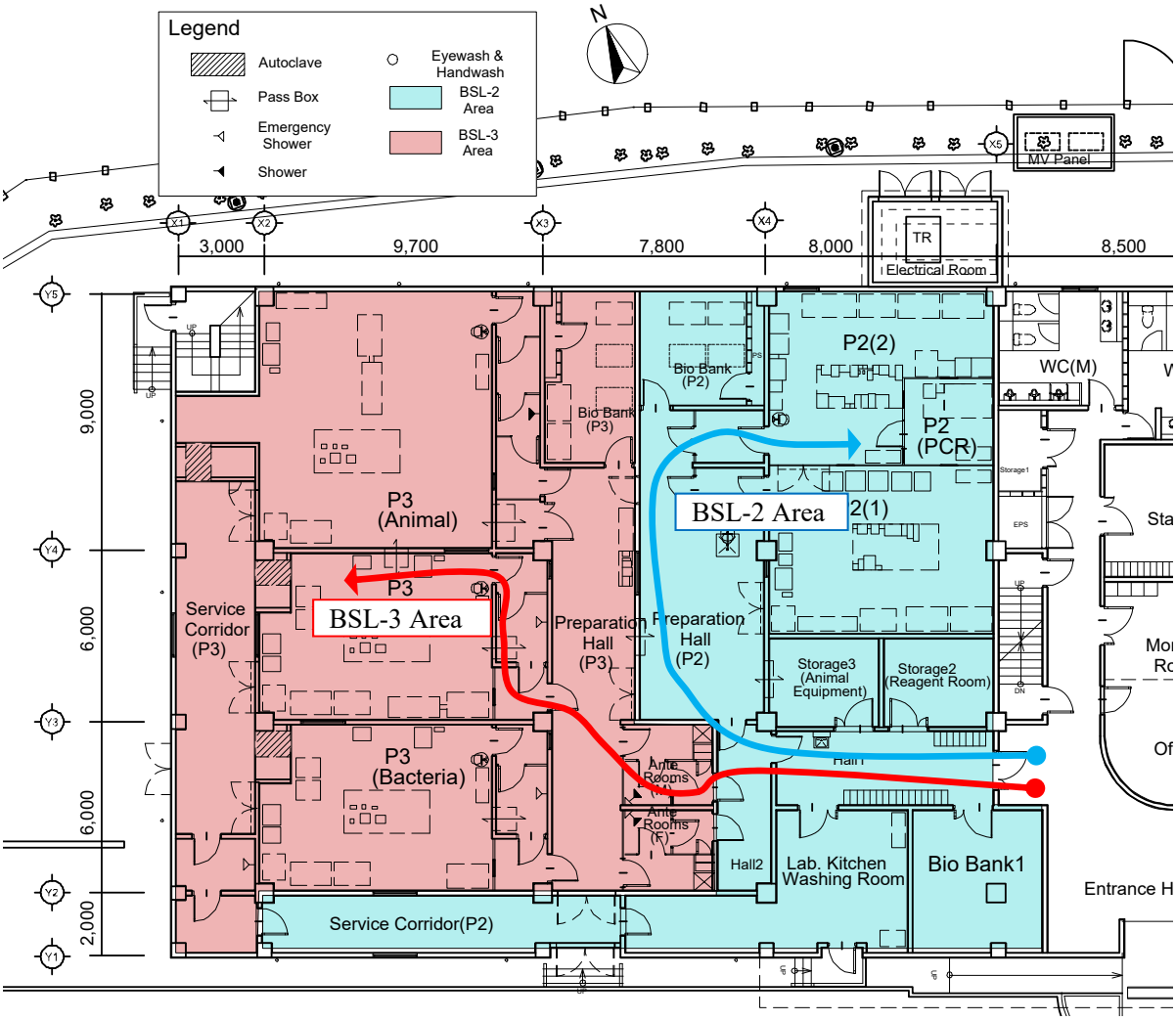


Figure 2-6 Flowline in the Infection Prevention and Management Zone

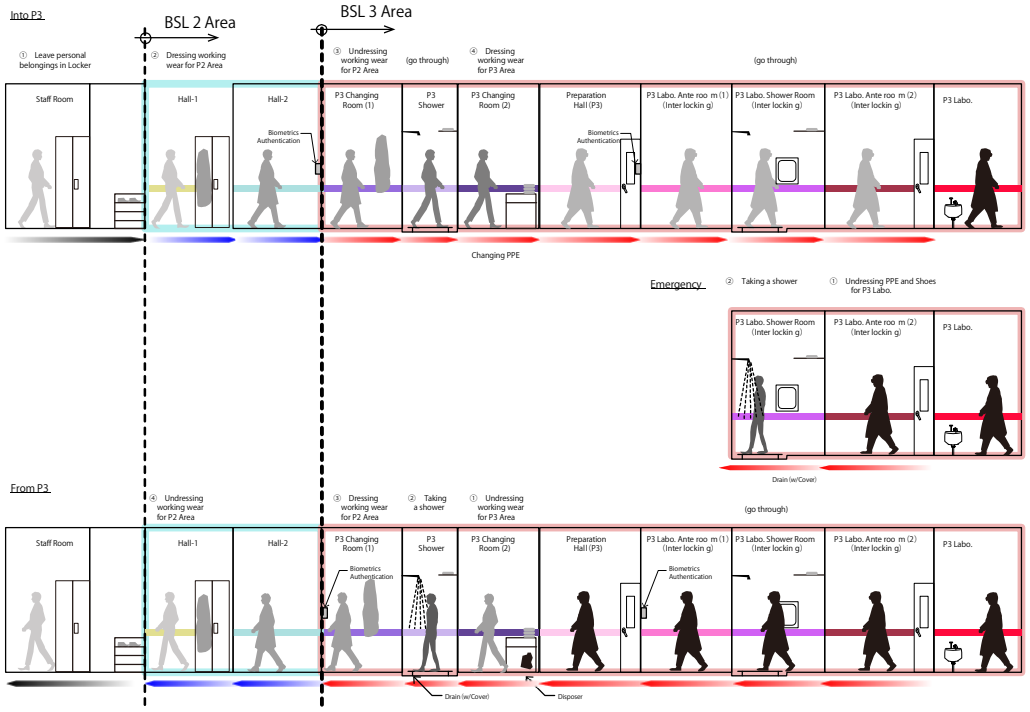


Figure 2-7 Flow of Gown Technic and PPT On/off in BSL-3 Area

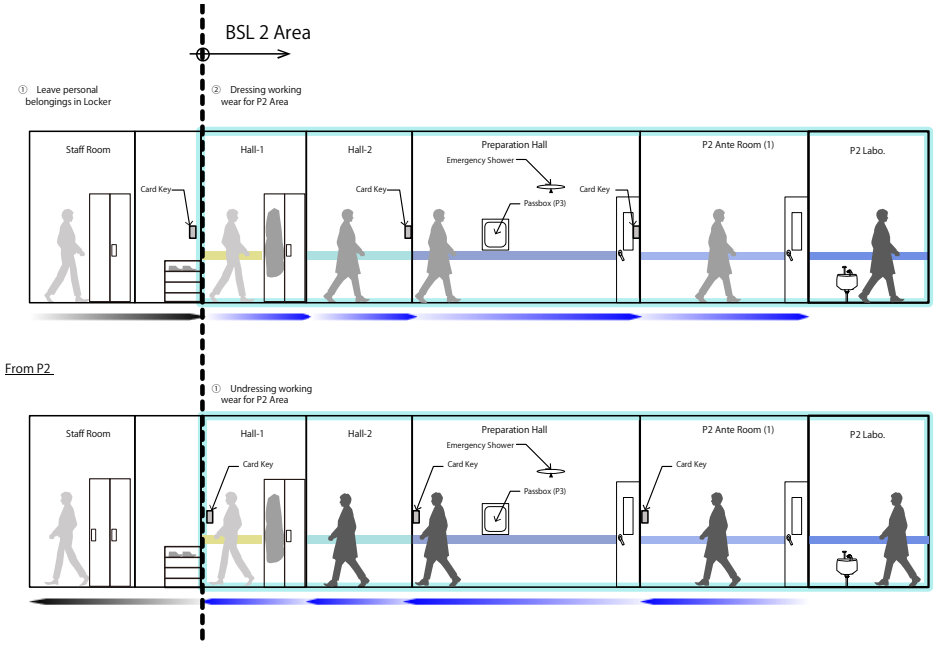


Figure 2-8 Flow of Gown Technic and PPT On/off in BSL-2 Area

b. Bio-bank

Bio-bank is considered both space for non-infectious cell and infection cell. The required room is not planned as the location for engineered freezing storage but installation of freezers.

c. Ante-room

Wearing the laboratory coat and PPE is mandatory at the ante-rooms. Two doors furnished in each ante room are operated with automatic closing and interlocking system to avoid two doors opened at the same time. The partition walls will be specified with the metal sliding panel of high efficiency air tightness. Emergency shower will be equipped at the ante-room. The access will be controlled with the card key system.

d. Laboratory kitchen/ Washing room

This is located next to Hall 1 and a shelf and ultrapure water system are installed. For the BSL-2 management area, it has been decided that the drainage plan of washing shall be based on wastewater treatment of the BSL-2 management.

e. Machine rooms at the basement floor

Infectious discharge treatment system for the BSL-2 and BSL-3 management would be installed. Also there are plans to install holding tanks and sterilization unit. The traffic lines for each BSL-2 and BSL-3 management are clearly separated in other to avoid risk as much as possible. The rooms planned for the infection prevention control area would be isolated from general area.

f. Machine rooms at the first floor

The air conditioning and ventilation system is mainly installed and located in the infection control areas on

the floor directly above the laboratories. Each machine rooms of P2 and P3 laboratory are clearly separated and planned for the infection prevention control area are isolated from general area.

2) Planning of Rooms in Administrative Area

g. Office and Monitoring room

Administrative management related to diagnosis and research, monitoring in the laboratories and security management will be carried out. It is assumed that the office would occupy 2 to 3 members of staff.

In order to properly take care of visitors, it is planned to set up an administrative office facing the entrance hall 2, with a reception desk on the hall side. In addition, CCTV monitoring system shall be installed in Entrance hall 1 and Entrance hall 2 for security.

h. Staff room

It serves as an office space and a rest space for researchers with outside facing windows. It would be useful for invited participants of donor agencies and collaborators, and the capacity is 5 to 6 people.

It is also used as a meeting space for visitors. Conferences can be held at the large conference room located within the existing facility.

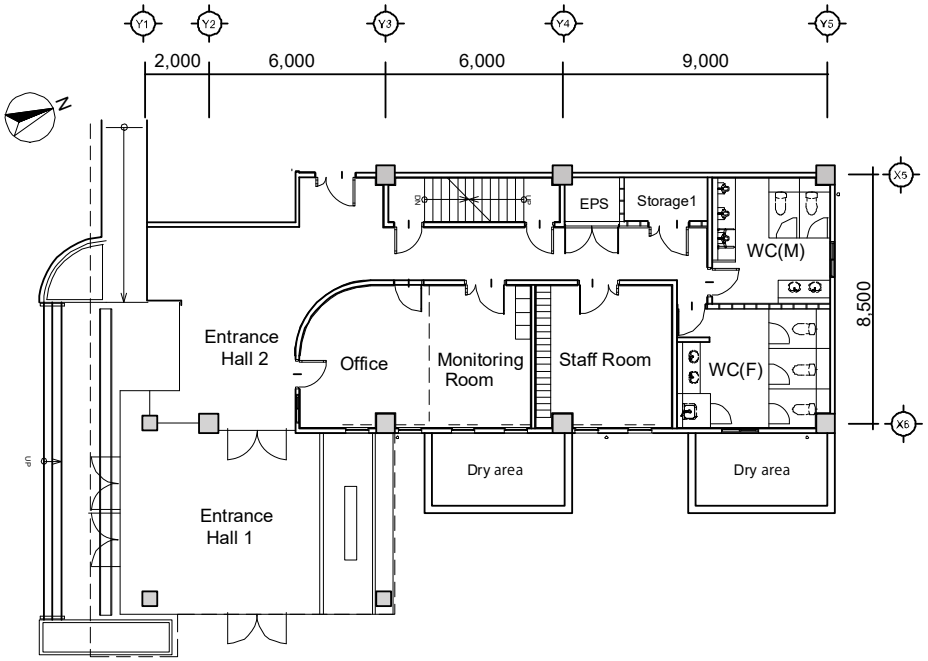


Figure 2-9 Plan in administrative area

3) Table of Floor Area

The area of each room is shown in Table below.

Table 2-8 Table of Floor area

Area	Room name	Floor Area [m^2]	Total [m^2]
BSL-3 Management Area	P3 Laboratory (Bacteria with 3 Anterooms)	60.76	354.53
	P3 Laboratory (Virus with 3 Anterooms)	60.76	
	P3 Laboratory (Animal experiments with 4 Anterooms)	99.88	
	Preparation hall (P3)	43.50	
	Bio-bank (P3)	20.38	
	Service corridor (P3)	50.03	
	Anterooms (Male)	9.61	
	Anterooms (Female)	9.61	
BSL-2 Management Area	P2 Laboratory 1 (with Anteroom)	53.00	165.70
	P2 Laboratory 2 (with Anteroom)	44.57	
	P2 Laboratory (PCR)	9.84	
	Preparation hall (P2)	39.50	
	Bio-bank 2 (P2)	18.79	
Service area (BSL-2)	Service corridor (P2)	26.65	145.97
	Hall 1	21.31	
	Hall 2	12.24	
	Storage 2 (Reagent)	13.00	
	Storage 3(Animal equipment)	13.00	
	Laboratory kitchen, Washing room	35.45	
	Bio-bank 1 (P2)	24.32	
Administrative area	Entrance hall 1	57.51	279.63
	Entrance hall 2, Corridor	69.49	
	Office, Monitoring room	39.06	
	Staff room	24.24	
	WC (Male)	18.79	
	WC (Female)	22.84	
	Storage 1	5.10	
	Staircase 1	28.45	
	Staircase 2	10.75	
	EPS	3.40	
		(Sub total)	945.83
Machine room	Electrical room 1 (GF)	13.50	873.42
	Oil pump room (GF)	3.96	
	Machine room (BF)	180.34	
	HVAC rooms (1F)・Electrical room 2 (1F)	675.61	
Grand total			1,819.25m^2

(4) Sectional Planning

In planning the section, the following activities are planned for in addition to the special conditions of the biomedical research centre and the climate in this region.

- Mechanical air conditioning will be provided.
- The floor level and exterior drainage plan will be carefully designed to counteract the potential damage caused by the rains as well as the floods in the future.
- The flat roof will be employed for the main building considering advantages in loading and unloading of equipment and maintenance, while the pitched roof is designed for the entrance hall. It is essential for the design to secure an enough slope to flush the rainfall. The attic ventilation will be considered to reduce heat loads and to improve cooling effects of the new building facility.
- Eaves will be installed to block intense daylights and severe rain blowing in the rainy season.
- The standard floor height in the general management area will be of 3.5m, while the ceiling height is of 2.8m which allows an easy arrangement and distribution of piping etc.
- The standard floor and ceiling height in the infection control areas will be of 3.5m with the direct slab finished which allows the expose piping and ducting of the air conditioning and ventilation system as well as the safety cabinet.
- The standard floor height of the machine rooms located both at the basement and the 2nd floor will be of 3.5m and 4.5m respectively having sufficient space for installation and maintenance.

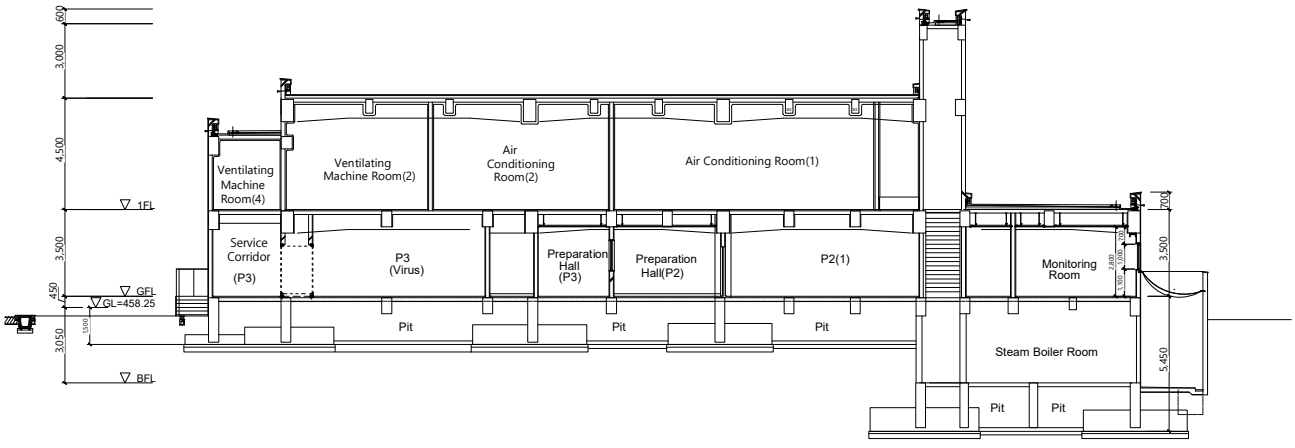


Figure 2-10 Sectional plan

2-2-2-3 Structural Plan

(1) Basic Policy

It is essential;

- to accurately obtain the geological condition of the Project site, the groundwater level, the bearing stratum and the like, and to plan a safe and reasonable foundation and the basement floor;

- to consider deflection, vibration and the like during the long-term loading, and to select a safe and reasonable structure type for the proper use of the building;
- to secure a safe and sufficient structural capacity for the short-term loading such as the intensive seasonal winds etc.;
- to develop simple and sustainable structure plan which allows the construction to be compatible to materials and practices locally procured.

(2) Method and Materials

Construction method is reinforced concrete structure which is generally accepted and economical on site. The wall shall be of reinforced concrete. The flat roof shall be of reinforced concrete.

(3) Design Policy

- Long term allowance bearing capacity is 300kN/m2
- A thickness of 150 mm of crushed stone shall be laid under the floor slab.
- The foundation type shall be a spread footing.
- The aseismic design criteria are indicated in 2-2-1-5 (5).
- The wind resistant design shall be conducted with 30m/sec of the standard wind pressure.
- The design load of roof, office and laboratory shall be the following value according to Japanese standards.

Table 2-9 Design load

Design load for the floor and beam	
Roof	900N/m^2
Offices	2,900N/m^2
Laboratory	2,300N/m^2

(4) Materials

Consideration is given to the following material:

Table 2-10 Structural materials

Concrete	From footing to ground floor	24N/mm^2
	From ground floor to first floor	24N/mm^2
	From first floor to roof	24N/mm^2
Reinforcement	Round steel bar	φ6 φ9
	Deformed steel bar SD295	D10~D14
	Deformed steel bar SD345	D16~D25

2-2-2-4 Utility Plan

(1) Plumbing System

1) Water Supply System

a. Water source

It has been confirmed that NRL currently uses wells located in the Project site as a water source. In addition, the city water network has been laid up to 1.2km from the site. The administrative staff of the Federal Capital Territory (FCT) Water Board confirmed that it is also possible to supply water to the site using the city water network. Based on results of the field survey and water quality test, the amount and the water quality of both the well water and the city water have been confirmed as sufficient and appropriate for use.

It is planned that the city water will be connected as a water source for the new building facility considering a stable quality and quantity to supply.

- Main water pipe diameter of city water 63mmφ
- Water pressure 0.1MPa
- Planned water pipe diameter of installation 63mmφ

b. Assumption of daily water consumption

No. of users	Staff	20 persons	100 litres/person･day
	Visitors	10 persons	20 litres/person･day
	Total	30 persons	2,200 litres/day

Shower room (Animal experiments)	5 persons×150 litres/time =	750 litres/day
For research (Autoclave)	3 units×50 litres/unit =	150 litres/day

Based on these conditions, daily water demand will be assumed 4m^3/ day as follows.

Staff & visitors	2,200 litres/ day
Shower room	750 litres/ day
For research	150 litres/ day
Total	3,100 litres/ day→ 4m^3/ day

c. Water supply system and capacity of major equipment

It is planned that the high pressure water supply system will be employed, and that the receiver tank stores the required amount of water to be pressurized by the water pump for the supply with the designed pressure. The existing elevated tank will be connected as a back-up water source with the new building facility through by-pass piping. The receiver tank will be of FRP (fibre reinforced plastic) material having 2 separate vessels, and will be located on the basement floor with the capacity equivalent to the water consumption for 1 day.

- Water reservoir (size: W2.0m×D2.0m×H1.5.0m)
  Capacity 4m3/day × 100% = 4m^3
- Water pressure system: Pump unit of water pressure system
  100L/min × 0.3MPa (Two pumps shall be automatically operated in alternate mode)

d. Prevention of cross contamination

The backflow prevention valve will be installed in the water supply system to P2 and P3 laboratory in order to prevent reverse flow due to negative pressure inside the piping.

2) Drainage (Domestic wastewater and infectious wastewater)

The drainage system of the new building facility will be completely separated into two different circuits singly discharged i.e. one circuit for the domestic wastewater (sewage and miscellaneous wastewater) generated from the general management area, and another for the infectious discharge generated from BSL-2, BSL-3 management areas. The circuits of the infectious discharge will be further separated into 2 lines namely : BSL-2 line and the BSL-3 line.

The domestic wastewater is treated in the new septic tank. Thereafter, the treated water will percolate into the soil as it enters into the penetration tank underground, while the infectious discharge from BSL-2 and BSL-3 management area collecting the wastewater from lab-sinks, hand wash basins and emergency showers will be sterilized by the infectious discharge treatment system per circuits and percolated underground.

The infectious discharge treatment system will employ the high-temperature steam sterilizer with reservoir tanks for batch, which will be located in the machine room of the biosafety containment on the basement floor.

Rainwater collected at the roof and the paved surface in the compound will be discharged to existing rainwater infiltration basins or the public drainage (open ditch) located along the access road on the north boundary just as the existing facilities do.

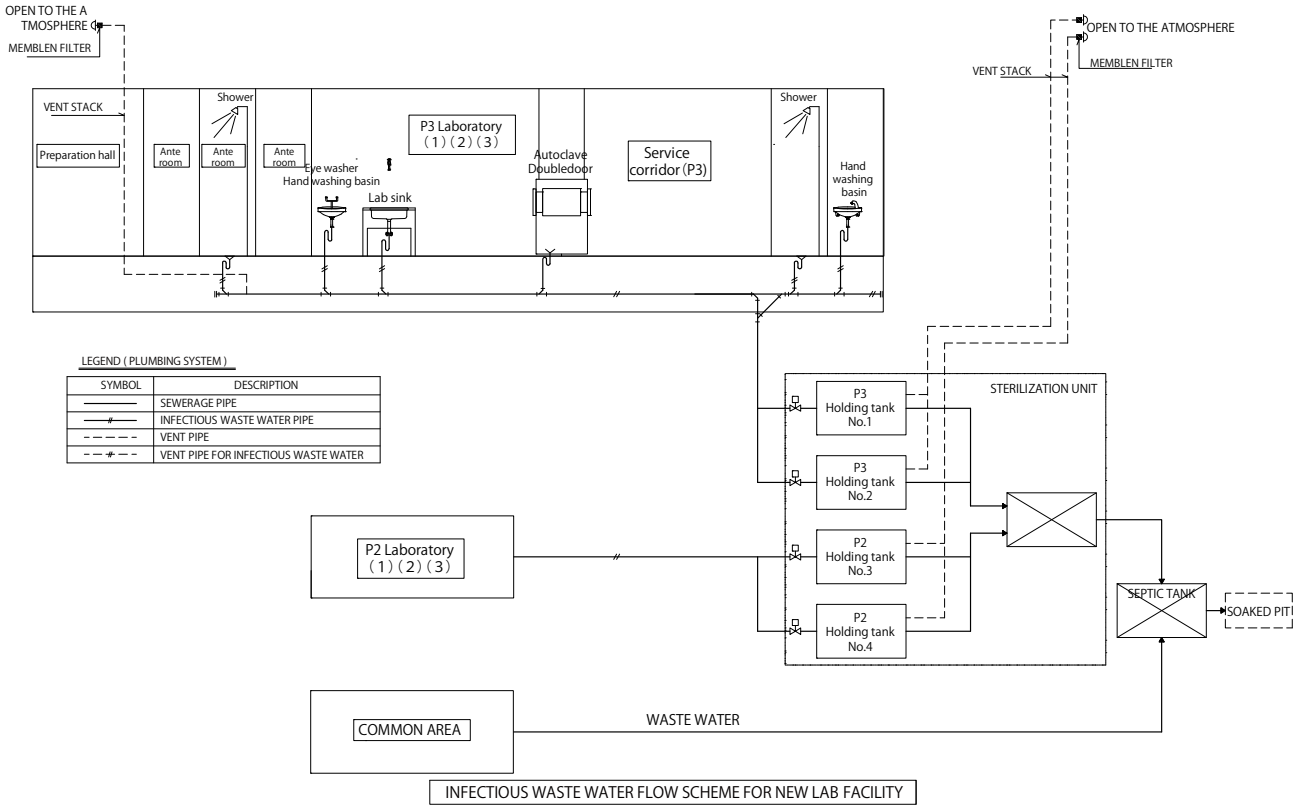


Figure 2-11 Infectious wastewater flow scheme for laboratory

3) Sanitary Equipment

Toilets provided in the existing facility are Western-style fixtures only, and all toilets in this Project will be Western-style plumbing fixtures. Also, toilets for disabled persons do not need to be installed in the planned personnel plan, and equipment is planed according to the local building standards.

4) Fire Extinguisher

Indoor fire hydrants and fire extinguishers will be considered effective for initial firefighting based on the use and magnitude of building in conformity with local regulations and standards. Fire extinguishers will be reserved particularly inside and outside P2 and P3 laboratory.

5) CO2 Gas System

Gas central piping including collecting devices, regulators will be considered for CO2 supply to the CO2 incubators which are procured and installed by the equipment package.

6) High Pressure Steam System

High-pressurized steam piping will be considered to connect the double door autoclaves at P3 laboratory with the steam generator (electrical boiler) installed at the basement machine room. The autoclaves and steam generator are procured and installed by the equipment package.

(2) Ventilation and Air Conditioning System

1) Air Conditioning System

The Project area is located in the city of Abuja, where is situated 9.0° north of the equator at altitude of 620m. The climate is savanna and divided into rainy season (April - October) and dry season (November - March).

According to the American Society of Heating, Refrigerating and Air-conditioning Engineers, Inc. (ASHRAE) guideline, which covers all design conditions for major cities in all countries, air conditioning design specifications are as follows.

Outdoor Design Condition:

Dry Bulb Temp. : 32.2 °C, Wet Bulb Temp. : 27.3°C, Daily Temp. Difference: 6.6°C

(Source: ASHRAE Weather data: at Abidjan)

In consideration of these climatic conditions and the room application in the new building facility, air conditioning system will be installed in required rooms in order to eliminate exposure to some undesirable environment conditions such as heat, humidity and dust, this provision would also ensure that a suitable indoor environment is maintained for a better work efficiency.

2) Ventilation System

In order to eliminate climate odours, heat and moisture, the rooms will be provided with mechanical ventilation system.

With reference to the above and in accordance with ASHRAE Standards and Japanese ministry of Land, Infrastructure and Transport design standards, applicable ventilation design conditions for this Project are considered in the tables below.

Table 2-11 Design conditions for ventilation system

Room name	Type of ventilation	Capacity of ventilation	Remarks
Room with general air conditioning	Supply air fan	25m3/person･day	For fresh air intake
Storage	Exhaust air fan only	5 times/hour	
Bio-bank	Exhaust air fan only	10 times/hour	For removal of heated air
WC	Exhaust air fan only	10 times/hour	For odours elimination
Water reservoir	Exhaust air fan only	3 times/hour	
Electrical room	Exhaust air fan only	10 times/hour	For removal of heated air
Emergency generator room	Supply/ exhaust dual air fan	25~30 times/hour	Combustion air supply and removal of heated air

3) Air conditioning and Ventilation system in P2 and P3 Laboratory

It is planned that the system will comply with the following international standards and Japanese standards, which enables NCDC to obtain the international certification of laboratory facilities when needed.

- WHO : Laboratory Biosafety manual
- CDC : Biosafety in Microbiological and Biomedical Laboratories
- National Institute of Infectious Diseases: Provisions for safety management of pathogens, etc.

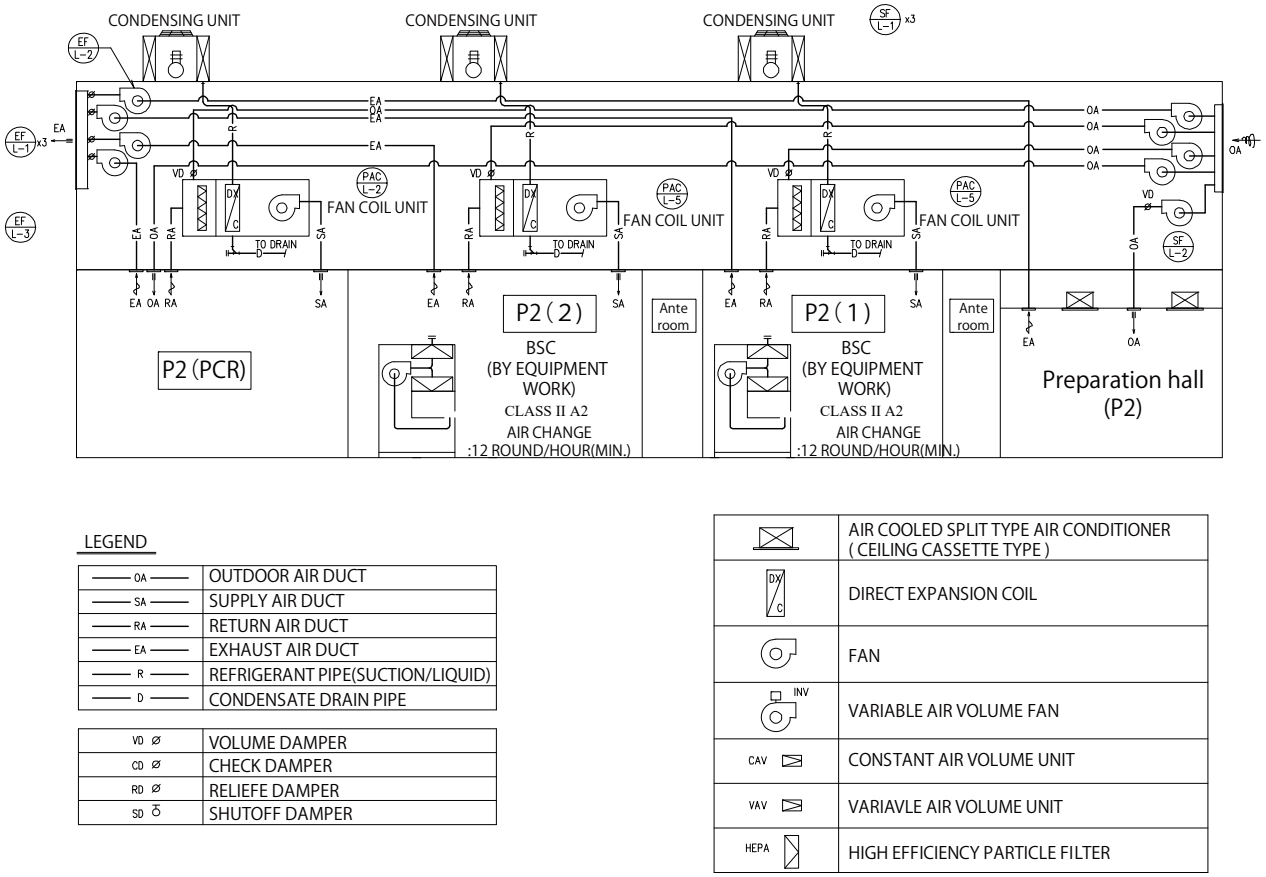
As a containment laboratory with high risk of infection (corresponding to WHO risk groups 2 and 3) handling infectious microorganisms, the air conditioning and ventilation system for the P3 laboratory shall be designed with negative pressure management, room air flow control, ensuring indoor cleanliness, exhaust system with High Efficiency Particle Air Filter (HEPA) filtration, maintenance of indoor temperature and the like. In addition, the system shall maintain a proper and accurate control of the negative pressure considering a large amount of the exhaust air from the biosafety cabinets (BSC) installed in the laboratory for handling infectious materials.

In order to satisfy these requirements, each P3 laboratory including ante rooms, shower room, changing room shall be equipped with the individual air conditioner, HEPA filter units, exhaust fans, air volume control units etc. and the ducting system. Also, a support area for each P3 laboratory such as the preparation halls, the service corridors shall be also equipped with the individual air conditioning and ventilation system.

Although the biosafety requirements are not as strict as P3 laboratory, it is planned that P2 laboratory as well shall be equipped with the air conditioning and ventilation system which conforms to certain grades of containment.

It is planned that these air conditioning and ventilating equipment shall be installed in the 2nd floor machine room right above the laboratory to ease workability and maintenance. In order to manage the system, the operation control monitoring board shall be installed at the monitoring room in the general management area which enables the operation state of each device, the static pressure of the HEPA filter, the pressure in each room in the laboratory, etc. to be comprehensively monitored and controlled.

HVAC system flow schematic for P2 and P3 laboratory are as shown below.



LEGEND

OA	OUTDOOR AIR DUCT
SA	SUPPLY AIR DUCT
RA	RETURN AIR DUCT
EA	EXHAUST AIR DUCT
R	REFRIGERANT PIPE(SUCTION/LIQUID)
D	CONDENSATE DRAIN PIPE

VD	VOLUME DAMPER
CD	CHECK DAMPER
RD	RELIEFE DAMPER
SD	SHUTOFF DAMPER

	AIR COOLED SPLIT TYPE AIR CONDITIONER (CEILING CASSETTE TYPE)
DX C	DIRECT EXPANSION COIL
	FAN
INV	VARIABLE AIR VOLUME FAN
CAV	CONSTANT AIR VOLUME UNIT
VAV	VARIAVLE AIR VOLUME UNIT
HEPA	HIGH EFFICIENCY PARTICLE FILTER

HVAC SYSTEM FLOW SCHEME FOR P2 LABORATORY

Figure 2-12 HVAC system flow schematic for P2 laboratory

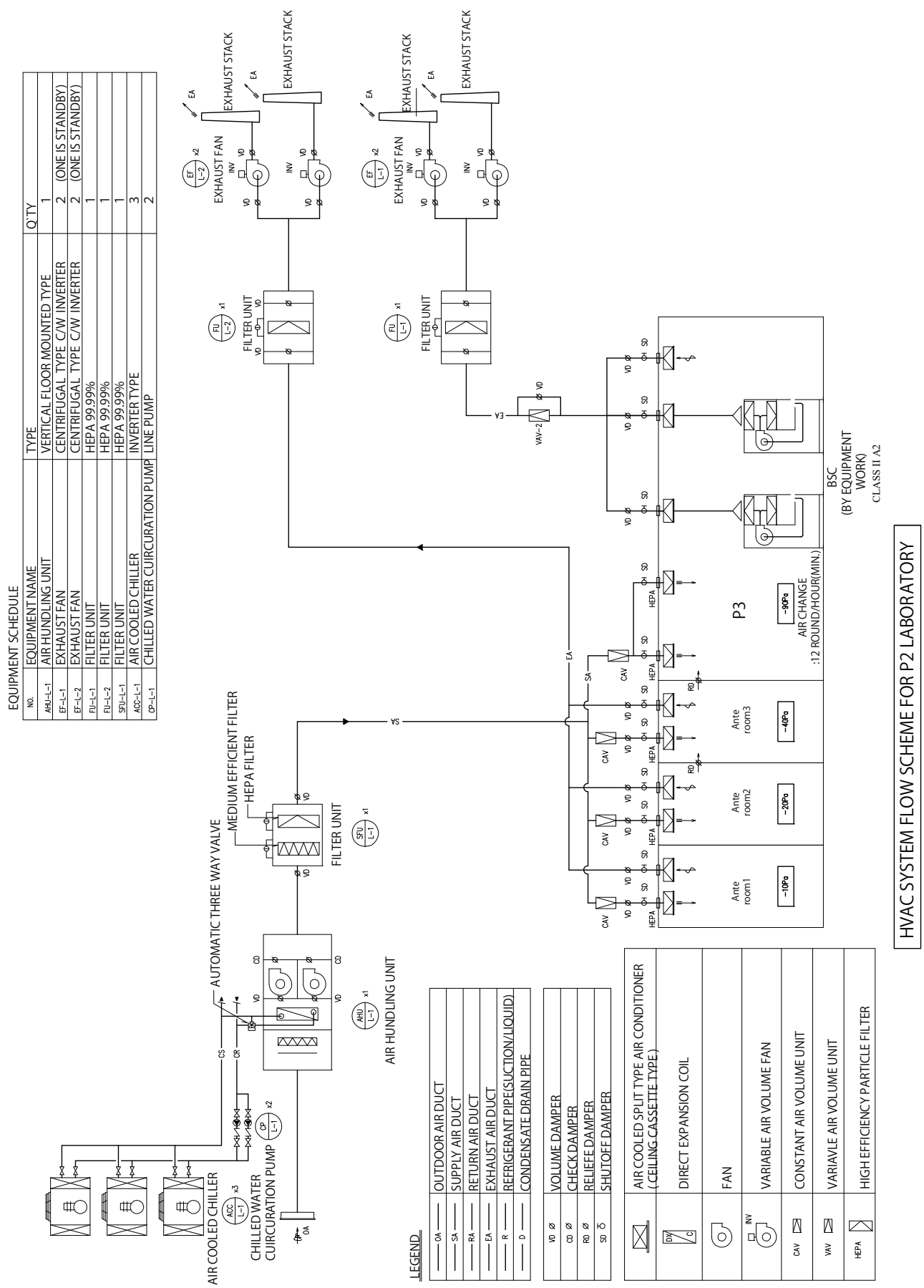


Figure 2-13 HVAC system flow schematic for P3 laboratory

(3) Electrical System

1) Substation System

The existing facility currently receives intermediate voltage of 33.0KV from Abuja Electric Power Corporation (AEDC), which is reduced to the low voltage through the step-down transformer installed outdoors, and distributed to each building. Regarding power distribution to the new building facility, based on results of consultation with the AEDC, it is planned that the existing AEDC distribution line shall be used, and that a new receiving panel and circuit breakers will be installed to enable branching to the existing transformer and the new transformer.

・ Input power : 33KV 3-phase 3-wires, 50Hz

a. Expected power load capacity

Expected power load capacity of transformer is calculated as shown in the table below.

Table 2-12 Expected power load capacity

Load capacity	Load density (VA/m2)	Floor area (m2)	Load capacity (KVA)	Remarks
Lighting & Outlet	30	1,600	48.0	
HVAC system and equipment in P2 Laboratory	60KVA	3 rooms	180	
HVAC system and equipment in P3 Laboratory	100KVA	3 rooms	300	
Air conditioning system	100	150	15	General air conditioning
Sanitary equipment	-	-	80	
計			623	

Total expected power load capacity is 623KVA and maximum power demand will be determined as follows, with an assumed demand rate of 50%:

・ 623KVA × 0.5 ＝ 311.5KVA → 320KVA（355KW）

2) Emergency Generator System

In the new building facility, such equipment as safety cabinet, a glove box, an incubator, a freezer, a refrigerator, etc., would need uninterrupted power supply. The outage of power supply to these equipment can cause a critical accident in terms of the operation of diagnosis and research as well as the containment of biological contaminations. For air conditioning and ventilation system in P2 and P3 laboratory where strict operation under BSL-2 and BSL-3 management is required, an uninterrupted operation is indispensable even in case of the power outage. It is planned under these requirements that emergency generator shall be newly established.

It is planned that the generator with an affordable storage of fuel shall have a minimum capacity necessary for uninterrupted power supply during the power outage, and that the estimated total capacity shall be more of the maximum demand electric power (320KW). 2 units of 200KVA capacity generators shall be

installed in consideration of the demands during the period of low consumptions such as maintenance and night time loads, when an alternative operation of units will suffice the demands. Capacity of storage of the diesel fuel will be determined by considering 1 week of the duration of outage and 4 to 5 hours of the operation time per day based on results of the field survey. .

- System Low noise air cooled type, indoor use package unit
- Capacity 3-phase 4-wires 380V 50Hz 200KVA (fuel consumption: 32Litre/hour)
- Fuel tank 2,000 L Diesel
- Operating hours 62.5hours at alternative operation, 31.25 hours in simultaneous operation
- Quantity 2 units

The uninterruptible power supply (UPS) shall be procured in the equipment package for diagnosis and experimental equipment which are sensitive to power fluctuations.

Meanwhile, the need for additional UPS for the air conditioning and ventilation system, biosafety cabinets of P2 and P3 laboratory shall be considered to avoid possible critical failure caused by instantaneous power stoppage.

3) Power Supply Trunk Line System

From the power distribution board in substation boards, 3-phase, 4-wires 400/230V 50Hz power will be distributed to each demand point according to the division of load and grouping of facilities. Trunk line capacity will be set to meet the installed capacity to be connected under the appropriate voltage drop and allowable current rate. The cable and wiring system will basically be a cable rack system in the shafts and others will be through conduit piping. The electrical power shall be supplied from a low voltage panel through an automatic voltage regulator (AVR) equipped on the trunk line in order to prevent those critical malfunction of the air conditioning and ventilation system i.e. air balance failures which may be incidentally caused by voltage fluctuations and the like.

The distribution method is as follows.

Trunk line:	3φ4W 230V/400V
Single phase load:	1φ2W 230V
Power load:	3φ3W400V

4) Lighting System

Each room and corridor will be provided with straight tube type Light Emitting Diode (LED) lighting in order to reduce maintenance and running costs. Illuminance criteria (standard illumination level) will be planned as follows based on the required average illuminance by international standards and Japanese standards (JIS), as well as the Nigerian domestic standards.

Table 2-13 Planned illuminance

Office, Monitoring room, Staff room	350 lux
P2, P3 Laboratory	500 lux
Corridor, Staircase	150 lux
WC, Storage	100 lux
Machine room, Electrical room	150 lux

Lighting will be controlled in each of the rooms and lighting circuitry will be planned to enable lighting control in every section of the room. A low voltage power supply system for lighting and outlets will be planned to distribute single phase, 2-wires, and 230V. Evacuation routes such as P2 and P3 Laboratory whose access is controlled, stairs, etc., will be planned with emergency exit sign and emergency lighting.

5) Telephone System

There are several private communication carriers in Abuja that currently provide services for mobile phones and data communication. However there are just a few companies offering services that combine telephone and data communication. Since there is no carrier providing high-speed broadband network service using optical fibre, it is planned that the microwave wireless system with voice channel will be connected by installing a dish antenna likely to the internet connection.

It is planned that the new building facility will have 1 to 3 incoming lines and the telephone extension number is about 10 lines. The IP phone PBX (with UPS) and telephone set will be furnished in various rooms. The telephone set for outside calls will be furnished for offices in the general management area, while intercommunication will be installed in the rooms within the infection control area to aid communication with the monitoring room using hands-free intercom system.

6) Local Area Network

Considering the needs for close communication and collaboration with laboratories and research institutes locally and overseas, it is planned that the local area network (LAN) will be established for the new building facility by using the data communication services provided by the microwave wireless system just as the telephone line services.

- LAN standards: Carrier transmission speed 6Mbps (installation of router)
- Wiring(CAT6) or wireless
- Data transmission speed: 1000Mbps,100Mbps

7) Access Control System

In order to strictly control the restricted access to BSL-2 and BSL-3 management areas, it is planned that the access control system shall be installed to manage access to authorized persons and to record “entry and exit” of the area as well as P2 and P3 laboratory. The biometrics authentication such as the iris authentication will be adopted for the system; the control panel for this purpose will be installed in the monitor room in the general control area.

8) Remote Monitoring System

Surveillance cameras will be installed in each Laboratories and Preparation hall and Sterilization room in BSL-2 and BSL-3 management areas, and remote monitoring display is planned in Monitoring room.

9) Emergency Call System

Emergency buttons will be installed in each Laboratory, Preparation hall and Sterilization room in BSL-2 and BSL-3 management areas and the emergency call display is planned in the Monitoring room.

10) Fire Alarm System

Fire alarm system will be installed in the service area and the administrative area. In BSL-2 and BSL-3 management areas with strict access control, an automatic fire alarm system with smoke and heat detectors to enable fire deduction at early stage will be installed as planned. A fire receiver will be installed in the Monitoring room. Together with access and interlock control installations.

11) Lightning Protection System

To avoid damages caused by lightning, consideration would be given to the installation of lightning protection facilities for the new building facility. Protective device system will be properly installed to maintain a stable power supply and to prevent computers, telephone sets, IPBX and laboratory equipment from the effects of lightning strikes whether directly or indirectly which may cause critical malfunctions of the electronic equipment by abnormal currents/voltages induced through power lines, telephone lines etc.

12) Waste Management

Since NRL has an existing plan to renew the existing incinerator for the solid waste generated from the laboratory in the compound, the new building facility will not have an incineration facility. At the same time, liquid waste (organic solvent), solid waste (garbage) storages and incineration ash pit shall be concretely examined according to the waste management plan formulated by NCDC but as has been said will not be part of the new building facility.

2-2-2-5 Building Material Plan

(1) BasicPolicy

The building material plan shall be formulated based on the climatic conditions, the location of the site, the local construction situation, construction period, construction cost and maintenance/operation costs. The following shall be matters of Basic Policy :

- Based on the peculiarity of the building facility, some of construction materials, devices and equipment specified for the infection control areas will be procured in Japan. However, conventional materials would be locally procured and used in the general control areas, this would greatly reduce construction costs and shorten construction period.

- The maintenance and operation costs shall be reduced by considering adaptation to the local climate, resistance against climate and the selection of local materials that are easy to maintain.
- The decision to procure from the third countries shall be based on their advantages, availability and the ease of maintenance.
- The selection and determination of the building materials shall be based on the studies of local procurement or application of local construction method.

(2) Selection of Construction Materials

1) Structural Materials

The main frames which are reinforced concrete for mainframes of column, beam and slab, and concrete walls will be adopted for this Project. The flat roof will be reinforced concrete roof slabs.

2) Exterior Finishing Materials

a. Exterior Wall

Polyurethane paint on mortar base will be used as the finishing materials for exterior walls, columns and beams.

b. Roofs

The flat roof will be designed with the rubber asphalt coating waterproofing which has a high workability and elasticity without heating and additive solvent. The waterproofing surface will be covered by protective concrete (40 to 50mm of thickness) to avoid the deterioration caused by ultraviolet radiations.

c. Windows and Doors

For external openings, such as windows and doors, aluminium sashes, steel doors and stainless steel doors will be used. Considering the purpose of the new building facility, the bulletproof glass shall be selected for the openings facing the exterior in other to strengthen security against burglary, biological crimes, terrorism and the like.

d. Eaves

Eaves will be installed at the entrance lobby to block intense daylights and severe rain blowing in the rainy season. Eaves will be specified with reinforced concrete coated by the rubber asphalt waterproofing.

3) Interior Finishing Materials

a. Floors

Polyvinyl floor sheet will be specified for the rooms in the general management area, while chemical resistant polyvinyl floor sheet is specified for the infection control areas. Ceramic tiles will be specified for the toilets according to availability from local procurement.

b. Walls

Polyurethane paint on mortar base will be used as the finishing materials for interior walls. Also, polyurethane paint on mortar base will be used in laboratory.

c. Ceilings

Double board lining will be specified (plaster board + rock wool sound absorbing board etc.) for the rooms in the general management area, while no board lining is specified for the infection control areas where the concrete ceiling slab will be exposed and finished with the urethane paint on the repaired surface.

4) Main Proposed Materials

The criteria for building materials have been analysed and studied. Based on the analysis, the main proposed materials are as follows:

Table 2-14 Main proposed materials

Structure		Reinforced concrete				
Floor height		1F: 3,500mm、2F: 4,500mm				
Exterior finish	Roof	Flat roof: Rubber asphalt water proofing Slope roof: Rubber asphalt water proofing				
	Exterior wall	Mortar trowel with polyurethane paint				
	Windows	Aluminium, Stainless steel, Bullet proof glass				
	Doors	Steel, Stainless steel				
Interior finish	Room name	Main entrance	P2, P3 Laboratory	Staff room	WC	Corridor
	Floor	Concrete non slip	Mortar steel trowel, PVCS floor Sheet (chemical resistance)	Mortar steel trowel, PVCS floor sheet	Mortar Steel Trowel, Porcelain Tile 300sq	Mortar steel trowel, PVCS floor sheet
	Wall	Glass wall	Mortar steel trowel with Polyurethane paint	Mortar steel trowel with Polyurethane paint	Mortar steel trowel, Porcelain Tile 300sq	Mortar steel trowel with Polyurethane paint
	Ceiling	Aluminium louver	Patching mortar, polyurethane paint	System ceiling (Plaster board t9.5+t9.5, with Polyurethane paint)	CMB t5.0+t5.0 with NAD paint	System ceiling (Plaster board t9.5+t9.5, with Polyurethane paint)
Ceiling height		2,950~2,000	3,300	2,800	2,800	2,800

2-2-2-6 Equipment Plan

(1) Requested Equipment

Equipment for establishment of P2 and P3 laboratory in NRL and equipment necessary for strengthening the function of CPHL were requested. The following priorities for this equipment were created and the final procurement equipment was established.

A: Essential equipment for the establishment of P2 and P3 laboratory of NRL and strengthening the function of CPHL

B: Necessary equipment for the establishment of P2 and P3 laboratory of NRL and strengthening the function of CPHL. However, further study is required.

1) Requested Equipment in NRL

The equipment requested in NRL will be utilized for P3 laboratory, BSL-3 management area, P2 laboratory, BSL-2 management area and existing facility.

a. Requested equipment in P3 Laboratory and BSL-3 management area

The rooms requested for equipment in BSL-3 management area are: P3 laboratory (animal, virus, bacteria), preparation hall, and bio bank P3. The equipment plan for these rooms are shown in the table below

Table 2-15 Requested equipment for P3 Laboratory and BSL-3 management area

No.	Room name	Equipment
1	P3 Laboratory (Animal experiments)	Autoclave, double door A, Autoclave, vertical, biosafety, Biosafety cabinet A, Centrifuge, mini, Computer, Deep freezer B, Glove box A, Caging system A, Laboratory refrigerator, Laboratory sink, Pipette set, Shelf, Thermoblock, Transilluminator, UV, Voltex mixer, Waste liquid tank, Working bench A
2	P3 Laboratory (Virus)	Autoclave, double door B, Autoclave, vertical, biosafety, Biosafety cabinet B, Centrifuge, high speed, Centrifuge, low speed, Centrifuge, mini, CO2 incubator, Computer, Deep freezer A, Deep freezer B, Glove box B, Incubator, Laboratory refrigerator, Laboratory sink, Pipette set, Shelf, Thermoblock, Transilluminator, UV, Voltex mixer, Waste liquid tank, Working bench A
3	P3 Laboratory (Bacteria)	Autoclave, double door B, Autoclave, vertical, biosafety, Biosafety cabinet C, Centrifuge, high speed, Centrifuge, low speed, Centrifuge, mini, CO2 incubator, Computer, Deep freezer A, Deep freezer B, Incubator, Laboratory refrigerator, Laboratory sink, Pipette set, Shelf, Thermoblock, Transilluminator, UV, Voltex mixer, Waste liquid tank, Working bench A
4	Preparation hall	Aerosol photometer, Air flow visualizer, Air velocity meter, Formaldehyde fumigation set (for biosafety cabinet), Formaldehyde fumigation set (for laboratory), PAO generator, Shelf
5	Bio-bank P3	Cryotank, Deep freezer B

Appropriateness of this equipment is examined by the following points.

① Equipment indispensable for the function of P3 laboratory
② Equipment conforming to NRL inspection and research
③ Equipment that can can be operated and maintained in NRL (including outsourcing)
④ Equipment that can not utilize existing equipment

⑤ Equipment that is difficult to procure at NRL

If point number ② and ③ are negative, but point number ① is positive, approval would be given to procure the equipment anyway and then separately eliminate the problem. And also, even if ① to ③ is satisfied, the equipment shall be excluded from the procurement plan if it is possible for NRL to arrange the equipment through the evaluation of ④ and ⑤.

b. Requested equipment in P2 Laboratory and BSL-2 management area

The equipment rooms requested for BSL-2 management area are P2 laboratory (1, 2 and PCR), Laboratory kitchen/washing rooms. Equipment plan for these rooms are indicated in the table below.

Table 2-16 Requested equipment in P2 Laboratory and BSL-2 management area

No.	Room name	Equipment
1	P2 Laboratory (1)	Autoclave, vertical, Autoclave, vertical, biosafety, Biosafety cabinet D, Centrifuge, high speed, Centrifuge, low speed, Centrifuge, mini, CO2 incubator, Computer, Deep freezer A, Deep freezer B, Electric balance, Electric balance, precision, Hot air oven, Incubator, Laboratory refrigerator, Laboratory sink, Microscope, Microscope, inverted, fluorescent, Microvolume spectrophotometer, Microwave oven, pH meter, Pipette set, Shelf, Thermoblock, Voltex mixer, Waste liquid tank, Water bath, Working bench A, Ultracentrifuge
2	P2 Laboratory (2)	Autoclave, vertical, Autoclave, vertical, biosafety, Biosafety cabinet D, Centrifuge, high speed, Centrifuge, low speed, Centrifuge, mini, CO2 incubator, Computer, Deep freezer A, Deep freezer B, Electrophoresis, ELISA set, Gel documentation system, Hot air oven, Incubator , Computer, Incubator with shaker, laboratory refrigerator, Laboratory sink, Microscope, Microscope, fluorescent, Microwave oven, Pipette set, Real-time PCR, Shelf, Spectrophotometer, Thermoblock, Thermal cycler,, Transilluminator, UV, Transilluminator, LED, Voltex mixer, Waste liquid tank, Water bath, Working bench A
3	P2 Laboratory (PCR)	Domestic refrigerator, PCR work station, Shelf, Thermoblock, Working bench B
4	Bio-bank	Cryotank, Deep freezer B
5	Laboratory kitchen/ Washing room	Shelf, Ultrapure water system

The appropriateness of this equipment is examined based on the following points.

① Equipment indispensable for the function of P2 laboratory
② Equipment conforming to NRL inspection and research
③ Equipment that can be operated and maintained by NRL (including outsourcing)
④ Equipment that cannot utilize existing equipment
⑤ Equipment that is difficult to procure at NRL

If ② and ③ are negative, but item ① is satisfied, the equipment would be procured under this plan and then eliminate the problems that are caused by ignoring ② and ③. Also, if ① to ③ are satisfied, the equipment shall be excluded from the procurement plan if the equipment is deemed to be able to arrange by NRL through the evaluation of ④ and ⑤.

c. Requested equipment in the existing facility

One equipment is requested in the existing facility.

Table 2-17 Requested equipment in the existing facility

No.	Room name	Equipment
1	Animal cage	Caging system B

The appropriateness of this equipment is examined based on the following points.

① Equipment indispensable for the function of P3 laboratory
② Equipment conforming to NRL inspection and research
③ Equipment that can be operated and maintained by NRL (including outsourcing)
④ Equipment that cannot utilize existing equipment
⑤ Equipment that is difficult to procure at NRL

If ② and ③ are negative, but item ① is satisfied, the equipment would be procured under this plan and the problems caused by ignoring the other items would be eliminated. And also, if ① to ③ are satisfied, the equipment shall be excluded from the procurement plan if the equipment is deemed to be able to arrange by NRL through the evaluation of ④ and ⑤.

2) Requested Equipment in CPHL

The department requested some additional equipment rooms in CPHL which are the bacteria laboratory and virus laboratory. The equipment plan for these rooms are as indicated in the table below.

Table 2-18 Requested equipment in CPHL

No.	Room name	Equipment
1	Bacteria laboratory	Autoclave, vertical, Biosafety cabinet D, Centrifuge, low speed, CO2 incubator, Incubator, Laboratory refrigerator, Microscope
2	Virus laboratory	Autoclave, vertical, Biosafety cabinet D, Centrifuge, high speed, Centrifuge, low speed, Centrifuge, mini, Deep freezer B, Electrophoresis, ELISA set, Gel documentation system, Incubator, PCR work station, Thermoblock, Transilluminator, UV, Voltex mixer, Water bath, shaking, Water distiller

The appropriateness of this equipment is examined based on the following points.

① Equipment indispensable for enhancing the function of CPHL
② Equipment that matches the CPHL inspection level
③ Equipment that can be operated and maintained by CPHL

④ Equipment that cannot utilize existing equipment

⑤ Equipment difficult to procure in CPHL

⑥ There is no overlap with the equipment procured by the technical cooperation project currently being prepared.

If ② and ③ are negative, but item ① is positive, the equipment would be procured under this plan and the problems caused by ignoring the other items would be eliminated. And also, if ① to ③ are satisfied, the equipment shall be excluded from the procurement plan if the equipment is deemed to be able to arrange by NRL through the evaluation of ④ to ⑥.

3) Utilization of Existing Equipment

The existing equipment at NRL will continue to be used for the inspection of bacteria, viruses, etc. carried out at the existing facility. Therefore, it may not be necessary to consider using the existing equipment in the newly established laboratory. In the case of CPHL, there is some existing equipment that is not obsolete and can be used in the future. This equipment will be utilized in the future.

4) Analysis Results

The analysis results for the above equipment are shown in the Table 2-19 and Table 2-20. As for CPHL's equipment, it shall be excluded from the equipment plan because it will be procured by technical cooperation. The planned equipment and its allocation are shown in the Table 2-21. The requested microscope, inverted, was included in the components of glove box B. Also, with regard to the caging system, it was divided into two items considering allocation.

Table 2-19 Analysis results of equipment for NRL

Items of analysis:

1. P2, P3 Equipment indispensable as a function of the laboratory
2. Equipment that matches NRL inspection and research level
3. Equipment that can be maintained and managed in NRL (including outsourcing)
4. Equipment that cannot utilize existing equipment
5. Equipment that is difficult to procure at NRL

Code No.	Equipment	Priority	Qty	1	2	3	4	5	Result
1	Aerosol photometer	A	1	○	○	○	○	○	○
2	Air flow visualizer	A	1	○	○	○	○	○	○
3	Air velocity meter	A	1	○	○	○	○	○	○
4	Autoclave, double door A	A	1	○	○	○	○	○	○
5	Autoclave, double door B	A	2	○	○	○	○	○	○
6	Autoclave, vertical	A	2	○	○	○	○	○	○
7	Autoclave, vertical, biosafety	A	5	○	○	○	○	○	○
8	Biosafety cabinet A	A	1	○	○	○	○	○	○
9	Biosafety cabinet B	A	1	○	○	○	○	○	○
10	Biosafety cabinet C	A	2	○	○	○	○	○	○
11	Biosafety cabinet D	A	4	○	○	○	○	○	○
12	Centrifuge, high speed	A	4	○	○	○	○	○	○
13	Centrifuge, low speed	A	4	○	○	○	○	○	○

Code No.	Equipment	Priority	Qty	1	2	3	4	5	Result
14	Centrifuge, mini	A	5	○	○	○	○	○	○
15	CO2 incubator	A	4	○	○	○	○	○	○
16	Computer	B	5	○	○	○	○	○	○
17	Cryotank	A	2	○	○	○	○	○	○
18	Deep freezer A	A	4	○	○	○	○	○	○
19	Deep freezer B	A	10	○	○	○	○	○	○
20	Domestic refrigerator	B	1	○	○	○	○	○	○
21	Electric balance	A	1	○	○	○	○	○	○
22	Electric balance, precision	A	1	○	○	○	○	○	○
23	Electrophoresis	A	2	○	○	○	○	○	○
24	ELISA set	A	1	○	○	○	○	○	○
25	Formaldehyde fumigation set (for biosafety cabinet)	A	1	○	○	○	○	○	○
26	Formaldehyde fumigation set (for laboratory)	A	1	○	○	○	○	○	○
27	Gel documentation system	A	1	○	○	○	○	○	○
28	Glove box A	A	1	○	○	○	○	○	○
29	Glove box B	A	1	○	○	○	○	○	○
30	Hot air oven	A	2	○	○	○	○	○	○
31	Incubator	A	3	○	○	○	○	○	○
32	Incubator with shaker	A	1	○	○	○	○	○	○
33	Caging system A	A	1	○	○	○	○	○	○
34	Caging system B	A	1	○	○	○	○	○	○
35	Laboratory refrigerator	A	5	○	○	○	○	○	○
36	Laboratory sink	A	5	○	○	○	○	○	○
37	Microscope	A	2	○	○	○	○	○	○
38	Microscope, fluorescent	A	1	○	○	○	○	○	○
39	Microscope, inverted	A	1	○	○	○	○	○	○
40	Microscope, inverted, fluorescent	A	1	○	○	○	○	○	○
41	Microvolume spectrophotometer	B	1	○	○	○	○	○	○
42	Microwave oven	B	2	○	○	○	○	○	○
43	PAO generator	A	1	○	○	○	○	○	○
44	pH meter	A	1	○	○	○	○	○	○
45	Pipette set	A	5	○	○	○	○	○	○
46	PCR work station	A	1	○	○	○	○	○	○
47	Real-time PCR	A	1	○	○	○	○	○	○
48	Shelf	A	8	○	○	○	○	○	○
49	Spectrophotometer	A	1	○	○	○	○	○	○
50	Thermoblock	A	6	○	○	○	○	○	○
51	Thermal cycler,	A	2	○	○	○	○	○	○
52	Transilluminator, UV	A	4	○	○	○	○	○	○
53	Transilluminator, LED	A	1	○	○	○	○	○	○
54	Ultrapure water system	A	1	○	○	○	○	○	○
55	Voltex mixer	A	5	○	○	○	○	○	○
56	Waste liquid tank	A	5	○	○	○	○	○	○
57	Water bath	A	2	○	○	○	○	○	○
58	Working bench A	A	5	○	○	○	○	○	○
59	Working bench B	A	1	○	○	○	○	○	○
60	Ultracentrifuge	A	1	○	○	○	○	○	○

Table 2-20 Analysis results of equipment for CPHL

Items of analysis:

1. Equipment indispensable for enhancing the function of CPHL
2. Equipment that matches CPHL inspection level
3. Equipment that can be operated and maintained by CPHL

4. Equipment that cannot utilize existing equipment

5. Equipment difficult to procure in CPHL

6. There is no overlap with the equipment procured by the technical cooperation project currently being prepared.

Code No.	Equipment	Priority	Qty	1	2	3	4	5	6	Result
6	Autoclave, vertical	B	1	○	○	○	○	○	duplicate	×
11	Biosafety cabinet D	B	2	○	○	○	○	○	duplicate	×
12	Centrifuge, high speed	B	1	○	×	○	○	○	duplicate	×
13	Centrifuge, low speed	B	2	○	○	○	○	○	duplicate	×
14	Centrifuge, mini	B	1	○	×	○	○	○	duplicate	×
15	CO2 incubator	B	1	○	○	○	○	○	duplicate	×
19	Deep freezer B	B	1	○	○	○	○	○	duplicate	×
23	Electrophoresis	B	1	○	×	○	○	○	duplicate	×
24	ELISA set	B	1	○	○	○	○	○	duplicate	×
27	Gel documentation system	B	1	○	×	○	○	○	duplicate	×
31	Incubator	B	2	○	○	○	○	○	duplicate	×
35	Laboratory refrigerator	B	1	○	○	○	○	○	duplicate	×
37	Microscope	B	1	○	○	○	○	○	duplicate	×
46	PCR work station	B	1	○	×	○	○	○	duplicate	×
47	Real-time PCR	B	1	○	×	○	○	○	duplicate	×
50	Thermoblock	B	1	○	×	○	○	○	duplicate	×
52	Transilluminator, UV	B	1	○	×	○	○	○	duplicate	×
55	Voltex mixer	B	1	○	○	○	○	○	duplicate	×
61	Water bath, shaking	B	1	○	○	○	○	○	duplicate	×
62	Water distiller	B	1	○	○	○	○	○	duplicate	×

Table 2-21 Equipment allocation list

Code No.	Equipment name	Sub total	Gaduwa new facility										Gaduwa existing facility
			P3 Laboratory (Animal experiments)	P3 Laboratory (Virus)	P3 Laboratory (Bacteria)	Preparation hall	P2 Laboratory(1)	P2 Laboratory(2)	P2 Laboratory(PCR)	Laboratory kitchen/ Washing room	Bio-bank P3	Bio-bank P2	
1	Aerosol photometer	1				1							
2	Air flow visualizer	1				1							
3	Air velocity meter	1				1							
4	Autoclave, double door A	1	1										
5	Autoclave, double door B	2		1	1								
6	Autoclave, vertical	2					1	1					
7	Autoclave, vertical, biosafety	5	1	1	1		1	1					
8	Biosafety cabinet A	1	1										
9	Biosafety cabinet B	1		1									
10	Biosafety cabinet C	2			2								
11	Biosafety cabinet D	4					2	2					
12	Centrifuge, high speed	4		1	1		1	1					
13	Centrifuge, low speed	4		1	1		1	1					
14	Centrifuge, mini	5	1	1	1		1	1					
15	CO2 incubator	4		1	1		1	1					
16	Computer	5	1	1	1		1	1					
17	Cryotank	2									1	1	
18	Deep freezer A	4		1	1		1	1					

Code No.	Equipment name	Sub total	Gaduwa new facility										Gaduwa existing facility
			P3 Laboratory (Animal experiments)	P3 Laboratory (Virus)	P3 Laboratory (Bacteria)	Preparation hall	P2 Laboratory(1)	P2 Laboratory(2)	P2 Laboratory(PCR)	Laboratory kitchen/ Washing room	Bio-bank P3	Bio-bank P2	
19	Deep freezer B	10	1	1	1		1	1			3	2	
20	Domestic refrigerator	1							1				
21	Electric balance	1					1						
22	Electric balance, precision	1					1						
23	Electrophoresis	2						2					
24	ELISA set	1						1					
25	Formaldehyde fumigation set (for biosafety cabinet)	1				1							
26	Formaldehyde fumigation set (for laboratory)	1				1							
27	Gel documentation system	1						1					
28	Glove box A	1	1										
29	Glove box B	1		1									
30	Hot air oven	2					1	1					
31	Incubator	3		1	1		1						
32	Incubator with shaker	1						1					
33	Caging system A	1	1										
34	Caging system B*	1											1
35	Laboratory refrigerator	5	1	1	1		1	1					
36	Laboratory sink	5	1	1	1		1	1					
37	Microscope	2					1	1					
38	Microscope, fluorescent	1						1					
39	Microscope, inverted, fluorescent	1					1						
40	Microvolume spectrophotometer	1					1						
41	Microwave oven	2					1	1					
42	PAO generator	1				1							
43	pH meter	1					1						
44	Pipette set	5	1	1	1		1	1					
45	PCR work station	1							1				
46	Real-time PCR	1						1					
47	Shelf	8	1	1	1	1	1	1	1	1			
48	Spectrophotometer	1						1					
49	Thermoblock	6	1	1	1		1	1	1				
50	Thermal cycler,	2						2					
51	Transilluminator, UV	4	1	1	1			1					
52	Transilluminator, LED	1						1					
53	Ultrapure water system	1								1			
54	Voltex mixer	5	1	1	1		1	1					
55	Waste liquid tank	5	1	1	1		1	1					
56	Water bath	2					1	1					
57	Working bench A	5	1	1	1		1	1					
58	Working bench B	1							1				
59	Ultracentrifuge	1					1						

* Include Microscope, inverted

(2) Equipment Major Specification

Major specification of planned equipment is shown in the Table 2-22.

Table 2-22 Major specification of planned equipment

Code No.	Equipment	Major specification
1	Aerosol photometer	For PAO, with constant velocity suction probe
4	Autoclave, double door A	Capacity : 700L or more, Temp. range : 121 - 130℃ or wider, Double door, Drain water sterilization function equipped
5	Autoclave, double door B	Capacity : 200L or more, Temp. range : 121 - 130℃ or wider, Double door, Drain water sterilization function equipped
8	Biosafety cabinet A	Class : II, Internal size : 1,600mm or more, Open type exhaust unit equipped, Pre-filter for animal is equipped, Connectable to Glove box A
9	Biosafety cabinet B	Class : II, Internal size : 1,200mm or more, Open type exhaust unit equipped, Connectable to Glove box B
10	Biosafety cabinet C	Class : II, Internal size : 1,200mm or more, Open type exhaust unit equipped
11	Biosafety cabinet D	Class : II, Internal size : 1,200mm or more
12	Centrifuge, high speed	Self-standing type, Rotation speed : 15,000rpm or more, Rotor : 1.5ml/2.0ml/96hole micro plate with biosafety cup
19	Deep freezer B	Chest type, 450L or more, Lowest temperature : -80℃ or less
24	ELISA set	ELISA reader and washer, Manual type
26	Formaldehyde fumigation set (for laboratory)	Formaldehyde fumigation unit, Decomposition unit, Circulator, Gas density analyser etc.
27	Gel documentation system	UV irradiation device, CCD camera with display
28	Glove box A	Internal size : W1,800xD550xH700mm or more, Material : SUS304, equipped with pass box and dunk tank, Animal cage with rack is equipped
29	Glove box B	Internal size : W1,800xD550xH700mm or more, Material : SUS304, equipped with pass box and dunk tank, Microscope inverted with CCD camera is equipped.
33	Caging system A	For mice and rats, Cage number: 30 or more, HEPA filter equipped.
34	Caging system B	For mice and rats, Cage number: 30 or more, HEPA filter equipped.
38	Microscope, fluorescent	Research microscope, Fluorescent unit equipped, Eyepiece : 10x, Objective lens : 10x、20x、40x、100x, with CCD camera
39	Microscope, inverted, fluorescent	Inverted microscope, Light source : LED or halogen lamp, Fluorescent unit equipped, Eyepiece : 10x, Objective lens : 10x、20x、40x、100x, with fluorescent function and CCD camera
40	Microvolume spectrophotometer	Minimum sample volume : 1μ or less, Light source : LED, Measuring wavelength : 260nm and 280nm or more
46	Real-time PCR	Excitement wavelength : 4 or more, Detection channel : 4 or more, Reactor vessel : 96 micro plate or more, Temperature rate : 4℃/s or more, Light source : LED
48	Spectrophotometer	UV-VIS, Wavelength width : 1.5nm or less
50	Thermal cycler	Reaction vessel : 96 microplate or more, Temperature rate : 4℃/s or more, Temperature setting range : 5 - 100℃ or wider
53	Ultrapure water system	Ultrapure water and pure water production : 30L/day or more, Water collection tank equipped
57	Working bench A	W3,000 x L1,500 mm or more. Main body material : Wood, Plate : Chemical proof, Plug socket and shelf : Equipped
59	Ultracentrifuge	Revolution speed: 150,000rpm or more, Max. acceleration : 1,000,000g or more, Temperature control range : 0 - 40°C or wider, Angle rotor equipped

2-2-3 Outline Design Drawing

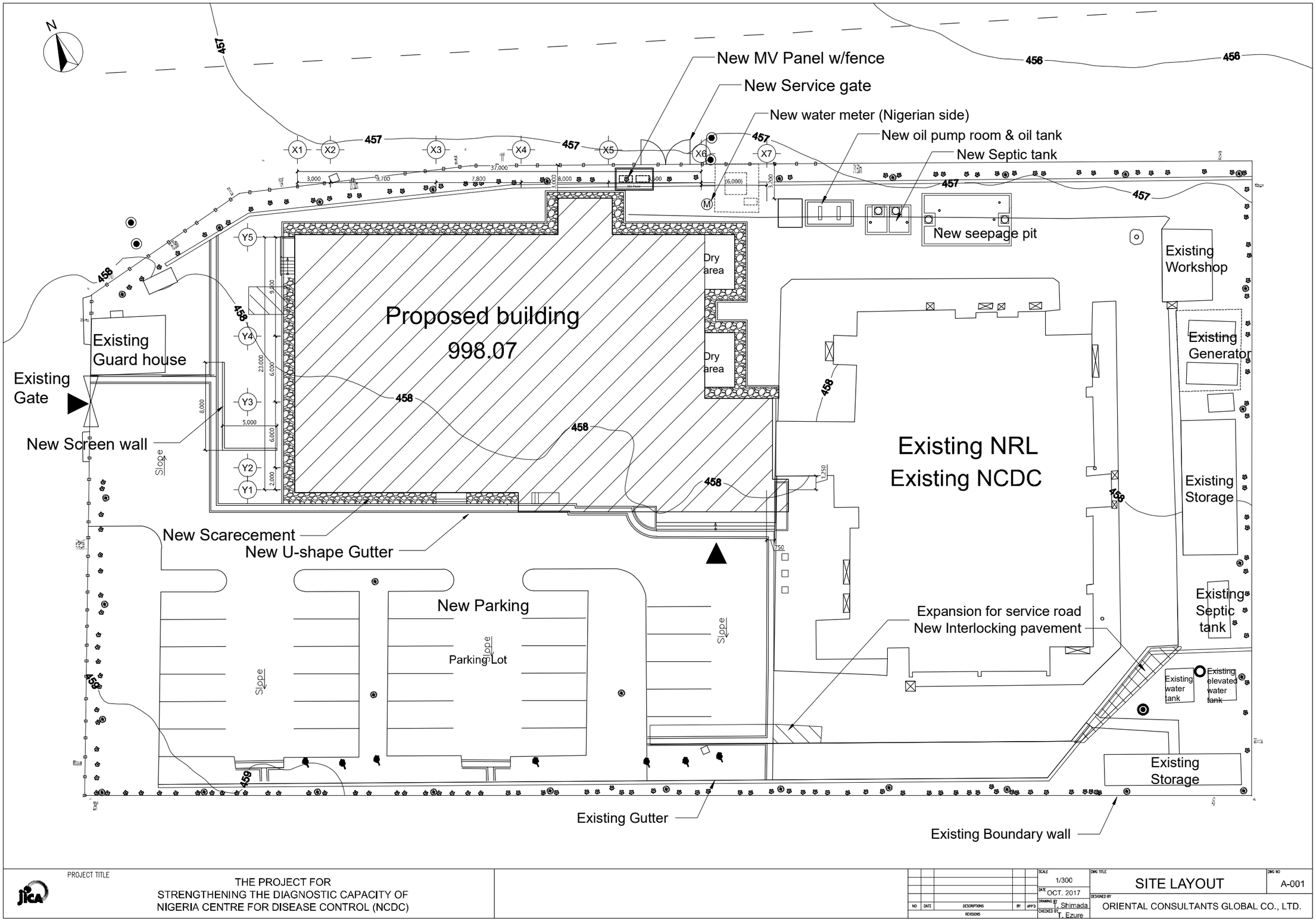


Figure 2-14 Site layout plan

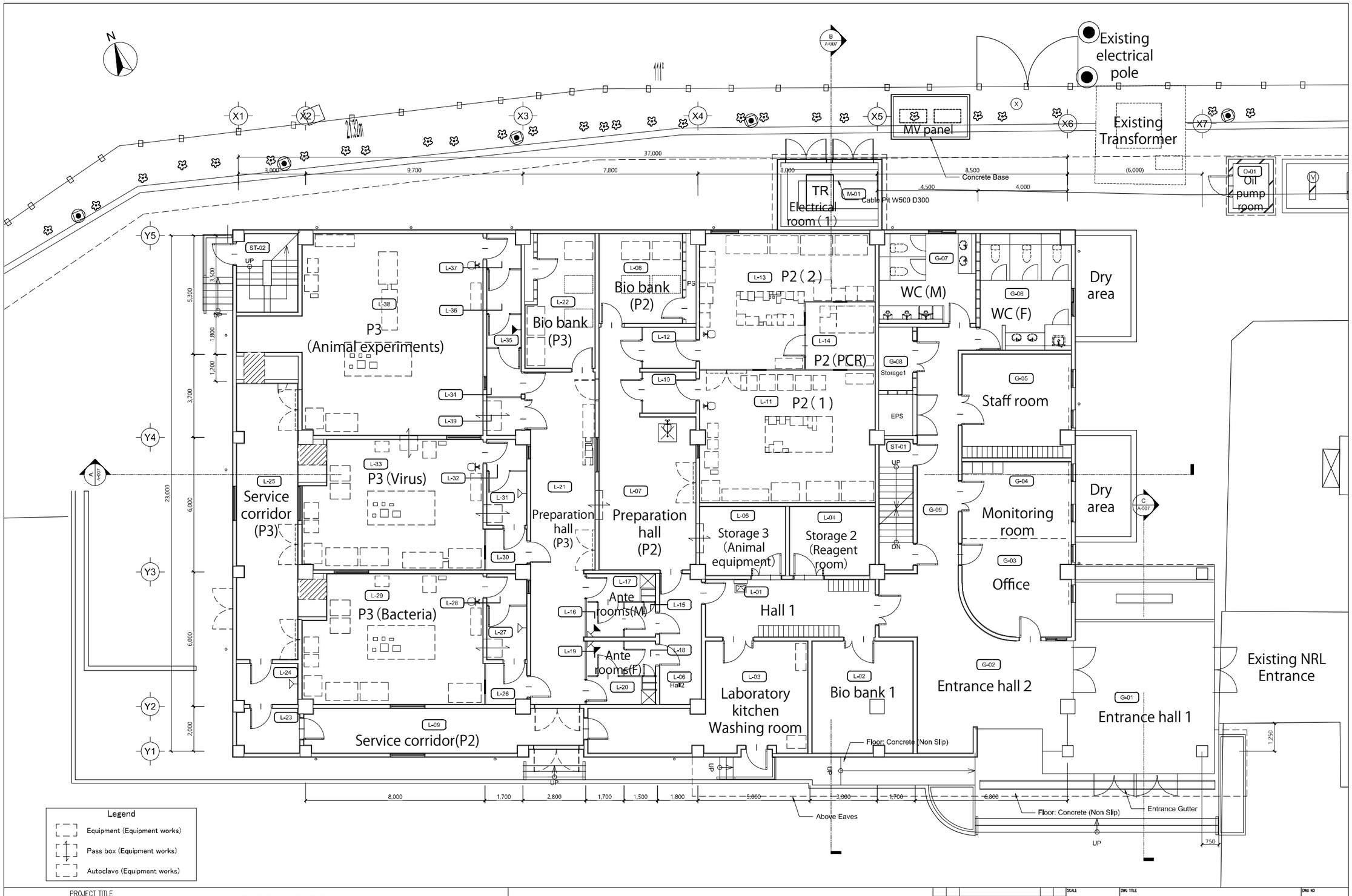
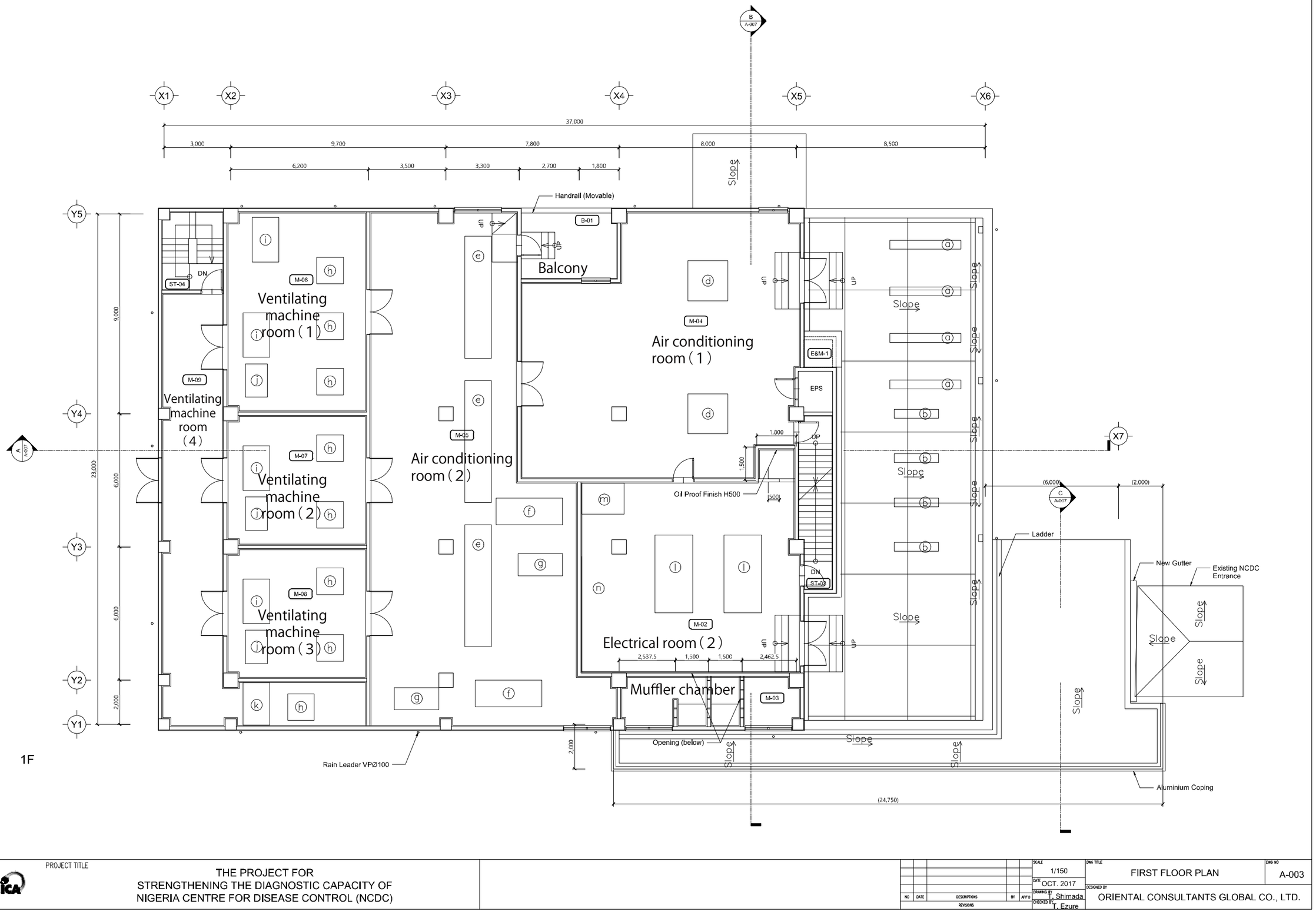


Figure 2-15 Ground floor plan



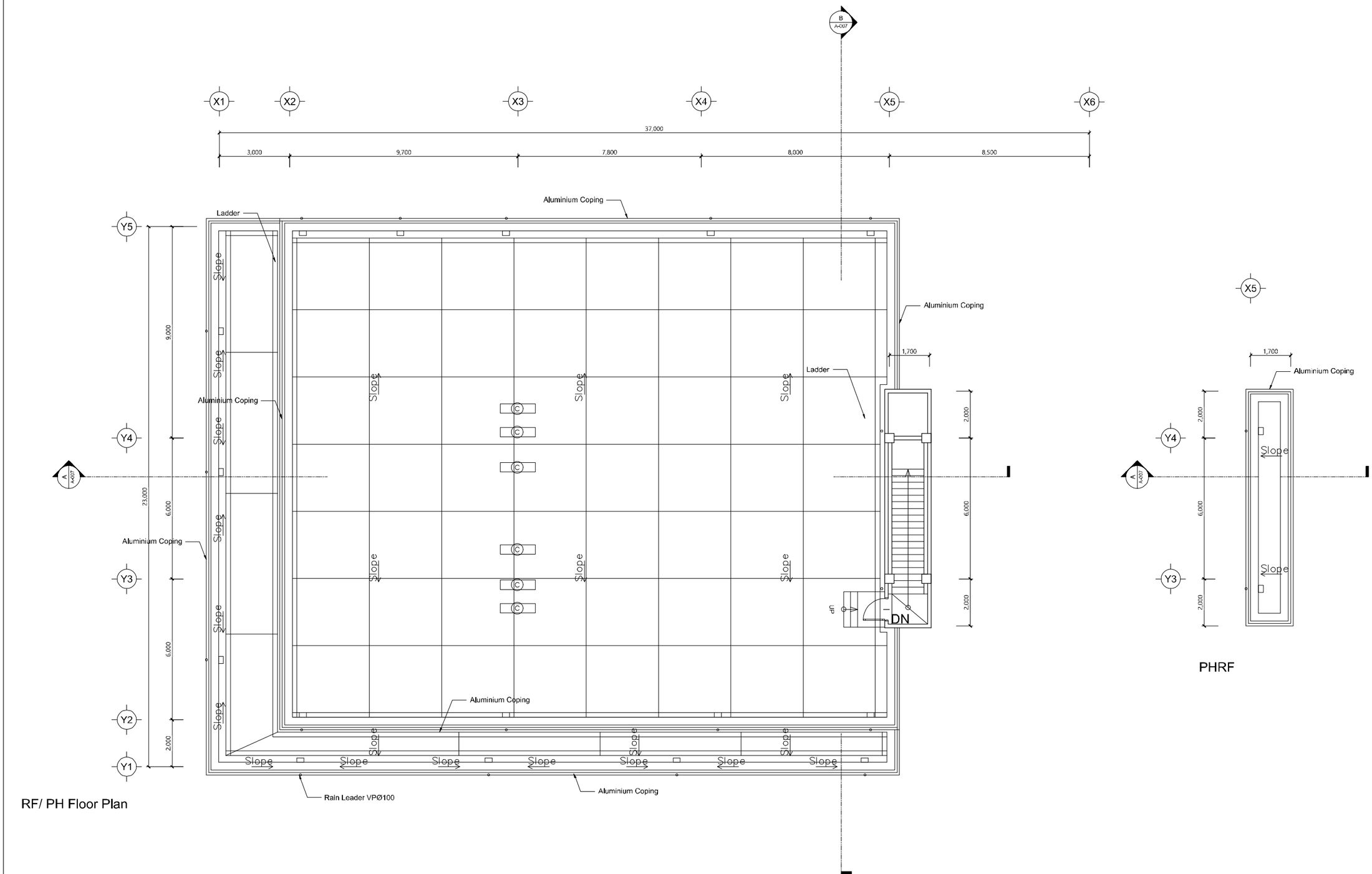
PROJECT TITLE

THE PROJECT FOR
STRENGTHENING THE DIAGNOSTIC CAPACITY OF
NIGERIA CENTRE FOR DISEASE CONTROL (NCDC)

SCALE	DWG TITLE	DWG NO
1/150	FIRST FLOOR PLAN	A-003
DATE: OCT. 2017		
DRAWING BY: T. Shimada	DESIGNED BY: ORIENTAL CONSULTANTS GLOBAL CO., LTD.	
CHECKED BY: T. Ezure		

REVISIONS: NO | DATE | DESCRIPTIONS | BY | APP'D

Figure 2-16 First floor plan

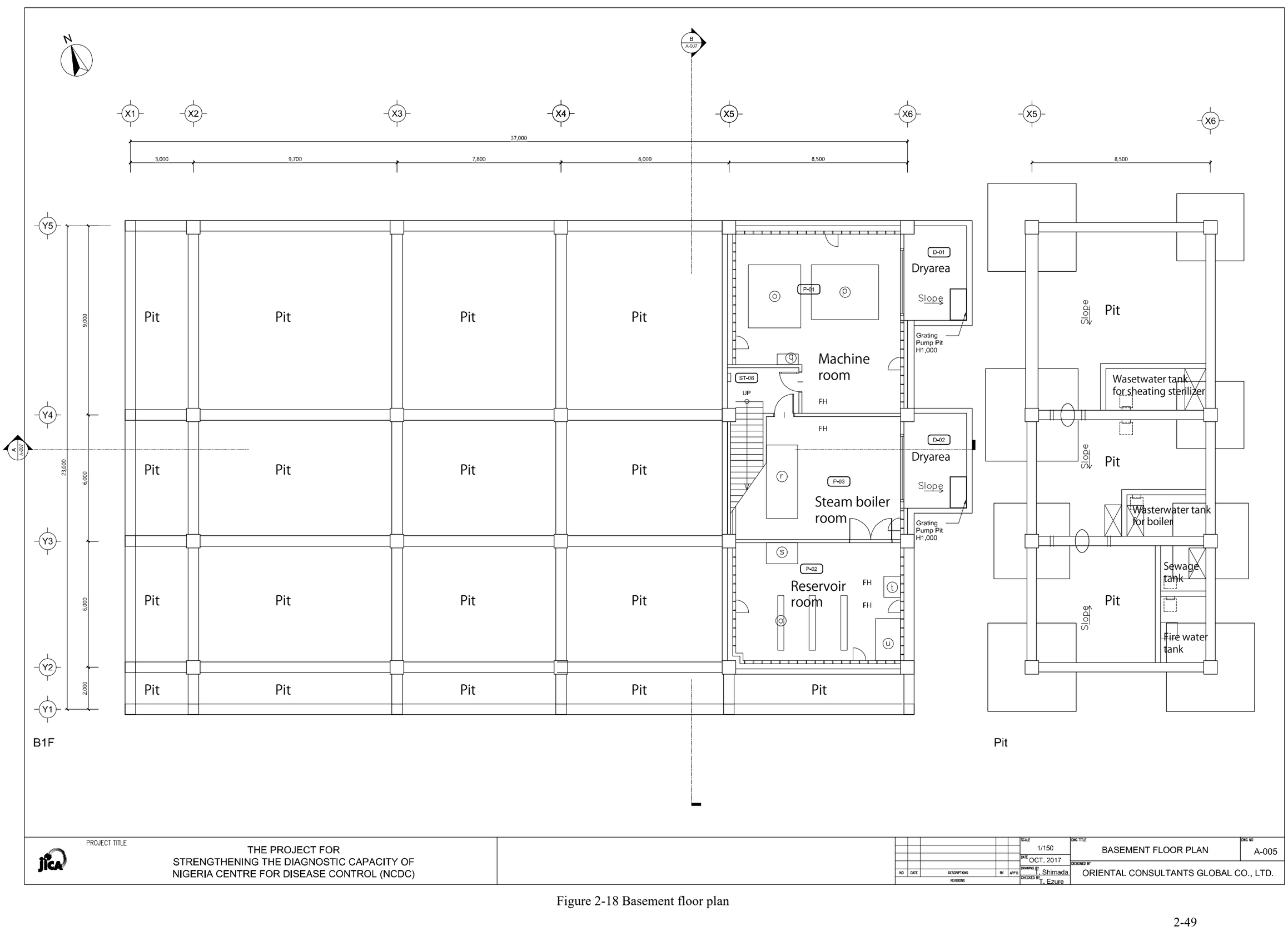


RF/ PH Floor Plan

PHRF

PROJECT TITLE: THE PROJECT FOR STRENGTHENING THE DIAGNOSTIC CAPACITY OF NIGERIA CENTRE FOR DISEASE CONTROL (NCDC)			SCALE: 1/150	DWG TITLE: ROOF FLOOR PLAN	DWG NO: A-004
			DATE: OCT. 2017		
			DRAWING BY: Y. Shimada	DESIGNED BY: ORIENTAL CONSULTANTS GLOBAL CO., LTD.	
			CHECKED BY: T. Ezure		
NO	DATE	DESCRIPTIONS	BY	APP'D	REVISIONS

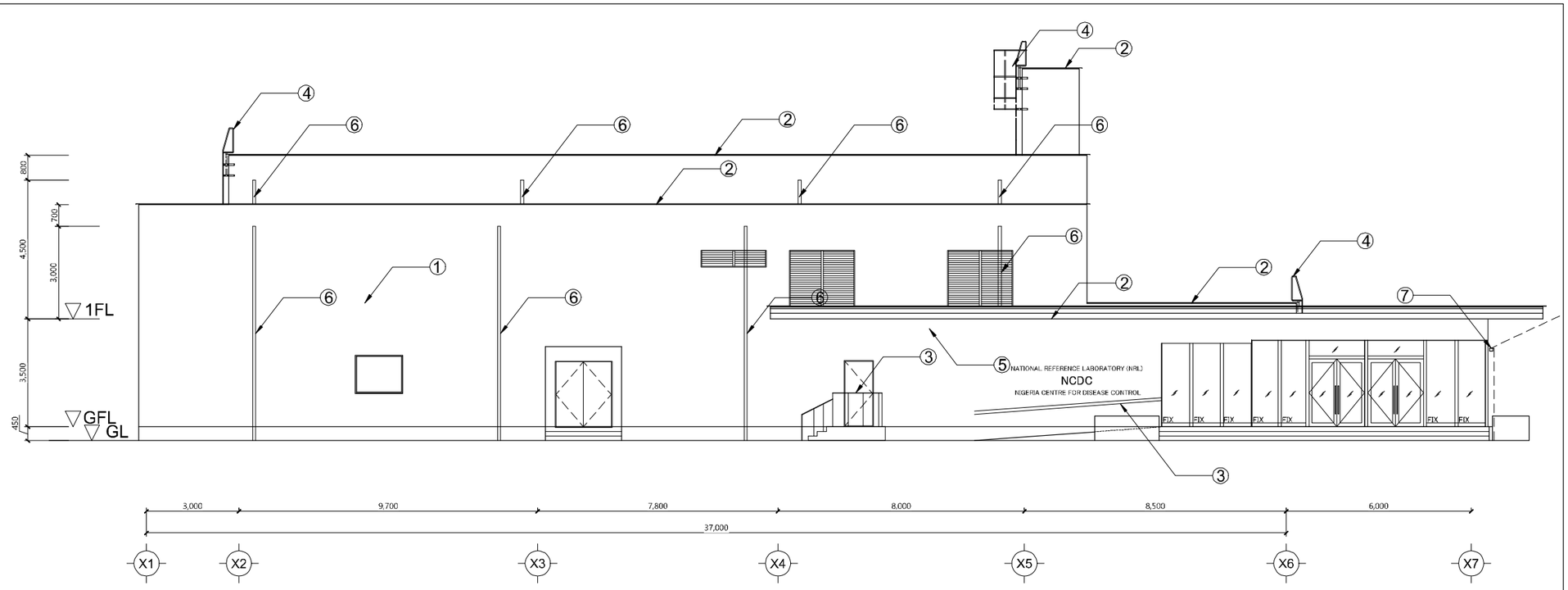
Figure 2-17 Roof floor plan



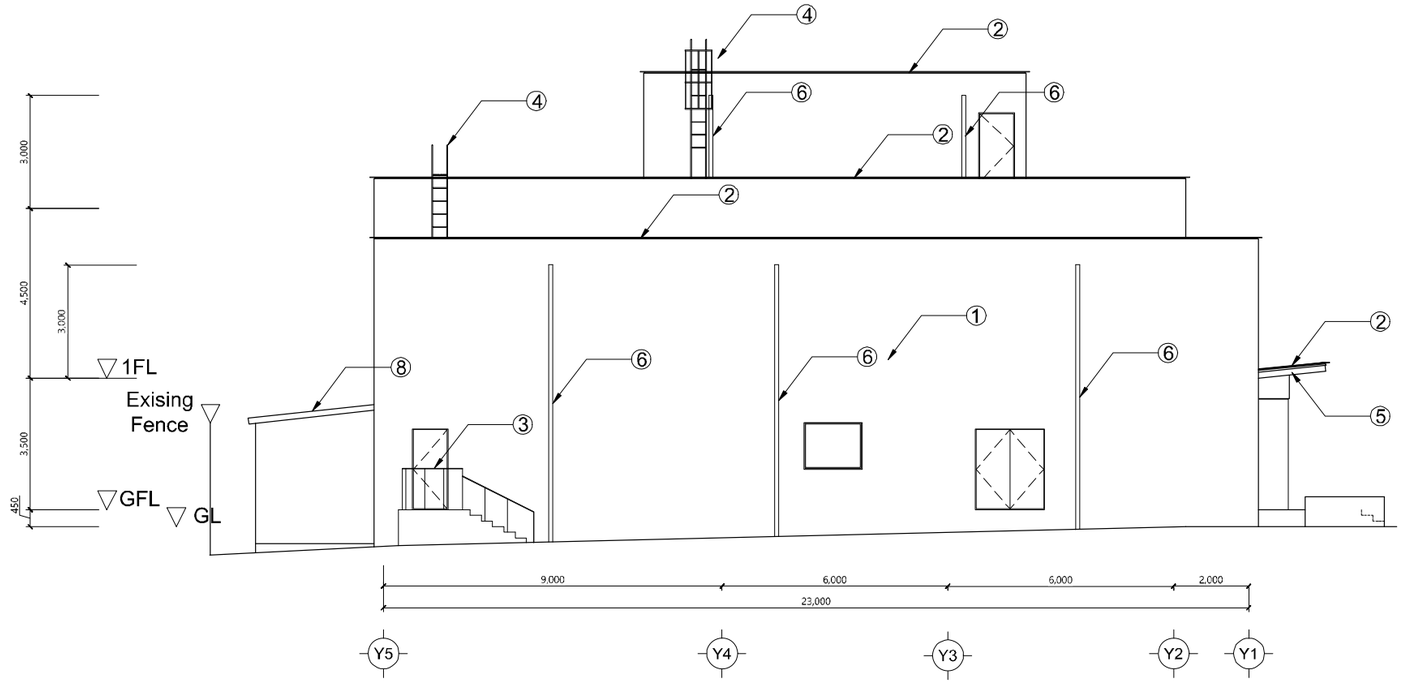
PROJECT TITLE: THE PROJECT FOR STRENGTHENING THE DIAGNOSTIC CAPACITY OF NIGERIA CENTRE FOR DISEASE CONTROL (NCDC)			SCALE: 1/150	DWG TITLE: BASEMENT FLOOR PLAN	DWG NO: A-005
			DATE: OCT. 2017		
	NO	DATE	DESCRIPTIONS	BY	APP'D
			REVISIONS	DRAWING BY: T. Shimada	DESIGNED BY: ORIENTAL CONSULTANTS GLOBAL CO., LTD.
				CHECKED BY: T. Ezure	

Figure 2-18 Basement floor plan

No.	Material/Finish
①	Polyurethane resin coating
②	Readymade aluminium coping
③	Handrail: Steel FB w/SOP
④	Ladder: Stainless steel 304 HL
⑤	Eaves: Concrete w/ Urethane waterproofing t3.0
⑥	Down spout PVC φ100
⑦	New gutter
⑧	Slope roof: Rubber asphalt water proofing t2.0
⑨	



South elevation

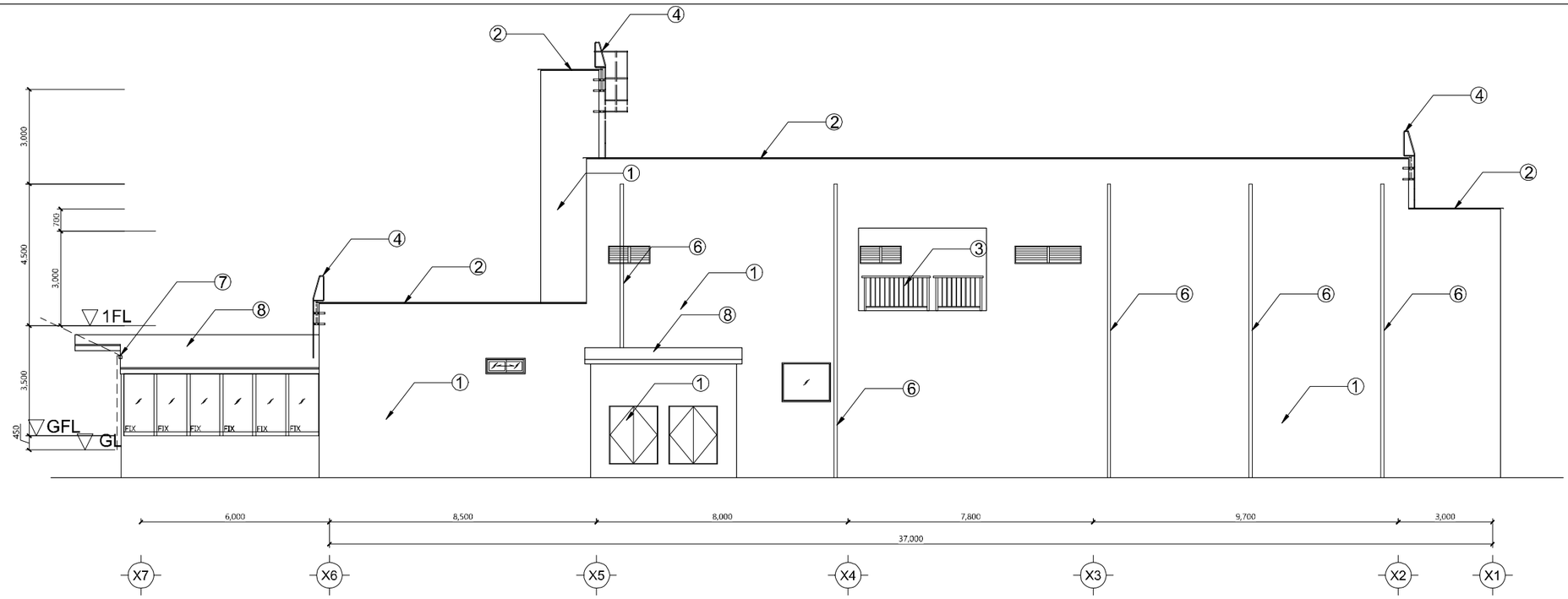


West elevation

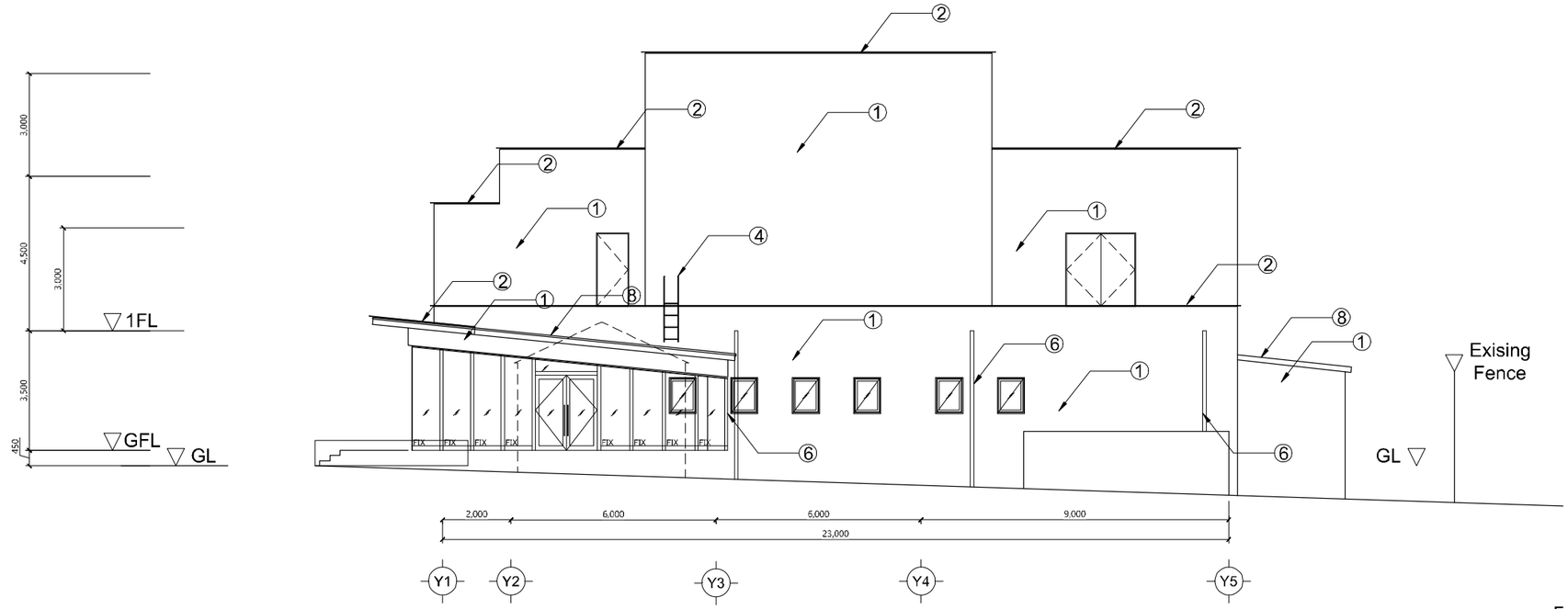
PROJECT TITLE: THE PROJECT FOR STRENGTHENING THE DIAGNOSTIC CAPACITY OF NIGERIA CENTRE FOR DISEASE CONTROL (NCDC)				SCALE: 1/150	DWG TITLE: ELEVATION (1)	DWG NO: A-006
				DATE: OCT. 2017	DESIGNED BY: ORIENTAL CONSULTANTS GLOBAL CO., LTD.	
				DRAWING BY: T. Shimada		
NO	DATE	DESCRIPTIONS	BY APP'D	CHECKED BY: T. Ezure		
		REVISIONS				

Figure 2-19 Elevation (1)

No.	Material/Finish
①	Polyurethane resin coating
②	Readymade aluminium coping
③	Handrail: Steel FB w/SOP
④	Ladder: Stainless steel 304 HL
⑤	Eaves: Concrete w/ Urethane waterproofing t3.0
⑥	Down spout PVC φ100
⑦	New gutter
⑧	Slope roof: Rubber asphalt water proofing t2.0
⑨	



North elevation



East elevation

PROJECT TITLE

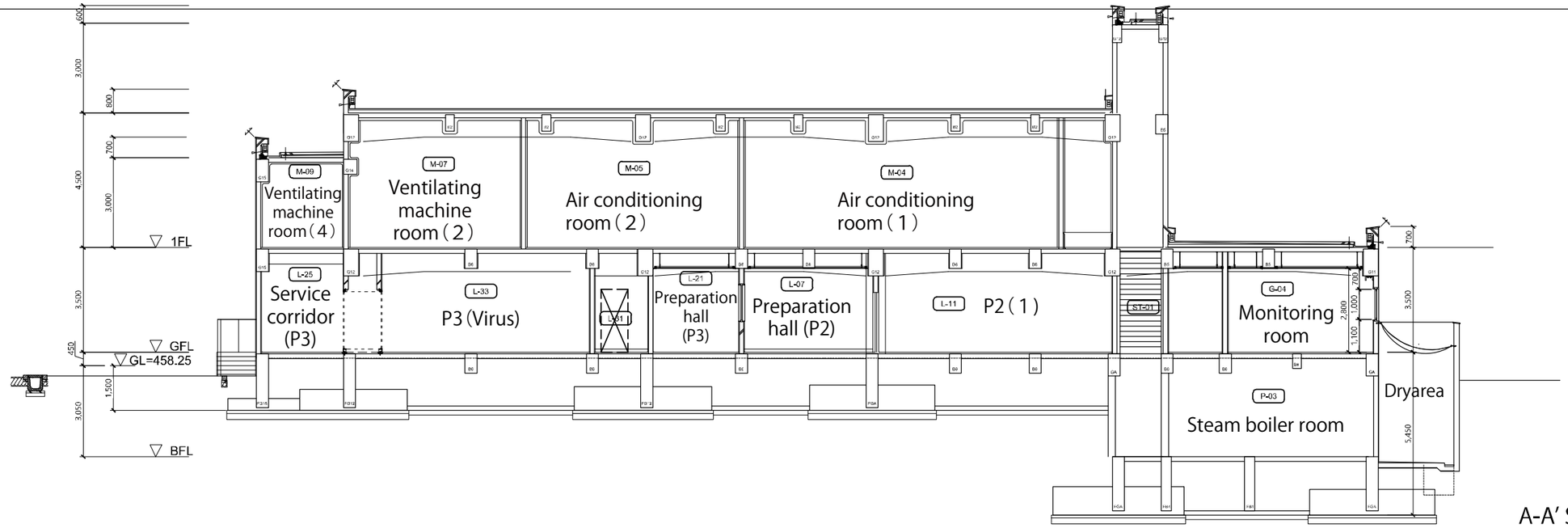
THE PROJECT FOR
STRENGTHENING THE DIAGNOSTIC CAPACITY OF
NIGERIA CENTRE FOR DISEASE CONTROL (NCDC)

NO	DATE	DESCRIPTIONS	BY	APP'D
		REVISIONS		

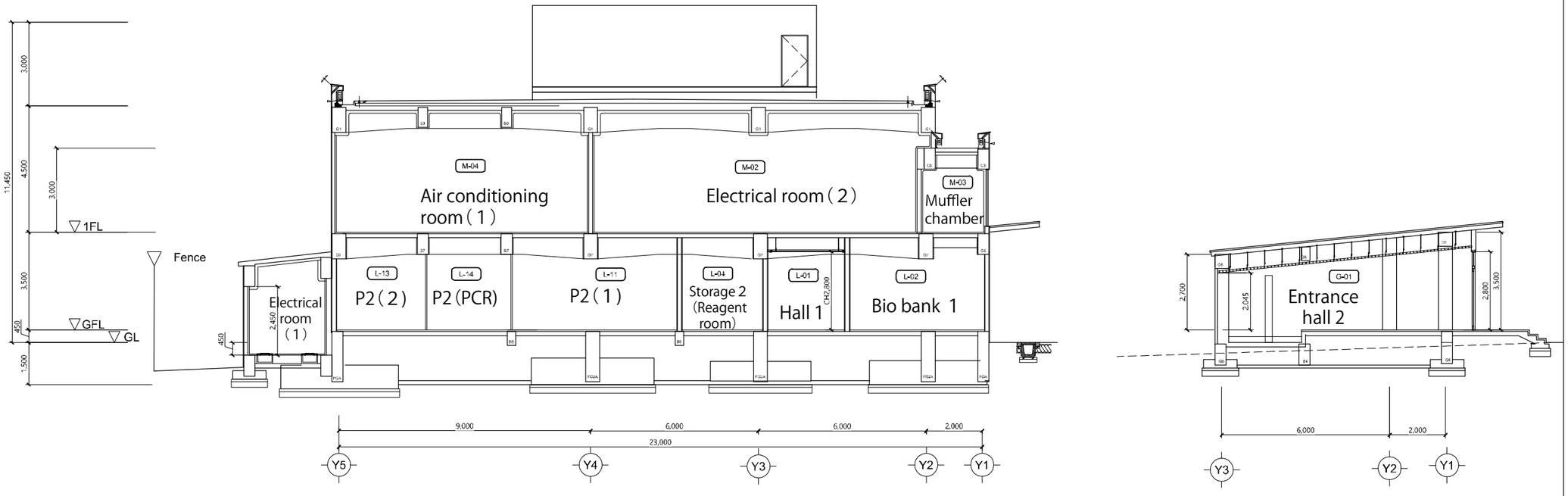
SCALE 1/150
DATE OCT. 2017
DRAWING BY T. Shimada
CHECKED BY T. Ezure

DWG TITLE ELEVATION (2)
DWG NO A-007
DESIGNED BY ORIENTAL CONSULTANTS GLOBAL CO., LTD.

Figure 2-20 Elevation (2)



A-A′ Section



B-B′ Section

C-C′ Section

PROJECT TITLE: THE PROJECT FOR STRENGTHENING THE DIAGNOSTIC CAPACITY OF NIGERIA CENTRE FOR DISEASE CONTROL (NCDC)			SCALE: 1/150	DWG TITLE: SECTION	DWG NO: A-008
			DATE: OCT. 2017		
			DRAWING BY: T. Shimada	DESIGNED BY: ORIENTAL CONSULTANTS GLOBAL CO., LTD.	
			CHECKED BY: T. Ezure		
NO.	DATE	DESCRIPTIONS / REVISIONS	BY	APP'D	

Figure 2-21 Section

2-2-4 Implementation Plan

2-2-4-1 Implementation Policy

(1) General

1) The Exchange of Notes (E/N) for the Grant Aid Project shall be concluded between the Government of Japan and the Government of Nigeria after the cabinet meeting and decision by the Government of Japan.

2) With the signing of E/N, Grant Agreement (G/A) shall be entered into between JICA and the recipient country. On the basis of the G/A, JICA will make payments to the recipient country as the Project progresses.

3) The signing of E/N and G/A will mark Japan's official commitment to provide the aid in question and its practical implementation.

4) Following conclusion of G/A, consultants of Japanese nationality and the government of Nigeria will conclude an execution design and supervision contract, and immediately start detailed design work.

(2) Detailed Design Stage

1) For the Detailed Design, full details of facilities and equipment in the Outline Design should be carefully confirmed and discussed with the implementing agency.

2) The consultant shall discuss the technical issues through meetings with the relevant authorities in Japan and Nigeria during the detailed design stage.

3) The design period will require approximately 3 months.

(3) Tender

1) Tendering will follow the JICA tendering guidelines.

2) There are three possible methods for the tender, (a) a Japanese construction company for facility construction and equipment, (b) a stand-alone method dividing facilities and equipment or (c) a consortium between Japanese construction companies and trading companies that combines facility construction, the evaluation is carried out after a careful verification of the peculiarities of the Project.

3) The party executing the tender will be the implementing agency, but it is necessary for consultants to cooperate sufficiently while taking instructions from JICA.

(4) Construction

1) According to the result of the Preparatory Survey in Nigeria, local building materials which are acceptable in quality and quantity should be used for the Project as much as possible. Ensuring and maintaining quality are the most important items to be noted.

2) For the planning of labour supply, the quality level of locally organized skilled and semi-skilled workers will be taken into consideration. It is important that a Japanese contractor is the prime contractor, the contractor will supervise and manage the local contractor and his labourers to maintain the quality assurance required for the Project.

(5) Implementation Organization (Project Implementation Agent)

The organization responsible for the Project is the Federal Ministry of Health (FMOH) and the implementation organization is NCDC. The following diagram shows the relationship between the implementation organization, the Japanese consultant and contractor.

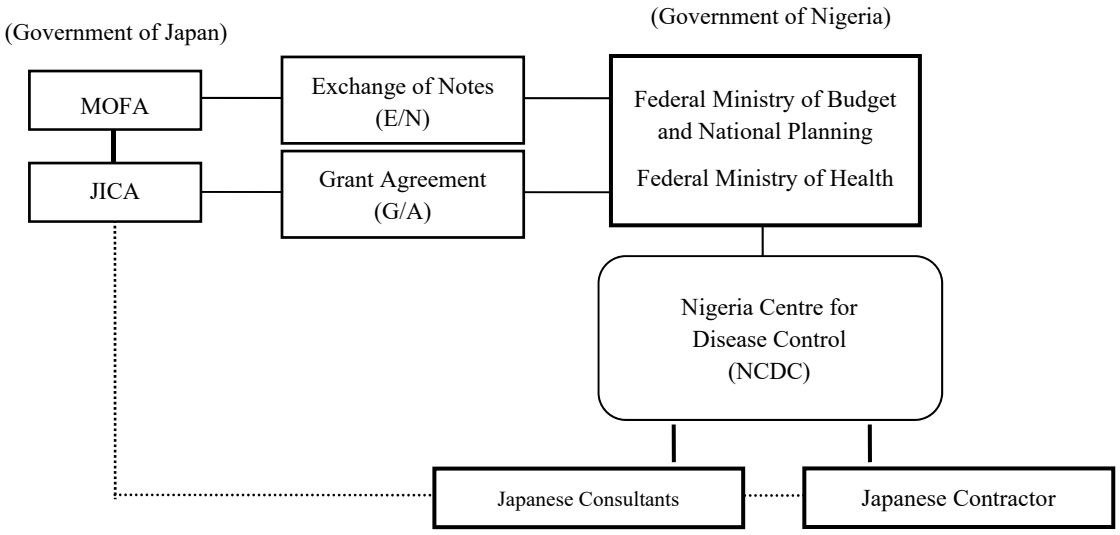


Figure 2-22 Implementation Organization

2-2-4-2 Implementation Conditions

(1) The rainy season in Abuja is between May and October, however between July and September rainfall intensity is usually very high. Hence it is necessary to formulate a construction plan with sufficient consideration for the rainy season.

(2) The standards and laws concerning construction are based on Nigerian standards (NBCN: National Building Code of Nigeria) and Japanese standards, and in some cases BS, ASTM, etc. standards shall be applied after considering local circumstances.

(3) Detailed coordination and adjustment shall be necessary for the contractors to schedule construction works, installation of laboratory equipment.

(4) Since the construction works is implemented inside the compound of NRL, the following consideration shall be taken for the surrounding environment.

a) Construction methods that minimize the negative impacts on the existing facility shall be adopted. The construction plan shall be formulated to prevent construction pollutions such as noise, accidents etc. during the construction period.

b) It is important to establish a HSE (Health, Safety and Environment) plan in order to ensure the safety of life and property, to ensure traffic control of construction vehicles as well as pedestrians, and for preventing existing roads and surrounding area from damages.

c) The safety plan shall be formulated for the proper storage of construction materials, machinery and equipment, the placement of temporary buildings etc. to prevent NRL from interruptions in operating the existing facility.

(5) Value Added Tax (VAT), customs duty and other taxes, which are imposed in Nigeria for those materials and equipment procured for the purpose of the Project, shall be subject to tax exemption. It is understood that Import tax, VAT (5%), Income Tax (CIT: 10% in general rate), Personal Income Tax (PIT: 24% in maximum rate) including withholding tax shall be exempted for the Project.

2-2-4-3 Scope of Works/ Division of Procurement and Installation

The responsibilities of the Japanese side and the Nigerian side for the implementation of Japan's Grant Aid Project are shown in the Table 2-23.

Table 2-23 Division of works between the Japanese Government and the recipient country for Grant Aid Project

Japanese side	Nigeria side
(1) Building works Structure works, finishing works, parking etc. (2) Electrical works Wiring work from the arrival panel in the electrical room (including the arrival panel), lightning protection equipment, lighting / socket, communication equipment (3) Plumbing works a) Water supply works Water equipment works b) Drainage works Penetration in site and drain outside the premises c) Water treatment facility d) Water reservoir e) Fire hydrant etc. (4) External works in Project site Driveway (5) Equipment works a) Equipment procurement b) Maritime and domestic transport in Nigeria c) Delivery and installation of equipment d) Trial test and explanation of the instructions for use	(1) Site preparation a) Ground-preparation works: Demolition of trees(16), street lights(15) Removal of generators(2) b) The temporary electricity supply and water for construction works (2) Basic works a) Water supply Installation and preparation of the water supply pipe from the city water system to the connection point at the boundary of the site b) Electrical power installation works Installation and preparation of the electrical power supply from the commercial power network to the connection point at the boundary of the site c) Telephone and network works Installation and preparation of the telephone and telecommunication line from the city network to the connection point at the boundary of the site (3) Other formalities Formalities for land ownership, Formalities for changing land use, Formalities for applying for a building permit, formalities relating to social and environmental

(6) Compliance with the environmental management plan stipulated by Nigeria (7) Technical guidance on special facility and equipment for P2 and P3 laboratory (8) Basic technical assistance for maintenance of facility, utility and equipment(including initial operation training)	considerations, formalities for requesting the connection of facilities, formalities and exemption from customs clearance of materials and equipment for the construction of installations, etc. (4) Budget required for the maintenance, management and operation of new facilities (5) Exemption from customs duties, internal taxes, and other charges for Japanese and third-country nationals involved in the works for the Project (6) Facilities and privileges of Japanese technicians during their entry and leave of Nigeria (7) All works other than those supported by the Japanese side
	(1) Payment to the B/A (Banking Arrangement) and A/P (Authorization to Pay) (2) Tax exemption of equipment import (3) Participation in the explanation of the instructions for use of the equipment (4) Assignment of maintenance staff and participation in technical supervision (5) Issuance of certificate of completion after acceptance of equipment

2-2-4-4 Consultant Supervision

(1) Basic Policy

It is planned that a resident supervisor (who specializes in construction) shall be dispatched to supervise the entire construction in order to thoroughly carry out proper quality control on site upon commencement of construction Works by the contractor. In addition, specialized supervisors shall perform on the spot supervision at appropriate times according to the progress of various stages of construction (framework construction, building facility construction, etc.). The Project manager shall undertake on-site supervision and/or inspections at the specified milestones i.e. at commencement of works, at the completion of concrete works and at the final completion of works.

Table 2-24 Plan of personnel necessary for supervision

Name of supervisor (expertise)	Period (Nigeria)
<Building facility>	
Resident construction supervising engineer	16.0 months
Non-resident supervised engineer	
・Project manager/construction supervised engineer 1 (architecture)	1.43 months
・construction supervised engineer 2 (architecture)	0.57 months
・construction supervised engineer 3 (structure)	0.30 months
・construction supervised engineer 4 (electric/machine)	0.90 months
・construction supervised engineer 5 (HVAC)	1.60 months

Name of supervisor (specialty)	Period (Nigeria)
<Equipment>	
Resident construction supervised engineer	1.97 months
Supply supervised engineer (confirmation, acceptance /delivery)	0.40 months
Inspection engineer (examination / verification of shop drawings)	1.39 months
Inspection engineer (inspections with witness)	0.30 months

(2) Contents of Consultants Assignment

The resident supervisor for construction works shall be mainly in charge of:

a) Inspection, confirmation and coordination on site of work progress on construction works and equipment procurement and installation.

b) Review and approval of construction documents such as relevant construction plans, construction drawings and the like.

Headquarters in Tokyo shall be responsible for:

a) Monitoring and supporting the on-site supervision.

b) Reporting the progress of construction works to JICA headquarters.

c) Attending the factory/product inspection, pre-shipment inspection etc. in Japan.

The resident supervisor for procurement of equipment shall be in charge of:

a) Receive and cooperate with official inspectors on-site

b) Inspection, confirmation, coordination on site on the progress of installation works on equipment procured by trading companies.

(3) Issuance of Certificates

The certificates on import of construction materials and equipment, the payment for construction, practical completion and final completion, etc., are issued.

(4) Submission of Reports, etc.

Checking and approving monthly progress reports, completion documents and photos of works from the contractor and submitting to the Government of Nigeria and JICA. After completion, the completion report shall be prepared and submitted to JICA in accordance with the Grant Aid guidelines.

(5) Others

Monitoring and expediting the schedule of works to achieve smooth operation of related works executed by the Government of Nigeria, shall be done as necessary.

2-2-4-5 Quality Control Plan

(1) Basic policy

The Detailed Design drawings shall be developed based on the studies analyzed from actual circumstances in Nigeria, maintenance cost, use of local materials and local construction methods. The specification should comply with the Nigerian construction standards, Japanese Regulations such as Japanese Architectural Standard Specification (JASS), National Building Code of Nigeria (NBCN), British Standards (BS) and American Society for Testing and Materials (ASTM) to ensure the quality of buildings, utilities and equipment.

The construction plan, implementation schedule and shop-drawings which are to be submitted by the contractor during the construction period shall be examined and approved by the consultant.

(2) Quality Examination (Building Construction)

The Consultant shall examine the implementation plan submitted by the Contractor prior to the commencement of each stage of the works, and approve it if the construction materials and the execution methods conform to the Specification. The Consultant should inspect necessary portions of work based on the implementation plan and Specifications. The key supervisory items will be determined on the basis of the implementation plan, and inspections will be carried out properly.

In this Project many materials can be purchased locally, besides the manufacturers' warranty on the products. Unannounced quality assurance inspections shall be carried out to assure quality.

1) Earthwork

The work plans and schedule shall be developed based on the open cut method for excavating the basement floor and foundation, considering the groundwater level and rainy season. It is important to pay attention to the disposal of the excavated soil and the quality of the borrowed materials.

2) Reinforcing Bar Work

The Mill-Sheet and so on, showing re-bar content submitted by the Contractor should be confirmed by the Consultant. Also bar quality and strength should be inspected to match yield strength in the specification.

3) Concrete Work

It is planned to use the ready mixed concrete which is available in Abuja city. The main items for the supervision works (items to be inspected, method of inspection) are as follows:

a. Items to be inspected for concrete material

Material	Item to be inspected	Method of inspection
Cement	Hydration Heat	Dissolution Heat
Sand/ Gravel/ Crushed Stone	Grading	Sieve analysis
	Absolute dry specific gravity	Specific gravity & ratio of water absorption
	Alkali aggregate reaction	Alkali aggregate reaction test
Water	Organic impurities	Quality test of water

b. Items to be inspected for the mixing test

Item to be inspected	Method of inspection
Estimate test for structural concrete	Compression test machine
Slump	Slump cone
Concrete humidity	Hygrometer
Air content	Manometer
Chloride volume	Measuring instrument for salt

c. Items to be inspected for the concrete placing

Item to be inspected	Method of inspection
Time from mixing to completion of concrete placing	Check time of completion of concrete placing (one hr. or less)
Slump	Slump cone
Concrete humidity	Hygrometer
Air content	Manometer
Chloride volume	Measuring instrument for salt

d. Items to be inspected in the progress schedule

Item to be inspected	Method of inspection
Estimate test for structural concrete	Compression test machine
Accuracy for the openings of door & windows	Measurement
Accuracy for horizontal level of concrete slab	Spirit level & measurement
Status of Finishing	Visual inspection

(3) Quality Inspection (Equipment)

During the equipment procurement and installation supervision, the most appropriate work plan shall be established through coordination of work schedule, work contents and placement plan etc. with Nigerian side and Procurement Company. After establishing procurement equipment, smooth progress of the overall operation will be implemented in accordance with the construction plan. For procurement and supervision, the following points should be followed:

1) After concluding equipment procurement contract, they shall promptly confirm the content of the procured equipment, the allocation plan, country of manufacture, supplier, utility to building, facility consultant, Nigerian side facility personnel and outsourcing company for procurement.

2) Under the supervision of a consultant, the equipment procurement contractor conducts inspection for custom-made equipment at the manufacturer's factory and pre-shipment inspection prior to the export packaging.

3) For the equipment shipping from Japan, consign to third-party institution and conduct pre-shipment equipment verification inspection under the supervision of consultant.

4) On the installation work of the equipment procurement contractor, a person in charge of supervision from consultant will be dispatched to witness the work on site and make necessary coordination with facility side based on the arrangement plan.

5) In the final delivery inspection, confirm the number of contracted equipment, any discrepancy, required specification and function, implementation of operation training etc. and carry out delivery work.

2-2-4-6 Procurement Plan

(1) Prcurement Plan

The main building materials and equipment needed for the construction work are available and can be supplied in Nigeria. However, since a large part of the structures and finishing materials will be imported from neighbouring countries through distributors in Abuja, it will be necessary to ensure homogeneity and quality.

For concrete, ready-mix concrete available from power plants in the city of Abuja will be used.

Locally manufactured products such as tiles as interior and exterior coating materials, paint, aluminium products, lighting fixtures for installation work, switches, ceiling fans, electrical wires, cables, conduit material, plumbing fixtures, pumps, water tank, distribution board, including imported products, are widely available in the market, but it will be necessary to ensure the homogeneity and quality of the products.

Roofing waterproof materials, aluminium coping, windows, doors, finishing materials (polyvinyl chloride (PVC) floor sheet and steel panel), pass box, plaque, air conditioning units, the air filtering unit and evacuation filter (integrated HEPA), variable air volume unit, air distribution vents, automatic control devices, water treatment system, pumps, emergency shower enclosure, materials used in the finishing of pipelines such as steel pipes coated with PVC and stainless steel pipes necessary for installation work, are planned to be supplied from Japan.

Also, the equipment will be basically procured from Japan or Nigeria. However, there is a possibility that a competitive and fair bidding will not be established by procuring the equipment limited to Japanese product. Therefore, the procurement from third countries will be considered for cases below.

1) Equipment which is not produced, or whose manufacturer is limited in Japan.
   Biosafety cabinet, Glovebox, Ultrapure water system, and some of analytical equipment.

2) Equipment which is generally procured locally in Nigeria.
   Domestic refrigerator, Microwave etc.

The procurement countries of major items are shown in the Table 2-25 and Table 2-26.

Table 2-25 Procurement country of major construction materials

Name of material	Procurement country			Remarks
	Local	Japan	Third country	
[Materials] Portland Cement	○			
Sand	○			
Gravel	○			
Re-bar	○			
Form	○			
Concrete Blocks	○			
Timber	○			
Metal Fittings	○	○		
Steel Panel		○		For laboratory

Aluminium fittings	○	○		Airtight fittings for laboratory
Glass	○	○		Airtight fittings for laboratory
Paint	○	○		
Waterproof material		○		
Distribution Panel	○			
Wire, Cable	○			
Wiring Devices (Switch, Outlets)	○			
Conduit Pipe	○			
Lighting Fixtures	○			
Air Conditioning Units (Split Type)		○		
Ventilating Fans		○		
Water reserving tank		○		
Sanitary Fixtures	○	○		
Pipe (uPVC, SGP)	○	○		Stainless pipes are supplied in Japan
Valve	○	○		Valves and metal fittings for infectious waste water are supplied in Japan
Well water treatment equipment		○		
Supply fan unit		○		
Emergency shower unit		○		
Chemical faucet		○		
Generator	○			
Construction Machinery	○			
Furniture	○			

Table 2-26 Procurement country of major equipment

Name of material	Procurement country			Remarks
	Local	Japan	Third country	
Aerosol photometer Autoclave, double door, Biosafety cabinet Centrifuge, high speed Deep freezer ELISA set Formaldehyde fumigation set Gel documentation system Glove box Caging system Microscope Microvolume spectrophotometer Real-time PCR Spectrophotometer Thermal cycler, Ultrapure water system Working bench		○	○	DAC member countries To conduct appropriate competitive bidding..

2-2-4-7 Initial handling training and operational training

Initial handling, training and operational training will be conducted by the engineer dispatched by the supplier at the time of installation of all planned equipment. The training will include initial handling guidance, special notes on daily checkup, trouble shooting, and regulatory operation maintenance checkup. In order to maintain installed equipment, the contents of daily checkup of pre- and post-operation will be trained appropriately.

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

At present NRL has just two biomedical engineers and one electrician placed in charge of in-house maintenance of the facility and an arrangement for limited maintenance and inspection, which are usually conducted by external resources for those conventional systems and equipment such as emergency power supply facilities, low voltage distribution lines, pumps, etc. In view of the new construction materials and specialized equipment to be installed in the new building facility, it becomes necessary that NCDC obtain specialized technical knowledge and experience required for proper operation and maintenance of P2 and P3 laboratory.

Soft-component program shall be required to support NCDC in acquiring basic knowledge and skills necessary for operation and maintenance with regard to the air conditioning and ventilation system, the infectious discharge treatment system and the laboratory equipment specialized for P2 and P3 laboratory, which require advanced maintenance in particular.

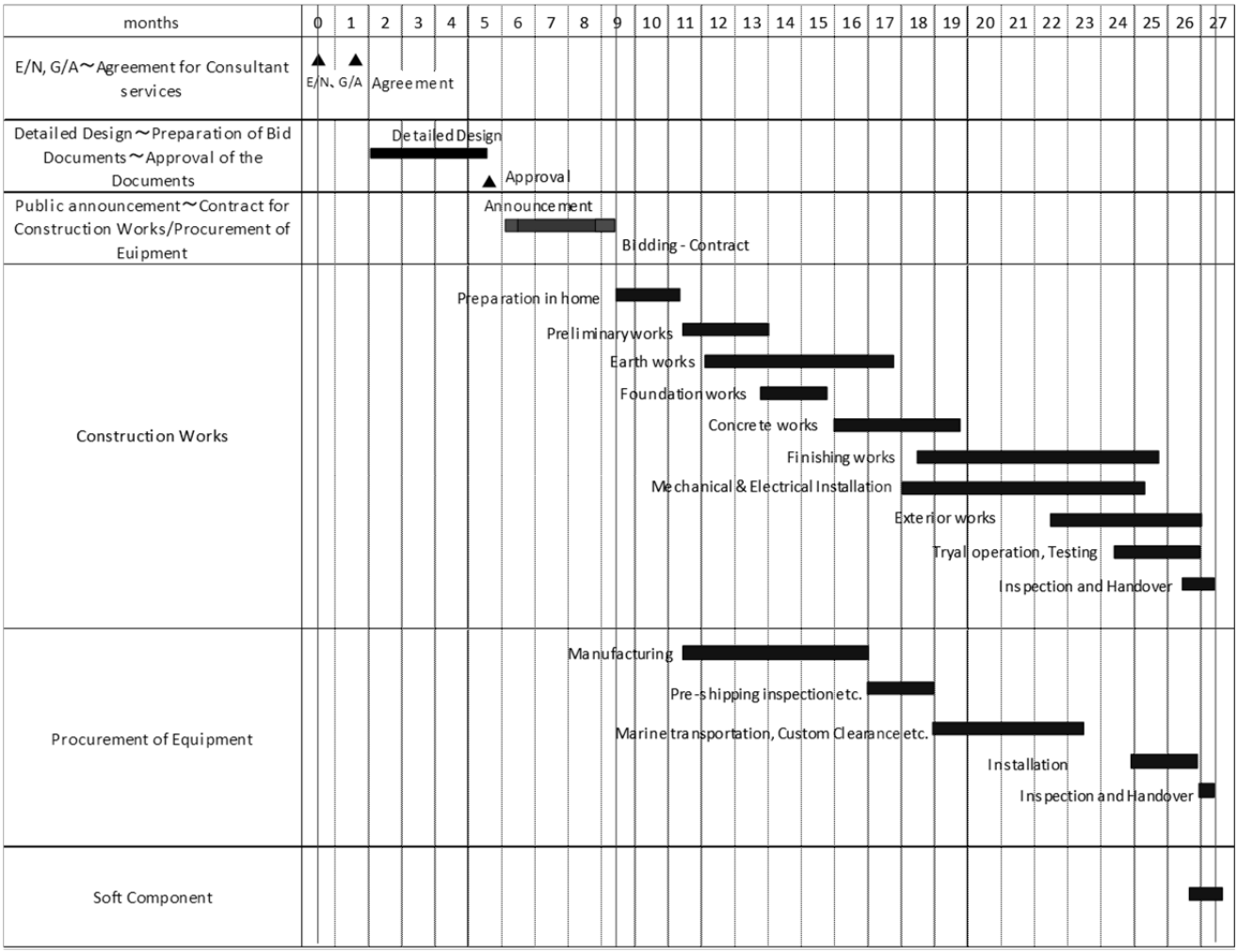
The following 3 experts shall be dispatched for implementing the proposed activities of soft component.

1） 1 Engineer for the air conditioning and ventilation system
2） 1 Engineer for the special laboratory equipment
3） 1 engineer for the infectious discharge treatment system

2-2-4-9 Implementation Schedule

The tentative implementation schedule for the Project is expected as shown in the Table 2-27.

Table 2-27 Tentative General Project Schedule



2-3 Obligations of Recipient Country

2-3-1 Responsibilities of Recipient Country

In case the Project is implemented, the Nigerian side will carry out the following scope of works and it has been confirmed that the Nigerian side agree to execute their scope of works during the Preparatory Survey.

(1) Tax Exemption

The Nigerian side shall secure a quick tax exemption of materials, equipment purchased for the Project under the grant aid as well as facilitation of customs clearance and domestic inland transport.

Based on the verified contract, the Nigerian side shall undertake tax exemption on customs duties, domestic taxes with regard to materials and services to be procured in Nigeria, and other fiscal surcharge imposed to Japanese nationals who reside in Nigeria to engage in the Project.

(2) Giving Facilities

Based on the verified contract, assistance with regards to entry and safety during their stay will be provided by the Nigerian side to the Japanese nationals who will be involved in this Project.

(3) Social and Environmental Considerations

Based on the JICA Environmental and Social Consideration Guidelines (April 2010), the Nigerian side shall undertake the appropriate environmental and social considerations during Project implementation and after Project completion, conduct necessary procedures for environmental impact assessment to acquire relevant licenses and approvals.

2-3-2 Portions by Recipient Country

The portions by the Nigerian side is shown in the Table 2-23. The major items are noted as follows:

(1) Before Implementation of the Project

1) Clearing the Site, such as demolishing and removing equipment, trees and roots, street lights and etc., of the Site shall be completed before the construction starts.

2) Temporary electric power for construction work and temporary water supply pipes shall be secured.

3) Mandated procedures related to the renewal/modification of land ownership of the Project site (sub-division of the land lot if required) and the change of land use of the same shall be completed and approved.

4) Mandated procedures related to the building permit shall be completed and related license and approval shall be acquired. The relevant license and approval due the existing NRL facility shall be also obtained when required incidentally.

5) Mandated procedures related to the environmental impact assessment shall be completed and related license and approval shall be obtained. The relevant license and approval due the existing NRL facility shall be obtained when required.

6) Utility services such as water supply, electric power, communication etc. necessary for implementation of the Project shall be provided to the Project site.

(2) During Implementation of the Project

1) Permits and licenses, etc., necessary for the implementation of the Project shall be issued without delay.

2) Necessary environmental monitoring activities etc. shall be carried out according to the contents of environment-related license and approval.

3) General furniture, curtains and carpets, etc. for the new building facility shall be purchased and furnished if necessary.

4) Access control and security check for existing facilities in the Project site shall be undertaken.

(3) After Implementation of the Project

1) Necessary environmental monitoring activities etc. shall be carried out according to the contents of environment-related license and approval.

2) Implementation organization for the operation and maintenance of the facility and equipment shall be secured.

3) Budget of expenses for the operation and maintenance of the new building facility and equipment shall be allocated.

In order to carry out the Project smoothly for the portion allocated to the Nigerian side, sufficient explanation of the contents, schedule, etc., should be given.

The budget for the portion allocated to the Nigerian side should be prepared by NCDC. In order to facilitate the completion of construction in accordance with the schedule, the Nigerian side must complete their scope of works on schedule and coordinate their works with the Japanese side, in order to meet the final completion date. The preparatory survey team has also explained the importance of this. It is necessary for the Japanese side to monitor work progress with regards to this matter.

2-4 Project Operation Plan

2-4-1 Operation Policy

(1) Organization

The main implementing agency of the Project is NCDC. The Figure 2-23 shows an organogram of NCDC. NCDC consists of six departments namely; Public Health Laboratory Services, Prevention & Programs Coordination, Emergency Preparedness & Response, Surveillance & Epidemiology, Finance & Accounts, and Administration & Human Resources, and is led by the CEO (Chief Executive Officer). In addition, administrative divisions (Governance Units) and external technical assistance are organized. According to the 2017 official list provided by NCDC (NCDC NOMINAL ROLL 2017), NCDC has a total of 109 members of staff including those at the CPHL in Lagos.

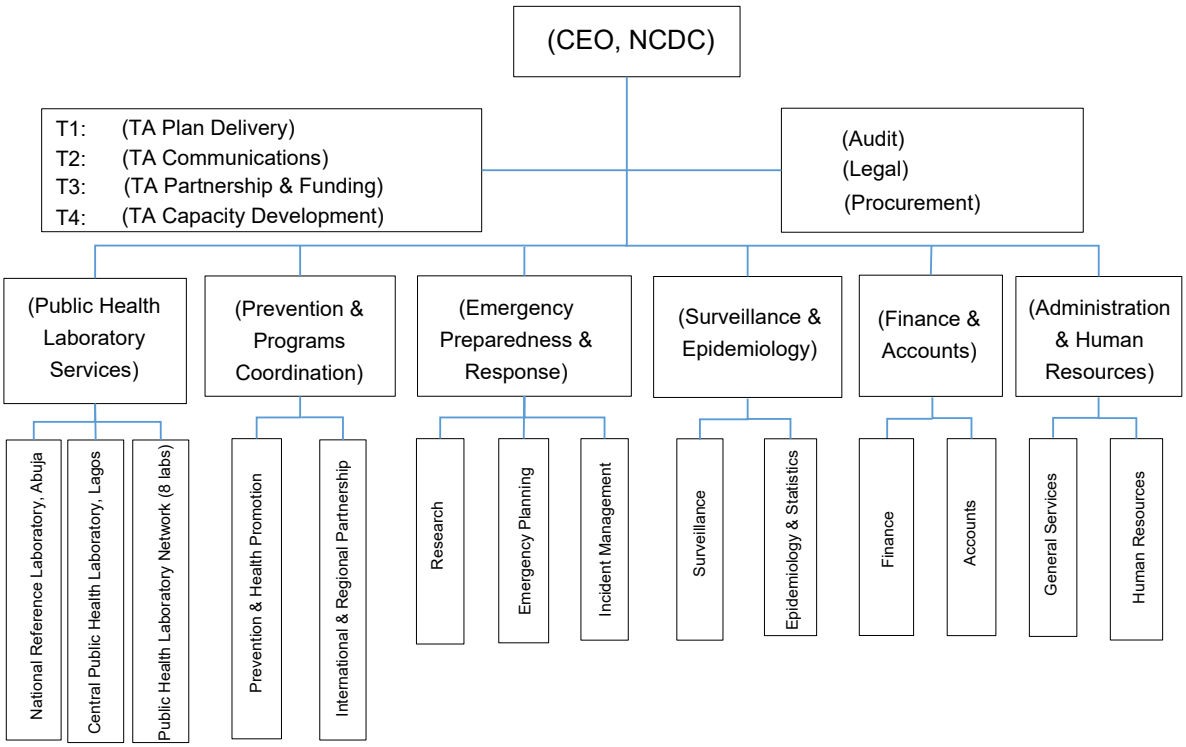


Figure 2-23 NCDC organization

1) Staff Plan

P3 laboratory and facilities supported by the Project would be operated and managed by existing staff as well as new personnel to be employed by NCDC.

As already agreed in the technical note, it is necessary to hire personnel that would take care of operation and maintenance of new equipment/facilities. Additionally, setting an internal committee (or department) to handle the issues related to biosafety for laboratories including BSL-3 should be discussed and considered and whether it is necessary to hire additional personnel.

The table 2-27 shows the number of staff of the department of Public Health Laboratory service (including NRL and CPHL) in NCDC. Currently, CPHL has nearly three times as many laboratory staff as NRL

because the workload at CPHL is much larger than NRL, but there is a possibility that personnel shift from CPHL to NRL will occur after NRL's workload is increased.

Table 2-28 Number of personnel in the Public Health Laboratory Services

Department	NRL/Abuja	CPHL/Lagos
Public Health Laboratory Services	13	33

Sources: JICA Study Team edited on the answer of questionnaire by NCDC

(2) Budget and Financial Resources

The table 2-28 shows managing budget of NCDC from 2015 to 2019. The budget includes contributions from the government as well as from the donors. For three years including 2017, Government budget increased by about 20% compared to the previous year while the contribution from donors decreased to about one-half in 2016. A total budget in 2017 was slightly increased compared to 2015 because the government contribution almost doubled while the contributions from donors decreased by about 35% compared to FY 2016.

FMOH (Federal Ministry of Health) is committed to ensuring continuous financial support for updating and maintaining equipment for laboratory services in "Nigerian Medical Laboratory Strategic Plan (NMLStP) 2015-2019". An increase in government contributions for three consecutive years from 2015 is considered to be a reflection of the commitment.

Regarding the budget since 2018, NCDC is planning to apply the budget which is six to nine times more than that of 2017. There might be considerations to measure changing expenditure items in NCDC (expenditure of personnel expenses has been transferred from FMOH to NCDC since 2017), full operation of NRL after completed relocation, strengthening activities of AMR.

Table 2-29 Budget for operation and maintenance of NCDC

Naira [NGN]

	2015	2016	2017	2018	2019
Revenue	334,306,562	267,092,663	369,008,399	2,908,895,187	1,878,580,976
(1) Governmental budget	114,778,502	158,853,163	298,481,529	2,872,307,187	1,878,580,976
(2) Funds by Donner	219,528,060	108,239,500	70,526.870	36,588,000	under planning
(3) Funds by Research partners	-	-	-	-	under planning
(4) Profit of Medical Treatment	-	-	-	-	under planning
(5) Profit of Lab.tests/Experiments	-	-	-	-	under planning
Expenditures	323,330,102	263,845,477	352,081,948	2,908,895,187	under planning
(1) Staff Salary and Welfare	n/a	n/a	12,457,939	816,000,000	under planning
(2) Operation Costs	211,330,102	107,719,800	54,858,507	752,692,642	under planning
1) office requisites	-	-	-	-	-
2) running costs (laboratory)	208,551,600	104,992,315	53,600,419	727,223,797	-
3) running costs (other)	2,778,502	2,727,485	1,258,088	25,468,845	-
4) maintenance cost (building)	-	-	-	-	-
5) maintenance cost (equipment)	-	-	-	-	-
(3) Other Expenditure	112,000,000	156,125,677	284,765,502	1,340,202,545	under planning
Balance	10,976,460	3,247,186	16,926,451	0	under planning

Sources: JICA Study Team edited on the answer of questionnaire by NCDC

Maintenance and maintenance expenses for facilities and equipment to be supported by the Project are estimated to be about 217.3 million NGN/year. This is about 7.5% of the total revenue for FY 2018 of the budget plan, and thus it is determined that maintenance of facilities and equipment are done properly from the point of view that there is no shortage in the budget. However, it is necessary to pay attention to how the government responds.

2-4-2 Operation and Maintenance of the Building Facility and Equipment

(1) Building Facility

Maintenance and management of building facility and equipment of NCDC is carried out mainly by one electrical engineer assigned to the public health inspection service department of NRL, while utilizing external resources. Since facility equipment and systems requiring special skills are not installed in the existing facility, maintenance and inspection have been conducted on a limited basis based on demand or emergency situation associated with power supply facilities, low voltage distribution lines, pumps, etc.

The establishment of maintenance and management structure is currently underway after NRL commenced the operation recently. Since specialized construction materials and equipment installed in P2 and P3 laboratory of the new building facility, specialized technical knowledge and experience shall be required for operation and maintenance. Therefore, it will be essential that, in addition to engineers in charge of laboratory equipment, a comprehensive facility maintenance team shall be established in the maintenance department consisting of technical experts in construction, air conditioning, electricity, water supply and sanitation, this team shall conduct daily operations and inspections, periodic inspection which will enable them to adequately respond to preventive maintenance for the infection control in BSL-2 and BSL-3 management areas. With regard to the air conditioning and ventilation system in the laboratory and the infectious discharge treatment system, which require advanced maintenance in particular, soft component program shall be organized to support and aid NCDC in the learning of basic knowledge and skills necessary for operation and maintenance.

(2) Equipment

Currently, maintenance of each equipment is carried out by outsourcing. Some equipment has been contracted to the distributor of the equipment and others are entrusted to a certified engineer. This engineer is certified by NSF (National Sanitization Foundation USA) and belonging to NGO which maintain and inspect research/laboratory equipment in Nigeria. P3 laboratory itself can be certified by this certified engineer.

Regarding the special equipment, certification work is also carried out at the same time of periodic inspection. At present, the number of equipment items is small, only outsourcing is enough to cover maintenance work. As the number of equipment increases due to the implementation of this Project, the amount of work for maintenance will increase. NCDC will intend to update and conduct the operation and maintenance plan under the leadership of 2 biomedical engineers who are currently hired by NCDC. Cooperatively, the Japanese side will support these biomedical engineers by assisting them acquire basic knowledge and skills necessary for maintenance through soft-component program.

2-5 Project Cost Estimation

2-5-1 Initial Cost Estimation

2-5-1-1 Costs to be borne by Nigerian side

Items	Cost estimation (NGN: Naira)	Remarks
(1) Cost for site preparation	12,436,304	
1) Site preparation and clearance (removal, replacement etc.)	2,964,454	trees, street lights
2) Water supply main distribution line	4,190,500	
3) Electrical power supply main distribution line	3,567,750	
4) Telecommunication line	1,398,600	
5) Data communication line	315,000	
6) Land use change/Land ownership renewal	0	Free
(2) Building permit	1,510,000	
(3) Social and Environmental Impact Assessment	1,832,000	
(4) General furniture	4,079,524	meeting table, desk & chair, curtain
(5) Banking arrangement fee	4,187,196	
Sub-total (1), (2),(3),(4),(5)	24,045,023	
(6) Tax exemption (reimbursement)		
1) VAT	67,134,271	Estimated costs in local currency x5%
Sub-total (6)	67,134,271	
Total Rate: 1NGN=0.36769yen	91,179,294	33,525 (thousand yen)

2-5-1-2 Condition of Cost Estimation

1) Date of estimation: September, 2017
2) Exchange rate: Average three-month rate from 1st June to 31st August, 2017
   1Naira = 0.36769 Japanese yen
   1US$ = 112.05 Japanese yen
3) Construction Period: 18months (including 2 months domestic preparation period)
4) Other: The Project shall be implemented in compliance with Japanese Grant Aid Scheme.

2-5-2 Operation and Maintenance Cost

(1) Required Cost for New Building Facilities

The running cost (expenses for power and fuel) for the new building is calculated as follows:

1) Electricity Cost

Assumption

Maximum demand	320	kw
Load factor	0.30	

Tariff of electricity charge (Tariff of Abuja Electricity Distribution Company(AEDC) 33KV Office category)

Demand charge	1970	NGN/kw
Unit charge	100	NGN/kwh

Mothly electricity cost

Demand charge	320kw×1970	NGN/kw	=	630,400 NGN/month
Unit charge	320kw×720h/month×0.3×100	NGN/kwh	=	6,912,000 NGN/month
Total				7,542,400 NGN/month

Annual electricity cost

7,542,400	NGN/month	×	12	month	=	90,508,800 NGN/year

2) Telephone Cost

Microwave network system (1 line, 10mbps)	Included in internet access cots	
Unit charge (Domestic)	10 台×180 分/月×5 NGN/min=9,000	NGN/month
Unit charge (International)	10 台×100 分/月×39 NGN/min=39,000	NGN/month
Monthly telephone cost	48,000	NGN/month
Annual telephone cost	48,000 NGN/月 × 12 month= 576,000	NGN/month

3) Data Communication Cost

Internet access cost (1 line of optical line, 10mbps)	520,833	NGN/month
Annual data communication cost	520,833 NGN/month× 12 month×1 line= 6,249,996	NGN/month

Source : Quatation of "Globacom Ltd" ; telecommunication carrier in Nigeria

4) Water Supply and Sewage Cost (Sewage cost is not applicable)

Maximum volume of water consumption per day

Maximum volume of water consumption per day	4 m3/day

Tariff of water charge (Tariff of FCT water board)

Unit charge	300 NGN/m^3

Annual water supply and sewage cost

4m^3/day ×	360	day/year ×	0.7	×	300	NGN/m^3	=	302,400 NGN/year

5) Fuel Cost

Conditions stand-by generator	Output 350KVA 3-phases 4wire 380V 50HZ (Diesel)	
	Fuel consumption	56.0 litres/hour
Assuming consumption	Monthly operation hours (5hours /day)	150 hours/month
Unit price of diesel fuel		267 NGN/litre
Annual fuel cost	56.0 litres/hour × 150 hours/month × 12month × 267 NGN/litre=	26,913,600 NGN/year

6) CO2 Gas Cost

Replacement frequency	For CO2 incubator	10times/unit/month
Consumption of CO2 gas	Capacity 167liters × 10% × 10times =	167 litres/unit/month
Annual consumption of CO2 gas	167liters/unit/month × 5unit × 12month =	10,020 L/year
Conversion of cylinder(30kg/unit)	10,020 litres/year ÷ 15,272 litres/unit =0.66unit	1.0unit/year
Unit price of CO2 gas		270 USD/unit
Annual CO2 gas	1.0 unit/year × 270 USD/unit=	270 USD/year

Exchange rate:1.0 USD = 304.74 NGN → 82,279 NGN/year

7) Maintenance Cost for Septic Tank

New septic tank		
Septic tank for the new facility (Capacity 14.4 m3/day)		1unit
Number of changes		1time/year
Cost		105,000 NGN/time
Maintenance cost	105,000 NGN/time × 1unit =	105,000 NGN/year
Total		105,000 NGN/year

8) Maintenance Cost for Facility

	Monthly repair cost (USD)				Annual repair cost (USD)
	Spare parts	Consumables	Inspection	Total	
Lighting fixtures	100	300	50	450	5,400
Standard air conditioning equipment	200	300	60	560	6,720
Sanitary equipment	150	200	608	510	6,120
Repair of interior and exterior	20 USD/m2/year × 1,800m2 =				36,000
Total					54,240 USD/year

Exchange rate:1.0 USD = 304.74 NGN → 16,529,097 NGN/year

9) Replacement Cost for HEPA Filter

Frequency and unit price of replacement

Medium efficient filter	For P3 Laboratory 1 time/year	360 USD/pcs
HEPA filter	For P3 Laboratory 0.5 time/year	900USD/pcs

Annual cost of replacement

Medium efficient filter	360 USD/pcs× 7 pcs×1time/year =	2,520 USD/year
HEPA filter	900USD/pcs× 64 pcs×0.5times/year =	28,800 USD/year
Total		31,320 USD/year

Exchange rate:1.0 USD = 304.74 NGN → 9,544,456 NGN/year

10) Maintenance Cost for Infectious Wastewater Treatment System

Filter, trim, etc.	300,000yen×1time/year =	300,000 yen/year
Annual cost		300,000yen/year

Exchange rate:1.0 NGN = 0.36769 Japanese yen→ 815,904 NGN/year

(2) Required Cost for new Equipment

The annual running cost for equipment is calculated as follows:

Table 2-30 Annual Running Cost for equipment

No.	Equipment name	Spare parts for maintenance	Number of units supplied	Total amount
4	Autoclave, double door A	Exhaust filter Yen 108,000 x 2 pcs. x 1 time Door packing Yen 40,000 x 2pcs. x 1 time Air filter Yen 140,000 x 2 times Pre-filter Yen 14,000 x 1 time Recording paper and ink ribbon Yen 45,000 x 2boxes Resin (Ion exchange) Yen 15,000 x 1 time Periodical maintenance and certification Yen 300,000	1	869,000
5	Autoclave, double door B	Exhaust filter Yen 108,000 x 2 pcs. x 1 time Door packing Yen 40,000 x 2pcs. x 1 time Air filter Yen 140,000 x 2 times Pre-filter Yen 14,000 x 1 time Recording paper and ink ribbon Yen 45,000 x 2boxes Resin (Ion exchange) Yen 15,000 x 1 time Periodical maintenance and certification Yen 300,000	2	1,738,000
8	Biosafety cabinet A	HEPA filter etc. Yen 290,400 x 1 time Periodical maintenance and certification Yen 300,000	1	590,400
9	Biosafety cabinet B	HEPA filter etc. Yen 290,400 x 1 time Periodical maintenance and certification Yen 300,000	1	590,400
10	Biosafety cabinet C	HEPA filter etc. Yen 290,400 x 1 time Periodical maintenance and certification Yen 300,000	2	1,180,800
11	Biosafety cabinet D	HEPA filter etc. Yen 290,400 x 1 time Periodical maintenance and certification Yen 300,000	3	1,771,200
17	Cryotank	Liquid nitrogen Yen 310,000	2	310,000
23	Electrophoresis	Gel set Yen80,000 (800 sheets)	2	160,000
24	ELISA set	Reagent kit Yen1,040,000	1	1,040,000
28	Glove box A	HEPA filter etc. Yen 270,000 x 1 time Periodical maintenance and certification Yen 300,000	1	570,000

No.	Equipment name	Spare parts for maintenance	Number of units supplied	Total amount
29	Glove box B	HEPA filter etc. Yen 270,000 x 1 time Periodical maintenance and certification Yen 300,000	1	570,000
33, 34	Caging system A	Feeding Yen1,080,000 Mat Yen 32,400 Drink water Yen 225,000 Mice and rats Yen 3,240,000 Filter Yen 72,600 HEPA filter for main unit Yen 186,500 Periodical maintenance and certification Yen 300,000	Total 2	10,273,000
37	Microscope, fluorescent	Oil Yen 112,000 x 1 time	2	224,000
38	Microscope, inverted	Oil Yen 112,000 x 1 time	1	112,000
43	pH meter	Reagents	1	16,400
46	Real-time PCR	Reagent set 2,400 samples / year (10 samples / day)	1	1,080,000
50	Thermal cycler,	Reagent set 2,400 samples / year (10 samples / day)	2	2,850,000
53	Ultrapure water system	Filter etc. Yen 107,833 x 2times	1	215,666
Total				24,160,866Yen/Year

Exchange rate:1.0 NGN = 0.36769 Japanese yen→ 65,709,880 NGN/Year

(3) Estimated Annual Cost for Operation and Maintenance

The annual cost for operation and maintenance is calculated as follows:

Table 2-31 Annual cost for operation and maintenance

Items		Annual cost (NGN)	VAT (5%)	Total (NGN)
(1)	Cost of facility maintenance			
1	Electricity cost	90,508,800	4,525,440	95,034,240
2	Telephone cost	576,000	28,800	604,800
3	Data communication cost	6,249,996	312,500	6,562,496
4	Water supply and sewage cost	302,400	15,120	317,520
5	Fuel cost for generator	26,913,600	1,345,680	28,259,280
6	Cost of CO^2 gas	82,279	4,114	86,393
Sub-total -1(Annual cost of utilities)		124,633,075	6,231,654	130,864,729
7	Maintenance cost for septic tank	105,000	5,250	110,250
8	Maintenance cost for facility	16,529,097	826,454	17,355,551
9	Replacement cost for HEPA Filter	9,544,456	477,223	10,021,679
10	Maintenance cost for infectious wastewater treatment system	815,904	40,795	856,699
Sub-total-2(Annual cost for maintenance of facilities)		26,994,457	1,349,722	28,344,179
(2)	Annual cost of equipment maintenance	65,709,880	3,285,494	68,995,374
Total (1)+(2)		217,337,412	10,866,870	228,204,282

Exchange rate:1.0 NGN = 0.36769 Japanese yen→ 83,908 (thousand yen)

Chapter 3 Project Evaluation

Chapter 3 Project Evaluation

3-1 Preconditions

In order to carry out the Project smoothly, it is important that those responsibilities assumed by the Nigerian side as described in "2-3 Obligations of Recipient Country" are certainly conducted at appropriate times before and during the construction of the Project.

3-2 Ncessary Inputs by Receipent Country

The Project includes the construction of P3 laboratory and the procurement of associated laboratory equipment. The Nigerian side should provide inputs and deal with the following items in order to make effective use of the inputs from the Japanese side, strengthen the diagnostic and research functions of NCDC, and to play a sufficient role as a regional and international core of the disease control in West Africa.

(1) Staff Deployment of the New Building Facility

The planned facility will be operated by existing NCDC staff and staff newly hired by NCDC and approximately 25 diagnosis/research members and maintenance engineers (facility, equipment) will operate it at full-scale operation. P2 and P3 laboratory are basically operated by the existing staff of the Public Health Laboratory Service Department who belongs to NRL and CPHL, but otherwise it is necessary to plan the concurrent position holding/re-deployment of existing staff, eligibility requirements of new employees or detailed staff deployment such as the number or deployment of employees to ensure reliable staff deployment.

(2) Securing of Budget for Operation and Maintenance of Building Facility and Equipment

NCDC secures a budget for managing the operation and maintenance of the planned facility and equipment. NCDC's operation budget consists of contributions from the Nigerian government, other donors/joint research institutions and the internal profits of NCDC. Although it was confirmed that the budget could be expected to accommodate the management of the operation and maintenance of the planned facility and equipment in the revenue and expenditure plans for three years from 2017 presented by the Nigeria side during the preparatory survey, it is necessary to continue taking favorable budgetary actions after 2020 when the Project is completed.

(3) Management of Operation and Maintenance of Building Facility and Equipment

The management of the operation and maintenance of the planned facility and equipment requires specialized skill and experience to deal with the special building facility and equipment specified for P2 and P3 laboratory.

The building facility requires an implementing structure that capable of the operation/inspection and periodic inspection of the air conditioning ventilation system, wastewater treatment system/infectious wastes of laboratories and preventive maintenance in the infectious control area. In order to fulfill the requirement, it is necessary to add a facility/equipment maintenance management team consisting of engineers specializing

in architecture, air conditioning, electricity and water supply; in addition to adding drainage hygiene to NRL's maintenance team that belongs to the Public Health Service Department.

As for the equipment, conduct maintenance management by combining the maintenance team and the use of outsourcing maintenance. General equipment requires daily inspection following the operational manual to maintain good condition. Special equipment installed in P2 and P3 laboratory such as biosafety cabinet (BSC), pass-through type autoclave, formalin fumigation device or BSC with glove box requires daily inspection by a member of the maintenance team, whose necessary capability of maintenance management is improved by soft -component program, and periodic inspection as well as replacement/adjustment performed by an outsourced professional. It is required to conclude an annual maintenance contract as required and also ensure the safe and efficient operation of equipment.

(4) Realization of Laboratory/Research Plan and Training Plan

NCDC should formulate finer details of plans regarding pathogens subject to diagnosis/research, contents/number of research/programs, contents of laboratory or number of samples through discussion with other donors, joint researchers and international organizations. It is reported that there were three research projects or programs in the field of infectious disease measures under way as of 2017: "PEPFAR (USCDC)," "SLMTA (USCDC)" and "Recherche sur Ebola (WHO)." After the cooperation project is completed, it will be necessary to strive to promote increasing the number of research projects and donors/joint researchers while making full use of the planned facility and equipment including P2 and P3 laboratory.

The procurement of equipment by the Project is based on the minimal contents required for diagnosis/research and training and excludes currently existing equipment which can be used. Thus, PCR equipment or a spectrophotometer needs to be certainly transferred from existing facilities.

(5) Enhancement of Biosafety and Biosecurity for New Installation of Laboratory

In order to make effective use of the new installation of P2 and P3 laboratory, the update of guidelines concerning the operation of existing laboratories conducted by NCDC and establishment of appropriate BSL-2 and BSL-3 management systems are required. The strengthening of biosafety and biosecurity will contribute to the safe and proper use of the planned facility and equipment from the viewpoint of management to prevent infectious diseases. In addition, from the viewpoint of the management of high-risk pathogens, necessary countermeasures against crimes/disasters and environmental pollution around the laboratory must be taken into considerations.

(6) Implementation of Environmental Monitoring

It is required to conduct environmental monitoring for pollution measures from time to time and to report the results periodically to JICA based on the environmental impacts assessment and the environmental management plan established and conducted by the Nigerian side in compliance with the environmental laws, regulations and standards of Nigeria.

3-3 Important Assumptions

Important assumptions are considered as follows to materialise and sustain the effectiveness of the Project.

(1) Promotion of Development Plan in the Health Sector

"National Health Policy 2016" sets a goal to reduce a burden in any emergency (infectious diseases, humanitarian crisis or natural disasters) concerning infectious diseases and public health, as it regards infectious disease measures as highly prioritized policy issues following maternal and child health in order to achieve the Universal Health Coverage (UHC).

The "Nigeria Medical Laboratory Services Policy" and the current "Nigeria Medical Laboratory Strategic Plan 2015-2019" also cover the improvement of laboratory functions and regard NCDC's infectious disease surveillance, prevention and emergency response, enhancement of the capability to investigate epidemiology and development of NRL as priority issues. Among the issues, the strengthening of the laboratory network, laboratory data maintenance and storage of specimens/samples are expected, along with the preparation of the containment laboratory of BSL-3, which is a key to the improvement of bacteriological tests.

The framework of the Project is established following the policy and request from a high-level plan and the positive and continuous promotion of actions in the field of infectious diseases by the Nigerian side are important in order to achieve the goal of the plan.

(2) Continuous Support from Other Donors Including JICA, Joint Researchers and International Organizations

NCDC is currently carrying out three research projects and programs (answer to questionnaire) with support from other donors, joint researchers and international organizations. It is necessary to strengthen activities greatly contributing to NCDC's internal profits such as the development of a quick diagnosis kit for infectious diseases or holding of training, seminars or academic conferences in the field of infectious disease measures as part of important technical and financial support of the laboratory/research function of NCDC. As NCDC mainly receives support from WHO and USCDC, it becomes important to continuously gain support from these organizations and develop new supporters from now on. Additional support is now expected for the re-construction and re-organization of the laboratory network which has difficulties in maintaining the quality of specimens and preventing infection.

3-4 Project Evaluation

3-4-1 Relevance

The expected effect of the Project and its worthiness are as follows.

As the Project contributes to the improvement of international health issues mainly including infectious disease measures, the improvement of the health of Nigeria's population including the poor and mothers and children, and the improvement and stability of people's welfare or livelihood, it can be concluded that it is worth conducting the cooperation project by our grant aid cooperation in terms of people's safety.

1) Relevance of Benefit and Target of the Project

The Project promotes the diagnosis of tropical infectious diseases, basic research and development of the health care professionals or researchers by expanding facilities/instruments for the laboratory/research and training of NCDC, and then contributes to the improvement of access to the health services of Nigeria.

It is expected that it will promote the improvement of initiatives to infectious disease measures in our nation and West Africa and it is considered that it will bring benefits to 185.99 million people in Nigeria (2016, UNICEF).

NCDC now plays a major role in the research/diagnosis related to infectious disease measures and conducts the tests and diagnoses of the pathogens of the five most significant diseases (viral hemorrhagic fever, yellow fever, cholera, meningitis, measles) among the 41 subjects to IDSR (Intgrated Disease Surveillance and Response) designated by WHO. Major local laboratories including NRL and CPHL (11 facilities), standard virus laboratories (2 facilities) and a laboratory network (10 facilities in total) are established as an inspection system in infectious disease surveillance. As for influenza, fixed-point surveillance is formed with 4 supporting institutions and continuous tests are conducted in existing research facilities. The improvement of NCDC's functions including establishment of P3 laboratory by the Project is considered to contribute to the further enhancement of the capability to tackle infectious diseases in Nigeria and improvement of access to health services.

As planning countermeasures against the threat of an infectious disease epidemic, such as high-risk viral hemorrhagic fever like Ebola hemorrhagic fever or Nigeria's indigenous disease Lassa fever or yellow fever, has recently been an urgent issue for the Nigeria and its neighboring countries, roles expected to NCDC as an important location for these infectious disease measures are significant and it is expected to bring about benefits to Nigeria and its neighboring countries in the future.

2) Consistency with Nigeria's Health Policy

As described in "National Health Policy 2016," "Nigeria Medical Laboratory Services Policy" and "Nigeria Medical Laboratory Strategic Plan 2015-2019," Nigeria positions various infectious disease measures as priority issues to improve laboratory functions. NCDC is supposed to play a major role in surveillance, prevention and emergency response regarding infectious diseases. And in order to enhance the surveillance capability and epidemiology testing, the preparation of the containment laboratory of BSL-3 is expected. The Project is defined as the embodiment of these priority issues.

3) Consistency with Japan's Aid Policy

The Project is defined as a project consistent with the development cooperation policy by nation (September 2017) for Nigeria, which sets our nation's basic policy for peace and health, basic policy about the strengthening of countermeasures to infectious diseases leading to international threats and "comprehensive and robust establishment of health care/medical system" as one of the important fields. In particular, with the cooperation policy to support the improvement of local health service, achievement of UHC and strengthening of laboratories and disease prevention center, the Project is expected to enhance the capability

to deal with infectious diseases by developing the health infrastructure.

It also has a great significance in terms of contribution to Goal 3 of the Sustainable Development Goals (SDGs), international support to the enhancement of the capability to deal with infectious diseases in post Ebola and strengthening of the performance of WHO International Health Regulations (IHR) through the improvement of laboratory/diagnosis techniques and enhancement of the research capability. Furthermore, it is expected to serve as a base for the development of human resources to take infectious disease measures presented in TICD VI as well as to contribute to the achievement of a secure health system presented in G7 Ise-Shima Vision for international health and UHC with better preparation for a public health crisis.

3-4-2 Effectiveness

The output expected by carrying out the Project and outcome expected by carrying out the whole project plan are described as follows. Quantitative and qualitative indicators are suggested assuming that the standard year of indicators is 2017 and target year is 2023, three years after 2020 when the construction of the building facility and procurement of equipment are expected to be completed.

(1) Quantitative Effects

The standard and target values of the number of researchers/technicians trained to use BSL-3 (P3) laboratory are suggested as the quantitative indicator are set as shown in the table 3-1.

Table 3-1 Indicator of quantitative effects (output by carrying out the Project)

Indicator Name	Indicator Value		Target Value (FY2023) [Three years after the project is completed]
	Standard Year	Standard Value	
Number of researchers/technicians who finished receiving BSL-3 (P3) laboratory training	2017 Result Value	0	25

The number of persons who finished receiving BSL-3 (P3) laboratory training is set as the total number of persons who are currently engaged in testing/researching highly pathogenic pathogens (such as viral hemorrhagic fever, yellow fever or influenza desired to be conducted in P3 laboratory) and persons who perform the maintenance and inspection of the laboratory. The target value shall be 25 persons based on Japan's suggestion of the further increase of management members for operation and maintenance from the staff deployment plan (diagnosis/research: 15-20 persons, maintenance engineers: 2-3 persons) of P2 and P3 laboratory confirmed with the Nigerian side during the preparatory survey.

The introduction of the diagnosis method required to use BSL-3 (P3) laboratory and number of research projects using BSL-3 (P3) laboratory are suggested as the quantitative indicators of the whole project plan as follows.

Table 3-2 Indicator of quantitative effects (outcome by carrying out the whole project plan)

Indicator Name	Indicator Value		Target Value (FY2023) [Three years after the project is completed]
	Standard Year	Standard Value	
Introduction of new research and diagnostic method using BSL-3 (P3) laboratory	2017 Result Value	NA	3cases
Number of research programs using BSL-3 (P3) laboratory	2017 Result Value	0/year	5 cases/year

The target value of the introduction of the research and diagnosis method required to use BSL-3 (P3) laboratory was set to 3 as i) virus separation/identification, ii) virus cell culture and iii) genetic analysis of highly pathogenic pathogens which should be performed in P3 laboratory and indicate that BSL-3 (P3) laboratory is effectively used.

The target value of the number of research programs using BSL-3 (P3) laboratory was set to 5 based on discussion with NCDC referring to indicators in other similar matters since currently there is no research project being carried out.

(2) Qualitative Effects

1) Improvement of safety/quality of diagnosis/research by expanding facilities/equipment

The development of the physical construction of NRL's facilities/equipment (completed with support from USCDC in 2017) has been conducted partially and limitedly by using existing buildings constructed for other purposes. As facilities/equipment of CPHL have also deteriorated significantly, NCDC's entire laboratory/research facilities are facing insufficient infection prevention measures, countermeasures to crimes/disasters and consideration for the safety and efficiency of work. Specifically, imperfect infection prevention control zones, insufficient airtight/differential control, lack of working space in test/research-related rooms, failure of working lines and defects in arrangement/mounting of equipment are causing large impediment in performing tests/research using highly pathogenic pathogens.

The Project is expected to improve many systems of the facility such as monitoring of interior/exterior access, air conditioning/ventilation, drainage hygiene or infectious wastewater treatment. Furthermore, the rooms which should be adjacent to or cooperated with each other (establishing the preparation hall, P3 laboratory combined with P2 laboratory) or rooms which should be specialized (3 rooms consisting of laboratory for virus and bacteria and P3 laboratory handling animals) will be arranged properly. In other words, the Project will ensure the deployment of proper working lines and equipment and working space.

2) Prevention of public health crisis in Nigeria by dealing with infectious diseases and strengthening surveillance

NCDC arranges a diagnostic system as the infectious diseases surveillance system in cooperation with major local laboratories including NRL and CPHL and standard virus laboratories. Although it ensures certain functions and obtains favorable results from them, their quality and quantity still need to be improved in the

strengthening of the quality control of laboratory network, improvement of test accuracy installing the external accuracy assessment system or increase in the number of diagnosis by improving specimen transfer.

It is expected that P3 laboratory, P2/P3 bio-bank (storing specimen/pathogen samples as a major bio-bank) and equipment provided by the Project will be coordinated in future for the technical cooperation project namely ”the Project for strengthening the detection of and countermeasures to threats on public health”, and will generate further synergistic effects concerning specimen transfer and improvement of accuracy assurance.

3) Improvement of importance/functionality of NCDC as the center of infectious disease measures in the West African (ECOWAS) area

It was determined in 2015 that NCDC would be RCDC of ECOWAS and the current NCDC CEO has been inaugurated as an interim representative. In the same way, NCDC is also designated as RCC of the West African area of the African community ACDC. It means NCDC is expected to play a major role in the infectious disease measures in the West African area while international laboratory network regarding post-Ebola syndrome is regarded as an important issue.

The Project enables NCDC to install the containment facilities and equipment of BSL-3 arranged at the international level in terms of biosafety and biosecurity and realize safe, rapid and highly accurate tests/research under the proper BSL-3 management. Through the laboratory network, it becomes possible to positively communicate its performance and results inside and outside the country, leading to the wide and international recognition of physical construction and networking strength NCDC has. It is expected that gaining more reliability as a diagnosis/research institution enhances NCDC’s role as the international center of West Africa in infectious disease measures in the medium and long term.

Appendices

Appendix-1 Member List of the Survey Team

Field Survey (From August 12th, 2017 to September 13th, 2017)

Name	Function	Affiliation
Dr. Mitsuo ISONO	Leader	Senior Adviser, JICA
Dr. Katsuaki SHINOHARA	Facility Planning (1)	Div. of Biosafety Control and Research National Institute of Infectious Diseases
Dr. Yasuhiro KAWAI	Facility Planning (2)	Div. of Biosafety Control and Research National Institute of Infectious Diseases
Dr. Shuetsu FUKUSHI	Infection Control (1)	Dep. of Virology 1 National Institute of Infectious Diseases
Dr. Tomoki YOSHIKAWA	Infection Control (2)	Dep. of Virology 1 National Institute of Infectious Diseases
Ms. Hanae NISHIMURA	Project Coordinator	Health Team 2, Health Group 1,JICA
Mr. Teruyasu EZURE	Chief Consultant /Architectural Planning /Environmental Condition	Oriental Consultants Global Co., Ltd.
Mr. Takatsugu SHIMADA	Architectural Planning/Natural Conditions Survey	Oriental Consultants Global Co., Ltd.
Mr. Masahiko SUZUKI	Facility Design	Oriental Consultants Global Co., Ltd. (SPC)
Ms. Ayaka KAWANO	Construction Planning /Cost Estimation (Facilities)	Oriental Consultants Global Co., Ltd.
Mr. Akio KANEKO	Equipment Procurement Planning	Fujita Planning Co., Ltd. (AHMN)
Mr. Masashi TESHIMA	Equipment Procurement Planning /Cost Estimation (Equipment)	Fujita Planning Co., Ltd
Mr. Takashi MIURA	Research & Medical Planning	Oriental Consultants Global Co., Ltd. (Japan Anti-Tuberculosis Association)
Ms. Naoko MIYATAKE	Architectural Planning /Natural Conditions Survey	Oriental Consultants Global Co., Ltd.

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Name	Function	Affiliation
Dr. Mitsuo ISONO	Leader	Senior Adviser, JICA
Ms. Hanae NISHIMURA	Project Coordinator	Health Team 2, Health Group 1,JICA
Mr. Teruyasu EZURE	Chief Consultant /Architectural Planning /Environmental Condition	Oriental Consultants Global Co., Ltd.
Mr. Takatsugu SHIMADA	Architectural Planning/Natural Conditions Survey	Oriental Consultants Global Co., Ltd.
Mr. Akio KANEKO	Equipment Procurement Planning	Fujita Planning Co., Ltd. (AHMN)

Appendix-2 Survey Schedule

Field Survey (From August 12th, 2017 to September 13th, 2017)

				Chief Consultant /Architectural Planning/Environmental Condition	Architectural Planning/Natural Conditions Survey	Architectural Planning/Natural Conditions Survey	Facility Design	Construction Planning／Cost Estimation (Facilities)	Equipment Procurement Planning	Equipment Procurement Planning / Cost Estimation (Equipment)	Research & Medical Planning
	DATE		JICA	EZURE/TERUYASU	SHIMADA/TAKATSU GU	MIYATAKE/NAOKO	SUZUKI/MASAHIKO	KAWANO/AYAKA	KANEKO/AKIO	TESHIMA/MASASHI	MIURA/TAKASHI
Explanation of Inception Report. Site and Facility Survey -1	1	12-Aug	Sa	TOKYO→							
	2	13-Aug	Su	→ABUJA							
	3	14-Aug	M	Meeting w/JICA Office Meeting w/NCDC Site Survey(NRL)							
	4	15-Aug	T	Meeting w/NCDC							
	5	16-Aug	W	Site Survey(LAGOS)	TOKYO→LONDON	TOKYO→LONDON			TOKYO→LONDON		
	6	17-Aug	Th	JICA team Meeting OD team Meeting Meeting w/WB	→ABUJA Survey on Site Conditions(NRL) OD team Meeting				w/ Chief Consultant		
	7	18-Aug	F	Meeting w/NCDC	Meeting w/NCDC Survey on Similar Facilities(ABUJA) Survey on Environmental Impact Assessment				w/ Chief Consultant		
	8	19-Aug	Sa	OD team Meeting Discussion, Preparation for Minutes of Discussion	OD team Meeting Preparation for Natural Conditions				w/ Chief Consultant		
	9	20-Aug	Su	OD team Meeting Discussion, Preparation for draft M/D	OD team Meeting Data/Docs. Organization and Analysis	TOKYO→LONDON			w/ Chief Consultant	TOKYO→LONDON	
	10	21-Aug	M	OD team Meeting Meeting w/NCDC, Explanation, Discussion on Inception Reoprts and Questionnaire		→ABUJA OD team Meeting, Meeting w/NCDC, Explanation, Discussion on IC/R and Questionnaire			→ABUJA OD team Meeting, Meeting w/NCDC, Explanation, Discussion on IC/R and Questionnaire		
Discussion and Signing of M/D	11	22-Aug	T	Meeting w/Donnors Meeting w/NCDC(TA)	Survey on Site Conditions(NRL), Survey on Facility Planning				Survey on Equipment Planning	Survey on Equipment Procurement	
	12	23-Aug	W	Meeting w/Donnors Preparation for draft M/D	Survey Facility Planning, Survey on Environmental Impact Assessment, Preparation for draft M/D	Survey Facility Planning Subcontract arrangement local consultants on Natural Conditions Survey	Survey on Mechanical & Electrical Installations, Survey on Natural Conditions (Elecricity)		Survey on Equipment Planning	Survey on Equipment Procurement	
	13	24-Aug	Th	Discussion of draft M/D		Survey Facility Planning Subcontract arrangement local consultants on Natural Conditions Survey	Survey on Mechanical & Electrical Installations		w/ Chief Consultant	Survey on Equipment Procurement	
	14	25-Aug	F	Discussion and Signing of M/D Meeting w/JICA Office Briefing to EoJ		Survey Facility Planning Subcontract arrangement local consultants on Natural Conditions Survey	Survey on Mechanical & Electrical Installations		w/ Chief Consultant	Survey on Equipment Procurement	TOKYO→LONDON
Site and Facility Survey -2 Examinations on Facility and Equipment Planning, Discussion on Draft Outline Design	15	26-Aug	Sa	ABUJA→	Planning Optional Outline Designs Survey on Natural Conditions				Survey on Equipment Planning	Survey on Equipment Procurement	→ABUJA Survey on Site Conditions(NRL)
	16	27-Aug	Su	→TOKYO	Consultant team Meeting Planning on Optional Outline Designs ABUJA→LAGOS				Consultant team Meeting Planning on Optional Outline Designs ABUJA→LAGOS		
	17	28-Aug	M		Survey on Similar Facilities (LAGOS) CPHL, Nigerian Institute of Medical Research P3 Lab LAGOS→ABUJA				Survey on Similar Facilities (LAGOS) CPHL, Nigerian Institute of Medical Research P3 Lab		w/ Chief Consultant
	18	29-Aug	T		Examinations on Optional Outline Designs (Building/ M&E/ Equipment)				Survey on Equipment Planning (LAGOS) LAGOS→ABUJA		Survey on Medical Research Planning
	19	30-Aug	W		Consultant team Meeting Planning on Optional Outline Designs			TOKYO→LONDON	w/ Chief Consultant Survey on Equipment Planning	Team Meeting Survey on Equipment Procurement	w/ Chief Consultant Survey on Medical Research Planning
	20	31-Aug	Th		Discussions w/ NCDC (Optional Outline Designs) Survey on Facility Plan, Survey on Natural Conditions			→ABUJA Survey on Site Conditions	Discussions w/ NCDC Survey on Equipment Planning	Discussions w/ NCDC Survey on Equipment Procurement	Discussions w/ NCDC Survey on Medical Research Planning
	21	1-Sep	F		Discussions w/ NCDC (Questionnaire etc) Preliminary reports Survey on Natural Conditions			Survey on Construction Planning/Cost Estimate	Survey on Equipment Planning		
	22	2-Sep	Sa		Examinations on drfat Outline Design Data/Docs. Organization and Analysis						
	23	3-Sep	Su		Examinations on drfat Outline Design Preparation of Workshop						
	24	4-Sep	M		Examinations on drfat Outline Design Preparation of Workshop	Examinations on drfat Outline Design Survey on Natural Conditions		Survey on Construction Planning/Cost Estimate	w/ Chief Consultant	Survey on Equipment Procurement	w/ Chief Consultant
	25	5-Sep	T		Discussions w/ NCDC (Questionnaire etc) Preliminary reports Survey on Natural Conditions		ABUJA→LONDON	Survey on Construction Planning/Cost Estimate/Construction Circumstances	w/ Chief Consultant Survey on Equipment Planning	Survey on Equipment Procurement	w/ Chief Consultant Survey on Medical Research Planning
	26	6-Sep	W		Discussion about draft OD w/ NCDC (Wokrshop) Survey on Construction Planning/Cost Estimate/Construction Circumstances		→TOKYO	w/ Chief Consultant	w/ Chief Consultant Survey on Equipment Planning	w/ Chief Consultant Survey on Equipment Procurement	w/ Chief Consultant Survey on Medical Research Planning
Explanation of Outline Design Discussion of Technical Note	27	7-Sep	Th		Preparation for draft Technical Notes Survey on Construction Circumstances, Survey on Environmental Impact Assessment			w/ Chief Consultant	w/ Chief Consultant	w/ Chief Consultant Survey on Equipment Procurement	w/ Chief Consultant Survey on Medical Research Planning
	28	8-Sep	F		Discussions of draft Technical Notes (1) Briefing to JICA Office	w/ Chief Consulltant Survey on Construction Planning/Cost Estimate		Survey on Construction Planning/Cost Estimate	w/ Chief Consultant	w/ Chief Consultant Survey on Equipment Procurement	w/ Chief Consultant
	29	9-Sep	Sa		Revision for draft Technical Notes Prelimnary Report of Field Survey			Survey on Construction Planning/Cost Estimate Prelimnary Report of Field Survey	w/ Chief Consultant	Survey on Equipment Procurement Prelimnary Report of Field Survey	w/ Chief Consultant
	30	10-Sep	Su		Consultant team Meeting Data/Docs. Organization and Analysis			Consultant team Meeting Data/Docs. Organization and Analysis			
	31	11-Sep	M		Discussions of draft Technical Notes (2) and Signing of Technical Notes Prelimnary Report of Field Survey			Survey on Construction Planning/Cost Estimate Prelimnary Report of Field Survey	ABUJA→LONDON	Explanation of draft Outline Design Discussions and Signing of Technical Notes Briefing to JICA Office	
	32	12-Sep	T		ABUJA→LONDON			ABUJA→LONDON	→TOKYO	ABUJA→LONDON	
	33	13-Sep	W		→TOKYO			→TOKYO		→TOKYO	

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	DATE		JICA Leader	JICA Project Coordinator	Chief Consultant /Arcitectural Planning /Environmental Condition	Architectural Planning /Natural Conditions Survey	Equipment Procurement Planning
			Dr. Isono	Ms. Nishimura	Mr. Ezure	Mr. Shimada	Mr. Kaneko
1	10-Feb	Sa	NRT→PARIS		HND→LHR		
2	11-Feb	Su	→ ABUJA		→ ABUJA		
3	12-Feb	M	Team meeting for the Preparation of the Minutes of Discussion (M/D)				
			NCDC: Explanation for the Preparatory Survey Draft Reoprt , Draft Equipment Specification Preparation of the Minutes of Discussion (M/D)				
4	13-Feb	T	NCDC: Discussion for the Preparatory Survey Draft Reoprt , Draft Equipment Specification				
			Team meeting for the Preparation of the Minutes of Discussion (M/D)				
5	14-Feb	W	NCDC: Discussion on the Draft M/D Team meeting for the Finalization of M/D				
6	15-Feb	Th	NCDC: Singning of M/D				
			Briefing to EoJ & JICA Office &				
7	16-Feb	F	ABUJA → PARIS	ABUJA → LAGOS	ABUJA → LHR		
8	17-Feb	Sa			→ HND		
9	18-Feb	Su	→ NARITA				

HND:HANEDA, LHR:LONDON HEATHROW
NCDC: Nigeria Centre for Disease Control

Appendix-3 List of Parties Concerned in the Recipient Country

1. Embassy of Japan Nigeria
   - Mr. Hiroki OGAWA : First Secretary, Economic/Development Cooperation Section
   - Mr. Mitsuhiro INAMURA : First Secretary, Head of Development Cooperation

2. JICA Nigeria Office
   - Mr. Hirotaka NAKAMURA : Chief Representative
   - Mr. Katsutoshi KOMORI : Chief Representative
   - Ms. Makiko OKUMURA : Senior Representative
   - Mr. Masanori SAKAMOTO : Representative
   - Ms. Yuriya TERAGAKI : Project Formulation Advisor

3. NCDC : Nigeria Centre for Disease Control
   - Dr. Chikwe Ihekweazu : CEO
   - Ms. Adebola Olayinka : Lab Consultant,
   - Ms. Oyeronce oyeanji : Technical Assistant
   - Mr. Adedeji Adebayo : Director, Public Health Laboratory Services Dept.
   - Ms. Nwamo Mba : Laboratory
   - Mr. Oguanui Bmeka : Communication
   - Ms. Imu Chmasa : Communication
   - Mr. Joshua Obasanya : Head, Prevention & Programs Coordination Dept.
   - Mr. Burgor Joel : Medical Lab Scientist
   - Mr. Poporha Michael : Medical Lab scientist
   - Ms. Amira Garba : Chief Medical Lab Officer

4. CPHL : Central Public Health Laboratory, NCDC
   - Ms. Nwende Mba : Director
   - Ms. Babatunde : Assistant Director
   - Ms. Ekwuazi A C : Assistant Director
   - Mr. Ekoh Aniefiok : Assistant Director
   - Mr. Okon Anthony : Assistant Director
   - Mr. Martins Olajide : Chief Medical Laboratory
   - Mr. Benjamin : Accountant

5. FCDA : Federal Capital Development Authority
   - Mr. Peter C. Ugwu : Deputy Director, the Department of Development Control
   - Mr. Richard Ukpapia : Deputy Director, Gaduwa District Office
   - Tpl. Momoh E. T : Town planner, Urban Planning Division
   - Tpl. Ademola Adebayo : Town planner, Urban Planning Division
   - Mr. Mustapha Mubdiyu : Urban Planner

6. AGIS : Abuja Geographic Information Systems
   - Mr. Abdulemeem : Head of Research

7. FCT Water Board Gaduwa area
   - Mr. Ibrahim Mohammad : Manager
   - Mr. Uzumi : Engineer

8. AEDC : Abuja Electricity Distribution Company
   - Mr. Aba Godfrey : Manager

Mr. Eugre Pascal Abdullahi : Engineer

9. NIMR : Nigerian Institute of Medical Research, Centre for Human Virology and Genomics

Dr. Rosemary Audu	: Laboratory Director
Mr. Onwuamah Chika	: Head
Ms. Onroudriji Obcayeu	: Data Officer
Ms. Aje Tmimothy O	: Lab Technician
Mr. Okonkwo Heanyi	: Research Fellow
Ms. Efere Kauretta	: Research Fellow
Eng. Edomomuonti Osano	: Senior

10. ECOWAS : Economic Community of West African States

Dr. Abdulsalami Nasidi	: Executive Director, RCDC (Former NCDC Head)

11. Local Contractor

Lightyear Engineering Company Ltd.

Eng. John B Uswuagbo	: Chairman (CEO)
Arch. Umar Farooq	: Associate Architect
Mr. Ageva Peter	: Design Engineer
Tpl. Kanu U. Kingsley	: Registered Planner

Aluwin tech Nigeria Ltd.

Arch. Godwin Iduma	: Architect

Wisco Prime Nigeria Ltd.

Eng. Ofonime Okoal	: Engineer/Managing Director

Cypress Konsult Ltd.

Eng. Victor Konyeha	: Managing Director
Mr. Franklyn Ohakim	: Computer Engineer

12. Local Consultants

Be-Brace Consult Ltd.

Mr. Adewoye A. Ezekiel	: Principal Partner

Zenith Carex

Mr. Adelana Olamilekan	: MD/CEO
Mr. Babatunde Ajayi	: Admin/ Office manager

13. Equipment Distributor

Institute of Human Virology

Mr. Olatokun Ayobami	: Biotech engineer

Recado Sannies Ltd.

Ms. Abban Olubummi	: Senior business development executive

Katchey company Ltd.

Ms. Oluwatoyin Adeleye	:Business Development Unit (Life science solution)
Mr. Sam Nwogu	: General manager operations
Mr. Michael Okele	: Engineering & product support
Mr. Philip Ayogu	: Business development manager
Ms. Kate Isa	: CEO

Thermo Fisher Scientific
Mr. Antonio Aversente : Director commercial export

Crown Agents
Mr. Jiru Bako : Country manager

Winteck Nigeria Ltd.
Ms. Lanre Akinseye : Marketing executive
Mr. Andrey M.I. Okere : Head Corporate Image

LS scientific
Mr. Olumurewa Odunjo : Managing Director

MINUTES OF DISCUSSIONS
ON THE PREPARATORY SURVEY
ON THE PROJECT FOR STRENGTHENING THE DIAGNOSTIC CAPACITY OF NIGERIA CENTRE FOR DISEASE CONTROL IN THE FEDERAL REPUBLIC OF NIGERIA

Based on the several preliminary discussions between the Government of the Federal Republic of Nigeria (hereinafter referred to as "Nigeria"), the Embassy of Japan in Nigeria and JICA Nigeria Office with reference to the letter MBNP/AP-2008/S.14/I dated 23rd August 2016, the Government of Japan decided to conduct a Preparatory Survey on the Project for Strengthening the Diagnostic Capacity of Nigeria Centre for Disease Control (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent the Preparatory Survey Team for the Outline Design (hereinafter referred to as "the Team") to Nigeria, headed by Dr. Mitsuo Isono, Senior Advisor of Health Sector, Human Development Department, JICA, from 13th to 25th August, 2017.

The Team held a series of discussions with the officials of the Government of Nigeria and conducted a field survey.

In the course of the discussions and field survey, both sides have confirmed the main items described in the attached sheets. The Team will proceed to further works and prepare the Preparatory Survey Report.

Abuja, 25th August, 2017

Dr. Mitsuo Isono
Leader
Preparatory Survey Team
Japan International Cooperation Agency
Japan

Dr. Chikwe Ihekweazu
National Coordinator/
Chief Executive Officer
Nigeria Centre for Disease Control
The Federal Republic of Nigeria

Witnessed by

Mr. Samuel Eloho
Director
Department of International Cooperation
Federal Ministry of Budget and National Planning
The Federal Republic of Nigeria

ATTACHMENT

1. Objective of the Project

The objective of the Project is to expand and improve the facilities and equipment for diagnosis, research and training of the Nigeria Centre for Disease Control (hereinafter referred to as "NCDC") in order to identify the pathogens of infectious diseases, conduct basic research and promote trainings of health workers and researchers, which will contribute to position NCDC to play a leading role in fulfilling the ever expanding research and training needs of the country and the West African sub-region and strengthen the capacity of infectious disease control.

2. Title of the Preparatory Survey

Both sides confirmed the title of the Preparatory Survey as "the Preparatory Survey for the Project for Strengthening the Diagnostic Capacity of Nigeria Centre for Disease Control".

3. Project Sites

Both sides confirmed that the sites of the Project are on the grounds of the NCDC (Abuja and Lagos). The location map of the Project site in Abuja is shown in Annex-1.

4. Responsible and Implementing Agency

4-1. The Responsible Agency is the Federal Ministry of Health.

4-2. The Implementing Agency is the NCDC. The implementing agency shall coordinate with all the relevant agencies to ensure smooth implementation of the Project and ensure that the Undertakings are taken by relevant agencies properly and on time.

The organization chart of the NCDC is shown in Annex-2.

5. Items Requested by the Government of Nigeria

5-1. Both sides agreed that the requested facility for the new laboratory would serve as diagnostic and surveillance center for emerging and re-emerging diseases in the sub-region and confirmed the architectural designing of the facility as follows:

- 3 BSL 3 laboratories
- 3 BSL 2 laboratories
- Bio-bank
- Monitoring Room

- Security Room

5-2. Both sides agreed that the essential equipment to operate BSL 3 and 2 laboratories is to be prioritized and that the requested list of major equipment is in Annex 3.

The detailed recommended list of equipment, for the new laboratory and for the existing NCDC laboratory in Lagos will be submitted as a technical note by the Team for the discussion with the Nigeria side by the end of the survey.

5-3. JICA will assess the feasibility of the above requested items through the survey and will report the findings to the Government of Japan. The final scope of the Project will be decided by the Government of Japan.

5-4. The Government of Nigeria shall submit an official request to the Government of Japan through a diplomatic channel before the appraisal of the Project, which is scheduled in October, 2017.

6. Japan's Grant Aid Scheme

6-1. The Nigerian side understands the Japan's Grant Aid Scheme explained by the Team, as described in Annex-4, Annex-5 and Annex-6.

6-2. The Nigerian side will take the necessary measures, as described in Annex-7, for smooth implementation of the Project, as the condition for the Japanese Grant Aid to be implemented.

7. Schedule of the Study

7-1. The Team will proceed to further studies in Nigeria until 13th September, 2017.

7-2. An official request to the Government of Japan will be submitted by the Government of Nigeria at the beginning of October, 2017.

7-3. JICA will prepare the draft report in English and dispatch a mission to Nigeria in order to explain its contents in February, 2018.

7-4. In case that the contents of the report are accepted and the undertakings for the Project are fully agreed by the Government of Nigeria, JICA will complete the final report and send it to the Government of Nigeria by April, 2018.

7-5. The above schedule is tentative and subject to change.

8. Environmental and Social Considerations

8-1. The Nigerian side confirmed to give due environmental and social considerations during implementation, and after completion of the Project, in accordance with the JICA Guidelines for Environmental and Social Considerations (April, 2010).

8-2. The Project is categorized as "C" from the following considerations:
The Project site is not located in a sensitive area, nor has it sensitive characteristics, nor falls it into sensitive sectors under the Guidelines, and its potential adverse impacts on the environment are not likely to be significant.

9. Other relevant issues

9-1. Budget Allocation

The Nigerian side agreed to allocate budget (operational and maintenance costs), take necessary actions for the provision of new furniture and manpower (health service providers and any other personnel) necessary for the proper and sustainable operation and maintenance of the facilities and the equipment to be provided under the Project.

10. Undertakings by the Nigerian Side

10-1. NCDC agreed on the following to ensure proper and safe usage of the laboratory that will ensure its sustainability:
(1) Allocate budget for continuous electrical power as well as routine maintenance of the facility and equipment.
(2) Train all existing and incoming staff on accurate and up-to-date knowledge of biosafety.

10-2. Exemption of customs duties, internal taxes and other fiscal levies
Both sides confirmed that customs duties, internal taxes and other fiscal levies which may be imposed in Nigeria with respect to the purchase of the products and/or the services be exempted. Both sides also recognized that, presently, tax exemption procedure in Nigeria is as indicated in Annex-8. The contents of Annex-8 will be updated as the Preparatory Survey progresses, and eventually will be used in the implementation stage.

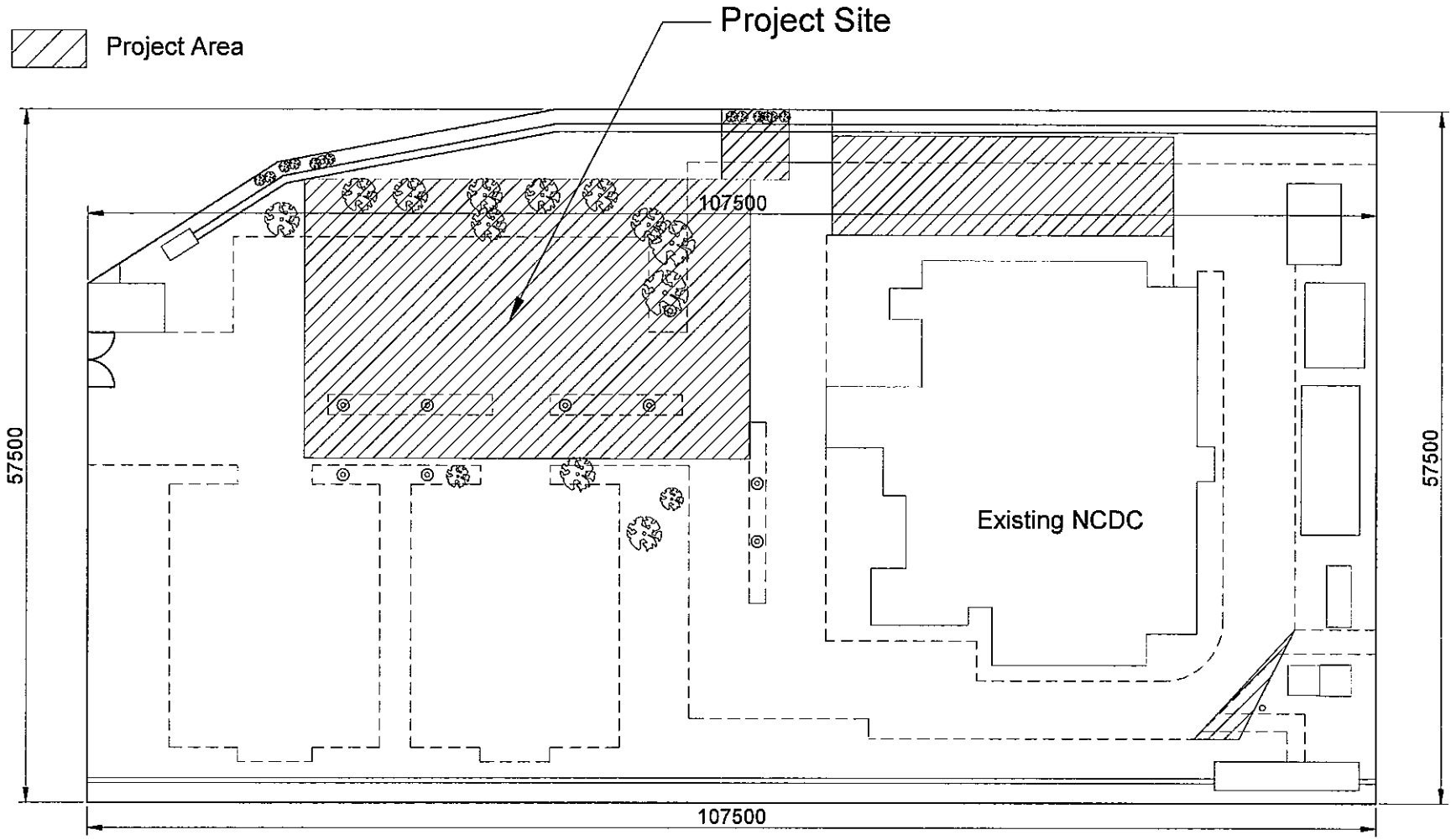
11. Technical Assistance ("Soft Component" of the Project)

Both sides agreed to explore possibilities for assistance as necessary in increasing the technical capacity of the NCDC to operate the new BSL 3 and 2 laboratories. This may include assistance to 1) ensure full and proper utilization of the new laboratories, 2) conduct training for existing and incoming staff, including researchers, laboratory

technicians, and maintenance staff. These technical assistance shall be done through the "Soft Component" of the Project. However, this scheme shall provide training only for basic operation and maintenance of facilities and equipment. Therefore, both sides agreed that additional technical assistance for BSL3 laboratories management including high level biosecurity and research capacity shall be provided by the technical cooperation project by JICA entitled "The Project for Strengthening Detection of and Response to Public Health Threats in Nigeria" which is supposed to be initiated in early 2018.

Annex-1	Location Map
Annex-2	Organization Chart of the NCDC
Annex-3	Equipment List
Annex-4	Japan's Grant Aid
Annex-5	Flow Chart of Japanese Grant Procedure
Annex-6	Financial Flow of Grant Aid
Annex-7	Major Undertakings to be Taken by Each Government
Annex-8	Tax exemption procedure in Nigeria

Annex1 Location Map



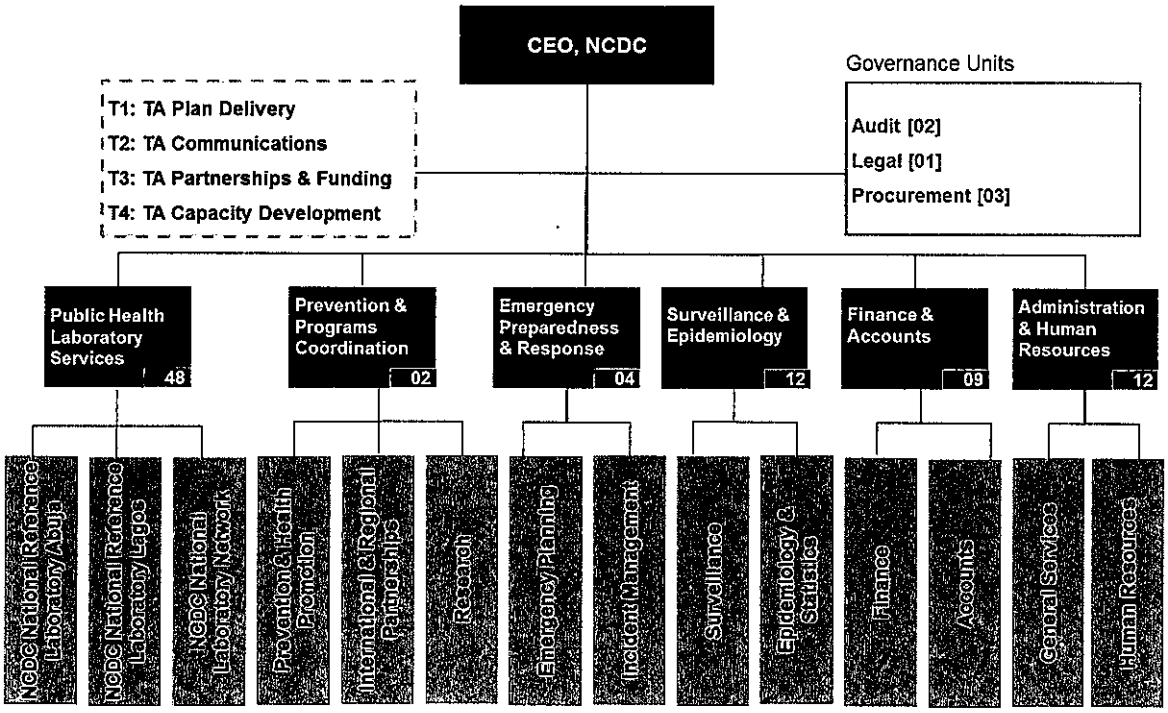
Tree ◎ Street Light

to be removed and/or relocated by Nigeria side

Scale 1:500

Annex-2

Organization Chart of the NCDC



Equipment List

Location	Major Equipment to each location
BSL3 (Animal)	Biosafety cabinet, Glove box, Co2 incubator, Deep freezer, Autoclave (vertical, biosafety), Autoclave (double door), Laboratory table with chair, Individual ventilation animal caging system, Centrifuge (mini, low speed and high speed), Transilluminator etc
BSL3 (Virus)	Biosafety cabinet, Glove box, Co2 incubator, Deep freezer, Autoclave (vertical, biosafety), Autoclave (double door), Laboratory table with chair, Centrifuge (mini, low speed and high speed), Transilluminator etc.
BSL3 (Bacteria)	Biosafety cabinet, Co2 incubator, Deep freezer, Autoclave (vertical, biosafety), Autoclave (double door), Laboratory table with chair, Centrifuge (mini, low speed and high speed), Transilluminator etc.
Preparation Hall (BSL3)	Formalin fumigation system (for laboratory room), Formalin fumigation set (for biosafety cabinet), PAO generator, Air flow visualizer, Photometer, Air velocity meter etc.
BSL2 (1 and 2)	Biosafety cabinet, Co2 incubator, Incubator, Deep freezer -30°C, Deep freezer -80°C, Laboratory refrigerator, Laboratory sink, Autoclave (vertical, biosafety), Laboratory table with chair, Shelf, Water bath, Water bath shaking, Drying oven, Pipette set, Vortex mixer, Centrifuge (mini, low speed and high speed), Transilluminator, Microscope, Fluorescent microscope, Inverted Microscope, Microscope camera set, pH meter, Electric balance, Precision electric balance, Electrophoresis, Gel documentation system, ELISA set, Spectrophotometer, Microwave oven etc.
BSL2 (PCR)	Real time PCR, Conventional PCR etc.
Laboratory kitchen / Washing room	Ultrapure water system etc.
Bio bank 1	Ultra-low temperature freezer, Cryotank etc.
Existing facility, etc.	Individual ventilation animal caging system etc.

JAPAN'S GRANT AID

The Government of Japan (hereinafter referred to as "the GOJ") is implementing the organizational reforms to improve the quality of ODA operations, and as a part of this realignment, a new JICA law was entered into effect on October 1, 2008. Based on this law and the decision of the GOJ, JICA has become the executing agency of the Grant Aid for General Projects, for Fisheries and for Cultural Cooperation, etc.

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

1. Grant Aid Procedures

The Japanese Grant Aid is supplied through following procedures :

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

2. Preparatory Survey

(1) Contents of the Survey

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

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

- Estimation of costs of the Project.

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

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

(2) Selection of Consultants

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

(3) Result of the Survey

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

3. Japan's Grant Aid Scheme

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

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

(2) Selection of Consultants

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

(3) Eligible source country

Under the Japanese Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. When JICA and the Government of the recipient country or its designated authority deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals".

(4) Necessity of "Verification"

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

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

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as Annex.

(6) "Proper Use"

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

(7) "Export and Re-export"

The products purchased under the Grant Aid should not be exported or re-exported from the recipient country.

(8) Banking Arrangements (B/A)

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

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

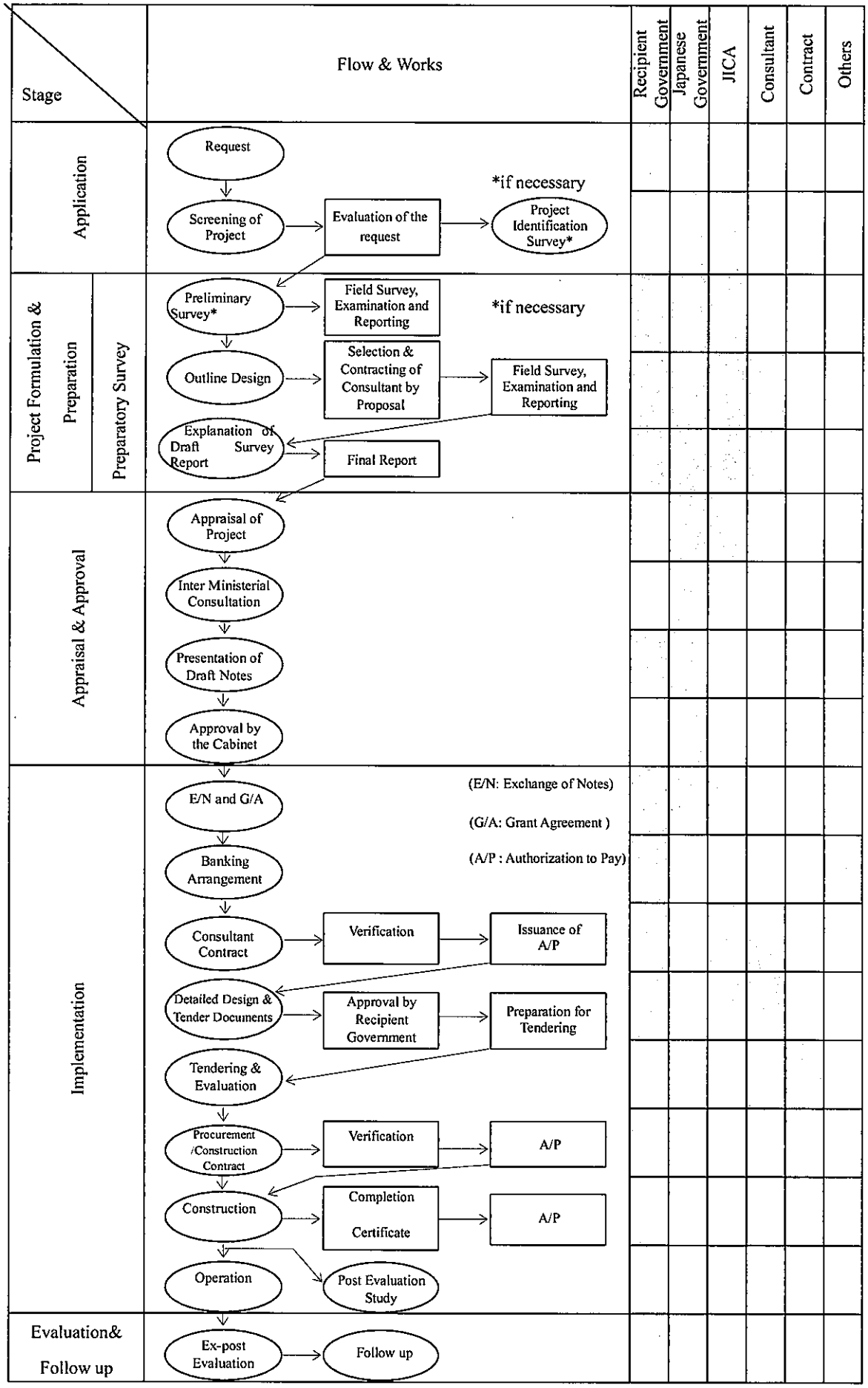
(9) Authorization to Pay (A/P)

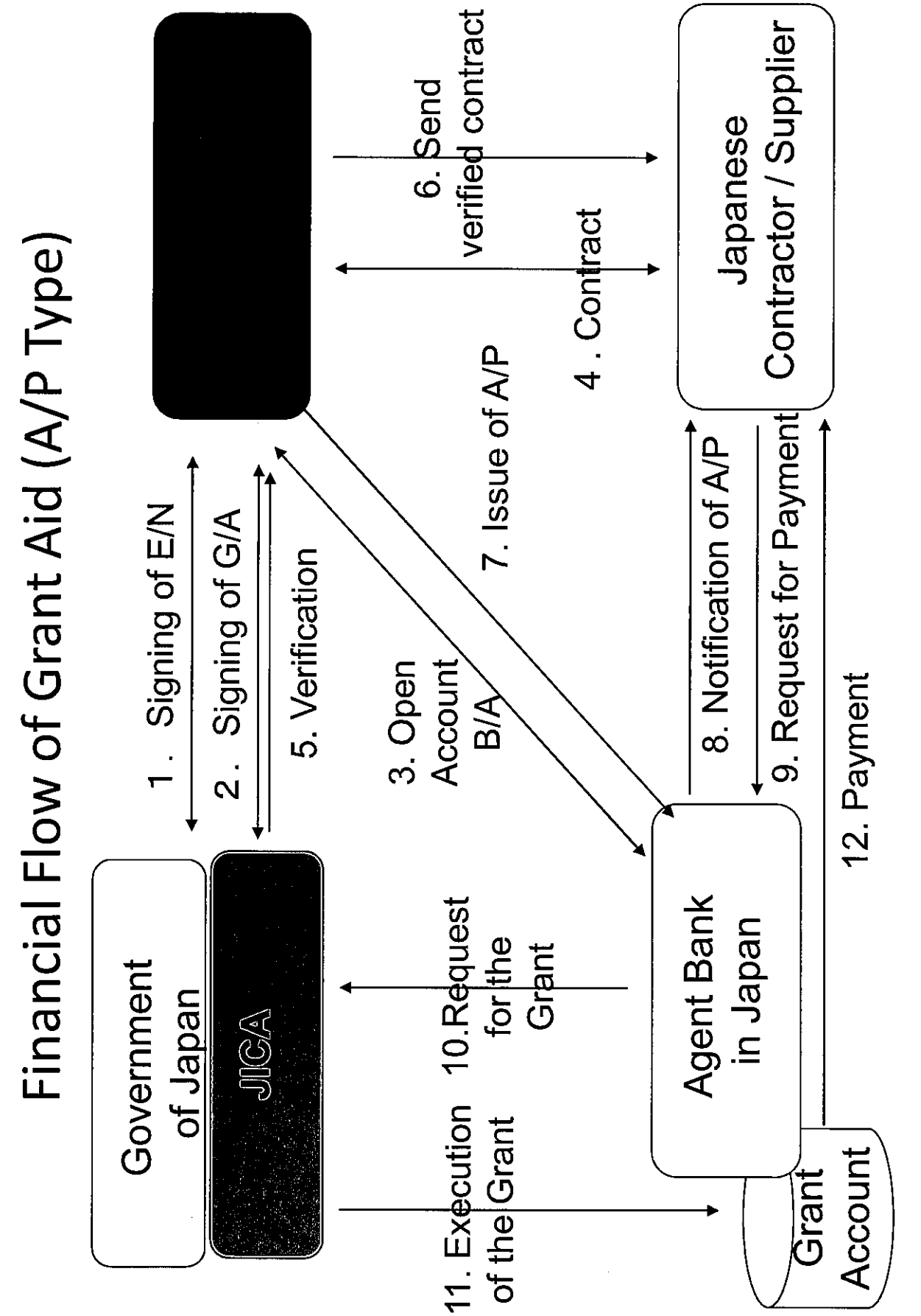
The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions paid to the Bank.

(10) Social and Environmental Considerations

A recipient country must carefully consider social and environmental impacts by the Project and must comply with the environmental regulations of the recipient country and JICA socio-environmental guidelines.

FLOW CHART OF JAPANESE GRANT PROCEDURES




Financial Flow of Grant Aid (A/P Type)
Government of Japan
JICA
[redacted]
Japanese Contractor / Supplier
Agent Bank in Japan
Grant Account
1. Signing of E/N
2. Signing of G/A
5. Verification
3. Open Account B/A
7. Issue of A/P
6. Send verified contract
4. Contract
8. Notification of A/P
9. Request for Payment
12. Payment
10. Request for the Grant
11. Execution of the Grant

Major Undertakings to be taken by both Governments of Nigeria and Japan

No	Items	Responsibility		Major Undertakings to be taken by Recipient			
		To be covered by Grant Aid	To be covered by recipient side	Deadline	In charge	Cost	Remarks
	Before Tender						
1	To bear the following commissions paid to the Japanese bank for banking services based upon the B/A						
	1) Advising commission of A/P		•	2018/7	NCDC/FMoH	20,000 usd	
	2) Payment commission for A/P		•		NCDC/FMoH		
2	To give due environmental and social consideration in the implementation of the Project		•		NCDC/FMENV		
3	To secure the following land necessary for the implementation of the Project						
	1) Project sites for the BSL-3 laboratory, BLS-2 laboratory and Waste water treatment system		•	2018/11	NCDC		
	2) Temporary stock yard for construction near the Project area		•	2019/1	NCDC		
4	To clear, level and reclaim the project site						
	1) Removal of existing asphalt and cement block pavement, concrete curbs	•					
	2) Removal or tranpslant of existing trees		•	2018/11	NCDC	5,000 usd	
	3) Leveling and reclaiming the sites	•					
5	To obtain the building permission		•	2019/1	NCDC/FMFCT		
6	To obtain the environmental permission		•	2018/7	NCDC/FMENV	25,000usd	
	During the Project						
7	To bear the following commissions to a bank of Japan for the banking services based upon the B/A						
	1) Advising commission of A/P		•		NCDC/FMoH		
	2) Payment commission for A/P		•		NCDC/FMoH		
8	To ensure prompt unloading and customs clearance of the products at ports of disembarkation in the recipient country and to assist internal transportation of the products						
	1) Marine (air) transportation of the Products from Japan to the recipient country	•					
	2) Tax exemption and customs clearance of the products at the port of disembarkation		•		NCDC/FMoF		
	3) Internal transportation from the port of disembarkation to the project site	•					
9	To accord Japanese nationals 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 recipient country and stay therein for the performance of their work		•		NCDC/FMFA		
10	(To exempt Japanese nationals from/to bear, without using the Grant,) customs duties, internal taxes and other fiscal levies such as VAT(Value Added Tax), Personal Income Tax, Corporate Income Tax, Remittance Tax, Economic Service Charge, which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract		•		NCDC/FMoF		
11	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities as well as for the transportation and installation of the equipment		•		NCDC/FMoH		
12	Construct temporary access road for the construction work.		•	2019/1	NCDC/FMFCT		

13	To construct the following facilities:						
	1) The building	●					
	2) The gates and fences in and around the site		●		NCDC/FMoH		
	3) The parking lot	●					
	4) The road within the site	●					
	5) The road outside the site		●		NCDC/FMFCT		
14	To provide facilities for distributing electricity, water supply and drainage, and other incidental facilities necessary for the implementation of the Project outside the site						
	1) Electricity						
	a. The distribution power line to the site with electric power capacity required by the Project		●	2019/1	NCDC		
	b. The drop wiring and internal wiring within the site	●					
	c. The main circuit breaker and transformer	●					
	2) Water Supply						
	a. The city water distribution main to the site with water consumption and pressure required by the Project		●	2019/1	NCDC		
	b. The supply system within the site (receiving and elevated tanks)	●					
	3) Drainage						
	a. The city drainage main (for storm sewer and others to the site)		●		NCDC/FMFCT		
	b. The drainage system (for toilet sewer, common waste, storm drainage, and others) within the site	●					
	4) Gas Supply						
	a. The city gas main to the site		●		n/a		
	b. The gas supply system within the site	●					
	5) Telephone System						
	a. The telephone to the main distribution frame/panel (MDF) of the building with line capacity required by the Project		●	2019/1	NCDC		
	b. The MDF and the extension after the frame/panel	●					
	6) Furniture and Equipment						
	a. General furniture		●		NCDC		
	b. Project equipment	●					
	After the Project						
15	To ensure that facilities and the products be maintained and used properly and effectively for the implementation of the Project		●		NCDC/FMoH		
16	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project		●		NCDC/FMoH		
17	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid.						
	1) Allocation of maintenance cost		●		NCDC/FMoH		
	2) Operation and maintenance organization and staff		●		NCDC/FMoH		
	3) Routine check/periodical maintenance		●		NCDC/FMoH		

(B/A: Banking Arrangement, A/P: Authorization to pay)

Tax exemption procedure in Nigeria

(1) Fiscal levies and taxes with respect to the corporate income (Corporate tax)

A. Tax Basic Information (name, percentage, how to calculate, basis law)

(1) Corporate Income Tax

1) Tax rate and calculation method

(a) There shall be levied and paid for each year of assessment in respect of total profits of every company, tax at the rate of thirty kobo for every naira in case of "Standard Profit".

- Definition of Standard Profit

  Standard Profit means - in the case of every company other than a Nigerian company and as respects any year of assessment commencing on 1st January 1989,

  (i) the amount of fifteen per cent of the turnover of the company for that year being turnover attributed to any part of the operations of the company carried out in Nigeria; or

  (ii) the amount of six million naira, whichever is greater.

(b) There shall, as from the assessment year commencing on 1st January, 1989 be levied and paid a special levy of fifteen per sent on excess profits of every company including banks and for the purpose of this section.

- Definition of Excess Profit

  "Excess profits" means the difference between total profits as computed in accordance with section 31of this Act and standard profits as calculated in accordance with the previsions of (a) (i) or (ii) of this section.

2) Basis law

Companies Income Tax Act CAP.60 LFN:1990

B Tax Exemption Procedure(procedure, application authority, required time)

To be filled out later (survey in progress)

C Other remarks

(2) Fiscal levies and taxes on their personal income (Personal income tax)

A. Tax Basic Information (name, percentage, how to calculate, basis law)

(1) Personal Income Tax

1) Tax rate and calculation method

0.5% of taxable income

2) Basis law
Personal Income Tax Act No.104,1993

B Tax Exemption Procedure(procedure, application authority, required time)
To be filled out later (survey in progress)
C Other remarks

(3) Indirect taxes such as Value added tax （VAT)

A. Tax Basic Information (name, percentage, how to calculate, basis law)
(1) Value Added Tax
1) Tax rate and calculation method
5% of taxable value

2) Basis law
Value Added Tax Act 1993 No.102,1993

B Tax Exemption Procedure(procedure, application authority, required time)
To be filled out later (survey in progress)

C Other remarks

(4) Duties and related fiscal charges with respect to the import and/or re-export of materials and equipment (Customs)

A. Tax Basic Information (name, percentage, how to calculate, basis law)
(1) Customs duties and excise duties imposed by Nigeria
1) Rate of tax
As shown in the attachment "CET_tariff"
2) Basis law
Customs and Excise Management Act,CAP84,1990

(2) Other duties and fiscal levies
1) Port Development Levy : 7% of the duties payable
2) ECOWAS Community Levy : 0.5%
3) Comprehensive Import Supervision Scheme Charge : 1% of the F.O.B value of

imports

4) Statistical Tax : 1%

B Tax Exemption Procedure(procedure, application authority, required time)

To be filled out later (survey in progress)

C Other remarks

(5) Other taxes

A. Tax Basic Information (name, parentage, how to calculate)

B Tax Exemption Procedure(procedure, application authority, required time)

C Other remarks

Minutes of Discussions
on the Preparatory Survey for the Project for
Strengthening the Diagnostic Capacity of Nigeria Centre for Disease Control
(Explanation on Draft Preparatory Survey Report)

With reference to the minutes of discussions signed between Nigeria Centre for Disease Control (hereinafter referred to as "NCDC") and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on 25 August 2017 and in response to the request from the Government of Nigeria (hereinafter referred to as "Nigeria") dated 15 November 2017, JICA dispatched the Preparatory Survey Team (hereinafter referred to as "the Team") for the explanation of Draft Preparatory Survey Report (hereinafter referred to as "the Draft Report") for the Project for Strengthening the Diagnostic Capacity of Nigeria Centre for Disease Control (hereinafter referred to as "the Project").

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

Abuja, 15 February 2018

Mitsuo Isono
Leader
Preparatory Survey Team
Japan International Cooperation Agency
Japan

Emmanuel Meribole
Director
Department of Health Planning, Research and Statistics
Federal Ministry of Health
The Federal Republic of Nigeria

Chikwe Ihekweazu

National Coordinator

Chief Executive Officer

Nigeria Centre for Disease Control

The Federal Republic of Nigeria

Witnessed by

Samuel Eloho

Director

Department of International Cooperation

Federal Ministry of Budget and National Planning

The Federal Republic of Nigeria

ATTACHMENT

1. Project site

   Both sides confirmed that the site of the Project is on the ground of the NCDC (Abuja) which is shown in Annex 1.

2. Responsible authority for the Project

   Both sides confirmed the authorities responsible for the Project are as follows:

   2-1. NCDC 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.

   2-2. The line ministry of the Executing Agency is the Federal Ministry of Health (hereinafter referred to as "FMoH"). FMoH shall also be responsible for oversight of the Project as well as securing exemption of all taxes, custom duties and fiscal levies imposed in Nigeria related to the implementation of the Project.

   2-3. The Federal Ministry of Budget and National Planning (hereinafter referred to as "FMBNP") is an agency responsible for managing the Japanese Grant Aid Projects in Nigeria, and as such the Executing Agency and the line ministry are managed by FMBNP.

3. Contents of the Draft Report

   After the explanation of the contents of the Draft Report by the Team, the Nigerian side agreed on its contents. The facility components which are included in the Project are shown in Annex 3 and the equipment list is shown in Annex 4. Based on the discussions in the last mission, a space for animal keeping before experiments and an incinerator are excluded from the Project.

4. Cost estimate

   Both sides confirmed that the cost estimate including the contingency described in Annex 5 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.

5. Confidentiality of the cost estimate and technical specifications

Both sides confirmed that the cost estimate and technical specifications of the Project in the Draft Report and Annex 5 should never be duplicated or disclosed to any third parties except until all the contracts under the Project are concluded.

6. Timeline for the project implementation

The Team explained to the Nigerian side that the expected timeline for the project implementation is as attached in Annex 6. Both sides agreed to take necessary actions properly according to the timeline for smooth implementation of the Project.

7. Expected outcomes and indicators

Both sides agreed that key indicators for expected outcomes are as follows. The NCDC will be responsible for the achievement of agreed key indicators targeted in year 2023 and shall monitor the progress based on those indicators.

[Quantitative indicators]

Indicators	Baseline	Goal (2023)
Number of new research and diagnostic methods using BSL3 laboratory (cases/year)	NA	3
Number of research programs using BSL3 laboratory (cases/year)	0	5
Number of researchers/technicians who are trained to use BSL3 laboratory (number of people)	0	25

[Qualitative indicators]

・Improvement of the safety and quality of diagnostic and research procedures (increase in efficiency and accuracy)

・Prevention of public health threats in Nigeria by strengthening capacity to response to infectious diseases and surveillance system

・Increase of the significance of NCDC as the centre of excellence for the infectious disease control in the region of ECOWAS

8. Technical assistance ("Soft Component" of the Project)

Considering the sustainable operation and maintenance of the products and services granted through the Project, technical assistance for operation and maintenance of

specialized facility, specialized equipment for BSL3 and BSL2 laboratories and facility for medical wastewater is planned under the Project. The Nigerian side confirmed to deploy necessary number of counterparts who are appropriate and competent for its purpose of the technical assistance as described in the Draft Report.

9. Undertakings of the Project

Both sides confirmed the undertakings of the Project as described in Annex 7. Both sides also confirmed that the Annex 7 will be used as an attachment of G/A.

9-1. Exemption of customs duties, internal taxes and other fiscal levies

Such customs duties, internal taxes and other fiscal levies including Value Added Tax (hereinafter referred to as "VAT"), commercial tax, income tax and corporate tax which may be imposed in Nigeria with respect to the purchase of the products and/or the services shall be exempted. FMoH will take necessary action to ensure the exemption, through sending letters to Federal Ministry of Finance and other relevant authorities to have order(s) in the exemption and instruct all relevant agencies and offices to follow it. Such procedure can start just after the signing of Exchange of Notes (hereinafter referred to as "E/N") and G/A utilizing list(s) of equipment and its cost estimation, instead of actual invoice.

9-2. Budget to be secured by Nigerian side

The Nigerian 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.

9-3. Personnels to be secured by Nigerian side

The Nigerian side agreed the plan to allocate necessary personnels of new laboratories based on the recommendation by the Japanese side.

10. Linkage with the Technical Cooperation Project

Considering the significance of capacity development for sustainable utilization of the new laboratory, especially for the BSL3 rooms, the Japanese side confirmed to provide technical assistance, in addition to the "Soft Component" in section 8, to develop human resource and management system for full operation and maintenance of the new laboratory through the technical cooperation project which

is planned to start in 2019. The Japanese side pointed out the significance of promotion of research program in collaboration with foreign institutes to increase operational cost of the new laboratory and also agreed to work on this issue through the technical cooperation project.

11. 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 8. The timing of submission of the PMR is described in Annex 7.

12. 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.

13. 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 Nigerian side is required to provide necessary support for the data collection.

14. Schedule of the Study

JICA will finalize the Preparatory Survey Report based on the confirmed items. The report will be sent to the Nigerian side around April, 2018.

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.

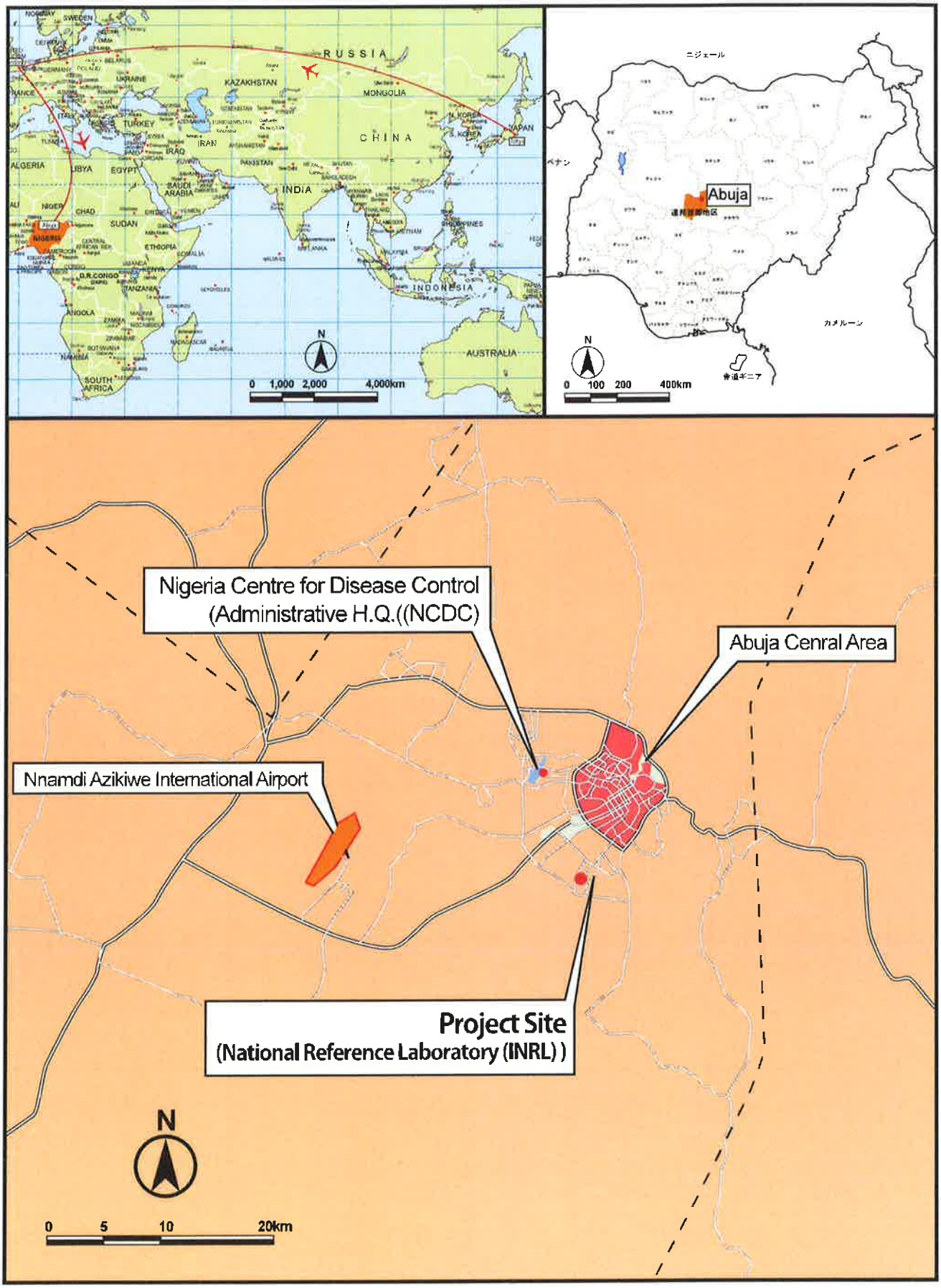
16. Other Relevant Issues

16-1. Disclosure of Information

Both sides confirmed that the Preparatory Survey Report from which project cost

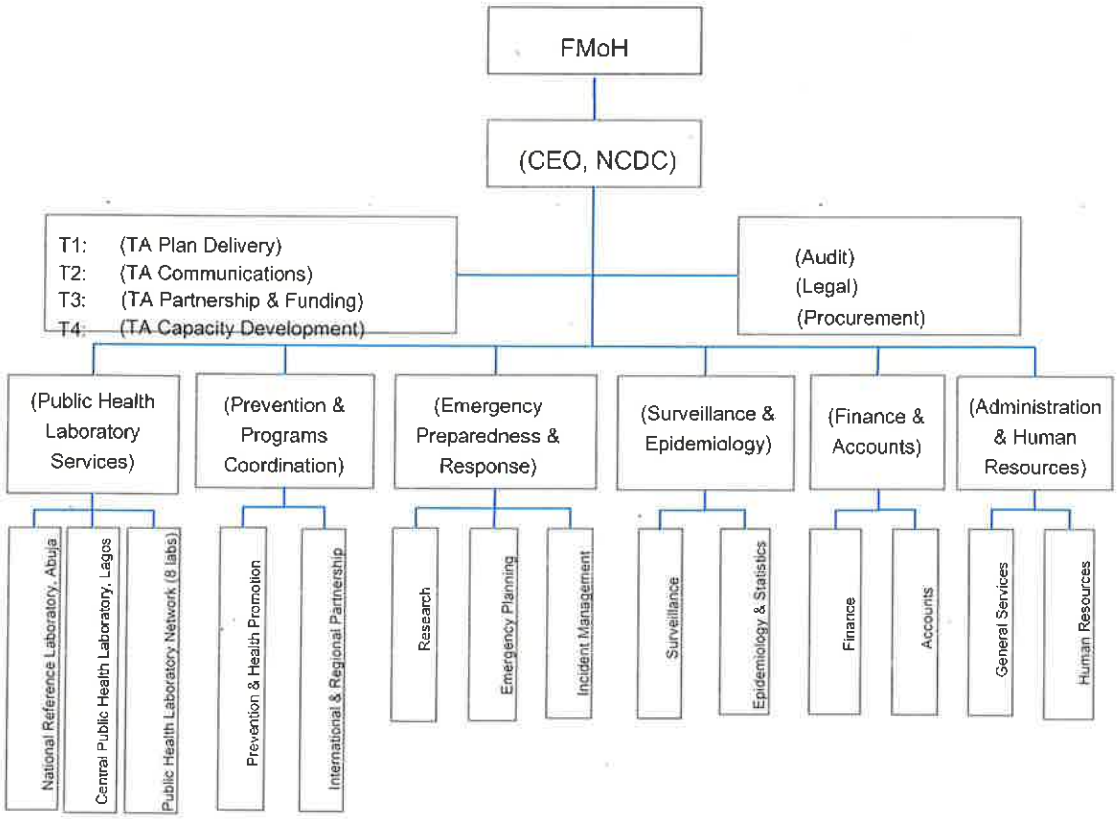
is excluded will be disclosed to the public after completion of the Preparatory Survey. The comprehensive report including the project cost will be disclosed to the public after all the contracts under the Project are concluded.

Annex 1 Project Site
Annex 2 Organization Chart
Annex 3 Outline of the Facility
Annex 4 Equipment List
Annex 5 Project Cost Estimation (confidential)
Annex 6 Project Implementation Schedule
Annex 7 Major Undertakings to be taken by the Government of Nigeria
Annex 8 Project Monitoring Report (template)



Location Map

Organization Chart of the NCDC



Outline of the facility

Area	Room name	Floor Area [m^2]	Total [m^2]
BSL-3 Area	P3 Laboratory (Bacteria with 3 Anterooms)	60.76	354.53
	P3 Laboratory (Virus with 3 Anterooms)	60.76	
	P3 Laboratory (Animal experiments with 4 Anterooms)	99.88	
	Preparation hall (BSL-3)	43.50	
	Bio-bank (BSL-3)	20.38	
	Service corridor (BSL3)	50.03	
	Anterooms (Male)	9.61	
	Anterooms (Female)	9.61	
BSL-2 Area	P2 Laboratory 1 (with Anteroom)	53.00	165.70
	P2 Laboratory 2 (with Anteroom)	44.57	
	P2 Laboratory (PCR)	9.84	
	Preparation hall (BSL-2)	39.50	
	Bio-bank 2 (BSL-2)	18.79	
Service area (BSL-2)	Service corridor (BSL-2)	26.65	145.97
	Hall 1	21.31	
	Hall 2	12.24	
	Storage 2 (Reagent)	13.00	
	Storage 3(Animal equipment)	13.00	
	Laboratory kitchen, Washing room	35.45	
	Bio-bank 1(BSL-2)	24.32	
Administrative area	Entrance hall 1	57.51	279.63
	Entrance hall 2, Corridor	69.49	
	Office, Monitoring room	39.06	
	Staff room	24.24	
	WC (Male)	18.79	
	WC (Female)	22.84	
	Storage 1	5.10	
	Staircase 1	28.45	
	Staircase 2	10.75	
	EPS	3.40	
		(Sub total)	945.83
Machine room	Electrical room 1 (GF)	13.50	873.42
	Oil pump room (GF)	3.96	
	Machine room (BF)	180.34	
	HVAC rooms (1F) · Electrical room 2 (1F)	675.61	
Grand total			1,819.25m2

Equipment List

No.	Equipment name	Total
1	Aerosol photometer	1
2	Air flow visualizer	1
3	Air velocity meter	1
4	Autoclave, double door A	1
5	Autoclave, double door B	2
6	Autoclave, vertical	2
7	Autoclave, vertical, biosafety	5
8	Biosafety cabinet A	1
9	Biosafety cabinet B	1
10	Biosafety cabinet C	2
11	Biosafety cabinet D	4
12	Centrifuge, high speed	4
13	Centrifuge, low speed	4
14	Centrifuge, mini	5
15	CO2 incubator	4
16	Computer	5
17	Cryotank	2
18	Deep freezer A	4
19	Deep freezer B	10
20	Domestic refrigerator	1
21	Electric balance	1
22	Electric balance, precision	1
23	Electrophoresis	2
24	ELISA set	1
25	Formaldehyde fumigation set (for biosafety cabinet)	1
26	Formaldehyde fumigation set (for laboratory)	1
27	Gel documentation system	1
28	Glove box A	1
29	Glove box B	1
30	Hot air oven	2
31	Incubator	3
32	Incubator with shaker	1
33	Caging system A	1
34	Caging system B	1
35	Laboratory refrigerator	5
36	Laboratory sink	5
37	Microscope	2
38	Microscope, fluorescent	1
39	Microscope, inverted, fluorescent	1
40	Microvolume spectrophotometer	1
41	Microwave oven	2
42	PAO generator	1
43	pH meter	1
44	Pipette set	5
45	PCR work station	1
46	Real-time PCR	1
47	Shelf	8
48	Spectrophotometer	1
49	Thermoblock	6
50	Thermal cycler,	2
51	Transilluminator, UV	4
52	Transilluminator, LED	1
53	Ultrapure water system	1

54	Ultracentrifuge	1
55	Voltex mixer	5
56	Waste liquid tank	5
57	Water bath	2
58	Working bench A	5
59	Working bench B	1

Project Cost Estimation

The detailed initial costs to be borne by the Japanese side and the Nigerian side according to the division of works are estimated based on the calculation conditions as specified in (3), when the Project is implemented through the Japan's Grant Aid. This cost estimation is provisional.

(1) Cost to be borne by the Japanese side

(2) Costs to be borne by the Nigerian Side

Items	Cost estimation (NGN: Naira)	Remarks
1. Cost for site preparation	12,136,304	
1) Site preparation and clearance (removal, replacement etc.)	2,964,454	trees, street lights
2) Water supply main distribution line	4,190,500	
3) Electrical power supply main distribution line	3,567,750	
4) Telecommunication line	1,398,600	
5) Data communication line	315,000	
6) Land use change/Land ownership renewal	0	Free
2. Building permit	1,510,000	
3. Social and Environmental Impact Assessment	1,832,000	
4. General furniture	4,079,524	meeting table, desk & chair, curtain
5. Banking arrangement fee	4,187,196	
Sub-total (1)	24,045,023	
6. Tax exemption (reimbursement)		
VAT	67,134,271	Estimated costs in local currency x5%
Sub-total (2)	67,134,271	
Total ((1) + (2)) Rate: 1NGN=0.36769yen	91,179,294	33,525 (thousand yen)

(3) Costs to be borne by the Nigerian Side after the Project

Items	Cost estimation (NGN: Naira)	Remarks
To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid. - Annual maintenance cost of utilities of building facility	130,864,729	
- Annual maintenance cost for maintenance of building facility	28,344,179	
- Annual maintenance cost of maintenance of equipment	83,010,413	
Total	242,219,321	

(4) Calculation Conditions

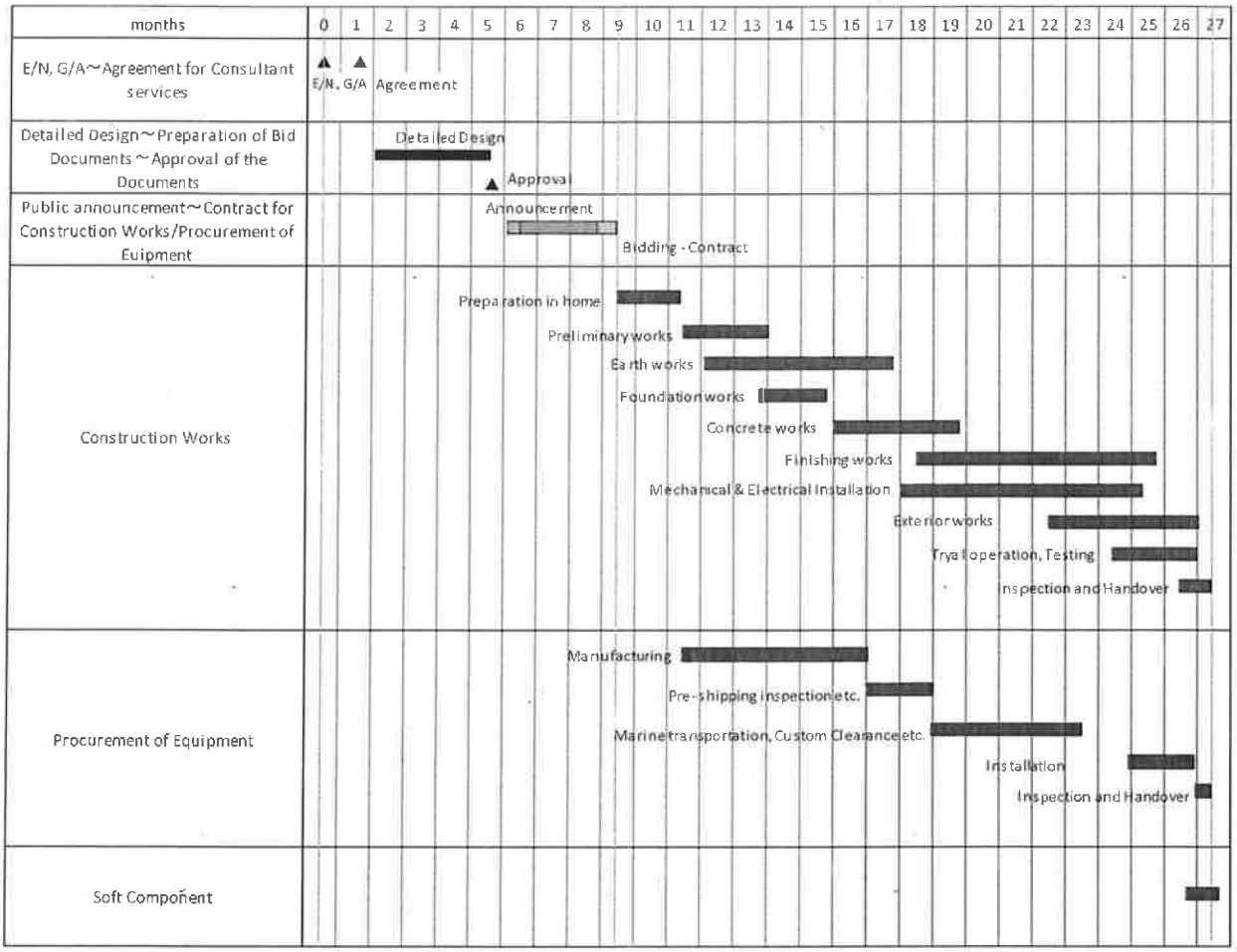
1) Date of estimation: September, 2017

2)Exchange rate: Average three-month rate from 1st June to 31st August, 2017
1Naira = 0.36769 Japanese yen
1US$ = 112.05 Japanese yen

3)Construction Period: 18months (including 2 months domestic preparation period)

4)Other: The Project shall be implemented in compliance with Japanese Grant Aid Scheme.

Project Implementation Schedule



Major Undertakings to be taken by the Government of Nigeria

Specific obligations of the Government of Nigeria which will not be funded with the Grant

(1) Before the Tender

NO	Items	Deadline	In charge	Estimated Cost (NGN)	Ref.
1	To Open Bank Account (Banking Arrangement (B/A))	Within 1 month after G/A	FMBNP	-	
2	To bear the following commissions paid to the Japanese bank for banking services based upon the B/A - Advising commission of A/P	2018/8	NCDC	4,187,196	
3	To clear, level and reclaim the project site - Removal or transplant of existing trees	2018/11	NCDC	2,964,454	
4	To obtain the approval of land use including sub-division of land ownership, if any	2018/8	NCDC	0	
5	To obtain the environmental permission	2018/8	NCDC	1,832,000	
6	To obtain the building permission	2018/8	NCDC	1,510,000	
7	To submit Project Monitoring Report (with the result of Detail Design)	before preparation of bidding document	NCDC		

(2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost (NGN)	Ref.
1	(To exempt Japanese nationals from/to bear, without using the Grant,) customs duties, internal taxes and other fiscal levies such as VAT(Value Added Tax), Personal Income Tax, Corporate Income Tax, Remittance Tax, Economic Service Charge, which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract	-	NCDC	(67,134,271)	
2	Electricity - The distribution power line to the site with electric power capacity required by the Project	2019/1	NCDC	3,567,750	
3	Water Supply - The city water distribution main to the site with water consumption and pressure required by the Project	2019/1	NCDC	4,190,500	
4	Telecommunication System - The telephone trunk line to the main distribution frame/panel (MDF) of the building with line capacity required by the Project	2019/1	NCDC	1,398,600	
5	- Data communication trunk line with line capacity required by the Project	2019/1	NCDC	315,000	
6	Furniture and Equipment - General furniture, if any	-	NCDC	4,079,524	

7	1) To submit Project Monitoring Report	every month	NCDC		
	2) To submit Project Monitoring Report (final)	within one month after signing of Certificate of Completion for the works under the contract	NCDC		
8	To submit a report concerning completion of the Project	within six months after completion of the Project	NCDC		

(3) After the Project

NO	Items	Deadline	In charge	Estimated Cost (NGN)	Ref.
1	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid. - Annual maintenance cost of utilities of building facility	-	NCDC	130,864,729	
2	- Annual maintenance cost for maintenance of building facility	-	NCDC	28,344,179	
3	- Annual maintenance cost of maintenance of equipment	-	NCDC	83,010,413	

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)

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) F=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)

-
-
-

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%)	

TECHNICAL NOTES (T/N)

The Preparatory Survey on the Project for Strengthening the Diagnostic Capacity of Nigeria Centre for Disease Control in the Federal Republic of Nigeria

As recorded in the Minutes of Discussions (M/D) signed on August 25, 2017 between Nigeria Centre for Disease Control (NCDC) and JICA for the captioned project (hereafter referred to as "the Project"), the Consultant continued the study and this T/N was prepared and signed. M/D prevails over T/N.

1. Project Site

Project area:

(1) The Consultant explained the Project Area inside the NCDC/NRL compound in Gaduwa district, which is required for the construction of the new building and facility implemented by the Project, as indicated in the Attchment-1, and NCDC agreed with the explanation.

(2) The Consultant explained that existing trees/plants and the electrical lighting poles indicated in the attachement-1 would be removed by NCDC before January, 2019 prior to the expected dated of the public announcement of the tender, and NCDC agreed with the explanation.

Parking lots:

(3) The Consultant explained the parking lots should be rearranged as proposed in the Attachment-1 in compliance with the building code of Nigeria, and NCDC agreed with the explanation.

2. Utilities for the Project

Electrical power line:

(1) The Consultant explained the connection point with the grid power by utilizing the existing electrical pole, as well as the scope of works which shall be undertaken by NCDC, as indicated in the Attchment-2, and NCDC understood the explanation.

(2) The Consultant submitted the estimated cost as NCDC's undertaking obtained from the AEDC (Abuja Electricity Distribution Company) to NCDC for their budgetary preparation.

City water supply line:

(3) The Consultant explained that the water source for the existing NRL building was the well water which is not favorable in terms of the supply with stable volume and water quality, and that the city potable water would be recommended by newly connecting from the nearest connection points located approximately 1.2km away from the compound, as indicated in the Attchment-3, and NCDC understood the explanation.

NCDC agreed that the water source for the Project would be selected based on results of water quality tests which the Consultant is carrying out.

(4) The Consultant submitted the estimated cost as NCDC's undertaking obtained from the Water Board of FCT (Federal Capital Territory) to NCDC for their budgetary preparation.

Telecommunication network:

(5) The Consultant explained that the incoming telecommunication network to the new building would be an independent connection in terms of the biosecurity and operation, and NCDC agreed with the explanation.

(6) The Consultant submitted the estimated cost as NCDC's undertaking obtained from the MTN and GLO to NCDC for their budgetary preparation.

3. Building and Facility Planning

Architectural planning:

(1) The Consultant explained the block layout, the floor plan (ground floor), the cross section and the list of rooms planned as shown in the Attachment-4, 5, 6, 7 respectively, and NCDC agreed with the planning.

(2) The Consultant requested the space/room required for the animal care and storage before the experiments would be considered in the exiting NRL building, and NCDC acknowledged and allocated the room (2.7m x 2.8m) located next to the entrance hall at the existing NRL building.

(3) The Consultant explained the flow plan of ingress/egress at the BSL-2, BSL-3 laboratory with handling laboratory clothes and PPE as shown in the Attachment-8, and NCDC agreed with the planning.

Arrangements of incoming electrical power line:

(4) The Consultant explained that i) the exiting transformer and distribution line would remain as currently installed, and that ii) the existing transformer would be fed by branching 33kv of MV power from the switchgear panel located near the connection point and provided by the Project, as shown in the Attachment-2, and NCDC agreed on the explanation.

Infectious waste management:

(5) The Consultant explained the handling flow for the infectious waste disposals as shown in the Attachment-9, and NCDC agreed on the explanation.

(6) NCDC explained that the existing incineration system would be renovated and upgraded by NCDC. The Consultant suggested that the upgraded capacity of the incineration system would suffice for processing those waste generated from the new building and facility of the Project, and NCDC agreed on the request.

4. Equipment Planning

(1) The Consultant explained the equipment to be examined for the provision by the Project as indicated in the equipment list Attachment-11 as the results of review and discussions with NCDC on the requested equipment indicated in the Attachment-10, and NCDC agreed with the planning.

(2) The Consultant requested that NCDC would employ at least one biomedical engineer for equipment management and maintenance, and NCDC acknowledged needs and the request.

(3) The Consultant requested that NCDC would make the maintenance contract(s) with the external specialized agent(s) in PCR and Autoclave etc., NCDC acknowledge needs and the request.

5. Construction Planning

(1) The Consultant explained the construction planning on temporary occupation during the construction for the following purposes as indicated in the Attchment-12, and NCDC understood the explanation.

1) Site temporary office for the Consultant at the existing NRL building

2) Site temporary office, toilets, storage etc. for the Contractor at the existing parking area

3) Stock yards and workshop of materials/equipment at the existing parking area

4) Temporary enclosure and gates for the construction area with fencing

(2) The Consultant explained that the area inside the right of way along the exterior fence, where the corn field (it may be unlawful plantation) currently extends, would be utilized as a part of the temporary occupation during the construction, and that the corn plots would be required to be removed before the commencement of construction, and NCDC understood the explanation.

(3) The Consultant explained that the access for NCDC/NRL personnel during the construction to the existing building would be through the temporary gate, which will be constructed at the North-west corner of the compound by the Contractor, having necessary spaces for parking outside the compound, and NCDC understood the explanation.

(4) The Consultant requested the following considerations during the construction, and NCDC understood the explanation.

1) The Consultant shall be allowed to work at the site office from 8:00 to 17:00 on week days and Saturday.

2) The Consultant shall be allowed to work at the site office on Sunday as well as at the night shift by requesting permissions in anticipation.

3) The Contractor shall be allowed to utilize the existing well water or city water on the purpose of the construction and/or to drill new bore hole for that purpose in the compound.

6. "Soft Component" of the Project

(1) NCDC requested, after confirming the importance of the operation and maintenance for the building facilities and equipment specialized for the P3 laboratory provided by the Project, a further study on the availability of the following technical assistances, and the Consultant understood the request.

1) Training on the operation and maintenance of the air conditioning and ventilation system for the P3 laboratory

2) Training on the operation and maintenance of the specialized equipment for the P3 laboratory such as the double door autoclaves, the fumigation system with formalin gas, the biosafety cabinets, the glove boxes etc.

3) Training on infectious wastewater treatment management (including training on the operation of the high temperature heating sterilization system)

7. Other Relevant Issues

Land Ownership and Land Use of the NCDC/NRL compound:

(1) The Consultant requested the submission of copies of the evidential/supporting documents of the landownership no later than September 19, 2017, and NCDC acknowledged the request.

(2) The Consultant explained that those evidential/supporting documents should declare the appropriate designation of land use for the laboratory, and be lawfully required to submit to the supervisory authority in due course for obtaining the building approval of the Project, and NCDC acknowledged the explanation.

Building Approval for the building facility of the Project:

(3) The Consultant explained that the building approval of the Project would be applied and obtained by NCDC's undertaking before January, 2019 prior to the expected dated of the public announcement of the tender, and that the following arrangements and documentations should be conducted by NCDC, and NCDC acknowledged the explanation.

1) Carry out the technical review on the design documents prepared by the Consultant by contracting architects and engineers registered in ARCON(Architect Registration Council of Nigeria) and COREN(Council for the Regulation of Engineering in Nigeria)

2) Carry out the environmental impact assessment(EIA) and preparation of the EIA report by contracting a town planner qualified by FCDA(Federal Capital Development Agency)

3) Carry out the preparation of documents required for the application incorporating results of 1) and 2) by contracting a town planner qualified by FCDA

(4) Due to the fact that NCDC organizes no in-house nor outsourceable engineering expertise related to the building infrastructure, NCDC requested to reconsider the scope of undertakings between Nigerian side and Japanese side stated above in (3)-1), and to include the technical review by the Nigerian qualified architects/engineers into the scope of Japanese side for the purpose of the smoother implementation of technical clarification and communication required

on the review, and the Consultant understood the request for a further study.

(5) The Consultant explained that it would mostly take 3 months to evaluate the application and issue the approval after receiving of the complete documents of application, and NCDC acknowledged the explanation.

(6) The Consultant requested the provision of copies of the building approval of the existing NRL building no later than September 19, 2017, and NCDC acknowledged the request.

(7) The Consultant requested the provision of copies of the EIA report which had been attached with the building approval of the existing NRL building no later than September 19, 2017, and NCDC acknowledged the request.

(8) The Consultant explained that those documents stated above in (4), (5) together with document stated in (3) would be required to submit as a mandatory to the supervisory authority in due course for obtaining the building approval of the Project, and NCDC acknowledged the explanation.

Environmental Impact Assessment:

(9) The Consultant explained that the EIA mandated by the Federal Ministry of Environment must been conducted focusing on the land utilization of the NCDC/NRL compound other than the EIA for the building approval mentioned above in (6). The Consultant requested to identify the relevant records and provide copies of documents if any, and NCDC understood the explanation.

Staff Deployment/Assignment

(10) NCDC explained that two assigned staff for maintenance of the building facility, whose expertise is the electrical installation, would take care of minor maintenance and small scale repairs such as A/C, lighting fixtures, retouch painting etc., and that major maintenance and large scale renovation would be conducted by outsourcing.

(11) The Consultant requested to consider strengthening the operation and maintenance structure i) by recruitment of mechanical and electrical engineers for the new building and facility, ii) by outsourcing the specialized maintenance company such as AFMS(Air Filter Maintenance Services, South Africa) who is capable to provide the periodical maintenance services and calibrations, and NCDC agreed with the request.

Field Survey by Local sub-consultant:

(12) The Consultant requested to extend the approval given by NCDC after the Study team departure for the following survey to be continued, and NCDC approved the request.

1) Measurement of the fluctuation of electrical power supply at the power receiving room in the exiting NRL building

2) Water Sampling of the existing well at CPHL in Lagos

Questionnaires:

(13) The Consultant requested answers to the questionnaires Chapter-4: Current Operation and Future Plan for Biomedical Research Activities, Chapter-5: Operation and Management of NCDC, Chapter-7: Equipment Plan for NRL and CPHL of NCDC, Chapter-10: Operation and Maintenance Plan, which have remained blank partially for answers, and NCDC acknowledged the request.

(End of Notes)

Attachment 1 Project Area

Attachment 2 Location and Scope of works for the electrical power connection

Attachment 3 Location and Scope of works for the city potable water connection

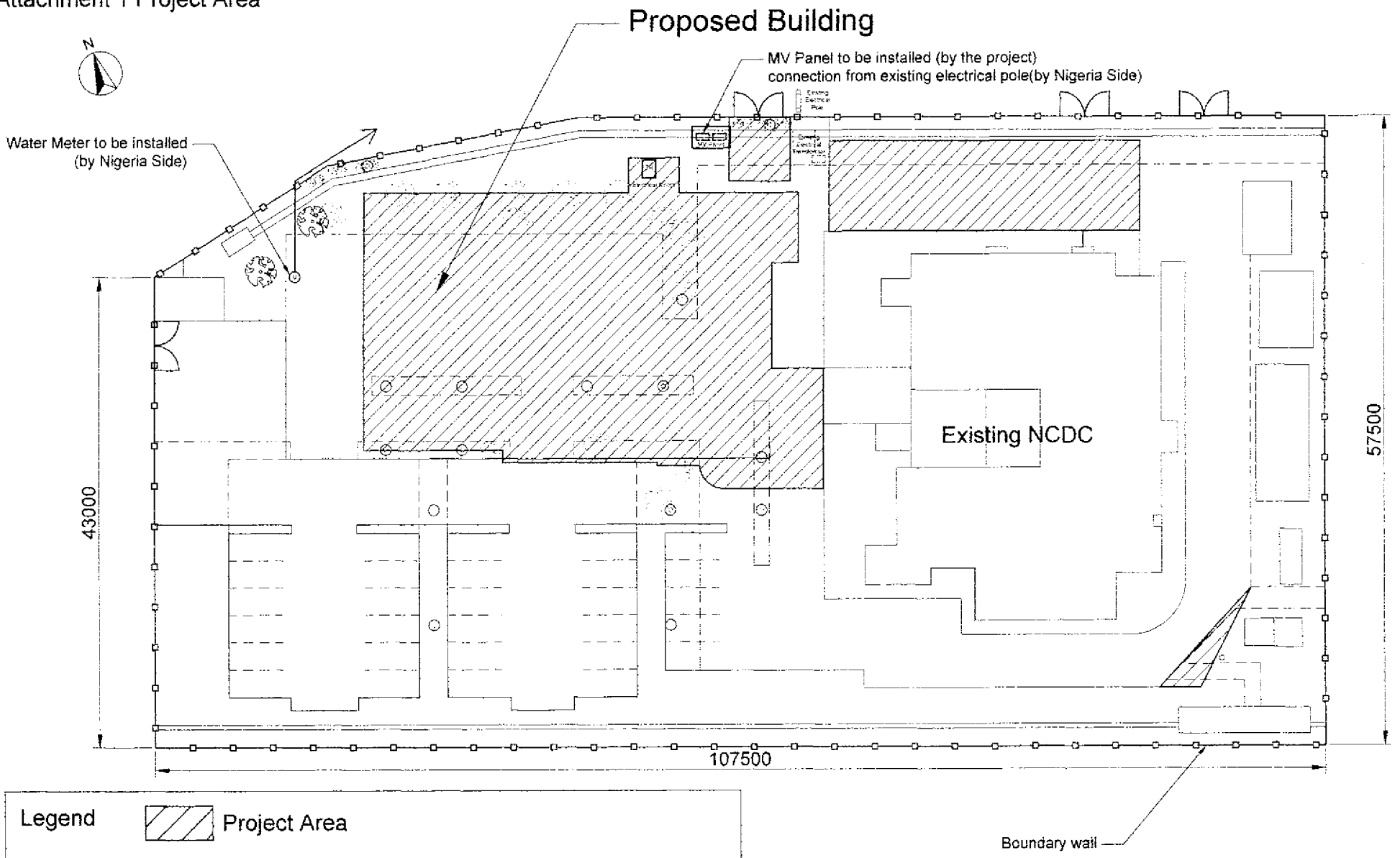
Attachment 4	Block layout
Attachment 5	Floor plan (ground floor)
Attachment 6	Cross section
Attachment 7	List of rooms planned
Attachment 8	Ingress/Egress flow at P2, P3 laboratory
Attachment 9	Infectious waste management flow
Attachment 10	Requested equipment
Attachment 11	Equipment list
Attachment 12	Construction planning for temporary occupation during the construction

Abuja, September 11, 2017

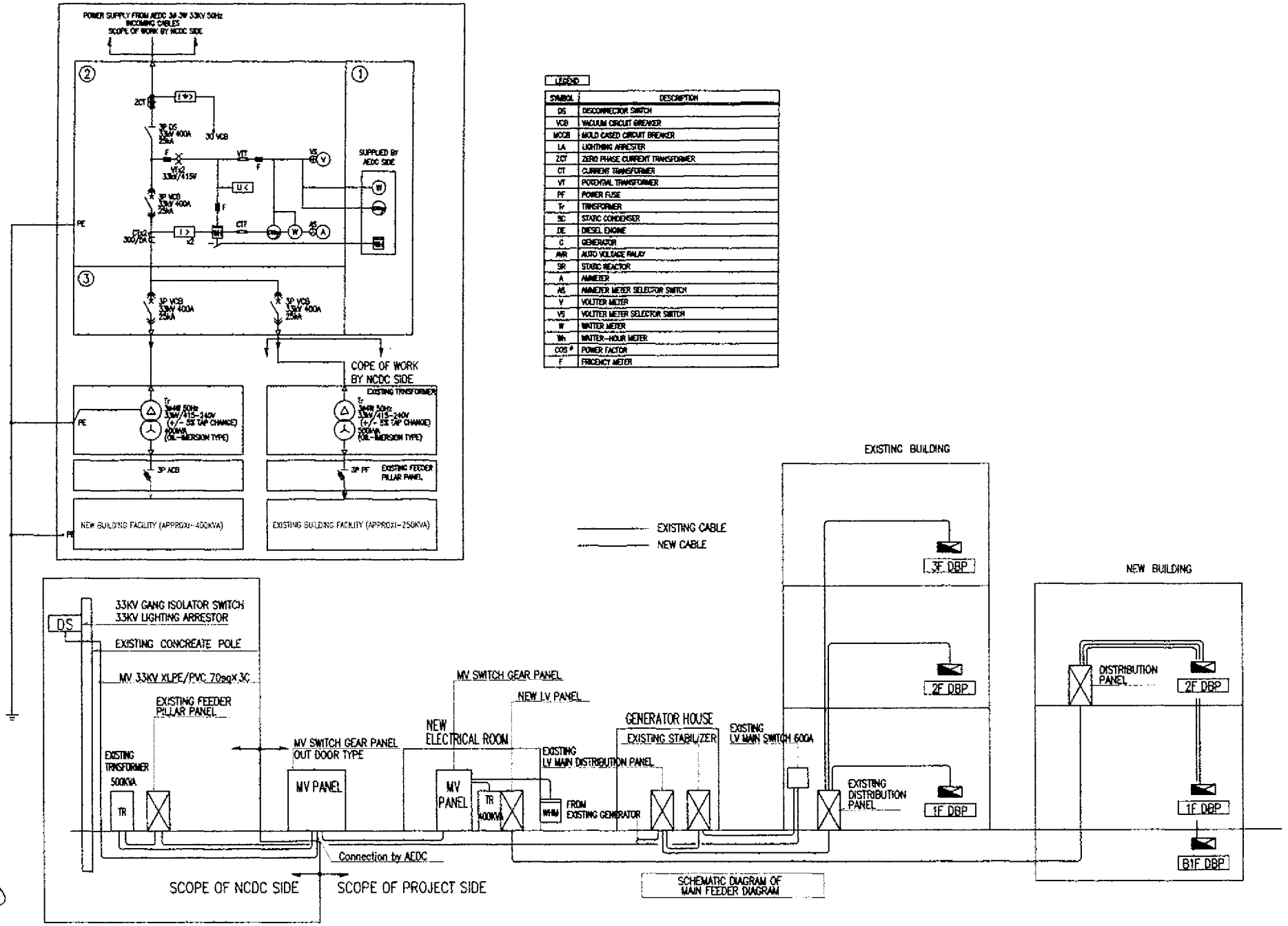
Prof. Adebola T. Olayinka
Consultant/Senior Laboratory Adviser
Nigeria Centre for Disease Control

Mr. Teruyasu EZURE
Chief Consultant, JICA Study Team
Oriental Consultants Global Co., Ltd.

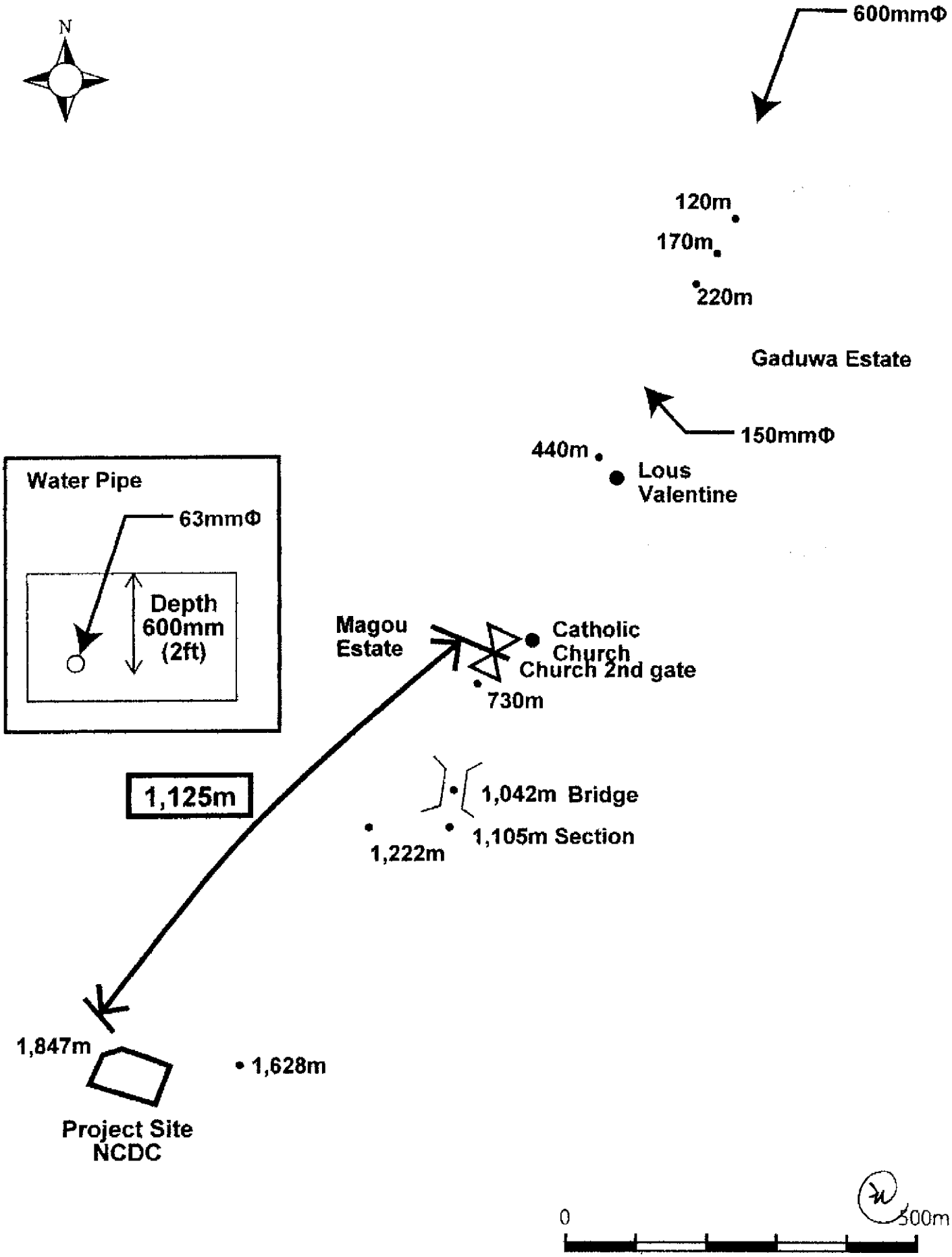
Attachment 1 Project Area



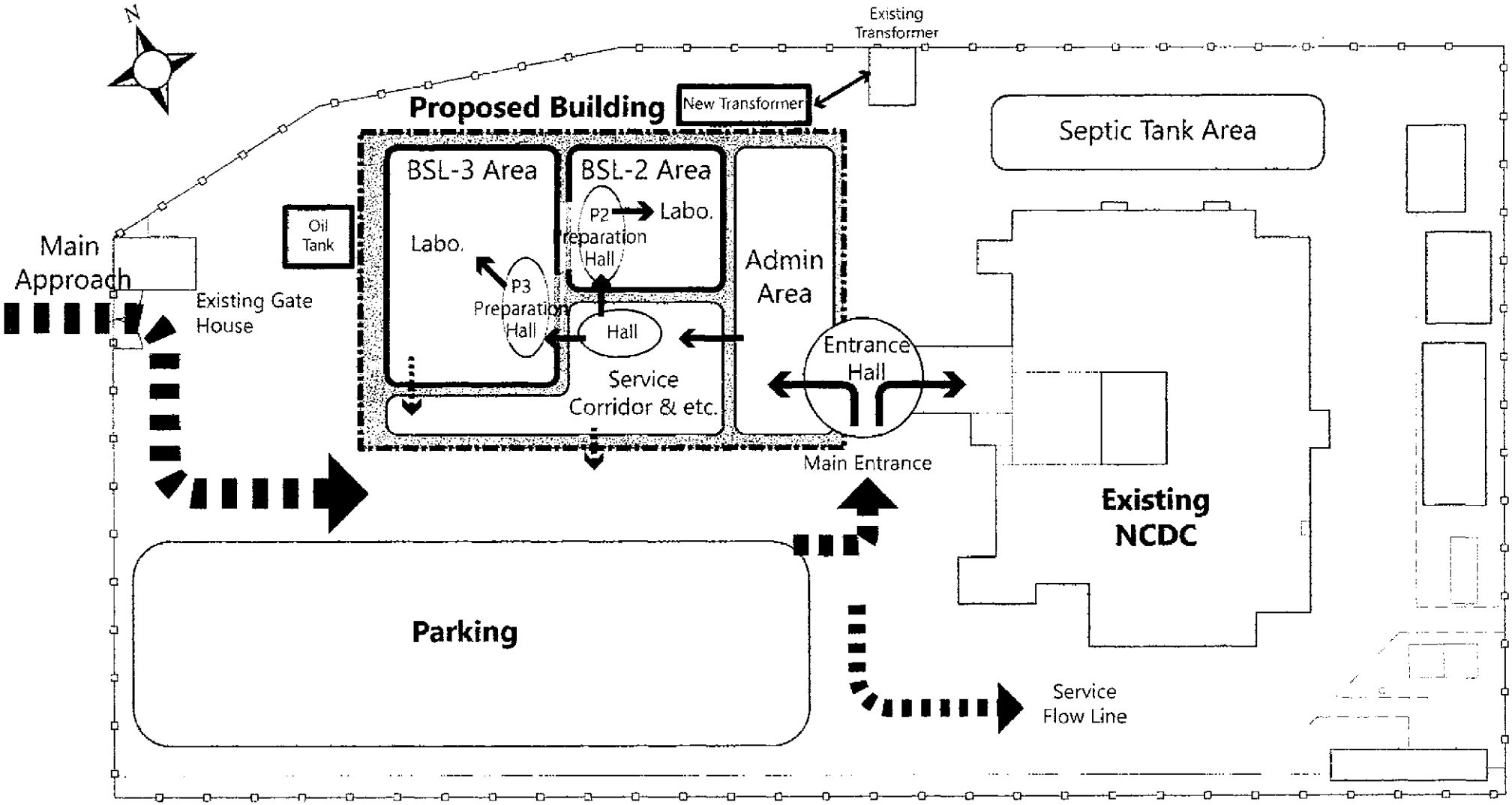
A-5-6


POWER SUPPLY FROM AEDC 3Φ 3W 33KV 50Hz
INCOMING CABLES
SCOPE OF WORK BY NCDC SIDE
SUPPLIED BY AEDC SIDE
COPE OF WORK BY NCDC SIDE
EXISTING TRNSFORMER
NEW BUILDING FACILITY (APPROXI-400KVA)
EXISTING BUILDING FACILITY (APPROXI-250KVA)
LEGEND
SYMBOL DESCRIPTION
DS DISCONNECTOR SWITCH
VCB VACUUM CIRCUIT BREKER
MCCB MOLD CASED CIRCUIT BREAKER
LA LIGHTNING ARRESTER
ZCT ZERO PHASE CURRENT TRANSFORMER
CT CURRENT TRANSFORMER
VT POTENTIAL TRANSFORMER
PF POWER FUSE
Tr TRNSFORMER
SC STATIC CONDENSER
DE DIESEL ENGINE
G GENERATOR
AVR AUTO VOLTAGE RALGY
SR STATIC REACTOR
A AMMETER
AS AMMETER METER SELECTOR SWITCH
V VOLTTER METER
VS VOLTTER METER SELECTOR SWITCH
W WATTER METER
Wh WATTER-HOUR METER
COS φ POWER FACTOR
F FRICENCY METER
EXISTING CABLE
NEW CABLE
EXISTING BUILDING
NEW BUILDING
33KV GANG ISOLATOR SWITCH
33KV LIGHTING ARRESTOR
EXISTING CONCREATE POLE
MV 33KV XLPE/PVC 70sq×3C
EXISTING FEEDER PILLAR PANEL
EXISTING TRNSFORMER 500KVA
MV SWITCH GEAR PANEL OUT DOOR TYPE
MV PANEL
NEW ELECTRICAL ROOM
MV SWITCH GEAR PANEL
NEW LV PANEL
MV PANEL
EXISTING LV MAIN DISTRIBUTION PANEL
FROM EXISTING GENERATOR
GENERATOR HOUSE
EXISTING STABILIZER
EXISTING LV MAIN SWITCH 600A
EXISTING DISTRIBUTION PANEL
3F DBP
2F DBP
1F DBP
DISTRIBUTION PANEL
2F DBP
1F DBP
B1F DBP
Connection by AEDC
SCOPE OF NCDC SIDE
SCOPE OF PROJECT SIDE
SCHEMATIC DIAGRAM OF MAIN FEEDER DIAGRAM

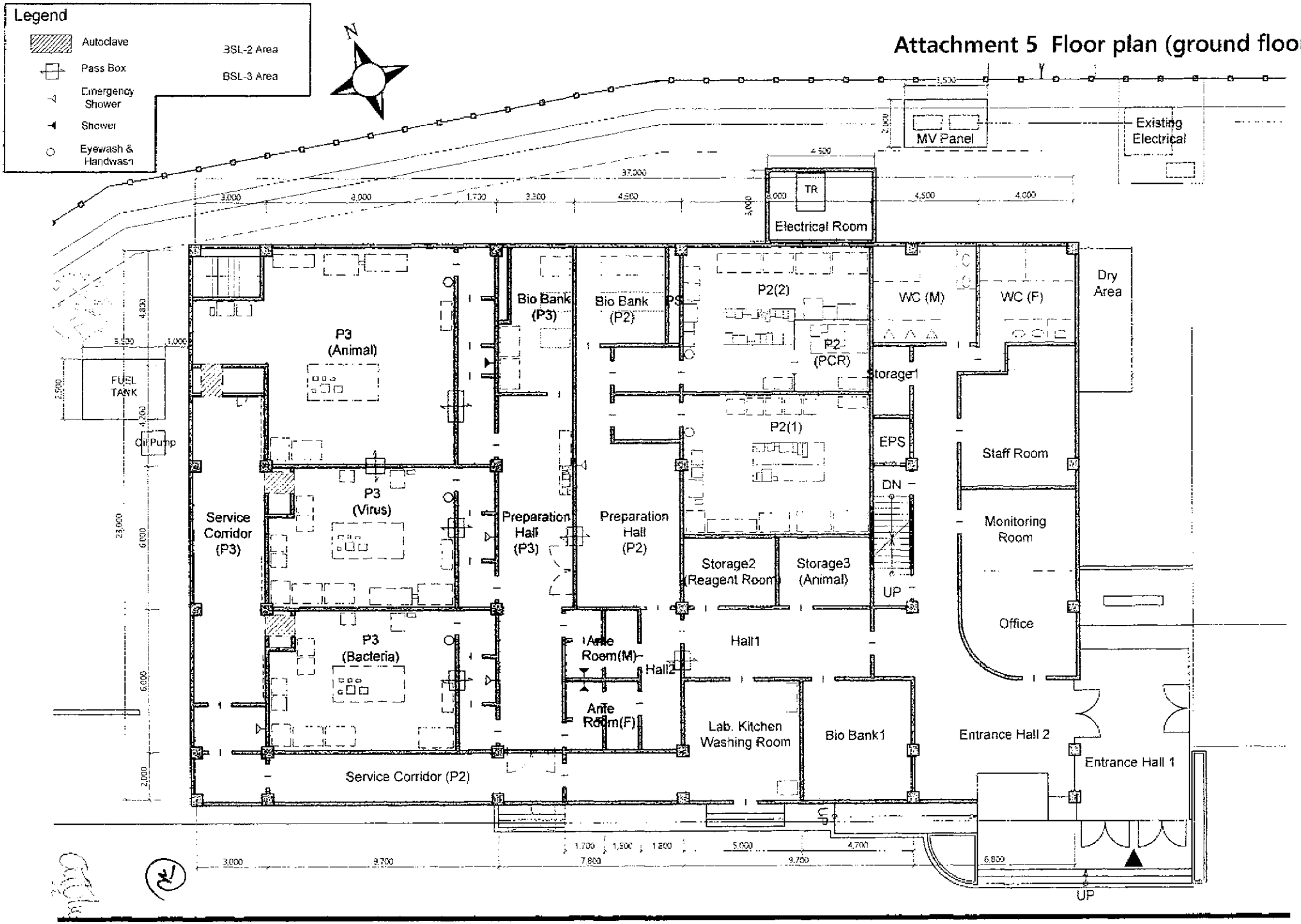
Attachment 3 Location and Scope of works for the city potable water connection



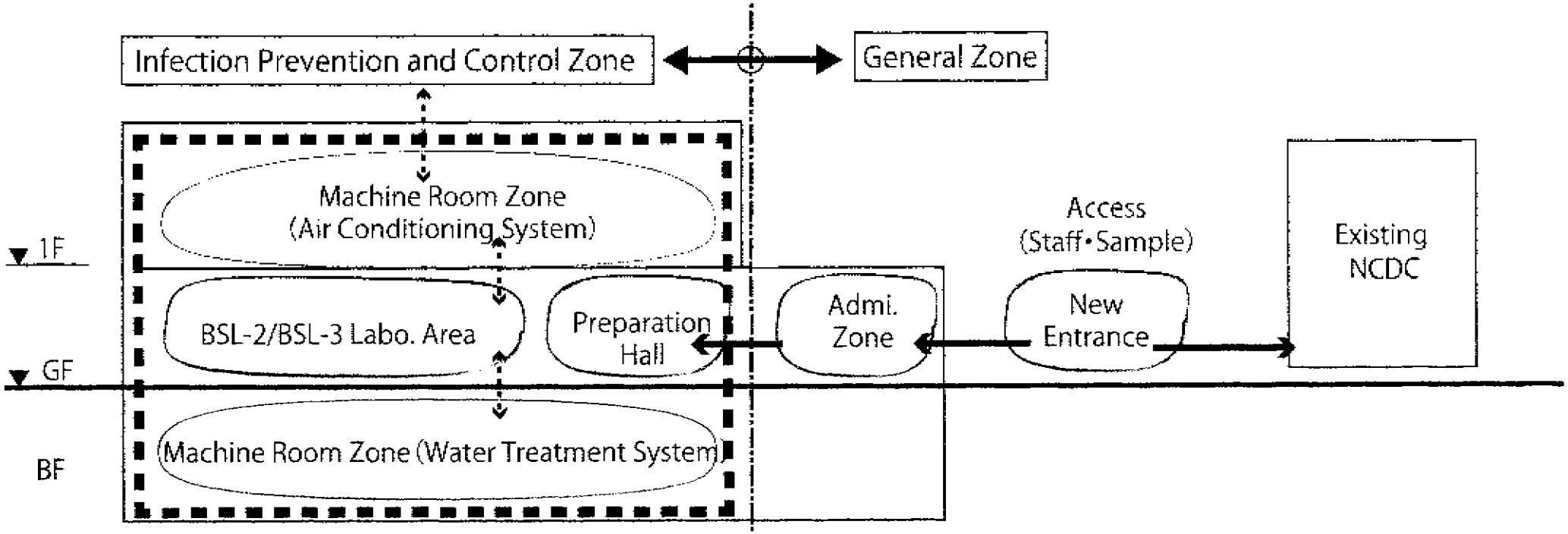
Attachment 4 Block layout



Attachment 5 Floor plan (ground floor)



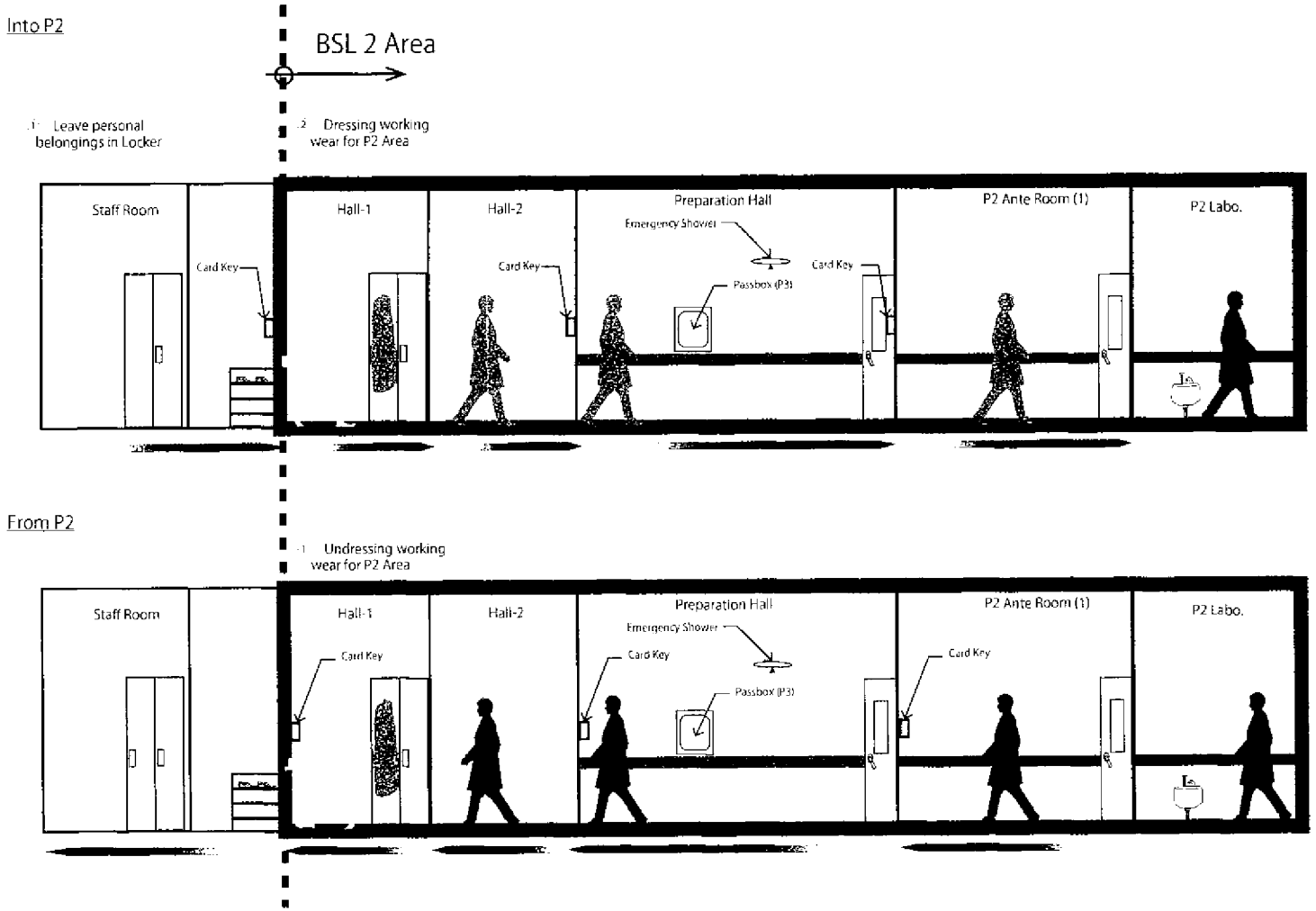
Attachment 6 Cross section



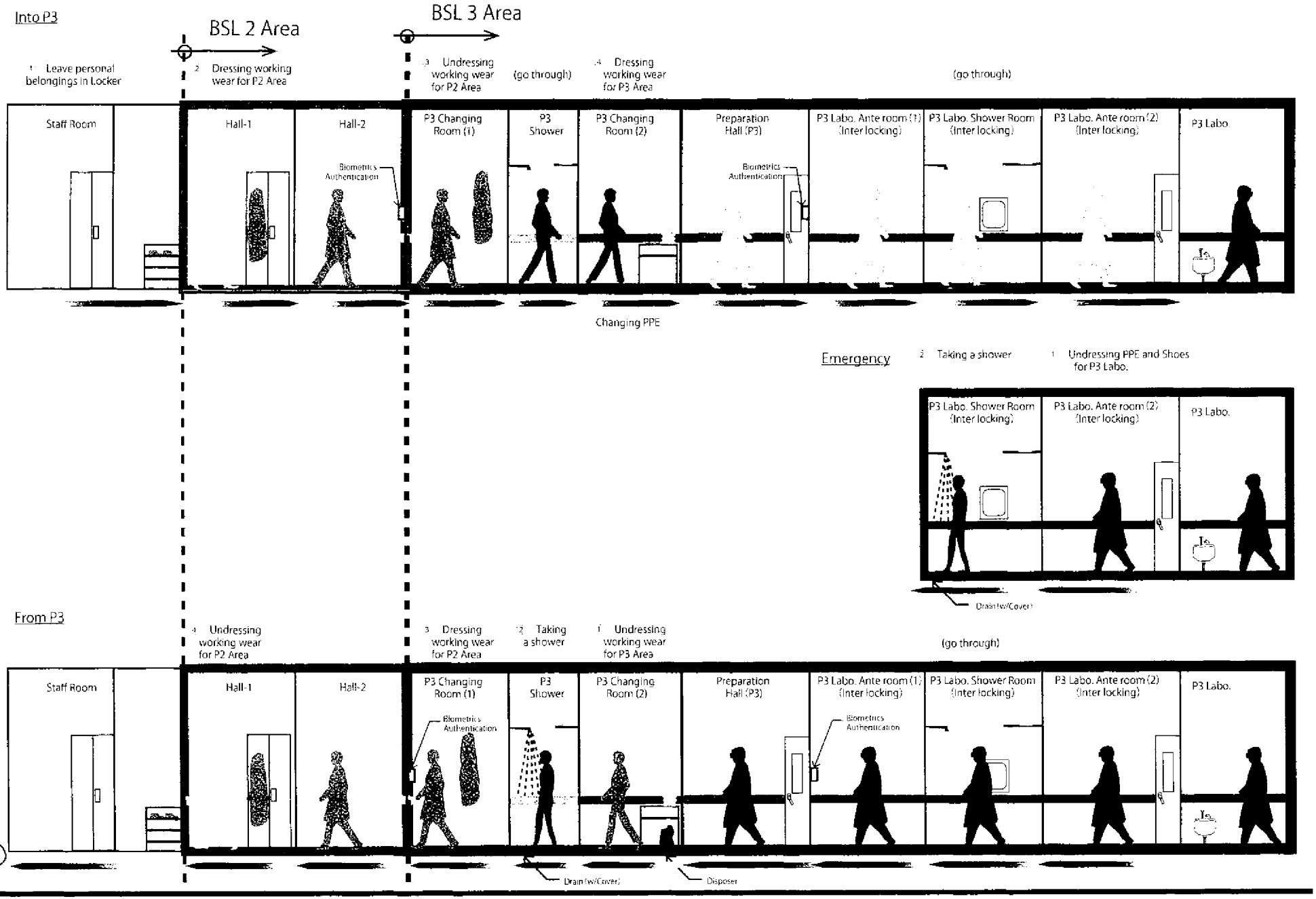
Attachment 7 List of rooms planned

Components		
BSL-3 Barrier	BSL-2 Barrier	Administration, M&E
P3 (Bacteria) Laboratory (incl. autoclave, 3 ante rooms)	P2(1) Laboratory, (incl. 1 ante room)	Entrance Hall 1
P3 (Virus) Laboratory (incl. autoclave, 3 ante rooms)	P2(2) Laboratory, (incl. 1 ante room)	Entrance Hall 2, Corridor
P3 (Animal) Laboratory (incl. autoclave, 4 ante rooms)	P2(PCR) Laboratory	Office, Monitoring Room
Preparation Hall (P3)	Preparation Hall (P2)	Staff Room
Bio Bank (P3)	Bio Bank (P2)	WC (Male)
Service Corridor (P3)	Service Corridor (P2)	WC (Female)
Ante Rooms (Male)	Hall 1	Storage 1
Ante Rooms (Female)	Hall 2	Staircase 1
	Storage 2 (Reagent)	Staircase 2
	Storage 3 (Animal Equipment)	EPS
	Lab. Kitchen, Washing Room	Electrical Room 1 (GF)
	Bio Bank 1	Machine Room 1 (BF)
		Machine Room 2 (1F) & Electrical Room 2 (1F)

Attachment 8 Ingress/Egress flow at P2, P3 laboratory

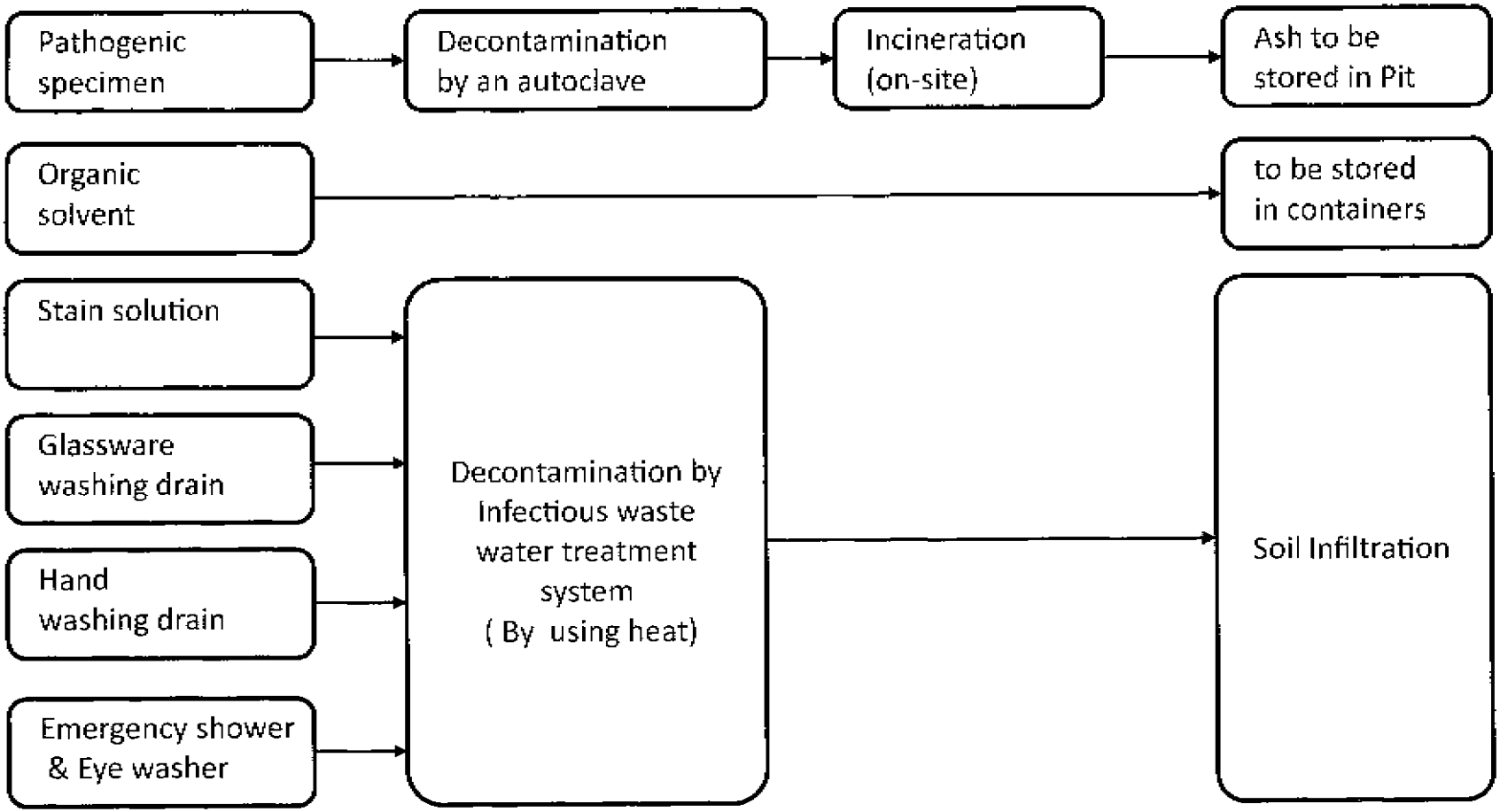


A-5-13

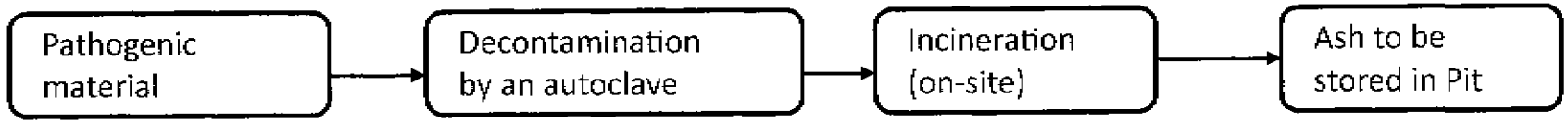

Into P3
BSL 2 Area
BSL 3 Area
1 Leave personal belongings in Locker
2 Dressing working wear for P2 Area
3 Undressing working wear for P2 Area
(go through)
4 Dressing working wear for P3 Area
(go through)
Staff Room
Hall-1
Hall-2
Biometrics Authentication
P3 Changing Room (1)
P3 Shower
P3 Changing Room (2)
Preparation Hall (P3)
Biometrics Authentication
P3 Labo. Ante room (1) (Inter locking)
P3 Labo. Shower Room (Inter locking)
P3 Labo. Ante room (2) (Inter locking)
P3 Labo.
Changing PPE
Emergency
2 Taking a shower
1 Undressing PPE and Shoes for P3 Labo.
P3 Labo. Shower Room (Inter locking)
P3 Labo. Ante room (2) (Inter locking)
P3 Labo.
Drain(w/Cover)
From P3
4 Undressing working wear for P2 Area
3 Dressing working wear for P2 Area
2 Taking a shower
1 Undressing working wear for P3 Area
(go through)
Staff Room
Hall-1
Hall-2
P3 Changing Room (1)
Biometrics Authentication
P3 Shower
P3 Changing Room (2)
Preparation Hall (P3)
Biometrics Authentication
P3 Labo. Ante room (1) (Inter locking)
P3 Labo. Shower Room (Inter locking)
P3 Labo. Ante room (2) (Inter locking)
P3 Labo.
Drain(w/Cover)
Disposer

Attachment 9 Infectious waste management flow

Liquid waste



Solid waste



Attachment 10 Requested equipment

EQUIPMENT LIST REQUEST FOR NRL GADUWA ABUJA:

1. Biosafety Cabinet Class 2A
2. Conventional PCR Thermocycler
3. Electrophoretic Equipment for PCR
4. Transilluminator
5. Plate Centrifuge with cover
6. ELISA Reader and Washer
7. BACTEC Blood Culture Machine
8. ABI Quant Studio 5
9. VITEK 2 or MALDI-TOF Mass spectrometer or Bact Alert 3D
10. Genomic Sequencer
11. Fluorescent Microscope
12. Phase contrast microscope
13. Magnetic Stirrer
14. 8-Channel Multichannel Autopipettes

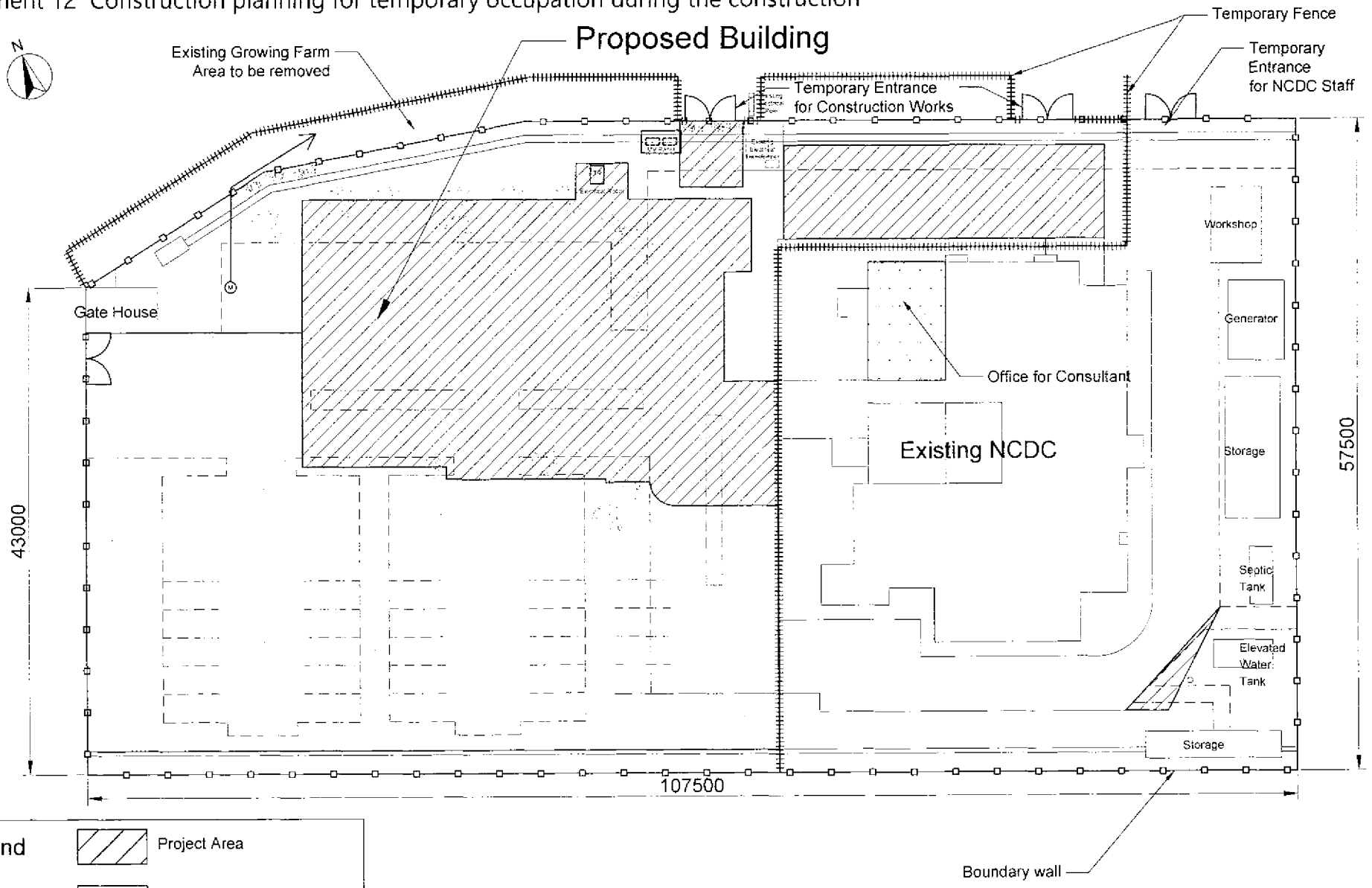
EQUIPMENT LIST REQUEST FOR NRL LAGOS (CPHL):

1. Biosafety Cabinet for Biocontainment Class 2A – 3(Virology, Bacteriology, TB)
2. Autoclaves
3. Incubators
4. Hot air Oven
5. Bacterial identification system
6. Centrifuge
7. Flourescent microscope (fitted with camera)
8. Water Distiller
9. Shaker/Rotator
10. PCR Workstation
11. Refrigerated micro-centrifuge
12. PCR plate centrifuge
13. Vortex Mixer
14. Roller Mixer
15. Quant Studio 5 Real-Time PCR System
16. Electrophoresis equipment – for PCR
17. Gel Imaging System
18. Chemistry Analyser
19. Spectrophotometer
20. Hematology Analyser
21. CD4 Counter
22. Electrophoresis equipment – for Haemoglobin genotyping
23. 8-Channel Multichannel auto pipettes

Code No.	Equipment	Grand Total	Priority	Sub-Total	Gaduwa New Facility										Gaduwa Existing Facility	Priority	Sub-Total	Lagos CPHL Bacteology	Lagos CPHL Virology
					P3 (Animal)	P3 (Virus)	P3 (Bacteria)	Service corridor(P3)	P2 (1)	P2 (2)	P2 (PCR)	Labo+Kitchen, Washing Rm	Bio Bank P3	Bio Bank P2					
1	Aerosol Photometer	1	A	1				1											
2	Air flow visualizer	1	A	1				1											
3	Air velocity meter	1	A	1				1											
4	Autoclave, double door A	1	A	1	1														
5	Autoclave, double door B	2	A	2		1	1												
6	Autoclave, vertical	3	A	2					1	1						B	1	1	
7	Autoclave, vertical, biosafety	5	A	5	1	1	1		1	1									
8	Biosafety cabinet A	1	A	1	1														
9	Biosafety cabinet B	1	A	1		1													
10	Biosafety cabinet C	2	A	2			2												
11	Biosafety cabinet D	6	A	4					2	2						B	2	1	1
12	Centrifuge, high speed	5	A	4		1	1		1	1						B	1		1
13	Centrifuge, low speed	6	A	4		1	1		1	1						B	2	1	1
14	Centrifuge, mini	6	A	5	1	1	1		1	1						B	1		1
15	CO2 incubator	5	A	4		1	1		1	1						B	1	1	
16	Computer	5	B	5	1	1	1		1	1									
17	Cryotank	2	A	2									1	1					
18	Deep freezer A	4	A	4		1	1		1	1									
19	Deep freezer B	11	A	10	1	1	1		1	1			3	2		B	1		1
20	Domestic refrigerator	1	B	1							1								
21	Electric balance	1	A	1					1										
22	Electric balance, precision	1	A	1					1										
23	Electrophoresis	3	A	2						2						B	1		1
24	ELISA set	2	A	1						1						B	1		1
25	Formaldehyde fumigation set (for biosafety cabinet)	1	A	1				1											
26	Formaldehyde fumigation system (for laboratory room)	1	A	1				1											
27	Gel documentation system	2	A	1						1						B	1		1
28	Glove box A	1	A	1	1														
29	Glove box B	1	A	1		1													
30	Hot air oven	2	A	2					1	1									
31	Incubator	5	A	3		1	1		1							B	2	1	1
32	Incubator with shaker	1	A	1						1									
33	Individual ventilation caging system	2	A	2	1										1				
34	Laboratory refrigerator	6	A	5	1	1	1		1	1						B	1	1	
35	Laboratory sink	5	A	5	1	1	1		1	1									
36	Microscope	3	A	2					1	1						B	1	1	
37	Microscope, fluorescent	1	A	1						1									
38	Microscope, inverted	1	A	1					1										
39	Microscope, inverted, fluorescent	1	A	1					1										
40	Microvolume spectrophotometer	1	B	1					1										
41	Microwave oven	2	B	2					1	1									
42	PAO generator	1	A	1				1											
43	pH meter	1	A	1					1										
44	Pipette set	5	A	5	1	1	1		1	1									
45	PCR work station	2	A	1							1					B	1		1
46	Real Time PCR	2	A	1						1						B	1		1
47	Shelf	8	A	8	1	1	1	1	1	1	1	1							
48	Spectrophotometer	1	A	1						1									

Code No.	Equipment	Grand Total	Gaduwa New Facility												Gaduwa Existing Facility	Lagos CPHL Bacteology		Lagos CPHL Virology
			Priority	Sub-Total	P3 (Animal)	P3 (Virus)	P3 (Bacteria)	Service corridor(P3)	P2 (1)	P2 (2)	P2 (PCR)	Labo+Kitchen, Washing Rm	Bio Bank P3	Bio Bank P2		Priority	Sub-Total	
49	Thermoblock	7	A	6	1	1	1		1	1	1					B	1		1
50	Thermocyner	2	A	2						2									
51	Transilluminator, UV	5	A	4	1	1	1			1						B	1		1
52	Transilluminator, LED	1	A	1						1									
53	Ultrapure water system	1	A	1								1							
54	Voltex mixer	6	A	5	1	1	1		1	1						B	1		1
55	Waste liquid tank	5	A	5	1	1	1		1	1									
56	Water bath	2	A	2					1	1									
57	Working bench with chair A	5	A	5	1	1	1		1	1									
58	Working bench with chair B	1	A	1							1								
59	Water bath, shaking	1														B	1		1
60	Water distiller	1														B	1		1

Attachment 12 Construction planning for temporary occupation during the construction



A-5-19

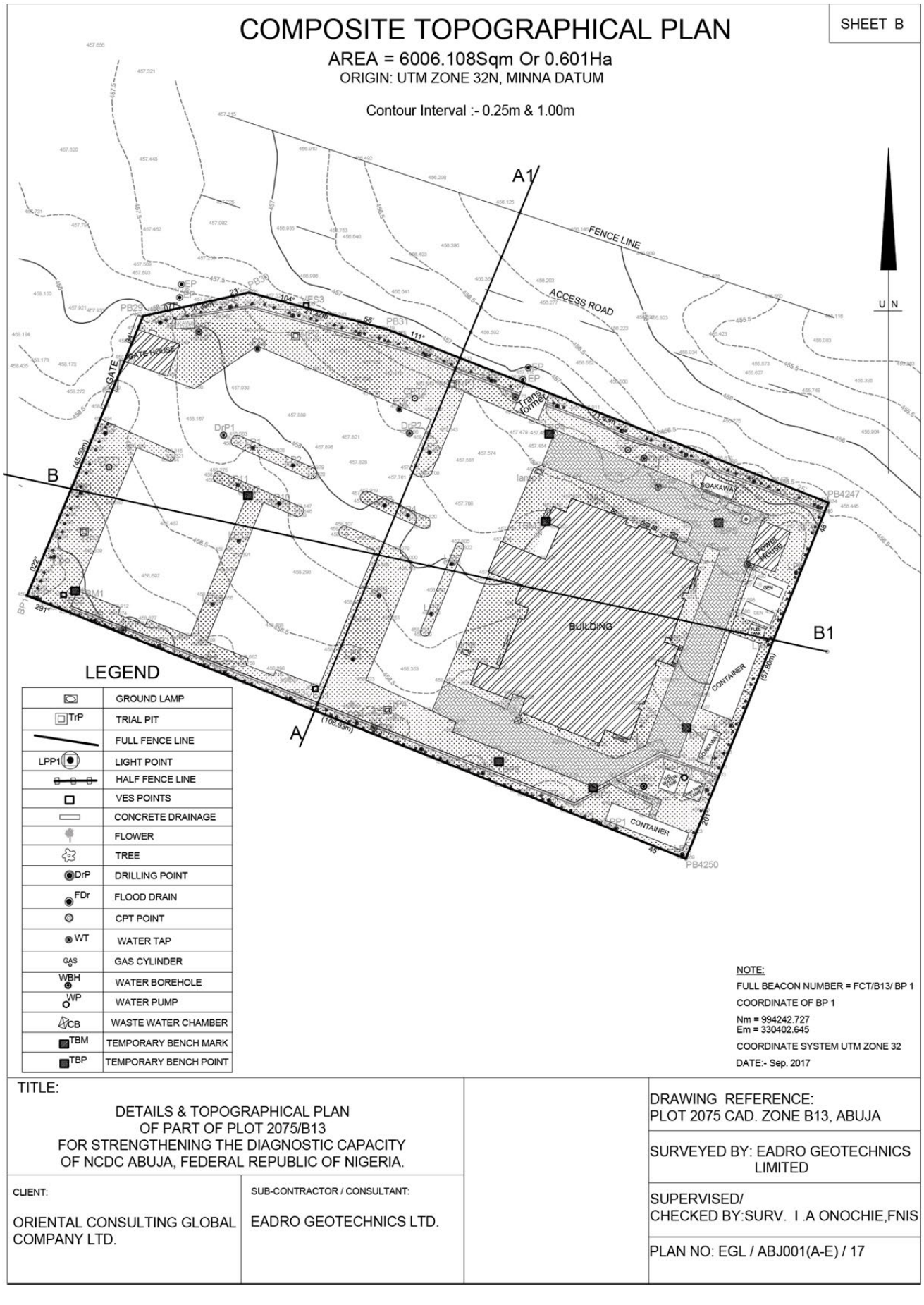
Appendix-6 List of reference documents to be collected

No.	Name	Publication	Form	Collection date	Genre				
					Collection Documents	Created by Experts	JICA	Text	Others
1	ACDC RCC West Africa meeting	JICA Nigeria Office	Digital Media	26-July			1		
2	STRATEGIC PRIORITIES AND OPERATING MODEL	AFRICA CDC	Digital Media	27-July					1
3	Survey Report March 2016, June 2016 & January 2017	JICA	Digital Media	28 July		1			
4	Laboratory Supply through US CDC to NCDC Reference Laboratory, Gaduwa-August 2013	NCDC	Digital Media	28-July	1				
5	Equipment List by JICA Grant Aid	NCDC	Digital Media	28 July	1				
6	National Guidelines on Infection Prevention and Control of Viral Haemorrhagic Fevers	NCDC	Digital Media	4 August	1				
7	Technical Guidelines for Integrated Disease Surveillance and Response in Nigeria	NCDC	Digital Media	4 August	1				
8	Nigeria National Pandemic Influenza Preparedness and Response Plan	NCDC	Digital Media	4 August	1				
9	WHO Country Cooperation Strategy 2014-2019 Nigeria	WHO	Digital Media	4 August	1				
10	National Health Policy 2016	Federal Ministry of Health	Digital Media	4 August	1				
11	Outline in Nigeria	JICA	Digital Media	10 August			1		
12	Nigeria Frontline Field Epidemiology Training Programme	AFENET	Digital Media	24 August	1				
13	Nigeria Field Epidemiology and Laboratory Training Program (NFELTP)	AFENET	Digital Media	24 August	1				
14	Infection control considered from One Health	Modern Media	Digital Media	24 August	1				
15	NATIONAL STRATEGIC HEALTH DEVELOPMENT PLAN (NSHDP) 2010-2015	Federal Ministry of Health	Digital Media	23 August	1				
16	Laboratory Biosafety Manual (Third Edition)	WHO	Digital Media	18 August	1				
17	Technical Guidelines for Integrated Disease Surveillance and Response in Nigeria	Federal Ministry of Health	Digital Media	7 August	1				
18	INTERNATIONAL HEALTH REGULATIONS (2005) SECOND EDITION	WHO	Digital Media	7 August	1				
19	CWA 15793	EUROPEAN COMMITTEE FOR STANDARDIZATION	Digital Media	21 August	1				
20	Pathogens prescribe safety management Regulations	National Institute of Infectious Diseases,Japan	Digital Media	19 August	1				
21	Pathogen detection manual	National Institute of Infectious Diseases,Japan	Digital Media	28 August	1				
22	Meeting Minutes, Documents	JICA Survey Team	Digital Media	28 August		1			
23	Protocol for National Influenza Sentinel Surveillance	NCDC	Print	29 August	1				
24	National Action Plan on Antimicrobial Resistance (AMR) 2016-2020	The Government of Japan	Digital Media	30 August	1				
25	Action Plan for Strengthening Measures on Emerging Infectious Diseases -Japanese actions challenging continuous threats of infectious diseases-	Ministerial Meeting on Measures on Emerging	Digital Media	30 August	1				

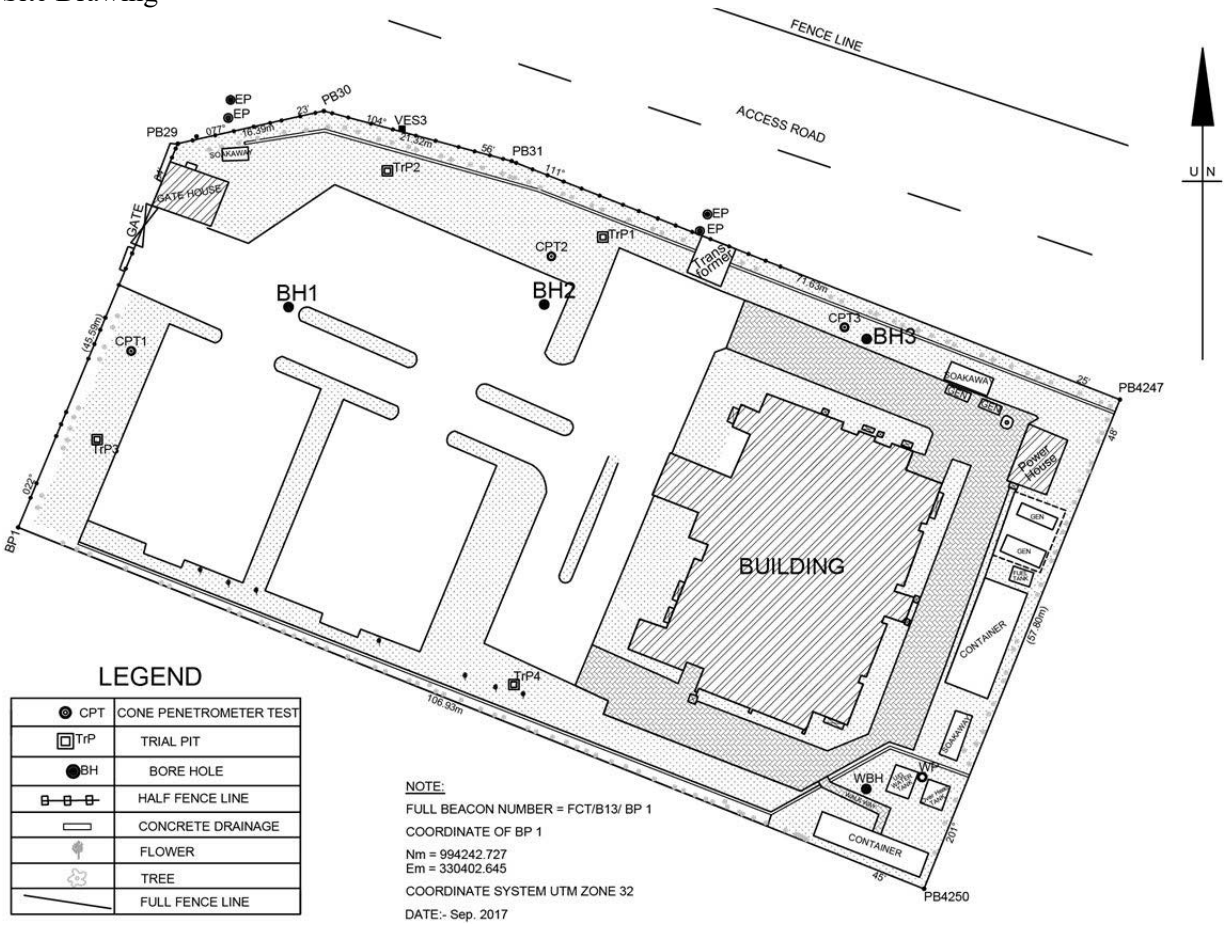
No.	Name	Publication	Form	Collection date	Genre				
					Collection Documents	Created by Experts	JICA	Text	Others
		Infectious Diseases							
26	Nigeria Medical Laboratory Services Policy	Department of Public Health, FMoH	Digital Media	31 August	1				
27	Nigeria Medical Laboratory Strategic Plan (NMLStP) 2015-2019	Department of Public Health, FMoH	Digital Media	31 August	1				
28	Company Profile	LIGHTYEAR ENGINEERING CO LTD	Digital Media	31 August	1				
29	Company Profile	Aluwintech Integrated Concepts LTD.	Digital Media	31 August	1				
30	Company Profile	WISCO PRIME NIGERIA LIMITED.	Digital Media	31 August	1				
31	Company Profile	CYPRESS KONSULT CONSTRUCTION PROFILE	Digital Media	1 September	1				
32	National Action Plan for Antimicrobial Resistance 2017-2022	NCDC	Digital Media	2 September	1				
33	NCDC, Nigeria's Presentation	NCDC	Digital Media	2 September	1				
34	JICA PAST AND ONGOING PROJECTS RELATED TO THE HEALTH SECTOR	JICA Nigeria Office	Documents	31 August	1				
35	Company Profile	BE-BRACE CONSULT LIMITED	Documents	5 September	1				
36	National Building Code of Nigeria 2006	FEDERAL RWPUBLIC OF NIGERIA	Digital Media	9 September	1				
37	CEREBROSPINAL MENINGITIS OUTBREAK IN NIGERIA Situation Report (2nd June, 2017)	NCDC	Digital Media	1 September	1				

Appendix-7 Other Relevant Data

Topographical Plan



Soil Investigation
Site Drawing



Photos

BH1

BH2

BH3

CPT1

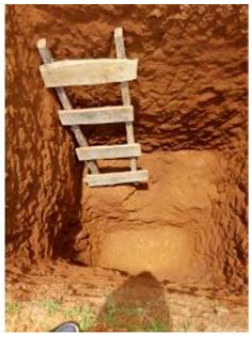
CPT2

CPT3

TrP1

TrP2

TrP3



TrP4

Permeability test

Borehole Logs

Cadro Geotechnics Limited

CLIENT: ORIENTAL CONSULTANTS GLOBAL CO., LTD

PROJECT: NCDC LABORATORY BUILDING

LOCATION: GADUWA DISTRICT, ABUJA

CONTRACT NO:

BH 1

330432.283 E

994266.91 N

Elev. (m)

WL = 5.6m

Elevation (m)	Depth below g.l (m)	Layer thickness (m)	Strata	STRATA DESCRIPTION	SPT N-VALUE	W_n (%)	R (kN/m^3)	C_u (kN/m^2)	Q(°)
		3.00		Brownish Red sandy lateritic CLAY	15	15	19.1	114	0
455.12	3.0	1.50		Brownish clayey silty SAND	13				
		0.75		Brownish sandy CLAY	13	28.5			31
452.12	6.0	5.25		Reddish brown to grayish brown, clayey silty SAND	14				
					20	32.0	19.5		33
449.12	9.0				21	38.0	20.1		33
					19				33

DRILLED BY: STEPHEN O. | EQUIPMENT: ROTO-PERCUSSION RIG | LOGGED BY: LEVI, C

CLIENT: ORIENTAL CONSULTANTS GLOBAL CO., LTD

PROJECT: NCDC LABORATORY BUILDING

LOCATION: GADUWA DISTRICT, ABUJA

CONTRACT NO:

BH 2

330460.313 E | Elev. (m) 457.75

994267.183 N | WL = 5.45m

Elevation (m)	Depth below g.l (m)	Layer thickness (m)	Strata	STRATA DESCRIPTION	SPT N-VALUE	W_n (%)	R (kN/m^3)	C_u (kN/m^2)	Q(°)
		3.00		Brownish Red sandy lateritic CLAY	12	22	17.1	111	0
454.75	3.0	2.25		Brownish clayey silty SAND	14 18	26.8	18.9		33
451.75	6.0	1.5		Brownish sandy CLAY	16				
		3.75		Reddish brown to grayish brown, clayey silty SAND with traces of weathered Mica Schist occurring at 9.0m below ground level	18 19 24	36.8 40.1	18.9 19.6		32 33 34
448.75	9.0								

DRILLED BY: STEPHEN O. | EQUIPMENT: ROTO-PERCUSSION RIG | LOGGED BY: LEVI, C

Cadro Geotechnics Limited

CLIENT: ORIENTAL CONSULTANTS GLOBAL CO., LTD

PROJECT: NCDC LABORATORY BUILDING

LOCATION: GADUWA DISTRICT, ABUJA

CONTRACT NO:

BH 3

330495.672 E | Elev. (m) 457.19

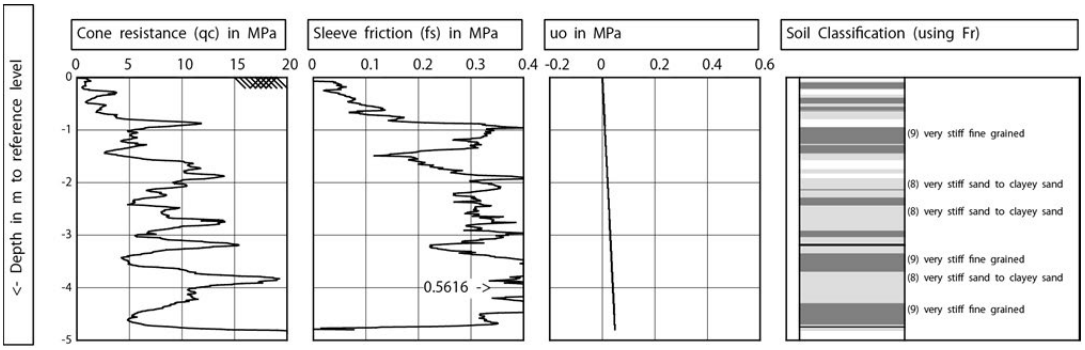
994263.401 N | WL = 3.5m

Elevation (m)	Depth below g.l (m)	Layer thickness (m)	Strata	STRATA DESCRIPTION	SPT N-VALUE	W_n (%)	R (kN/m^3)	C_u (kN/m^2)	Q(°)
		3.00		Brownish Red sandy lateritic CLAY	19	17	18.9	80	0
454.19	3.0	1.50		Brownish clayey silty SAND	20 13	19.5	19.1		31
451.19	6.0	2.25		Brownish sandy CLAY	13	24.0	18.0	50	0
		3.75		Reddish brown to grayish brown, clayey silty SAND with traces of weathered Mica Schist occurring at 8.25m below ground level	19 21 24	32.6 36.5	19.1 20.2		33 33 34
448.19	9.0								

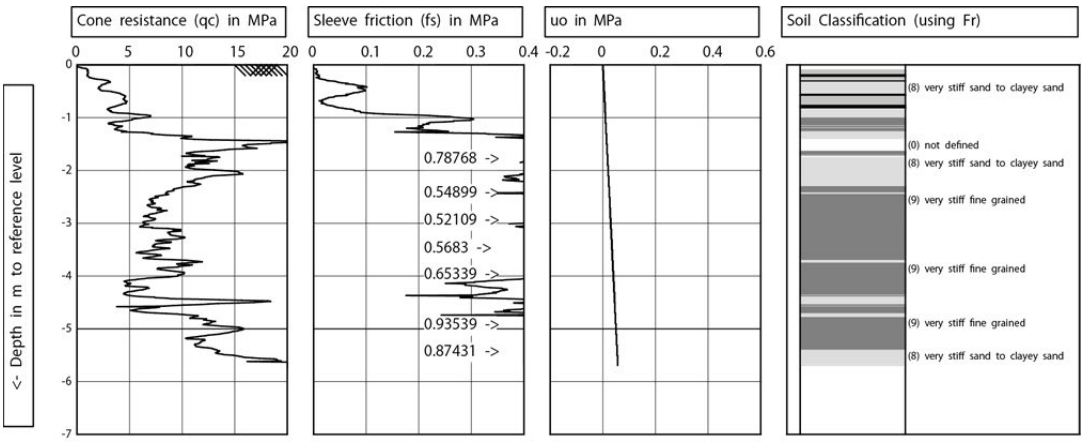
DRILLED BY: STEPHEN O. | EQUIPMENT: ROTO-PERCUSSION RIG | LOGGED BY: LEVI, C

CONE PENETRATION TEST PROFILES

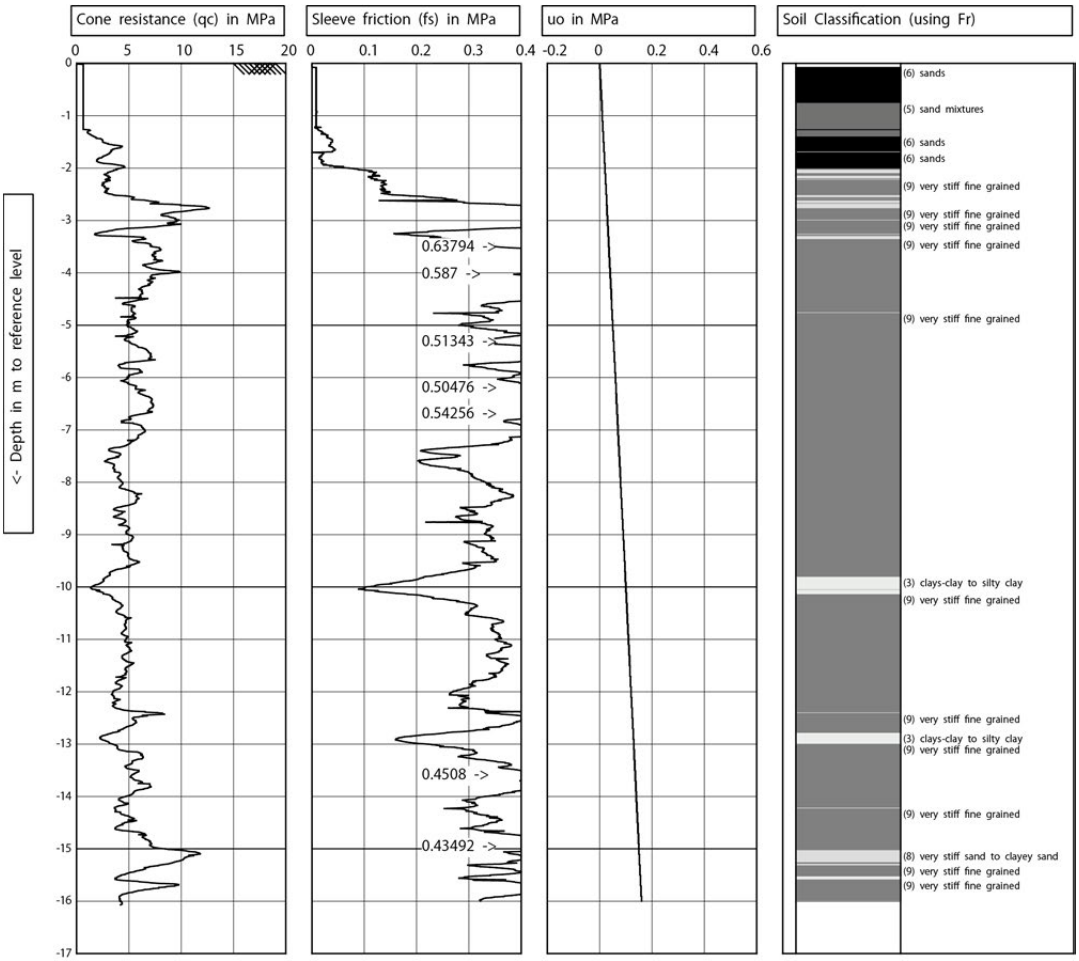
CPT1



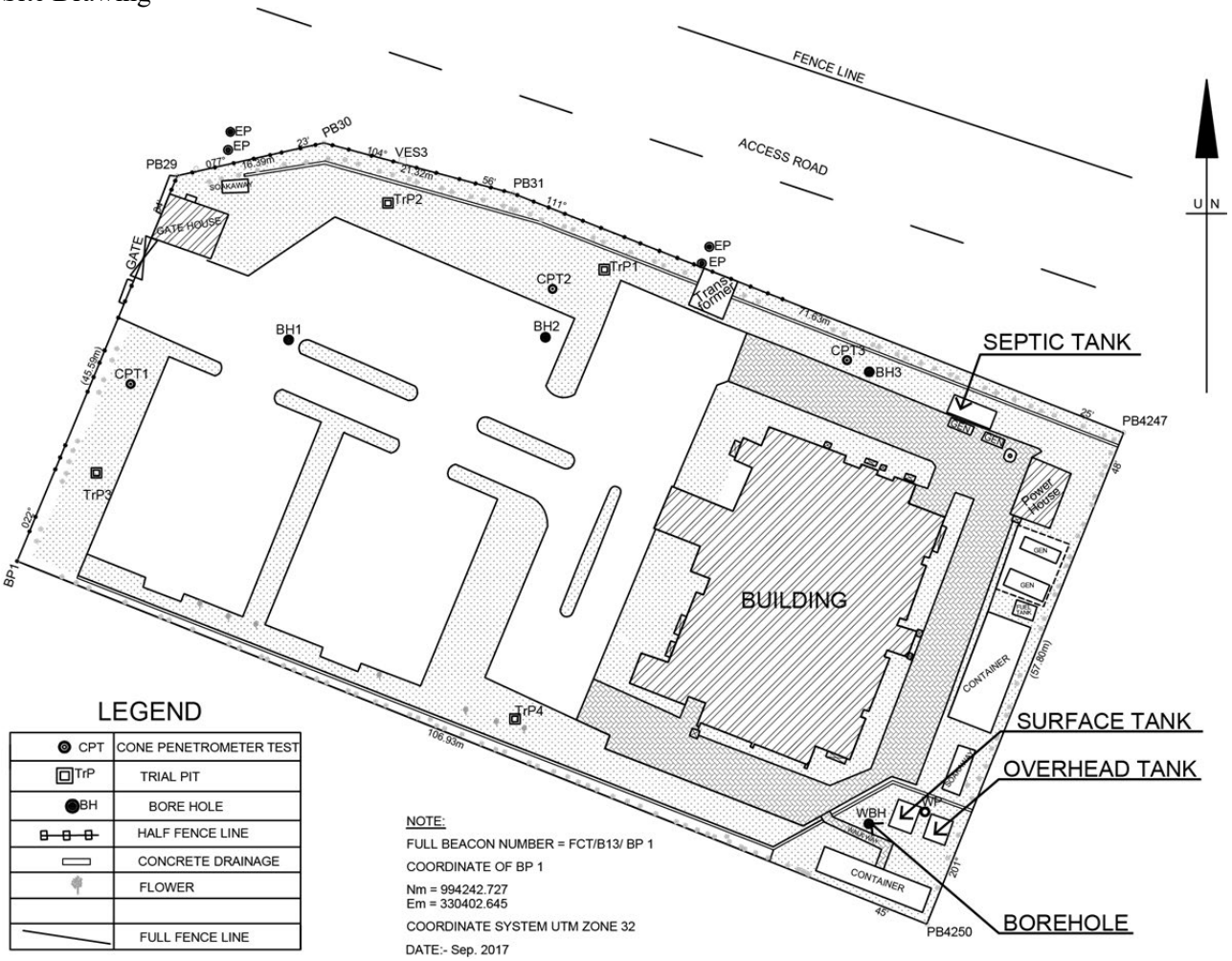
CPT2



CPT3



Hydrological Survey
Site Drawing



Photos

BOREHOLE

GADUWA ESTATE

OVERHEAD TANK

SURFACE TANK

TANK INSIDE

SEPTIC TANK

Water Sample Analysis

S/N	Parameter(s)	BOREHOLE	GADUWA ESTATE MAINS	OVERHEAD TANK	SURFACE TANK	WHO STANDARD	FME STANDARD
1.	pH	7.4	7.4	7.1	6.4	*7.0 to 8.5*	*6.5 – 8.5*
2.	Conductivity, (µS/cm)	70	50	50	50	*900 -1200*	-
3.	Temperature (0C)	24.4	24.5	24.4	24.3	*30c*	-
4.	Appearance	Clear	Clear	Clear	Clear	*Clear*	-
5.	Colour, (pt – Co)	6	9	8	98	*5 units*	*15.0 (colourless)*
6.	Odor	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	*Unobjectionable*	*3.5 (colourless)*
7.	Taste	Tasteless	Tasteless	Tasteless	Tasteless	-	*Tasteless*
8.	Total Hardness (mg/l)	52	25	21	21	*30-200*	*200*
9.	Total Alkalinity (mg/l)	30	15	12	15	*30-500*	-
10.	Total Dissolved Solid, TDS (mg/l)	38.5	27.5	26	26	*500*	*500*
11.	Chloride (mg/l)	6	2	3	3	*200mg/l*	*250*
12.	Sulphate (mg/l)	1	1	1	1	*200mg/l*	*500*
13.	Phosphate (mg/l)	0.53	0.24	0.31	0.30	-	*>5*
14.	Nitrate (mg/l)	1.6	1.0	1.2	1.1	*50*	*10*
15.	Bicarbonite, (mg/l)	NIL	NIL	NIL	NIL	-	-
16.	DO (mg/l)	5.0	4.7	5.3	4.2	-	*7.5*
17.	BOD (mg/l)	0.333	0.375	0.209	0.709	-	*0*
18.	COD (mg/l)	0.500	0.563	0.313	1.063	-	-
19.	Ammonium - Nitrogen (NH4-N) (mg/l)	0.4	0.3	0.4	0.3	-	-
20.	Nitrite – Nitrogen (NO2-N)(mg/l)	<0.001	<0.001	<0.001	<0.001	*3*	-

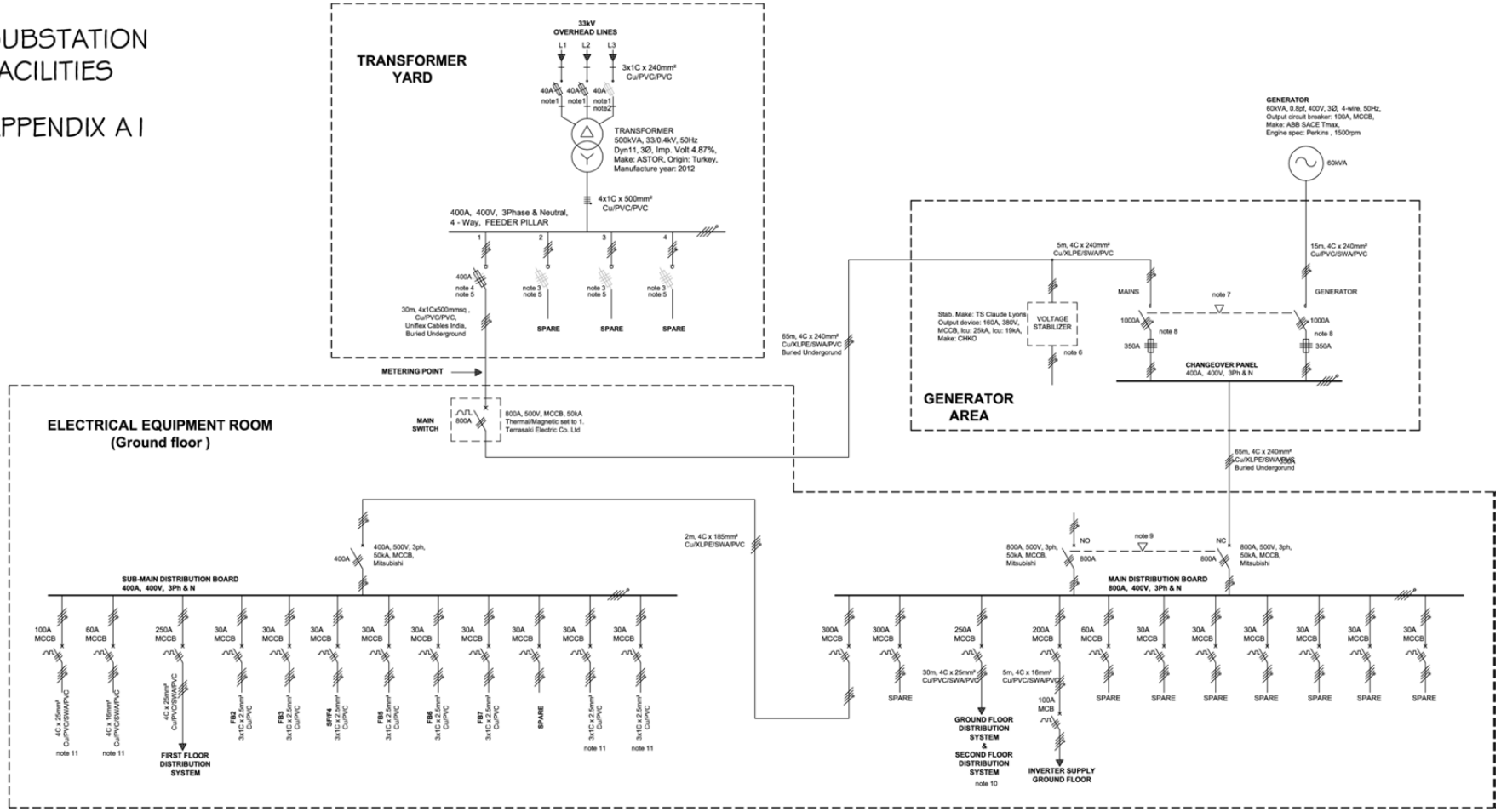
S/N	Parameter(s)	BOREHOLE	GADUWA ESTATE MAINS	OVERHEAD TANK	SURFACE TANK	WHO STANDARD	FME STANDARD
21.	Nitrate – Nitrogen (NO3-N) (mg/l)	0.3	0.2	0.3	0.2	*50*	-
22.	Oil & Grease (mg/l)	<0.01	<0.01	<0.01	<0.01	-	-
23.	Total Iron, Fe (mg/l)	<0.001	0.146	<0.001	<0.001	*0.1/mg/l*	*1.0*
24.	Sodium, Na (mg/l)	4.735	3.593	4.315	4.502	*75mg/l*	*200*
25.	Calcium, Ca (mg/l)	1.475	1.595	0.859	1.107	*30mg/l*	-
26.	Magnesium, Mg (mg/l)	1.299	1.026	1.172	1.287	*50*	-
27.	Potassium, K (mg/l)	2.320	2.746	2.371	2.195	*0.01*	-
28.	Arsenic, As (mg/l)	<0.001	<0.001	<0.001	<0.001	*0.003*	*0.5*
29.	Lead, Pb (mg/l)	<0.001	<0.001	<0.001	<0.001	*0.05mg/l*	*0.01*
30.	Cadmium, Cd (mg/l)	<0.001	<0.001	<0.001	<0.001	-	*0.05*
31.	Manganese, Mn	0.018	0.011	0.077	0.016	*0.4*	*0.001*
32.	Mercury, Hg (mg/l)	<0.001	<0.001	<0.001	<0.001	-	*0.05*
33.	Chromium (mg/l)	<0.001	<0.001	<0.001	<0.001	-	-
34.	Total Bacteria	2.1	1.3	1.0	1.6	-	-

Waste Water Sample Analysis

S/N	Parameter(s)	SEPTIC TANK	DPR STANDARD
1.	DO (mg/l)	2.7	4.0 – 5.0mg/l
2.	BOD (mg/l)	*2.209*	*45*
3.	COD (mg/l)	*3.313*	*125*
4.	Ammonium – Nitrogen (mg/l)	*1.02*	-
5.	Nitrite – Nitrogen (mg/l)	*0.010*	-
6.	Nitrate – Nitrogen (mg/l)	*0.84*	-
7.	Oil & Grease (mg/l)	*0.25*	*20*
8.	Total Iron, Fe (mg/l)	*1.702*	-
9.	Flourine, F (mg/l)	-	-
10.	Arsenic, As (mg/l)	*<0.01*	-
11.	Lead, Pb (mg/l)	*<0.001*	-
12.	Cadmium, Cd (mg/l)	*<0.001*	-
13.	Maganese, Mn (mg/l)	*0.172*	-
14.	Mercury, Hg (mg/l)	*<0.001*	-
15.	Chromium, Cr (mg/l)	*<0.001*	*0.5*
16.	Total Bacteria (cfu/ml) x104	*6.5*	-
17.	Faecal Coliform (MPN/100ml)	*≥2400*	*400MPN/100ml*
18.	Total Coliform (MPN/100ml)	*≥2400*	-

SUBSTATION FACILITIES

APPENDIX A I



NOTE:

1. The HT fuses are replaced by non-standard wire links. This is not a good practice. Fuse ratings here are estimated values.
2. The wire link for L3 is loosely hanging, creating partial contacts and resulting in voltage fluctuation on the Transformer.
3. The are no fuses here, as no load connected.
4. The blue phase (L3) fuse is blown, as a result one phase is lost.
5. Fuse specification for Feeder Pillar: 400A, 500V, 120kA, NT2, gG-gL, IEC 269.
6. The Voltage stabilizer is bypassed as shown in drawing, and the covers removed. Stabilizer rating could not be ascertained,
7. The Changeover Panel has an electrical interlock(1 out of 2) between Mains and Generator Feeder.
8. Specification: combination of contactor 1000A and fuse 350A, Telemecanique, 10kA, 4-pole, 3phase and Neutral, 500V.
9. Mechanical interlock (1out of 2) for both incomer devices.
10. The supply cables to Second floor and Ground floor distribution systems are bunched to one point of connection.
11. The load is not identified on the DB.

LEGEND

- Single phase Miniature circuit breaker MCB
- Three phase Switch disconnector
- Live and neutral cable
- Four core cable (three phase and neutral cable)
- RCBO - Residual Current Circuit breaker with overcurrent protection
  ELCB - Earth Leakage Circuit Breaker

Survey Photos

FIG. 1 – RIGHT OF WAY OF 33KV OVERHEAD LINES IMPACTED BY OVER-GROWN TREES

FIG. 2 – HT POLES AND 33KV OVERHEAD LINES. STANDARD FUSES ARE REMOVED. LINE 3 WIRE LINK LOOSELY CONNECTED

FIG. 3 – 500KVA TRANSFORMER

FIG. 4 – FEEDER PILLAR. GATE - BROKEN. LOW LEVEL. DOOR OPENED TO RAIN/SUN.. TOO CLOSE TO ENTRANCE.

FIG.5 - MAIN GEAR SWITCH 800A AND METERING POINT. POOR CABLE TERMINATION. (Inisde Equipment Room-Ground floor)

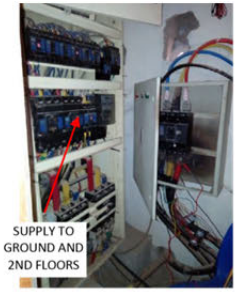


FIG.6 - MAIN GEAR SWITCH 800A AND MAIN DISTRIBUTION BOARD. (Inisde Equipment Room-Ground floor)

FIG.7 – SUB MAIN DISTRIBUTION BOARD. (Inisde Equipment Room-Ground floor)

FIG.8 – VOLTAGE STABILIZER AND CHANGEOVER SWITCH. (Generator area)

FIG.9 – VOLTAGE STABILIZER. NOT FUNCTIONAL. (Generator area)

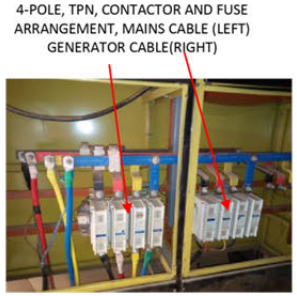


FIG.10 – CHANGEOVER PANEL. EXPOSED LIVE BUSBARS. NO INGRESS PROTECTION. (Generator area)

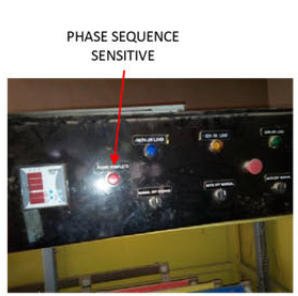


FIG.11 – CHANGEOVER PANEL. WITH AUTO AND MANUAL SWITCHING PROVISIONS. (Generator area)

FIG.12 – VOLTAGE STABILIZER DISPLAY METERING AND INDICATORS. NOT FUNCTIONAL (Generator area)

FIG.13 – 500KVA TRANSFORMER, FEEDER PILLAR, HT POLE (Transfomer area)

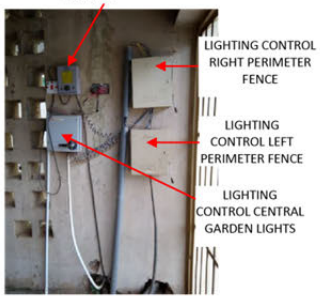


FIG.14 – LIGHTING CONTROL GEAR SWITCHES. (Generator area)

FIG.15 – 3NOS DISTRBUTION BOARDS (Ground Floor)

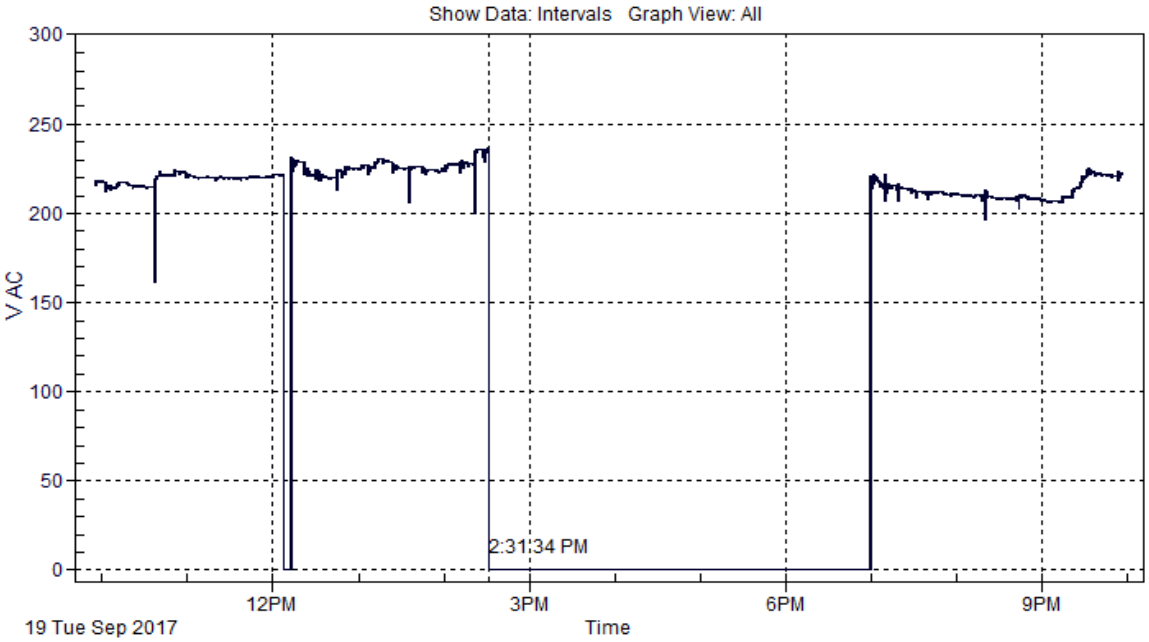
FIG.16 – 3NOS DISTRBUTION BOARDS (First Floor) same arrangement as ground floor

FIG.17 – 3NOS DISTRBUTION BOARDS (second Floor) same arrangement as first floor

FIG.18 – GENERATOR 60KVA (Generator area)

FIG.19 – GENERATORS 250KVA AND 500KVA (Generator area)

Logged Data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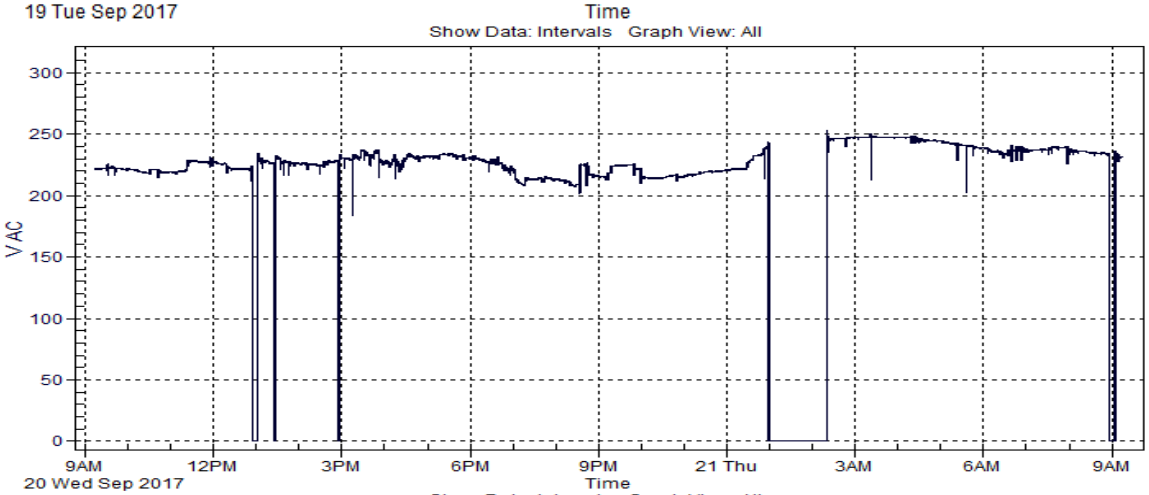
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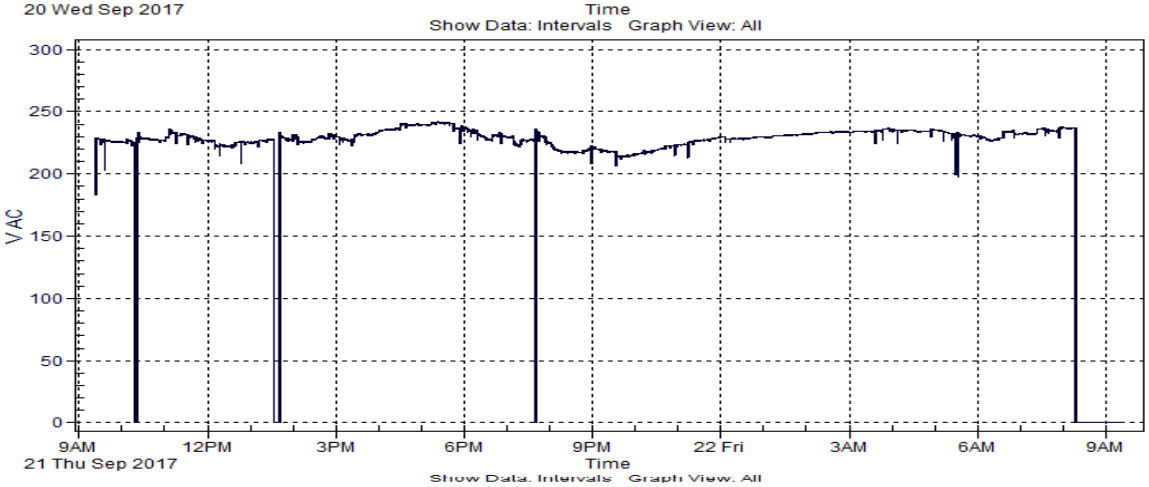
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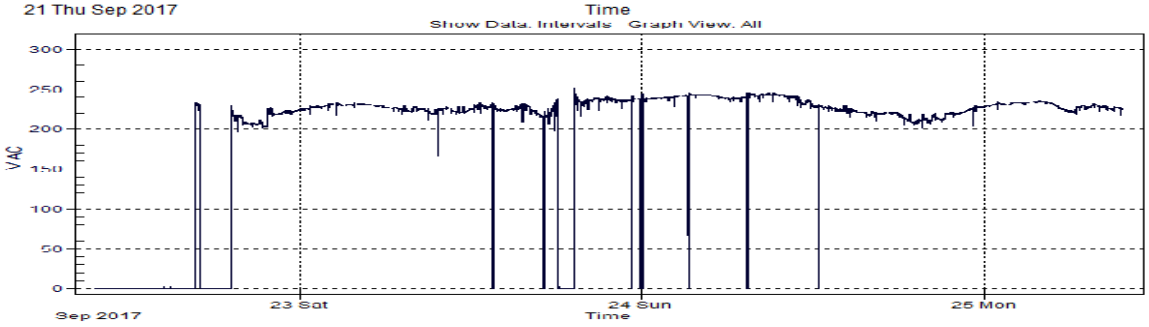
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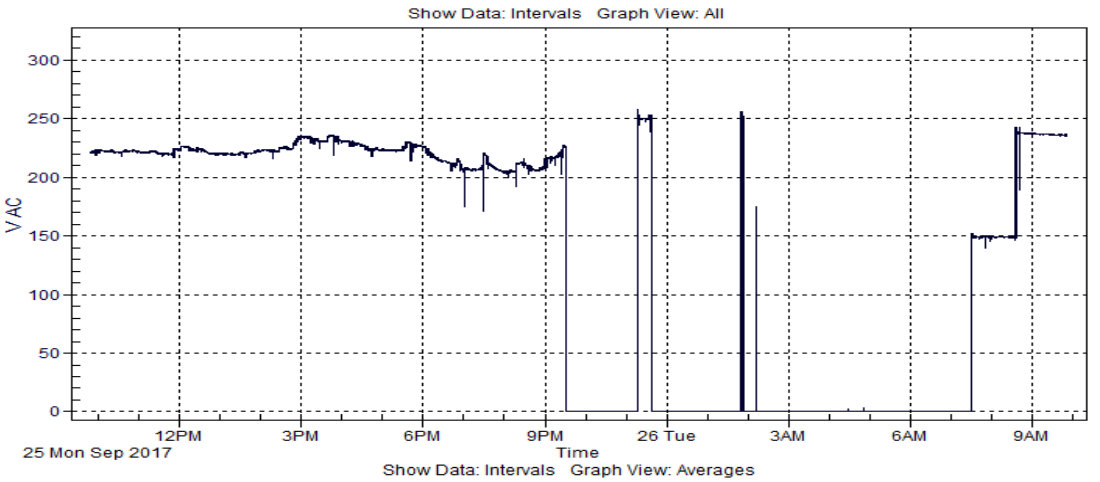
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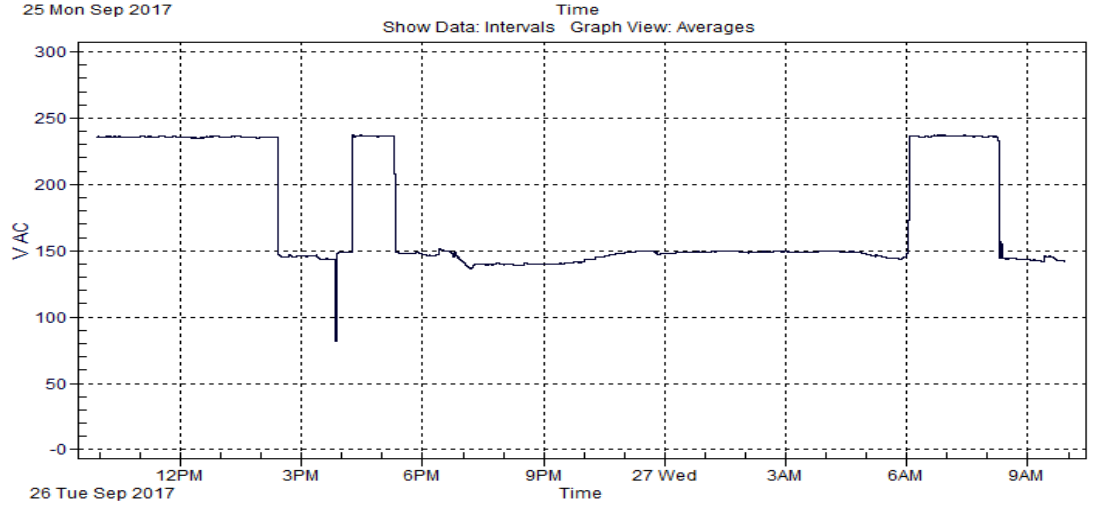
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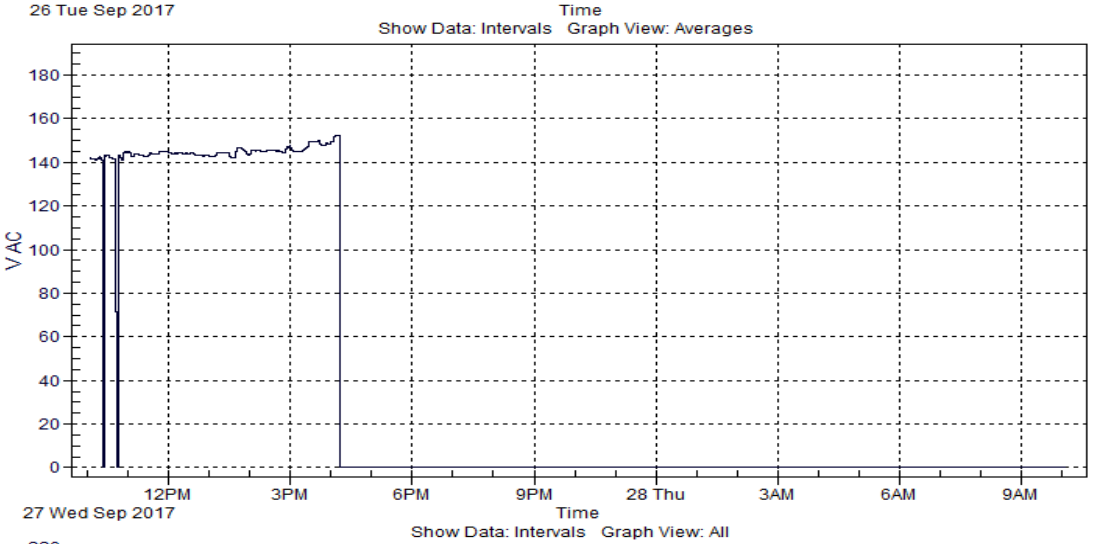
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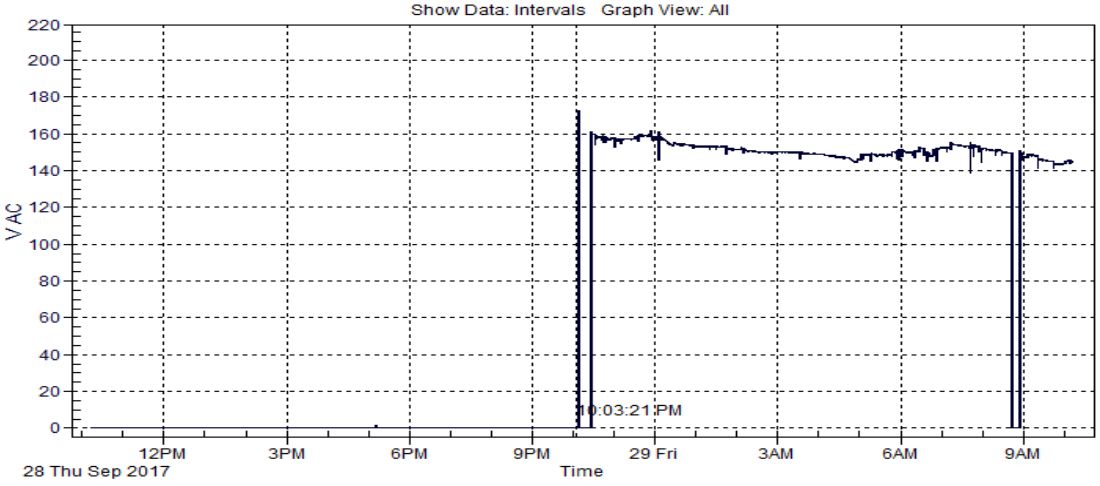
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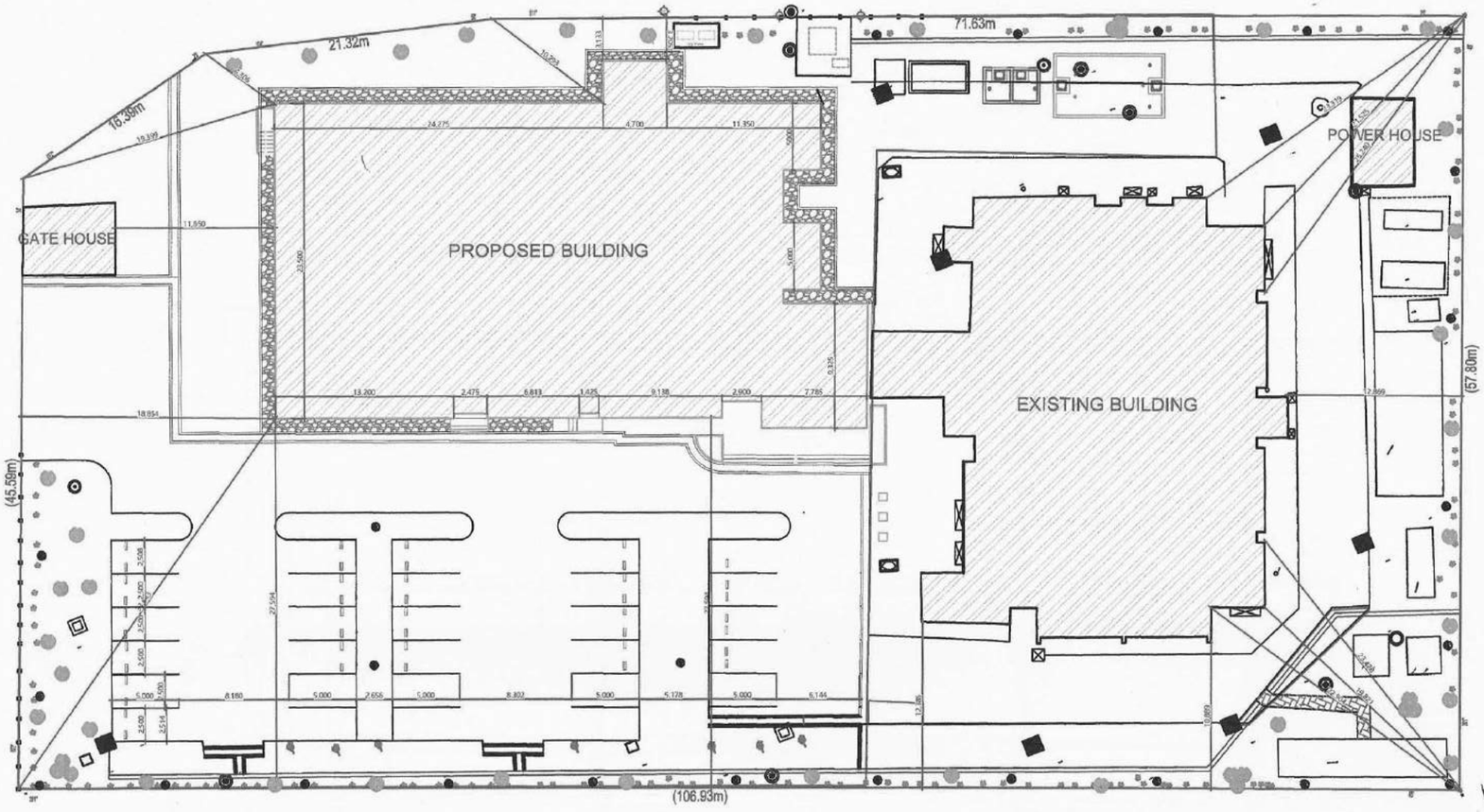
28 Thu Sep 2017



APPROVAL COLUMN

APRN/1.13/467/F2821_/18.05/3868

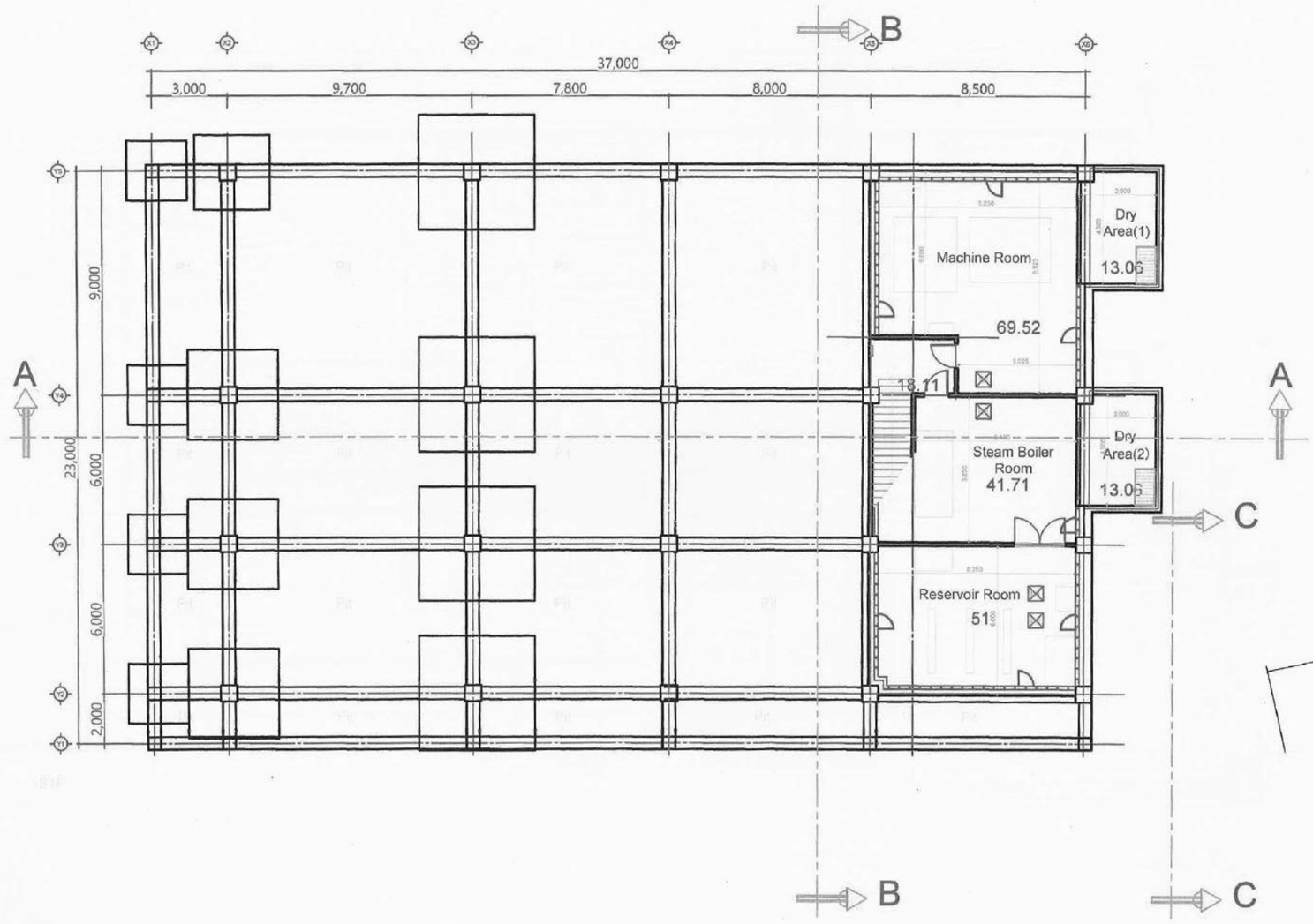
SITE ANALYSIS

PLOT AREA	=	6006.00SQM	EXISTING GATE HOUSE AREA	=	35.89SQM
PRO. BUILDING AREA	=	980.00SQM	TOTAL EXISTING BUILDING AREA	=	821.89SQM
EXISTING BUILDING AREA	=	756.00SQM	TOTAL BUILT-UP AREA AREA	=	1801.89SQM
EXISTING POWER HOUSE AREA	=	30.00SQM	% BUILT-UP AREA	=	30.00%

ARCHITECTS REGISTRATION COUNCIL OF NIGERIA
Established by Decree No.10 of 1969
A 1880711

JICA	PROJECT TITLE: THE PROJECT FOR STRENGTHENING THE DIAGNOSTIC CAPACITY OF NIGERIA CENTRE FOR DISEASE CONTROL (NCDC)	PROPOSED DIAGNOSTIC CENTRE FOR NIGERIA CENTRE FOR DISEASE CONTRO L (NCDC) PLOT 467 CADASTRAL ZONE B13,GADUWA DISTRICT GADUWA,FCT,ABUJA	SCALE: 1/400 DATE: OCT. 2017 DRAWN BY: T. Shimada CHECKED BY: T. Ezure
			DRG TITLE: SITE LAYOUT DRG NO: A-001
			ORIENTAL CONSULTANTS GLOBAL CO., LTD.

APPROVAL COLUMN

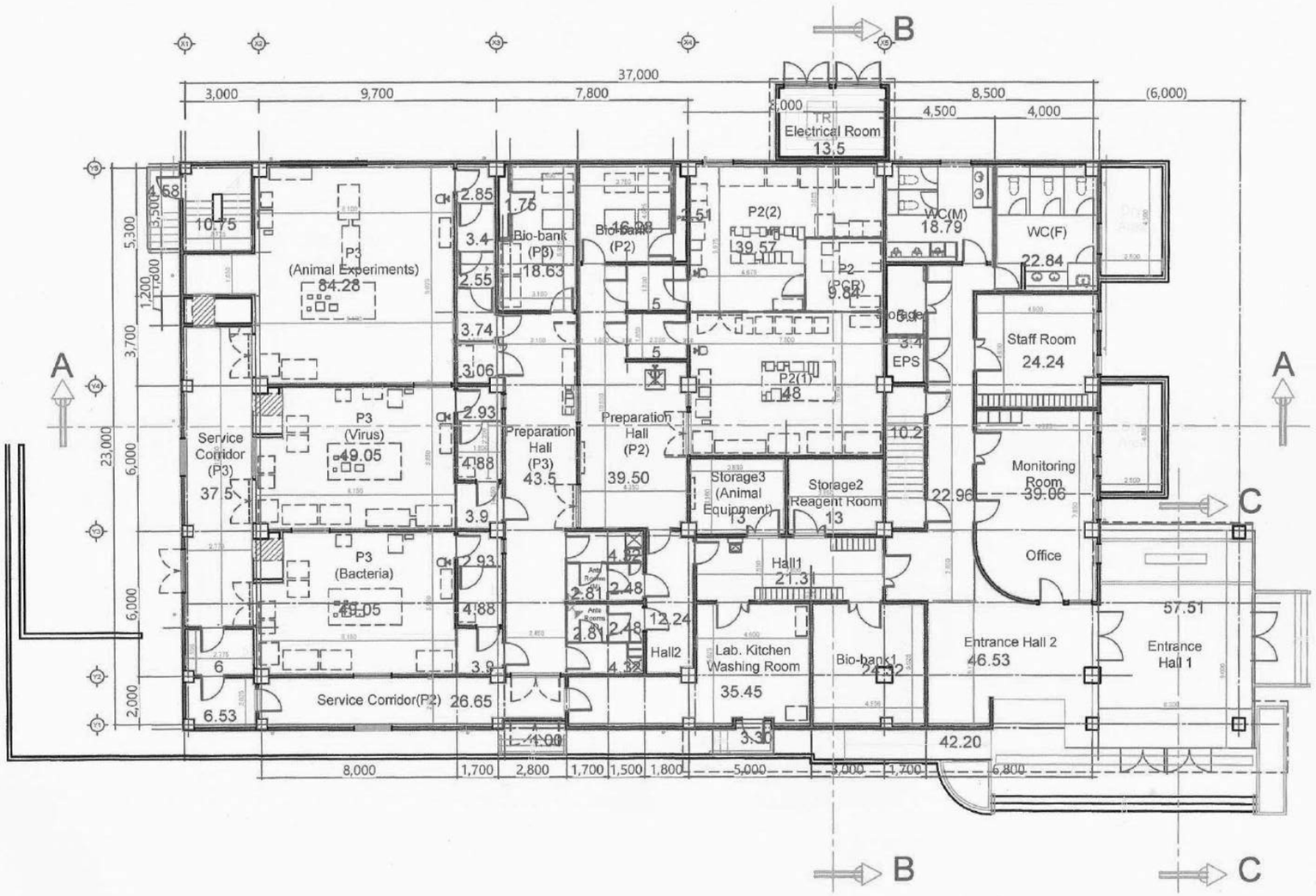


APRN/1.13/467/F2821_/18.05/3868

ARCON
Established by Decree No.10 of 1969
A 1321213

PROJECT TITLE: THE PROJECT FOR STRENGTHENING THE DIAGNOSTIC CAPACITY OF NIGERIA CENTRE FOR DISEASE CONTROL (NCDC)	PROPOSED DIAGNOSTIC CENTRE FOR NIGERIA CENTRE FOR DISEASE CONTRO L (NCDC) PLOT 467 CADASTRAL ZONE B13,GADUWA DISTRICT GADUWA,FCT,ABUJA	SCALE 1/200 DATE OCT. 2017 DRAWN BY T. Shimada CHECKED BY T. Ezure	DRG TITLE: BASEMENT FLOOR PLAN DRG NO: A-002 DESIGNED BY: ORIENTAL CONSULTANTS GLOBAL CO., LTD.

APPROVAL COLUMN

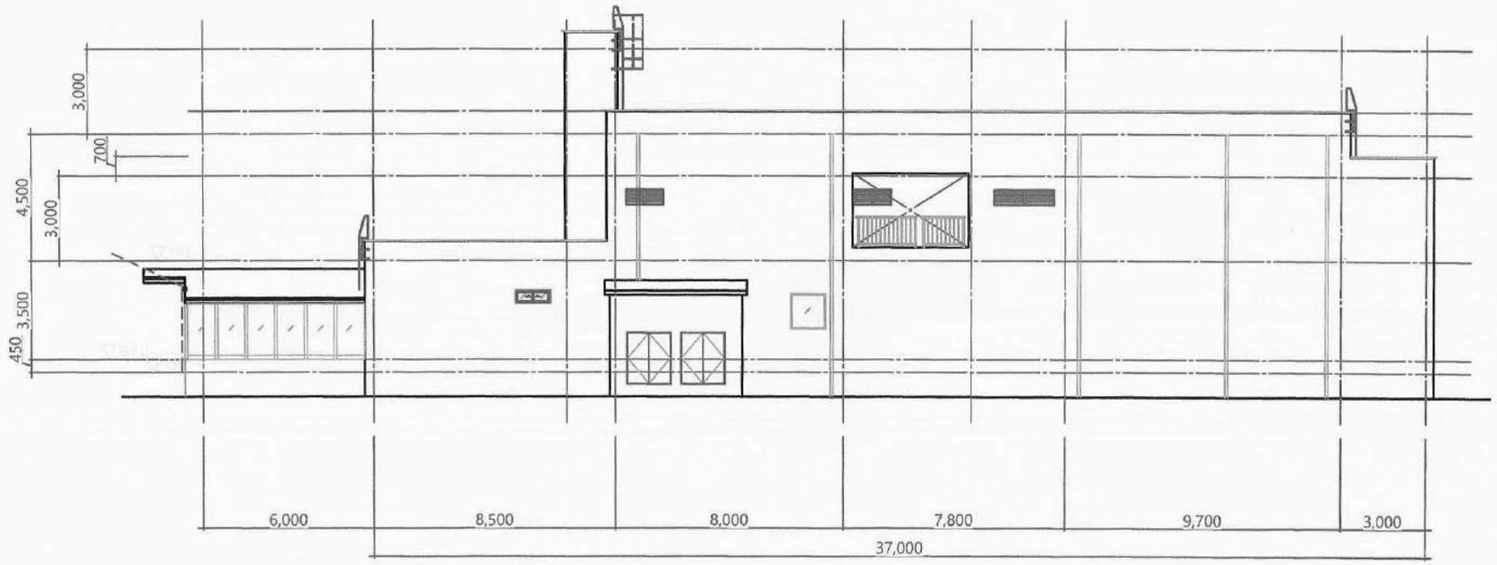


APRN/1.13/467/F2821_/18.05/3868

ARCON
Established by Decree No.10 of 1969
1342213

PROJECT TITLE: THE PROJECT FOR STRENGTHENING THE DIAGNOSTIC CAPACITY OF NIGERIA CENTRE FOR DISEASE CONTROL (NCDC)	PROPOSED DIAGNOSTIC CENTRE FOR NIGERIA CENTRE FOR DISEASE CONTRO L (NCDC) PLOT 467 CADASTRAL ZONE B13,GADUWA DISTRICT GADUWA,FCT,ABUJA	1/200 OCT. 2017	GROUND FLOOR PLAN — A-003
		DESIGNED BY: T. Shimada CHECKED BY: T. Ezure	ORIENTAL CONSULTANTS GLOBAL CO., LTD.

APPROVAL COLUMN

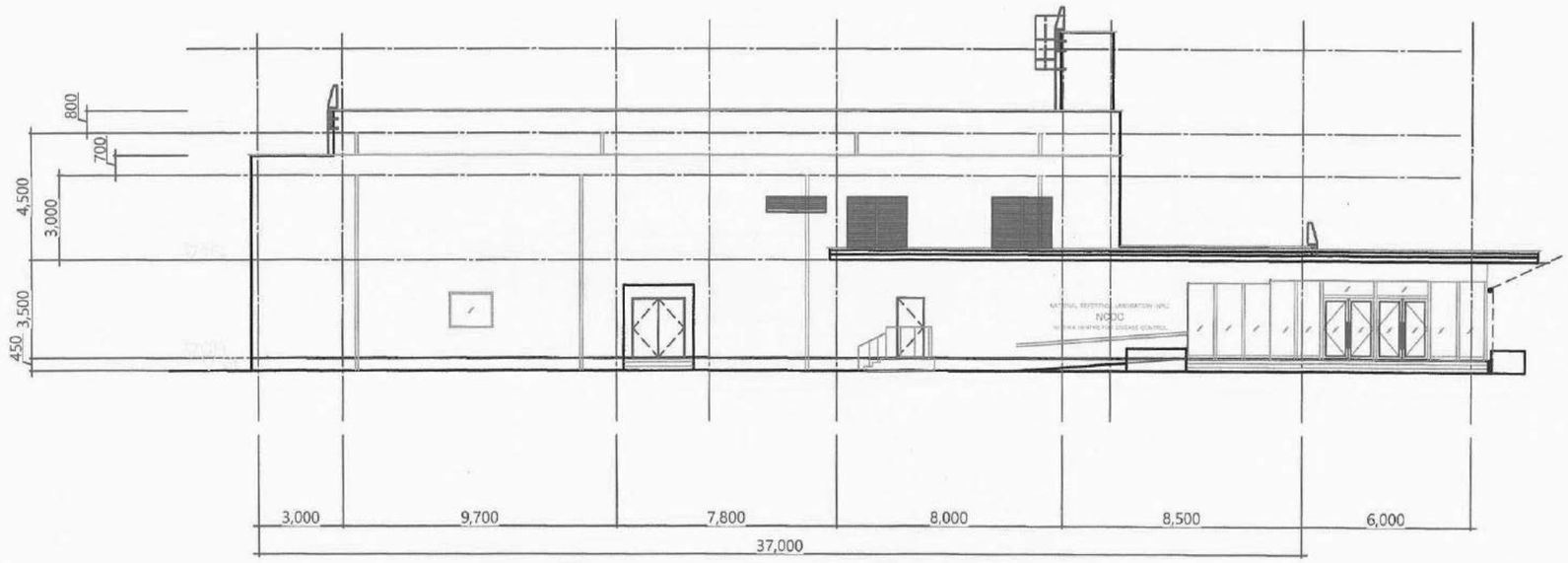


APRN/1.13/467/F2821_/18.05/3868

ARCON
Established by Decree No.10 of 1969
A1331712
NSPM, Pic

PROJECT TITLE: THE PROJECT FOR STRENGTHENING THE DIAGNOSTIC CAPACITY OF NIGERIA CENTRE FOR DISEASE CONTROL (NCDC)	PROPOSED DIAGNOSTIC CENTRE FOR NIGERIA CENTRE FOR DISEASE CONTRO L (NCDC) PLOT 467 CADASTRAL ZONE B13,GADUWA DISTRICT GADUWA,FCT,ABUJA	SCALE 1/200 · DATE OCT. 2017 · DRAWN BY T. Shimada · CHECKED BY T. Ezure	NORTH ELEVATION · A-006 · ORIENTAL CONSULTANTS GLOBAL CO., LTD.

APPROVAL COLUMN

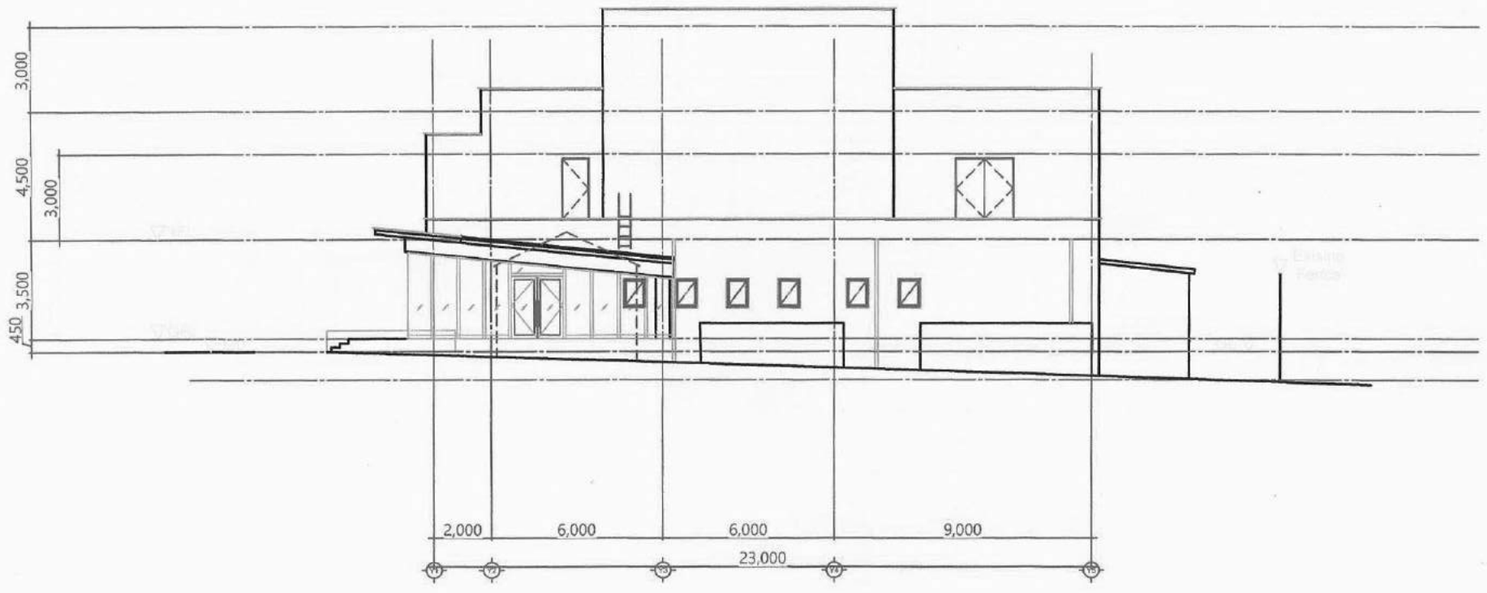


APRN/1.13/467/F2821_/18.05/3868

ARCON
Established by Decree No.10 of 1988
A 328212
Registrar
NSPM Fic

PROJECT TITLE: THE PROJECT FOR STRENGTHENING THE DIAGNOSTIC CAPACITY OF NIGERIA CENTRE FOR DISEASE CONTROL (NCDC)	PROPOSED DIAGNOSTIC CENTRE FOR NIGERIA CENTRE FOR DISEASE CONTRO L (NCDC) PLOT 467 CADASTRAL ZONE B13,GADUWA DISTRICT GADUWA,FCT,ABUJA		SCALE: 1/200	DRAWING TITLE: SOUTH ELEVATION
			DATE: OCT. 2007	DRAWING NO: A-007
			DESIGNED BY: Shimada CHECKED BY: T. Ezure	DRAWN BY: ORIENTAL CONSULTANTS GLOBAL CO., LTD.

APPROVAL COLUMN



APRN/1.13/467/F2821_/18.05/3868

ARCHITECTS ARCON Established by Decree No.10 of 1969 A 335212 Registrar NIGERIA

PROJECT TITLE: THE PROJECT FOR STRENGTHENING THE DIAGNOSTIC CAPACITY OF NIGERIA CENTRE FOR DISEASE CONTROL (NCDC)	PROPOSED DIAGNOSTIC CENTRE FOR NIGERIA CENTRE FOR DISEASE CONTRO L (NCDC) PLOT 467 CADASTRAL ZONE B13,GADUWA DISTRICT GADUWA,FCT,ABUJA	SCALE 1/200 DATE OCT/2017 DRAWN BY Y. Shimada CHECKED BY T. Ezure	EAST ELEVATION DRG NO A-008 ORIENTAL CONSULTANTS GLOBAL CO., LTD.

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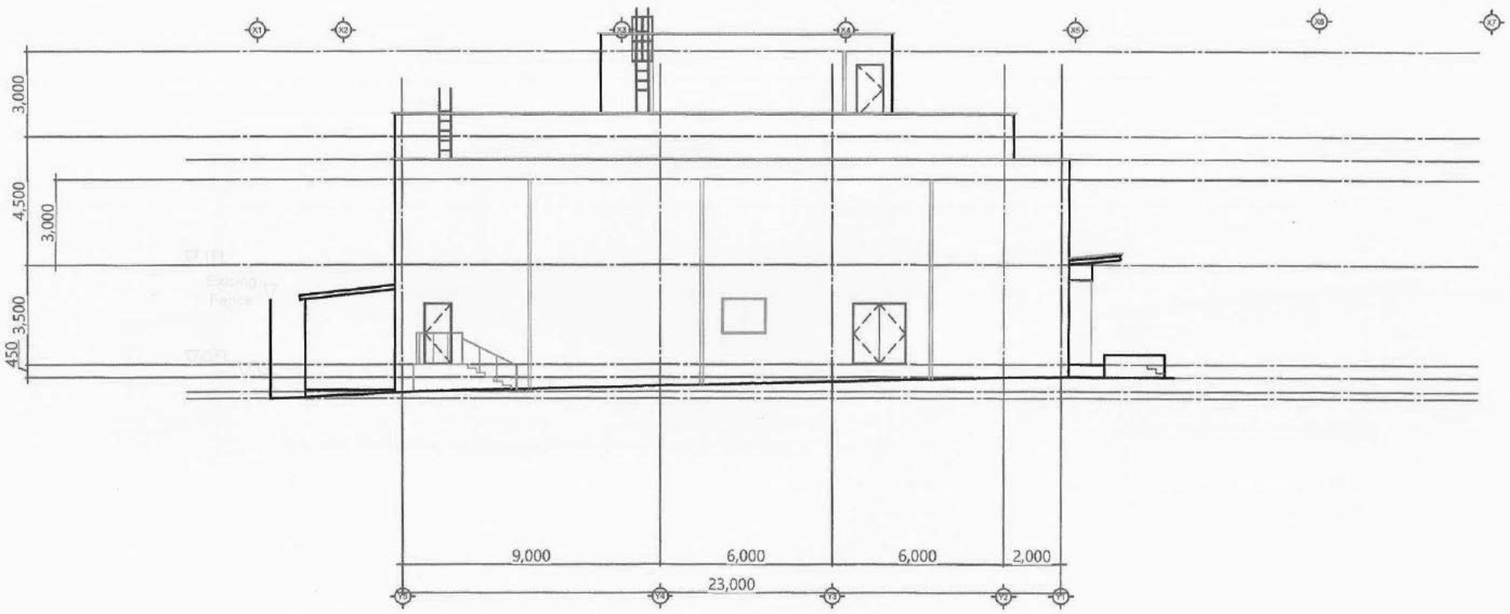
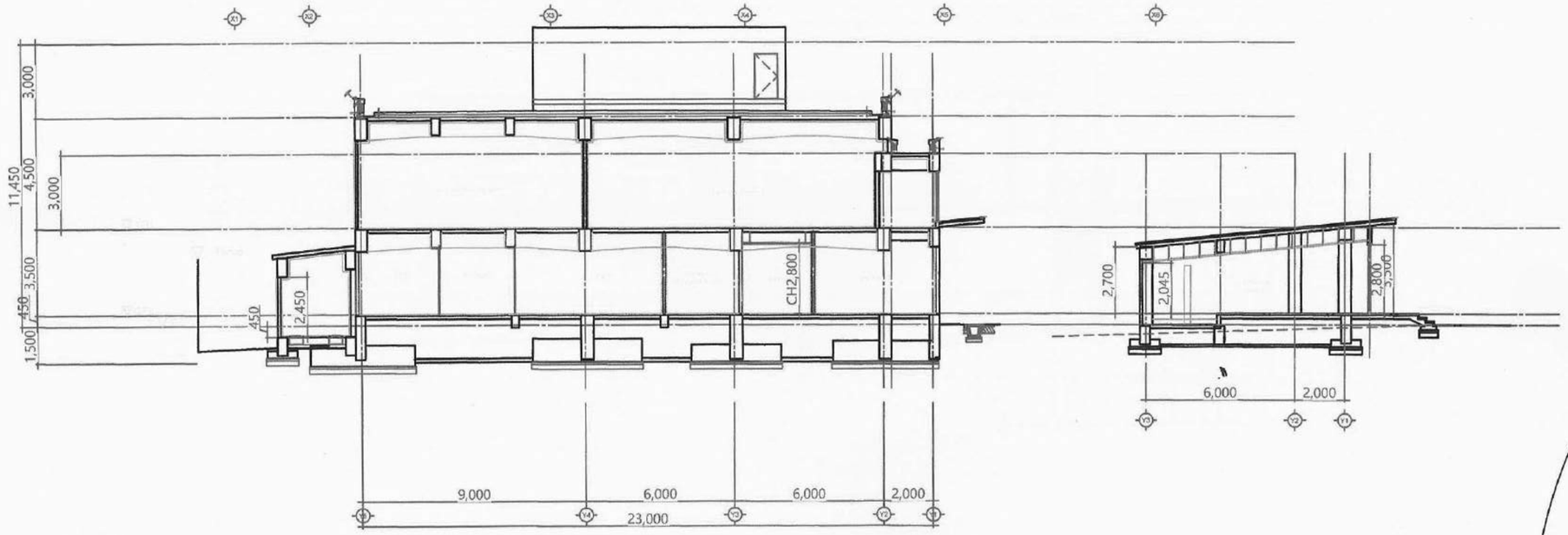


APRN/1.13/467/F2821_/18.05/3868

ARCON
Established By Decree No.10 of 1969
A1324712
NSPM Plc

PROJECT TITLE THE PROJECT FOR STRENGTHENING THE DIAGNOSTIC CAPACITY OF NIGERIA CENTRE FOR DISEASE CONTROL (NCDC)	PROPOSED DIAGNOSTIC CENTRE FOR NIGERIA CENTRE FOR DISEASE CONTROL (NCDC) PLOT 467 CADASTRAL ZONE B13,GADUWA DISTRICT GADUWA,FCT,ABUJA	NO / DATE / DESCRIPTION / BY / APP'D REVISIONS	SCALE 1/200 DATE OCT. 2017 DRAWN BY Shimada DESIGNED BY T. Ezure	DWG TITLE WEST ELEVATION DESIGNED BY ORIENTAL CONSULTANTS GLOBAL CO., LTD.	DWG NO A-009

APPROVAL COLUMN

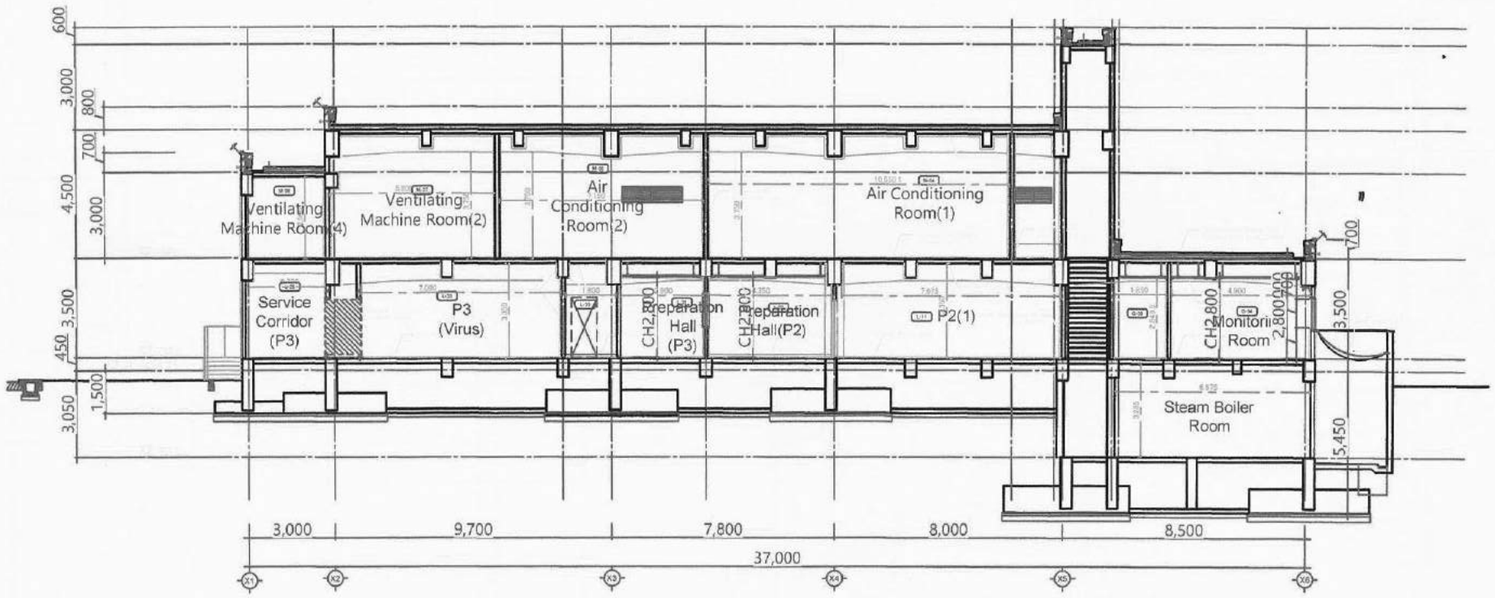


APRN/1.13/467/F2821_/18.05/3868

ARCON
Established by Decree No.10 of 1988
A 1321212
NSPM Pic

PROJECT TITLE THE PROJECT FOR STRENGTHENING THE DIAGNOSTIC CAPACITY OF NIGERIA CENTRE FOR DISEASE CONTROL (NCDC)	PROPOSED DIAGNOSTIC CENTRE FOR NIGERIA CENTRE FOR DISEASE CONTROL (NCDC) PLOT 467 CADASTRAL ZONE B13,GADUWA DISTRICT GADUWA,FCT,ABUJA	NO. / DATE / DESCRIPTIONS / BY / APP'D	SCALE 1/200 DATE OCT. 2017 DRAWN BY T. Shimada CHECKED BY T. Ezure	DRG TITLE LONGITUDINAL SECTION	DRG NO A-010
				DESIGNED BY ORIENTAL CONSULTANTS GLOBAL CO., LTD.	

APPROVAL COLUMN

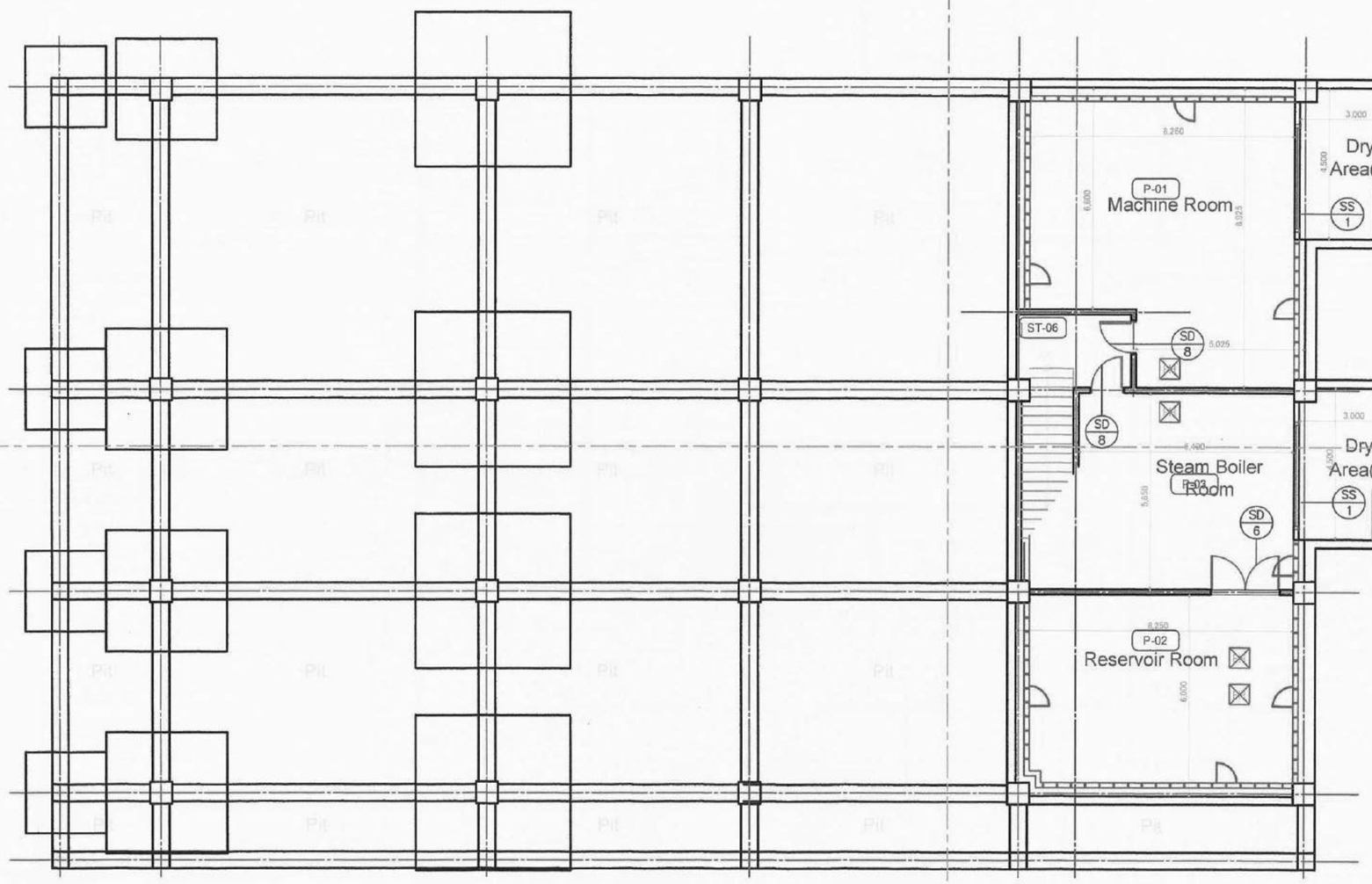


APRN/1.13/467/F2821_/18.05/3868

ARCHITECTS REGISTRATION COUNCIL OF NIGERIA
Established by Decree No.10 of 1969
A 363212
NSPM Plc

PROJECT TITLE: THE PROJECT FOR STRENGTHENING THE DIAGNOSTIC CAPACITY OF NIGERIA CENTRE FOR DISEASE CONTROL (NCDC)	PROPOSED DIAGNOSTIC CENTRE FOR NIGERIA CENTRE FOR DISEASE CONTROL (NCDC) PLOT 467 CADASTRAL ZONE B13,GADUWA DISTRICT GADUWA,FCT,ABUJA	SCALE: 1/200	DRG TITLE: TRANSVERSE SECTION
		DATE: OCT. 2017	DRG NO: A-011
		DESIGNED BY: T. Shimada	ORIENTAL CONSULTANTS GLOBAL CO., LTD.
		CHECKED BY: T. Ezura	

APPROVAL COLUMN

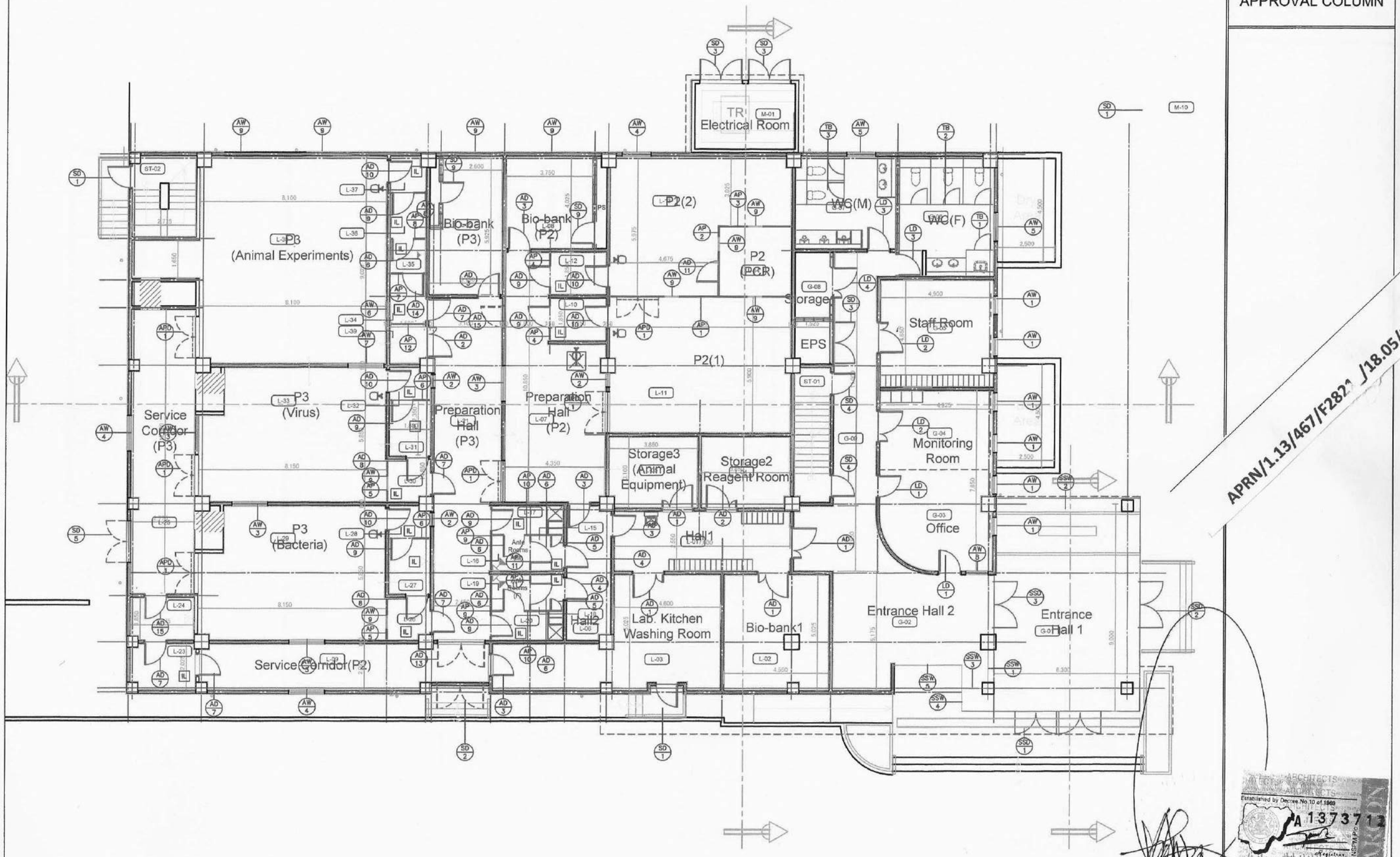


APRN/1.13/467/F2821_/18.05/3868

ARCHITECTS REGISTRATION COUNCIL OF NIGERIA
Established by Decree No.10 of 1969
A 1366712
NSPM Plc
ARCON

PROJECT TITLE JICA THE PROJECT FOR STRENGTHENING THE DIAGNOSTIC CAPACITY OF NIGERIA CENTRE FOR DISEASE CONTROL (NCDC)	PROPOSED DIAGNOSTIC CENTRE FOR NIGERIA CENTRE FOR DISEASE CONTRO L (NCDC) PLOT 467 CADASTRAL ZONE B13,GADUWA DISTRICT GADUWA,FCT,ABUJA	NO / DATE / DESCRIPTIONS / BY / APVD REVISIONS	SCALE 1/150 DATE OCT. 2017 DRAWN BY T. Shimada CHECKED BY T. Ezure	TITLE BASEMENT FLOOR WINDOWS & DOORS KEY PLAN ORIENTAL CONSULTANTS GLOBAL CO., LTD.	DWG NO A-012

APPROVAL COLUMN

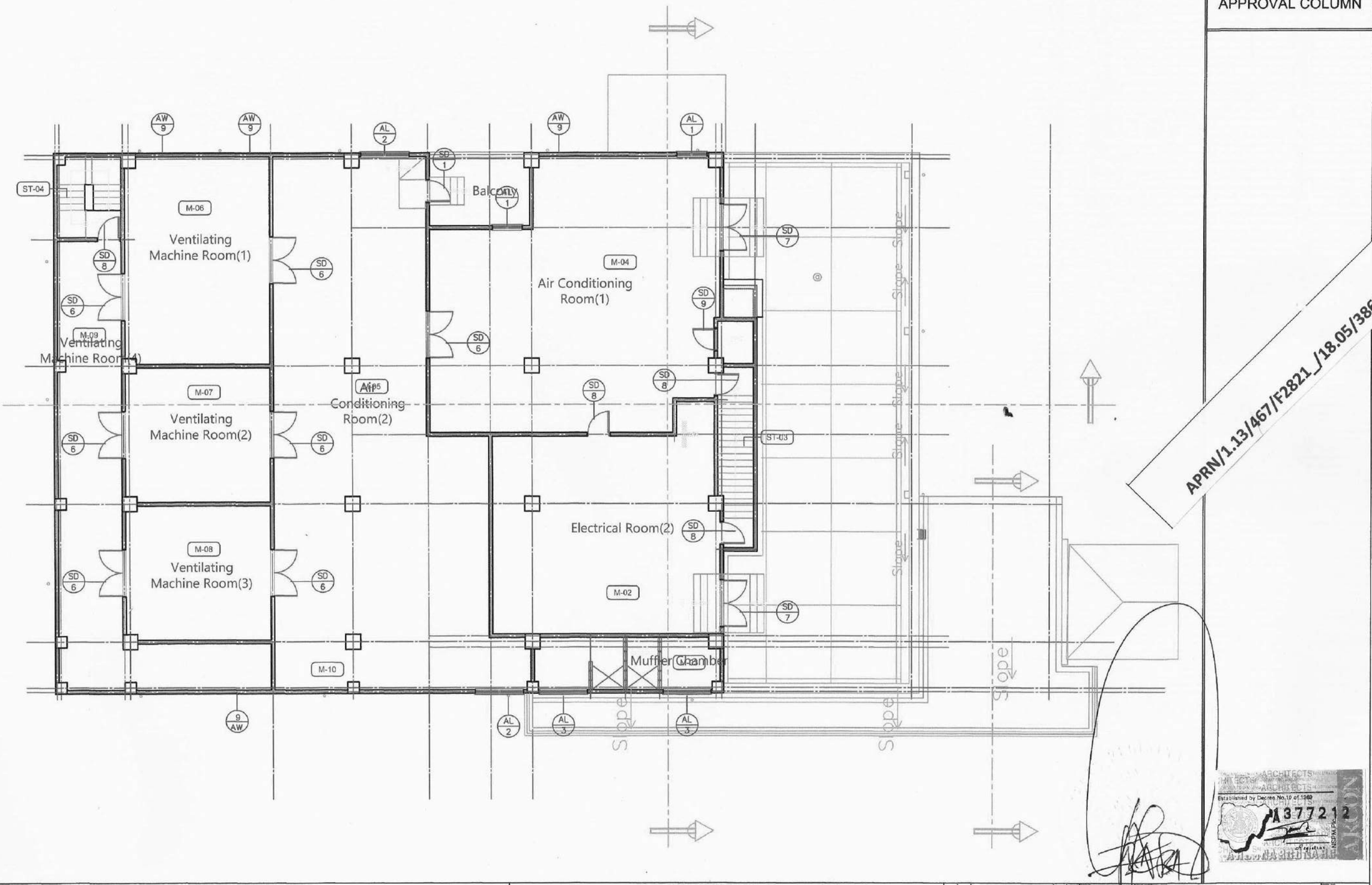


APRN/1.13/467/F2821 /18.05/3868

ARCHITECTS REGISTRATION COUNCIL OF NIGERIA
Established by Decree No.10 of 1969
A 1373712

PROJECT TITLE THE PROJECT FOR STRENGTHENING THE DIAGNOSTIC CAPACITY OF NIGERIA CENTRE FOR DISEASE CONTROL (NCDC)	PROPOSED DIAGNOSTIC CENTRE FOR NIGERIA CENTRE FOR DISEASE CONTROL (NCDC) PLOT 467 CADASTRAL ZONE B13,GADUWA DISTRICT GADUWA,FCT,ABUJA	NO. DATE DESCRIPTION BY APP'D REVISIONS	SCALE 1/150 DATE OCT. 2017 DRAWN BY T. Shimada CHECKED BY T. Ezure	GROUND FLOOR WINDOWS & DOORS KEY PLAN DRAWING BY ORIENTAL CONSULTANTS GLOBAL CO., LTD.	DRG NO A-013

APPROVAL COLUMN



APRN/1.13/467/F2821_/18.05/3868

ARCHITECTS REGISTRATION COUNCIL OF NIGERIA
Established by Decree No.10 of 1969
A377212
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PROJECT TITLE: THE PROJECT FOR STRENGTHENING THE DIAGNOSTIC CAPACITY OF NIGERIA CENTRE FOR DISEASE CONTROL (NCDC)	PROPOSED DIAGNOSTIC CENTRE FOR NIGERIA CENTRE FOR DISEASE CONTRO L (NCDC) PLOT 467 CADASTRAL ZONE B13,GADUWA DISTRICT GADUWA,FCT,ABUJA	SCALE 1/150; DATE OCT. 2017; DRAWN BY T. Shimada; CHECKED BY T. Ezure	DWG TITLE: FIRST FLOOR WINDOWS & DOORS KEY PLAN; DWG NO A-014; DESIGNED BY ORIENTAL CONSULTANTS GLOBAL CO., LTD.

STRUCTURAL NOTES

GENERAL STRUCTURAL NOTES

STRUCTURE

1. THIS STRUCTURE IS SAFELY DESIGNED TO BS 8110
   NO ALTERATION SHOULD BE MADE WITHOUT CONSULTING THE DESIGN ENGINEER
2. DURING CONSTRUCTION, THE STRAP BEAM BETWEEN THE FOOTINGS SHOULD NOT BEAR AGAINST THE SOIL, HENCE THE GROUND DIRECTLY UNDER THE BEAM SHOULD BE LOOSENED AND LEFT UNCOMPACTED
3. CONCRETE FLOOR TO BE 150mm
   THICK SMOOTH FINISH CAST ON PLACED HARDCORE
   25mm BED OF SHARP SAND
4. AGGREGATES SHALL BE GRANITE OF 19mm MAX SIZE
5. BARS SHALL BE CLEANSED OF ALL RUST BEFORE PLACEMENT
6. LAP TO BARS SHALL BE MINIMUM OF 500mm IN FOOTINGS AND 750mm IN COLUMNS
7. ENGINEER IS NOT RESPONSIBLE FOR BUILDING NOT SUPERVISED BY HIM
8. READ DRAWINGS ALONGSIDE ARCHITECTURAL AND OTHER RELEVANT WORKING DRAWINGS

CONCRETE

1. CONCRETE STRENGTH MUST ACHIEVE A MINIMUM ULTIMATE STRENGTH AT 28 DAYS AS LISTED BELOW:
   FOOTINGS: – 20N/mm²(1:2:4–20mm AGGREGATES)
   SLABS ON GRADE: – 20N/mm²(1:2:4–12mm AGGREGATES)
   COLUMNS AND BEAMS: – 25N/mm²(1:2:3–12mm AGGREGATES)
   SUSPENDED SLAB: – 20N/mm² (1:2:4–12mm AGGREGATES)
2. CONCRETE SLUMP FOR STANDARD CONCRETE SHALL BE HELD AT 75mm +25mm

REINFORCING STEEL

1. ALL REINFORCING BARS SHALL BE HIGH YIELD DEFORMED BARS OF 410N/mm²
2. STIRRUPS AND TIES SHALL BE SMOOTH BARS OF 250N/mm² MILD STEEL
3. CONCRETE COVER FOR REBARS IN CONCRETE:
   50mm FOR ALL SUBSTRUCTURAL WORKS
   30mm FOR COLUMNS AND BEAMS ABOVE THE GROUND
   50mm FOR REBARS INSIDE BLOCKWALLS INCLUDING WALL THICKNESS
4. LAP LENGTHS FOR ALL BARS SHALL BE 50 TIMES THE BAR DIAMETER

CMU BLOCKS

1. ALL STRUCTURAL CMU BLOCKS TO BE CEMENT SAND RATIO 1:9 (3.5N/mm²) BEDDED IN CEMENT MORTAR 1:5 (7N/mm²)

WOOD

1. ALL STRUCTURAL WOOD IN ROOF MEMBERS SHOULD BE WELL SEASONED HARDWOOD (EKHIMI OR DANTA):
   STRENGTH IN BENDING – 17.5N/mm²
   STRENGTH IN TENSION – 10.5N/mm²
   STRENGTH IN COMPRESSION – 16.5N/mm²

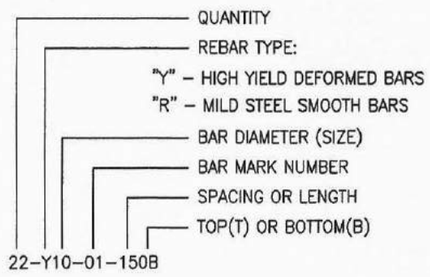
STEEL

1. ALL STRUCTURAL STEEL MEMBERS SHOULD BE OF GRADE 43 STEEL

ABBREVIATIONS

FFL	– FINISH FLOOR LEVEL
FL	– FLOOR LEVEL
GL	– GROUND LEVEL
GFL	– GROUND FLOOR LEVEL
RSL	– ROOF SLAB LEVEL
PHR	– PENTHOUSE ROOF
MR	– MEZZANINE ROOF
CONC	– CONCRETE
RC	– REINFORCED CONCRETE
CMU	– CONCRETE MASONRY UNITS
ARB	– ADDITIONAL REINFORCED BAR
HOR.	– HORIZONTAL
DIRG.	– DIAGONAL
VERT.	– VERTICAL
FG	– FOUNDATION GIRDER
FB	– FOUNDATION BEAM
F	– FOUNDATION FOOTING
FS	– FLOOR SLAB
W	– WALL
RW	– RETAINING WALL
CB	– CONCRETE BLOCK WALL
G	– GIRDER
B	– BEAM
C	– COLUMN
CS	– CANTILEVER SLAB
DFS	– DIRT FLOOR SLAB
P	– PILLAR
CG	– CANTILEVER GIRDER
MID	– MIDDLE
DN	– DOWN
EPS	– ELECTRICAL PIPE SPACE

BAR NOTATIONS

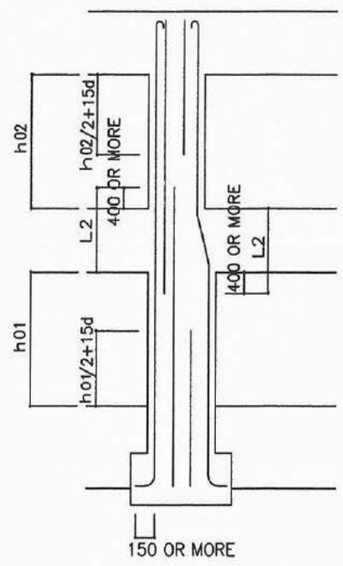


DRAWING INDEX

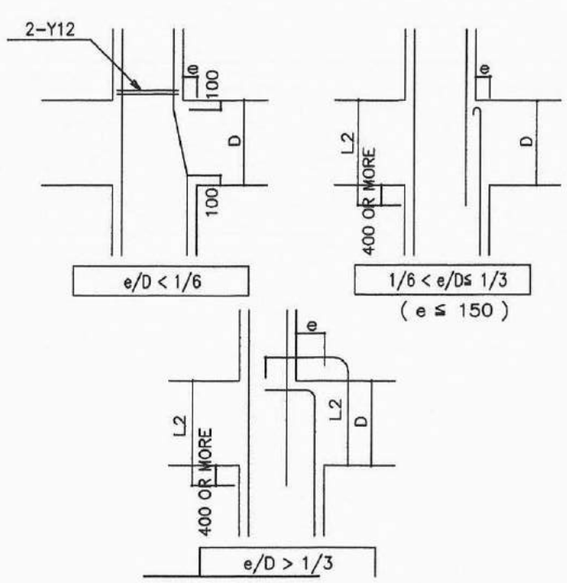
COREN REGISTERED ENGINEER In accordance with Decree 53 of 1970 C 31911 Registrar

PROJECT TITLE: THE PROJECT FOR STRENGTHENING THE DIAGNOSTIC CAPACITY OF NIGERIA CENTRE FOR DISEASE CONTROL (NCDC)	PROPOSED DIAGNOSTIC CENTRE FOR NIGERIA CENTRE FOR DISEASE CONTROL (NCDC) PLOT 467 CADASTRAL ZONE B13,GADUWA DISTRICT GADUWA,FCT,ABUJA	SCALE: -	DRAWING TITLE: NOTES	DRG NO: S-01
		DATE: MARCH 2018	DESIGNED BY: ORIENTAL CONSULTANTS GLOBAL CO.,, LTD.	

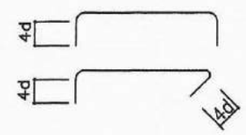
1−1 ANCHORAGE



1−2 CONNECTION OF DEFERENT COLUMN SIZE



3 TIE BARS

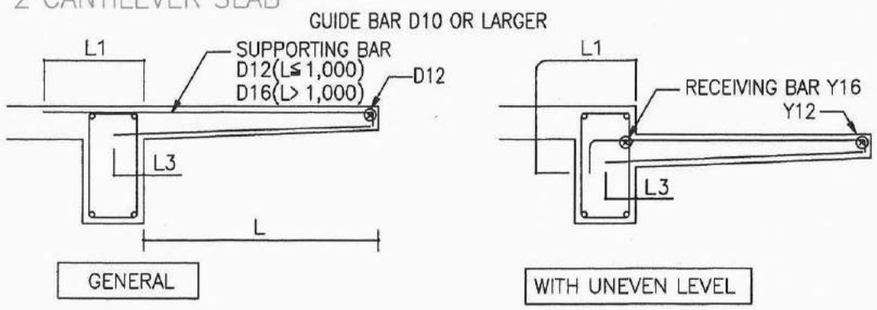


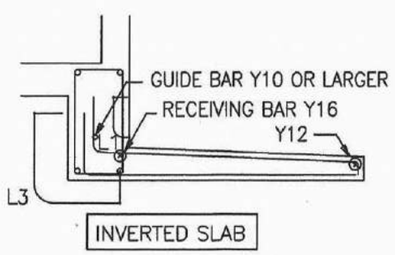
(1) TIE BARS ALLOCATION DISTANCE SHALL BE SMALLER THAN 1,000mm.

(2) WHEN THE WEB BAR IS IN 2 STEPS OR MORE, TIE BARS SHALL NOT BE PLACED IN THE SAME LOCATIONS, BUT ARRANGED IN STAGGERED POSITIONS.

3) RECEIVING BARS OF 2 STEPS ARRANGEMENT

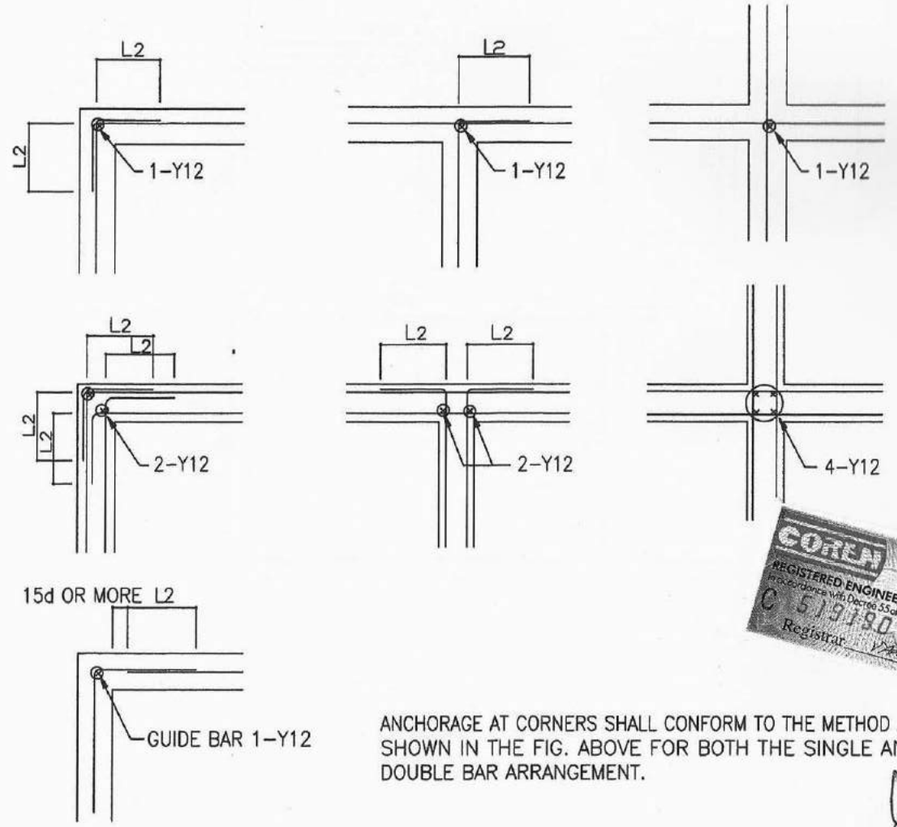
2 CANTILEVER SLAB





THE TOP BARS OF THE SLAB SHALL BE ANCHORED IN THE BEAM AND NO JOINTS ARE ALLOWED TO BE WITHIN THE BEAM−WIDTH.

4 ANCHORAGE TO WALL (WHEN TRANSVERSE BARS ARE TO BE ANCHORED TO WALL)



ANCHORAGE AT CORNERS SHALL CONFORM TO THE METHOD AS SHOWN IN THE FIG. ABOVE FOR BOTH THE SINGLE AND DOUBLE BAR ARRANGEMENT.

COREN REGISTERED ENGINEER In accordance with Decree 55 of 1970 C 519180 Registrar

PROJECT TITLE: THE PROJECT FOR STRENGTHENING THE DIAGNOSTIC CAPACITY OF NIGERIA CENTRE FOR DISEASE CONTROL (NCDC)	PROPOSED DIAGNOSTIC CENTRE FOR NIGERIA CENTRE FOR DISEASE CONTROL (NCDC) PLOT 467 CADASTRAL ZONE B13,GADUWA DISTRICT GADUWA,FCT,ABUJA	SCALE: - / DATE: MARCH 2018	DRG TITLE: MISCELLANEOUS DETAILS / DRG NO: S-02
			DESIGNED BY: ORIENTAL CONSULTANTS GLOBAL CO., LTD.

MECHANICAL DRAWING LIST

DWG.NO	DRAWING TITLE	SCALE		REMARKS
		A1	A3	
M — 000	MECHANICAL DRAWING LIST	NONE	NONE	
M — 001	LEGEND AND GENERAL NOTES FOR MECHANICAL WORK	NONE	NONE	
M — 002	EQUIPMENT SCHEDULE FOR PLUMBING SYSTEM	NONE	NONE	
M — 003	SITE PLAN FOR PLUMBING WORK	1/150	1/300	
M — 004	B1F FLOOR PLAN FOR PLUMBING WORK	1/75	1/150	
M — 005	GROUND FLOOR PLAN FOR PLUMBING WORK	1/75	1/150	
M — 006	1ST FLOOR PLAN FOR PLUMBING WORK	1/75	1/150	
M — 007	DETAIL PLAN (1) FOR PLUMBING WORK	1/50	1/100	
M — 008	DETAIL PLAN (2) FOR PLUMBING WORK	1/50	1/100	
M — 009	EQUIPMENT SCHEDULE (1) FOR HVAC WORK	NONE	NONE	
M — 010	EQUIPMENT SCHEDULE (2) FOR HVAC WORK	NONE	NONE	
M — 011	EQUIPMENT SCHEDULE (3) FOR HVAC WORK	NONE	NONE	
M — 012	HVAC FLOW SCHEME FOR P3 LAB. (1)	NONE	NONE	
M — 013	HVAC FLOW SCHEME FOR P3 LAB. (2)	NONE	NONE	
M — 014	HVAC FLOW SCHEME FOR P3 LAB. (3)	NONE	NONE	
M — 015	HVAC FLOW SCHEME FOR P3 LAB. (4)	NONE	NONE	
M — 016	HVAC FLOW SCHEME FOR P3 LAB. (5)	NONE	NONE	
M — 017	HVAC FLOW SCHEME FOR P3 LAB. (6)	NONE	NONE	
M — 018	GROUND FLOOR PLAN FOR DUCTING OF HVAC WORK	1/75	1/150	
M — 019	1ST FLOOR PLAN FOR DUCTING OF HVAC WORK	1/75	1/150	
M — 020	ROOF FLOOR PLAN FOR DUCTING OF HVAC WORK	1/75	1/150	
M — 021	GROUND FLOOR PLAN FOR PIPING OF HVAC WORK	1/75	1/150	
M — 022	1ST FLOOR PLAN FOR PIPING OF HVAC WORK	1/75	1/150	
M — 023	EQUIPMENT SCHEDULE DETAIL PLAN FOR OIL SUPPLY WORK	1/50	1/100	
M — 024	SCHEMATIC DIAGRAM FOR OIL SUPPLY WORK	1/50	1/100	
M — 025	GROUND AND 1ST FLOOR PLAN FOR OIL SUPPLY WORK	1/75	1/150	

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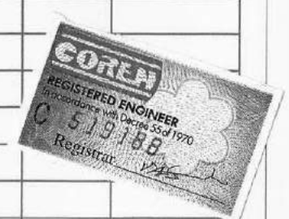
		A1	A3	



PROJECT TITLE

THE PROJECT FOR
STRENGTHENING THE DIAGNOSTIC CAPACITY OF
NIGERIA CENTRE FOR DISEASE CONTROL (NCDC)

PROPOSED DIAGNOSTIC CENTRE FOR
NIGERIA CENTRE FOR DISEASE CONTROL (NCDC)
PLOT 467 CADASTRAL ZONE B13,GADUWA DISTRICT
GADUWA,FCT,ABUJA

NO	DATE	DESCRIPTIONS	BY	APP'D
		REVISIONS		

SCALE: NONE
DATE: MARCH,2018
DRAWING BY: T. Shimada
CHECKED BY: O. Sajo
DWG TITLE: MECHANICAL DRAWING LIST
DWG NO: M-000
DESIGNED BY: ORIENTAL CONSULTANTS GLOBAL CO., LTD.

GENERAL NOTES FOR PLUMBING SYSTEM

A. GENERAL NOTES
1. DRAWINGS ARE DIAGRAMMATIC/SCHEMATIC AND INDICATE DESIGN INTENT AND GENERAL ARRANGEMENT OF THE SYSTEMS AND WORKS, AND DO NOT NECESSARILY PURPORT TO SHOW THE EXACT POSITIONS,SIZE OR DETAILS OF THE EQUIPMENT.

2. LOCATIONS OF EQUIPMENT AND FIXTURES INDICATED ON THE DRAWINGS,ARE APPROXIMATE ONLY AND SUBJECT TO MINOR ADJUSTMENTS IN THE FIELD WORK COORDINATED WITH ALL OTHER TRADES TO AVOID INTERFERENCE.

3. ALL ROUTINGS FOR PIPING INDICATED DO NOT INDICATE PRECISE POSITIONS OF SERVICES BUT FEASIBLE TO INSTALL THE SERVICES WITHIN THE GENERAL INDICATED, AND SHALL BE SELECTED AND DETERMINED BY THE CONTRACTOR COMPLING WITH ALL REQUIREMENTS OF THE SPECIFICTIONS.

4. DRAWINGS ARE NOT INTENDED TO SHOW EVERY OFFSET OR FITTINGS OR EVERY STRUCTURAL DEFFICULTY THAT MAY BE ENCOUNTERED DURING INSTALLATION OF THE WORK, LOCATION OF ALL ITEMS NOT DEFINITELY FIXED BY DIMENSIONS ARE APPROXIMATE ONLY. EXACT LOCATIONS NECESSARY TO SECURE BEST CONDITIONS AND RESULTS SHALL BE SELECTED AND DETERMINED AT THE SITE BY THE CONTRACTOR.

GENERAL NOTES FOR HVAC SYSTEM

A. GENERAL NOTES
1. DRAWINGS ARE DIAGRAMMATIC AND INDICATE DESIGN INTENT AND GENERAL ARRANGEMENT OF THE SYSTEMS AND WORKS AND DO NOT NECESSARILY PURPORT TO SHOW THE EXACT POSITIONS,SIZE OR DETAILS OF THE EQUIPMENT.

2. THE CONTRACTOR SHALL SATISFY THEMSELVES THAT THE EQUIPMENT OFFRERD BY THEM CAN BE ACCOMMODATED IN THE AVAILABLE SPACE AND POSITIONED IN SUCH A WAY THAT ACCESS FOR OPERATION AND MAINTENANCE ARE NOT OBSTRUCTED.

3. ALL ROUTINGS FOR PIPING AND DUCTING DO NOT INDICATE PRECISE POSITIONS OF SERVICES BUT FEASIBLE TO INSTALL THE SERVICES WITHIN THE GENERAL INDICATION AND SHALL BE SELECTED AND DETERMINED BY THE CONTRACTOR COMPLYING WITH ALL REQUIREMENTS OF THE SPECIFICATIONS.

4. DUCT SIZES AND ALL OPENINGS THROUGH THE BUILDING CONSTRUCTION SHALL SUIT EQUIPMENT FURNISHED.

5. COORDINATE DIFFUSER,GRILLE AND REGISTER LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLANS.

6. TRAPPED CONDENSATE DRAINS FROM ALL MECHANICAL EQUIPMENT SHALL BE PROVIDED FOR PROPER DRAINAGE TO SUIT EQUIPMENT FURNISHED.

7. ACCESS PANELS IN DUCTWORK FOR CEILINGS SHALL BE PROVIDED WHERE REQUIRED FOR OPERATION,BALANCING OR MAINTENANCE OF ALL MECHANICAL EQUIPMENT.

8. UNLESS OTHERWISE NOTED,ALL EQUIPMENT AND VALVE DRAINS SHALL BE INDEPENDENTLY PIPED TO THE NEAREST PLUMBING DRAIN.

9. LOCATE DUCTWORK,PIPNG AND MECHANICAL EQUIPMENT AWAY FROM THE SPACE ABOVE ELECTRICAL PANELS,TRANSFORMERS AND OTHER ELECTRICAL EQUIPMENT.

LEGEND (PLUMBING SYSTEM)

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
——	POTABLE WATER PIPE		BALL TAP		INTERNAL HYDRANT BOX
——	PRIMENTARY AND LIFT-UP WATER PIPE		WATER FLOW CONTROL VALVE	ABC	MULTIPUPOUSE CHEMICAL FIRE EXTINGUISHER 6Kg
—t—	HOT WATER SUPPLY PIPE	WM	WATER METER W/ BOX		W/ PEDESTAL
——	SEWERAGE PIPE	IR	FAUCET FOR IRRIGATION W/ BOX		
—//	INFECTIOUS WASTE WATER PIPE	GT	GREASE SEPARATOR	—C—	CO2 GAS PIPE
——	VENT PIPE		INVERT MANHOLE W/ COVER		
//	VENT PIPE FOR INFECTIOUS WASTE WATER		STORM MANHOLE W/ COVER		
—S—	STEAM SUPPLY PIPE	A	AUTOMATIC AIR RELEASE VALVE		
—SD—	STEAM CONDENSING DRAIN PIPE		FLUSHING VALVE		
—X—	FIRE HYDRANT PIPE		FAUCET FOR WATER		
—C—	CO2 GAS PIPE		MIXING FAUCET		
	INDICATOR FOR UNDERGROUND PIPE		FAUCET FOR HOT WATER		
VB	VALVE BOX		SHOWER SET		
GV	GATE VALVE		SPRAY GUN WITH HOSE		
BV	BALL VALVE		FLOOR DRAIN TRAP		
CV	CHECK VALVE	COA	FLOOR CLEAN OUT		
SOV	SOLENOID VALVE (EMERGENCY SHUTOFF)	COB	FLOOR CLEAN OUT (WATERPROOF LAYER)		
		CO	CLEAN OUT		
BV	BUTTERFLY VALVE		VENT CAP		
			FLEXIBLE JOINT FOR DRAINAGE		
			VENT CAP C/W MEMBREN FILTER		

LEGEND (AIR CONDITIONING AND VENTILATION SYSTEM)

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	AIR CONDITIONING (INDOOR UNIT) FOR WALL MOUNTED TYPE	—R—	REFRIGERANT PIPE (W/ INSULATION)	VD	VOLUME DAMPER
		—D—	AIR CONDENSING DRAIN PIPE (W/ INSULATION)	NRD	NON RETURN DAMPER
	AIR CONDITIONING (INDOOR UNIT) FOR CEILING MOUNTED TYPE	—CS—	COOLED WATER SUPPLY (W/ INSULATION)	SD	SHUT OFF DAMPER
		—CR—	COOLED WATER RETURN (W/ INSULATION)	RD	RELEASE DAMPER
	AIR CONDITIONING (OUTDOOR UNIT)	— C —	OIL SUPPLY PIPE	VAV	VARIABLE AIR VOLUME DAMPER
	CENTRIFUGAL FAN	—OR—	OIL RETURN PIPE	CAV	CONSTANT AIR VOLUME DAMPER
		----O----	OIL VENT PIPE		
INV	CENTRIFUGAL FAN C/W INVERTER			DPT	DIFFERENTIAL PRESSURE GAUGE
		GV	GATE VALVE		
	CEILING FAN	BV	BALL VALVE	SA	SUPPLY AIR DUCT
	LINE FAN	CV	CHECK VALVE	EA	EXHAUST AIR DUCT
	PROPELLER FAN		FLEIBLE JOINT	OA	OUTDOOR AIR DUCT
	EXHAUST HOOD FOR KITCHEN			RA	RETURN AIR DUCT
	AIR CONDITIONING (INDOOR UNIT) FOR CIELING CONCEALED TYPE	S	OIL STRAINER (DOUBLE TYPE)		

COREN REGISTERED ENGINEER In accordance with Decree 55 of 1970 C 519013 Registrar

PROJECT TITLE

THE PROJECT FOR
STRENGTHENING THE DIAGNOSTIC CAPACITY OF
NIGERIA CENTRE FOR DISEASE CONTROL (NCDC)

PROPOSED DIAGNOSTIC CENTRE FOR
NIGERIA CENTRE FOR DISEASE CONTROL (NCDC)
PLOT 467 CADASTRAL ZONE B13,GADUWA DISTRICT
GADUWA,FCT,ABUJA

NO	DATE	DESCRIPTIONS	BY	APPD
		REVISIONS		

SCALE 1/100
DATE MARCH,2018
DRAWN BY T. Shimada
CHECKED BY O. Sajo

DWG TITLE MECHANICAL LEGENDS
DWG NO M-001
DESIGNED BY ORIENTAL CONSULTANTS GLOBAL CO., LTD.

ELECTRICAL DRAWING LIST

DWG.NO	DRAWING TITLE	SCALE		REMARKS
		A1	A3	
E — 00	ELECTRICAL DRAWING LIST (電気図面一覧表)	NONE	NONE	
E — 01	GENERAL LEGEND (凡例)	NONE	NONE	
E — 02	SITE PLAN (全体配置図)	1/300	1/600	
E — 03	SINGLE LINE DIAGRAM (単線結線図)	1/50	1/100	
E — 04	FLOOR PLAN FOR EMERGENCY GENERATOR STSTEM (発電機配置図)	1/50	1/100	
E — 05	SCHEMATIC DIAGRAM OF UNINTERRUPTIBLE POWER SUPPLY STSTEM (UPS配置図、姿図)	NONE	NONE	
E — 06	SCHEMATIC DIAGRAM OF MAIN FEEDERS SYSTEM (幹線系統図)	NONE	NONE	
E — 07	PANEL SCHEDULE-1 (電灯盤表)	NONE	NONE	
E — 08	PANEL SCHEDULE-2 (電灯盤表)	NONE	NONE	
E — 09	PANEL SCHEDULE-3 (電灯盤表)	NONE	NONE	
E — 10	B1 FLOOR PLAN FOR MAIN FEEDER SYSTEM & POWER(幹線動設備 B1階平面図)	1/75	1/150	
E — 11	GROUND FLOOR PLAN FOR MAIN FEEDER SYSTEM & POWER (幹線動設備 1階平面図)	1/75	1/150	
E — 12	1st FLOOR PLAN FOR MAIN FEEDER SYSTEM & POWER(幹線動設備 2階平面図)	1/75	1/150	
E — 13	ROOF FLOOR PLAN FOR MAIN FEEDER SYSTEM & POWER(幹線動設備 3階平面図)	1/75	1/150	
E — 14	LIGHTING FIXTURES (照明姿図)	NONE	NONE	
E — 15	B1 FLOOR PLAN FOR LIGHTING SYSTEM (電灯設備 B1階平面図)	1/75	1/150	
E — 16	GROUND FLOOR PLAN FOR LIGHTING SYSTEM (電灯設備 1階平面図)	1/75	1/150	
E — 17	1st FLOOR PLAN FOR LIGHTING SYSTEM (電灯設備 2階平面図)	1/75	1/150	
E — 18	ROOF FLOOR PLAN FOR LIGHTING SYSTEM (電灯設備 3階平面図)	1/75	1/150	
E — 19	B1 FLOOR PLAN FOR RECEPTACLE OUTLET SYSTEM (コンセント設備 B1階平面図)	1/75	1/150	
E — 20	GROUND FLOOR PLAN FOR RECEPTACLE OUTLET SYSTEM (コンセント設備 1階平面図)	1/75	1/150	
E — 21	1st FLOOR PLAN FOR RECEPTACLE OUTLET SYSTEM (コンセント設備 2階平面図)	1/75	1/150	
E — 22	SCHEMATIC DIAGRAM OF TELEPHONE & LAN SYSTEM (電話, LAN設備 系統図)	NONE	NONE	
E — 23	GROUND FLOOR PLAN FOR TELEPHONE & LAN SYSTEM (電話, LAN設備 1階平面図)	1/75	1/150	
E — 24	SCHEMATIC DIAGRAM OF FIRE ALAM SYSTEM(自動火災報知設備 系統図)	NONE	NONE	
E — 25	B1 FLOOR PLAN FOR FIRE ALARM SYSTEM (自動火災報知設備 B1階平面図)	1/75	1/150	
E — 26	GROUND FLOOR PLAN FOR FIRE ALARM SYSTEM (自動火災報知設備 1階平面図)	1/75	1/150	
E — 27	1st FLOOR PLAN FOR FIRE ALARM SYSTEM (自動火災報知設備 2階平面図)	1/75	1/150	
E — 28	SCHEMATIC DIAGRAM OF ACCESS CONTROL SYSTEM (入退室管理設備 系統図)	NONE	NONE	
E — 29	GROUND FLOOR PLAN FOR ACCESS CONTROL SYSTEM (入退室管理設備 1階平面図)	1/75	1/150	
E — 30	SCHEMATIC DIAGRAM OF CCTV SYSTEM(CCTV設備系統図)	NONE	NONE	
E — 31	GROUND FLOOR PLAN FOR CCTV SYSTEM (CCTV設備 1階平面図)	1/75	1/150	
E — 32	LIGHTNING PROTECTION EQIPMENT FIXTURES (避雷設備 機器表)	NONE	NONE	
E — 33	GROUND FLOOR PLAN FOR LIGHTNING PROTECTION SYSTEM (避雷設備 1階平面図)	1/75	1/150	
E — 34	1st FLOOR PLAN FOR LIGHTNING PROTECTION SYSTEM (避雷設備 2階平面図)	1/75	1/150	
E — 35	ROOF FLOOR PLAN FOR LIGHTNING PROTECTION SYSTEM (避雷設備 3階平面図)	1/75	1/150	

DWG.NO	DRAWING TITLE	SCALE		REMARKS
		A1	A3	

COREN
REGISTERED ENGINEER
in accordance with Decree 55 of 1970
C 519189
Registrar

PROJECT TITLE
THE PROJECT FOR
STRENGTHENING THE DIAGNOSTIC CAPACITY OF
NIGERIA CENTRE FOR DISEASE CONTROL (NCDC)

NO	DATE	DESCRIPTIONS	BY	APPD

REVISIONS

SCALE: NONE
DATE: MARCH, 2018
DRAWING BY: T. Shimada
CHECKED BY: O. Monday
DWG TITLE: ELECTRICAL DRAWING LIST
DWG NO: E-00
DESIGNED BY: ORIENTAL CONSULTANTS GLOBAL CO., LTD.

PANEL AND SMALL POWER

SYMBOL	DESCRIPTION	
	LIGHTING & POWER CONTROL PANEL	
	POWER CONTROL PANEL	
	BRANCH PANELS(RESIDENCE & EXPERIMENTAL)	
	WALL TYPE SOCKET OUTLET 1P 220V +E (2 GANG) 16A	1P 220V+E
WP	WALL TYPE SOCKET OUTLET 1P 220V +E (2 GANG) 16A (WP)	1P 220V+E
	(WITH WEATHER COVER RECEPTACLE)	
F	SOCKET OUTLET 1P 220V+E (FOR FANS) 16A, LOCKED TYPE	1P 220Vx1 (1GANG)
	(LOCKING PLUGS SUPPLY---BY ELECTRICAL WORK)	
20A	SOCKET OUTLET 1P 220V +E (20A)	1P 220V+E (1 GANG)
15A	WALL TYPE SOCKET OUTLET 1P 220V (15A)	1P 220V+E(1 GANG)
OA	FLOOR TYPE SOCKET OUTLET 1P 220V. (OA FLOOR)	1P 220V(OA TAP)
AC	SOCKET OUTLET 1P 220V+E (FOR AC UNIT) 16A	1P 220Vx1 (1GANG)(LOCKED TYPE
	(LOCKING PLUGS SUPPLY---BY ELECTRICAL WORK)	
MCB	SWITCH BOX (MCB 16A)	
	ONE GANG ONE WAY FLUSH SWITCH (10A)	
WP	ONE GANG ONE WAY FLUSH SWITCH (10A)(WATER PROOF TYPE)	
3	3 WAY FLUSH SWITCH (10A)	
4	4 WAY FLUSH SWITCH (10A)	
L	ONE GANG ONE WAY FLUSH SWITCH (FOR CEILING E/F)	
A	AUTO ON/OFF SWITCH (PHOTO SWITCH)	
	PVC 2 x 2.5sqmm + PE2.5 (PVC PIPE 3/4")	(CONSEALED IN CONCRETE)
	PVC 3 x 2.5sqmm + PE2.5 (PVC PIPE 3/4")	(CONSEALED IN CONCRETE)
	PVC 3 x 2.5sqmm + PE2.5 (PVC PIPE 3/4")	(CONSEALED IN CONCRETE)
	PVC 4 x 2.5sqmm + PE2.5 (PVC PIPE 3/4")	(CONSEALED IN CONCRETE)
	PVC 5 x 2.5sqmm + PE2.5 (PVC PIPE 1")	(CONSEALED IN CONCRETE)
	PVC 6 x 2.5sqmm + PE2.5 (PVC PIPE 1 1/4")	(CONSEALED IN CONCRETE)
	PVC INSULATED ELECTRIC WIRE.(COPPER CONDUCTOR)	

WIRING CONNECTION SYSTEM

SYMBOL	DESCRIPTION
	CONSEALED PIPING IN THE BUILDING
	UNDER FLOOR CABLE IN COMPUTER TRAINING ROOM
	EXPOSED CABLING
	UNDER GROUND CABLE IN CONDUIT (HDPE)
J	JUNCTION BOX (3 WAY OR 4 WAY) (CONCRETE BOX WITH SUS COVER)
	UP OR DOWN CABLE
MH	MAN HOLEHOLE(1500x1500x1500)(SIDE OF BUILDING--CONSTRUCTED BY CIVIL)
MH	MAN HOLEHOLE(1500x1500x1500)(INSIDE GREEN BELT--ELECTRICAL SCOPE)
HH	HANDHOLE(900x 900x 1000mmDepth)(ELECTRICAL WORK)
REMARKS:	
PVC	POLYVINYL CHLORIDE
XLPE/PVC	CROSS LINKED POLYETHYLENE INSULATED PVC SHEATHED CABLE
HDPE	HIGH DENSITY POLYETHYLENE CORRUGATED PIPE

LIGHTING FIXTURE

SYMBOL	DESCRIPTION	
	FLUORESCENT LAMP	FL 40W-2
	FLUORESCENT LAMP (WITH BATTERY AND CHARGER)	FL 40W-2
	FLUORESCENT LAMP	FL 40W-1
	FLUORESCENT LAMP (WITH BATTERY AND CHARGER)	FL 40W-1
	DOWN LIGHT	FDL 18W OR 27W
	BRACKET LIGHT	FDL 18W-1
	DOWN LIGHT (FLOOD LIGHT WITH PIPE PENDANT)	MF 150Wx1
	EXIT LIGHT	FL 18W-1(OR EQUIVALENTS)
	EXIT LIGHT	FL 18W-1(OR EQUIVALENTS)
	EXIT LIGHT	FL 18W-1(OR EQUIVALENTS)
	GARDEN LIGHT	FDL 27Wx11M POLE
	STREET LIGHT	HF 100Wx2 OR MF150Wx1
	JUNCTION BOX (3 WAY)	OUTLET BOX 119x119x54mm WITH COVER
	JUNCTION BOX (4 WAY)	OUTLET BOX 119x119x54mm WITH COVER
	JUNCTION BOX (SQUARE TYPE WITH WATER PROOF)	
	PVC 2 x 2.5sqmm + PE2.5 (PVC PIPE 3/4")	(CONSEALED IN CONCRETE)
	PVC 3 x 2.5sqmm + PE2.5 (PVC PIPE 3/4")	(CONSEALED IN CONCRETE)
	PVC 3 x 2.5sqmm + PE2.5 (PVC PIPE 3/4")	(CONSEALED IN CONCRETE)
	PVC 4 x 2.5sqmm + PE2.5 PVC PIPE (3/4")	(CONSEALED IN CONCRETE)
	PVC 5 x 2.5sqmm + PE2.5 (PVC PIPE 1")	(CONSEALED IN CONCRETE)
	PVC 6 x 2.5sqmm + PE2.5 (PVC PIPE 1 1/4")	(CONSEALED IN CONCRETE)
	PVC INSULATED ELECTRIC WIRE.(COPPER CONDUCTOR)	

AUDIO SYSTEM

SYMBOL	DESCRIPTION
	AUDIO RACK
M	MAIN SPEAKER 240W
S	SUB SPEAKER
	WIRELESS ANTENNA
M	MIC JACK WALL TYPE
S	SPEAKER PLUGS
	MIC RECEPTACLE WALL TYPE
	LCD PROJECTOR OUTLET (CEILING MOUNT)

TELEPHONE SYSTEM

SYMBOL	DESCRIPTION
IP PABX	PRIVATE AUTOMATIC BRANCH EXCHENGER(IP TYPE)
MDF	MAIN DISTRIBUTION FRAME
	TERMINAL BOARD
TEL	TELEPHONE OUTLET
TEL OA	TELEPHONE OUTLET(OA TAP TYPE)
	TIEV 1 x 0.65-4 (PVC PIPE 3/4")
	TIEV 2 x 0.65-4 (PVC PIPE 3/4")
	TIEV 3 x 0.65-4 (PVC PIPE 3/4")
	TIEV 4 x 0.65-4 (PVC PIPE 3/4")
	TIEV 5 x 0.65-4 (PVC PIPE 1 1/4")
	PVC INSULATED LOCAL TELEPHONE CABLE (0.56mm Dia. CONDUCTOR)

LAN SYSTEM

SYMBOL	DESCRIPTION
	LAN RACK
LN	LAN ROSETTE(1 GANG)
LN OA	LAN ROSETTE(OA 1 GANG)(MODULAR JACK TYPE)
SW	SWITCHING UNITT
HUB	HUB SWITCHING UNITT
R	ROUTER UNIT
	CAT 6 x 1 (PVC 3/4")
	CAT 6 x 2 (PVC 3/4")
	CAT 6 x 3 (PVC 1")
	CAT 6 x 4 (PVC 1")
	CAT 6 x 5 (PVC 1 1/4")
	REMARKS:
	CAT 6 CABLE SHALL BE UTP TYPE , SOLID WIRES AND FR TYPE.

FIRE ALARM SYSTEM

SYMBOL	DESCRIPTION
	FIRE ALARM CONTROL PANEL
	TERMINAL BOARD
L	INDICATION LAMP
	EMERGENCY CALL PUSH BUTTON
B	BELL
T	MAINTENANCE TELEPHONE

LIGHTNING PROTECTION SYSTEM

SYMBOL	DESCRIPTION
	AIR TERMINAL(DYNASPHERE TYPE)
	LIGHTNING EVENT CONTER DEVICE
	INDIVISUAL GROUNDING SYSTEM
	TEST WELL POINT FOR GROUNDING RESISTANCE

COREN
REGISTERED ENGINEER
(In accordance with Decree 55 of 1970)
C 51912
Registrar

PROJECT TITLE
THE PROJECT FOR
STRENGTHENING THE DIAGNOSTIC CAPACITY OF
NIGERIA CENTRE FOR DISEASE CONTROL (NCDC)

SCALE	NONE
DATE	MARCH, 2018
DRAWING BY	T. Shimada
CHECKED BY	O. Monday
DWG TITLE	GENERAL LEGEND
DWG NO.	E-01
DESIGNED BY	ORIENTAL CONSULTANTS GLOBAL CO., LTD.

P/2821

ARCHITECTS REGISTRATION COUNCIL OF NIGERIA

HOUSE 1A & 1B DOLPHIN SCHEME, BEHIND FEDERAL SECRETARIAT IKOYI, LAGOS
P.O. BOX 52895 FALOMO, IKOYI, LAGOS. TEL: 01-3424202
NULGE BUILDING, 26 AJOSE ADEOGUN STREET, OFF AUGUSTUS AIKHOMU STREET,
UTAKO DISTRICT, ABUJA. TEL: 09-2917487, 08165528570

No 0061397 **RECEIPT** Date: 11th May 2018

ARCON

Received from: Arc Babatunde Gbenga E

the sum of: Sixty thousand five hundred Naira Only

Cash RRR. 1102-2282-6922+3502-282-7360

		₦	K
1.	**Registration fee.**	50,000	=
2.	**Annual Subscription fee for:**		
3.	**Seal.**		
4.	**Security Stamps:** A/880711-A1363213	5,500	=
5.	**Publications:**		
	(a)		
	(b)		
	(c)		
	(d)		
6.	**Others:** ARN/1.13/467/2821/18.05/3868		
	Total ₦	60,500.00	

Receiving Officer