THE NATIONAL UNIVERSITY OF SAMOA
THE INDEPENDENT STATE OF SAMOA

PREPARATORY SURVEY
ON
THE PROJECT
FOR
THE IMPROVEMENT OF FACILITIES
AT
THE FACULTY OF HEALTH SCIENCE, NATIONAL UNIVERSITY OF SAMOA
IN
THE INDEPENDENT STATE OF SAMOA

FINAL REPORT

AUGUST 2022

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

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FUKUNAGA ARCHITECTS-ENGINEERS
BINKO INTERNATIONAL LTD.

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JR
22-064

PREFACE

Japan International Cooperation Agency (JICA) decided to conduct the preparatory survey and entrust the survey to the consortium of Yamashita Sekkei Inc., Fukunaga Architects-Engineers and Binko International Ltd.

The survey team held a series of discussions with the officials concerned of the Independent State of Samoa, 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 Independent State of Samoa for their close cooperation extended to the survey team.

August, 2022

SAKUMA Jun
Director General
Human Development Department
Japan International Cooperation Agency

SUMMARY

1. Country Profile

The Independent State of Samoa (Samoa) is an island country in the South Pacific Ocean, and is located on the west side of the Samoa Islands from 171st meridian line. Samoa is composed of two volcanic islands, Upolu Island (area 1,700 km^2) and Sabai'i Island (area 1,115 km^2), where the capital Apia is located, and seven small islands, with 2,830 km^2 in the total land area and 198,410 in population (as of 2020, World Bank). Most of the people live on Upolu and Savai'i, and more than 80% of the nation lives in rural areas. Thus, urban concentration is not outstanding compared to other Pacific countries.

Samoa belongs to the Tropical Rainforest climate according to the Köppen climate classification. It is hot and humid, and has narrow annual temperature and humidity ranges. The annual rainfall is about 3,000 mm, and during the rainy season from November to March, there is about twice as much rainfall as in the dry season.

GDP of Samoa is USD 807 million and GDP per Capita is USD 4,357 (as of 2020, World Bank), and the 10-year average growth rate of GDP of Samoa is 1.4% despite of -2.6% of annual change in 2020. The tertiary industry is the largest industry, accounting for about 70% of the GDP. Among them, the tourism industry is growing rapidly, accounting for more than 30% of GDP. Secondary industry accounts for about 20% of GDP. The construction industry and the food processing industry have a large weight, and the total is about 10% of the GDP. Primary industry accounts for about 10% of GDP.

The economy in Samoa relies on development assistance, remittance from overseas migrant workers, agricultural exports, tourism. It has typical economic traits in Pacific countries, that is to say, difficult to establish economies of scale and develop the export industry due to a small land, population and domestic market, and its remoteness from major markets, and susceptible to fluctuations in international prices such as food and fuel. In addition, since the infrastructure of the country is vulnerable to natural disasters (cyclones and earthquakes), In case of cyclone with higher intensity scale, it causes enormous damage to the economy of Samoa. Furthermore, since 2020, as a measure against COVID-19, immigration restrictions have been implemented such as all commercial flights prohibited, which has a great impact on the economy.

2. Background

The Government of Samoa has the over-riding vision in the Pathway for the Development of Samoa 2021/22-2025/26, "Nurture growth that benefits all of our people," also emphasizes importance of human development. In line with the vision, plans for health and education sector are positioned as measures for responding to future needs and strengthening human resources in Samoa.

The health sector in Samoa faces an immature health system, as demonstrated by the measles outbreak in November 2019, which resulted in 83 deaths and more than 5,700 cases of infection. It is analyzed that the shortage of qualified medical personnel has led to the low vaccination rate even though sufficient material and equipment for vaccination were available, supported by donor agencies. To improve the current situation, the Ministry of Health of Samoa, under the Health Sector Plan 2019/20-2029/30, is

striving to develop healthcare professionals with expertise as well as increasing the number of students in the health sector.

At the National University of Samoa (NUS), the Faculty of Health Science (FOHS), which consists of the Schools of Nursing (SON) and the School of Medicine (SOM), is the only public educational institution in the health sector to offer degree programs for doctors and nurses. Thus, 90% of the health personnel in the country have obtained degree at NUS.

The existing facilities and equipment of FOHS are not adequate in terms of their quantity, size of rooms, setup, and age. Therefore, improvement of facilities and equipment of FOHS is an urgent issue in order to implement the strengthening of health human resource development stipulated in the Health Sector Plan 2019/20-2029/30.

Under these circumstances, the Government of Samoa made a plan to construct FOHS complex and procure educational equipment for FOHS and then requested the Government of Japan for Grant Aid for the implementation.

3. Survey Result and Contents of the Project

In response to the request by the Government of Samoa, Japan International Cooperation Agency (JICA) conducted a preparatory survey from July 2021 to May 2022, in which a project possibly executed under Japanese Grant Aid (hereinafter referred to as the “Project”) was developed and its relevance was confirmed.

The Project is to contribute to strengthening the development of human resources for healthcare, an initiative identified in the "Health Sector Plan 2019/20-2029/30" by the Ministry of Health of Samoa, by improving the quality of education of FOHS, NUS through construction of a building for education and training of FOHS on the Le Papaigalagala Campus, which includes rooms for FOHS, and for Learning Resource Centre (LRC) including a library and other learning support facilities available to FOHS students, as well as provision of related equipment. The overview of the Project is described as below;

Implementing agency : NUS
Project site : at the NUS main campus (Le Papaigalagala Campus)
Project Components : as shown in the table below;

Table I: Project Components

Category	Description
Facilities	Main building 3 story and 1 basement floor, Total floor area: 3,515 m^2 Major rooms: FOHS lecture rooms, FOHS simulation room, FOHS medical laboratories, FOHS staff office, library, lecture theatre, seminar room, group space for students, etc. Generator hut, 1 story, Total floor area: 35m^2
Equipment	Practical training mannequin for simulation room (SON & SOM), essential laboratory equipment such as binocular microscope, and large display monitor for lecture room etc.

4. Project Schedule and Estimated Cost

The project period is planned for approximately 33 months (12 months for detailed design and bidding, 19 months for building construction, 11 months for equipment procurement and installation, and 1.5 months for technical assistance), taking into account the scale of the building and local construction conditions. The project cost to be borne by the Samoa side is estimated at 443 million Japanese yen.

5. Project Evaluation

(1) Relevance

The relevance of the Project is evaluated as follows:

1) Beneficial Effects of Project

Students and teaching staff of FOHS (approx. 380 and 40 persons, respectively, as of October 2021) are expected to benefit directly from the Project. The beneficiary students include not only Samoan students but also students from the Solomon Islands and Tokelau where there are no medical schools. As the Project is expected to alleviate the shortage of classrooms and expand the functions of LRC, which is also to be used by students of other faculties, all NUS students and teaching staff are expected to benefit indirectly from the Project.

The people of Samoa and those in the Solomon Islands and Tokelau are expected to benefit from the implementation of the Project through services provided by the health workers trained in FOHS.

2) Project Purpose and Urgency of Implementation

The Project will contribute to the improvement of human resource development in the health sector, which is highlighted in the "Health Sector Plan 2019/20-2029/30" of MOH, by improving the educational functions of FOHS through the construction of a building and the provision of equipment.

FOHS is the only public educational institution for human resource development in the health sector in Samoa. However, the existing buildings of FOHS are very old and deteriorated. FOHS does not have sufficient simulators or equipment to provide appropriate simulation training, and some of the existing equipment is not functioning properly. As the deterioration of the quality of health education derived from this inappropriate educational environment is a pressing issue in the promotion of the health policy of the Government of Samoa, the Project needs to be implemented urgently.

3) Contribution to Achievement of Goals in the Mid-Long-term Development Plan

The Government of Samoa has the over-riding vision in the Pathway for the Development of Samoa 2021/22-2025/26, "Nurture growth that benefits all of our people," also emphasizes importance of human development. In line with the vision, plans for health and education sector are positioned as measures for responding to future needs and strengthening human resources in Samoa.

The Project shall contribute to the achievement of this long-term developmental goal by improving the quality of human resource development in the health sector.

4) Consistency with Assistance Policy and Strategy of Japan

Based on the basic policy of the Country Assistance Policy for Samoa, namely, "To achieve sustainable and environment-friendly economic growth and improvements in living standards," the Government of Japan (GOJ) assists in the development of infrastructure and human resources that support social development for the stable and sustainable development of Samoa.

GOJ has been assisting Samoa in improving the quality of education in the education sector and the improvement of health services, including human resource development, in the health sector to "Reduce Vulnerability (a priority area of the country assistance policy)." Moreover, GOJ has defined, "COVID-19 Response and Recovery" as one of the priority areas of cooperation in the Leaders' Declaration endorsed at the 9th Pacific Islands Leaders Meeting (PALM 9) held in July 2021, and stressed its intention to provide assistance to strengthen health care systems in light of the impact of COVID-19. As the Project is consistent with the above-mentioned policies of GOJ, the relevance of the assistance in the Project is evaluated as high.

(2) Effectiveness

The implementation of the Project is expected to produce the following effects.

1) Quantitative Effects

Table II Quantitative Effects

Indicator	Baseline value 2021	Target value 2028
A) Area of medical laboratory and Simulation room per student at FOHS (m^2/person)	1.00 (m^2/person)	1.64 (m^2/person)
B) Number of hours per year of experiments and simulation training conducted by FOHS[1] during normal operating hours (8:00 a.m. to 5:00 p.m.) (hours)	SOM: 462 (hours) 73% of total time stipulated in the curriculum	SOM: 630 (hours) 100% of total time stipulated in the curriculum
	SON: 448 (hours) 76% of total time stipulated in the curriculum	SON: 588 (hours) 100% of total time stipulated in the curriculum
C) Number of hours per year of joint lectures (for about 100 students) conducted in large classrooms on Bachelor of nursing and Diploma of nursing programmes at SON[2] (hours)	126 (hours) 33% of total time stipulated in the curriculum	378 (hours) 100% of total time stipulated in the curriculum

A) Area of medical laboratory and simulation laboratory per student at FOHS

Currently, FOHS has only old laboratory and simulation room at the Moto'otua Campus, and SON at the Le Papaigalagala Campus is forced to use other faculty laboratories and general lecture rooms

[1] Experiments and simulation training for 1st year to 5th year of MBBS programme at SOM, and 1st year to 3rd year of nursing programme at SON are included.

[2] Joint lectures for 1st and 2nd year of nursing and diploma nursing programmes at SON are included.

instead, which means that only a limited number of experiments and practical training are conducted, and activities using the laboratory and simulation room stipulated in the curriculum are not sufficiently carried out. The baseline value for the area of laboratories and simulation rooms per student at FOHS (m^2/person) is 1.00 (m^2/person).

Assuming that the new building will be equipped with the medical laboratory and simulation room after the implementation of the Project, and that the FOHS curriculum can be delivered as planned, the total area of the existing facilities at the Moto'otua Campus and the relevant rooms in the new building at the Le Papaigalagala Campus will reach the target value of 1.64 (m^2/person).

B) Number of hours per year of experiments and simulation training conducted by FOHS during normal operating hours (8:00 a.m. to 5:00 p.m.)

The existing laboratory and simulation room at the FOHS are insufficient in terms of number and size to accommodate all the curriculum contents during regular operating hours (8:00 am to 5:00 pm), and some contents are conducted outside of regular hours.

Of the experiments and simulation training conducted by SOM, 462 hours per year are currently spent on regular operations (8am to 5pm) and 448 hours on SON.

After the implementation of the Project, it is expected that all the courses will be conducted within the regular timetable by utilizing the medical laboratory, simulation room and new equipment in the new building, so the target value is 630 hours for SOM and 588 hours for SON as the total number of hours per year for experiments and simulation training as specified in the curriculum.

C) Number of hours per year of joint lectures (for about 100 students) conducted in large classrooms on Bachelor of Nursing and Diploma of Nursing programmes at SON

SON has courses conducted jointly by the Bachelor of Nursing and Diploma of Nursing programmes and the number of students attending the courses exceeds 100, but presently the lecture rooms with a capacity exceeding 100 students is limited because they are shared with other faculties. This has been addressed by using semi-outdoor facilities on campus (Fale, a traditional Samoan building) and by dividing the class into multiple classes in general lecture rooms. Consequently, in addition to the difficulty in implementing the curriculum, securing teachers and classrooms and organizing the timetable has been a major burden. Currently, 126 hours of the SON courses jointly conducted by Bachelor of Nursing course and Diploma of Nursing course can be held in a large classroom annually.

After the implementation of the Project, the new building will have the lecture theatre which will be operated as a large classroom. Therefore, it is assumed that joint lectures will be appropriately implemented in terms of size and learning environment, the target value will be 378 hours in a year, which is the total number of hours per year for joint courses (classroom lectures) for Bachelor of Nursing and Diploma of Nursing programmes in the SON as specified in the timetable.

2) Qualitative Effects

- The procurement of medical simulators and examination equipment required for the implementation of the curricula shall improve the quality of education in FOHS, NUS.
- The establishment of a library shall improve the learning environment for the students of FOHS with improved access to the latest scientific papers.
- Improvement of the quality of education including practical training shall enhance the human resource development of FOHS, NUS

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LOCATION MAP

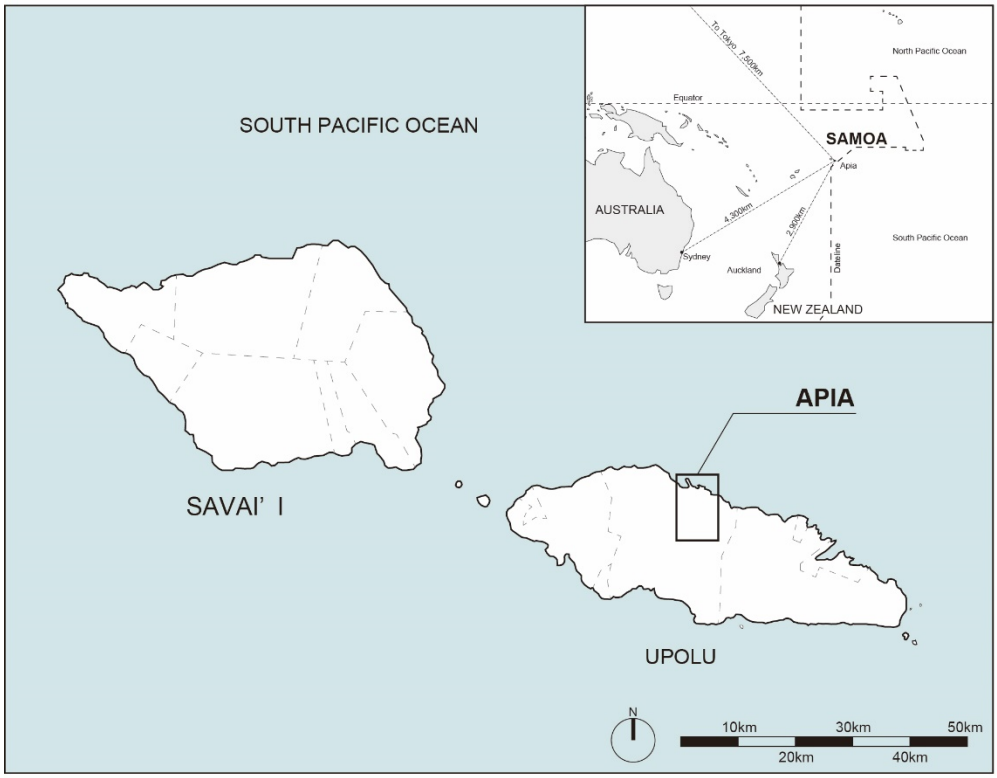
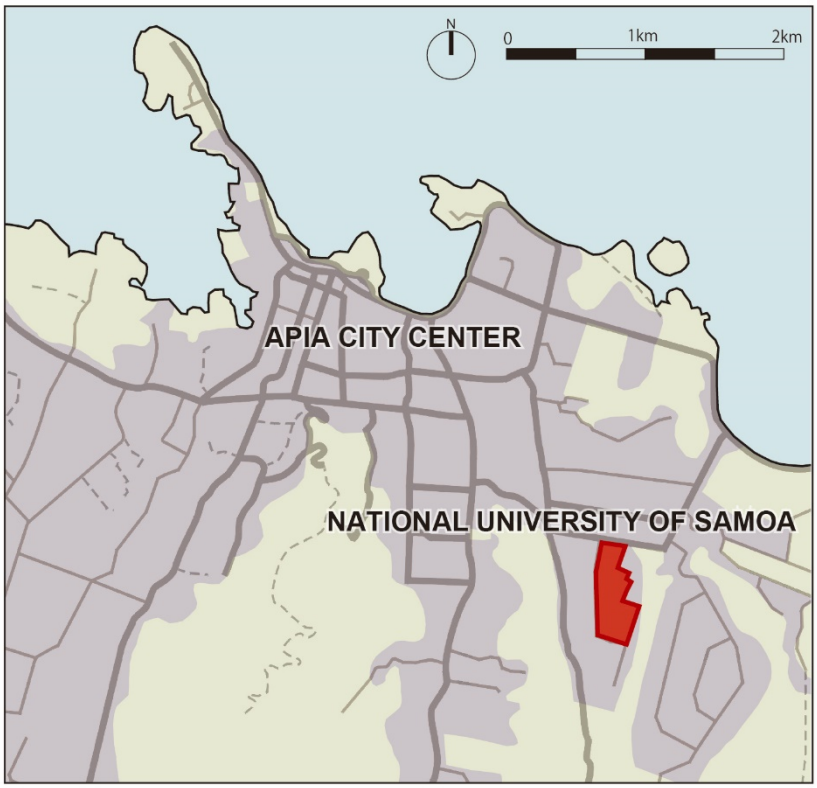


Figure I Map of Samoa



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PERSPECTIVE

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ABBREVIATIONS

APTC	Australia Pacific Training Coalition
CEAR	Comprehensive Environmental Assessment Report
COVID-19	Coronavirus Disease 2019
COEP	Samoa Codes Of Environmental Practice
EIA	Environmental Impact Assessment
E/N	Exchange of Notes
EPC	Electric Power Corporation
FOHS	Faculty of Health Science
G/A	Grant Agreement
ICT	Information and Communication Technology
IEE	Initial Environmental Examination
IMF	International Monetary Fund
IPES	Institute of Professional Engineers Samoa
ISO	International Organization for Standardization
JIS	Japanese Industrial Standards
LAN	Local Area Network
LED	Light Emitting Diode
LRC	Learning Resource Centre
MBBS	Bachelor of Medicine, Bachelor of Surgery
M/D	Minutes of Discussions
MNRE	Ministry of Natural Resources and Environment
MOH	Ministry Of Health
MOU	Minutes of Understanding
MWTI	Ministry of Works, Transport Infrastructure
NBC	National Building Code
NCD	Non-Communicable Disease
NUS	National University of Samoa
NZ	New Zealand
OUM	Oceania University of Medicine
O&M	Operation and Maintenance
PBL	Problem Based Learning
PEAR	Preliminary Environmental Assessment Report
PG	Post Graduate
PUMA	Planning and Urban Management Agency
P/Q	Prequalification
PBX	Private Branch eXchange
RC	Reinforced Concrete
SOM	School of Medicine
SON	School of Nursing
SHRHS	Samoa Human Resources For Health Strategy 2020/21–2025/26
SHWDP	Samoa Human Workforce Development Plan 2020/21–2025/26
SQA	Samoa Qualifications Authority
SWA	Samoa Water Authority
TTM Hospital	Tupua Tamasese Meaole Hospital
UNDP	United Nations Development Programme
UPS	Uninterruptible Power Supply
USD	US Dollar
VAGST	Value Added Goods and Services Tax
WHO	World Health Organization
WPAME	Western Pacific Association for Medical Education

CHAPTER 1. Background of the Project

1-1 Background of the Project and Overview

(1) Background of the Project

The Government of Samoa has the over-riding vision in the Pathway for the Development of Samoa 2021/22-2025/26, “Nurture growth that benefits all of our people,” also emphasizes importance of human development. In line with the vision, plans for health and education sector are positioned as measures for responding to future needs and strengthening human resources in Samoa.

The health sector in Samoa faces an immature health system, as demonstrated by the measles outbreak in November 2019, which resulted in 83 deaths and more than 5,700 cases of infection. It is analyzed that the shortage of qualified medical personnel has led to the low vaccination rate even though sufficient materials and equipment for vaccination were available, supported by donor agencies. To improve the current situation, the Ministry of Health of Samoa, under the Health Sector Plan 2019/20-2029/30, is striving to develop healthcare professionals with expertise as well as increasing the number of students in the health sector.

At the National University of Samoa (NUS), the Faculty of Health Science (FOHS), which consists of the Schools of Nursing (SON) and the School of Medicine (SOM), is the only public educational institution in the health sector to offers degree programs for doctors and nurses. This, 90% of the health personnel in the country have obtained degree at NUS.

The existing facilities and equipment of FOHS are not adequate in terms of their quantity, size of rooms, setup, and age. Therefore, improvement of facilities and equipment of FOHS is an urgent issue in order to implement the strengthening of health human resource development stipulated in the Health Sector Plan 2019/20-2029/30.

Under these circumstances, the Government of Samoa made a plan to construct FOHS complex and procure educational equipment for FOHS and then requested the Government of Japan for Grant Aid for the implementation. In response to the request, Japan International Cooperation Agency (JICA) conducted a preparatory survey from July 2021 to May 2022, in which a project possibly executed under Japanese Grant Aid (hereinafter referred to as the “Project”) was developed and its relevance was confirmed.

(2) Overview of the Project

1) Project Objectives

The Project is to contribute to strengthening the development of human resources for healthcare, an initiative identified in the "Health Sector Plan 2019/20-2029/30" by the Ministry of Health, by improving the quality of education of FOHS, NUS, the only public educational institution in the health sector of Samoa.

2) Contents of the Project

At the compound of NUS（at the main campus: Le Papaigalagala Campus） the following building construction and equipment procurement will be implemented;

A) Building Construction

FOHS complex with total floor area of 3,350 m^2

Major rooms) FOHS lecture room, FOHS simulation room, FOHS medical laboratories, FOHS staff office, library, lecture theatre, seminar room, and group space for students

B) Equipment Procurement

Practical training mannequin for simulation room (SON & SOM), essential laboratory equipment such as binocular microscope, and large display monitor for lecture room etc.

1-2 Natural Conditions

(1) Topographical Features

The Le Papaigalagala Campus, where the project site is located, is situated on a hill southeast of the centre of Apia and slopes from south to north. In the project site it also slopes from south to north with an average gradient of about 5%.

(2) Geological Features

According to the results of the geological survey at the project site, a sand and gravel mixed layer with porous basalt with an N value of 1 to 5 is observed up to a depth of about 5m. After that it becomes a solid basalt layer[3].

(3) Climate

Samoa belongs to the Tropical Rainforest climate according to the Köppen climate classification. It is hot and humid, and has narrow annual temperature and humidity ranges. The annual rainfall is about 3,000 mm, and during the rainy season from November to March, there is about twice as much rainfall as in the dry season. The climate data obtained from the meteorological station located in Apia is shown in the table below;

[3] In the preparatory survey boring tests including Standard Penetration Tests, and Scala Penetrometer Tests were conducted as the geotechnical survey. Then, it was confirmed that the supporting layer for the new building of the project was deeper than those of neighbour buildings. In order to confirm in detail distribution of the supporting layer in depth under the new building, additional geotechnical survey will be conducted at the detailed design stage.

Table 1 Climate Data in Apia

In 2020	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maximum Temperature (℃)	30	29	30	30	29	29	29	29	29	29	30	30
Minimum Temperature (℃)	24	24	23	24	23	23	23	24	23	24	23	23
Rainfall (mm)	635	554	128	270	216	262	222	89	233	302	202	779
Relative Humidity (%)	79	79	79	77	76	73	75	74	76	77	76	78
Prevailing Wind Direction, Wind Speed (km/h)	E-S 1-10	NE 1-10	SE-S 1-10	E 1-10	E 1-10	E 10-20	E 10-20	E 10-20	E 10-20	E 10-20	E 1-10	SE 1-10
No. Of Rainy Days	29	20	13	21	18	16	20	13	18	23	15	24

(4) Natural Disaster

1) Tropical Cyclone

Tropical cyclone is the one of the most severe natural disasters in Samoa. The nation suffers from serious cyclone disaster once every few years. The Cyclone VAL making landfall on Savai'i Island in 1991 killed 13 people and caused USD 240 million in economic losses. It is regarded as the largest tropical cyclone in Samoa with an estimated maximum wind speed of 45 m/s. In 2012, the Cyclone EVAN (maximum wind speed 22 m/s) landed on Upolu Island where Apia is located causing heavy rainfall and floods resulting in a total of 24 death and missing, and causing economic loses worth USD 203.9 million.

2) Flood

Heavy rains sometimes cause large-scale floods around the rivers[4] that flow through Apia. Floods caused by the heavy rains in 2001 and by the Cyclone EVAN in 2012 caused particularly great damage. The 2001 flood did not cause any deaths, but the damage amounted to USD 4.4 million. At the time of the landing of the Cyclone EVAN, it recorded 612.2 mm of rainfall for 24 hours. Le Papaigalagala Campus of NUS where the project site is located has not experienced serious flood because it is located 20m to 60m higher than the lowlands of the city.

3) Earthquake

Earthquakes are not as frequent as on the Pacific coast of Japan, however since Samoa is close to the Ring of Fire, earthquakes occurring around it have an impact on Samoa. The magnitude 8.0 earthquake in 2009, with its epicentre 190 km south of Apia, was one of the biggest earthquakes in recent years. The tsunami (estimated maximum height of 11m) caused by this earthquake reached the southern coast of Upolu Island resulting in a total of 148 death and missing, and causing economic losses worth USD 124 million .

[4] The major rivers flowing through the Apia include the Vailima, Vaisigano and Vaibase rivers

1-3 Environmental and Social Considerations

(1) Classification of the Project based on JICA Guidelines for Environmental and Social Considerations (April 2010 version)

The survey team studied the project site following JICA's environmental guidelines, and no specific point of concern was determined which require further analysis during the screening process. The survey team concludes that the Project can be classified 'Category C' as in the guidelines, because the survey team can foresee that the Project is likely to have minimal or little adverse environmental and social impact.

(2) Procedure of Environmental and Social Assessment in Samoa

The proposed building is an expansion of the campus facility on the existing NUS premises. NUS and the survey team agreed that NUS will carry out environmental assessment of the proposed building following the environmental framework and the procedures of the Government of Samoa. NUS developed the Campus Master Plan (2021/22-2024/25) including the expansion plan for the Le Papaigalagala Campus, and in the past the preliminary environmental assessment report (PEAR) was prepared for the initial proposal. The previous PEAR was submitted and approved by the Ministry of Natural Resources and Environment (MNRE). The proposed building will be located on the same site as the initial proposal, however, when the Project commences, NUS is required to update the existing PEAR and obtain development consents from the Planning and Urban Management Agency (PUMA), the Ministry of Works, Transport and Infrastructure (MWTI)[5].

The construction work does not change the landform significantly, and three-story building work will be contained within the Le Papaigalagala campus, and there will be no resettlement of communities. Based on the Samoa Codes of Environmental Practice (COEP), consideration of construction phase will be minimal.

[5] PUMA was moved from MNRE to MWTI in 2019

CHAPTER 2. Contents of the Project

2-1 Basic Concept of the Project

(1) Overall Goals

As described in ”1-1 Background of the Project and Overview,” the Ministry of Health of Samoa, under the Health Sector Plan 2019/20-2029/30, is striving to develop healthcare professionals with expertise as well as increasing the number of students in the health sector in line with Pathway for the Development of Samoa FY2021/2022-FY2025/26.

However, the buildings of SON and SOM at FOHS of NUS, the only public educational institution in the health sector of Samoa have both deteriorated, and it is difficult to say whether they are suitable as learning environment for the highest educational institution in Samoa. There are also problems with equipment at the FOHS: a significant shortage of simulators used for trainings in particular, and deterioration of experimental tools. In terms of space, the SON does not have enough rooms at the Le Papaigalagala campus to accommodate the courses for each programme included in the curriculum, thus some classes need to use rooms of other departments. In addition, as the SON does not have a laboratory, its courses are held using the laboratory of the Faculty of Science. However, the laboratory is used preferentially by the Faculty of Science, so the SON has no choice but to hold its classes late in the evenings after the regular school hours. Moreover, as the SON simulation room is not exclusively for simulation training but shared with other general courses, necessary simulators, desks and chairs need to be prepared for each course, making it difficult to secure the course hours. Furthermore, the library at the Le Papaigalagala campus available to FOHS students is too small to hold all of its collection of books. The reading space is always filled with students, and some students who do not have seats sit on the floor for reading or self-studying. The SOM building at the Moto'otua Campus, which was originally built as a tuberculosis ward of a national hospital, is not suitable as an educational environment in terms of floor layout.

With such background, the goal of the project is to contribute to strengthening the development of human resources for healthcare, an initiative identified in the "Health Sector Plan 2019/20-2029/30" by the Ministry of Health of Samoa, by improving the quality of education of FOHS, NUS through development of the FOHS complex on the Le Papaigalagala Campus.

(2) Overview of the Project

To achieve the Project goal described in "(1) Overall Goals" above, the Project intends to construct a building for education and training of FOHS on the Le Papaigalagala Campus, which includes rooms for FOHS (mainly for SON), and for Learning Resource Centre (LRC) including a library and other learning support facilities available to FOHS students, as well as providing related equipment.

2-2 Outline Design of the Japanese Assistance

2-2-1 Design Policy

As a result of the site survey conducted for approximately 2 months from August 2021, the outline design has been carried out based on the basic policies stated in the table below.

Table 2 Basic Policy

1. The Project shall be aligned with activities of the NUS and the FOHS.
2. The Project shall be aligned with the maintenance capabilities of the NUS, with cost reduction taken into account.
3. The Project shall take barrier-free for people with disabilities into consideration.
4. Thermal insulation, sun shading, and high-efficiency equipment such as LED lighting system, etc. shall be applied appropriately to ensure comfortable learning and working environment and energy efficiency.
5. The Project shall include disaster prevention properties against natural disasters such as heavy rain and high wind.
6. Consideration shall be given to gender.
7. While incorporating traditional Samoan motifs into the exterior design, consideration shall be given to creating a well-proportioned appearance and space which students and faculty members can be proud of.
8. The Project shall be consistent with the NUS Campus Master Plan.

2-2-1-1 Policy on Natural Conditions

(1) Consideration for High Temperature and Solar Radiation

In Apia, average monthly temperature and relative humidity are 26 °C to 27 °C and 73% to 79%, respectively. In light of the high temperature and humidity throughout the year, reducing the heat load on buildings leads to energy conservation. More specifically, the higher capability of heat insulation will be installed on the rooftop surface that are exposed to the most solar radiation. On the eastern and western faces that are exposed to the second most solar radiation, minimum openings will be installed in general, or if a large opening is needed, a sunshade will be installed on the front. The openings in the northern and southern faces will have eaves on their upper part to prevent direct sunlight. In addition, heat-absorbing glass will be used for windows to curb the exposure to direct sunlight.

(2) Consideration for Rainfall

Apia receives an annual average of about 3,000 mm of rainfall, concentrated in the rainy season from November to March. Windows in public areas of the building which prompt natural ventilation will be carefully placed so that they can be easily closed to prevent rainwater from entering the building during heavy rains. To prevent rainwater from accumulating around the building even during sudden heavy rain, surface water drainage route will be secured so that the building is not flooded. For the construction period, if excavation work or foundation work is carried out in the rainy season, necessary actions against rainwater such as temporary water pumping system will be planned.

(3) Consideration for Strong Wind

Samoa has experienced several large cyclones. Cyclone Val making landfall on Savai'i in 1991 is regarded as the one which caused the greatest damage in Samoa. The planned building should be capable of sufficiently withstanding a cyclone which can hit Samoa.

2-2-1-2 Policy on Socioeconomic Conditions

Female faculty members and students account for 60 to 65 percent at NUS, and 80 percent at SON. Restroom design will be determined in consideration of the expected users' needs and the adequate number of toilets available. In addition, outdoor lighting will be installed around the building so that they do not feel uneasy when moving within the campus after sunset, and the public area in the building will offer a clear view by using glass walls for partitioning, etc.

2-2-1-3 Policy on Construction Conditions and Procurement Conditions

(1) Policy on Construction Conditions

Of the total number of Samoa's 24,261 employees as of June 2021, only 962, or 4.0 percent, were employed in the construction industry[6], a relatively low ratio of about 0.5 percent to the total population of approximately 200,000 (In Japan, about 5 percent of the population are working in the construction industry.). The construction schedule should be materialized considering the limited workforce in the local construction market.

(2) Policy on Procurement Conditions

For the procurement of equipment, to ensure quality, the equipment for the simulation room and the medical laboratory will be selected from products manufactured in factories that conform to the appropriate standards such as ISO 9001 (Quality Control System). Since Samoa does not manufacture equipment for the Project, Japanese products will generally be eligible for procurement. However, if the competitiveness of bidding cannot be ensured by shortlisting potential Japanese product suppliers and some products are difficult to maintain, then procurement from third countries may be allowed.

2-2-1-4 Policy on Use of Local Contractors

There are some local contractors with experience of participating in previous Japanese grant aid projects in Samoa, as well as ones with the technical capabilities required under the Project, such as branches of contractors headquartered in New Zealand. These contractors can be utilized in the Project.

2-2-1-5 Policy on Operation and Maintenance

Systems for site servicing requiring routine maintenance will be selected with priority given to the ease

[6] SBS Employment Statistics June 2021

of obtaining consumables and maintenance parts, with consideration given to ensuring that maintenance costs do not become a burden on operations.

Also, systems requiring highly-skilled maintenance will be excluded from the selection.

In principle, the maintenance of the equipment to be provided under the Project is to be handled by the biomedical technicians of TTM Hospital, a teaching hospital providing venue for clinical training for NUS students, based on the MOU concluded between the NUS and TTM Hospital. For equipment that is in need of repair but cannot be repaired by biomedical technicians, a repair request is made to agencies in New Zealand or Australia designated by its manufacturer. Routine and periodic preventive maintenance management for the equipment to be provided under the Project will be conducted mainly by the NUS end users and TTM biomedical technicians. In order to ensure preventive maintenance management for the equipment under the Project, technical support will be provided as Software Component of the Project.

2-2-1-6 Policy on Grade Setting for Facilities and Equipment

In the past, two construction projects were carried out for the NUS under the Japanese grant aid. The facilities constructed under these projects are still in good condition and maintained and managed by the NUS. In light of these facts, the grade of facilities under the Project should be equivalent to those under the past projects.

For equipment, the grade of simulators and medical laboratory equipment should be suitable for the implementation of the FOHS curriculum. Projectors, screens, etc., to be installed at the lecture theatre should be of sufficient grade, without excess or deficiency, for the intended use of courses.

2-2-1-7 Policy on Construction Schedule

In addition to the description in "2-1-4 (2) Policy on Construction Conditions," in light of the fact that the region has a rainy season from November to April, with heavier rainfall from December to March, the construction period will be scheduled with a possible construction slowdown during such a period.

2-2-1-8 Policy on Safety during Construction

Since the construction work under the Project will be carried out on the university campus being used, the safety of third parties must be ensured first so as not to disturb activities of students, faculty members, etc. on the campus. Efforts should be made to reduce noise and dust during daytime construction work.

At construction sites, in accordance with the ODA Safety Management Guidance for Construction Work, workers are obliged to use scaffolding at height, fall prevention handrails and safety belts. Routine procedures for safety management and an emergency communication system will be put in place.

2-2-2 Basic Plan (Construction Plan / Equipment Plan)

2-2-2-1 Examination of Request

(1) Request at the beginning of Site Survey

At the initial phase of the site survey, the NUS requested a project targeting the two campus where the FOHS is located: Le Papaigalagala Campus (The NUS's main campus where the SON is located) and the Moto'otua Campus (The campus next to TTM Hospital where the SOM is located). The rooms and equipment requested at the initial phase of the site survey are outlined in the table below.

Table 3 Requested Rooms at the Initial Phase of Site Survey

Site	Function	Room
Le Papaigalagala Campus	FOHS SON	FOHS staff offices
		Simulation classroom
		Medical laboratory
		Lecture room
		Cafeteria
	Learning Resource Centre (LRC)	NUS book store
		Copy centre
		Library
		Student administration office spaces
		Student support services office spaces
		Librarian office spaces
		Seminar room
		ICT multimedia / helpdesk
		Samoa digital library office and server room
		Video Conference Lecture Room
		Adaptable lecture theatre
		Computer lab
		Group Space for Students
		Conference room
		Student lounge
		Flexible Retail (Bank etc.)
Moto'otua Campus	FOHS SOM	FOHS staff offices
		Clinical simulation classroom
		Medical laboratory
		Lecture room
		Cafeteria/pavilion
		Video conference lecture room
		Adaptable lecture theatre
		Library
		Computer lab
		Conference room
		Samoa cancer society office space

Table 4 Requested Equipment at Le Papaigalagala Campus at the Initial Phase of Site Survey

Room	Equipment (requested quantity)
Simulation room	Hospital beds (4), basic combination nursing manikins (4), child nursing manikins (2), midwifery manikins (4), fetus manikins (3), gynecological examination manikins (2), childbirth simulating manikins (4), CPR[7] manikins (4), vital signs machines (4), electrocardiographs (ECG) (4), ultrasound machines (4), laryngoscopes (4), Suction machines (2), infusion pumps (4), otoscopes (20), Hanging wired full size adult skeleton (2), organ models (brain, heart, lungs, liver, kidneys, female pelvic organs, and male pelvic organs) (2 each), full-size adult muscle models (2), full-size adult nervous system models (2), and visual anatomical charts (22)
Teaching staff room	Desktop computers (12), laptops (5), computer tables (12), swivel chairs (12), photocopiers/printers (2), printers/scanners (2), and spiral binders (2)
Learning Resource Centre (LRC)	Tables for library card issuance (2), electronic entrance gate, medium-size tables for book loaning (4), chairs (7), bookshelves (120), book trolleys, standard trolleys, bookends (2), book easels (2), poster racks (2), display racks (2), DVD/video display units (2), paperback stands (2), display cabinets (2), photocopier (1), computers for staff (10), laptops (2), OHP + screen (1), printers (4), computers (24), printers (5), and photocopiers (2)

Table 5 Requested Equipment at Moto'otua Campus at the Initial Phase of Site Survey

Room	Equipment (requested quantity)
Medical laboratories (clinical examination rooms)	Full automated blood culture analyser (1), urine analyser (1), stain kit (for Gram's stain and ZN stain) (1), real-time PCR system (1), fluorescent immunoassay analyser (1), GeneXpert (1), distilled water filter (1), consumables such as agar (1), multi-headed teaching microscopes (5), centrifuge trays, etc. (1), biosafety cabinet (2), HbA1C analyser (1), -80ºC freezer (1), van or bus (1), laptops (5), colour printers/photocopiers (2), PCs (15), blood cell analyser (1), blood coagulation analyser (1), erythrocyte sedimentation rate (ESR) analyser (1), blood stain kit (1), biochemical analyser (1), arterial blood gas analyser (1), immunoassay analyser for measuring hormone levels (1), reagents for haematological examination (1 set), safety cabinet for TB sample preparation (2), and flow cytometer (1)

(2) Consolidation of the Project Site in One Place

As a result of the site survey, the NUS has changed its request to consolidate necessary functions into one building at the Le Papaigalagala campus from the viewpoint of effective use of limited funds.

A simulation room and a medical laboratory with higher priorities for development are planned to be shared between the SOM, which is located at the Moto'otua campus, and the SON. It has been confirmed that the NUS will secure the transportation means necessary for traffic between the campuses. The existing offices and lecture rooms of the SOM at the Moto'otua Campus will continue to be used.

(3) Examination on Request for Facilities

Since the Project has become targeted only at the Le Papaigalagala Campus, Samoa's request for development was consolidated into FOHS-related rooms to improve educational functions of FOHS as well as the LRC as learning support functions available to FOHS students. Details of the NUS's request for rooms and priorities for the facilities are shown in the table below.

[7] CPR: Cardio Pulmonary Resuscitation

Table 6 Requested Rooms and Priority at the End of Site Survey

Function	Room	Priority
FOHS SON	FOHS staff office	A
	Simulation room	A
	Medical laboratory	A
	Lecture room	A
	Cafeteria	C
Learning Resource Centre (LRC)	NUS book store	C
	Copy centre	C
	Library	A
	Student administration office spaces	C
	Student support services office spaces	C
	Librarian office spaces	A
	Seminar room	B
	ICT multimedia / helpdesk	B
	Samoa digital library office and server room	B
	Video conference lecture room/ adaptable lecture theatre	A
	Computer lab	A
	Group Space for Students	B
	Conference room	C
	Student lounge	C
	Flexible Retail (Bank etc)	C

A: High priority: to be included to the facility
B: Medium priority: to need further examination in consideration with both consistency of the objective and other elements of the Project
C: Less priority: not to be considered in the Project

As described below, from the viewpoint of consistency with the governmental policies and plans of Samoa and the FOHS curriculum and educational support functions required for the FOHS, necessary rooms are identified and the reasonableness of the Samoa's request is verified.

1) Necessary Room for Curriculum Implementation of FOHS

A) Necessary Number of Human Resource for Health to be Developed by FOHS

The Samoa Health Workforce Development Plan (SHWDP) 2020/21-2025/26 of the Ministry of Health of Samoa plans to increase human resource for health by 20 percent in 2030 compared to that in 2019 (baseline), while the Samoa Human Resource for Health Strategy (SHRHS) 2020/21 - 2025/26 plans a 50 percent increase.

Table 7 Target in Human Resource Development Plan by Ministry of Health of Samoa

	2019 baseline				2030 target in SHWDP: 20 % increase		2030 target in SHRHS: 50 % increase	
	Percentage of the population[8]	Number of people			Increase in headcount required to meet the target	Total headcount required to meet the target	Increase in headcount required to meet the target	Total headcount required to meet the target
		Public facilities	Private facilities	Total				
Doctor	0.56	77	37	114	23	137	57	171
Nurse and Midwife	3.21	638	10	648	130	768	324	972

In Samoa almost all medical personnel training programs are provided by the FOHS. Therefore, the FOHS human resources development Plan has a direct impact on the achievement of these plan targets. The FOHS human resource development plan will be implemented in accordance with the SHWDP and SHRHS. Below, confirms the number of human resources the FOHS will need to produce to meet the Health Ministry's plan targets in the table above.

a) Necessary Number of Doctors to be Developed by FOHS

Forecast an increase in the number of doctors in the entire Samoa from the baseline of 2019 and identify the number of doctors that the FOHS should produce. First, the factors in the table below are considered to be related to an increase or decrease in the number of doctors in Samoa.

Table 8 Factors Related to Number of Doctor in Samoa

Factors		Assumptions and points to note in growth forecasting
Increase factors	FOHS graduates	It is based on the following: actual results for 2020 and previous years; forecasts in the SOM Business Plan FY2019-2023 for 2021-2023; and an assumption that the annual rate of growth (11 percent) expected in the said Business Plan will continue for 2024 and thereafter.
	OUM[9] graduates	The OUM offers its own scholarships to Samoan students. It is expected to produce one doctor a year on average.
Decrease factors	Retirement rate	The rate is expected to be 4 percent for each year.
	FOHS graduates from outside Samoa	The proportion to total graduates is estimated to be 20 percent based on interviews with the SOM.

The table below shows the expected number of doctors in the future in Samoa calculated based on the above conditions, which indicates that the target set in the SHRHS, a 50 percent increase from 2019, will be achieved in 2030.

[8] In 2019, Samoa had a population of 201,917.

[9] Oceania University of Medicine. A Communications University located in Samoa that offers MBBS courses mainly for students from outside Samoa.

Table 9 Expected Number of Doctor in Future in Samoa

Factors contributing to increase/decrease		'19 /20	'20 /21	'21 /22	'22 /23	'23 /24	'24 /25	'25 /26	'26 /27	'27 28	'28 /29	'29 /30	'30 /31
Increase factors	FOHS graduates		3	8	8	10	11	12	13	14	16	18	20
	OUM graduates		1	1	1	1	1	1	1	1	1	1	1
Decrease factors	Retirement rate		-1	-2	-2	-2	-2	-2	-3	-3	-3	-4	-4
	Nursing course students from outside Samoa		-5	-4	-5	-5	-5	-5	-5	-6	-6	-6	-6
Total		114	112	115	117	121	126	132	138	144	152	161	172

b) Necessary Number of Nurses and Midwifes to be Developed by FOHS

The factors listed in the table below are considered to be parameters contributing to the increase/decrease in the number of nurses and midwives, which is used in forecasting the growth from the baseline 2019. In this context, a "nurse" refers to a person qualified as a registered nurse or above. Midwives are registered nurses who have moved up in their careers. So, forecasting the growth in the number of nurses and midwives focuses only on the increase /decrease in the number of registered nurses.

Table 10 Factors Related to Number of Nurse in Samoa

Factors contributing to increase/decrease		Assumptions and points to note in growth forecasting
Increase factors	FOHS graduates	Assumption is 69, which is the average number of graduates of SON nurse course over the last 5 years.
	OUM graduates	Assumption is zero (0) because the OUM does not produce nurses.
	Persons qualified as registered nurses through other career paths (diploma nursing + 2 years of work experience, etc.)	Assumption is 5, which is 30 percent of the average number of graduates of SON diploma nursing course over the last 5 years.
Decrease factors	Retirement rate	The rate is expected to be 5 percent of the total number of nurses and midwives in each fiscal year.
	FOHS graduates from outside Samoa	Assumption is 1 per year, which is the average over the last 5 years.

The table below shows the expected number of nurses and midwives in Samoa based on the above assumptions. This indicates that the target set in the SHRHS, a 50 percent increase from 2019, will be achieved in 2029.

Table 11 Expected Number of Nurses and Midwives in Future in Samoa

Factors contributing to increase/decrease		'19 /20	'20 /21	'21 /22	'22 /23	'23 /24	'24 /25	'25 /26	'26 /27	'27 28	'28 /29	'29 /30	'30 /31
Increase factors	FOHS graduates		73	69	69	69	69	69	69	69	69	69	69
	OUM graduates		0	0	0	0	0	0	0	0	0	0	0
	Other career paths		5	5	5	5	5	5	5	5	5	5	5
Decrease factors	Retirement rate		-33	-35	-37	-39	-40	-42	-44	-45	-47	-48	-49
	Nursing course students from outside Samoa		-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Total		648	692	730	766	800	833	864	893	921	947	972	996

The above forecasts suggest that the FOHS needs to maintain the current number of graduates of SON nursing courses.

B) Necessary Room Type for Curriculum Implementation of FOHS

The education methods adopted by the SON and SOM programmes are broadly divided into classroom studies, experiments, simulations, and clinical practice in hospitals, and out of which, classroom studies, experiments, and simulations are provided at the existing campus. Lecture rooms, laboratories, and simulation rooms need to be in place as the minimum requirements for undergraduate education in FOHS.

C) Examination on Necessary Size and Number of Room for Curriculum Implementation of FOHS

The number of rooms required for the new building is identified through curriculum analysis for each programme offered by FOHS. As prerequisites, the number of students per grade and the number of classes by room type for each FOHS programme are assumed as shown in the table below. It should be noted that some courses for nursing and diploma nursing programs are held jointly.

Table 12 No of Students per grade & No of Classes by Room Type

Programme	No of student	Basis for no of student	Medical Lab Max: 56 students	Simulation Rm Max: 70 students	Lecture Rm Standard: 40 student Max: 50 student
Foundation Certificate (Nursing)	71	Average number of students in the last five years	-	-	2
Nursing	73	Average number of students in the last five years	2	1	2
Diploma Nursing	36	Average number of students in the last five years	1	-	1
PG[10] Nursing	13	Average number of students in the last five years	1	1	1
MBBS	40	Twice the maximum number of graduates expected in the human resource development plan	1	1	-
For joint courses of nursing and diploma nursing (Number of students: 109)			2	2	3

FOHS courses are usually held between 8:00 and 17:00 on weekdays (Monday to Friday)[11]. With one hour of lunch break taken into account, the number of class hours assigned to one classroom in one week is calculated as follows:

8 hours/day x 5 days = 40 hours/week

Based on the above assumptions, in order for the FOHS to secure class hours set in its curriculum, the required number of classrooms is calculated by room type to be used for the FOHS courses.

Medical laboratory

A medical laboratory is expected to be used not only by SON students but also by SOM students at the Moto'otua campus. The required number of laboratories is calculated based on the use for undergraduate education. The estimated hours of use per week for classes held throughout a year, including the first and second semesters, are shown in the table below.

[10]PG: Post Graduate

[11]Some classes that are held at the laboratory of the Faculty of Science that SON borrows start at 7:00 PM, due to the need to wait for the laboratory to be available. In some cases, lectures are held after 5:00 PM for the convenience of faculty members.

Table 13 Necessary Time for FOHS to Occupy Medical Lab per Week through a Year

Program	Yr.	Course	Hr per week ①	No. Class ②	①x②	Note
Nursing	1	HNS112/161 Anatomy and Physiology	4	2	8	Together with Diploma Nursing
	2	HNS163 Introduction to Psychology	3	2	3	
	3	HNS255 Pharmacology in Nursing	3	2	3	
MBBS	1	HMS115 Biochemistry and Genetics	1	1	1	
		HMS116 Microbiology and Immunology	2	1	2	
		HMS121 Pathology	2	1	2	
	2	HMS200 Musculoskeletal System	2	1	2	
		HMS201 Cardiovascular System	2	1	2	
		HMS202 Respiratory System	2	1	2	
		HMS203 Genitourinary System	2	1	2	
		HMS204 Nervous System	2	1	2	
		HMS205 Gastrointestinal System	2	1	2	
	3	HMS300 Metabolism, Nutrition and Regulation of Body Functions	2	1	2	
		HMS301 Blood and Hematological Diseases	2	1	2	
		HMS302 Endocrine System	2	1	2	
		HMS303 Reproduction, Aging and Development	2	1	2	
		HMS304 Special Senses	2	1	2	
		HMS305 Immunity and Infection	2	1	2	
				Total	49	

The table shows total 49 hours of classes a year, which will be divided in the first and second semesters. Assuming that 25 hours of classes, almost half of the total hours, are held in one semester, the formula is "25/40 = 0.625," suggesting that one classroom is sufficient for undergraduate education.

Simulation room

Simulation room is expected to be used not only by SON students but also SOM students at the Moto'otua campus. The estimated hours of use per week for classes held throughout a year, including the first and second semesters, are shown in the table below.

Table 14 Necessary Time for FOHS to Occupy Simulation Room per Week through a Year

Program	Yr.	Course	Hr per week①	No. Class ②	① x ②	Note
Nursing	1	HNS126/166 Nursing Practice 1	8	2	16	All practice at simulation room. Together with Diploma Nursing
	2	HNS253 Nursing Practice 2	4	2	8	All practice at simulation room. Together with Diploma Nursing
		HNS254 Mental Health and Mental Illness	6	1	6	
		HNS222/262 Nursing Practice 3	4	2	8	Half of practice at simulation room, the rest at hospital. Together with Diploma Nursing
		HNS223/263 Primary Healthcare	3	2	6	Together with Diploma Nursing
	3	HNS351 Reproductive Health	3	1	3	
		HNS353 Nursing Practice 4	4	1	4	Half of practice at simulation room, the rest at hospital.
		HNS365 Nursing Practice 5	8	1	8	Half of practice at simulation room, the rest at hospital.
PG Nursing		HNS513 Midwifery Clinical Practice 1	4	1	4	Half of practice at simulation room, the rest at hospital.
		HNS523 Midwifery Clinical Practice 2	4	1	4	Half of practice at simulation room, the rest at hospital.
MBBS	4	HMS400 Internal Medicine Clinical Attachment	4	1	4	Half of practice at simulation room, the rest at hospital.
		HMS401 Surgery Clinical Attachment	4	1	4	Half of practice at simulation room, the rest at hospital.
		HMS402 Primary Health Care Clinical Attachment	4	1	4	Half of practice at simulation room, the rest at hospital.
		HMS403 Psychiatry Clinical Attachment	4	1	4	Half of practice at simulation room, the rest at hospital.
	5	HMS500 Obstetrics and Gynecology Clinical Attachment	4	1	4	Half of practice at simulation room, the rest at hospital.
		HMS501 Pediatric Clinical Attachment	4	1	4	Half of practice at simulation room, the rest at hospital.
		HMS502 Emergency Medicine and Anesthesia Clinical Attachment	4	1	4	Half of practice at simulation room, the rest at hospital.
		HMS503 Specialties Clinical Attachment	4	1	4	Half of practice at simulation room, the rest at hospital.
				Total	99	

The table shows total 99 hours of classes a year, which will be divided in the first and second semesters. Assuming that 50 hours of classes, almost half of the total hours, are held in one semester, the formula is "50/40 = 1.25," suggesting that two classrooms are needed. However, the SOM at the Moto'otua Campus has a small simulation room, and in consideration of the use of this room, it is judged that one simulation room is appropriate to be developed under the Project.

General lecture room

General lecture rooms will be used for classes not by the SOM but by the SON. (It is assumed that the SOM will hold its classes at the Moto'otua campus.) The lecture rooms to be developed under the Project will also be intended as classes which the SON provides as part of general basic courses, even though which are not for FOHS students. The estimated hours of use per week for classes held throughout a year, including the first and second semesters, are shown in the table below.

Table 15 Necessary Time for FOHS to Occupy Lecture Room per Week through a Year

Program	Yr.	Course	Hr per week ①	No. Class ②	①x ②	Note
Nursing	1	HNS112 Principles of Body Functions	3	3	9	Together with Diploma Nursing
		HNS111/151 Concepts of Nursing	3	3	9	Together with Diploma Nursing。
		HNS153 Society, Health and the Nurse	3	2	6	
		HNS112/161 Anatomy and Physiology	3	3	9	Together with Diploma Nursing。
		HNS163 Introduction to Psychology	3	2	6	
		HNS125/165 Introduction to the Process of Nursing	3	3	9	Together with Diploma Nursing
	2	HNS251 Nursing Process and Critical Reasoning 1	3	3	9	Together with Diploma Nursing
		HNS254 Mental Health and Mental Illness	3	2	6	
		HNS255 Pharmacology in Nursing	3	2	6	
		HNS221/261 Nursing Process and Critical Reasoning 2	3	3	9	Together with Diploma Nursing
		HNS223/263 Primary Healthcare	3	3	9	Together with Diploma Nursing
		HNS224/264 Health and Environment	6	3	18	Together with Diploma Nursing
	3	HNS351 Reproductive Health	3	2	6	
		HNS352 Child Bearing	3	2	6	
		HNS361 Ethico-Legal Aspects of Nursing	3	2	6	
		HNS362 Research in Nursing	3	2	6	
		HNS364 Management in Nursing	3	2	6	
		HNS366 Community Health Nursing	3	2	6	
Diploma Nursing		HNS112/HNS152 Principles of Body Functions	3	1	3	
PG Nursing		HNS511 Foundations of Midwifery	3	1	3	
		HNS512 Midwifery Knowledge	3	1	3	
		HNS521 Reproductive Health and Childbearing	3	1	3	
		HNS522 Complex Midwifery	3	1	3	
Foundation Certificate (Nursing)		HNS001 Introduction to Foundation Nursing	3	2	6	
		HNS002 Healthy Lifestyles	3	2	6	
		HNS003 Introduction to Primary Healthcare	3	2	6	
		HNS004 History of Nursing	3	2	6	
		HNS005 Interpersonal Relationships in Nursing	3	2	6	
Foundation Certificate (General)		HNS001 Introduction to Foundation Nursing	3	2	6	
		HNS002 Healthy Lifestyles	3	2	6	
		HNS003 Introduction to Primary Healthcare	3	2	6	
		HNS004 History of Nursing	3	2	6	
				Total	210	

The table shows total 210 hours of classes a year, which will be divided in the first and second semesters. 105 hours of classes, a half of the total hours, are held in one semester. 40 hours of use for the Bachelor of Health Science programme, now being temporarily closed, need to add onto 105 hours above. If the room occupancy rate is 80 to 70 percent, it is found necessary to secure rooms for 181 to 207 hours per week[12]. Since the hours available to one room is 40 hours per week, 4.525 to 5.175 rooms are needed and it is considered appropriate to secure 5 general lecture rooms.

2) LRC

Main facilities of the LRC, which provides learning support to FOHS students, are a library and a lecture theatre. The library functions of the Le Papaigalagala campus will be consolidated into a single library to be developed under the Project, which will enable efficient operation and management of the library without dispersing library staff, equipment, and supplies, etc.

The lecture theatre will be a staircase classroom with a capacity of 300 students, which can accommodate students belonging to the SON (Nursing, Diploma nursing, and PG nursing) at one time, and will be equipped with a video conference capabilities so that it can support remote lectures conducted by supporting universities, etc.

In addition, the LRC will be equipped with a group space for students to use for self-study, and a seminar room available for various seminars and conferences.

3) Outline of Major Rooms

Based on the above considerations, the major rooms that should be developed under the Project are as listed in the table below.

[12] If the occupancy rate is 80%, (105hours + 40hours) / 0.8 =181 hours
If the occupancy rate is 70%, (105hours + 40hours) / 0.7 =207 hours
The occupancy rate is the ratio of the time actually used during regular course time (Monday to Friday, 8:00 to 17:00) per week to the total of 40 hours of the regular course time a week.

Table 16 Outline of Major Rooms

Function	Room	Level	No.	Description
FOHS	Simulation room	2	1	Capable of accommodating up to 10 groups of students (4 to 7 students for each group) for practical training.
	Lecture room	2&3	5	Capable of accommodating approximately 40 students as standard use.
	Medical lab 1	3	1	Capable of accommodating up to 14 groups of students (4 students for each group) for conducting experiments.
	Medical lab 2	3	1	Available for research purposes. Facility features will satisfy BSL2.
	FOHS office	3	1	Serves as a SON office (including the office of the dean of the FOHS) capable of accommodating approximately 30 people, with future increase in headcount taken into account.
Learning Resource Centre (LRC)	Library	1	1	Capable of accommodating 80,000 books in anticipation of future increase in the number of books. Equipped with 200 seats in the reading area and 50 seats in the PC area.
	Librarian office	1	1	Capable of accommodating 14 staff members, with a future increase in headcount taken into account.
	Lecture theatre	1	1	300 seats (Capable of accommodating students in nursing, diploma nursing, and PG nursing at once)
	Group space for students	2	1	Approximately 60 seats
	Seminar room	3	1	Capable of accommodating approximately 40 students for standard use.

4) Project Site

The project site will be located at the main campus of the NUS, Le Papaigalagala Campus. The campus stretches as long as 700 meters from north to south, with the main gate (main gate 1 in the figure below) located in the middle of the west face of the campus. With this gate, the campus is divided into two zones: the northern block and southern block. The project site is situated in the northern block, to the east of the buildings for the Faculty of Technical Education that were constructed in 2006 through a Japanese grant aid project.

The site is reserved for construction of FOHS building and LRC under the NUS Campus Master Plan.

The NUS has confirmed that the pathway along the project site will be connected to the walkways on the Faculty of Technical Education side in the future, which facilitates access to the project site.

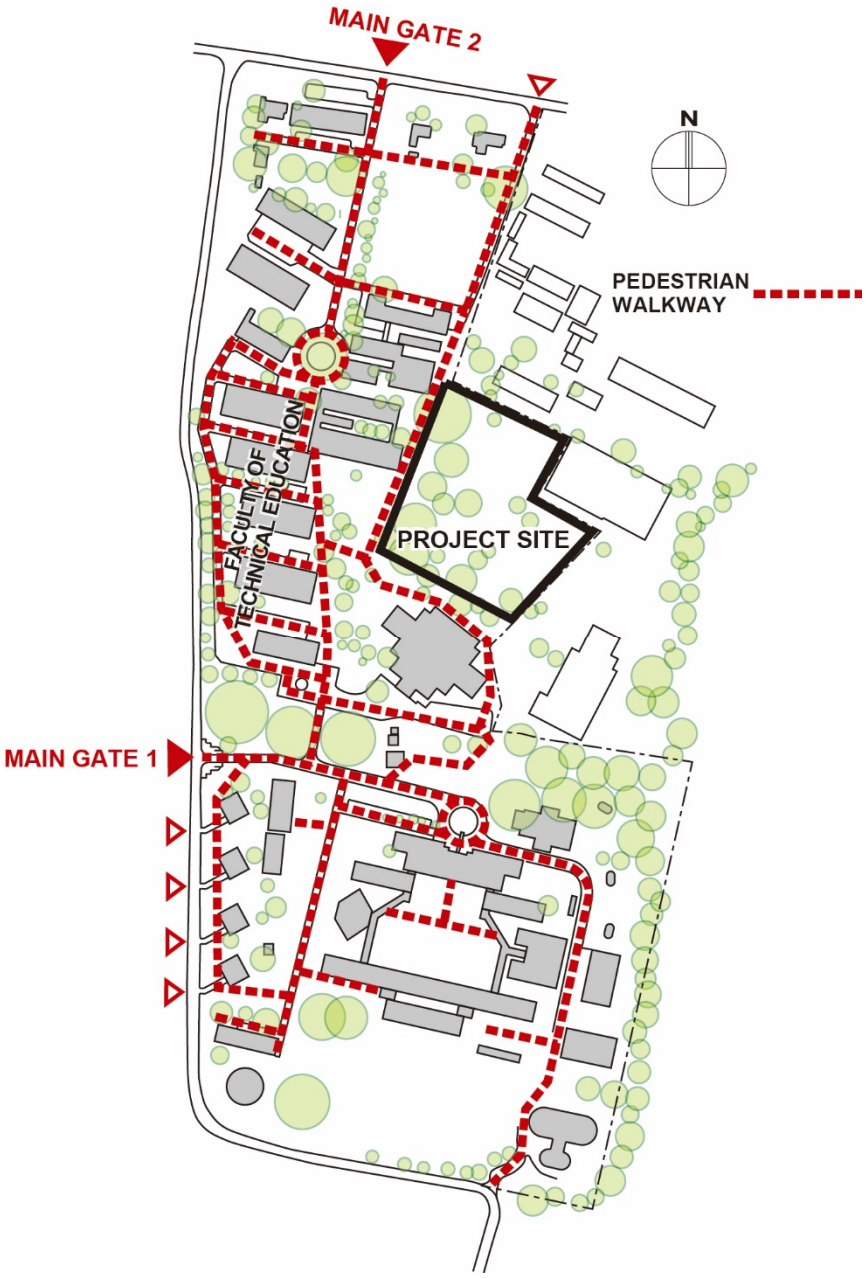

Figure 1 Circulation Plan at Le Papaigalagala Campus

(4) Examination on Request for Equipment

In the equipment plan, the request from the NUS at the end of the field survey is shown in the table below, focusing on the educational equipment that is indispensable for the implementation of the medical and nursing curriculum, to improve the quality of education.

It was confirmed that there is no duplication of equipment procured under the Project and the socio-economic development grant by the Japanese Government, and the existing equipment can be continuously used by relocation.

Table 17 Requested equipment with its priority (at the end of field survey)

Room name	Target	Equipment	Priority
FOHS administration room	FOHS teaching staff and general staff	General furniture (PC table, chairs) etc.	C
		PC and printer/scanner etc.	C
		Photocopier and printer etc.	C
		Spiral binders etc.	C
Simulation room	FOHS	Practical mannequin	A
		Medical equipment such as ECG and vital sign monitors etc.	B
		Human body and its organ model etc.	A
Medical laboratory	FOHS	Microscope etc.	A
		Biosafety cabinet, automated chemistry analyzer etc.	C
Lecture room	FOHS	Stacking table and chair etc.	C
		Projector, screen etc.	B
Library	FOHS	Reading table, chair etc.	B
		Main counter, issuing counter etc.	B
		Bookshelf, Book truck, Large Easel, poster rack, display rack, DVD/video display unit etc.	B
		Photocopier, PC for staff, OHP, screen etc.	B
Librarian office	Librarian	General furniture etc.	C
		PC and printer etc.	C
Seminar room	FOHS	Desk, chair etc.	B
		Projector, screen etc.	B
ICT multimedia room and help desk	FOHS	AV system etc.	B
		Stacking table, chair etc.	B
Samoa digital library administrative office and server room	FOHS	Server, digitizer etc.	C
Distance meeting, lecture hall (lecture room)	FOHS	Projector , screen etc.	A
Computer laboratory	FOHS	PC and printer etc.	B
		PC table, chair etc.	B
Lounge for students	FOHS	Table , chair etc.	C

A: High priority and included in the Project
B: Medium priority , need further analysis based upon project objectives
C: Low priority, not considered in the Project

Based on the above-mentioned analysis, the Project components are set as shown in Table below;

Table 18 Project Components

Category	Description
Facilities	Main building 3 story and 1 basement floor, Total floor area: 3,515 m^2 Major rooms: FOHS lecture rooms, FOHS simulation room, FOHS medical laboratories, FOHS staff office, library, lecture theatre, seminar room, group space for students, etc. Generator hut, 1 story, Total floor area: 35m^2
Equipment	Practical training mannequin for simulation room(SON & SOM), essential laboratory equipment such as binocular microscope, and large display monitor for lecture room etc.

2-2-2-2 Facility Plan

(1) Site Plan

The front entrance of the new building will be located on the southwest of the project site, and the face of the building will have eye-catching features which are visible from the side of the building 29A of the Faculty of Technical Education, a node of main pathways on the campus. The new building will be a three-story building which uses less land, and the remaining land on the north side of the site will be reserved for future expansion.

There are relatively large trees at the west end of the project site, which will be preserved.

Access to the project site will be mainly through (unpaved) pathways on the south and west sides of the site. In addition, it has been confirmed that the NUS will connect the project site and the pedestrian walkways on the Faculty of Technical Education side in the future. Layout of the building is shown on the right and below.

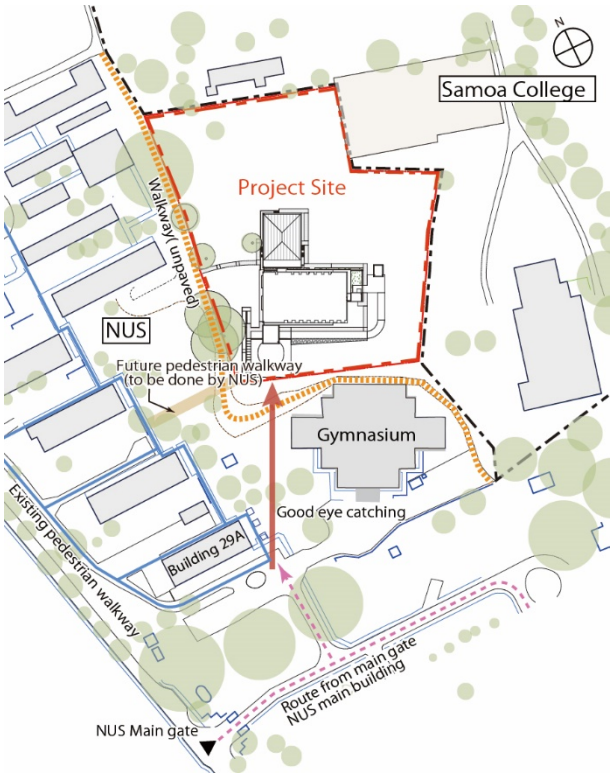

Figure 2 Site Plan 1

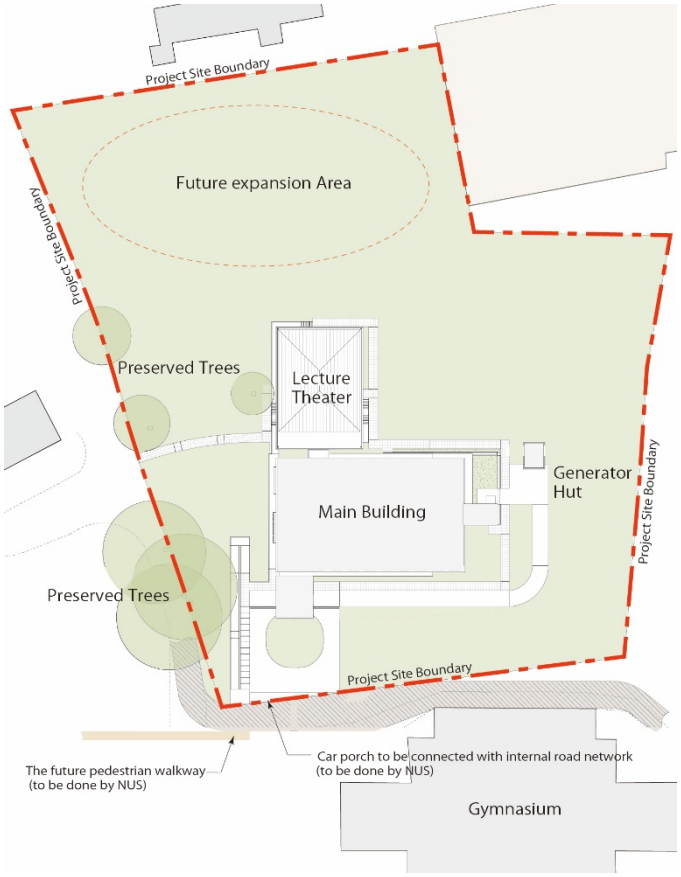

Figure 3 Site Plan 2

(2) Floor Plan

1) Composition of the New Building

The rooms of the LRC will be placed on the ground floor, and face the hall side on the second and third floor for easy access by students. The FOHS rooms will be located on the second and third floors. The hall on each floor will have an atrium, with a space where tables and chairs can be arranged so that it can serve as an informal learning space for students. With consideration of a barrier-free design, an elevator will be installed facing the atrium so that all the educational rooms in the new building are accessible by wheelchairs.

As the project site is situated on a slope, some semi-underground space will be created. This space will be effectively used as a machine room

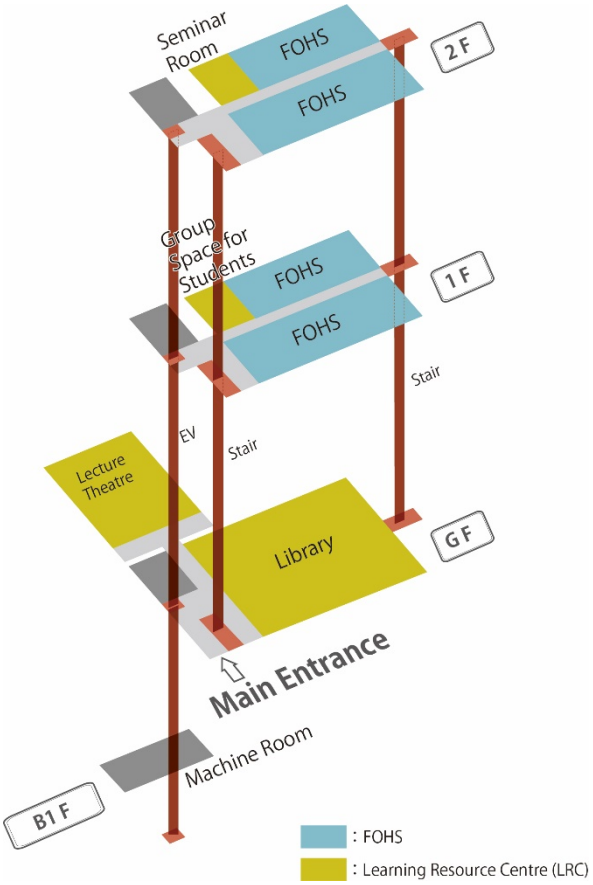

Figure 4 Composition of New Building

2) Ground Floor Plan

As mentioned above, the main rooms on the first floor are the LRC facilities: the library and the lecture theatre. A car porch and entrance hall will be at the southwest end of the building, and the library will be to the right after the entrance. Going straight inside, there will be the lecture theatre. The library will be a unified large space, including a PC area, to facilitate layout changes in response to future needs. The lobby of the lecture theatre, which is accessible through the hallway from the main entrance of the new building, will have another route for direct access from the walkway on the campus so that large groups of students can gather and disperse smoothly even in a large gathering.

On the east side of the building will be a loading dock accessible by vehicles. An outdoor stairway will provide a route to access each floor from the dock without passing through the entrance hall. A loading room for temporarily storing books to be received by donation will be located in the vicinity of the loading dock. The room will be directly accessible from the library and the librarian office. With consideration of barrier-free design, an accessible restroom will be placed on the ground floor. The figure below illustrates the layout of the ground floor.

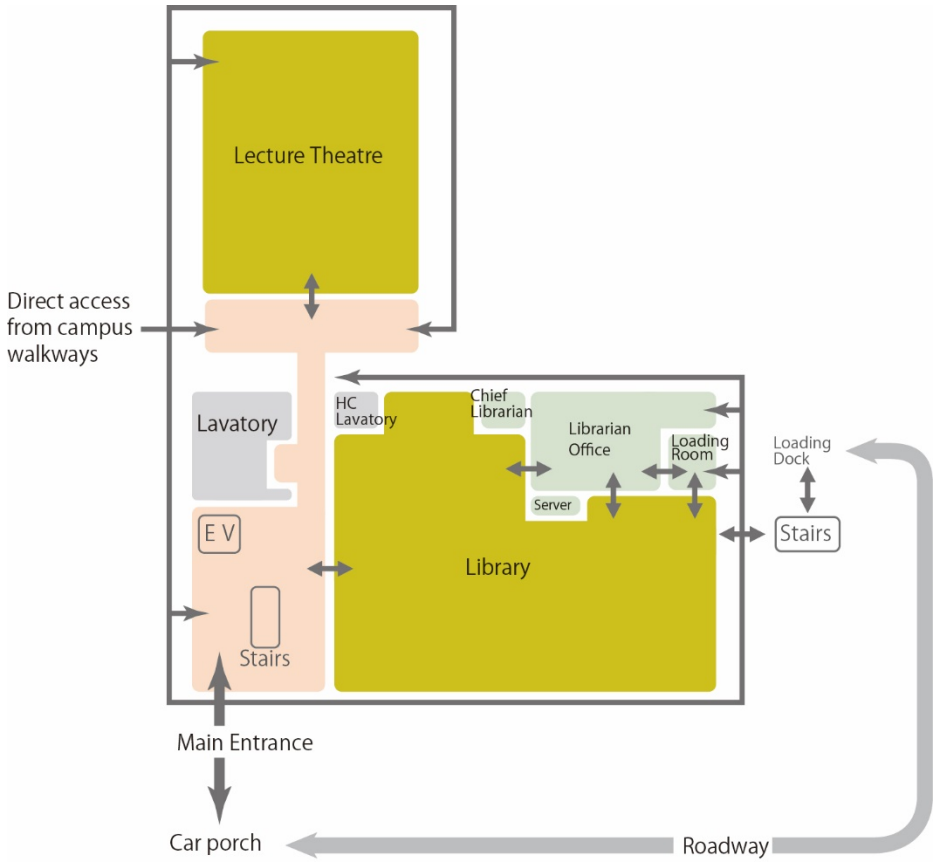

Figure 5 Functional Diagram of Ground Floor Plan

3) Second and Third Floor Plan

The second and third floors will feature FOHS rooms, as well as LRC facilities such as a group space for students and a seminar room located on the atrium side. The lecture rooms 1 and 5 facing the atrium will be equipped with collapsible partitions capable of dividing the room into smaller sections which are suitable as classes for a smaller group of people such as tutorials and PBL (Problem Based Learning).

To enable the FOHS to use as BSL2 (Bio Safety Level 2) laboratory in the future, the medical lab 2 on the third floor will have enough space to install necessary equipment and enough power capability to supply necessary electricity for such a lab.

The figures below illustrate the layout of the second and third floors.

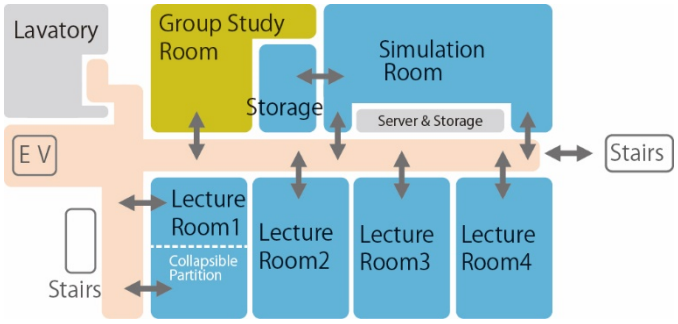

Figure 6 Functional Diagram of Second Floor Plan

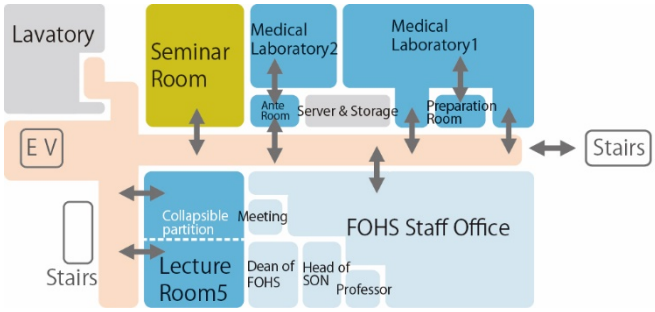

Figure 7 Functional Diagram of Third Floor Plan

4) Floor Area

Table below shows the floor areas of major rooms.

Table 19 Floor Areas of Major Rooms

Category	Lvl.	Room name	Area per room (m^2)	Description
LRC	1	Library	555	Capable of accommodating 80,000 books in anticipation of future increase in the number of books. Equipped with 200 seats in the reading area and 50 seats in the PC area.
	1	Lecture theatre	326	A staircase classroom with a capacity of 300 students. Equipped with video conferencing.
	1	Librarian office	119	Capable of accommodating 14 staff members, with a future increase in headcount taken into account. The chief librarian's office included.
	2	Group space for students	90	Equipped with approximately 60 seats.
	3	Seminar room	82	Capable of accommodating approximately 40 students as standard.
FOHS	2&3	Lecture room	78 to 84	5 rooms will be constructed. Capable of accommodating approximately 40 students as standard.
	2	Simulation room	194	Capable of accommodating up to 10 groups of students (4 to 7 students for each group) for practical training. Includes the storage for simulator.
	3	Medical lab 1	148	Capable of accommodating up to 14 groups of students (4 students for each group) for conducting experiments. Includes the preparation room.
	3	Medical lab 2	51	Available for research purposes. Facility features will satisfy BSL2.
	3	FOHS office	240	Serves as a SON office capable of accommodating approximately 30 people, with future increase in headcount taken into account. Includes offices of the Dean of the FOHS, the Head of the SON and the Professor, and a meeting room.

(3) Cross-sectional Plan

The project site is situated on the land sloping from south to north. The ground floor will be set at the height to provide a smooth transition via a ramp to the pathway around the site. A machine room will be located in the semi-underground of the building on the sloping ground, with drainage route for surface water around the building.

In the three-story building that accommodates the library and FOHS-related rooms, most of the rooms will have windows facing the south or north, with eaves installed above them to prevent rainwater and

direct sunlight from entering the rooms. The building will have a flat roof, which allows the NUS to install solar power generation system in the future[13].

As the lecture theatre will require large space with no columns, it will be a sloping roof with steel structure. It will have tiered seating, allowing those in the rear to see the stage in front of audience.

(4) Interior and Exterior Finishing

1) Basic Policy

In general finishing should use materials commonly used in local buildings, and should be easy to maintain.

2) Finishing Material

The major exterior finishings are shown in the table below.

Table 20 Major Exterior Finishing

Element	Finishing	Note
Roof	Flat Roof: asphalt waterproofing with concrete covering. Sloped roof (auditorium): Metal Roof	On the flat roof area NUS can install a solar power generation system in the future.
External wall	Paint finish	Easy maintenance as prioritized
External fittings	Aluminum fittings	Weather resistance as prioritized

To empower Samoa to sustain her culture and indigenous heritage in the new building, traditional Samoan pattern will be applied in the film on the glass screen above the main entrance.

The major internal finishing is shown in the table below.

[13]The NUS plans to install solar panels on all roof tops at the Le Papaigalagala campus in the Renewable Energy Plan 2021-2025.

Table 21 Major Interior Finishing

Room type	Finishing				Note
	Floor	Skirting	Wall	Ceiling	
Library	Vinyl tiles Carpet tiles	Vinyl skirting	Paint finish	Rock wool acoustic board (Aluminum louver in part)	Typical in local building
Lecture theatre	Carpet tiles	Hard wood	Lower part: Acoustic wall panel (Paint finish in the upper part)	Rock wool acoustic board	Sound absorption as prioritized
Lecture room Simulation room	Vinyl tiles	Vinyl skirting	Paint finish	Rock wool acoustic board	Typical in local building
Medical lab 1	Vinyl tiles (with chemical resistance)	Vinyl skirting	Paint finish	Rock wool acoustic board	chemical resistance for floor as prioritized
FOHS office	Carpet tiles	Vinyl skirting	Paint finish	Rock wool acoustic board	Sound absorption as prioritized
Corridor	Vinyl tiles	Vinyl skirting	Paint finish	Aluminum louver	Typical in local building
Toilet	Ceramic tiles	Ceramic tiles	Ceramic tiles (Paint finish in the upper part)	Fiber cement board	Easy cleaning as prioritized
Storage	Vinyl tiles	Vinyl skirting	Paint finish	Rock wool acoustic board	Typical in local building
Machine room	Dust-proofing paint	-	Glasswool Acoustic Panel	Glasswool Acoustic Panel	Sound absorption as prioritized

(5) Structural Design

1) Ground Conditions of the Project Site and Foundation

According to the results of the geological survey at the project site, a sand and gravel mixed layer with porous basalt with an N value of 1 to 5 is observed up to a depth of about 5m. After that it becomes a solid basalt layer. This basalt layer will be used as a support layer for the independent foundation. The design bearing capacity of the ground will be assumed as 30t/m^2[14].

2) Superstructure

The structural frame will be made of reinforced concrete and the external and internal walls will be made of concrete blocks, which is commonly applied to local buildings. The Lecture Theatre will have a steel frame due to its long span.

[14] In the preparatory survey boring tests including Standard Penetration Tests, and Scala Penetrometer Tests were conducted as the geotechnical survey. Then, it was confirmed that the supporting layer for the new building of the project was deeper than those of neighbour buildings. In order to confirm in detail distribution of the supporting layer in depth under the new building, additional geotechnical survey will be conducted at the detailed design stage.

3) Load

In light of the natural conditions in Samoa, the assumed loads and external forces to be taken into the Project will be set as below.

The structure will be designed to have necessary resistance against earthquakes and other anticipated natural disasters.

A) Dead Load

The loads will be calculated from the individual finishing and structural materials used in the Project.

B) Wind Load

Wind loads will be in accordance with the Japanese Building Code. The design wind speed is assumed to be 46 m/s (10-minutes averaged wind speed). The maximum wind speed at the time of Cyclone Val making landfall on Savai'i in 1991, which caused the greatest damage in Samoa, is estimated as 45 m / s (10-minutes averaged wind speed). Moreover, according to AS / NZ standard, a design wind speed in the cyclonic area on the Pacific coast is calculated 69 m / s as 3-seconds averaged in case of 500 years of recurrent interval (AS / NZS 1170: 2: 2011 TABLE 3.1), which is equivalent to 46 m / s as 10-minutes average.

C) Live Load

Live load will be calculated in accordance with the Japanese Building Code.

D) Seismic Load

Seismic loads will be in accordance with the Japanese Building Code. In the Japanese Building Code, it is intended that a building structure shouldn't have damage at a medium-scale earthquake, and at a large-scale earthquake it may get damaged but should stand and protect building users without collapse. A Medium-scale and large-scale earthquakes are regarded as 5 Upper and 6 Upper to 7[15] in the seismic intensity scale of the Japan Meteorological Agency. The Zone Factor in the Japanese Building Code is assumed to be 0.7 for the Project[16].

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[15] The seismic intensity scale of the Japan Metrological Agency defines 5 Upper as "walking is difficult without holding onto something stable. Things such as dishes or books on shelves may fall. Unsecured furniture may move and unstable objects may topple over", 6 Upper as "People need to crawl to move, and may be thrown through the air. Almost all unsecured furniture moves and may start toppling over. Large cracks may form in the ground, and large-scale landslips and massif collapse may occur", and 7 as "strongest reinforced concrete buildings with low seismic resistance collapse"

[16] In order to calculate the seismic load in accordance with the Japanese Building Code, it is necessary to set a Zone Factor that quantifies seismic hazard of the city of Apia where this project site is located. Referring to the 2015 OBO Building Code issued by the Bureau of Overseas Building Operations of the US State Department, which comprehensively evaluates the seismic hazard of major cities around the world, Apia and Naha, Okinawa are evaluated as the same seismic hazard (Zone 3 in 1997 UBC Seismic Zone). Thus, the Zone Factor of this project

4) Structural Material

The major structural materials are shown in the table below.

Table 22 Major Structural Materials

Materials	Specifications
Concrete	Design strength: Fc=27N/㎟
Reinforcing bar	Yield Strength:345 N/㎟、295 N/㎟

(6) Electrical System Design

1) Power Grid Connection and Transformer System

The 22kV overhead power distribution line from the power station located near the project site will be extended to the new building through stepping down to a lower voltage (400V/230V) using a transformer.

After the transformer, an underground cable will be installed to connect to the low-voltage distribution board in the electrical room.

Samoa side will be responsible for the installation of the overhead distribution line from the existing 22kV overhead distribution line to the electrical pole near the transformer, also the installation of the high voltage cable from the electrical pole to the transformer.

High voltage power：3Φ3W 22KV 50Hz
Low voltage power：3Φ4W 400V/230V 50Hz
Transformer capacity: 250KVA

2) Back-up Generator System

In light of the possible power outages, an emergency generator system will be planned to ensure that NUS activities in the new building would not be disturbed in the case of an interruption in the electricity supply.

The generator will start and stop automatically. The capacity of the generator will cover the whole new building as the existing buildings do.

The capacity of the oil tank for the generator will be calculated based on 30 hours (5 days x 6 hours) of running time.

Emergency generators： 250KVA
Oil tank： 1,000L

3) Power Supply System

Electricity will be supplied from the switchboard in the electricity room to the light distribution board

site under the Japanese Building Code is 0.7, the same as Naha, Okinawa.

and the power control board in each zone of the building by the cable rack system.

The distribution voltage of the main line will be 3Φ4W 400V/230V 50Hz for both the electric light distribution board and the power control board.

An alarm panel for monitoring the main power equipment will be installed in the librarian's office.

A cabling route from the new building to outside will be provided to enable NUS to connect the alarm network from other facilities on the campus in the future.

4) Lighting Fixture and Socket

A) Lighting Fixtures

The lighting fixture will be planned as LED type. The Lecture Theatre should be equipped with dimmer control for lectures with projectors. The lighting switches should be arranged with consideration to the usability of the rooms and energy saving. The target illuminance levels for the major rooms are shown in the table below.

Table 23 Target Illuminance of Major Rooms

Room	Target Illuminance (lx)
FOHS office, meeting room	500
Lecture room	500
Medical lab, simulation room	500
Library	500
Dean (FOHS), head of SON (FOHS), prof.(FOHS)	500
Preparation room	300
Lobby	200
Corridor	500
Lecture theatre, seating area (dimmer)	400
Lecture theatre, stage (dimmer)	800
Lecture theatre, control room (dimmer)	300

B) Socket Outlets

Socket outlets will be provided in consideration of activities in the new building. The sockets will be Type D in accordance with standards AS3100, AS3112 and NZS1938.

5) Public Address system

A main device will be installed in the Librarian Office for general and emergency announcement in the new building. Also, a remote microphone will be installed in the library reception area.

6) Telephone & Local Area Network (LAN) System

IP phone and LAN system will be planned in the new building. The scope of work under the Project will be only piping and wiring with cable trays from the server room to designated points in the new building.

Samoa side will be responsible for the equipment installed in the server room (Data-Storage, Router, Fire Wall, Server, Hub SW, UPS, etc.), LAN equipment such as Hub SW installed at the local network side, and connection work of LAN and IP phone network between the existing building and the new building.

The Project will provide a route from the new building to outside for connection work of LAN and IP telephone system.

7) Fire Alarm System

An automatic fire alarm system will be installed to enable early detection of fire and rapid response to evacuation. The signal receiving equipment will be located in the librarian's office.

The fire alarm panel will be an addressable type similar to the fire alarm panel installed in the existing building.

A wiring route from the new building to outside will be provided for the future connection between the new building and other buildings on the campus.

8) Solar Power Generation System

NUS has plan to install solar panels on the roofs of all buildings on the Le Papaigalagala campus in the RENEWABLE ENERGY PLAN 2021-2025. In consideration of the future plan for NUS to install a photovoltaic system on the roof of the new building, space for solar panels on the roof, and for photovoltaic circuit breakers and watt-hour meters in the low voltage distribution panel will be secured.

9) Exterior Lighting System

An external lighting system will be installed around the access corridor to the main entrance of the building and the direct route to the lobby of the lecture theatre.

10) Lightning Protection System

A lightning rod system will be installed as lightning protection.

(7) Mechanical System Design

1) Air-Conditioning System

The air conditioning system will be an air-cooled packaged system, considering the reduction of maintenance costs and easy repair in case of malfunction.

The areas to be air-conditioned will be minimized in order to reduce construction and running costs.

A) Design Condition

The designed temperature and humidity conditions are shown in the table below.

Table 24 Design Conditions

	Design outdoor air conditions	Design indoor air conditions
Dry bulb temperature℃	33.1℃	26℃
Relative humidity RH %	79%	–

B) Air-Conditioning System

The air conditioning system will be air-cooled package system. The outdoor units will be basically separated by room to minimize the impact on other rooms when the outdoor unit malfunctions. For a large room such as the library, several outdoor units will be installed. The table below shows air-conditioned rooms in the new building.

Table 25 Air-Conditioned Room

Floor	Room
1	Library, librarian room, lecture theatre
2	Lecture room, simulation room, group space for students
3	Lecture room, medical lab 1・2, FOHS office, seminar room

C) Ventilation System

The general rooms will be supplied with fresh outside air via pass-ducts installed in the corridors and other common areas, and will be ventilated by exhaust fans installed in each room.

The toilets, electrical room and generator room will be ventilated to remove smell, heat and dust. The auditorium will be supplied with air-conditioned fresh outside air by a floor-mounted air-conditioner.

2) Plumbing System

A) Water Supply System

The Samoa Water Authority (SWA) has installed a 300mm diameter City Water Main, from which 50mm diameter water pipe will be connected to the new building. For the new building, the water will be stored in a receiving tank and then supplied to the necessary locations using a pressurized water pump unit. The Samoa side will be responsible for the installation of the water meter at the connection point. Rainwater from the roof of the new building will be collected and stored in the other tank, and then supplied to the necessary locations by a pressurized water pump unit to be utilized as miscellaneous water such as flushing water for toilet. A sand filter will be installed for rainwater treatment. The estimated water supply required for the new building is shown in the table below.

Table 26 Calculation of Volume of Supply Water

Category		Number of persons	Unit consumption	Necessary volume
A	Teachers and staff	50 persons	100ℓ/person-day	5,000 ℓ/day
B	Students	200 persons	60ℓ/person-day	12,000 ℓ/ day
C	Library	250 persons	40ℓ/person-day	10,000 ℓ/ day
D	Others	10% of sum from A to C		3,000 ℓ/ day
			Total	30,000 ℓ/ day

- The ratio of tap water and miscellaneous water is 50:50.
- Daily consumption of tap water is 30,000 x 0.5 ≒ 15,000 ℓ/day
- The daily consumption of miscellaneous water is 15,000 L/day.
- The capacity of the water tank for tap water is 15m^3 for daily consumption.
- The capacity of the water tank for miscellaneous water is 15 m^3 for daily consumption.
- Rainwater harvesting tank capacity is 150m^3 for 10 days of miscellaneous water use.

B) Drainage System

There is no public sewerage system in the area around the project site. Therefore, wastewater from the building will be treated on site. Wastewater will be treated in accordance with local standards using a septic tank system, and the treated water will be absorbed into the ground. The septic tank system will have the following capacity

- Capacity of the septic tank system: 30 m^3/day

Rainwater drainage is temporarily stored in the building's underground pit and used as miscellaneous water after filtration.

C) Sanitary Appliance

Water closets, urinals, and wash basins, etc., with types commonly used in Samoa will be installed.

D) Firefighting System

An indoor fire hydrant system will be installed in accordance with the local code. A new fire pump will be installed for the new building.

A conceptual diagram of the water supply and drainage system is shown below.

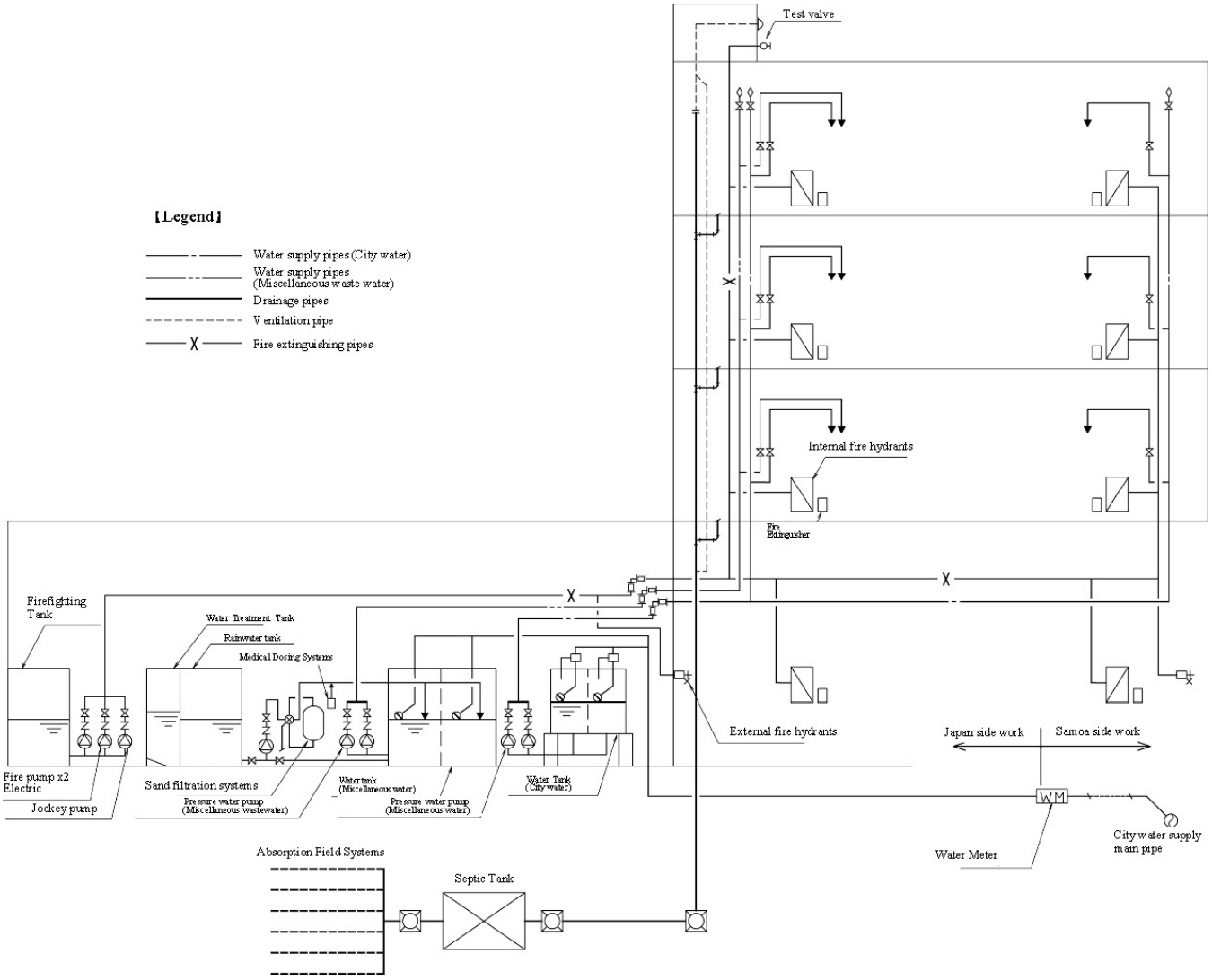


Figure 8 Water Supply and Drainage System Diagram

2-2-2-3 Equipment Plan

The equipment required for providing training in line with the medical and nursing education curricula in the new building will be procured in the Project. The basic policy shown in the table below will be followed in the selection of the equipment.

Table 27 Basic Policy for Equipment Plan

1.	Simulators and laboratory equipment shall be prioritized for procurement because they will contribute to the improvement of the quality of education.
2.	Equipment that can be used sustainably with technical support from agents in Samoa and the neighbouring countries such as New Zealand and Australia shall be procured.
3.	In principle, the Samoa side shall procure equipment with short service lives of approx. five years, including PCs and printers.
4.	In principle, the Samoa side shall procure general furniture because it is locally available at affordable prices.

(1) Order of Priority in Equipment Procurement

The types of equipment to be procured for each room in the new building is described below.

1) Simulation Room

The equipment, including simulators and medical equipment, required for the provision of practical training to medical and nursing students according to the curricula will be procured through this project. To make the training for medical students more practical, thoracic cavity, pericardiocentesis model, central venous puncture trainers, and fetal ultrasound diagnostic phantoms, etc. will be procured. Table below shows the major equipment to be procured for the Simulation Room.

Table 28 Major Equipment in Simulation Room

Item No.	Equipment	Quantity
6	Hospital bed	10
7	Basic combination nursing manikin	2
8	Physical assessment model	1
9	Child nursing manikin	2
10	Midwifery manikin	4
11	Fetus manikin	3
12	Gynecological examination manikin	2
16	Vital signs machine	1
18	Ultrasound machine (midwifery)	1
28	Full size human body model showing muscles and organs for training	2
29	Full size human skeletal model with nerves and blood vessels for training	2
33	Fetal ultrasound diagnostic phantom	2
34	Thoracic cavity, pericardiocentesis model	2
35	Central venous puncture trainer	2

2) Medical Laboratory

The equipment required for the provision of practical training in biochemistry, immunology, bacteriological examinations, etc. to medical and nursing students according to the curricula will be procured. The laboratory table will be installed as a part of the construction work of the Project, while round chairs will be procured in the equipment work of the Project. Table below shows the major equipment to be procured for the medical laboratory.

Table 29 Major Equipment in Medical Laboratories

Item No.	Equipment	Quantity
39	Binocular microscope	20
40	Multi-headed teaching microscope with camera	1
41	Specimen slides	10
44	Centrifuge	1
45	Microbiological stain set	1
52	Round chair for students	66

3) Lecture Rooms

The equipment required for lectures, including large display monitors, podiums, and foldable table for students, will be installed in five lecture rooms.

Table 30 Major Equipment in Lecture Rooms

Item No.	Equipment	Quantity
43	Large display monitor (wireless)	2
46	Table foldable for 1 student	200
47	Chairs for students	200
49	Teacher's desk	6
50	Chairs for teachers	6

4) Lecture Theatre

The lecture theatre will be used to hold online lectures using a video conference function, large-scale lectures, and assemblies, etc. Table below shows the equipment for the lecture theatre that will be procured in the Project.

Table 31 Major Equipment in Lecture Theatre

Item No.	Equipment	Quantity
51	AV system	1
53	Lectern	1

(2) List of Equipment

Table below shows the equipment to be procured in the Project.

Table 32 Equipment to be Procured

No.	Room	Equipment	Quantity in plan
1	Simulation room	Showcase, horizontal	2
2	Simulation room	Model case for 4 bodies	1
3	Simulation room	Showcase vertical	2
4	Simulation room	Storage rack	4
5	Simulation room	Storage case for training manikin	4
6	Simulation room	Hospital bed	10
7	Simulation room	Basic combination nursing manikin	2
8	Simulation room	Physical assessment model	1
9	Simulation room	Child nursing manikin	2
10	Simulation room	Midwifery manikin	4
11	Simulation room	Fetus manikin	3
12	Simulation room	Gynaecological examination manikin	2
13	Simulation room	Childbirth simulating manikin	4
14	Simulation room	CPR manikins (Adult)	2
15	Simulation room	CPR manikins (Child)	2
16	Simulation room	Vital signs machine	1

No.	Room	Equipment	Quantity in plan
17	Simulation room	ECG	1
18	Simulation room	Ultrasound machine (midwifery)	1
19	Simulation room	Tracheal intubation set	4
20	Simulation room	Otoscope	4
21	Simulation room	Organ model, Brain	2
22	Simulation room	Organ model, Heart 1	1
23	Simulation room	Organ model, Heart 2 (Large)	1
24	Simulation room	Organ model, Lungs	2
25	Simulation room	Organ model, Liver・Kidneys・Spleen	2
26	Simulation room	Female pelvic organ model	2
27	Simulation room	Male pelvic organ model	2
28	Simulation room	Full size human body model showing muscles and organs for training	2
29	Simulation room	Full size human skeletal model with nerves and blood vessels for training	2
30	Simulation room	Sets of Visual Anatomical Charts for 11 different Body systems: Integumental system, Respiratory system, Digestive System, Cardiovascular system, Nervous system, Skeletal system, Lymphatic system, Endocrine system, Urinary system, Muscular system and Reproductive System for preclinical training purposes	2
31	Simulation room	Neonatal resuscitation model	2
32	Simulation room	Resuscitation bag set	5
33	Simulation room	Fetal ultrasound diagnostic phantom	2
34	Simulation room	Thoracic cavity, pericardiocentesis model	2
35	Simulation room	Central venous puncture trainer	2
36	Simulation room	Blood pressure trainer	2
37	Simulation room	Withdrawing of urine training model for male	2
38	Simulation room	Withdrawing of urine training model for female	2
39	Medical laboratory	Binocular microscope	20
40	Medical laboratory	Multi-headed teaching microscope with camera	1
41	Medical laboratory	Specimen slides	10
42	Lecture rooms	Large display monitor	5
43	Medical laboratory	Large display monitor (wireless)	2
44	Medical laboratory	Centrifuge	1
45	Medical laboratory	Microbiological stain set	1
46	Lecture room	Table foldable for 1 student	200
47	Lecture room	Chairs for students	200
48	Lecture rooms, Medical laboratory	PC for teacher	6
49	Lecture rooms, Medical laboratory	Teacher's desk	6
50	Lecture rooms, Medical laboratory	Chairs for teachers	6
51	Lecture theatre	AV system	1
52	Medical laboratory	Round chair for students	66
53	Lecture room	Lectern	1

(3) Basic Specifications of Equipment

Table below shows the basic specifications of the major equipment to be procured.

Table 33 Specification of Equipment

No.	Equipment	Main Specifications
8	Physical assessment model	Composition: Main unit, control/monitor terminal, sphygmomanometer Main specifications: Type: adult full body model, Training items: blood pressure measurement: 50-200mmHg or wider, Heart sound auscultation(8 cases or more), Auscultation(wrist, neck), ECG simulation etc.
13	Childbirth simulating manikin	Composition: main unit Main specifications: Type: Full body of pregnant women, Training items: Chest palpation, auscultation, chest measurement, vaginal examination, uterine dilatation observation, direction of the fetus's head, episiotomy etc.
16	Patient Monitor	Composition: Main unit, cart, and accessories Main specifications: Measurement parameters: electrocardiograph, heart rate, respiration , body temperature, SPO2, NIBP or more, Display - colour LCD: size, 10.1 inches or more
18	Ultrasound scanner, portable	Composition: Main unit and convex transducer, cart Main specifications: Beamformer: digital, Scanning method: electronic convex, and electronic linear, Display size: 10 inches or more
51	AV System	Composition: AV wagon, Connection board, Wireless antenna, Video projector, Roll-up screen, Speaker, main, Speaker, ceiling, Microphone with cable, Microphone, wireless, outlets for microphone, outlets for video projector, standard accessories (including power cord) etc. Main specifications: Monitor: panel size: 17-20 inches, Number of pixels: 1920x1080 or better, Wireless antenna: wall or ceiling mounted, Video projector: optical outlet: 10,000 lumen, Roll up screen: size 220 inches, main speaker output sound pressure level: 100 bd/W, ceiling speaker: output sound pressure level: 90 bd/W, Microphone with cable: sensitivity: -54 bd etc.

2-2-3 Outline Design Drawing

The following outline design drawings will be presented on the following pages.

Site plan
Ground floor plan
Second floor plan
Third floor plan
Basement Floor Plan
Elevations
Sections and Generator Hut

Site Plan

1 : 500 (A3)

N

SAMOA COLLEGE CLASSROOM

PROJECT SITE BOUNDARY

PROJECT SITE BOUNDARY

TENNIS COURT

AREA FOR FUTURE EXPANSION

PROJECT SITE BOUNDARY

EXISTING TREES TO BE CONSERVED

LECTURE THEATER

ASI(34F) BUILDING

GENERATOR HUT

PROJECT SITE BOUNDARY

MAIN BUILDING

PROJECT SITE BOUNDARY

MAIN ENTRANCE

EXISTING TREES TO BE CONSERVED

CONNECTION WITH INTERNAL ROAD NETWORK TO BE DONE BY NUS

PROJECT SITE BOUNDARY

CORRIDOR

TO PUATAUNOFO BUILDING (30B)

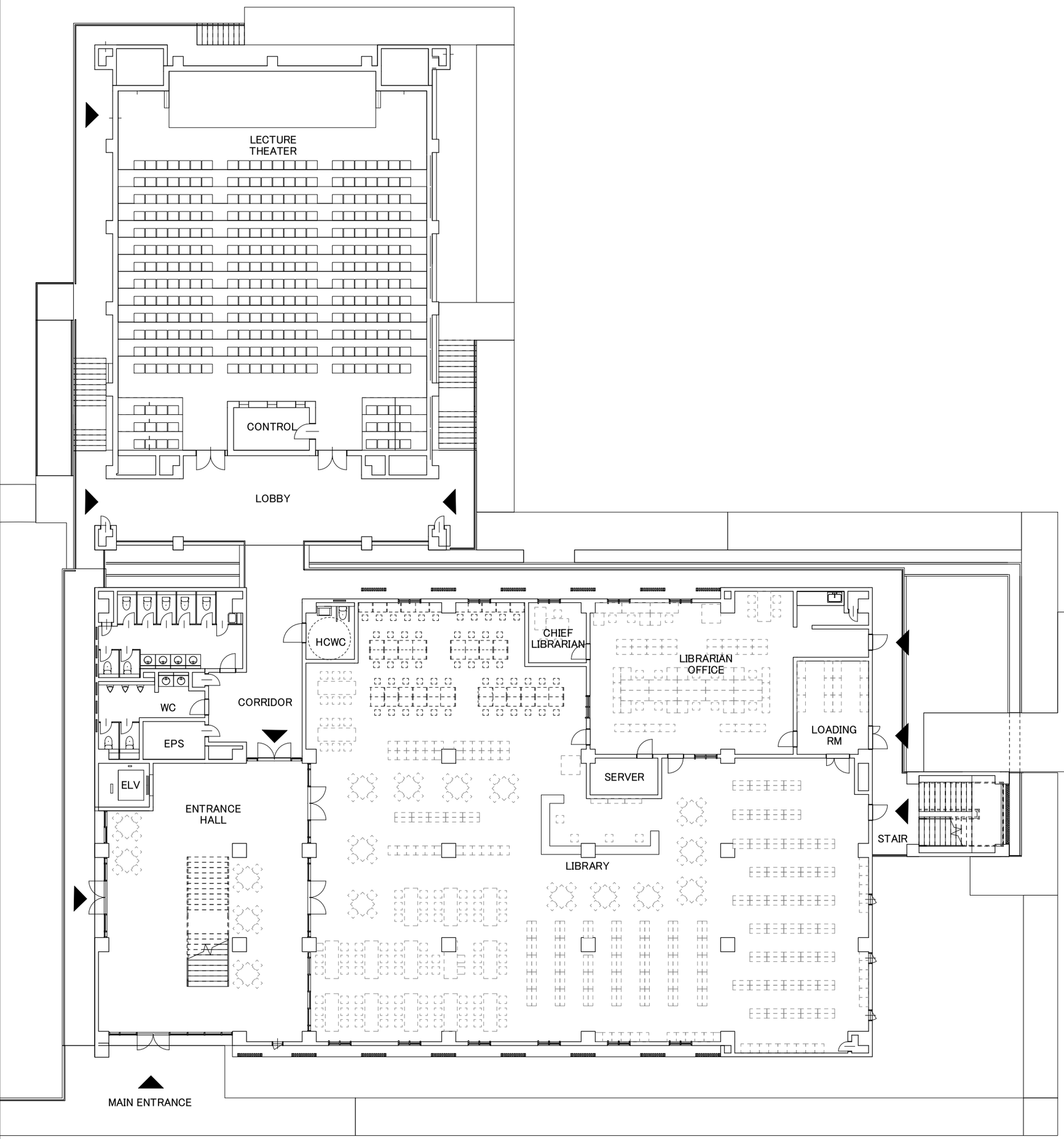
CONNECTION WITH PEDESTRIAN PATHWAY NETWORK TO BE DONE BY NUS

EXISTING ACCESS TRACK

GYMNASIUM(28)

GFL Plan

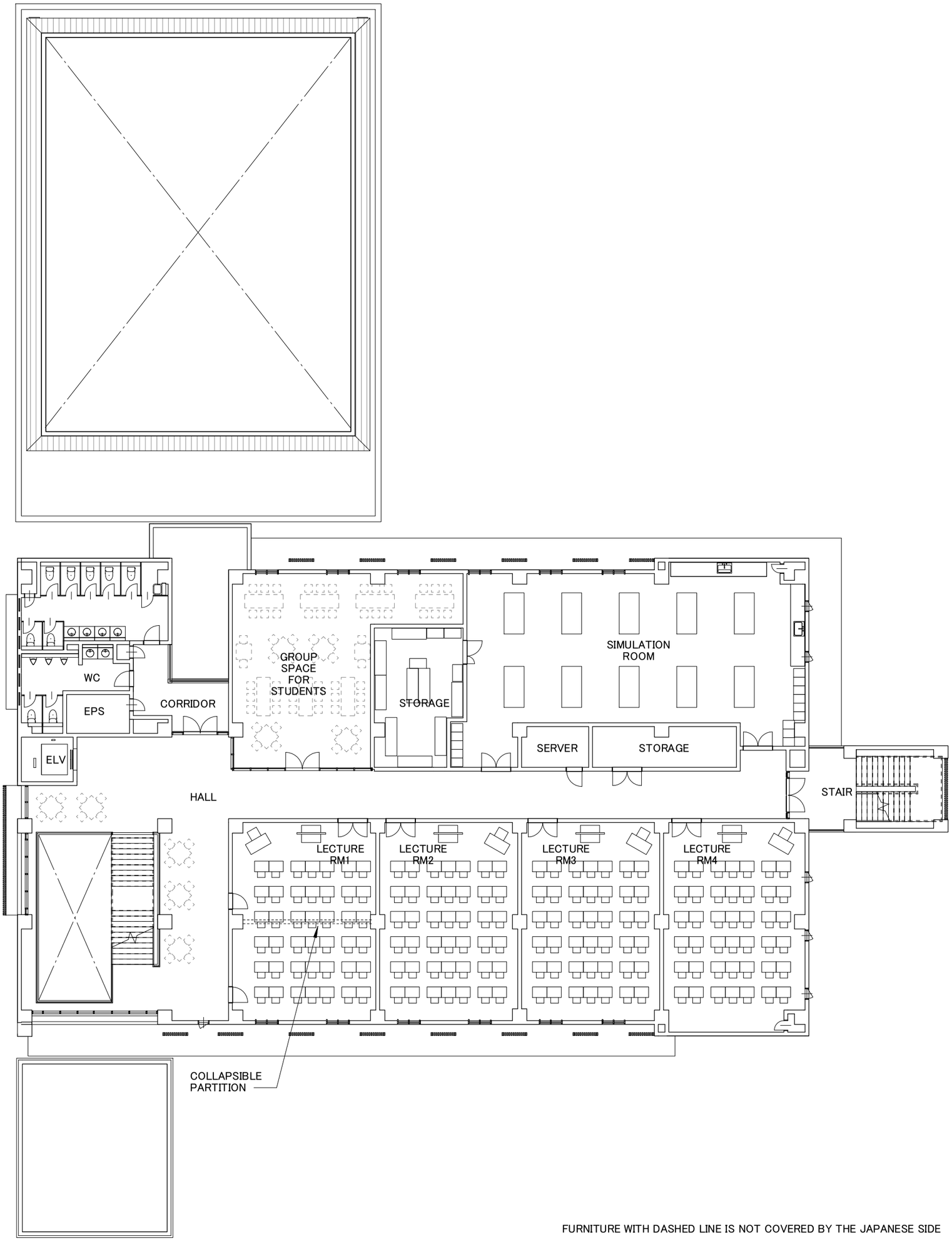
1 : 200 (A3)



FURNITURE WITH DASHED LINE IS NOT COVERED BY THE JAPANESE SIDE

2FL Plan

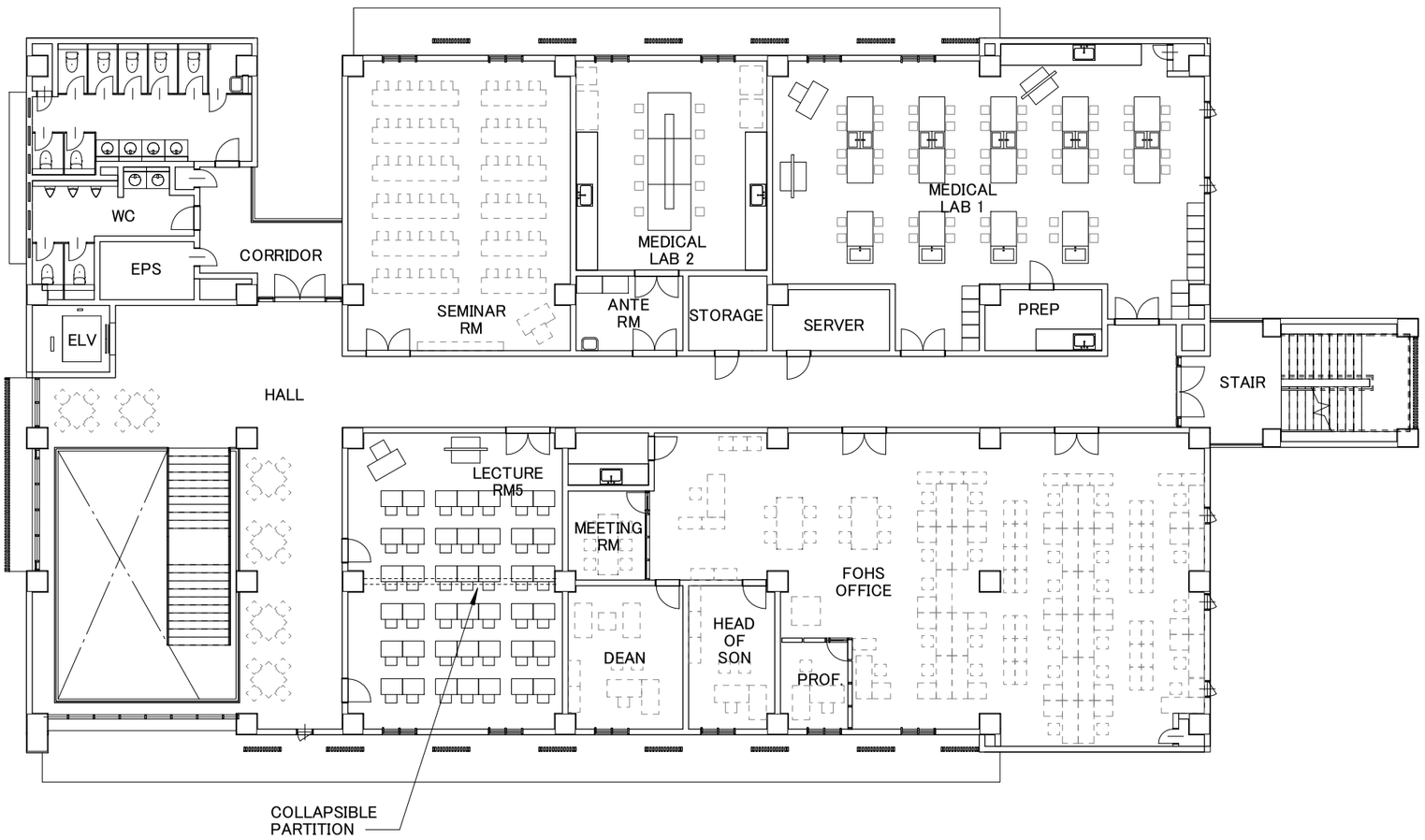
1 : 200 (A3)



FURNITURE WITH DASHED LINE IS NOT COVERED BY THE JAPANESE SIDE

3FL Plan

1 : 200 (A3)



FURNITURE WITH DASHED LINE IS NOT COVERED BY THE JAPANESE SIDE

BFL Plan

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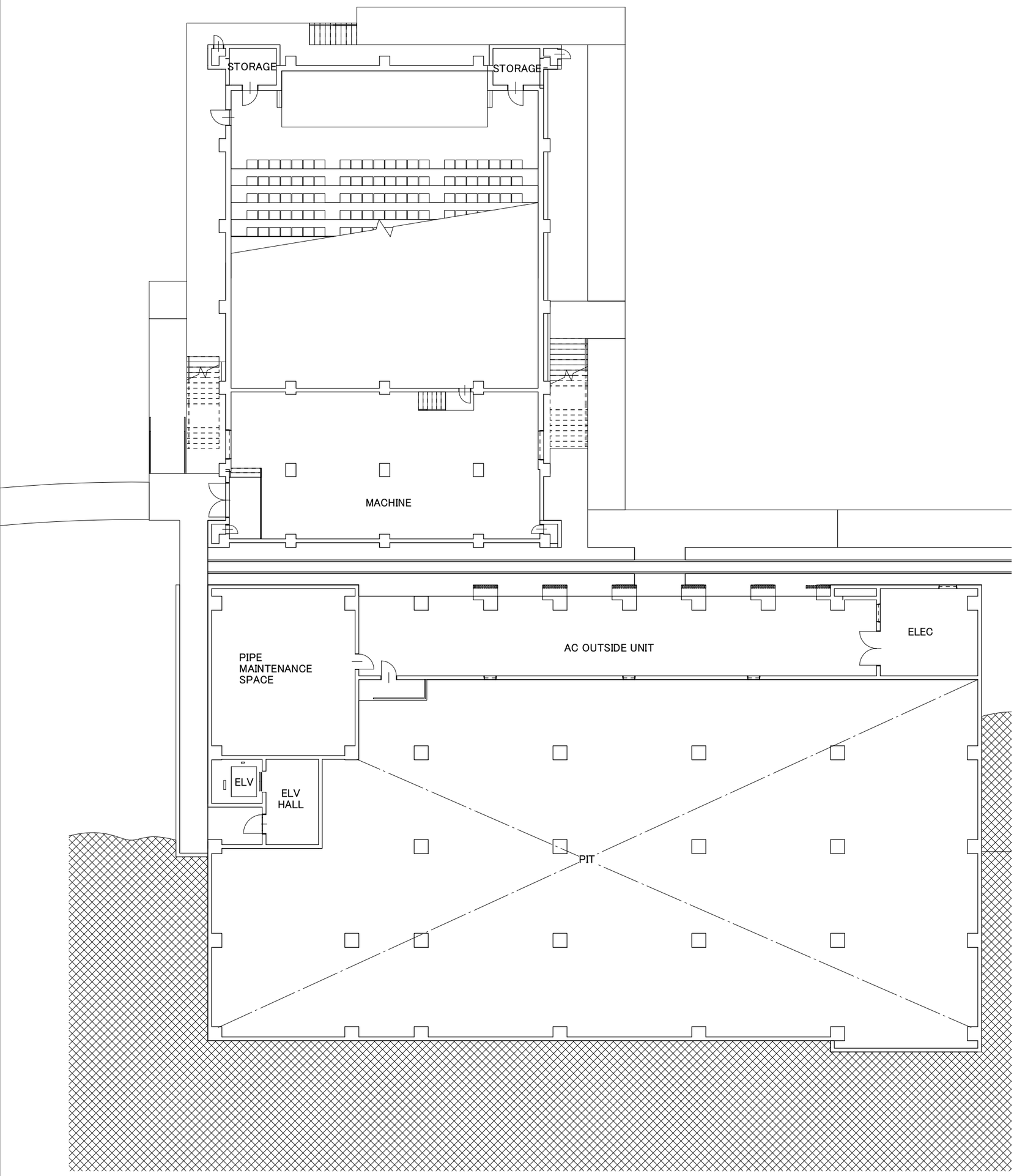
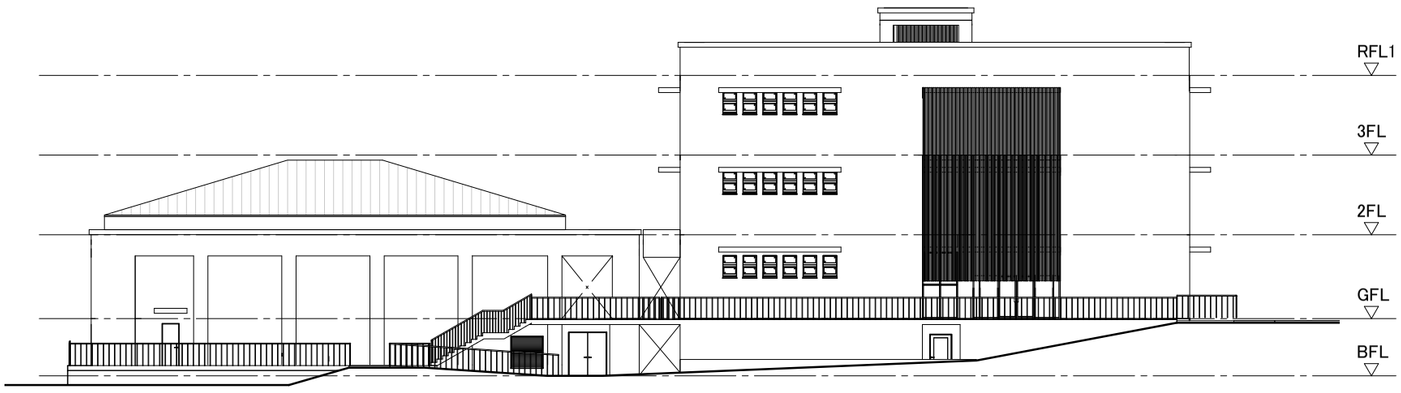


Elevation

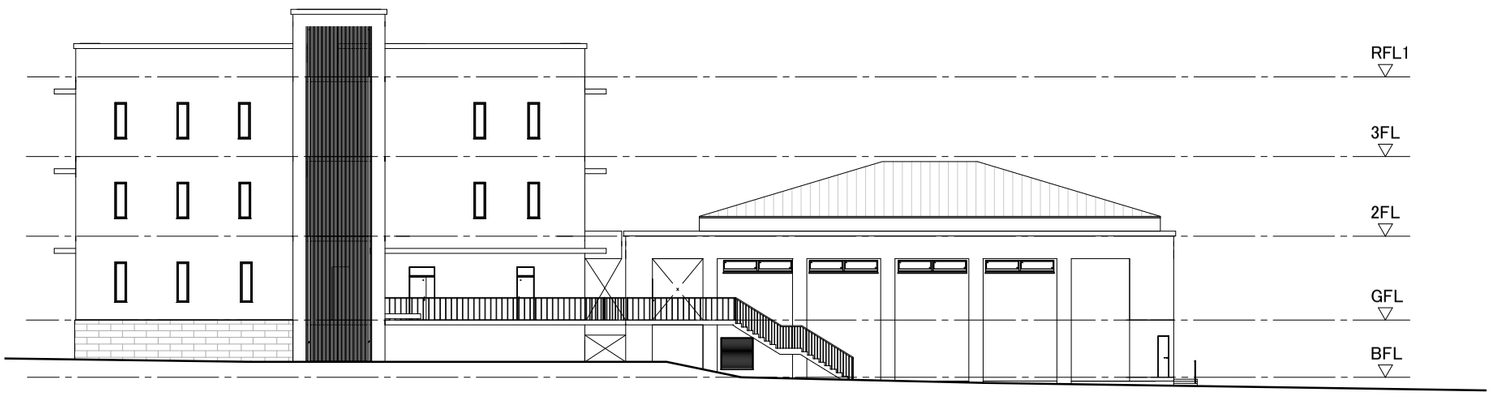
1 : 300 (A3)

NORTH ELEVATION



WEST ELEVATION

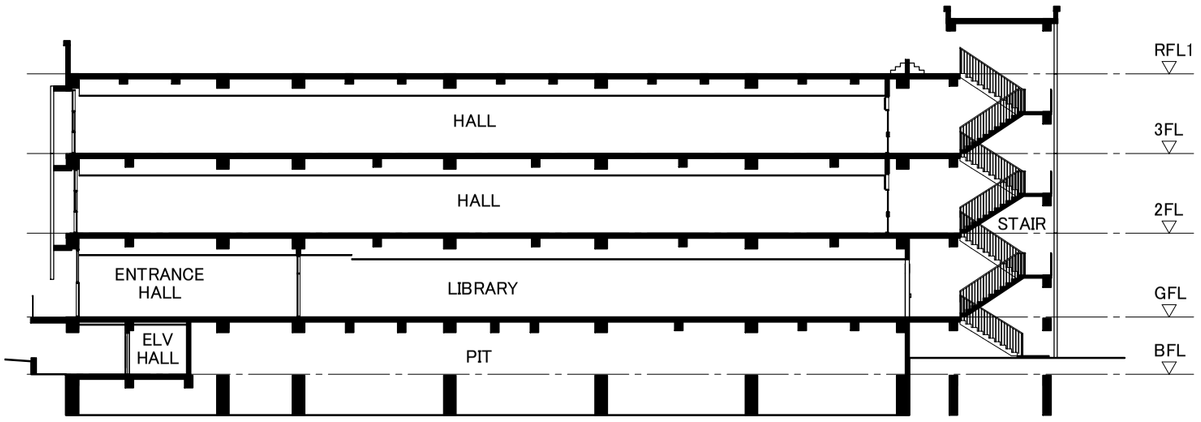
SOUTH ELEVATION



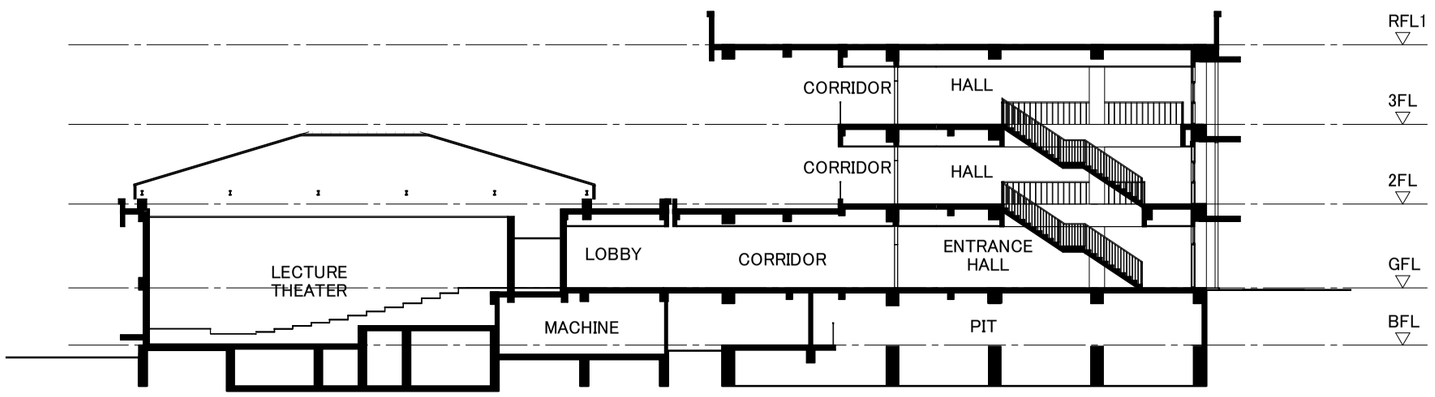
EAST ELEVATION

SECTION

1:300（A3）



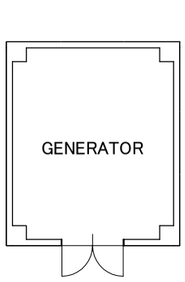
SECTION 1



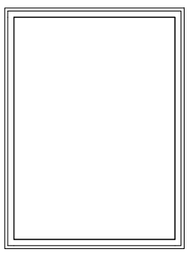
SECTION 2

GENERATOR HUT

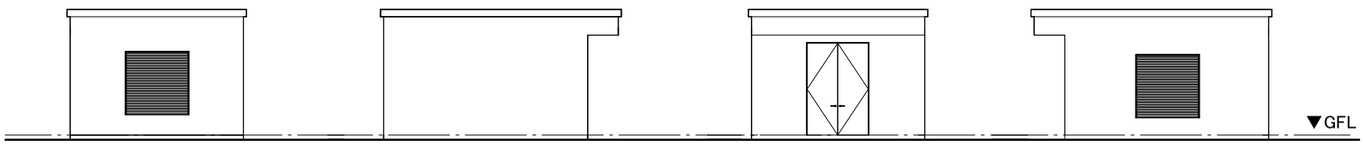
1:200（A3）



GFL PLAN



RFL PLAN



NORTH ELEVATION　WEST ELEVATION　SOUTH ELEVATION　EAST ELEVATION

2-2-4 Implementation Plan

2-2-4-1 Implementation Policy

The Project is to be implemented in accordance with Japan's Grant Aid Scheme. After the Project is approved by the Japanese Cabinet, the Governments of Japan and Samoa will sign an Exchange of Notes (E/N), which is followed by the conclusion of a Grant Agreement (G/A) between JICA and the Government of Samoa. Subsequently, the Government of Samoa will enter into a consulting services agreement for the Project with a Japanese consulting firm, which will conduct a detailed design for the Project's facilities and equipment. Then, detailed design drawings and bidding documents will be prepared for the bidding. A Japanese contractor who will be awarded the relevant contracts will construct facilities for the Project, also a supplier who will be awarded the relevant contracts will procure and install equipment for the Project.

Those agreement and contract with a consultant, contractor and supplier need to be verified by JICA to become effective under Grant Aid Scheme.

Once the construction starts, a supervision structure will be formed consisting of the implementing agency of Samoa as well as the Japanese consultant and the contractor.

(1) Project Implementation Organization

The implementing agency of the Project is NUS. NUS is in charge of the contract with the contractor and / or the consultant. The focal point at NUS for the project implementation is the Planning, Safety and Maintenance Department.

(2) Consultant

After the E/N and G/A are signed as mentioned above, NUS will conclude a consulting services agreement for the detailed design and supervision of the Project with a Japanese consulting firm and obtain verification of the agreement from JICA in accordance with the Grant Aid Scheme. After the agreement is verified, the consultant will prepare detailed design drawings and bidding documents based on this preparatory survey report and discussions with NUS. Eventually, these documents will be explained to NUS to gain its consent.

At the bidding and supervision stage, the consultant is to assist in the bidding process in accordance with relevant Procurement Guidelines for the Japanese Grant, and to supervise the construction work based on the detailed design drawings and other contract documents. For equipment procurement and installation, the consultant is also to assist in the bidding process and supervise the installation, trial run, and commissioning of the equipment. The detailed tasks and responsibilities of the consultant are described as follows.

1) Detailed Design

Based on this preparatory survey report, the consultant is to create a detailed plan, review the equipment plan, and prepare bidding documents consisting of relevant drawings, specifications, instructions to bidders, drafts of contracts for construction work and equipment procurement. The consultant is also to estimate the

costs of the construction and equipment procurement.

2) Assistance in Bidding

The consultant is to assist the implementing agency of Samoa in bidding to select a contractor and in preparing paperwork for the contract. The consultant is also to report the results of the bidding to the Government of Japan.

3) Construction and Procurement Supervision

The responsibilities of the consultant are to confirm whether the contractor performs its works properly as specified in the contract and to give them advice and guidance as well as coordinate all parties concerned from an impartial position to facilitate the smooth implementation of the Project. The major tasks of the consultant are described below;

- Examine and confirm the construction plans, working drawings, equipment specifications, and other relevant documents submitted by the contractor;
- Conduct pre-shipment inspection to examine and confirm the quality and performance of the construction materials, furniture, and equipment delivered;
- Ensure that building installations and equipment are delivered and installed and that operating instructions are given and demonstrated;
- Monitor and report the progress of the construction work;
- Witness the commissioning of the completed facilities and equipment; and
- Conduct search over the defects before the expiry of 1-year Defect Notification Period after completion of the construction work.

The consultant is also to report the progress of the Project, the process of payment, the commissioning of completed facilities and equipment, and other relevant matters to the entities concerned in Japan such as JICA.

(3) Contractors

A contractor is to be selected by open bidding in which only qualified Japanese Corporations are eligible to participate. In principle, the lowest bidder is to be awarded a contract with NUS for construction work and equipment procurement separately. In accordance with the contract, the contractor is to construct facilities, and the supplier is to procure, deliver, and install equipment as well as provide the Samoa side with operation and maintenance training for the equipment. Additionally, the supplier is to provide logistic support based on the cooperation with the relevant manufacturers and local agencies so that NUS can purchase spare parts and consumable supplies and receive paid technical training after the equipment is handed over to them.

(4) JICA

Under the Grant Aid scheme, JICA conducts necessary operation for promoting the project implementation as the implementing agency of the Government of Japan for the Project.

(5) Local Consultants and Contractors

Local consultants will assist a resident supervisor appointed from the Japanese consultant in his supervision work.

Local contractors will take part in the construction work of the Project as subcontractors of the Japanese contractor.

2-2-4-2 Implementation Condition

(1) Points to Be Considered for Construction Work

1) Schedule Management

The following points should be considered in terms of schedule control.

- The rainy season, which starts in November and continues until April, affects structural works and works related to the finishing of the external walls. Therefore, the construction plan should be carefully studied and necessary measures should be taken to prevent delays, such as the use of rain prevention sheet on the external scaffolding.
- Most of the building materials will be procured from outside of Samoa. Thus, delays may occur due to weather conditions during marine transportation. The procurement plan of re-bar, formwork, steel frame and interior/exterior finishing materials should be selected as early as possible to allow for sufficient time for procurement.
- In Samoa, there is generally a long holiday at Christmas time. It is important to make the construction schedule in anticipation of the Christmas holidays.

2) Anti-theft Measures of Materials

To prevent materials from theft, a 24-hour security should be introduced in the construction site.

(2) Points to Be Considered for Equipment Work

The complex coordination between procurement/installation work and construction work will be required for the AV system in the lecture theatre, as its installation will require wiring work in the theatre. In such cases, the consultant, the construction contractor, and the equipment supplier should coordinate the work schedules in advance so that the equipment supplier can centrally manage the schedule for the procurement and installation of the equipment concerned.

2-2-4-3 Scope of Work

The Project is implemented by mutual cooperation between the Governments of Japan and Samoa. The demarcation of responsibilities between both Governments in the implementation of the Project as the Japanese Grant Aid is as follows.

(1) Undertakings by the Government of Japan

The following undertakings on consulting, construction, procurement and installation of equipment in the Project are to be provided by the Government of Japan.

1) Consulting Service

- Preparation of detailed design of target facilities and equipment as well as bidding documents
- Operational support for selection of a contractor and supplier as well as contracting works
- Supervision of construction work and, delivery, installation, operational instruction of equipment
- Execution of Soft Component (Technical Assistance) for improvement of capacity of maintenance of equipment procured by the Project

2) Construction Work and Procurement and Installation of Equipment

- Construction of the target facilities
- Procurement of construction materials of the target facility and equipment, also its transportation and delivery to the project site.
- Installation, trial run, and adjustment of the equipment procured in the Project
- Explanation and training of operation and maintenance of the equipment procured in the Project

(2) Undertakings to be taken by the Government of Samoa

The undertakings to be taken by the Government of Samoa are as shown in Table below;

Table 34 Undertakings to be taken by the Government of Samoa

Items related to the construction work
Secure the lot of land necessary for the Project
Level the ground of the project site (Including removal of existing trees and fence dividing the project site from the main campus)
Install power distribution water supply distribution lines to the project site
Connect between the new building and existing network, and establish system for telephone and local area network (LAN)
Environmental clearance and acquisition of building permit
Landscape work around new building
Items related to the equipment procurement
Transfer existing equipment and furniture from existing building to new building
Procure furniture and equipment not covered by the Japanese side
Items related to operation and maintenance
Procure consumables and spare parts
Utilize and maintain the project facilities and equipment with appropriate human resource
Items related to administrative procedures
Commissions for the Banking Arrangement (B/A), payment to contractors, and Authorization to Pay (A/P) and amended A/P
Acquire necessary consent and/or permission for the project implementation
Prompt customs clearance and tax exemption of the construction material and equipment imported for the Project
Exempt customs duties, internal taxes and other fiscal levies which may be imposed in Samoa for the Project
Necessary arrangements for the Japanese nationals and parties concerned from third country to enter into and stay in Samoa for the Project
All necessary expenses, other than those covered by the Government of Japan under the Grant Aid Scheme

2-2-4-4 Consultant Supervision

(1) Consultant Supervision

The consultant is to conduct services by formulation of a project team, keeping consistency from the detail design stage, conforming to the concept at the preparatory survey and adhering to the policy of the Japanese grant aid implemented by the Government of Japan. Principles for the supervision of the construction work are the followings:

1) Consultant Supervision Policy

- Keep in close contact with the responsible officials of the relevant agencies of Samoa and Japan to ensure that the construction of facilities and the installation of equipment are completed without delay.
- Give prompt and appropriate instructions and advice to the contractor and equipment supplier and their related members from an impartial position.
- Provide proper instructions and advice on the operation and maintenance of the facilities and equipment after their installation and commissioning

2) Consultant Supervision Plan

In addition to a supervisor and local engineers stationed in the project site throughout the construction period, architects and engineers in the following specialty are to be dispatched to Samoa in accordance with the construction progress.

- Project manager : Overall coordination, supervision of process and quality control
- Architect : Explanation of design intent and confirmation of material, as well as midterm inspection
- Structural engineer : Confirmation of bearing capacity of soil and structural materials, as well as midterm inspection
- Mechanical engineer : Explanation of design intent and midterm and final inspection of plumbing and air-conditioning works
- Electrical engineer : Explanation of design intent and midterm and final inspection of electrical work
- Inspector for 1-year inspection: 1-year inspection before the expiry of 1-year Defect Notification Period after completion of the construction work to be conducted

For the procurement of equipment, the following technician is to be dispatched to Samoa in accordance with the procurement progress.

- Resident procurement supervisor : Equipment installation supervision, adjustment with construction work, attendance for numerical inspection, attendance of initial operational training (explanation of how to use, daily check and troubleshooting)

3) Equipment Procurement Supervision

The following are the major components of the service for equipment procurement supervision.

A) Coordination with the contractor and confirmation of equipment production drawing (work in Japan)

The consultant will confirm with the equipment supplier the equipment procurement schedule (ordering, inspection, ship-loading, transport, and installation), the work plan (including the assignment of workers and reporting procedures), and the documents to be submitted by the contractor as required in the contract (including shop drawings, equipment layout plans and a utility list).

B) Pre-shipment Inspection (work in Japan)

Some pieces of the equipment will be fully assembled and packed for export in the factories of the manufacturers and then delivered to a designated warehouse. Therefore, the consultant will inspect such

equipment in the factories before packing and delivery.

C) Pre-loading Inspection (work in Japan or third countries)

The consultant will select a third-party inspector for pre-shipment inspection of the equipment, prepare the documents required for inspection, including equipment specifications, examine the inspection certificate, and submit an inspection completion report to NUS.

D) Procurement supervision (on the project site)

The consultant will supervise the numerical examinations, inspection, installation, adjustment and trial run, and operational guidance of the equipment conducted by the equipment supplier. The consultant will verify that the manufacturers, models, and specifications of the procured equipment are those provided in the contract. Regarding the operational guidance, the consultant will examine the guidance completion report with the information of the participants (names, positions, and responsibilities as well as their signatures).

The consultant will report the completion of the performance of the contractual duties of the equipment supplier to the person in charge of the Project at NUS and will perform various procedures for the handover of the procured equipment. The consultant will dispatch a resident engineer for procurement supervision to Samoa to supervise the on-site activities of the equipment supplier from the installation work through to acceptance inspection and handover.

(2) Construction Management by the Building Contractor

To complete facilities consistent with the contract documents within the planned schedule, the building contractor will be required to manage the construction work in collaboration with local contractors smoothly. Understanding the characteristic of the target facilities, the contractor needs to station an experienced construction manager who is familiar with the local conditions in order to materialize the designated quality.

(3) Procurement Management by the Equipment Supplier

The following will be the major components of the procurement management by the equipment supplier:

1) Confirmation of equipment production drawings (work in Japan)

The supplier will explain to the consultant the equipment procurement schedule (ordering, inspection, ship-loading, transport, and installation), their work plan (including assignment of workers and reporting procedures), and submit the documents required in the contract (including shop drawings, equipment layout plans of equipment and utility list) to obtain the consultant’s approval.

2) Pre-shipment Inspection (work in Japan)

Some pieces of equipment, including simulator cases, will be assembled and packed for export in the

plants of the manufacturers and delivered to a designated warehouse. Therefore, pre-shipment inspections shall be conducted in the factories. The rest of the equipment shall be inspected in warehouses designated by the manufactures or forwarders.

3) Pre-loading Inspection (work in Japan or third countries)

The supplier will oversee the pre-shipment inspection conducted by a third-party inspector selected by the consultant. The supplier will submit photocopies of the shipping documents (including bills of loading, insurance policies, invoices, and packing lists) to the inspector after ship-loading. The inspection shall be conducted at a port of loading in every country of origin of the procured equipment.

4) Procurement supervision on the project site (on the project site)

The supplier will conduct numerical examinations, inspections, trial runs, and operational guidance of all the procured equipment in the presence of the person in charge of the Project at NUS and the consultant.

2-2-4-5 Quality Control Plan

(1) Construction

To secure the quality of the construction work, construction supervision is provided based on the standards commonly applied in Samoa or Japanese standard. The quality control plan for major construction work is as shown in Table below;

Table 35 Quality Control Plan

Work	Control parameter	Control policy	Inspection method	Standard	Inspection frequency	Recording method
Earth work	Bearing capacity of soil	According to structural plan and spec.		International standard*		Report
	Slope angle		Gauge, visual inspection		As needed	Photos, inspection documents
	Leveling tolerance		Level visual inspection		Ditto	Ditto
	Thickness of replaced soil		Ditto		Ditto	Ditto
Re-bar work	Reinforcement cover thickness	According to structural plan and spec.	Visual inspection, measurement	International standard*	As needed	Photos, inspection documents
	Shape tolerance		Ditto		Ditto	Ditto
	Tensile test		Sampling at the work site or at the time of shipment		Every 200t of steel bars of each diameter; three test pieces at each test	Report
Concrete work	Compression strength	According to structural plan and spec.	Test with attendance	International standard*	Three or more test pieces per batch and every 50m^3	Report
	Slump value		Ditto		When casting concrete	Photos, inspection documents
	Chloride content		Ditto		Ditto	Ditto
	Air content		Ditto		Ditto	Ditto
	Concrete temperature		Ditto		Ditto	Ditto
	Shape tolerance		Measurement		At the time of form removal	Ditto
Steel work	Steel materials and bolts	According to structural plan and spec.	Mill sheet (Original), Check tag in case of mill sheet copy	International standard*	Once per steel Grade	Report
	Production test		Measurement and visual inspection		All Place	Photos, inspection documents
	Installation accuracy		Measurement		All Place	Ditto
	High tension bolt setting		Visual inspection		All Place	Ditto
Concrete block work	Compression strength	According to technical spec.	Test with attendance	International standard*	Once before shipment from the factory	Report
Finishing work plastering painting roofing etc.	Materials, storage methods, work methods, mixing, coating thickness, curing, tolerance	According to technical spec.	Same as left	Same as left	If necessary	Photos, inspection documents
Plumbing work	Water supply pipes	Confirmation of leakage	Water pressure test	International standard*	At the completion of the work	Report
	Drainage pipes		Water filling test			
Electrical work	Cables	According to technical spec.	Insulation test	International standard*	At the completion of the work	Report
			Conductivity test		Ditto	Ditto

* ASTM, AS, NZS, JIS and other international standards

(2) Equipment

Equipment compliant with appropriate standards, such as ISO9001 (quality management system), will be procured for the Medical Laboratory and Simulation room to ensure the quality.

2-2-4-6 Procurement Plan

(1) Construction

1) Procurement Policy

The production of construction materials in Samoa is very limited. Materials locally produced in Samoa are mainly concrete and concrete blocks. It is deemed adequate that most of materials of the Project would be procured from Japan in principle because those from Australia and New Zealand are more expensive than Japan. For equipment that is part of the Project's site servicing systems and requires regular maintenance, it is a requirement that an equipment representative be available and able to service the equipment on site.

2) Procurement Plan

A) Structural Work

Structural materials such as sands, gravels, cements, and concrete blocks for partition walls are to be procured locally. Reinforcing bars and formwork materials are to be procured from Japan and/or third country.

B) Finishing Work

Both interior and exterior finishing materials, such as aluminum sashes, tiles, roof sheets, paint, and glass, are to be procured from Japan and/or third country.

C) Plumbing Work

Pumps, tanks and sanitary appliance are to be procured from Japan and/or third country.

D) Air Conditioning Work

Air-conditioning units, extractors and pipes are to be procured from Japan and/or third country with consideration of feasibility of maintenance.

E) Electrical Work

Electrical materials such as transformer, generator, distribution panel, lighting fixtures, cables / wires and conduits are to be procured from Japan and/or third country with consideration of feasibility of maintenance.

F) Labor

General and skilled worker are to be procured in Samoa.

Below Table shows procurement plan for major construction materials in the Project.

Table 36 Procurement Plan for Major Construction Materials

	Procurement Location			Note
	Samoa	Japan	Third country	
[Structure and finishing]				
Portland cement	○			Ready mixed concrete is available in Apia
Aggregate	○			
Concrete formwork plywood		○	○	
Deformed bar		○	○	
Concrete Block	○			
Structural steel		○	○	
Waterproofing material		○	○	
Window and door		○	○	
Glass		○	○	
Tile		○	○	
Paint		○	○	
[Mechanical and electrical]				
Air-conditioner & extractor		○		feasibility of maintenance to be confirmed
Elevator			○	feasibility of maintenance to be confirmed
Pump		○	○	
Pipe		○	○	
Sanitary appliance		○	○	
Distribution panel		○	○	feasibility of maintenance to be confirmed
Generator		○	○	feasibility of maintenance to be confirmed
cables / wires and conduits		○		
Lighting fixture		○		
[Temporary work and construction equipment]				
Scaffolding	○			to be leased locally
Temporary fence	○			
Construction equipment	○			

(2) Equipment

In principle, equipment will be procured in Samoa and from Japan. Procuring equipment from a third country can be considered if it is thought to be advantageous over procurement from Samoa or Japan even when taking into consideration the quality of maintenance services provided by local agents and when the conditions mentioned below apply:

- The manufacturer of the equipment concerned has a branch office or an agent that can provide maintenance services in Samoa or in neighbouring countries such as New Zealand or Australia.
- It might not be possible to organize a competitive bidding because the equipment concerned is commercially available as the only Samoan or Japanese product.
- The equipment concerned is widely used in institutions like FOHS in Samoa.

- The maintenance cost, including the costs of spare parts for regular replacement and consumables, is relatively low.

Table below shows the types of equipment that may be procured from third countries.

Table 37 Equipment Possibly Procured from the Third Country

No.	Name
7	Basic combination nursing manikin
8	Physical assessment model
9	Child nursing manikin
10	Midwifery manikin
11	Fetus manikin
12	Gynecological examination manikin
14	CPR manikins (Adult)
15	CPR manikins (Infant)
21	Organ model, Brain
22	Organ model, Heart 1
23	Organ model, Heart 2 (Large)
24	Organ model, Lungs
25	Organ model, Liver・Kidneys・Spleen
26	Female pelvic organ model
27	Male pelvic organ model
28	Full size human body model showing muscles and organs for training
30	Set of Visual Anatomical Charts for 11 different Body systems: Integumental system, Respiratory system, Digestive System, Cardiovascular system, Nervous system, Skeletal system, Lymphatic system, Endocrine system, Urinary system, Muscular system and Reproductive System for preclinical training purposes
31	Neonatal resuscitation model
36	Blood pressure trainer
37	Withdrawing of urine training model　for male
38	Withdrawing of urine training model　for female
39	Binocular microscope
40	Multi-headed teaching microscope with camera
42	Large display monitor
43	Large display monitor (wireless)
48	PC for teacher
51	AV system

2-2-4-7 Operational Guidance Plan

The equipment supplier will provide operational guidance for the procured equipment after delivery, installation, and adjustment/trial run, and the consultant will supervise the guidance to ensure appropriate implementation. The consultant will confirm the content of the guidance, the completion report and other documents with the person in charge of the Project at NUS.

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

The purpose of the soft component of the Project is to strengthen the existing maintenance systems to enable effective and efficient use of the procured equipment for a long period of time. The participants of

the soft component will be NUS Planning, Safety and Maintenance staff, the end-users of the equipment, i.e., teaching staff, and the biomedical technicians of TTM Hospital, where students of FOHS undergo clinical training. NUS and TTM Hospital have concluded an MOU on the assistance of TTM Hospital for the maintenance of equipment owned by FOHS. It has been confirmed that the MOU will remain in force in the future. (See "Soft Component Plan" attached hereto for the details of the plan.)

2-2-4-9 Implementation Schedule

To implement the Project as Japanese Grant Aid, the following steps are to be taken;

- The Governments of Japan and Samoa will conclude E/N for the Project and JICA and the Government of Samoa will sign on G/A for the Project.
- JICA will recommend a Japanese consulting firm to the Government of Samoa.
- NUS and the Japanese consulting firm will enter into detailed design and supervision agreements.
- The Japanese consulting firm will conduct detailed design which will be followed by bidding procedure. After conclusion of contracts, construction work and equipment procurement will be executed.

(1) Detailed Design

Based on the preparatory survey, the consultant is to create a detailed plan and bidding documents consisting of detailed design drawings, specifications, draft contract, instructions to bidders, etc. The consultant is to have close consultations with NUS in the initial and final phase of detailed design works and submit the final product. Upon their approvals, detailed design phase are completed.

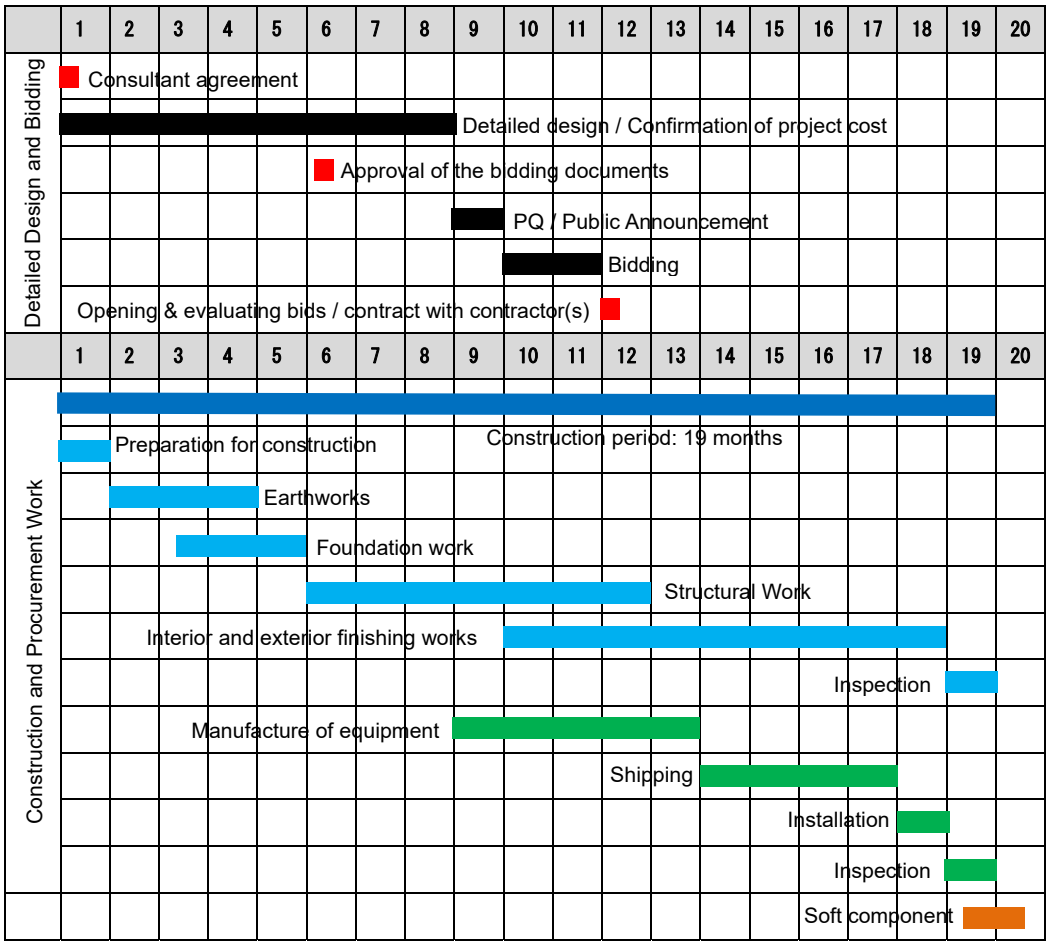
(2) Bidding

After the detailed design phase, the prequalification (P/Q) of the bidder is announced in Japan. Then, NUS as the client invites the construction companies that meet the P/Q criteria to the bidding. After bidding is made properly in the presence of parties concerned, the lowest bidder, whose bid is deemed appropriate, is to be awarded the contract for construction work and equipment procurement respectively with NUS.

(3) Construction Work and Equipment Procurement

After the signing of the contract, the contract needs to be verified as eligible by JICA before commencement of the work. Given the size of the project facilities and conditions of local construction, approximately 19 months in total will be required for construction work, procurement and installation of equipment, and operational instruction. This presupposes smooth procurement of materials and equipment by Japanese side and smooth implementation of undertakings of the Samoa side. Implementation schedule of the Project is as shown in Table below;

Table 38 Project Implementation Schedule



2-3 Security Plan

The project site is located in the middle of the campus, therefore it will be important to ensure the safety not only within the construction site but also along the route to the construction site for construction vehicles on the campus.

A route for the construction vehicles to the construction site on the campus should have the lowest traffic with NUS students and staff security guards in place.

Circulation of the construction traffic will be separated from the gates and walkways regularly used by NUS students and staff.

Both the construction site and the temporary yard will be enclosed by temporary fence with limited access, with security guards to monitor the entry and exit of workers and construction vehicles and, also to prevent unauthorized third parties from entering to the site.

The construction work will be carried out in accordance with the ODA's Construction Safety Management Guidance, which requires the use of scaffolding for height work, handrails for fall prevention and safety belts, as well as the establishment of a safety management routine and emergency communication system.

2-4 Obligations of Recipient Country

The Project will be implemented as the Japanese Grant Aid, and the Samoa side will be responsible for the following undertakings.

(1) Items Related to the Construction Work

- Secure the lot of land necessary for the Project
- Level the ground of the project site
- (Including removal of existing trees and fence dividing the project site from the main campus)
- Install power and water supply distribution lines to the project site
- Connect between the new building and existing network, and establish system for telephone and local area network (LAN)
- Environmental clearance and acquisition of building permit
- Landscape work around new building

(2) Items Related to the Equipment Procurement

- Transfer existing equipment and furniture from existing building to new building
- Procure furniture and equipment not covered by the Japanese side

(3) Items Related to Operation and Maintenance

- Procure consumables and spare parts
- Utilize and maintain the project facilities and equipment with appropriate human resource

(4) Items Related to Administrative Procedures

- Commissions for the Banking Arrangement (B/A), payment to contractors, and Authorization to Pay (A/P) and amended A/P
- Acquire necessary consent and/or permission for the project implementation
- Prompt customs clearance and tax exemption of the construction material and equipment imported for the Project
- Exempt customs duties, internal taxes and other fiscal levies which may be imposed in Samoa for the Project
- Necessary arrangements for the Japanese nationals and parties concerned from third country to enter into and stay in Samoa for the Project
- All necessary expenses, other than those covered by the Government of Japan under the Grant Aid Scheme

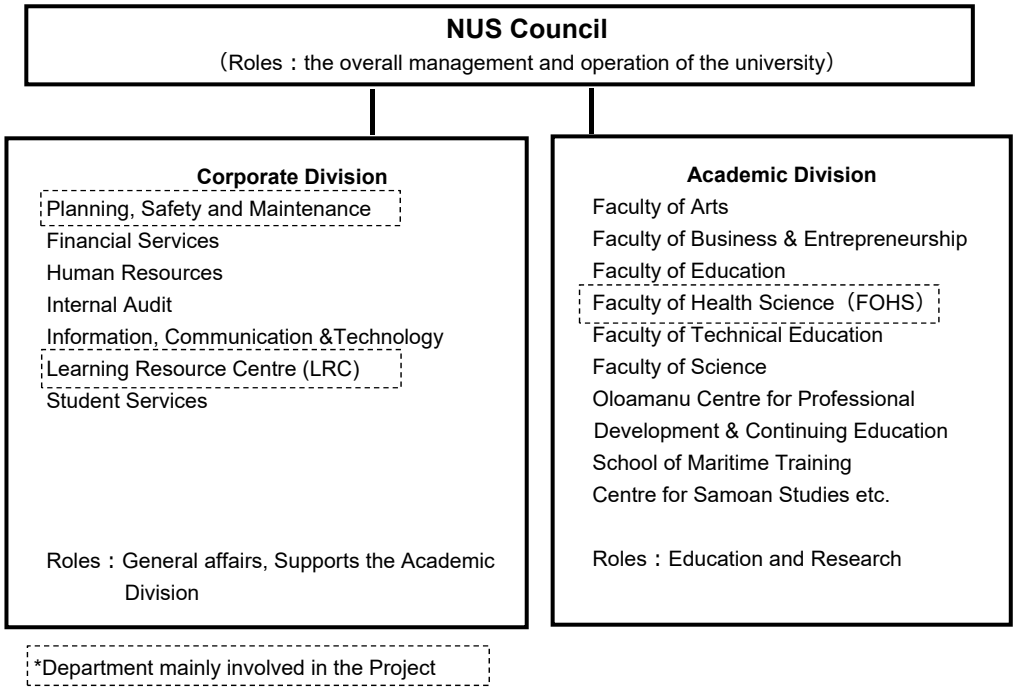
2-5 Project Operation Plan

2-5-1 Operation and Maintenance Plan

(1) Operation Structure

The mission of NUS is to provide high-quality education, conduct high-quality research, and develop high-quality human resources. The organizational structure of NUS consists of the NUS Council, Corporate Division, and Academic Division that facilitates the development of the university and maintains and improves the level of education. The Council manages the overall operation of the university, the Academic Division is responsible for education and research, which are the most important activities of the university, and the Corporate Division supports the Academic Division by handling the general affairs of the university. Table below shows the operational organizational structure of NUS and the roles of each organization in the structure.

Table 39 Operational Organizational Structure of NUS



In the Project, a new building will be constructed on the existing main campus of NUS and equipment will be procured and installed in the new building. FOHS in the Academic Division and LRC in the Corporate Division are expected to operate the new building and equipment. The Planning, Safety and Maintenance Department of the Corporate Division shall coordinate various matters concerning the implementation of the Project.

(2) Staffing Plan

FOHS is planning to increase the number of teaching staff in order to resume the Bachelor of Health Science Programme of SON, which has been temporarily suspended, and to start the graduate programmes (the Master of Medicine in Intensive Care and the Master of Medicine in Obstetrics and Gynecology)[17]. Also, two new librarians will be employed in LRC.

Table below shows the staffing of FOHS and LRC at the time of the opening of the new building based on the staffing plan of NUS.

Table 40 Staffing of FOHS and LRC at Present and at Opening of New Building

	Teaching staff	At Present		At Opening of New Building		Increment	
		SOM/ Total 33	SON/ Total 10	SOM/ Total 41	SON/ Total 13	SOM/ 8	SON/ 3
FOHS	Dean	-	1	-	1	-	-
	Head of School	1	- (cum Dean of FOHS)	1	- (cum Dean of FOHS)	-	-
	Professor	1	-	1	-	-	-
	Senior Lecturer	2	1	4	2	2	1
	Lecturer	1	8	3	10	2	2
	Pre-clinical Lecturer (part-time)	4	-	5	-	1	-
	Pre-clinical and Clinical Lecturer (part-time)	3	-	4	-	1	-
	Clinical Lecturer (part-time)	10	-	11	-	1	-
	Honorary Senior Clinical Lecturer	11	-	12	-	1	-

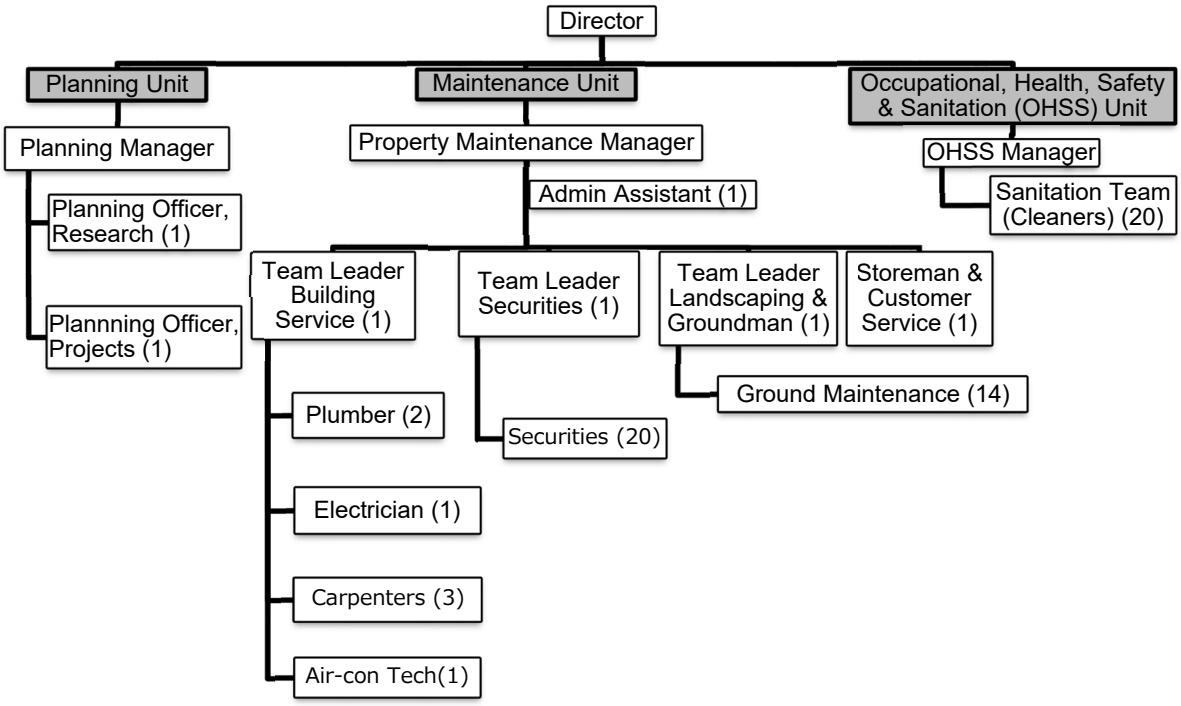
	Staff	At Present	At Opening of New Building	Increment
		LRC/ Total 11	LRC/ Total 13	LRC/ 2
LRC	Librarian	1	3	2
	Assistant Librarian	2	2	-
	Senior Library Assistant	1	1	-
	Library Assistant	7	7	-

(3) Maintenance System

1) Facilities

The Planning, Safety and Maintenance Department of the NUS is responsible for maintenance and repair work of facilities on the campus in the event of damage and/or malfunction. The organization chart for the Planning, Safety and Maintenance is shown as below;

[17] The educational functions of FOHS to be developed in this project are those for providing education in SOM and SON in accordance with the current curricula. As an introduction of a new curriculum is not considered in the plan, it is deemed that FOHS would be able to maintain the functions with the current staffing.



Note: A number in bracket represents the number of staff in the position

Figure 9 Organization Chart for Planning Safety and Maintenance Department, NUS

Maintenance routine at the NUS is carried out by the engineers/technician in charge of electricity, air conditioning, water supply and drainage, and the wooden work respectively.

The maintenance of other equipment that cannot be handled by the Planning, Safety and Maintenance Department, such as generators, lifts and pumps, are outsourced.

The basic flow for repair work in case of malfunction of buildings and/or equipment is as follows;

1. A user finds the trouble and contacts the Planning, Safety and Maintenance Department by e-mail or telephone.
2. A technician from the department is sent to check the condition. If a cause cannot be identified by the technician, condition check is outsourced to an agent or a supplier.
3. If the work is to be outsourced, a quotation is obtained and a repair plan is prepared. A budget for the repair work needs to be approved prior to outsourcing. In the case of minor works, plans and specifications for outsourcing are prepared by the Planning, Safety and Maintenance Department.
4. After approval, the repair work is contracted out.

2) Equipment

In principle, the equipment to be procured in the Project shall be maintained by the end-users, namely, the teaching staff of NUS. However, repairs in the case of equipment failure will be handled by the

biomedical technicians of TTM Hospital, with which NUS has concluded an MOU on equipment maintenance. If they cannot repair the equipment, they will contact a certified agent for the equipment in Samoa or a neighbouring country and either receive technical advice remotely and repair it by themselves or ask the agent to dispatch an engineer to Samoa for the repair.

2-5-2 Maintenance Plan

(1) Facilities

The maintenance of facilities is categorized into two types: (i) daily cleaning and (ii) repair of parts from wear and tear, damage, and deterioration. The repair of facilities mainly consists of the renovation and restoration of the interior and exterior finish on the structure. Facilities should be refurbished every decade to retain their functions. Items for regular inspection and repair which affect the lifespan of facilities will be presented in the maintenance manuals submitted by the contractor at the commissioning of the facilities. Detailed inspection and cleaning methods will be also explained.

Regular inspection points are summarized in the table below.

Table 41 Summary of regular inspection points of facilities

	Inspection and maintenance points	Frequency
Exterior	Restore and repaint exterior walls	Repaint every 3 years;
	Inspect and restore roofs	Inspection every 3 years; Restoration every 10 years
	Clean gutters and surrounding drains regularly	Every month
	Inspect and repair exterior door and window seals	Every year
	Inspect and clean ditches, manholes, etc.	Every year
Interior	Renovate the interior	As necessary
	Restore and repaint partition walls	As necessary
	Replace ceiling materials	As necessary
	Adjust doors and windows to fit the openings	Every year
	Replace door handles, hinges, etc.	As necessary
	Periodical check for Elevator	Every 3 months

(2) Site Servicing

What is important to maintain systems of site servicing is daily preventive maintenance before there arises a need to repair defects and replace parts. Its lifespan can be extended by normal operation and daily inspection, lubrication, tune-up, cleaning, and repair. Daily maintenance can prevent defects and accidents.

Equipment such as water pumps need periodical inspection and maintenance. It is important for these kinds of equipment to have annual inspection. The general lifespan of major element of site servicing is shown below in the table below.

Table 42 Lifespan of Element of Site Servicing

	Equipment	Lifespan
Electrical installations	Distribution panel	20-30 years
	LED lamp	40,000 hours
	Emergency generator	30 years
Plumbing installations	Pump, pipe, and valve	15 years
	Tank	20 years
	Sanitary ware	25-30 years
Air-conditioning installations	Pipe	15 years
	Exhaust fan	20 years
	Air conditioner	10 years

(3) Equipment

The equipment to be procured in the Project shall be maintained by the teaching staff of NUS or the biomedical technicians of TTM Hospital. In the Project, the implementation of a soft component for equipment maintenance has been planned to enable the use of the procured equipment in good condition over a long period of time. The existing maintenance system will be strengthened by instructing the staff of NUS Planning, Safety and Maintenance about the importance of securing a budget for equipment maintenance, the importance of appointing a person in charge of equipment maintenance, and methods to create and update inventory lists.

2-6 Project Cost Estimation

2-6-1 Initial Cost Estimation

(1) Estimated Cost to Be Borne by the Government of Samoa

Estimated cost to be borne by the Government of Samoa during the project implementation is shown in Table below.

Table 43 Estimated Cost to be Borne by the Government of Samoa[18]

Item	Estimated cost (NZD)	Estimated cost (thousand JPY)
Level the ground of the project site (Including removal of existing trees and fence dividing the project site from the main campus)	38,834	3,073
Install water supply distribution pipes to the project site	75,474	5,971
Install power distribution line to the project site	140,371	11,106
Connect between the new building and existing network, and establish system for telephone and local area network (LAN)	175,688	13,900
Procure furniture not covered by the Japanese side	473,964	37,500
Procure equipment not covered by the Japanese side	166,835	13,200
Landscape work around new building	27,738	2,195
Environmental clearance	37,835	2,994
Acquisition of building permit	22,746	1,800
Cost to exempt customs duties, internal taxes and other fiscal levies which may be imposed in Samoa for the Project	4,415,752	349,374
Commissions for payment to contractors, and issuance of Authorization to Pay (A/P) and amended A/P	27,136	2,147
Total	5,602,373	443,260

(2) Conditions for Estimation

Conditions for estimation are assumed as follows:

1) Estimating time: October 2021
2) Exchange rate: 1NZD = 79.120JPY, 1USD = 110.10JPY

- Construction and procurement period: See the project implementation schedule for the detail design, bidding and for construction and equipment works
- Other: The cost shall be estimated in accordance with Japanese Grant Aid Scheme

2-6-2 Operation and Maintenance Cost

(1) Operation and Maintenance Cost

Annual operation and maintenance cost of NUS increased by the Project is shown in the table below;

[18] Personnel cost to be secured for the Project is described in “5-2 Operation and Maintenance Cost”

Table 44 Estimated operation and maintenance cost for New Building (SAT per year)

Item		Expense when the new building starts operation (1) (SAT)		Personnel cost for current staff (2) (SAT)	Additional expense when the new building starts operation (3)=(1) – (2) (SAT)	(3) in JPY (thousand YEN) 1SAT=43.901YEN
Administration expense	1) Utility and communication cost	115,776	150,727	-	150,727	6,617
	2) Fuel cost	22,423				
	3) procurement cost of consumables for equipment	12,528				
Repairs & maintenance	4) Facility maintenance	35,600	41,295	-	41,295	1,813
	5) Equipment maintenance	5,695				
Personnel cost	6) Personnel cost	2,938,880 (1,630,667NZD)		2,016,188	922,692	40,507
Total		3,130,902 (1,737,212NZD)		-	1,114,714	48,937

8%[19] of price escalation in 2025 when operation of the new building will start is included.

【Basis of Calculation】

1) Utility and Communication Cost

a) Electricity

Based on the fact that capacity of the transformer for northern block of Le Papaigalagala Campus including the Faculty of Technical Education is 500KVA and electricity cost in the northern block for 6 months from March to August 2021 is 54,000SAT in total, the annual electricity cost for the new building, which will have a transformer with 250KVA in capacity is roughly calculated as follows;

54,000SAT x 2 times x 250KVA / 500KVA x 1.08 (inflation rate) ≈ 58,320 SAT

b) Water

Based on the fact that capacity of the receiving water tank for northern block of Le Papaigalagala Campus including Faculty of Technical Education is 30 m^3 and water cost in the northern block for 6 months from March to August 2021 is 31,000SAT in total, annual water cost for the new building, which will have a receiving water tank with 15m^3 is roughly calculated as follows;

31,000SAT x 2 times x 15m^3 / 30m^3 x 1.08 (inflation rate) ≈ 33,480 SAT

[19] Calculated based on inflation rates of consumer price in the world economic outlook database of IMF

c) Communication

IP Phone and LAN network of the new building will be available after NUS installs all necessary equipment and connects with the existing network on the campus. Based on the fact that annual internet charge for all activities at the NUS is approximately 222,000 SAT, and assuming a 10 % increase of internet charge for the new building, annual communication cost for the new building can be approximately calculated as follows;

222,000SAT x 10% x 1.08 (inflation rate) ≈ 23,976SAT

Therefore, total utility and communication cost will be
58,320 + 33,480 + 23,976 = 115,776 SAT per year

2) Fuel Cost

Operation cost for a diesel generator newly installed under the Project will be needed. Assuming 30 minutes operation a day on weekday during 1st and 2nd semester, the fuel cost is roughly calculated as follows;

32ℓ/h x 0.5 hours x 240 days x 3NZD/ℓ x 1.08 ≈ 22,423SAT per year

Where it is assumed that the fuel consumption of the generator is 32L / hour, operation time a day is 0.5 h, total duration 1st and 2nd semester is 240 days, and inflation rate is 1.08.

3) Procurement Cost of Consumables for Equipment

The annual cost of the consumables of equipment of the Project are shown in the table below.

Table 45 Procurement Cost of Consumables for Equipment

Room	Major consumables	Procurement cost of consumables for equipment	
		SAT	JPY(thousand YEN) 1SAT=43.901YEN
Simulation room	Wetting agent, pseudo blood, face sheet, pseudo skin, etc.	3,417	150
Medical Laboratory 1	Oil, centrifugal tubes etc.	2,277	100
Medical Laboratory 2 （Equipment to be procured by the Samoa side）	Reagents, HEPA filter etc.	6,834	300
	Total	12,528	550

4) Facility Maintenance

a) Architectural Repair Cost

Although the building repair cost varies each year, the annual average cost for the first 10 years from the completion of the facilities is assumed to be equal to 0.1%[20] of the construction cost of finishing works.

8,300SAT per year

b) Site Servicing Repair Cost

Although the cost is rarely incurred for the first five years from the completion of the facilities, the frequency of replacement of spare and defective parts can increase after that. The annual average site servicing repair cost for the first 10 years is assumed to be equal to 0.2%[21] of the building equipment that needs to be replaced.

11,300SAT per year

c) Elevator Maintenance Cost

Regular maintenance (preferably once a 4 months) is needed to secure safe operation of the elevator.

7,200SAT per year

d) Septic Tank maintenance Cost

Regular maintenance (preferably once a 4 months) is needed to secure long life of the septic tank.

8,800SAT per year

Therefore, total facility maintenance cost will be

8,300+ 11,300 + 7,200 + 8,800 = 35,600 SAT per year

5) Equipment Maintenance

Average equipment repair cost per year is shown in the table below;

Table 46 Average Equipment Repair Cost per Year

Room	Repair cost (including periodical check and calibration, etc.)	
	SAT	JPY(thousand YEN) 1SAT=43.901YEN
Medical Laboratory 2 (Equipment to be procured by the Samoa side)	2,278	100
Lecture theatre	3,417	150
Total	5,695	250

[20] Average building repair cost for ten years is assumed to be 0.1% of the construction cost of finishing works, considering maintenance cost of similar buildings.

[21] Average building repair cost for ten years is assumed to be 0.2% of the construction cost of building equipment considering maintenance cost of similar buildings

6) Personnel Cost

As mentioned in "4.1 Project Operation Plan," the current number of teaching staff will be maintained in order to appropriately use the facilities to be developed and the equipment to be procured in the Project, and to improve the quality of health and medical education. In addition, new teaching staff of FOHS will be employed for the planned resumption of the Bachelor of Health Science Programme and the start of the graduate programmes at the time of opening the new building. Also, two new librarians will be employed in LRC. Personnel cost is expected to increase due to the employment of new staff.

Table 47 Personnel Costs for FOHS & LRC

Teaching Staff	Salary (SAT/year)	At Present			At Opening of New Building				②−①
		SOM	SON	Total (SAT) ①	SOM	SON	Inflation Rate	Total (SAT) ②	
Dean	95,610	0	1	95,610	0	1	1.08	103,258	
Head of School	92,980	1	0	92,980	1	0	1.08	100,418	
Professor	104,427	1	0	104,427	1	0	1.08	112,781	
Senior Lecturer	72,730	2	1	218,190	4	2	1.08	471,290	
Lecturer	53,624	1	8	482,616	3	10	1.08	752,880	
Pre-clinical Lecturer (part-time)	23,833	4	0	95,332	5	0	1.08	128,698	
Pre-clinical and Clinical Lecturer (part-time)	23,833	3	0	71,499	4	0	1.08	102,958	
Clinical Lecturer (part-time)	23,833	10	0	238,330	11	0	1.08	283,136	
Honorary Senior Clinical Lecturer	26,322	11	0	289,542	12	0	1.08	341,133	
Total		33	10	1,688,526	41	13	-	2,396,552	708,026

Staff	Salary (SAT/year)	At Present		At Opening of New Building			②−①
		LRC	Total (SAT) ①	LRC	Inflation Rate	Total (SAT) ②	
Librarian	87,248	1	87,248	3	1.08	282,683	
Assistant Librarian	53,624	2	107,248	2	1.08	115,827	
Senior Library Assistant	22,069	1	22,069	1	1.08	23,834	
Library Assistant	15,871	7	111,097	7	1.08	119,984	
Total		11	327,662	13	-	542,328	214,666

Thus, table above reveals the following estimated increase in personnel cost:

708,026 + 214,666 = 922,692 (SAT).

(2) Feasibility of Budget Allocation to the Operation and Maintenance

Expense of NUS from FY2015/16 to FY2019/20 is shown in the table below. It has increased by 18 %, 4.5 % of average annual increase compared to FY2015/16.

Table 48 Expense of NUS in the past 5 years

(Currency : SAT)

Item	FY2015/16	FY2016/17	FY2017/18	FY2018/19	FY2019/20
Administration expense	4,444,464	6,155,140	6,066,686	6,100,870	4,700,805
Audit fee	38,678	26,367	29,545	35,997	28,349
Depreciation	2,656,006	2,933,245	3,022,150	3,168,605	3,331,354
Repairs & maintenance	407,238	393,944	379,220	294,201	417,264
Software upgrade/fees	137,086	214,359	304,250	303,323	292,703
Personnel cost	14,572,639	15,559,913	15,852,749	16,966,213	17,498,291
Total	22,256,111	25,282,968	25,654,600	26,868,209	26,268,766

Also, expense estimation of NUS until FY2024/25 is anticipated in the CORPORATE PLAN 2021/22-2024/25 as shown in the table below. It is planned to increase by 18% from FY2019/20 to FY 2024/25, 4.2 % of average annual increase compared to FY2015/16.

Table 49 Expense Estimation of NUS

(Currency : SAT)

Item	FY2019/20	FY2020/21	FY2021/22	FY2022/23	FY2023/24	FY2024/25
Administration expense	4,700,805	5,024,941	5,099,999	5,200,000	5,400,000	5,400,000
Audit fee	28,349	35,000	35,000	35,000	40,000	40,000
Depreciation	3,331,354	3,331,354	3,331,354	3,331,354	3,400,000	3,400,000
Repairs & maintenance	417,264	458,990	504,889	555,378	555,378	610,916
Software upgrade/fees	292,703	351,244	421,492	505,791	520,000	572,000
Personnel cost	17,498,291	19,402,761	19,790,816	20,186,632	20,590,365	21,002,172
Total	26,268,766	28,604,290	29,183,550	29,814,155	30,505,743	31,025,088

Regarding items related to the annual operation and maintenance cost added by the Project, additional operation and maintenance cost for the new building in 2025 calculated above, forecasted total expense of NUS in FY 2025/26 calculated by adding 4.2 % of amount in FY2015/16 to that of FY2024/25, and increased amount from FY2015/16 to FY2025/26 are shown in the table below for comparison.

Table 50 Comparison between Additional Expense to O&M of New Building and Expense Estimation

(Currency：SAT)

Item	FY2019/20 ①	FY2025/26 ②	③＝②-①	Additional annual operation and maintenance cost for the new building ④	④/③
Administration expense	4,700,805	5,626,800	925,995	150,727	0.16
Repairs & maintenance	417,264	636,574	219,310	41,295	0.19
Personnel cost	17,498,291	21,884,263	4,385,972	922,692	0.21

Judging from the table above, NUS well anticipates for the additional annual operation and maintenance cost for the new building.

CHAPTER 3. PROJECT EVALUATION

3-1 Preconditions

The new building to be constructed on the campus of NUS in the Project is included in the Campus Master Plan of NUS, which means that there are no preconditions concerning the acquisition of the project site that require difficult coordination, except that NUS needs to remove the trees and fences on the project site and level the site without delay.

The acquisition of an environmental permit and a building permit is an important precondition for the construction work. NUS needs to begin the procedures for the acquisition of an environmental permit before the commencement of the Project to facilitate implementation. Concerning the environmental permit, in a predecessor project to the Project that NUS was planning to implement by itself, an initial environmental assessment report was prepared and submitted to the Ministry of Natural Resources and Environment. The ministry approved the report. The environmental permit for the Project is expected to be obtained by updating this assessment report.

Furthermore, NUS needs to take the necessary taxation measures and extend the power and water supply infrastructure in line with the progress of the construction work.

NUS needs to appropriately and promptly implement all of the work assigned to the Samoa side in the agreement between the Governments of Japan and Samoa. It is important that the first step taken by NUS is to secure a budget for the implementation of each assigned work.

3-2 Necessary Inputs by Recipient Country

The Samoa side needs to fulfil the following requirements for the realization and maintenance of the effects of the Project.

(1) Appropriate Staffing

As mentioned in “4-1 (2) Staffing Plan,” the educational functions of FOHS to be developed in the Project have the purpose of providing education in SOM and SON in accordance with the current curricula. FOHS needs to maintain functionality with the current or more than staffing when the use of the new building begins, as there has been no consideration regarding the introduction of a new curriculum in the plan. In addition, the number of librarians in LRC to be increased by two as planned.

(2) Allocation of Operating Budget to FOHS

NUS needs to allocate the budget for personnel cost and the expenses for electricity, water, and communications that are required for the operation of the new building from within its own budget, which is mainly sourced from tuition fee revenue and government grants. NUS needs to ensure the stable and continuous allocation of the budget to cover the maintenance cost estimated in “5-2 (1) Operation and Maintenance Cost” to FOHS.

(3) Procurement of Equipment and Furniture not Included in Scope of the Japanese Side

The Samoa side needs to procure the necessary equipment and furniture not included in the scope of the Japanese side, especially in LRC including the library, in the new building. The Samoa side will be able to begin using the new building smoothly after the completion of the construction work by the Japanese side by procuring the equipment and furniture without delay.

3-3 Important Assumptions

(1) Spread of COVID-19 and Control Measures of the Government of Samoa

COVID-19 cases had been reported since March 2022 in Samoa, and commercial flights to Samoa had been cancelled. Unless the project team members can travel to and work in Samoa as planned and the construction equipment and materials can be imported into Samoa, it will not be possible to implement the Project.

(2) Continued Implementation of the Policy for Human Resource Development in the Health Sector in Samoa

The Government of Samoa is expected to continue implementing the policy of developing human resources in the health sector, e.g., increasing and improving the quality of the health workforce, mentioned in SHWDP and SHRHS of MOH.

(3) Increased Budget Allocation to Higher Education

The Government of Samoa has been allocating approx. 19 % of the national budget to the education sector, as the government recognizes the sector as a priority sector for national development. Sustaining the effects of the Project will require reliable budget allocation for the operation and maintenance of the new building and equipment. Therefore, the government is expected to manage stably national finances, continue allocating a sufficient budget to the education sector, increase the budget allocation to higher education for its expansion, and ensure appropriate budget allocation to higher education in the long term.

3-4 Project Evaluation

3-4-1 Relevance

The relevance of the Project is evaluated as follows:

(1) Beneficial Effects of Project

Students and teaching staff of FOHS (approx. 380 and 40 persons, respectively, as of October 2021) are expected to benefit directly from the Project. The beneficiary students include not only Samoan students but also students from the Solomon Islands and Tokelau where there are no medical schools. As the Project is expected to alleviate the shortage of classrooms and expand the functions of LRC, which is also to be

used by students of other faculties, all NUS students and teaching staff are expected to benefit indirectly from the Project.

The people of Samoa and those in the Solomon Islands and Tokelau are expected to benefit from the implementation of the Project through services provided by the health workers trained in FOHS.

(2) Project Purpose and Urgency of Implementation

The Project will contribute to the improvement of human resource development in the health sector, which is highlighted in the "Health Sector Plan 2019/20-2029/30" of MOH, by improving the educational functions of FOHS through the construction of a building and the provision of equipment.

FOHS is the only public educational institution for human resource development in the health sector in Samoa. However, the existing buildings of FOHS are very old and deteriorated. FOHS does not have sufficient simulators or equipment to provide appropriate simulation training, and some of the existing equipment is not functioning properly. As the deterioration of the quality of health education derived from this inappropriate educational environment is a pressing issue in the promotion of the health policy of the Government of Samoa, the Project needs to be implemented urgently.

(3) Contribution to Achievement of Goals in the Mid-Long-term Development Plan

The Government of Samoa has the over-riding vision in the Pathway for the Development of Samoa 2021/22-2025/26, "Nurture growth that benefits all of our people," also emphasizes importance of human development. In line with the vision, plans for health and education sector are positioned as measures for responding to future needs and strengthening human resources in Samoa.

The Project shall contribute to the achievement of this long-term developmental goal by improving the quality of human resource development in the health sector.

(4) Consistency with Assistance Policy and Strategy of Japan

Based on the basic policy of the Country Assistance Policy for Samoa, namely, "To achieve sustainable and environment-friendly economic growth and improvements in living standards," the Government of Japan (GOJ) assists in the development of infrastructure and human resources that support social development for the stable and sustainable development of Samoa.

GOJ has been assisting Samoa in improving the quality of education in the education sector and the improvement of health services, including human resource development, in the health sector to "Reduce Vulnerability (a priority area of the country assistance policy)." Moreover, GOJ has defined, "COVID-19 Response and Recovery" as one of the priority areas of cooperation in the Leaders' Declaration endorsed at the 9th Pacific Islands Leaders Meeting (PALM 9) held in July 2021, and stressed its intention to provide assistance to strengthen health care systems in light of the impact of COVID-19. As the Project is consistent with the above-mentioned policies of GOJ, the relevance of the assistance in the

Project is evaluated as high.

3-4-2 Effectiveness

The implementation of the Project is expected to produce the following effects.

(1) Quantitative Effects

Table 51 Quantitative Effects

Indicator	Baseline value 2021	Target value 2028
1)Area of medical laboratory and Simulation room per student at FOHS (m^2/person)	1.00 (m^2/person)	1.64 (m^2/person)
2)Number of hours per year of experiments and simulation training conducted by FOHS[22] during normal operating hours (8:00 a.m. to 5:00 p.m.) (hours)	SOM: 462 (hours) 73% of total time stipulated in the curriculum	SOM: 630 (hours) 100% of total time stipulated in the curriculum
	SON: 448 (hours) 76% of total time stipulated in the curriculum	SON: 588 (hours) 100% of total time stipulated in the curriculum
3)Number of hours per year of joint lectures (for about 100 students) conducted in large classrooms on Bachelor of nursing and Diploma of nursing programmes at SON[23] (hours)	126 (hours) 33% of total time stipulated in the curriculum	378 (hours) 100% of total time stipulated in the curriculum

(2) Qualitative Effects

- The procurement of medical simulators and examination equipment required for the implementation of the curricula shall improve the quality of education in FOHS, NUS.
- The establishment of a library shall improve the learning environment for the students of FOHS with improved access to the latest scientific papers.
- Improvement of the quality of education including practical training shall enhance the human resource development of FOHS, NUS

<u>Setting of Baselines and Targets</u>

1) Area of medical laboratory and simulation laboratory per student at FOHS

Currently, FOHS has only old laboratory and simulation room at the Moto'otua Campus, and SON at the Le Papaigalagala Campus is forced to use other faculty laboratories and general lecture rooms instead, which means that only a limited number of experiments and practical training are conducted, and activities

[22] Experiments and simulation training for 1st year to 5th year of MBBS programme at SOM, and 1st year to 3rd year of nursing programme at SON are included.

[23] Joint lectures for 1st and 2nd year of nursing and diploma nursing programmes at SON are included.

using the laboratory and simulation room stipulated in the curriculum are not sufficiently carried out. The baseline value for the area of laboratories and simulation rooms per student at FOHS (m^2/person) is 1.00 (m^2/person).

Assuming that the new building will be equipped with the medical laboratory and simulation room after the implementation of the Project, and that the FOHS curriculum can be delivered as planned, the total area of the existing facilities at the Moto'otua Campus and the relevant rooms in the new building at the Le Papaigalagala Campus will reach the target value of 1.64 (m^2/person).

Calculation of area of medical laboratory and simulation room per student at FOHS (m^2/person)
(Baseline value) ・272.32 m^2 / 271 persons = 1.00 (m^2/person) ・Number of persons/number of students enrolled in FOHS 271 (Average for the past 5 years) Bachelor of Nurse 207, Diploma of Nurse 28, PG Nurse 6, MBBS 30 ・Area 272.32 m^2 = 103.32 m^2 (Area 1) + 169 m^2 (Area 2) **(Target value)** ・445.32 m^2 / 271persons = 1.64 (m^2/person) ・Number of persons/number of students enrolled in FOHS 271 (Average for the past 5 years) Bachelor of Nurse 207, Diploma of Nurse 28, PG Nurse 6, MBBS 30 ・Area 445.32 m^2 = 103.32 m^2 (Area 1) + 342 m^2 (Area 3)
Area 1* : Area of existing laboratory and simulation room at the Moto'otua Campus. ---103.32 m^2 = laboratory (65 m^2) + simulation room (38.32 m^2) Area 2** : The area of other faculty laboratories and general lecture rooms currently substituted by SON at the Le Papaigalagala Campus. The area of the general lecture room used as a simulation room is the average of four lecture rooms for SON. ---169 m^2 = laboratory (78 m^2) + simulation room (lecture room) (91 m^2) Area3*** : Area of medical laboratory and simulation laboratory of new school building. ---342 m^2 = medical laboratory (148 m^2) + simulation laboratory (194 m^2)

2) Number of hours per year of experiments and simulation training conducted by FOHS during normal operating hours (8:00 a.m. to 5:00 p.m.)

The existing laboratory and simulation room at the FOHS are insufficient in terms of number and size to accommodate all the curriculum contents during regular operating hours (8:00 am to 5:00 pm), and some contents are conducted outside of regular hours.

Of the experiments and simulation training conducted by SOM, 462 hours per year are currently spent on regular operations (8am to 5pm) and 448 hours on SON.

After the implementation of the Project, it is expected that all the courses will be conducted within the regular timetable by utilizing the medical laboratory, simulation room and new equipment in the new building, so the target value is 630 hours for SOM and 588 hours for SON as the total number of hours per year for experiments and simulation training as specified in the curriculum.

Table 52 Number of hours per year of experiments and simulation training conducted by the SOM

Year	Course name	Number of hours per week (hours/week)	
		experiments	simulation training
1 year	HMS115 Biochemistry and Genetics	1	0
	HMS116 Microbiology and Immunology	2	0
	HMS121 Pathology	2	0
2 year	HMS200 Musculoskeletal System	2	0
	HMS201 Cardiovascular System	2	0
	HMS202 Respiratory System	2	0
	HMS203 Genitourinary System	2	0
	HMS204 Nervous System	2	0
	HMS205 Gastrointestinal System	2	0
3 year	HMS300 Metabolism, Nutrition and Regulation of Body Functions	2	0
	HMS301 Blood and Haematological Diseases	2	0
	HMS302 Endocrine System	2	0
	HMS303 Reproduction, Aging and Development	2	0
	HMS304 Special Senses	2	0
	HMS305 Immunity and Infection	2	0
4 year	HMS400 Internal Medicine Clinical Attachment	0	2
	HMS401 Surgery Clinical Attachment	0	2
	HMS402 Primary Health Care Clinical Attachment	0	2
	HMS403 Psychiatry Clinical Attachment	0	2
5 year	HMS500 Obstetrics and Gynaecology Clinical Attachment	0	2
	HMS501 Paediatric Clinical Attachment	0	2
	HMS502 Emergency Medicine and Anaesthesia Clinical Attachment	0	2
	HMS503 Specialties Clinical Attachment	0	2
Subtotal		29	16
Total---(A)		45 hours/week	
Number of hours per year ((A)x14) [24]		630 hours	

[24] A course is basically conducted semester-wise. A semester comprises of 14 weeks.

Table 53 Number of hours per week of experiments and simulation training conducted by the SON

Year	Course name	Number of hours per week (hours/week)	
		experiments	simulation training
1 year	HNS161ANATOMY AND PHYSIOLOGY	4	0
	HNS163INTRODUCTION TO PSYCHOLOGY	3	0
	HNS166NURSING PRACTICE 1	0	8
2 year	HNS253NURSING PRACTICE 2	0	4
	HNS254MENTAL HEALTH AND MENTAL ILLNESS	0	6
	HNS255PHARMACOLOGY IN NURSING	3	0
	HNS262NURSING PRACTICE 3	0	2
	HNS263PRIMARY HEALTHCARE	0	3
3 year	HNS351REPRODUCTIVE HEALTH	0	3
	HNS353NURSING PRACTICE 4	0	2
	HNS365NURSING PRACTICE 5	0	4
	Subtotal	10	32
	Total---(A)		42 hours/week
	Number of hours per year ((A)x14)		588 hours

Calculation of number of hours per year of experiments and simulation training conducted by FOHS during normal operating hours (8:00 a.m. to 5:00 p.m.) (hours)

(Baseline value)

SOM 462 hours (Hours 1)

SON 448 hours (Hours 2)

The baseline value is the total number of hours per year for experiments and simulation training at SOM and SON as specified in the curriculum deducted by the number of hours per year when experiments and simulation training are conducted outside of normal operating hours.

(Target value)

SOM 630 hours

SON 588 hours

The target value is the total number of hours per year for experiments and simulation training at SOM and SON as specified in the curriculum.

Hours 1 : At SOM, the total number of hours per year for experiments and simulation training specified in the curriculum deducted by the number of hours per year when experiments and simulation training are conducted outside of normal operating hours * (630-168=462)

*Number of hours per year conducted outside of normal operating hours for SOM, 168 hours

- Number of hours conducted outside of normal operating hours in order to secure experiment time due to the number of students exceeding the capacity of the existing laboratory space and/or available equipment = 56 hours
- Number of hours conducted outside of normal operating hours due to the number of students exceeding the capacity of the existing simulation room and/or available simulation equipment without substituted room and/or equipment = 112 hours

Hours 2 : At SON, the total number of hours per year for experiments and simulation training specified in the curriculum deducted by the number of hours per year when experiments and simulation training are conducted outside of normal operating hours * (588-140=448)

*Number of hours per year conducted outside of normal operating hours for SON ,140 hours

- Number of hours conducted outside of normal operating hours due to inability to use other faculty laboratories = 98 hours.
- Number of hours conducted outside of normal hours due to the number of students exceeding the capacity of the general classroom substituted for simulation room and/or available simulation equipment without substituted room and/or equipment = 42 hours.

3) Number of hours per year of joint lectures (for about 100 students) conducted in large classrooms on Bachelor of Nursing and Diploma of Nursing programmes at SON

SON has courses conducted jointly by the Bachelor of Nursing programme and Diploma of Nursing programmes and the number of students attending the courses exceeds 100, but presently the lecture rooms with a capacity exceeding 100 students is limited because they are shared with other faculties. This has been addressed by using semi-outdoor facilities on campus (Fale, a traditional Samoan building) and by dividing the class into multiple classes in general lecture rooms. Consequently, in addition to the difficulty in implementing the curriculum, securing teachers and classrooms and organizing the timetable has been a major burden. Currently, 126 hours of the SON courses jointly conducted by Bachelor of Nursing course and Diploma of Nursing course can be held in a large classroom annually.

After the implementation of the Project, the new building will have the lecture theatre which will be operated as a large classroom. Therefore, it is assumed that joint lectures will be appropriately implemented in terms of size and learning environment, the target value will be 378 hours in a year, which is the total number of hours per year for joint courses (classroom lectures) for Bachelor of Nursing and Diploma of Nursing programmes in the SON as specified in the timetable.

Table 54 Joint Lectures for Bachelor of Nursing and Diploma of Nursing courses in SON

Year	Course name	Number of hours per week (hours/week)	
		classroom lectures	practical training
1 year	HNS112 PRINCIPLES OF BODY FUNCTIONS	3	0
	HNS111/151CONCEPTS OF NURSING	3	0
	HNS121/161ANATOMY AND PHYSIOLOGY	3	4
	HNS125/165INTRODUCTION TO THE PROCESS OF NURSING	3	0
2 year	HNS251NURSING PROCESS AND CRITICAL REASONING 1	3	0
	HNS221/261NURSING PROCESS AND CRITICAL REASONING 2	3	0
	HNS223/263PRIMARY HEALTHCARE	3	3
	HNS224/264HEALTH AND ENVIRONMENT[25]	6	0
Total		27 hours/week	7 hours/week
Number of hours per year ((A)x14)		378 hours	98 hours

Calculation of number of hours per week of joint lectures (for about 100 students) conducted in large classrooms on Bachelor of Nursing and Diploma of Nursing programmes at SON

(Baseline value) 126 hours

Although there are deficiencies in the learning environment, the baseline value is 126 hours of joint lectures (classroom lectures) held in a semi-outdoor facility on campus (Fale, a traditional Samoan building).

(Target value) 378 hours

The total number of hours for the joint lectures of Bachelor of Nursing and Diploma of Nursing programmes in SON as specified in the timetable.

[25] HNS224/264 HEALTH AND ENVIRONMENT is conducted through a year spreading two semesters. Thus, three hours of classroom lecture necessary for the course per semester is multiplied by two.

Appendices

1. Member List of the Survey Team
2. Survey Schedule
3. List of Parties Concerned in the Recipient Country
4. Minutes of Discussions
5. Soft Component (Technical Assistance) Plan
6. Other Relevant Data
7. References

1. Member List of the Survey Team

1. Member List of the Survey Team

No.	Position	Name	Organization
1	Team Leader	Mr. HIRAOKA Hisakazu	JICA
2	Technical Advisor	Dr. ISONO Mitsuo	JICA
3	Technical Advisor	Dr. KANSAKU Rei	JICA
4	Program Coordinator	Mr. OTANI Kosuke	JICA
5	Chief Consultant / Facility Planning 1	Mr. KURODA Shingo	Yamashita Sekkei Inc.
6	Deputy Chief Consultant / Facility Planning 2	Mr. MOCHIZUKI Hiroaki	Yamashita Sekkei Inc.
7	Facility Design 1 / Natural Condition Survey	Mr. YOKOYAMA Motoharu	Yamashita Sekkei Inc.
8	Facility Design 2 / Utility Planning	Mr. YAMAMOTO Eisuke	Yamashita Sekkei Inc.
9	Construction Planning / Facility Cost Estimation 1	Mr. HIROOKA Hirotaka	Fukunaga Architects-Engineers
10	Equipment Planning / Operation and Maintenance Planning	Ms. ASANUMA Yasuko	Binko International Ltd.
11	Equipment Procurement / Cost Estimation	Ms. SAITO Rina	Binko International Ltd.
12	Health Sector Survey	Mr. SAWAI Kenji	Binko International Ltd.
13	Environment and Social Consideration / Facility Cost Estimation 2	Ms. SEYAMA Shoko	Fukunaga Architects-Engineers
14	Development Project Planning	Ms. Pisaina Leilua-Lei Sam	Yamashita Sekkei Inc.
15	Project Surveyor / Coordinator	Mr. TAKAZAWA Misao	Yamashita Sekkei Inc.

2. Survey Schedule

2. Survey Schedule

The survey was conducted in remote in collaboration with local survey members with an online conference system as the Japanese survey members were unable to enter Samoa due to closure of the international airport in Samoa because of the COVID-19 pandemic. The table below shows the main discussions with the Samoa side during the survey period.

1st survey : from 2nd August, 2021 to 12th October, 2021

Date	Discussion points	Paricipant		
		JICA	Samoa side	Consultant
2 Aug.	Kick-off meeting	○	○	○
3	MOD discussion	○	○	○
5	Ditto	○	○	○
12	Ditto	○	○	○
13	Ditto	○	○	○
17	Discussion on teaching and equipment plan		○	○
18	Ditto		○	○
19	Ditto		○	○
20	Ditto		○	○
23	Ditto		○	○
25	Ditto		○	○
31	MOD discussion	○	○	○
8 Sep.	Ditto	○	○	○
14	Technical note discussion (facility & equipment plan)		○	○
17	Ditto		○	○
28	Ditto		○	○
1 Oct.	MOD discussion	○	○	○
12	Technical note discussion (facility & equipment plan)		○	○

2nd survey (explanation on draft report) : from 9th March, 2022 to 15th March, 2022

Date	Discussion points	Paricipant		
		JICA	Samoa side	Consultant
9 Mar.	・Expalanation on draft report ・MOD discussion	○	○	○
10	MOD discussion	○	○	○
15	MOD discussion	○	○	○

3. List of Parties Concerned in the Recipient Country

3. List of Parties Concerned in the Recipient Country

No.	Organisations	Division	Position	Name
1	National University of Samoa (NUS)	NUS	Vice Chancellor & President	Aiono Professor Alec Ekeroma
		NUS	Deputy Vice Chancellor	Peseta Desmond Lee Hang
		Governance, Policy and Planning	Director	Martin Carey
			Project Manager	Eric Glen Groves
		Faculty of Health Science (FOHS)	Dean / Head of School of Nursing (SON)	Filipaina Amosa Lei Sam
		School of Medicine (SOM)	Head of School of Medicine (SOM)	Soi Sala Ma'atasesa Samuelu-Matthes
		Learning Resource Centre	Chief Librarian	Avalogo Nanai Togi Aifa'i Tunupopo
		Faculty of Health Science	Senior Lecturer of Nursing	Josie Abraham
		Faculty of Health Science	Senior Lecturer of Nursing	Ramona Boodoosingh
		Property Maintenance	Manager	Tuala Amerika Tuala
2	Ministry of Education and Sports and Culture (MESC)		Assistant Chief Executive Officer & Deputy Chief Executive Officer	Vau Peseta
		Curriculum and Assessment	Assistant Chief Executive Officer	Tuiloma Inipene Simanu
			Consultant / Advisor	Maria Elisaia
		Education Sector Coordination	Assistant Chief Executive Officer	Aida Faumui Savea
3	Ministry of Health (MoH)		Director General	Leausa Take Naseri
		Hospital & Clinical Services	Deputy Director General	Glenn Fatupaito
		Health Surveillance and Prevention	Deputy Director General	Robert Thomsen
4	Ministry of Foreign Affairs and Trade (MFAT)		Chief Executive Officer	Peseta Noumea Simi
		Bilateral Relations	Assistant Chief Executive Officer	Tagaloa Sharon Potoi Aiafi
			Principal Bilateral Officer	Angela Marie Ula
5	Ministry of Finance (MoF)	Aid Coordination & Debt Management	Assistant Chief Executive Officer	Peresitene Kirifi
			Principal Officer	Daniella Lio
			Senior Officer	Josephine Tumua-Neru
		Budget and Fiscal Policy	Assistant Chief Executive Officer	Abigail Rosemary Lee Hang
6	Ministry of Customs and Revenue (MCR)	Taxpayers Services	Assistant Chief Executive Officer	Auimatagi Michael Maua
			Principal Officer	Matilda Sakopo
		Legal and Technical Support	Principal Officer	Susana V.Tilialo
		Audit and Investigations	Principal Officer	George Mariner

No.	Organisations	Division	Position	Name
7	Ministry of Natural Resources and Environment (MNRE)		Chief Executive Officer	Frances Debra Brown Reupena
		Technical	Assistant Chief Executive Officer	Safuta To'elau Iulio
		Land Management	Assistant Chief Executive Officer	Manumaleuga Felisita Heather
		Water Resources	Flood Monitoring and Geohazard Assessment Specialist	Mafutaga Leiofi
8	Ministry of Commerce Industry and Labour (MCIL)	Apprenticeship Employment & Labor Market Division (AELM)	Assistant Chief Executive Officer	Sa'u Taupisi Faamau
		Registries for Companies and Intellectual Properties	Assistant Chief Executive Officer	Houlton Fa'asau
		International Relations Occupational Safety and Health (IROSH)	Assistant Chief Executive Officer	Albert Meredith
			Principal Officer	Jacinta Matulino
9	Ministry of Works, Transport and Infrastructure (MWTI)	Planning Urban Management Agency (PUMA)	Principal Sustainable Development Officer	John Sitagata
			Planning and Development Officer	Julie David
10	Ministry of Police, Prisons and Fire Service	Fire and Emergency Service Authority (SFESA) Fire Safety, Awareness and Prevention Services Department	Prevention Services Officer	Kueni Alatimu
11	World Health Organization (WHO)	WHO, Samoa	Health System Strengthening Officer	Dyxon Hansell
12	Oceania University of Medicine (OUM)		Vice Chancellor	Toleafoa Dr. Viali Lameko
13	Samoa Cancer Society (SCS)		Chief Executive Officer	Su'a John Ryan
14	Samoa National Kidney Foundation (SNKF)		Chief Executive Officer /General Manager (GM)	Mulipola Roger Hazelman

4. Minutes of Discussions

(1) 1st survey

Minutes of Discussions

on the Preparatory Survey for the Project for

Construction for Faculty of Health Science of National University of Samoa

In response to the request from the Government of the Independent States of Samoa (hereinafter referred to as "Samoa"), Japan International Cooperation Agency (hereinafter referred to as "JICA") organized the Preparatory Survey Team for the Outline Design (hereinafter referred to as "the Team") of the Project for Construction for Faculty of Health Science of National University of Samoa (hereinafter referred to as "the Project") to Samoa. The Team held a series of discussions with the officials of the Government of Samoa and conducted a field survey. In the course of the discussions, both sides have confirmed the main items described in the attached sheets.

Apia, October 7, 2021

HIRAOKA Hisakazu
Leader
Preparatory Survey Team
Japan International Cooperation Agency
Japan

Aiono Professor Alec Ekeroma
Vice Chancellor and President
National University of Samoa
Independent State of Samoa

Hon. Mr. Seuula Ioane Tuā'au
Minister
Ministry of Education Sports & Culture
Independent State of Samoa

ATTACHMENT

1. Objective of the Project

The objective of the Project is to improve the quality of education in the field of health care through construction of Faculty of Health Science Complex, Le Papaigalagala Campus and the improvement of the equipment at National University of Samoa (hereinafter referred to as "NUS"), thereby contributing to enhancing development of human resource for health.

2. Title of the Preparatory Survey

Both sides confirmed the title of the Preparatory Survey as "the Preparatory Survey for the Project for Construction for Faculty of Health Science of National University of Samoa

3. Project site

Both sides confirmed that the site of the Project is shown in Annex 1.

4. Responsible authority for the Project

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

4-1. NUS 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 managed by relevant authorities properly and on time. The organization charts are shown in Annex 2.

4-2. The line ministry of the Executing Agency is the Ministry of Education, Sports and Culture (hereinafter referred to as "MoE"). The MoE shall be responsible for supervising the Executing Agency on behalf of the Government of Samoa.

5. Items requested by the Government of Samoa

As a result of discussions, both sides confirmed that the items requested by the Government of Samoa are as follows:

5-1. Items requested by the Government of Samoa are described in Annex 3.

Construction of facilities Annex 3-1 Facility Plan

Procurement of equipment Annex 3-2 Equipment Plan

5-2. 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.

6. Procedures and Basic Principles of Japanese Grant

6-1. The Samoa side agreed that the procedures and basic principles of Japanese Grant (hereinafter referred to as "the Grant") as described in Annex 4 shall be applied to the Project.

As for the monitoring of the implementation of the Project, JICA requires Samoa side to submit the Project Monitoring Report that the form is attached as Annex 5.

6-2. The Samoa side agreed to take the necessary measures, as described in Annex 6, for smooth implementation of the Project. The contents of the Annex 6 will be elaborated and refined during the Preparatory Survey and be agreed in the mission dispatched for explanation of the Draft Preparatory Survey Report.

The contents of Annex 6 will be updated as the Preparatory Survey progresses, and eventually, will be used as an attachment to the Grant Agreement.

7. Schedule of the Survey

7-1. The Team will proceed with further survey in Samoa until the middle of October.

7-2. JICA will prepare a draft Preparatory Survey Report in English and dispatch a mission to Samoa in order to explain its contents around February 2022. Sending the mission may be substituted by remote meetings depending on the situation of COVID-19 pandemic.

7-3. If the contents of the draft Preparatory Survey Report is accepted and the undertakings for the Project are fully agreed by the Samoa side, JICA will finalize the Preparatory Survey Report and send it to Samoa around June 2022.

7-4. The above schedule is tentative and subject to change.

8. Environmental and Social Considerations

8-1. The Samoa 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:

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.

The Samoa side confirmed to conduct the necessary procedures concerning the environmental assessment (including stakeholder meetings, Environmental Impact

Assessment (EIA) /Initial Environmental Examination (IEE) and information disclosure, etc.) and make EIA/IEE report of the Project. The EIA/IEE approval shall be received from the responsible authorities and submitted to JICA before notice of the bidding documents.

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

Both sides confirmed necessity of maintenance and management guidance of facility and equipment namely 1) Guidance on the importance of maintenance system, 2) Guidance on development of maintenance system and improvement of management capacity and 3) Guidance on development and implementation of annual maintenance planning. These guidance shall be provided as "Soft Component" of the Project.

10. Other Relevant Issues

10-1 Both sides confirmed that the Project would prioritize improvement of education for Faculty of Health Science, NUS while NUS has a wide range of faculties and functions of education and research.

10-2 Further study by the Team will clarify the contents and details of the request e.g. facility design, area of each room, types of equipment and so on based on current and plan of education, number of expected students and staff, budget, and other operation and maintenance plan.

10-3 Ownership of the Project site, buildings, and other relevant facilities

NUS shall take necessary legal confirmation and procedures for site survey, removal of existing facilities and obstacles if necessary, construction work, and university management after the implementation of the Project under the control of NUS, by the timing that secures sufficient time for the Samoa side to execute their undertakings.

10-4 Consolidation of the Project site in one place

Originally Samoa side requested two Project sites; one in Le Papaigalagala Campus and the other Moto'otua Campus. As a result of discussions Samoa side requested to consolidate the Project sites in one place, Le Papaigalagala Campus, because of the efficient space utilization and possible financial arrangement by grant aid. Samoa side also requested to have enough space to secure functions that will be transferred from Moto'otua Campus to Le Papaigalagala Campus with preference to increasing the height of the building rather than making it wider and lower.

10-5 Arrangement for the transportation between two campuses

Regarding the facilities on the Moto'otua Campus, there are currently no other resources for development, so both sides confirmed the plan to utilize it as it is, for lectures, etc. It was confirmed that the Samoa side will handle the necessary arrangements for the transportation of students and lecturers between Moto'otsua Campus and Le Papaigalagala Campus when needed for practice at medical laboratory, simulation room to be located in Le Papaigalagala Campus.

10-6 Design of the laboratories

Samoa side requested medical laboratory should have Bio-Safety Level (BSL) 2 for research and teaching ambition in the future. JICA side explained that the main objective of the Project would be to improve education and the laboratory for research purpose would be less prioritized. JICA side understood that Samoa side requested the importance of this function of medical laboratory and the facility design including future expandability.

10-7 Exemption of custom duties, internal taxes and other fiscal levies

Both sides agreed that custom duty and Value Added Goods & Services Tax (VAGST) which may be imposed in Samoa will be borne by its designated authority without using the Grant. The Government of Samoa will take necessary measures for tax exemption, if any.

10-8 Securing the operation and sustainability

To secure the proper implementation and sustainability of the operation, the Samoa side would take necessary measures to secure 1) the human resources such as teaching staff, but also administrators and other supporting staff, 2) materials such as consumables and spare-parts and items that are not included under the Project, and 3) budget for operation and maintenance.

10-9 Gender Mainstreaming

Both sides confirmed that following gender elements shall be duly reflected in the scope of Preparatory Survey.

(a) Collection of information and gender disaggregated data for assessment of gender needs.

(b) Examination of gender-responsive measures based on the assessment, such as:

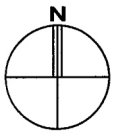
- ✓ Facility design that reflects gender-specific needs.
- ✓ Selection of equipment that reflects gender-specific needs and ensure usability by women.

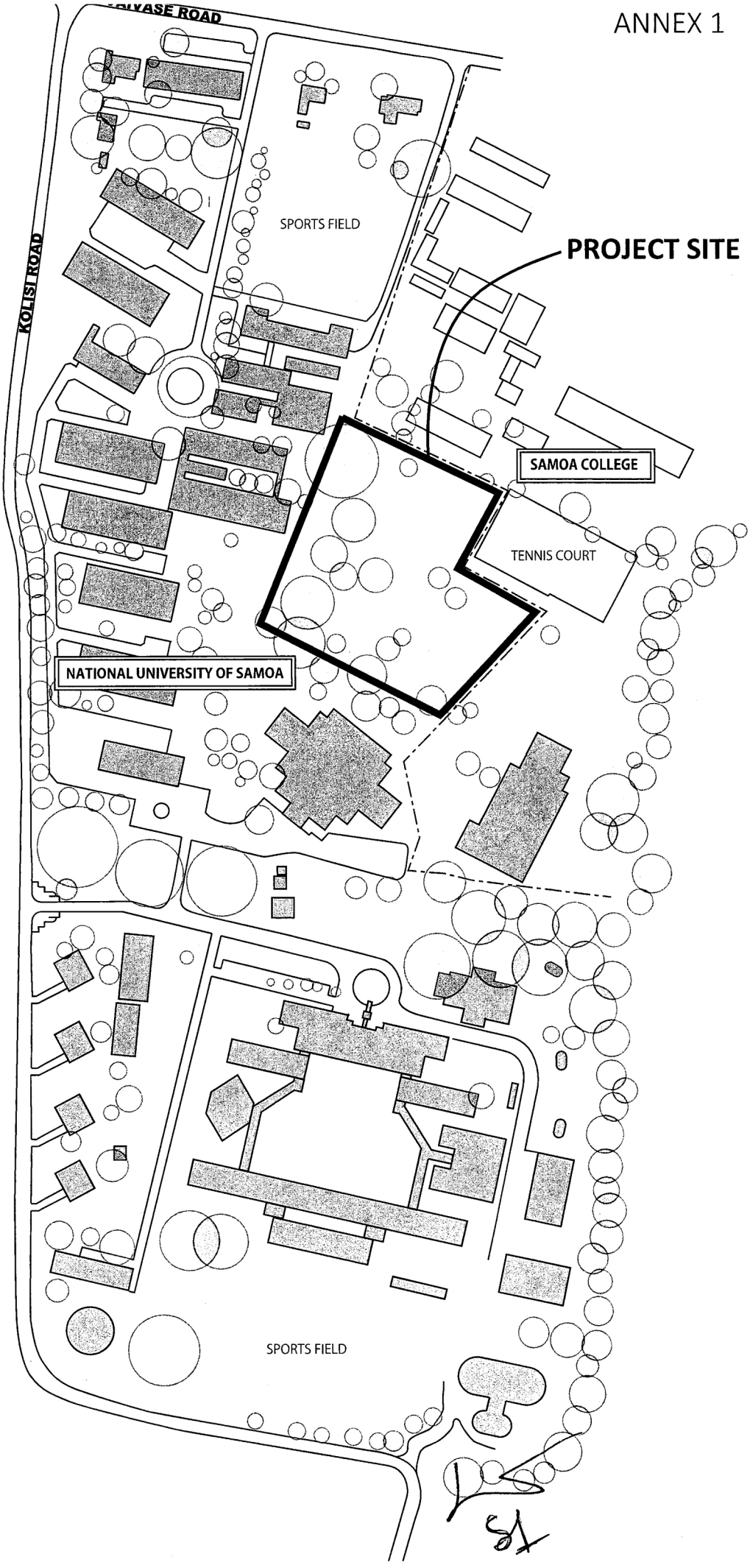
- ✓ Implementation of soft-component activities that promote women's empowerment.
- ✓ Collection of gender-disaggregated data for monitoring and evaluation (in case gender-related data is included in the indicators for project objective).

Annex 1 Project Site
Annex 2 Organization Chart
Annex 3 Item requested by Samoa side
  Annex 3-1 Facility Plan
  Annex 3-2 Equipment Plan
Annex 4 Japanese Grant
Annex 5 Project Monitoring Report (template)
Annex 6 Major Undertakings to be taken by the Government of Samoa

ANNEX 1

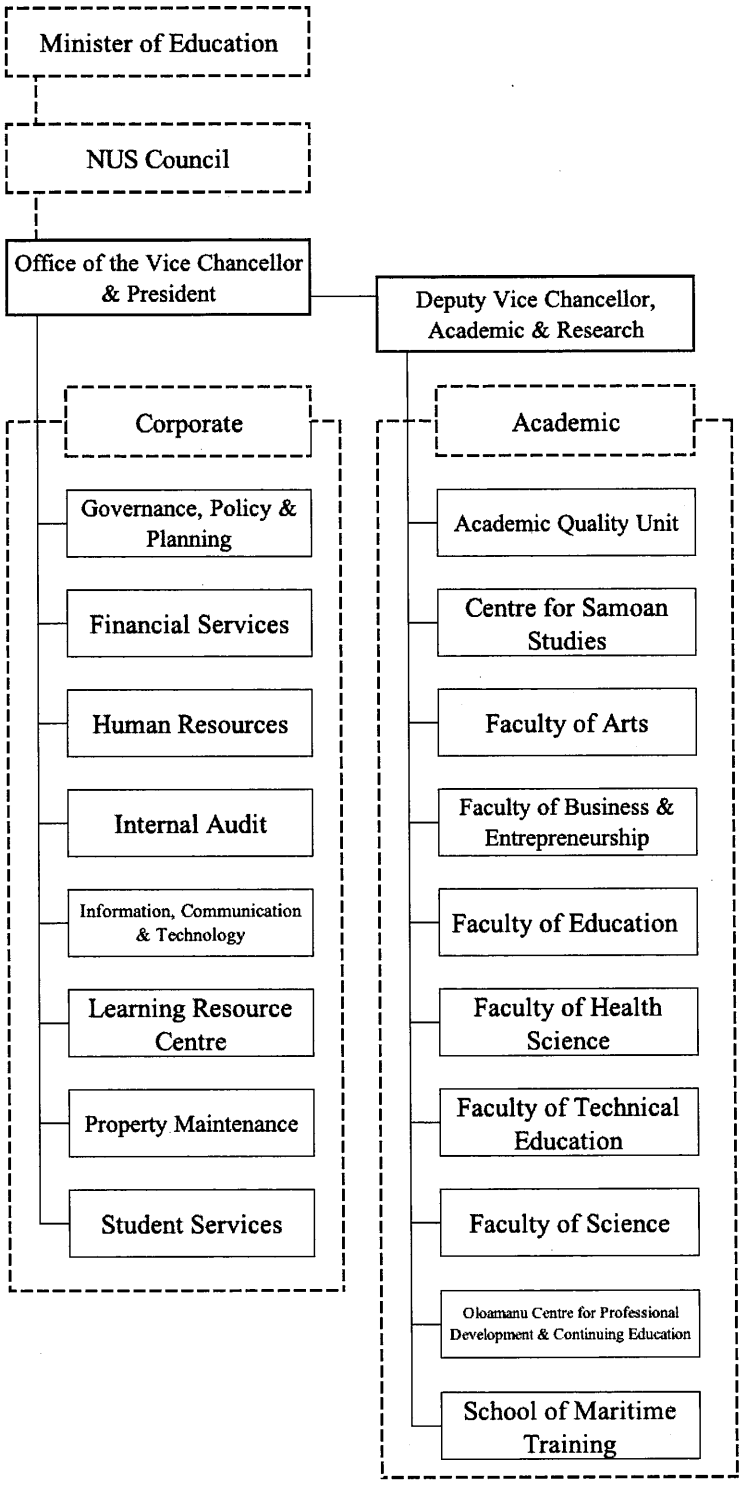
LE PAPAIGALAGALA CAMPUS





Annex 2

Organization Chart of National University Samoa



Annex 3-1

Facility Plan

Faculty of Health Science (FOHS) Complex, Le Papaigalagala Campus

Function	Room	Priority
Lecture, practice, administration	FOHS Staff Office	A
	Simulation Classroom	A
	Medical Laboratory	A
	Lecture Room	A
	Cafeteria	C
Learning Resource Center	NUS Book Store	C
	Copy Centre	C
	Library	A
	Student Administration Office Space	C
	Student Support Services Office Space	C
	Librarian Office Space	A
	Seminar Room	B
	ICT Multimedia / Helpdesk	B
	Samoa Digital Library Office and Server Room	B
	Video Conference Lecture Room / Adaptable Lecture Theatre	A
	Computer Lab	A
	Group Space for Students	B
	Conference Room	C
	Student Lounge	C
	Flexible Retail (Bank etc)	C

*Priority:

A High priority: to be included to the facility

B Medium priority: to need further examination in consideration with both consistency of the objective and other elements of the Project

C Less priority: not to be considered in the Project

Annex 3-2

Equipment Plan

Room name	Target	Equipment	Priority
FOHS Staff Offices	Faculty staff and administrative staff	General furniture (Computer table, Charis) etc.	C
		PC and Printer/Scanner etc.	C
		Copier machines and printer etc.	C
		Spiral Binding Equipment etc.	C
Simulation Classroom	FOHS	Training mannequins etc.	A
		Medical equipment such as ECG, vital sign monitors etc.	B
		Models such as human body & organs etc.	A
Medical Laboratory	FOHS	Microscopes etc.	A
		Biosafety cabinet and Automated analyzers etc.	C
Lecture Room	FOHS	Stacking desk and chair etc.	C
		Projector and screen etc.	B
Library	FOHS	Reading table and chair etc.	B
		Main issue desk and circulation desk etc.	B
		Bookshelves, and book trolleys, big book easel, poster each, display rack, and DVD/Video display unit etc.	B
		Photocopier、Staff computers, Laptops, OHP and screen etc.	B
Librarian Office Spaces	Librarians	General furniture etc.	C
		PC and printer etc.	C
Seminar Room	FOHS	Table and chair etc.	B
		Projector and screen etc.	B
ICT Multimedia / Helpdesk	FOHS	AV set etc.	B
		Stacking desk and chair etc.	B
Samoa Digital Library Office and Server Room	FOHS	Server and digitizer etc.	C
Video Conference Lecture Room / Adaptable Lecture Theatre	FOHS	Projector and screen etc.	A
Computer Lab	FOHS	PC and printers etc.	B
		Computer table and chair etc.	B
Group Space for Students	FOHS	Desk and chairs etc.	C

*Priority: Priority in the list indicates the priority at the room considering necessity of equipment and undertakings of both sides, and it does not reflect the priority of facility component listed on Annex 3-1.

A High priority: to be procured under the Project

B Medium priority: to need further examination in consideration with both consistency of the objective and other elements of the Project

C Less priority: not to be considered in the Project

Annex 4

JAPANESE GRANT

The Japanese Grant is non-reimbursable fund provided to a recipient country (hereinafter referred to as "the Recipient") to purchase the products and/or services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. Followings are the basic features of the project grants operated by JICA (hereinafter referred to as "Project Grants").

1. Procedures of Project Grants

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

(1) Preparation

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

(2) Appraisal

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

(3) Implementation

Exchange of Notes

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

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

-Agreement concluded between JICA and the Recipient

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

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

Construction works/procurement

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

(4) Ex-post Monitoring and Evaluation

-Monitoring and evaluation at post-implementation stage

2. Preparatory Survey

(1) Contents of the Survey

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

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of

relevant agencies of the Recipient necessary for the implementation of the Project.

- Evaluation of the feasibility of the Project to be implemented under the Japanese Grant from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.
- Confirmation of Environmental and Social Considerations

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

JICA requests the Recipient to take measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the executing agency of the Project. Therefore, the contents of the Project are confirmed by all relevant organizations of the Recipient based on the Minutes of Discussions.

(2) Selection of Consultants

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

(3) Result of the Survey

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

3. Basic Principles of Project Grants

(1) Implementation Stage

1) The E/N and the G/A

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

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

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

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

3) Procurement Procedure

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

4) Selection of Consultants

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

5) Eligible source country

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

6) Contracts and Concurrence by JICA

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

7) Monitoring

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

8) Safety Measures

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

9) Construction Quality Control Meeting

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

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

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

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

(2) Ex-post Monitoring and Evaluation Stage

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

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

(3) Others

1) Environmental and Social Considerations

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

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

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

3) Proper Use

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

4) Export and Re-export

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

PROCEDURES OF JAPANESE GRANT

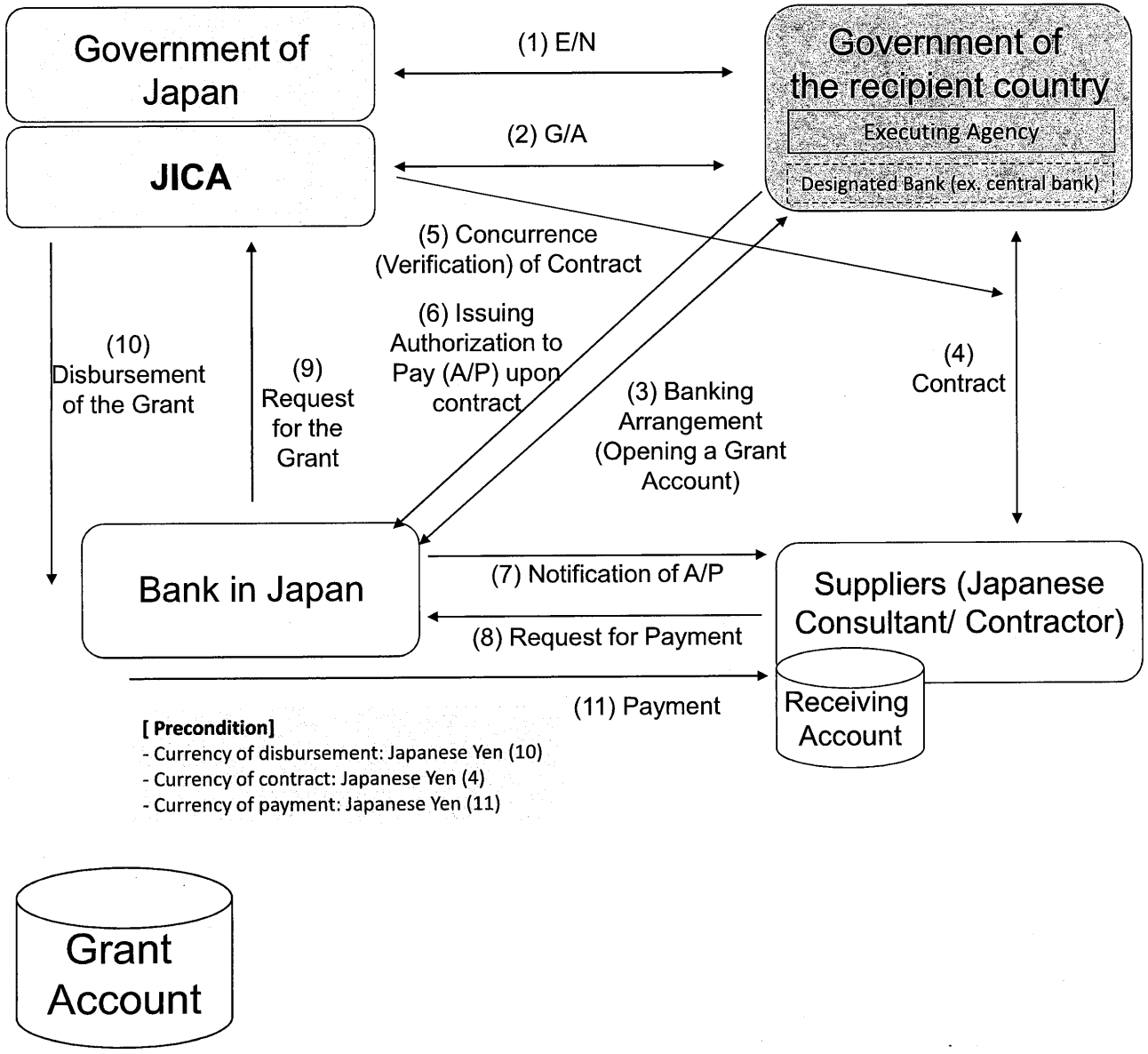
Stage	Procedures	Remarks						
Official Request	Request for grants through diplomatic channel	Request shall be submitted before appraisal stage.	x	x				
1. Preparation	(1) Preparatory Survey Preparation of outline design and cost estimate		x		x	x		
2. Appraisal	(2)Preparatory Survey Explanation of draft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

notes:

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

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

Financial Flow of Japanese Grant (A/P Type)



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 (_____): _____

G/A NO. XXXXXXX
PMR prepared on DD/MM/YY

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)

G/A NO. XXXXXXX
PMR prepared on DD/MM/YY

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%)	

Annex 6

Major Undertakings to be taken by the Government of Samoa

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

(1) Before the Bidding

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To sign the banking arrangement (B/A) with a bank in Japan (the Agent Bank) to open bank account for the Grant	within 1 month after the signing of the G/A	MOF		
2	To issue A/P to the Agent Bank for the payment to the consultant	within 1 month after the signing of the contract(s)	MOF		
3	To bear the following commissions to the Agent Bank for the banking services based upon B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	MOF		
	2) Payment commission for A/P	every payment	MOF		
4	To approve IEE/EIA(Conditions of approval should be fulfilled, if any) and secure the necessary budget for implementation for EMP and EMoP (and fulfilling conditions of approval, if any).	Before notice of the bidding documents	NUS		
5	To secure and clear the following lands 1) Project site for new facilities at Le Papaigalagala campus (approx.14,000sqm) 2) Temporary construction yard and stockyard near the Project area	before notice of the bidding documents	NUS		
6	To obtain the planning, zoning, building permit	before notice of the bidding documents	NUS		
7	To clear, level and reclaim the following site 1) removal of trees except for the conserved 2) removal of existing utilities (water tank, septic tank, inspection chamber, water pipe, cable, lighting pole, etc.) 3) removal of existing ancillary structures 4) removal of existing fence dividing the project site from Le Papaigalagala Campus 5) leveling and reclaiming the site	before notice of the bidding documents	NUS		
8	To submit Project Monitoring Report (with the result of Detailed Design)	before preparation of the bidding documents	NUS		

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

MOF: Ministry of Finance NUS: National university of Samoa

(2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost	Ref.

1	To issue A/P to the Agent Bank for the payment to the supplier and the contractor	within 1 month after the signing of the contract(s)	MOF		
2	To bear the following commissions to the Agent Bank for the banking services based upon the B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	MOF		
	2) Payment commission for A/P	every payment	MOF		
3	to ensure prompt unloading and customs clearance at ports of disembarkation in the country of the Recipient and to assist the Supplier(s) with internal transportation therein	during the Project	NUS		
4	To accord Japanese physical persons and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work	during the Project	NUS		
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the products and/or the services be exempted or be borne by its designated authority without using the Grant	during the Project	MOF NUS		
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project	during the Project	MOF NUS		
7	To notify JICA promptly of any incident or accident, which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers.	during the construction	NUS		
8	To submit Project Monitoring Report	every month	NUS		
9	To submit Project Monitoring Report (final) (including as-built drawings, equipment list, photographs, etc.)	within 1 month after issuance of Certificate of Completion for the works under the contract(s)	NUS		
10	To submit a report concerning completion of the Project	within 6 months after completion of the Project	NUS		
11	To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of the Project outside the site(s)				
	1) Electricity The distributing line to the site	3 months before completion of the construction	NUS		
	2) Water Supply The city water distribution main to the site	3 months before completion of the construction	NUS		
12	To provide equipment, furniture, facilities necessary for the implementation of the Project in the site(s)	before start of the construction	NUS		
13	To ensure the safety of persons engaged in the implementation of the Project	before start of the construction	NUS		
14	To ensure the proper personnel especially teaching staff and technical staff who provide education to the students, and maintenance team dedicated to equipment to be procured by the project.	1 month before commencement of installation	NUS		

		work of the equipment by Japanese side			

(3) After the Project

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To submit results of environmental monitoring to JICA, by using the monitoring form, semiannually - The period of environmental monitoring may be extended if any significant negative impacts on the environment are found. The extension of environmental monitoring will be decided based on the agreement between Samoa National University and JICA.	for 3 years after the Project	NUS		
2	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid 1) Allocation of sufficient budget for operation and maintenance 2) Training of teaching staff for simulators and laboratory equipment 3) Training of biomedical technicians of TTM how to maintain the equipment	After completion of the construction	NUS		
3	To transfer existing general furniture, also purchase and install new equipment and furniture not covered by the Japanese side to new facilities	One month after completion of the construction	NUS		
4	Landscape work around new facilities	One month after completion of the construction	NUS		
5	To transfer of FOHS from existing places to the new site including equipment and furniture.	One month after completion of the construction	NUS		
6	To secure transportation between Le Papaigalagala Campus and Moto'otua Campus for students and lecturers based at Moto'otua Campus to use the new facility at Le Papaigalagala Campus	After completion of the construction	NUS		

(2) 2nd survey (explanation on draft report)

Minutes of Discussions
on the Preparatory Survey for the Project for
Construction for Faculty of Health Science of National University of Samoa
(Explanation on Draft Preparatory Survey Report)

With reference to the minutes of discussions signed between National University of Samoa (hereinafter referred to as "NUS") and Ministry of Education Sports & Culture and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on October 7, 2021 and in response to the request from the Government of the independent States of Samoa (hereinafter referred to as "Samoa") dated July 28, 2020, JICA organized 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 Construction for Faculty of Health Science of National University of Samoa (hereinafter referred to as "the Project").

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

Apia, March 23, 2022

HIRAOKA Hisakazu
Leader
Preparatory Survey Team
Japan International Cooperation Agency
Japan

Aiono Professor Alec Ekeroma
Vice Chancellor and President
National University of Samoa
Independent State of Samoa

Leiataua Henry Ah Ching
Acting Chief Executive Officer /
Deputy Chief Executive Officer
Ministry of Finance
Independent State of Samoa

ATTACHMENT

1. Contents of the Draft Report

   After the explanation of the contents of the Draft Report by the Team, the Samoa side agreed to its contents. JICA will finalize the Preparatory Survey Report based on the confirmed items. The report will be sent to the Samoa side around June 2022.

2. Cost estimate

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

3. Confidentiality of the cost estimate and technical specifications

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

4. Timeline for the project implementation

   The Team explained to the Samoa side that the expected timeline for the project implementation is as attached in Annex 2.

5. Expected outcomes and indicators

   Both sides agreed that key indicators for expected outcomes are as follows. The Samoa side will be responsible for the achievement of agreed key indicators targeted in year 2028 and shall monitor the progress for Ex-Post Evaluation based on those indicators.

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr 2021)	Target (Yr 2028)
Area of medical laboratory and Simulation room per student at FOHS (m2/person)	1.00 (m2/person)	1.64 (m2/person)
Number of hours per year of experiments and simulation training conducted by FOHS during normal operating hours (8:00 a.m. to 5:00 p.m.) (hours)	SOM 462 (hours) 73% of total time stipulated in the curriculum	SOM 630 (hours) 100% of total time stipulated in the curriculum
	SON 448 (hours) 76% of total time	SON 588 (hours) 100% of total time

	stipulated in the curriculum	stipulated in the curriculum
Number of hours per year of joint lectures (for about 100 students) conducted in large classrooms on Bachelor of nursing and Diploma of nursing programmes at SON (hours)	126 (hours) 33% of total time stipulated in the curriculum	378 (hours) 100% of total time stipulated in the curriculum
Qualitative indicators to measure the attainment of project objectives		
➢ The procurement of medical simulators and examination equipment required for the implementation of the curricula shall improve the quality of education in FOHS, NUS. ➢ The establishment of a library shall improve the learning environment for the students of FOHS with improved access to the latest scientific papers. ➢ Improvement of the quality of education including practical training shall enhance the human resource development of FOHS, NUS.		

*FOHS: Faculty of Health Sciences
SOM:School of Medicine
SON: School of Nursing

6. 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 Samoa side is required to provide necessary support for the data collection.

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

Considering the sustainable operation and maintenance of the products and services granted through the Project, following technical assistance is planned under the Project. The Samoa side ensured to assign appropriate personnel including biomedical technicians working at TTM Hospital for participating training sessions as described in the Draft Report.

(a) Preparation of an inventory list of procured equipment.
(b) Appointment of a person in charge of equipment maintenance (a person who performs daily inspections and preventive maintenance and responds to equipment failure).
(c) Estimation and appropriate allocation of the budget required for equipment maintenance.

(d) The implementation of daily inspections by lecturers and preventive maintenance activities such as regular inspections within the capacity of end-users is enabled.
(e) Implementation of 5S activities for equipment maintenance.
(f) Establishment of a route for ordering the repair of malfunctioning equipment including procurement of necessary parts for repairing.

8. Undertakings of the Project

Both sides confirmed the undertakings of the Project as described in Annex 3. With regard to exemption of customs duties, internal taxes and other fiscal levies as stipulated in (2) - NO.5 of Annex 3, both sides confirmed that such customs duties, internal taxes and other fiscal levies shall be clarified in the bid documents by NUS during the implementation stage of the Project.

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

Both sides also confirmed that the Annex 3 will be used as an attachment of G/A.

9. 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 4. The timing of submission of the PMR is described in Annex 3.

10. 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 by the Executing Agency, but in any event not later than six months after completion of the Project.

11. Environmental and Social Considerations

11-1 Environmental Guidelines and Environmental Category

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.

11-2 Both side confirmed that application of the laws and regulations on environment is important despite the minimal adverse impact on the environment by the Project. Both side assured NUS will carry out environmental assessment of the building following the environmental framework and the procedure of the Government of Samoa.

12. Other Relevant Issues

12-1. 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.

12-2. Gender Mainstreaming

Both sides confirmed that gender mainstreaming should be duly practiced for the Project implementation as the project is categorized as GIS (Gender Integrated Project). In particular, Both sides agreed on the following gender elements to be integrated into the Project.

(a) Design the number of toilets according to the expected number of men and women.
(b) Design outdoor lights on the outside of the building to eliminate anxiety about moving after sunset.

12-3. Consideration for People with Disabilities

Both sides confirmed that the design of the building and facilities is inclusive for people with disabilities, e.g. application of barrier-free.

12-4. Geological survey

A boring survey will be conducted at the time of Detailed Design, and the construction method will differ slightly depending on the survey results.

12-5. Necessary arrangement for the Project personnel to enter the country

The Samoa side will provide the necessary arrangement to allow the Project personnel to enter the country according to the construction schedule even if there are changes of travel condition such as immigration restrictions for travelers due to the expansion of COVID-19. Both sides however acknowledge the potential risks (Page 11 of the Project Monitoring Report) that can hinder project implementation.

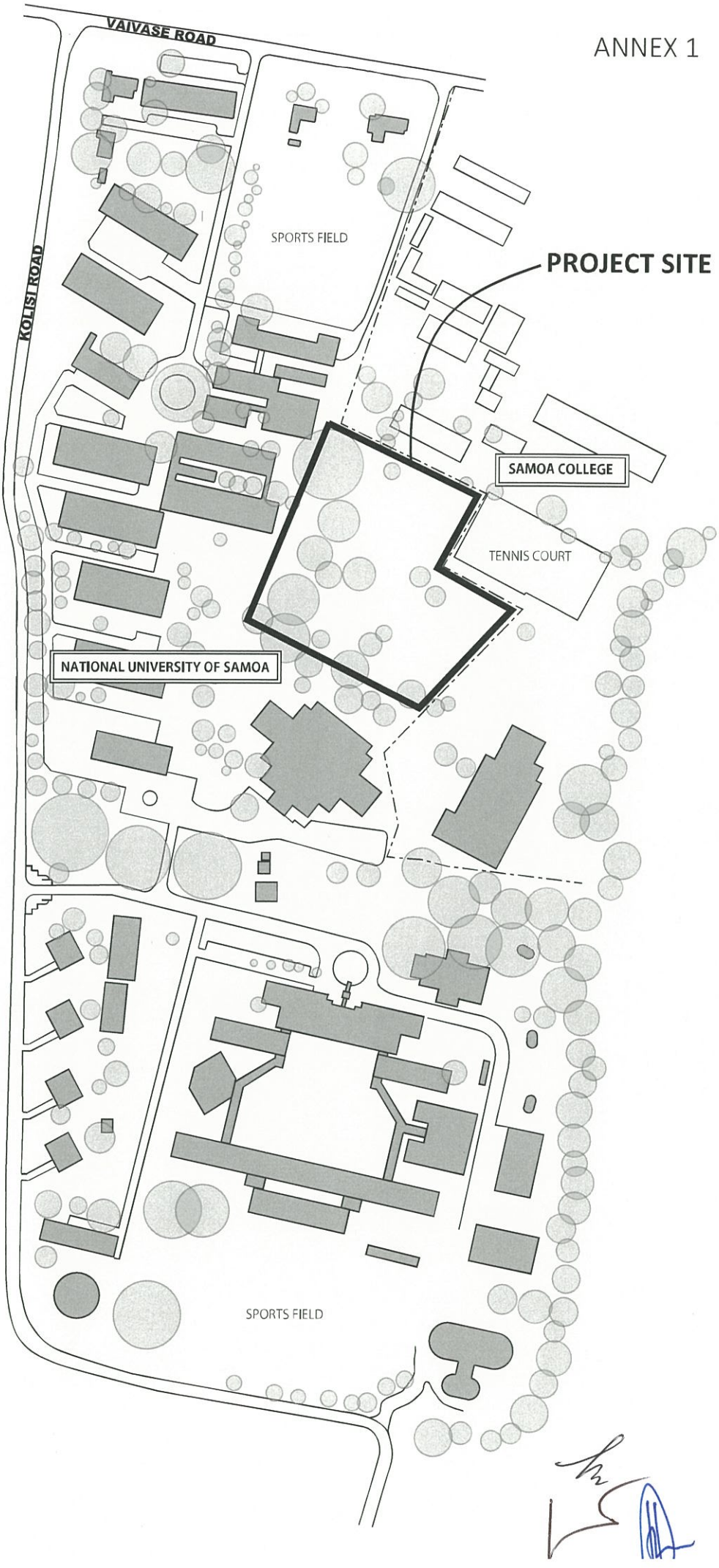
12-6. Securing staffing and budget

It was confirmed that the new staffing and budget for this project will be secured as described in the Draft Report. It was also confirmed that the budget for the maintenance of facilities and equipment would be secured.

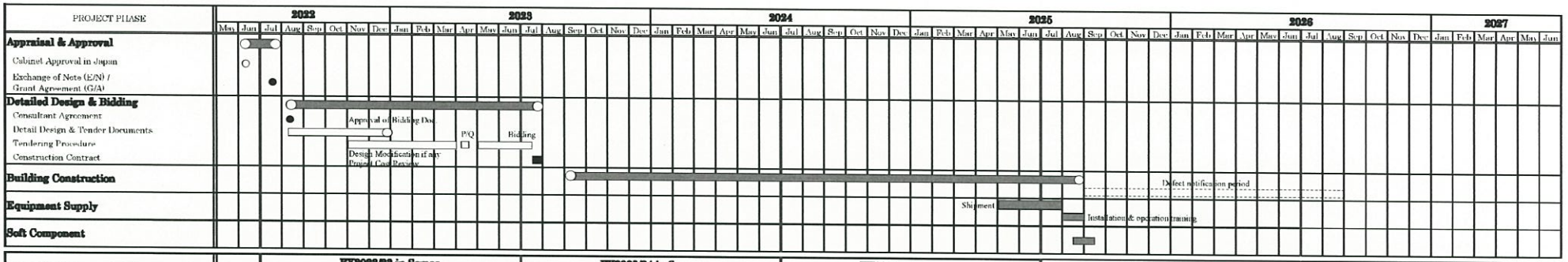
Annex 1 Project Site
Annex 2 Project Implementation Schedule
Annex 3 Major Undertakings to be taken by the Government of Samoa
Annex 4 Project Monitoring Report

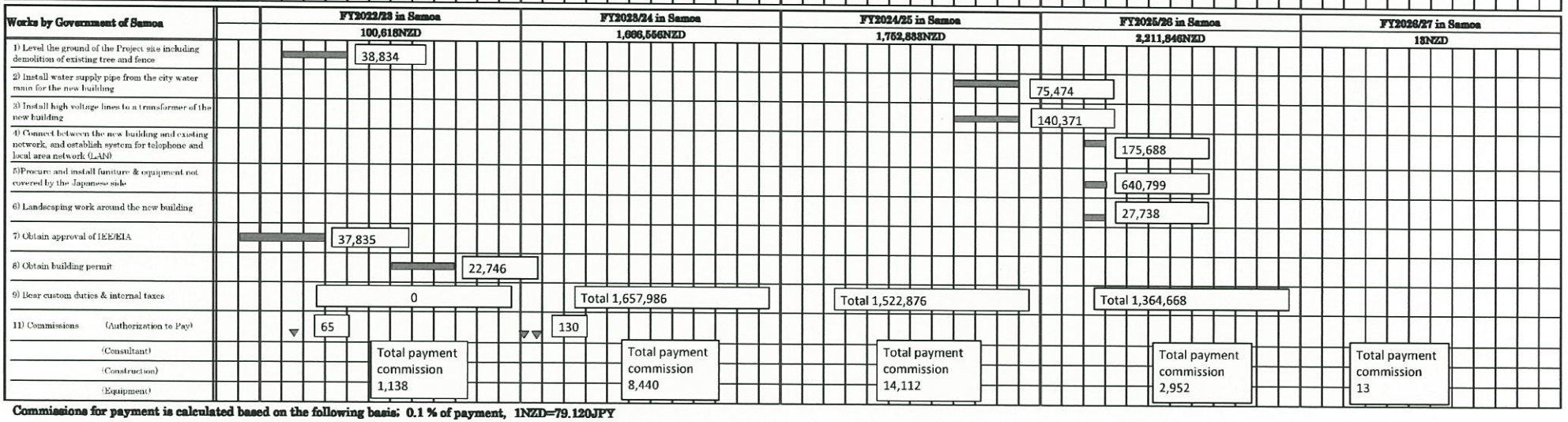
ANNEX 1

LE PAPAIGALAGALA CAMPUS



PROJECT IMPLEMENTATION SCHEDULE





Commissions for payment is calculated based on the following basis; 0.1 % of payment, 1NZD=79.120JPY

Annex 3

Major Undertakings to be taken by the Government of Samoa

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

(1) Before the Bidding

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To sign the banking arrangement (B/A) with a bank in Japan (the Agent Bank) to open bank account for the Grant	within 1 month after the signing of the G/A	MOF		
2	To issue A/P to the Agent Bank for the payment to the consultant	within 1 month after the signing of the contract(s)	MOF		
3	To bear the following commissions to the Agent Bank for the banking services based upon B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	MOF	65 NZD	
	2) Payment commission for A/P	every payment	MOF	1,138 NZD	
4	To approve IEE/EIA(Conditions of approval should be fulfilled, if any) and secure the necessary budget for implementation for EMP and EMoP (and fulfilling conditions of approval, if any).	Before notice of the bidding documents	NUS	37,835 NZD	
5	To secure and clear the following lands 1) Project site for new facilities at Le Papaigalagala campus (approx.14,000sqm) 2) Temporary construction yard and stockyard near the Project area	before notice of the bidding documents	NUS		
6	To obtain the planning, zoning, building permit	before notice of the bidding documents	NUS	22,746 NZD	
7	To clear, level and reclaim the following site 1) removal of trees except for the conserved 2) removal of existing utilities (water tank, septic tank, inspection chamber, water pipe, cable, lighting pole, etc.) 3) removal of existing ancillary structures 4) removal of existing fence dividing the project site from Le Papaigalagala Campus 5) leveling and reclaiming the site	before notice of the bidding documents	NUS	38,834 NZD	
8	To submit Project Monitoring Report (with the result of Detailed Design)	before preparation of the bidding documents	NUS		

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

MOF: Ministry of Finance NUS: National university of Samoa

(2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To issue A/P to the Agent Bank for the payment to the supplier and the contractor	within 1 month after the signing of the contract(s)	MOF		
2	To bear the following commissions to the Agent Bank for the banking services based upon the B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	MOF	130 NZD	
	2) Payment commission for A/P	every payment	MOF	25,517 NZD	
3	to ensure prompt unloading and customs clearance at ports of disembarkation in the country of the Recipient and to assist the Supplier(s) with internal transportation therein	during the Project	NUS		
4	To accord Japanese physical persons and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work	during the Project	NUS		
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the products and/or the services be exempted or be borne by its designated authority without using the Grant	during the Project	MOF NUS	4,545,530 NZD	
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project	during the Project	MOF NUS		
7	To notify JICA promptly of any incident or accident, which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers.	during the construction	NUS		
8	To submit Project Monitoring Report	every month	NUS		
9	To submit Project Monitoring Report (final) (including as-built drawings, equipment list, photographs, etc.)	within 1 month after issuance of Certificate of Completion for the works under the contract(s)	NUS		
10	To submit a report concerning completion of the Project	within 6 months after completion of the Project	NUS		
11	To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of the Project outside the site				
	1) Electricity The distributing line to the site	3 months before completion of the construction	NUS	140,371 NZD	
	2) Water Supply The city water distribution main to the site	3 months before completion of the construction	NUS	75,474 NZD	
12	To provide equipment, furniture, facilities necessary for the implementation of the Project in the site	before start of the construction	NUS		

13	To ensure the safety of persons engaged in the implementation of the Project	before start of the construction	NUS		
14	To ensure the proper personnel especially teaching staff and technical staff who provide education to the students, and maintenance team dedicated to equipment to be procured by the project.	1 month before commencement of installation work of the equipment by Japanese side	NUS	1,630,667 NZD (Yr 2025)	

(3) After the Project

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To submit results of environmental monitoring to JICA, by using the monitoring form, semiannually - The period of environmental monitoring may be extended if any significant negative impacts on the environment are found. The extension of environmental monitoring will be decided based on the agreement between Samoa National University and JICA.	for 3 years after the Project	NUS		
2	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid 1) Allocation of sufficient budget for operation and maintenance 2) Training of teaching staff for simulators and laboratory equipment 3) Training of biomedical technicians of TTM how to maintain the equipment	After completion of the construction	NUS	1,737,212 NZD Annually	
3	To transfer existing general furniture, also purchase and install new equipment and furniture not covered by the Japanese side to new facilities	One month after completion of the construction	NUS	640,799 NZD	
4	Landscape work around new facilities	One month after completion of the construction	NUS	27,738 NZD	
5	To connect between new facilities and existing network, and establish system for telephone and local area network (LAN)	One month after completion of the construction	NUS	175,688 NZD	
6	To transfer of FOHS from existing places to the new site including equipment and furniture.	One month after completion of the construction	NUS		
7	To secure transportation between Le Papaigalagala Campus and Moto'otua Campus for students and lecturers based at Moto'otua Campus to use the new facility at Le Papaigalagala Campus	After completion of the construction	NUS		

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

NO	Items	Deadline	Amount (Million Japanese Yen)*
1	1) To construct new facilities		This page is closed due to confidentiality
	2) To conduct the following transportation a) Marine(Air) transportation of the products from Japan to the country of the Recipient b) Internal transportation from the port of disembarkation to the project site		
	3) To construct access roads a) Within the site		
	4) To construct the temporary building		
	5) To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities a) Electricity - The drop wiring and internal wiring within the site - The main circuit breaker and transformer b) Water Supply - The supply system within the site (receiving tanks) c) Drainage - The drainage system (for toilet sewer, ordinary waster, storm drainage and others) within the site d) Furniture and Equipment - Project equipment		
2	To provide equipment with installation and commissioning		
3	To implement detailed design, bidding support, supervision and soft component (technical assistance) (Consulting Service)		
4	Contingencies		
	Total		

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

Annex 4
G/A NO. XXXXXXX
PMR prepared on DD/MM/YY

PROJECT MONITORING REPORT
ON
THE PROJECT FOR IMPROVEMENT OF THE FACULTY OF HEALTH SCIENCE OF THE NATIONAL UNIVERSITY OF SAMOA
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	THE PROJECT FOR IMPROVEMENT OF THE FACULTY OF HEALTH SCIENCE OF THE NATIONAL UNIVERSITY OF SAMOA
E/N	Signed date: Duration:
G/A	Signed date: Duration:
Source of Finance	Government of Japan: Not exceeding JPY _____ mil. Government of (_____): _____

G/A NO. XXXXXXX
PMR prepared on DD/MM/YY

1: Project Description

1-1 Project Objective

The Project is to contribute to "strengthening the development of human resources for healthcare," an initiative identified in the "Health Sector Plan 2019/20-2029/30" by the Ministry of Health of Samoa, by improving the quality of education of FOHS through construction of the FOHS complex and procurement of related equipment on the Le Papaigalagala Campus.

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

The over-riding vision of the Strategy for the Development of Samoa 2020/21-2023/24 is "An Improved Quality of Life for All" by accelerating sustainable development and broadening opportunities for all people. In this vision, plans for health and education sector are positioned as measures for responding to future needs and strengthening human resources in Samoa.

The health sector in Samoa currently has an immature prevention, diagnosis, and treatment system, highlighting problems such as the threat of spread of measles, COVID-19 and other communicable diseases due to a delay in the initial response system during epidemics, and the lack of immunization due to a shortage of specialized physicians. To address these problems, there is an urgent need to develop human resource in healthcare. In view of this situation, the Ministry of Health of Samoa, under the Health Sector Plan 2019/20-2029/30, has set a vision of a "Healthy Samoa" and is striving to develop healthcare professionals with expertise as well as increasing the number of students in the health sector. Subsequently, increasing the number of skilled and competent health professionals and relevant personnel, aimed at achieving an inclusive, people centered health service with an emphasis on preventive health, protection, patient care and compliance.

The Faculty of Health Sciences (FOHS) of the National University of Samoa (NUS) is the only public educational institution in Samoa that produces almost all of the nation's healthcare human resources. Therefore, achieving the goals for improving healthcare human resources in terms of quantity and quality depends on the capacity of the FOHS.

However, the buildings of the School of Nursing (SON) and the School of Medicine (SOM) at the FOHS have both deteriorated, and it is difficult to say whetherthey are suitable as learning environment for the highest educational institution in Samoa. There are also problems with equipment at the FOHS: a significant shortage of simulators used for trainings in particular, and deterioration of experimental tools. In terms of space, the SON does not have enough rooms at the Le Papaigalagala campus to accommodate the courses for each programme included in the curriculum, thus some classes need to use rooms of other departments. In addition, as the SON does not have a laboratory, its courses are held using the laboratory of the Faculty of Science. However, the laboratory is used preferentially by the Faculty of Science, so the SON has no choice but to hold its classes late in the evenings after the regular school hours. Moreover, as the SON simulation room is not exclusively for simulation training but shared with other general courses, necessary simulators, desks and chairs need to be prepared for each course, making it difficult to secure the course hours. Furthermore, the library at the Le Papaigalagala campus available to FOHS students is too small to hold all of its collection of books. The reading space is always filled with students, and some students who do not have seats sit down on the floor for reading or self-studying. The SOM building at the Moto'otua Campus, which was originally built as a tuberculosis ward of a national hospital, is not suitable as an educational environment in terms of floor layout.

1-3 Indicators for measurement of "Effectiveness"

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr 2021)	Target (Yr 2028)
Area of medical laboratory and Simulation room per student at FOHS (m2/person)	1.00 (m2/person)	1.64 (m2/person)
Number of hours per year of experiments and simulation training conducted by FOHS during normal operating hours (8:00 a.m. to 5:00 p.m.) (hours)	SOM: 462 (hours) 73% of total time stipulated in the curriculum	SOM: 630 (hours) 100% of total time stipulated in the curriculum
	SON: 448 (hours) 76% of total time stipulated in the curriculum	SON: 588 (hours) 100% of total time stipulated in the curriculum
Number of hours per year of joint lectures (for about 100 students) conducted in large classrooms on Bachelor of nursing and Diploma of nursing programmes at SON (hours)	126 (hours) 33% of total time stipulated in the curriculum	378 (hours) 100% of total time stipulated in the curriculum
Qualitative indicators to measure the attainment of project objectives		
➢ The procurement of medical simulators and examination equipment required for the implementation of the curricula shall improve the quality of education in FOHS, NUS. ➢ The establishment of a library shall improve the learning environment for the students of FOHS with improved access to the latest scientific papers. ➢ Improvement of the quality of education including practical training shall enhance the human resource development of FOHS, NUS.		

2: Details of the Project

2-1 Location

Components	Original *(proposed in the outline design)*	Actual
Facilities and equipment	Le Papaigalagala Campus of the National University of Samoa in Apia	

2-2 Scope of the work

Components	Original* *(proposed in the outline design)*	Actual*
Facilities	(Main Building) 3 story and 1 basement floor Total floor area: 3,515 m2 Major rooms: FOHS lecture rooms, FOHS Simulation Classroom, FOHS Medical Laboratory, FOHS Staff Offices, library, Adaptable Lecture Theatre, seminar room, Group Space for Students, etc. (Generator Hut) 1 story, Total floor area: 35m2	
Equipment	Practical training manequine for Simulation room(SON & SOM), Microscope, essential laboratory equipment such as binocular microscope, and large display monitor for lecture room etc.	
Consulting services	Detailed design, bidding support, supervision and soft component (technical assistance)	

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)*	
G/A	Jul 2022		
Detailed design	Aug - Dec 2022		
Prequalification notice	Apr 2023		
Bidding notice	May 2023		
Bid opening	Jul 2023		
Construction period	Sep 2023 - Aug 2025		
Installation of equipment	Aug 2025		
Soft component (technical assistance)	Aug - Sep 2025		
Defect liability period	Sep 2025 - Aug 2026		

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
Facilities	**(Main Building)** 3 story and 1 basement floor Total floor area: 3,515 m2 Major rooms: FOHS lecture rooms, FOHS Simulation Classroom, FOHS Medical Laboratory, FOHS Staff Offices, library, Adaptable Lecture Theatre, seminar room, Group Space for Students, etc. **(Generator Hut)** 1 story, Total floor area: 35m2		This page is closed due to confidentiality	
Equipment	Practical training manequine for Simulation room(SON & SOM), Microscope, essential laboratory equipment such as binocular microscope, and large display monitor for lecture room etc.			
Consulting services	Detailed design, bidding support, supervision and soft component (technical assistance)			
Contingency				
Total				

Note: 1) Date of estimation: OD) Oct 2021
2) Exchange rate: 1 US Dollar = OD) 1NZD=79.120JPY, 1USD=110.10JPY

2-5-2 Cost borne by the Recipient

Components		Cost (NZD)	
Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original[1),2)] *(proposed in the outline design)*	Actual
Level the ground of the Project site (Including removal of existing trees and fence dividing the project site from the main campus)		38,834	
Install water supply distribution pipes to the project site		75,474	
Install power distribution line to the		140,371	

project site			
Connect between the new building and existing network, and establish system for telephone and local area network (LAN)		175,688	
Procure furniture not covered by the Japanese side		473,964	
Procure equipment not covered by the Japanese side		166,835	
Landscape work around new building		27,738	
Environmental clearance		37,835	
Acquisition of building permit		22,746	
Cost to exempt customs duties, internal taxes and other fiscal levies which may be imposed in Samoa for the Project		4,545,530	
Commissions for payment to contractors, and issuance of Authorization to Pay (A/P) and amended A/P		26,850	
	Total	5,731,865	

Note: 1) Date of estimation: OD) Oct 2021
2) Exchange rate: 1 US Dollar = OD) 1NZD=79.120JPY, 1USD=110.10JPY

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
National University of Samoa

Role
Coordinating with all the relevant authorities to ensure smooth implementation of the Project, and ensuring that the undertakings for the Project shall be managed by relevant authorities properly and on time.

Financial situation

Fiscal year	FY2015/16	FY2016/17	FY2017/18	FY2018/19	FY2019/20
Income	**23,744,847**	**24,482,875**	**25,699,063**	**25,263,785**	**23,845,512**
Course fee	10,064,989	9,390,363	9,958,908	10,185,261	9,871,837
Operating grant & education sector budget support	11,046,789	12338449	12,586,159	11,904,915	11,355,636
Other income	2,633,069	2,754,063	3,153,996	3,173,609	2,618,039
Expense	**22,256,111**	**25,282,968**	**25,654,600**	**26,869,209**	**26,268,766**
Personnel cost	14,572,639	15,559,913	15,852,749	16,966,213	17,498,291
Operation cost	7,276,234	9,329,111	9,422,631	9,608,795	8,353,211
Repairs & maintenance	407,238	393,944	379,220	294,201	417,264
Net finance income	100,170	112,291	88,005	74,305	20,294
Net surplus/losses for the year	**1,588,906**	**-687,802**	**132,468**	**-1,531,119**	**-2,402,960**

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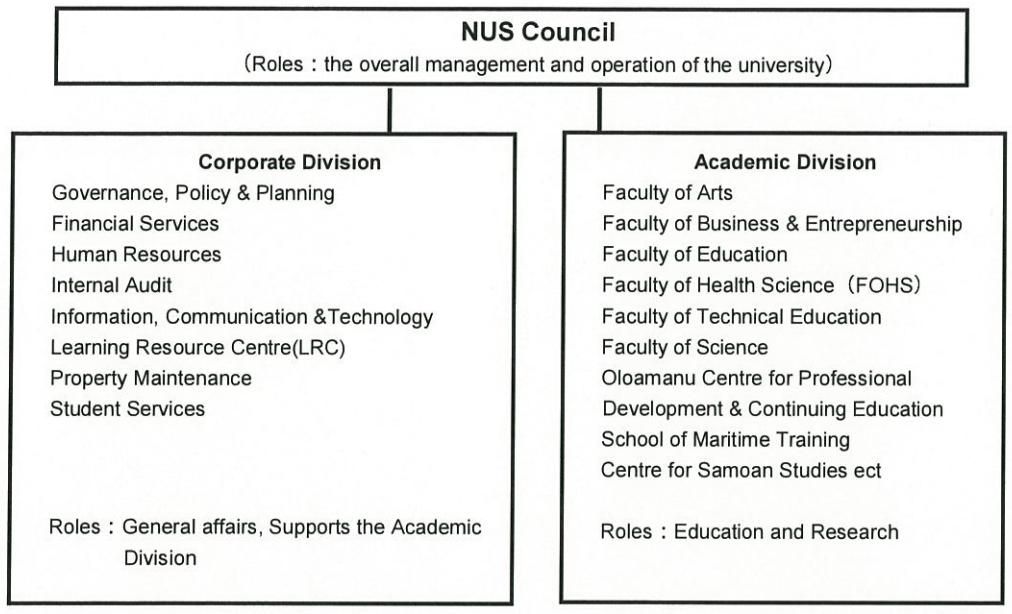
PMR prepared on DD/MM/YY

Institutional and organizational arrangement (organogram)



Note) The Governance, Policy & Planning Department, Property Maintenance Department, and Occupation, Health, Safety & Sanitation under the Human Resources Department will be integrated into the Planning, Safety & Maintenance Department around April, 2022.

Human resources (number and ability of staff)

FOHS

Teaching staff	At Present		At Opening of New Building		Increment	
	SOM/Total 33	SON/Total 10	SOM/Total 41	SON/Total 13	SOM/ 8	SON/ 3
Dean	-	1	-	1	-	-
Head of School	1	- (cum Dean of FOHS)	1	- (cum Dean of FOHS)	-	-
Professor	1	-	1	-	-	-
Senior Lecturer	2	1	4	2	2	1
Lecturer	1	8	3	10	2	2
Pre-clinical Lecturer (part-time)	4	-	5	-	1	-
Pre-clinical and Clinical Lecturer (part-time)	3	-	4	-	1	-
Clinical Lecturer (part-time)	10	-	11	-	1	-
Honorary Senior Clinical Lecturer	11	-	12	-	1	-

LRC

Staff	At Present	At Opening of New Building	Increment
	LRC/Total 11	LRC/Total 13	LRC/2
Librarian	1	3	2
Assistant Librarian	2	2	-
Senior Library Assistant	1	1	-
Library Assistant	7	7	-

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.)

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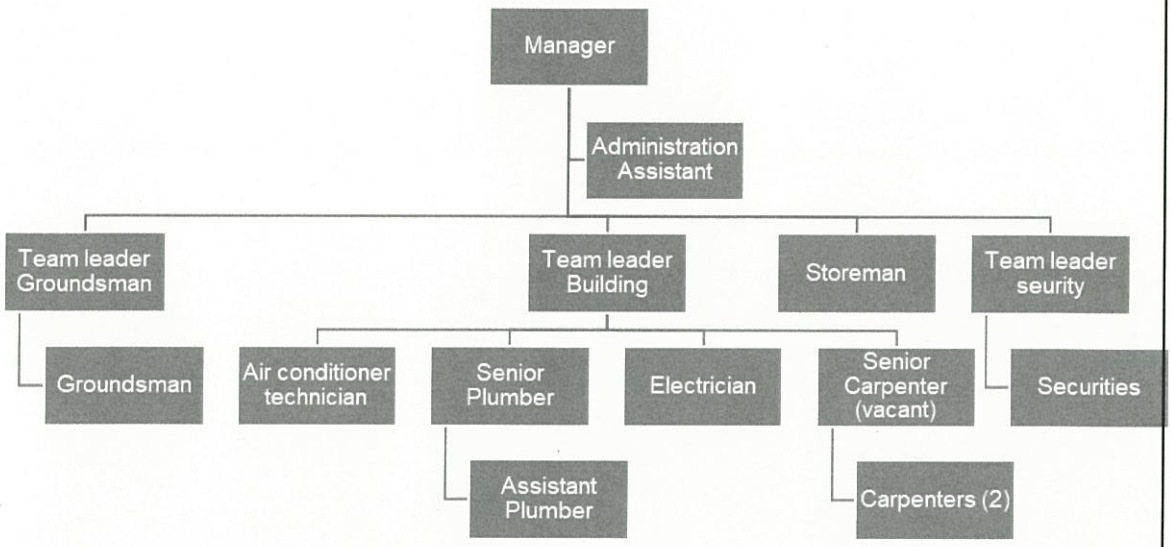
Original *(at the time of outline design)*

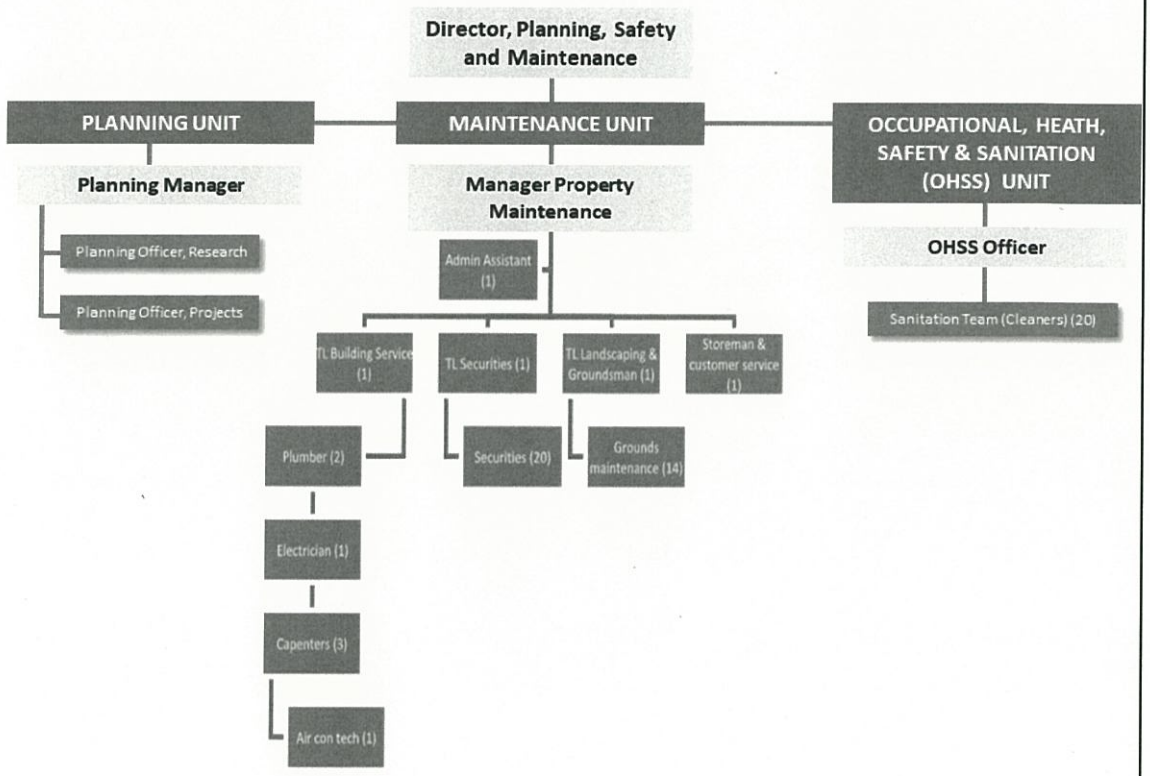
Facilities

The Property Maintenance Department of the NUS is responsible for maintenance and repair work of facilities on the campus in the event of damage and/or malfunction.



Organogram for Property Maintenance Department, NUS

The Property Maintenance Department will be integrated with the Governance, Policy & Planning Department, and Occupation, Health, Safety & Sanitation under Human Resources Department into the Planning, Safety & Maintenance Department as shown below around April 2022.



Maintenance routine at the NUS is carried out by the engineers/technician in charge of electricity, air conditioning, water supply and drainage, and the wooden work respectively.

The maintenance of other equipment that cannot be handled by the Property Maintenance Department, such as generators, lifts and pumps, are outsourced.

The basic flow for repair work in case of malfunction of buildings and/or equipment is as follows;

1. A user finds the trouble and contacts the Property Maintenance Department by e-mail or telephone.
2. A technician from the department is sent to check the condition. If a cause cannot be identified by the technician, condition check is outsourced to an agent or a supplier.
3. If the work is to be outsourced, a quotation is obtained and a repair plan is prepared. A budget for the repair work needs to be approved prior to outsourcing. In the case of minor works, plans and specifications for outsourcing are prepared by the Property Maintenance Department.
4. After approval, the repair work is contracted out.

Equipment

In principle, the equipment to be procured in this project shall be maintained by the end-users, namely, the teaching staff of NUS. However, repairs in the case of equipment failure will be handled by the biomedical technicians of TTM, with which NUS has concluded an MOU on equipment maintenance. If they cannot repair the equipment, they will contact a certified agent for the equipment in Samoa or a neighbouring country and either receive technical advice remotely and repair it by themselves or ask the agent to dispatch an engineer to Samoa for the repair.

Actual *(PMR)*

3-2 Budgetary Arrangement

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

Original *(at the time of outline design)*

Annual operation and maintenance cost for the facilities and equipment under the Project is estimated as below;

Item		Expense when the new building starts operation (SAT)	
Administration expense	1) Utility and communication cost	115,776	150,727
	2) Fuel cost	22,423	
	3) procurement cost of consumables for equipment	12,528	
Repairs & maintenance	4) Facility maintenance	35,600	41,295
	5) Equipment maintenance	5,695	
Personnel cost	6) Personnel cost		2,938,880
	Total		3,130,902

Actual *(PMR)*

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PMR prepared on DD/MM/YY

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) Spread of COVID-19 may result in that the project team members cannot travel to and work in Samoa as planned and the construction equipment and materials cannot be imported into Samoa.	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	It is unforeseeable and may give the project implementation schedule a significant impact.
	Mitigation Measures:
	Remote work can be applied to some component of the project (i.e. consulting service)
	Action required during the implementation stage:
	Monitoring spread of COVID-19 and measures of the Government of Samoa and Japan
	Contingency Plan (if applicable):
2. (Description of Risk) Delay and/or shortage of budget allocation of the Samoa side may affect project implementation schedule.	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	It can be controllable.
	Mitigation Measures:
	Confirming the schedule of budgeting process and taking necessary procedures on time
	Action required during the implementation stage:
	Confirming the schedule of budgeting process and taking necessary procedures on time
	Contingency Plan (if applicable):
3. (Description of Risk) Delay of procedures for undertakings by the Samoa side may affect project implementation schedule.	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	It can be controllable.
	Mitigation Measures:
	Confirming necessary procedures for undertakings by the Samoa side with the latest information and taking necessary action on time
	Action required during the implementation stage:
	Confirming necessary procedures for undertakings by the Samoa side with the latest information and taking necessary action on time
	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)

5. Soft Component (Technical Assistance) Plan

5. Soft Component (Technical Assistance) Plan

(1) Background

1) Objective of the Plan

The Faculty of Health Science (FOHS) of the National University of Samoa (NUS) is expected to contribute significantly to the achievement of the goal of increasing and improving the quality of the health workforce in line with the Samoa Health Workforce Development Plan 2020/21 – 2025/26 (SHWDP) and the Samoa Human Resource for Health Strategy 2020/21 – 2025/26 (SHRHS) of the Ministry of Health of Samoa because FOHS is responsible for almost all human resource development in the health sector in Samoa.

However, the existing buildings of the School of Nursing (SON) and the School of Medicine (SOM) are so old and have deteriorated so much that they are barely able to provide the learning environment that is merited by the students of the country's top educational institution. FOHS lacks the equipment, including simulators and laboratory equipment, to provide appropriate simulation training, and the equipment that it does have is old and deteriorated. There are not enough classrooms in SON in Le Papaigalagala Campus, in particular, to hold all of the classes that students need to take in order to obtain the credits required by the curriculum of each programme. Therefore, some classes have been held in the classrooms of other faculties. Due to the lack of a laboratory for practical training, SON in La Papaigalagala Campus has been using a Faculty of Science (FOS) laboratory to conduct practical training. As FOS uses the laboratory for its classes during ordinary school hours, the school has to provide practical training late in the evening after school hours. In addition, because of the lack of a designated simulation laboratory, the school has been conducting simulation training in an ordinary classroom that is also used by other faculties. Therefore, simulators, desks, and chairs must be set up in the classroom every time simulation training is held, which reduces the time remaining for training. The library in Le Papaigalagala Campus used by FOHS students is too small to accommodate all the books owned by NUS. The small reading space in the library is always crowded with students, and those who cannot find seats sit on the floor while reading. As the SOM Building in Moto'otua Campus used to be the Tuberculosis Ward of the National Hospital, inevitably, the floor plan and the locations of windows are not appropriate to an environment that is conducive to learning.

These circumstances justify the construction of classrooms and other rooms required for education in the schools of FOHS, including SON, and a learning resource center, including a library, that is expected to support learning among FOHS students in Le Papaigalagala Campus. It is expected that the simulation laboratory and medical laboratories, which are priority constructions in this project, will be used by SOM in Moto'otua Campus and by SON. SOM in Moto'otua Campus shall continue using the Administration Office and lecture rooms in the existing building. Therefore, NUS shall provide an appropriate means of transport between the existing building and the new facilities to be constructed in this project.

This assistance of the Government of Japan shall contribute to the development of human resources in the health sector, which is mentioned in the "Samoa Health Sector Plan 2020 – 2030," by constructing facilities, including lecture rooms, lecture halls, a simulation laboratory, and medical laboratories, and by procuring equipment for the facilities to improve the educational functions of FOHS.

2) Current State of and Problems with Equipment Use

The IT Department of NUS maintains the computers and associated equipment in the university. Meanwhile, FOHS has concluded a memorandum of understanding (MOU) on the maintenance of the equipment in the simulation laboratories and medical laboratories with the Maintenance Department of the Tupua Tamasese Meaole Hospital (TTM) that is adjacent to the Moto'otua Campus where students of FOHS undergo clinical training. The MOU provides that the biomedical technicians of the Maintenance Department shall repair FOHS equipment when any malfunction occurs.

The plan in this project is to install types of simulators that are not currently owned by FOHS, as well as other equipment that can be utilized by the current teaching staff for the improvement of the educational environment for medical and nursing students. In this project, equipment that will contribute to the improvement of the educational environment, including simulator equipment to be installed in the simulation laboratory, shall be procured and installed. Existing simulators are maintained by the teaching staff, who take out the simulators from storage spaces for use in classes before returning them to the storage space. However, the simulators are not sufficiently maintained, as the teachers do not perform pre-use inspections or manage consumables. Due to such poor maintenance, the teaching staff are unable to efficiently provide the appropriate training in line with the curriculum. To improve the poor state of equipment maintenance, it is necessary to improve the capacity for equipment maintenance in the Asset Management Department of NUS, the end-users, *i.e.*, NUS teaching staff, and the biomedical technicians of TTM.

The medical schools of Japanese national universities employ specialized staff to carry out maintenance and simple cleaning operations for equipment in simulation laboratories, lecture rooms, lecture halls, and medical laboratories, and to store them appropriately. These schools also outsource maintenance in order to appropriately maintain AV equipment in lecture halls. In this project, buildings are to be constructed on the main campus located 1.5 km from the coastline. However, if the procured equipment, including simulators, is left exposed to the air without protection, the silicon surfaces may deteriorate to an extent that the equipment can no longer be used in training. Therefore, thorough preventive maintenance, including regular maintenance and storage in a protected space, is essential for the effective use of the equipment to be procured. As NUS does not have staff specialized in such equipment maintenance, thorough instruction on the maintenance shall be provided to the teaching staff of NUS.

(2) Goal of Soft Component

The goal of the soft component of this project is to strengthen the maintenance systems of NUS and the Maintenance Department of TTM that has concluded an MOU on equipment maintenance with NUS in order for the equipment to be procured in this project to be kept in good condition while being used continuously for a long period of time.

(3) Outputs of Soft Component

3.1	Preparation of an inventory list of procured equipment.
3.2	Appointment of a person in charge of equipment maintenance (a person who performs daily inspections and preventive maintenance and responds to equipment failure).
3.3	Estimation and appropriate allocation of the budget required for equipment maintenance.
3.4	The implementation of daily inspections by lecturers and preventive maintenance activities such as regular inspections within the capacity of end-users is enabled.
3.5	Implementation of 5S activities for equipment maintenance.
3.6	Establishment of a route for ordering the repair of malfunctioning equipment including procurement of necessary parts for repairing.

(4) Means of Verification of Level of Achievement of Outputs

The following means shall be used to verify the level of achievement of outputs.

Table 1: Method of Confirmation on Achievement

Method of Confirmation on Achievement	Corresponding Items in "Outputs of Soft Component"
Paper proficiency test	3.1, 3.2, 3.3, 3.4, & 3.5
Operation status of inventory list of the procured equipment	3.2
Budget plan for equipment	3.3
Creation of daily checkup and usage management list of each equipment with standard format	3.4
Flow chart for repair in case of malfunction	3.6
Daily checkup list and Periodical checkup list	3.4
Standard operation procedure for 5s activities	3.5

This soft component is planned to be implemented only once when the equipment is delivered. For this reason, follow-up activities whether above outcomes have been realized will be confirmed at the time of conducting the facility defect inspection.

(5) Activities in Soft Component (Input Plan)

Training shall be provided once at the point of the handover of the installed equipment from the equipment supplier as an activity in the soft component of this project.

Table 2: Target items for Soft Component

Room Name	Description
Simulation Laboratory（Simulator）	Basic combination nursing manikin, Physical assessment model, Child nursing manikin, Midwifery manikin, Fetus manikin, Gynaecological examination manikin, Childbirth simulating manikin, CPR manikin (adult), CPR manikin (Child), Multipurpose injection training arm, Neonatal resuscitation model, Fetal ultrasound diagnostic phantom, Thoracic cavity, pericardiocentesis model, Central venous puncture trainer, Blood pressure trainer, Withdrawing of urine training model for male, Withdrawing of urine training model for female 17 items
Simulation Classroom (Medical equipment）	Vital signs machine, ECG, Ultrasound machine (midwifery), Tracheal intubation set, Otoscope, Resuscitation bag set 6 items
Medical Laboratory	Binocular microscope, Multiheaded teaching microscope with camera, Specimen slides, Centrifuge, Microbiological stain set 5 items
Lecture room	Large display monitors 2 kinds (for lecture room, and for medical laboratory) 2 items
Video Conference Lecture Room	AV system 1item
Total	31 items

Table 3: Participants of Soft Component

Organization	Position	Number of Participants	Activity
NUS	NUS Asset Manager and FOHS Manager	One each	➢ Explanation of equipment management activity plan ➢ Introduction of maintenance equipment ➢ Explanation of the importance of equipment maintenance (Protection from exposure to onshore breeze, in order to keep equipment useful in practical lecture for long term.) ➢ Management of equipment maintenance by 5S activities ➢ Designing the budget draft for equipment maintenance.
	Equipment Manager	Three～Five Lecturers of SON and SOM who are designated as equipment manager	➢ Division of duties among equipment managers. ➢ Instruction on how to update the equipment inventory ➢ Guidance on how to deal with equipment failures ➢ Designing the budget draft for equipment maintenance.
	End Users	FOHS Lecturers 10～12 in total	➢ Instruction of daily inspection ➢ Instruction on how to conduct periodic inspection that are manageable by users. ➢ Improvement on the equipment maintenance status by practicing 5S activities.
TTM Maintenance Department	Bio Medical Technician（BMT）	Three	➢ Instruction of procedures in case abnormal conditions are detected in daily inception. ➢ Instruction of procedures in case abnormal conditions are detected in periodic inception ➢ Acquaintance of method for improvement on equipment maintenance by practice of 5S activities

Table 4: Activities

Output	Activity .NO	Description	Main target				Schedule
			NUS Asset Manager & FOHS Manager	FOHS equipment manager	FOHS end users	TTM・BMT	
Overall	1.	Appointment of general equipment manager and equipment managers at the target facilities.	✓	-	-	-	At delivery of equipment
3.1	2.	Creation and utilization of the equipment inventory lists by equipment maintenance manager and his team and by maintenance department in TTM	-	✓	-	✓	
	3.	Creation of maintenance sheets for each equipment (Procurement year, Manufacturer, Model, Record of malfunction, functional/unfunctional time, Utilization records, Periodic inception records.	-	✓	-	✓	
3.2 3.3 3.4 3.5 3.6	4.	Guidance on the points of the daily/periodic inspection, and instruction on how to use the daily and periodic maintenance check	-	✓	✓	✓	
	5.	Improvement on maintenance status with introduction of 5Sactivities.	-	✓	✓	✓	
	6.	Instruction on how to estimate an annual cost for equipment and Creation of an annual budget draft.	✓	✓	-	✓	

(6) Trainers in Soft Component

A person with a comprehensive knowledge of, work experience in, and management experience in equipment maintenance in developing countries shall be dispatched from Japan and shall provide training on equipment maintenance to the counterparts. The following persons are to be assigned to the soft component:

- Equipment Maintenance Trainer (1):

  A person with at least 10 years' work experience in equipment maintenance in developing countries.
- Training Assistant/Training Supervisor (local employee: 1):

  The person concerned shall select appropriate training participants from among the staff of NUS and TTM and prepare a list of participants.

  S/he shall provide appropriate assistance in the training, including logistical work, such as the preparation of a list of participants, observation of participants' performance, and confirmation of the level of their understanding of the training.

  A video recording of the training shall be made, and the recorded video shall be handed over to NUS/FOHS as a tangible output of the soft component. The video shall be used to create an environment

so that the content of the training can be played back to FOHS staff at any time in order to use the procured equipment effectively.

In Samoa, there are no engineers who can teach the maintenance of the equipment to be procured. In addition, engineers who can be dispatched from the neighbouring counties such as Australia and New Zealand are not familiar with the maintenance of Japanese products. Therefore, the trainer shall be dispatched from Japan. A local consultant shall be employed as the training assistance/supervisor because a great deal of coordination will be required from the assistant/supervisor in Samoa.

(7) Implementation Schedule for Soft Component

The training session shall begin two weeks before equipment handover and shall last for 0.8 months. (Work in Samoa, training on equipment management: 0.73 P/M; Training assistance/supervision: 0.53 P/M) The teaching materials to be used in the training shall be prepared in Japan before the beginning of the session (0.45 P/M). By starting the training two weeks before equipment handover, the trainer will be able to understand how well the counterparts have understood the content of initial operation guidance provided by the engineer from the supplier, and will be able to provide appropriate soft component training based on the level of their understanding. The trainer will also be able to provide training to the trainees using the equipment that they shall use while working. Therefore, the implementation of this training is likely to lead to the establishment of a system for equipment maintenance.

Table 5: Implementation Schedule

Week	1	2	3	4	5	6	7	8	9	10	11	12	Japan	Samoa
Installation of Equipment	▲	▲	▲	▲	▲									
Handover of Equipment						▲								
Equipment Manitenance Trainer（1）		0.45PM				0.73PM							0.45	0.73
Traninig Assistant/Training Supervisor (local employee、1）						0.53PM								0.53
Completion Report of Soft Comoponent												▲		

(8) Deliverables of Soft Component

Following deliverables will be presented as outputs of soft component program.

Table 6: Deliverables

(1) Result of paper proficiency test
(2) Inventory list for procured equipment
(3) Budget plan for equipment
(4) Daily checkup list with standard format
(5) Flow chart for repair in case of malfunction
(6) Daily checkup list and periodical checkup list
(7) Standard operation procedure for 5s activities
(8) Training materials (presentation and video etc.) utilized in the Soft Component Program

(9) Estimated Cost of Soft Component

Total estimated cost: 4.779 million JPY (excluding the cost of controlling the COVID-19 epidemic)

(10) Obligations of Implementing Agency

1) Obligations of Recipient Country concerning Implementation of Soft Component

- NUS shall appoint a person in charge of equipment maintenance at least two weeks prior to the commencement of the soft component. NUS shall also select the training participants and inform the consultant of the participants at least one week prior to commencement. (The work schedules of the three biomedical technicians of TTM shall be arranged so that all of them can participate in the training.)
- NUS and TTM shall arrange the work hours of the participants of the soft component training so that they can participate in the training.
- NUS shall secure a venue for the soft component training.

2) Obligations of Recipient Country concerning Equipment Maintenance

The budget required for the participants of the soft component to practice what they have learned and practiced in the soft component shall be allocated to NUS every year.

Annex 1: Schedule of Soft component

Annex 2: Breakdown of Preparation in Japan

Annex 1: Schedule of Soft component

Activities and schedule				Participants				Equipment Manintenance Trainer 0.73PM (22days)	Training Assistant ／Traning Supervisor 0.53PM (16days)
Total Date	Equipment Manintenance Trainer Date	Traning Assistant /Training Supervisor Date	day of	NUS estate management division/ FOHS responsible person	FOHS equipment manager	FOHS end-user	TTM・BMT		
1		1	Wed						Schedule adjustent for participants such as TTM BMT, NUS lecturers etc., and explanation of soft compoments contents
2		2	Thu						Confirmation of attndee, Print and assembly of texts
3	1	3	Fri					Narita－Auckland	Nomination of equipment maintenance manager, and assistance for nomination
4	2		Sat					Auckland－Apia	
5	3		Sun					Document Filing	
6	4	4	Mon					MTG in JICA Samoa office、MTG in NUS/TTM、Explanation on contract of the soft component	
7	5	5	Tue	—	○	○	○	Confirmation of acquisition status of initial operation training provided by supplier about simulator, medical lab., and lecture hall equipment	
8	6	6	Wed	—	○	○	○		
9	7	7	Thu	—	○	○	○	Written exam on skill proficiency	Exam scoring, Preparation of texts
10	8	8	Fri	—	○	—	○	Creation of equipment inventry lists by the equipment maintenance manager and team, maintenance department of TTM	Observation of insruction and notification of necessity of follow-up during instruction by the equipment maintenace lecturor
11	9		Sat					Preparation of texts (ajastment of instruction programme depend on the result of the test)	
12	10		Sun					As is previous day	
13	11	9	Mon	—	○	—	○	Creation and utilization of the equipment inventory lists by equipment maintenance manager and his team and by maintenance department in TTM	Observation of insruction and notification of necessity of follow-up during instruction by the equipment maintenace lecturor
14	12	10	Tue	—	○	○	○	Guidance on daily/priodicary inseption points、and on how to use daily/periodicary inseption forms	As above + video recording of guidance
15	13	11	Wed	—	○	○	○	Summary of procedure for daily/regular inseption、Check of proficiency level	
16	14	12	Thu	—	○	○	○	Improvement on the equipment maintenance status by practicing 5S activities	
17	15	13	Fri	○	○	—	○	Guidance on how to estimate annual equipment maintenance cost Creation of an annual budget draft	
18	16		Sat					Documentation	
19	17		Sun					Documentation	
20	18	14	Mon	—	○	○	○	Operation (Update) of inventry list of procured equipment and simulation training of daily inspection	As above + video recording of guidance
21	19	15	Tue	—	○	○	○	Esatblishing a flow chart for repair in case of malduction occures Simulation for practice of 5S activity	
22	20	16	Wed	○	○	○	○	MTG in JICA Samoa office	
23	21		Thu					Apia - Auckland	
24	22		Fri					Auckland -Narita	

* Since the NUS teaching staff have lectures in charge, we will divide the sessions into two, morning and afternoon, depending on the time of the lectures in charge, so that human resources involved in the operation of procured equipment can participate in the lectures.

Annex2: Breakdown of Soft Component

A. Appointment of equipment managers and guidance on preventive maintenance activities	・text for electric security ・classification of medical equipment (form B・BF・CF) :each1page ・division of duties of maintenance manager and definition of their role:each2～3pages ・instruction for daily inspection before and after use. (indication of relevant points to detect malfunction in early stage.) : aroud4 pages ・instruction for periodical inspections that can be performed within NUS .(Patient monitor, ultrasound scanner etc.: 1sheet for each equipment) :in total 4～5pages ・manual for cleaning of simulator after use and storage: 3 pages Total: 16 pages
B the equipment inventory lists and management of records of repairs. .	・template of equipment inventory list (including examples in few other cases) ・template of records of malfunctions (including examples in few other cases) Total: 2 pages (for 6 cases)
C Establishment of reporting system in case multifunction occurs.	・records of repairs (describing the cause of malfunction, downtime of equipment, condition of equipment) examples in the past at least 3 cases : 1 page ・clarification of division of task between TTM and NUS: 1 page ・manual for how to report malfunction accurately to the agency located in remote region such as NZ and Australia: 2 pages Reporting route when equipment became malfunction (by using ZOOM or other software) :1 page Total: 5 pages (plus three cases)
D. Creation of maintenance sheets for daily and periodical inspections of each equipment (Procurement year, Manufacturer, Model, Record of malfunction, functional/unfunctional time, Utilization records, Periodic inspection records.)	・Creation of maintenance sheets for daily and periodical inspections with referring equipment manual, taking individual specification of equipment into consideration. Target equipment 27 kinds x 3sheet = 81sheets
E. Instruction for 5S activities	・text for 5S activities (management of manual, instructions for how to store and manage simulator): 5pages
	Total 109 pages

* Creation and arrangement of training materials 2 days
* Creation of documents, inquiry to manufactures, and correspondence 6 days
* Correspondence with local office, arrangement, and modification. 1 day

In total: 9days (0.45PM)

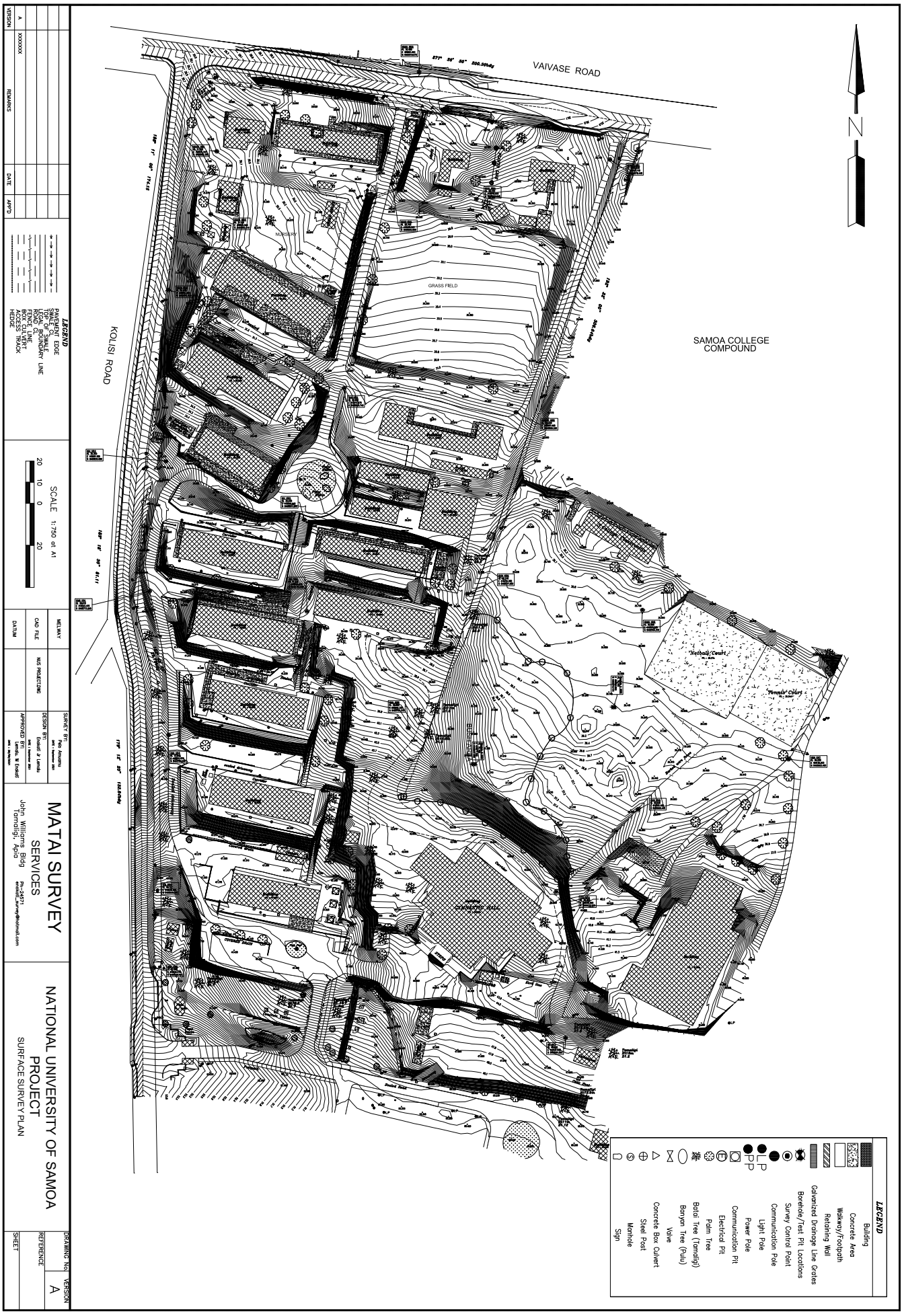
6. Other Relevant Data

6. Other Relevant Data

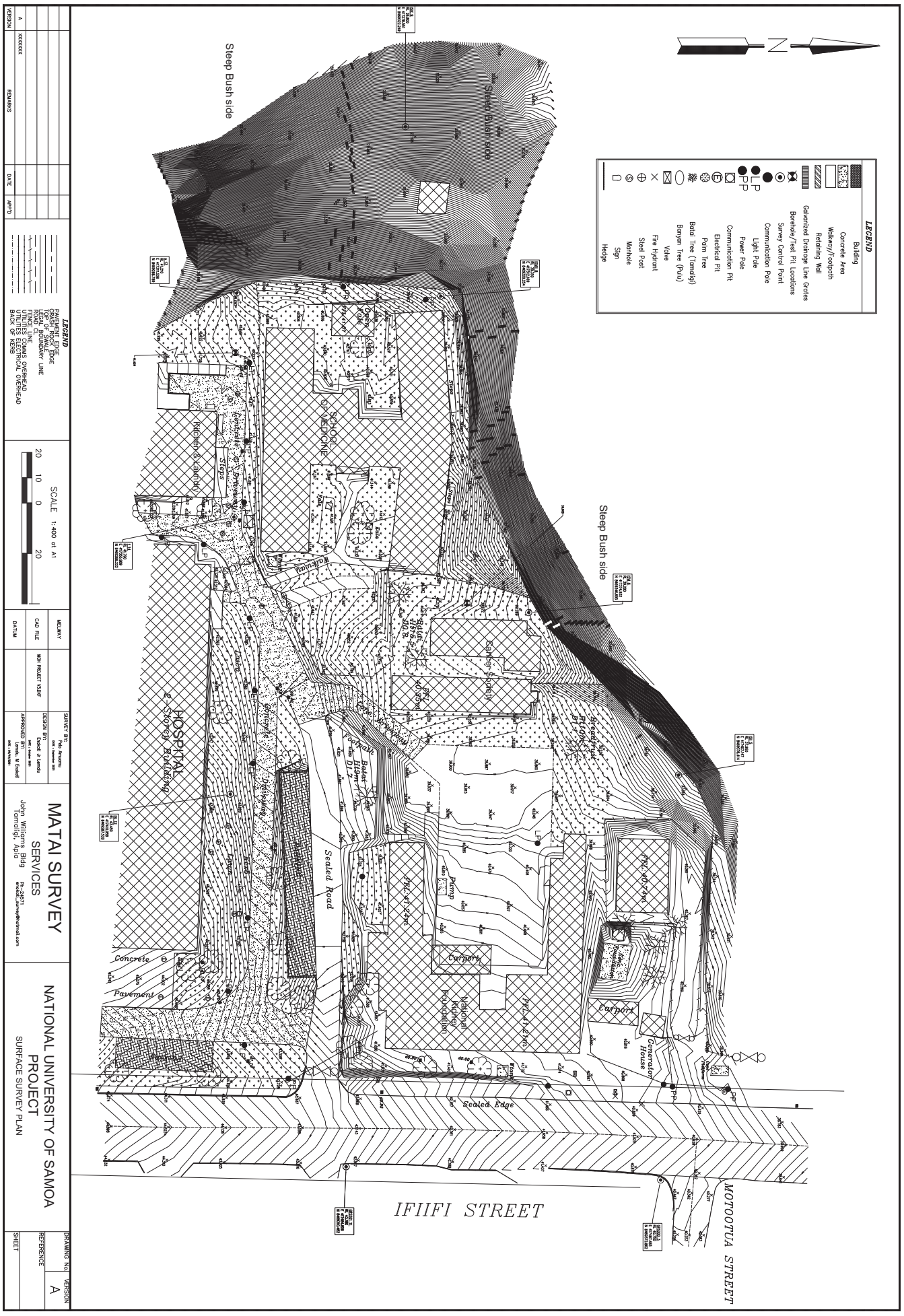
No	Name of Document	Original or Copy	Published by
1	Map of OUM and NKF	Copy	The National University of Samoa
2	NUS Statistical Digest 2019	Copy	The National University of Samoa
3	Business Plan FY2019-FY2024 School of Medicine, Moto'otua Campus Prepared	Copy	The National University of Samoa
4	Health Sector Plan 2019/20-2029/30	Copy	Ministry Of Health
5	Samoa Human Resources For Health Strategy(SHRHS) 2020/21-2025/26	Copy	Ministry Of Health
6	Education Sector Plan 2019/20-2023/24	Copy	Ministry of Education, Sports and Culture
7	NUS Corporate Plan 2021/22-2024/25	Copy	The National University of Samoa
8	National University of Samoa proposal for a pre-clinical and clinical infrastructure facility for the Faculty of Health Sciences	Copy	The National University of Samoa
9	Samoa Health Workforce Development Plan(SHWDP)2020/21-2025/26	Copy	Ministry Of Health
10	The School of Medicine Strategic Plan 2019-2024	Copy	National University of Samoa
11	Interim Waste Management Plan 2020 – 2021	Copy	National University of Samoa
12	Renewable Energy Plan 2021-2025	Copy	National University of Samoa
13	Strategy for the Development of Samoa (SDS) 2016/17–2019/20	Copy	Ministry of Finance
14	Pathway for the Development of Samoa (PDS) 2021/22 -2025/26	Copy	Ministry of Finance
15	NUS Strategic Plan	Copy	National University of Samoa
16	National University of Samoa Calendar 2021	Copy	National University of Samoa
17	National University of Samoa Calendar 2022	Copy	National University of Samoa

7. References

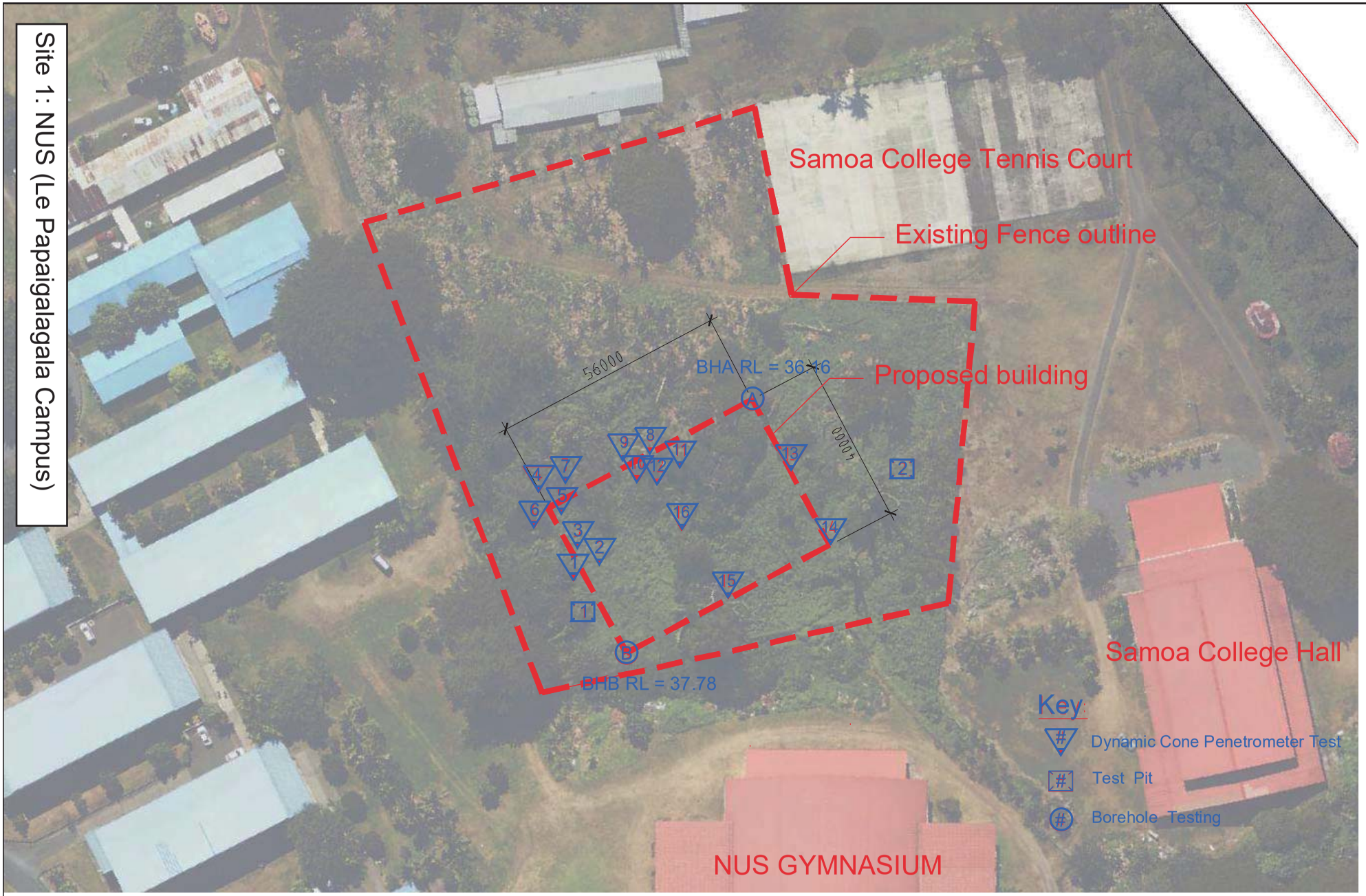
7. Topographic Survey: Le Papaigalagala Campus



7. Topographic survey: Moto'otua Campus



Site 1: NUS (Le Papaigalagala Campus)



Project: Plan: Locations of Boreholes & Scala Penetrometer & Test Pits

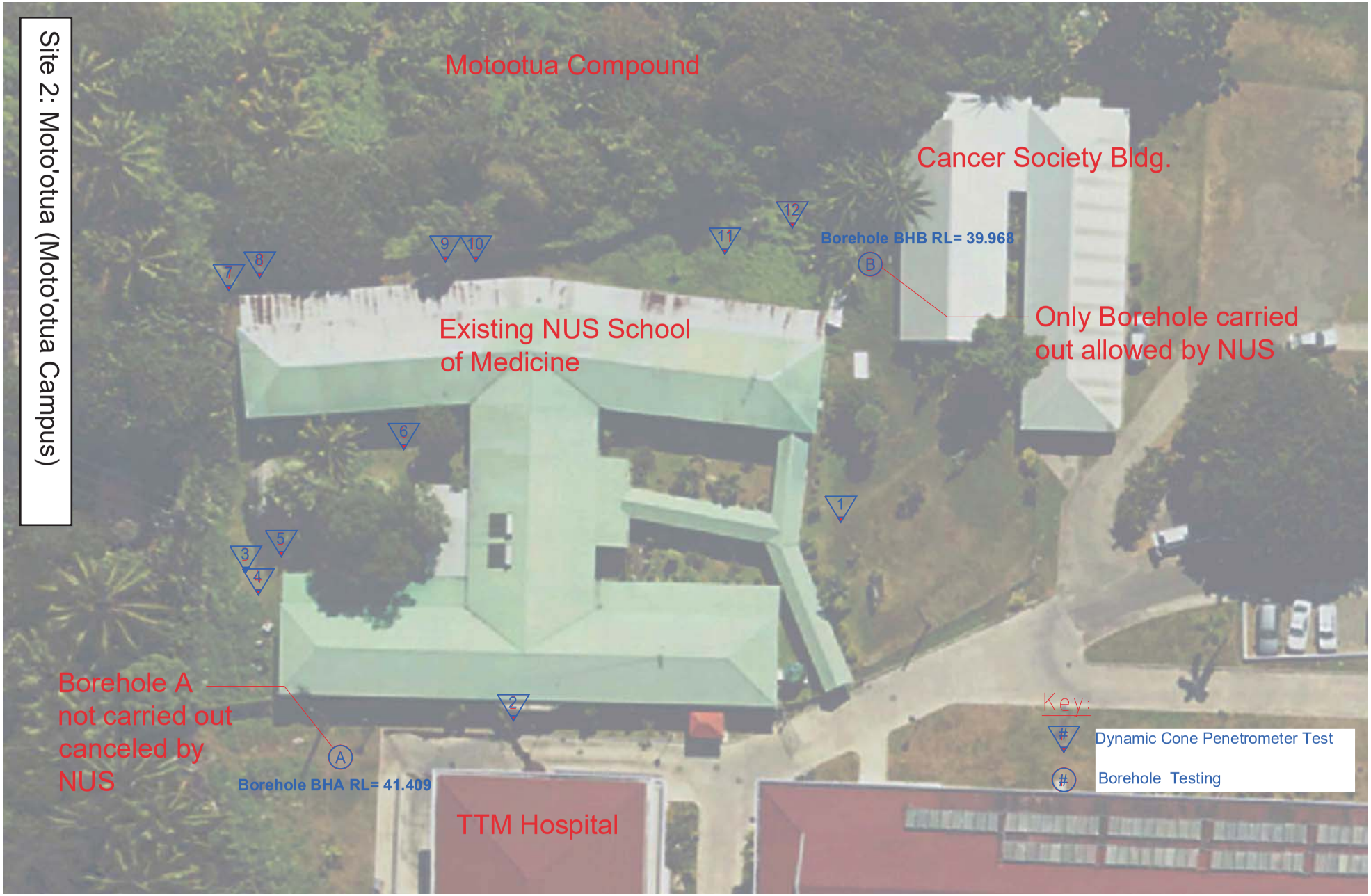
Date: 01 November 2021

TINAI, GORDON & ASSOCIATES LTD
CIVIL AND STRUCTURAL ENGINEERS

LEVEL 4 ACB BUILDING, BEACH ROAD
P.O BOX 9581 APIA, SAMOA

TEL : (685) 22-906
EMAIL : tom@tinaigordon.ws
EMAIL : bill@tinaigordon.ws

Site 2: Moto'otua (Moto'otua Campus)



Project: NUS Motootua Campus
Soil Tests Locations
Date: 30 September 2021

TINAI, GORDON & ASSOCIATES LTD
CIVIL AND STRUCTURAL ENGINEERS
LEVEL 4 ACB BUILDING, BEACH ROAD
P.O BOX 9581 APIA, SAMOA
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EMAIL : bill@tinaigordon.ws

APPENDIX 1

Logs of Boreholes

NUS (Site 1) Drilling Log Borehole A 28 September 2021					
Depth (m)	Core Description	SPT			
0.00	Brown topsoil with scattered stones and small basalt boulders.	Penetration (mm)	Blows	N - value	SPT Sample Description
1.00	Gray highly weathered fragments of basalt rock.	150 300 450	2 3 4	7	Brown soil with fragments of highly weathered basalt rocks.
2.00	Gray highly weathered fragments of basalt rock	150 300 450	2 2 3	5	Gray fragments of highly weathered basalt rocks
3.00	Brown soil and gray weathered fragments of basalt rock.	150 300 450	1 3 6	9	Brown soil with fragments of highly weathered basalt rocks
4.00	Brown soil and highly weathered fragments of basalt rock.	150 300 450	2 6 6	12	Brown soil with fragments of highly weathered basalt rocks
5.00	Fragments of highly weathered basalt rock.	150 300 450	2 4 6	10	Reddish brown soil.
END OF BOREHOLE					

NUS (Site 1) Drilling Log Borehole B 28 September 2021					
Depth (m)	Core Description	SPT			
0.00	Brown topsoil with scattered stones and small basalt boulders.	Penetration (mm)	Blows	N - value	SPT Sample Description
1.00	Dark gray weathered vesiculated basalt.	150 300 450	1	1	Brown soil with fragments of basalt rocks.
2.00	Brownish gray highly weathered fragmented basalt	150 300 450	3 3 2	5	Brown soil with fragments of basalt rock
3.00	Brownish gray highly weathered fragmented basalt	150 300 450	1 - 2	2	Brown soil with fragments of highly weathered basalt rocks
4.00	Gray highly weathered vesiculated basalt.	150 300 450	5 2 1	3	Gray highly weathered basalt
5.00	No core recovered (highly weathered basalt).	150 300 450	6 41 30	71	Gray fragments of basalt rock.
END OF BOREHOLE					

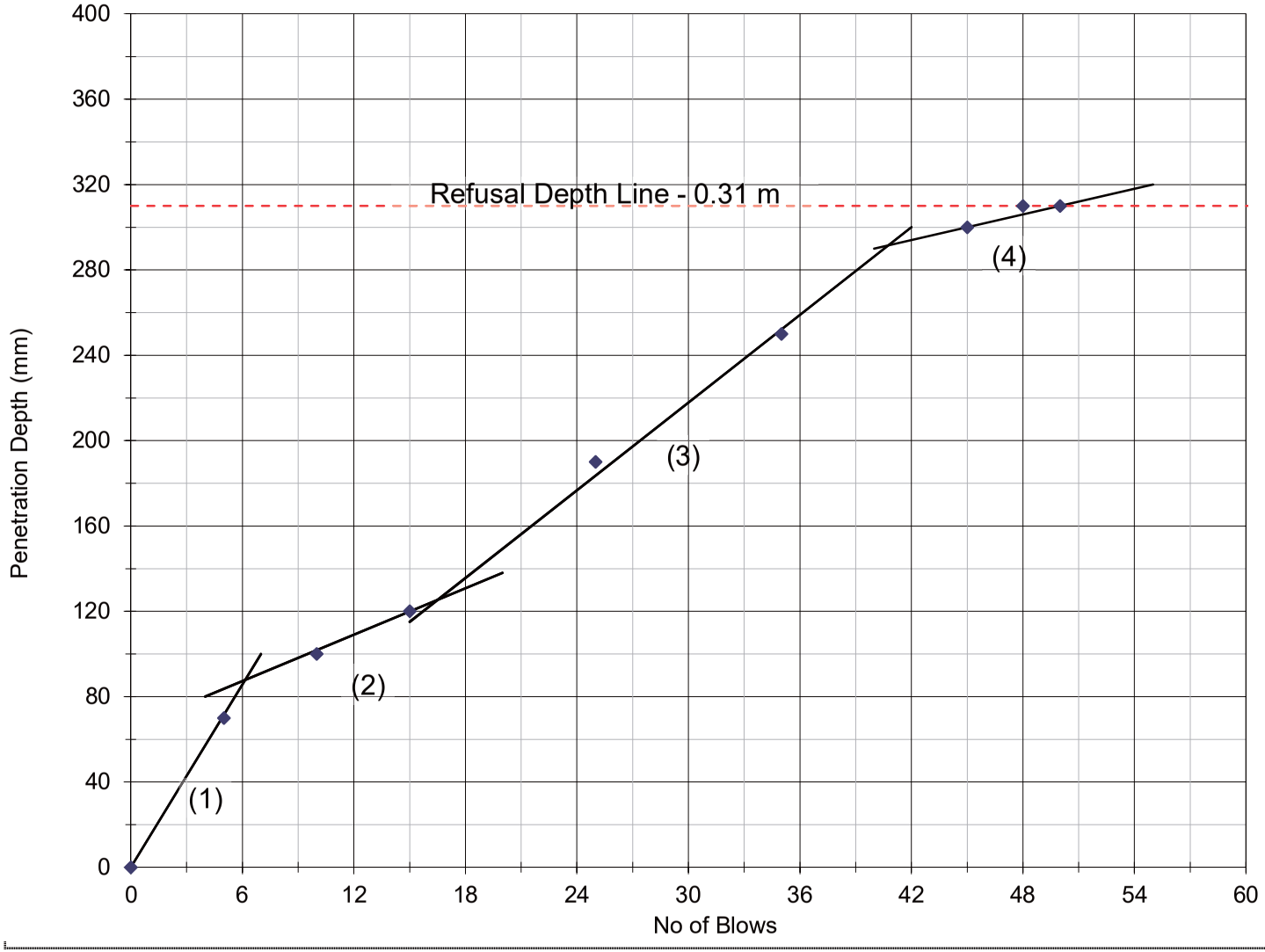
Motootua Hospital (Site 2) Drilling Log Borehole B 30 September 2021					
Depth (m)	Core Description	SPT			
0.00	Brown topsoil with scattered leaves and stones.	Penetration (mm)	Blows	N - value	SPT Sample Description
1.00	Brown soil and weathered fragments of basalt rock.	150 300 450	50	50	Fresh gray basalt rock fragments.
2.00	Brownish Gray highly weathered fragments of basalt rock.	150 300 450	6 12 15	27	Brown soil and highly weathered basalt rocks
3.00	Gray moderately weathered fragments of basalt rock.	150 300 450	50	50	Fresh gray basalt rock.
4.00	Gray moderately weathered fragments of basalt rock	150 300 450	50	50	Fresh gray basalt rock fragments.
5.00	Gray indurated basalt rock	150 300 450	nil	N/a	No SPT – hard rock.
6.00	Gray indurated weathered basalt rock	150 300 450	nil	N/a	No SPT – hard rock.
7.00	Gray indurated weathered basalt rock	150 300 450	11 13 6	19	Brownish gray basalt rock fragments.
END OF BOREHOLE					

APPENDIX 2

Scala Penetrometer Results

Site / Test No: **SP01**

Tinai Gordon & Associates Ltd
Scala Penetrometer Results



Project: **NUS GEOTECH**

Job No.: **1578-21**

Location: **NUS**

Tested By: AT & FL

Date: 27-Sep-21

Weather: Sunny / Dry

Comments: Refusal at a depth of 0.31m

LINE 1
mm/blow = 14 Gradient
CBR = 20
kPa = 200

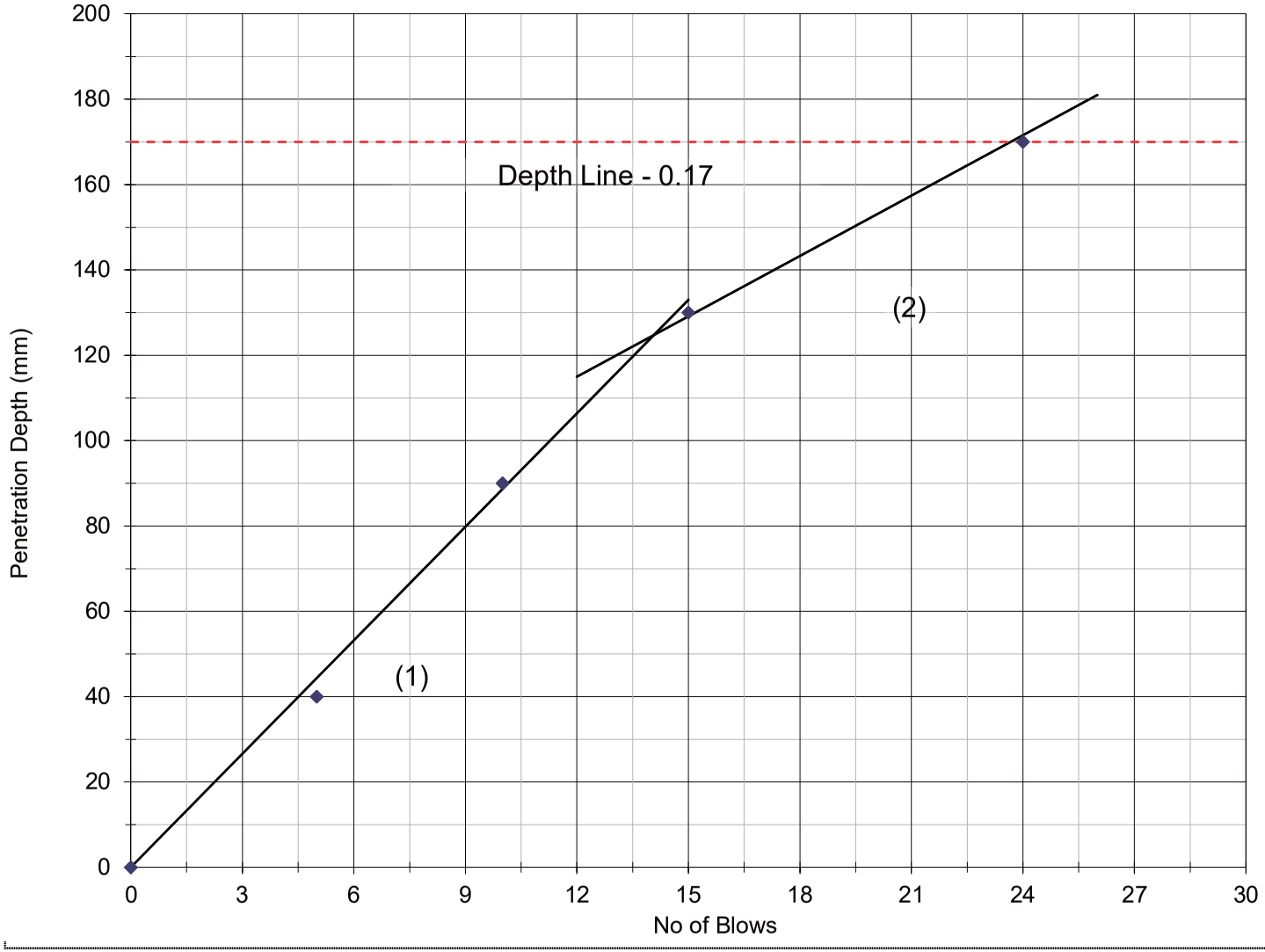
LINE 2
mm/blow = 4 Gradient
CBR = 75
kPa = 420

LINE 3
mm/blow = 7 Gradient
CBR = 38
kPa = 290

LINE 4
mm/blow = 2 Gradient
CBR = 100
kPa = 500

Site / Test No: **SP02**

Tinai Gordon & Associates Ltd
Scala Penetrometer Results



Project: **NUS GEOTECH**

Job No.: **1578-21**

Location: **NUS**

Tested By: AT & FL

Date: 27-Sep-21

Weather: Sunny / Dry

Comments: Refusal at a depth of 0.17m.

LINE 1
mm/blow = 9 Gradient
CBR = 29
kPa = 260

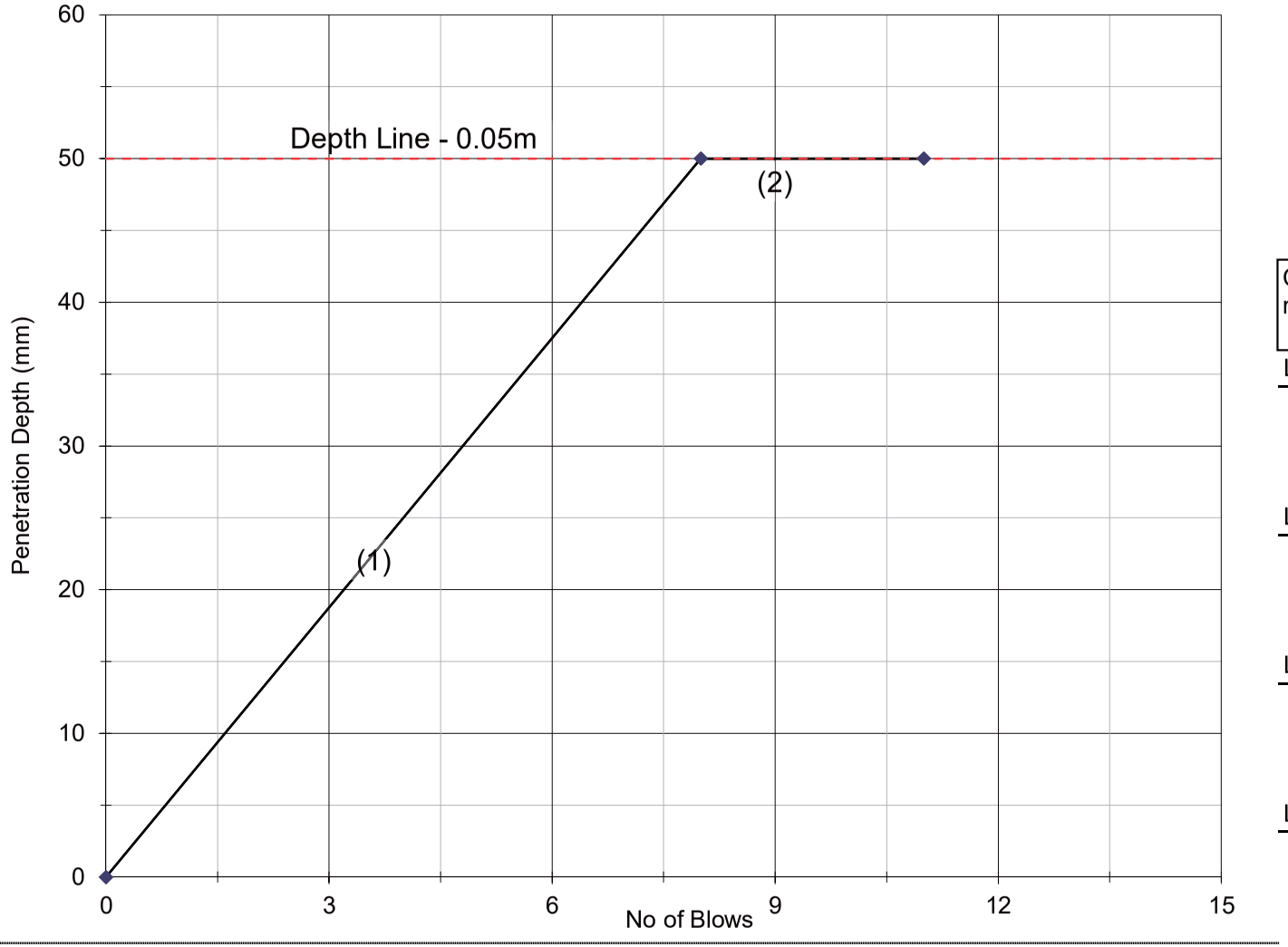
LINE 2
mm/blow = 5 Gradient
CBR = 57
kPa = 360

LINE 3
mm/blow = Gradient
CBR =
kPa =

LINE 4
mm/blow = Gradient
CBR =
kPa =

Site / Test No: **SP03**

Tinai Gordon & Associates Ltd
Scala Penetrometer Results



Project: **NUS GEOTECH**

Job No.: **1578-21**

Location: **NUS**

Tested By: AT & FL

Date: 27-Sep-21

Weather: Sunny / Dry

Comments: Refusal at a depth of 0.05m hard rock found at very shallow depth

LINE 1
mm/blow = 6 Gradient
CBR = 48
kPa = 320

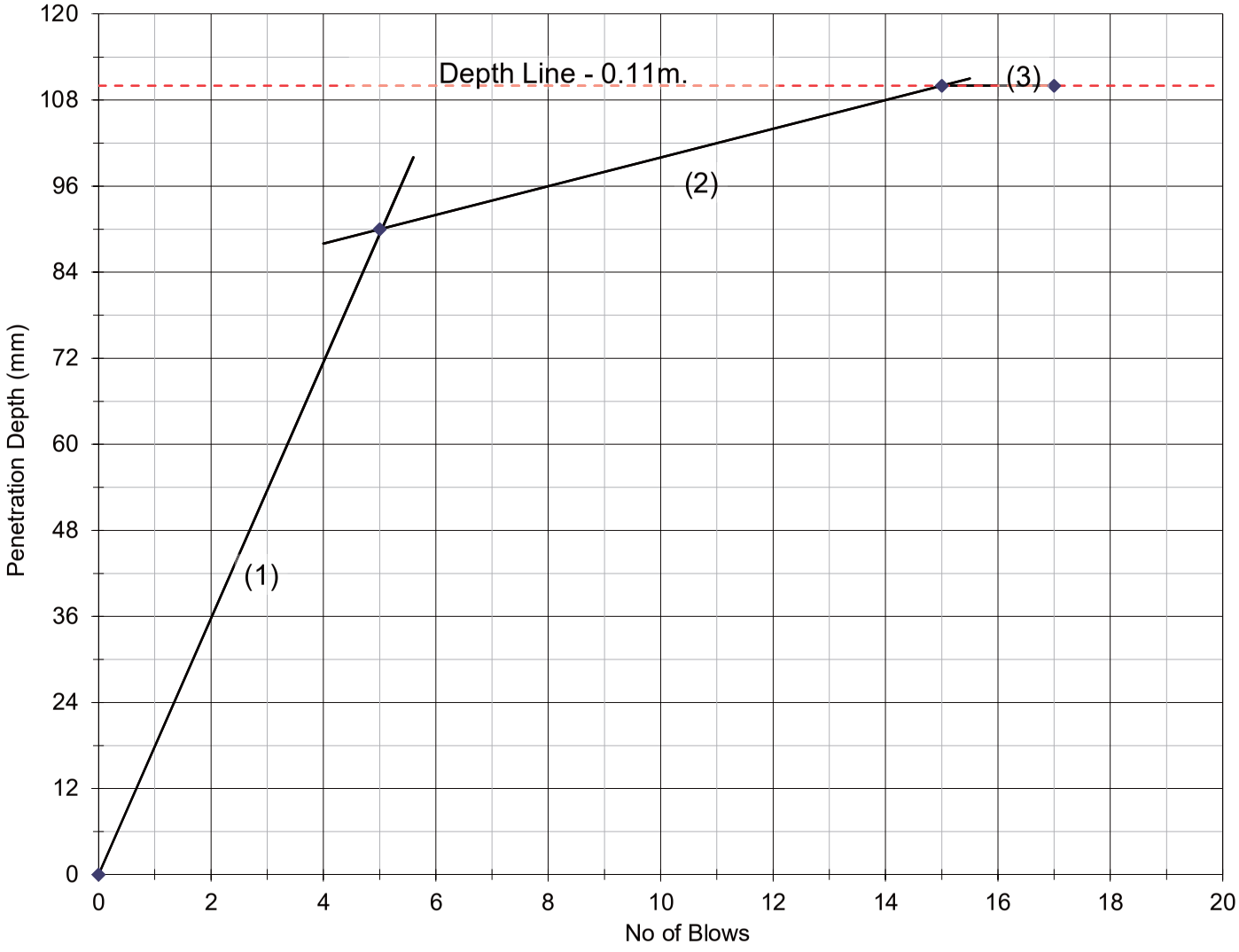
LINE 2
mm/blow = 0 Gradient
CBR = 100
kPa = 500

LINE 3
mm/blow = Gradient
CBR =
kPa =

LINE 4
mm/blow = Gradient
CBR =
kPa =

Site / Test No: **SP04**

Tinai Gordon & Associates Ltd
Scala Penetrometer Results



Project: **NUS GEOTECH**

Job No.: **1578-21**

Location: **NUS**

Tested By: AT & FL

Date: 27-Sep-21

Weather: Sunny / Dry

Comments: Refusal at a depth of 0.11m.

LINE 1
mm/blow = 18 Gradient
CBR = 13
kPa = 160

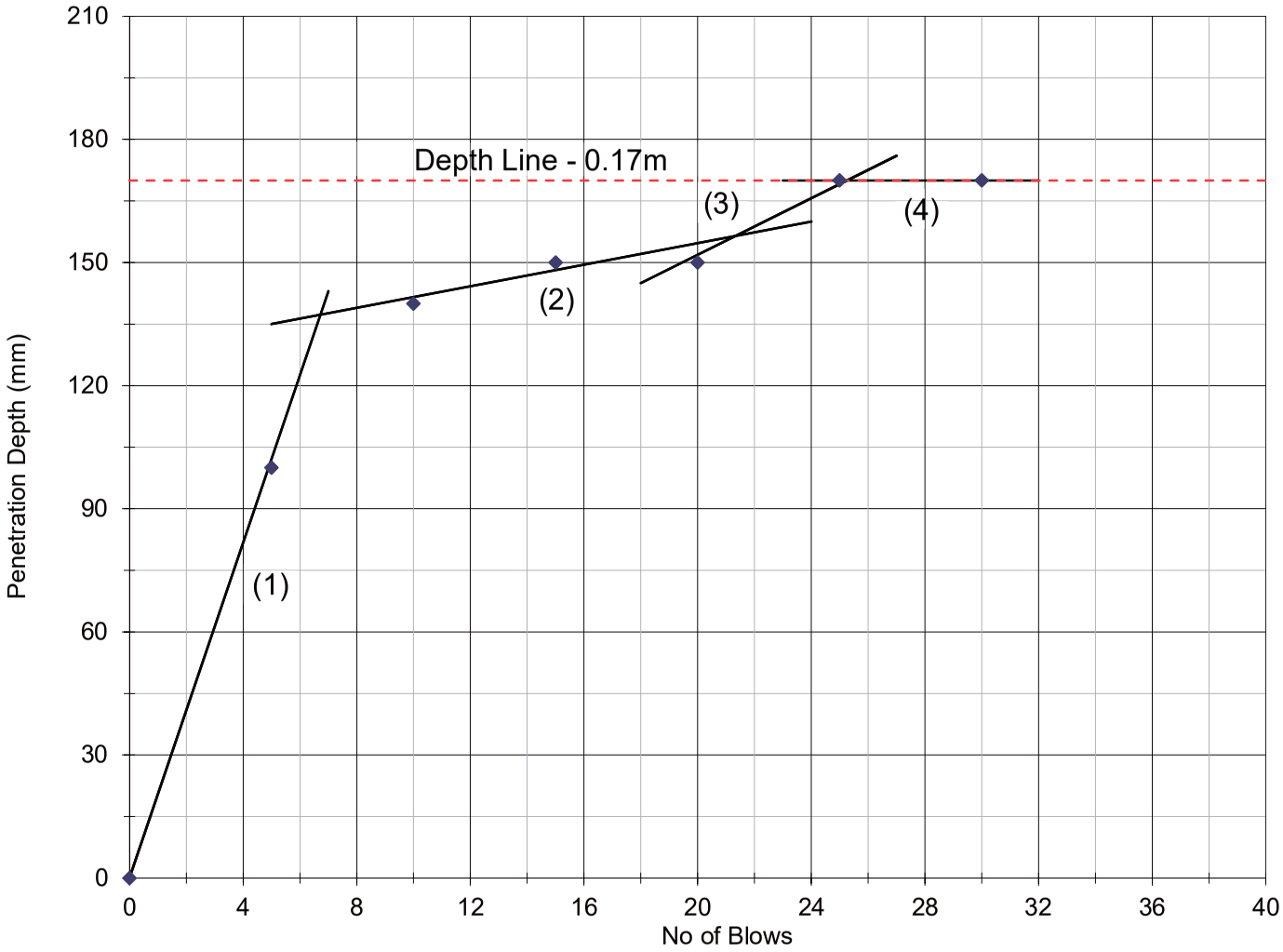
LINE 2
mm/blow = 2 Gradient
CBR = 100
kPa = 500

LINE 3
mm/blow = 0 Gradient
CBR = 100
kPa = 500

LINE 4
mm/blow = Gradient
CBR =
kPa =

Site / Test No: **SP05**

Tinai Gordon & Associates Ltd
Scala Penetrometer Results



Project: **NUS GEOTECH**

Job No.: **1578-21**

Location: **NUS**

Tested By: AT & FL

Date: 27-Sep-21

Weather: Sunny / Dry

Comments: Refusal at a depth of 0.17m

LINE 1
mm/blow = 20 Gradient
CBR = 13
kPa = 160

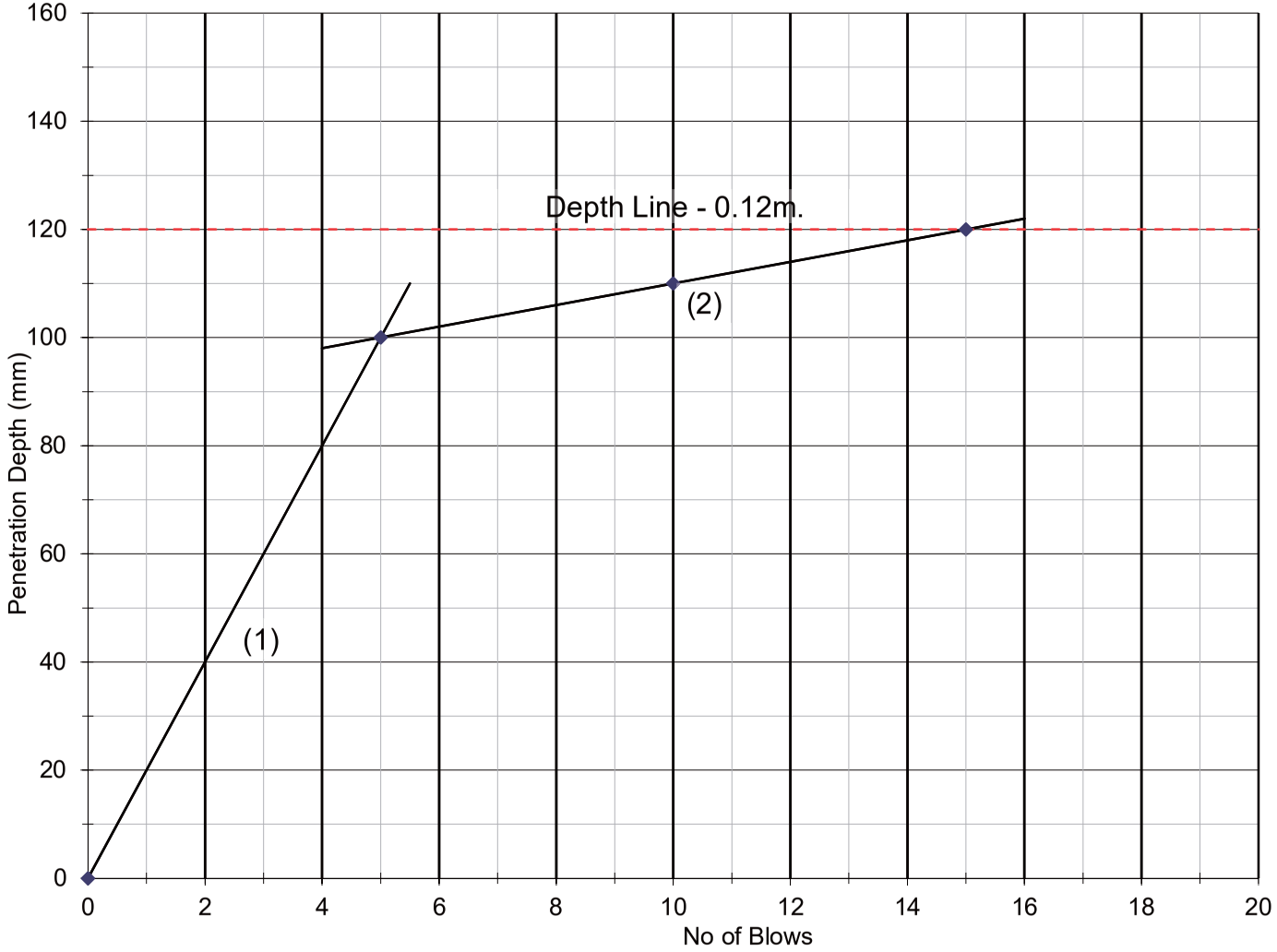
LINE 2
mm/blow = 1 Gradient
CBR = 100
kPa = 500

LINE 3
mm/blow = 3 Gradient
CBR = 100
kPa = 500

LINE 4
mm/blow = 0 Gradient
CBR = 100
kPa = 500

Site / Test No: **SP06**

Tinai Gordon & Associates Ltd
Scala Penetrometer Results



Project: **NUS GEOTECH**

Job No.: **1578-21**

Location: **NUS**

Tested By: AT & FL

Date: 27-Sep-21

Weather: Sunny / Dry

Comments: Rod bent at depth of 0.12m

LINE 1
mm/blow = 20 Gradient
CBR = 13
kPa = 160

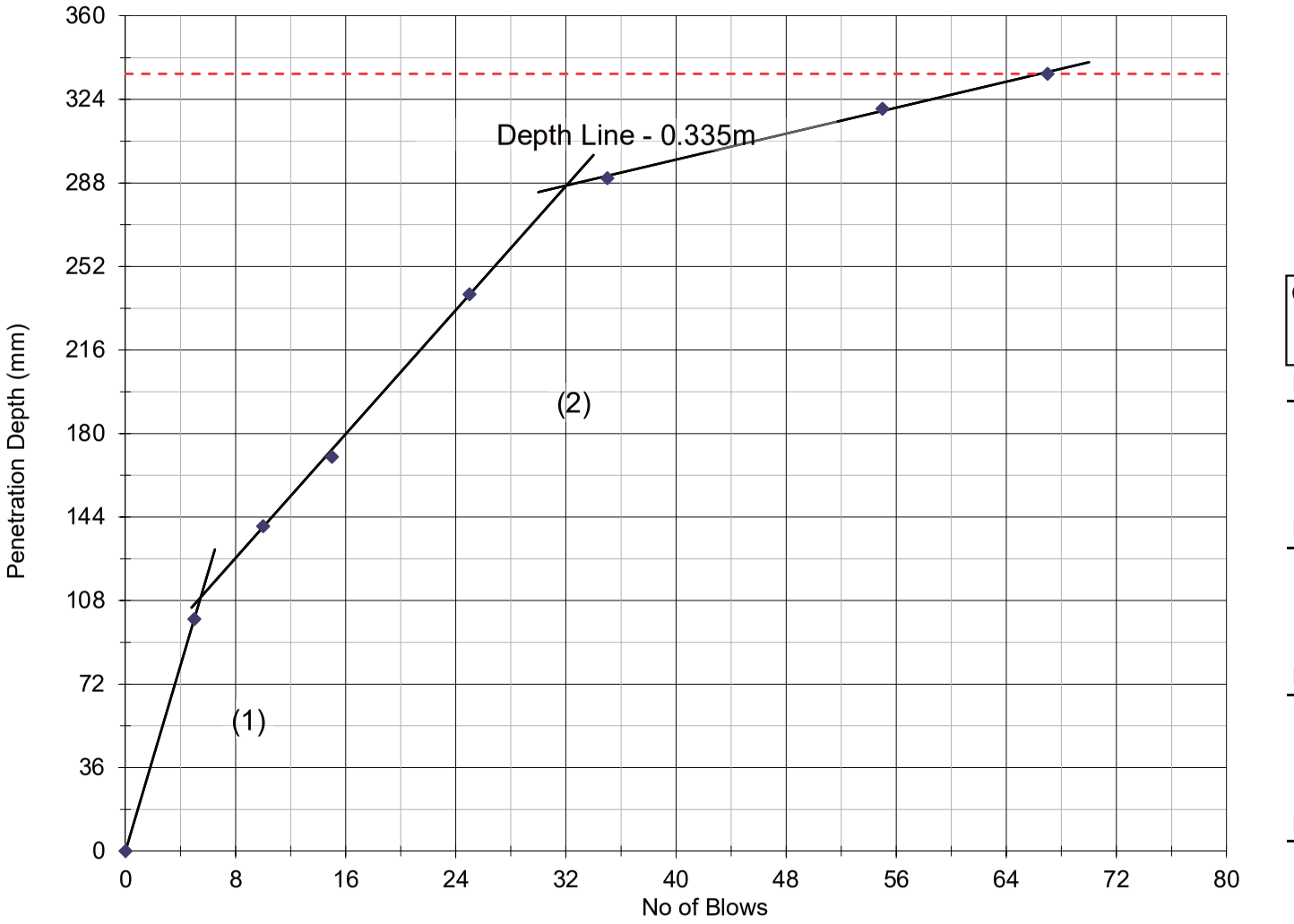
LINE 2
mm/blow = 2 Gradient
CBR = 100
kPa = 500

LINE 3
mm/blow = Gradient
CBR =
kPa =

LINE 4
mm/blow = Gradient
CBR =
kPa =

Site / Test No: **SP07**

Tinai Gordon & Associates Ltd
Scala Penetrometer Results



Project: **NUS GEOTECH**

Job No.: **1578-21**

Location: **NUS**

Tested By: AT & FL

Date: 27-Sep-21

Weather: Sunny / Dry

Comments: Refusal at a depth 0.335m

LINE 1
mm/blow = 20 Gradient
CBR = 13
kPa = 160

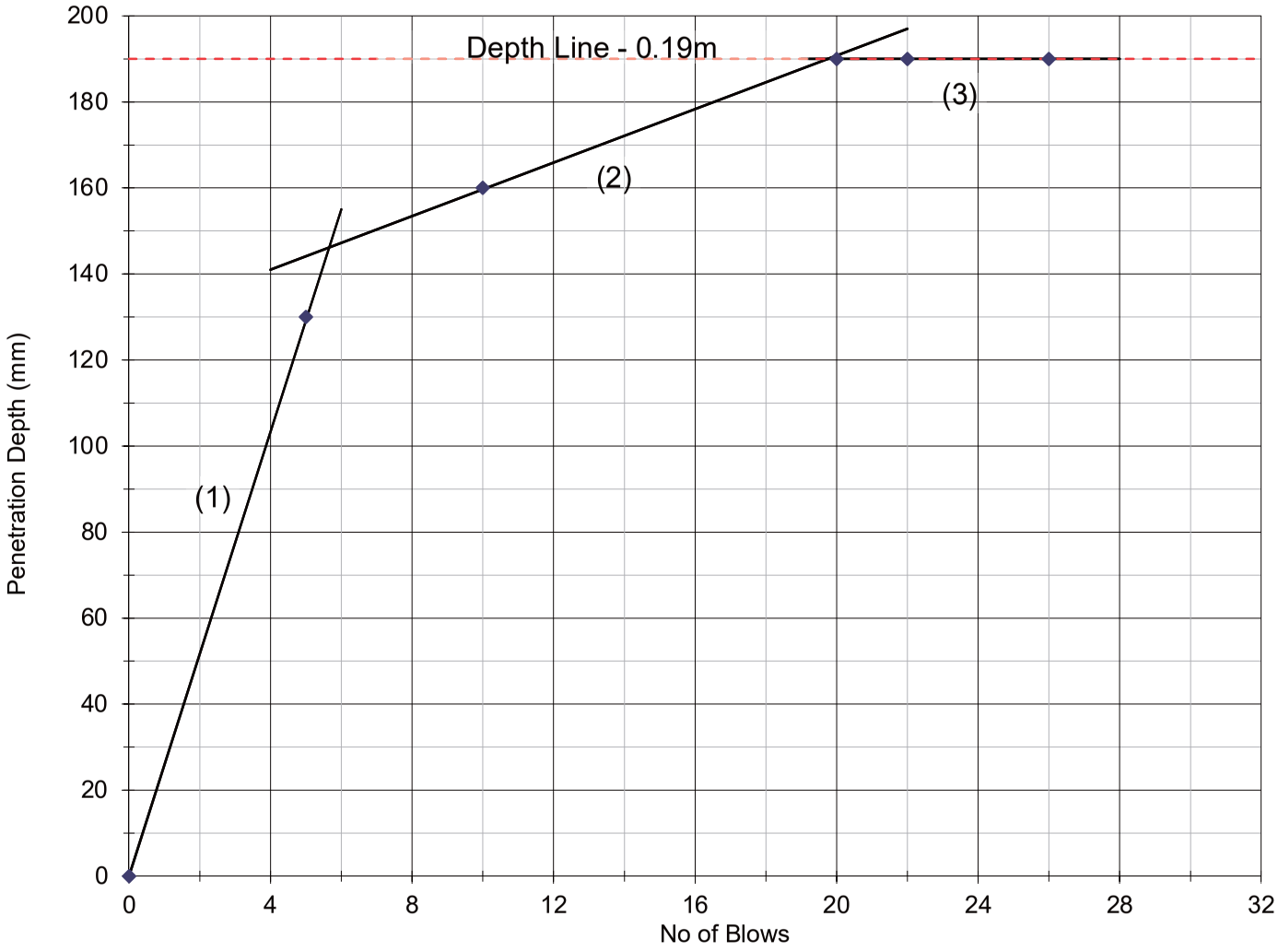
LINE 2
mm/blow = 7 Gradient
CBR = 38
kPa = 290

LINE 3
mm/blow = 1 Gradient
CBR = 100
kPa = 500

LINE 4
mm/blow = Gradient
CBR =
kPa =

Site / Test No: **SP08**

Tinai Gordon & Associates Ltd
Scala Penetrometer Results



Project: **NUS GEOTECH**

Job No.: **1578-21**

Location: **NUS**

Tested By: AT & FL

Date: 27-Sep-21

Weather: Sunny / Dry

Comments: Refusal at a depth of 0.19m

LINE 1
mm/blow = 26 Gradient
CBR = 9
kPa = 128

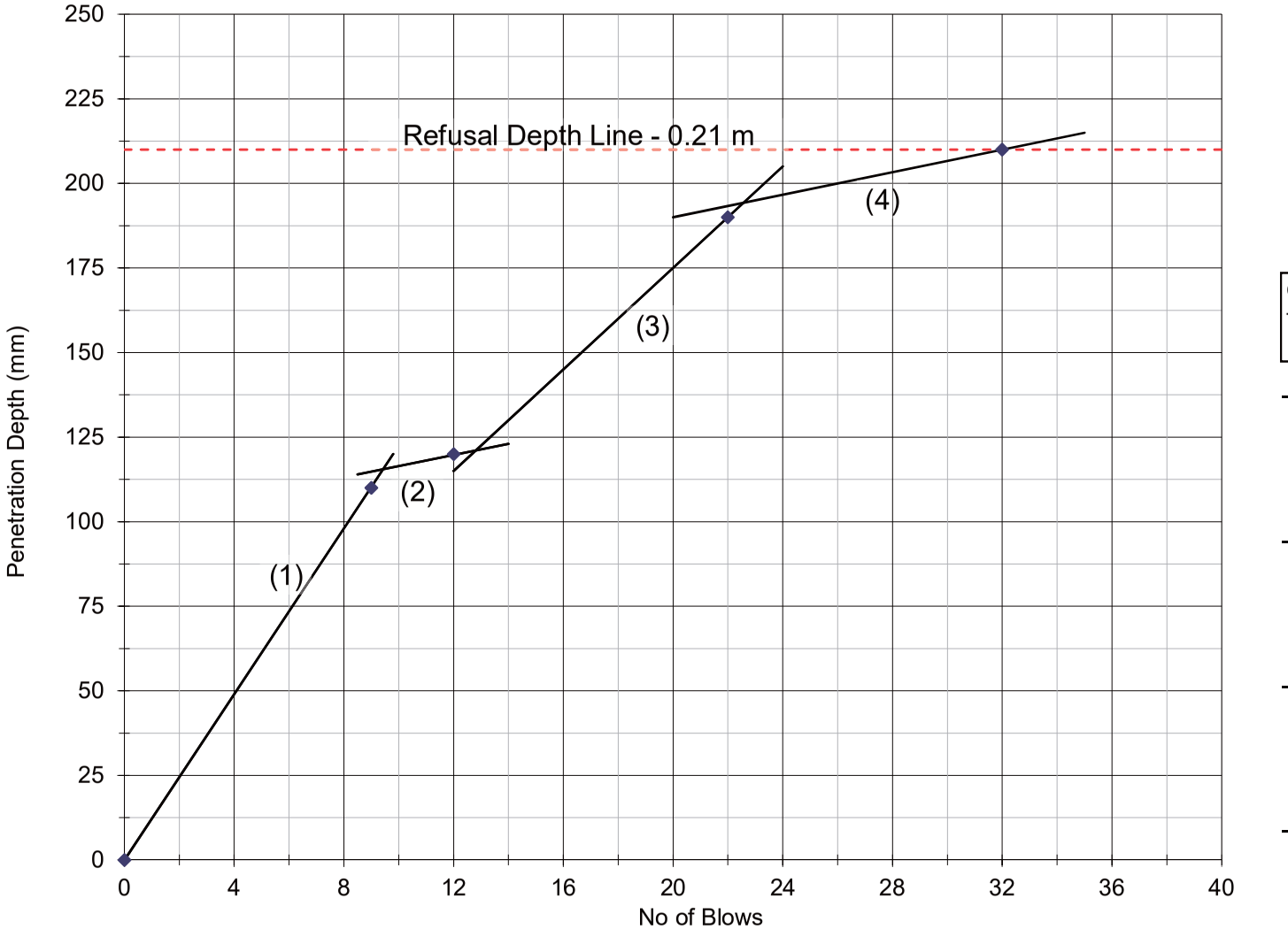
LINE 2
mm/blow = 3 Gradient
CBR = 100
kPa = 500

LINE 3
mm/blow = 0 Gradient
CBR = 100
kPa = 500

LINE 4
mm/blow = Gradient
CBR =
kPa =

Site / Test No: **SP09**

Tinai Gordon & Associates Ltd
Scala Penetrometer Results



Project: **NUS GEOTECH**

Job No.: **1578-21**

Location: **NUS**

Tested By: AT & FL

Date: 27-Sep-21

Weather: Sunny / Dry

Comments: Refusal hit 210 rock was found at this depth.

LINE 1

mm/blow = 12 Gradient

CBR = 25

kPa = 240

LINE 2

mm/blow = 2 Gradient

CBR = 100

kPa = 500

LINE 3

mm/blow = 8 Gradient

CBR = 35

kPa = 280

LINE 4

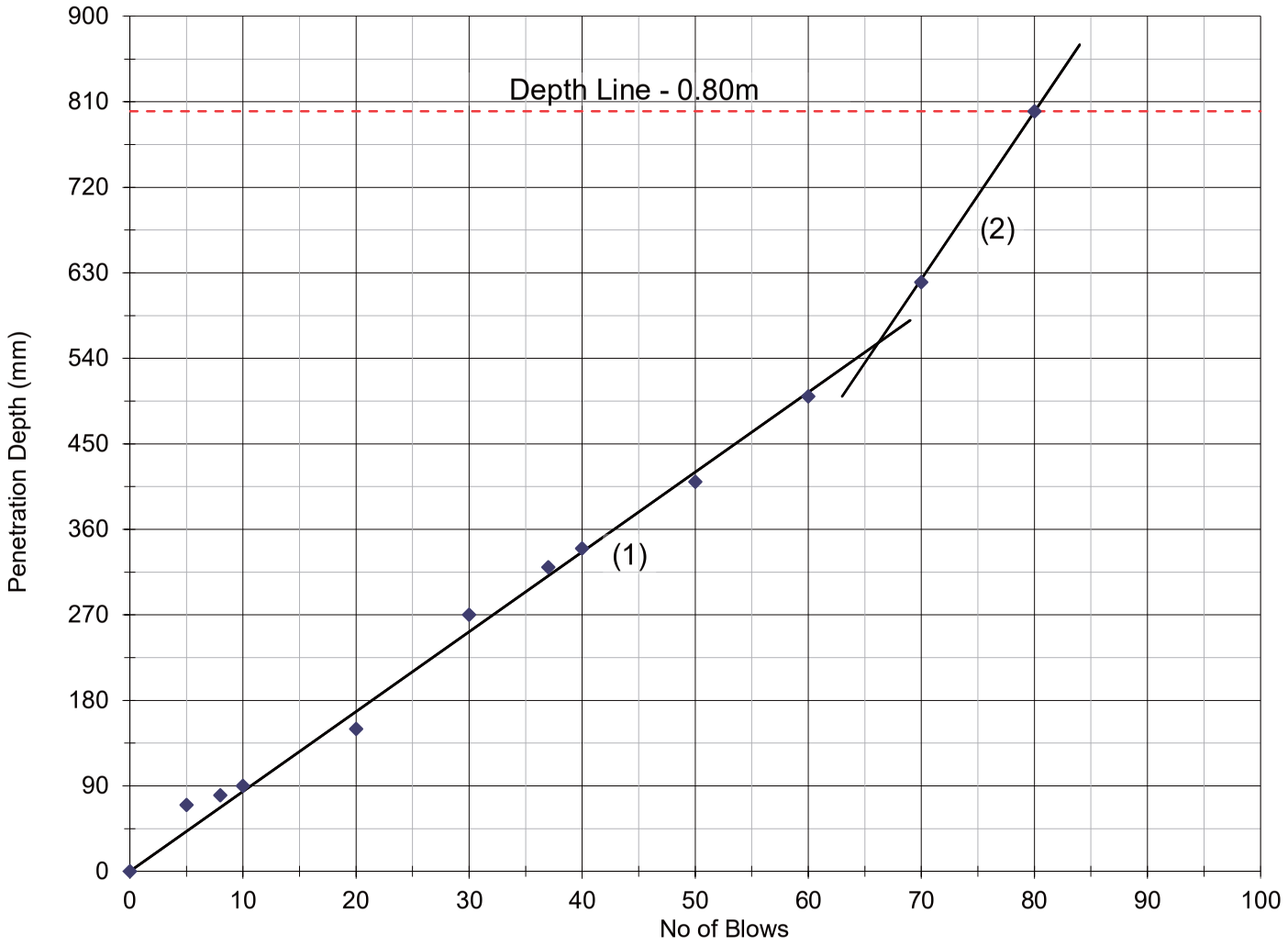
mm/blow = 2 Gradient

CBR = 100

kPa = 500

Site / Test No: **SP10**

Tinai Gordon & Associates Ltd
Scala Penetrometer Results



Project: **NUS GEOTECH**

Job No.: **1578-21**

Location: **NUS**

Tested By: AT & FL

Date: 27-Sep-21

Weather: Sunny / Dry

Comments: Refusal at a depth was reached at 800mm deep. No further testring was carried out

LINE 1
mm/blow = 8 Gradient
CBR = 35
kPa = 280

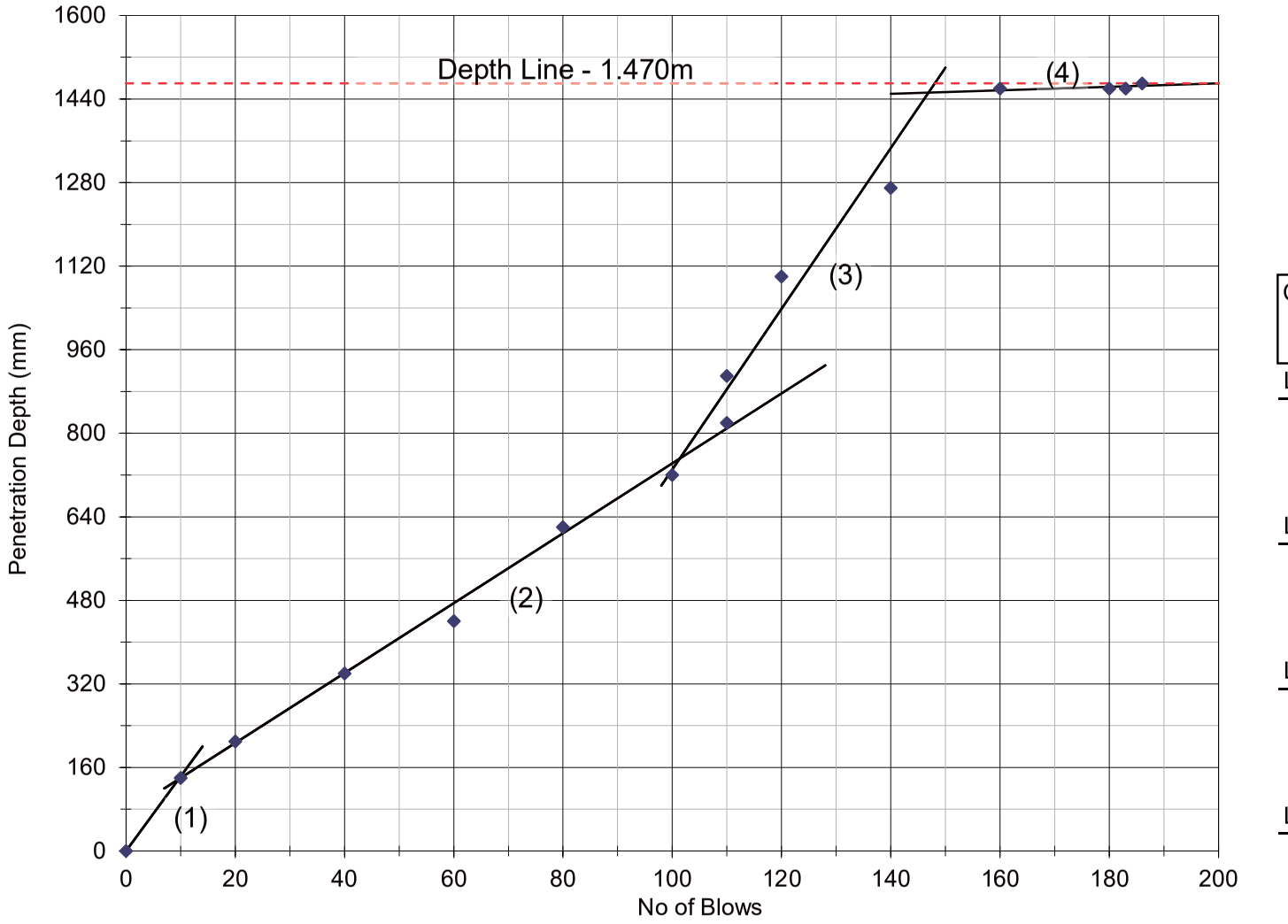
LINE 2
mm/blow = 18 Gradient
CBR = 13
kPa = 160

LINE 3
mm/blow = 0 Gradient
CBR = 0
kPa = 0

LINE 4
mm/blow = 0 Gradient
CBR = 0
kPa = 0

Site / Test No: **SP11**

Tinai Gordon & Associates Ltd
Scala Penetrometer Results



Project: **NUS**

Job No.: **1578-21**

Location: **NUS**

Tested By: FL&AT

Date: 27-Sep-21

Weather: Sunny / Dry

Comments: Refusal at a depth of 1.47m

LINE 1
mm/blow = 14 Gradient
CBR = 20
kPa = 200

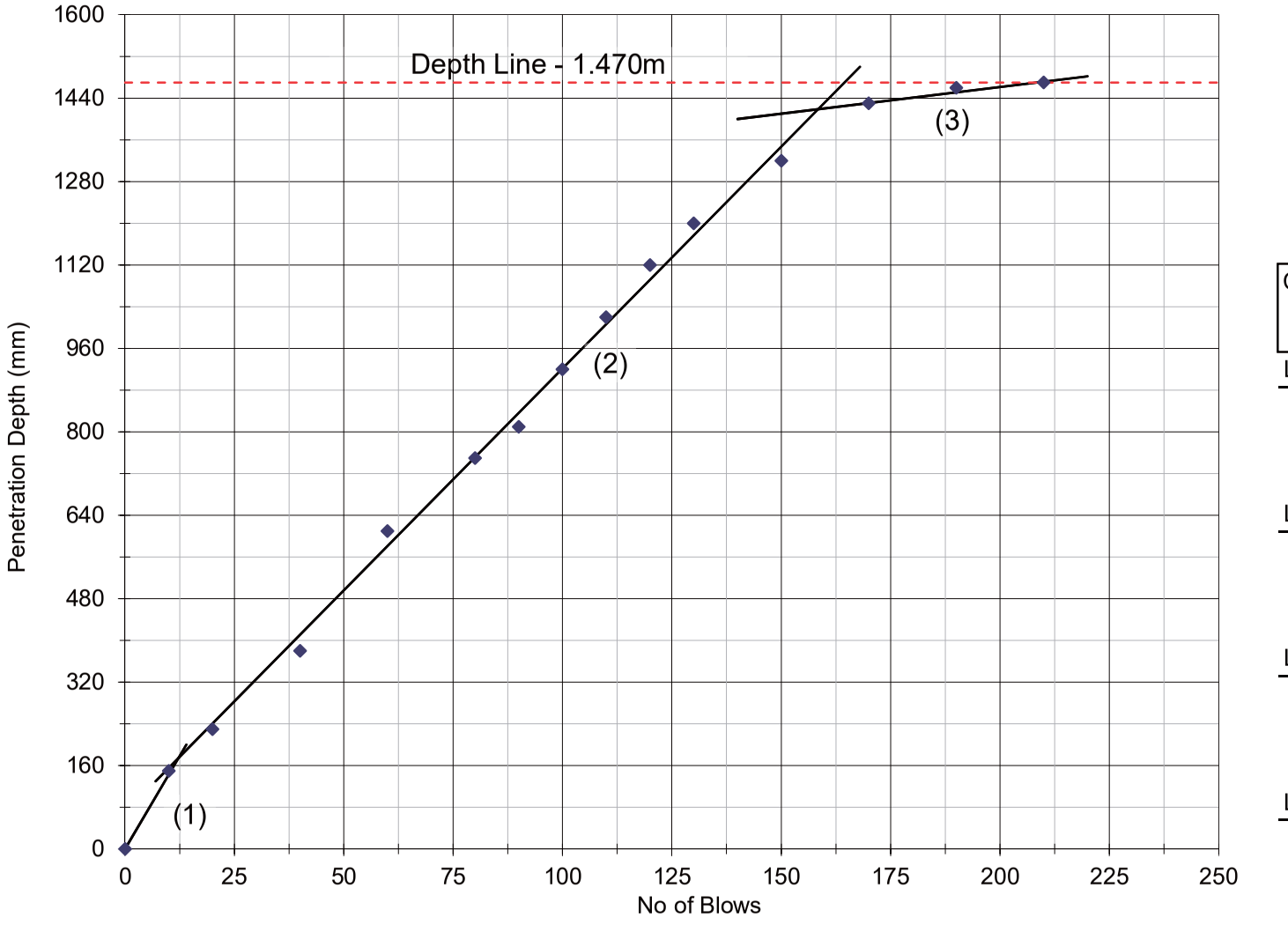
LINE 2
mm/blow = 7 Gradient
CBR = 38
kPa = 290

LINE 3
mm/blow = 15 Gradient
CBR = 19
kPa = 190

LINE 4
mm/blow = 0 Gradient
CBR = 100
kPa = 500

Site / Test No: **SP12**

Tinai Gordon & Associates Ltd
Scala Penetrometer Results



Project: **NUS**

Job No.: **1578-21**

Location: **NUS**

Tested By: FL&AT

Date: 27-Sep-21

Weather: Sunny / Dry

Comments: Refusal at a depth of 1.47m

LINE 1
mm/blow = 14 Gradient
CBR = 20
kPa = 200

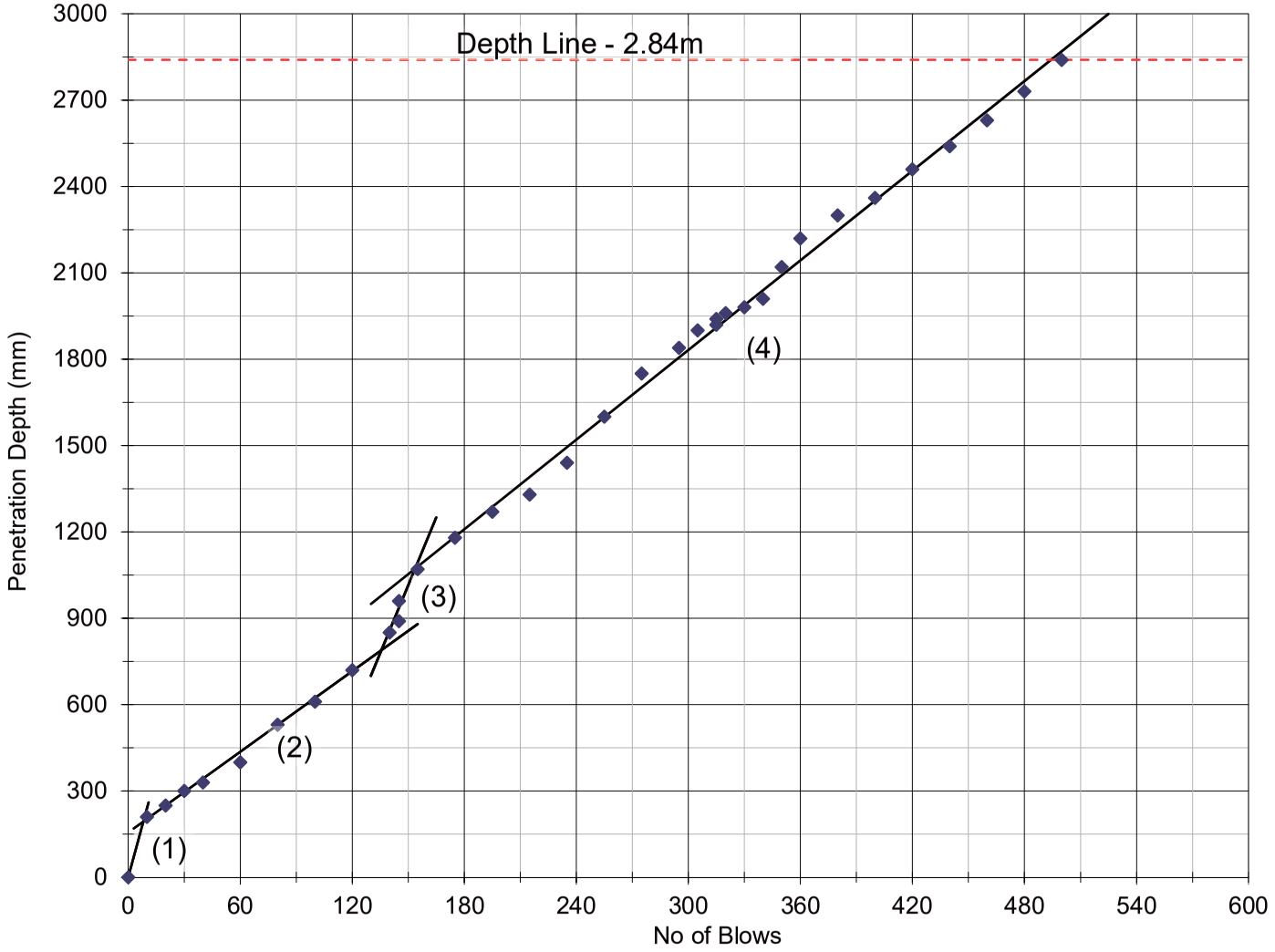
LINE 2
mm/blow = 9 Gradient
CBR = 29
kPa = 260

LINE 3
mm/blow = 1 Gradient
CBR = 100
kPa = 500

LINE 4
mm/blow = 0 Gradient
CBR =
kPa =

Site / Test No: **SP13**

Tinai Gordon & Associates Ltd
Scala Penetrometer Results



Project: **NUS GEOTECH**

Job No.: **1578-21**

Location: **NUS**

Tested By: AT & FL

Date: 27-Sep-21

Weather: Sunny / Dry

Comments: Refusal at a depth of 2.84m.

LINE 1
mm/blow = 24 Gradient
CBR = 10
kPa = 133

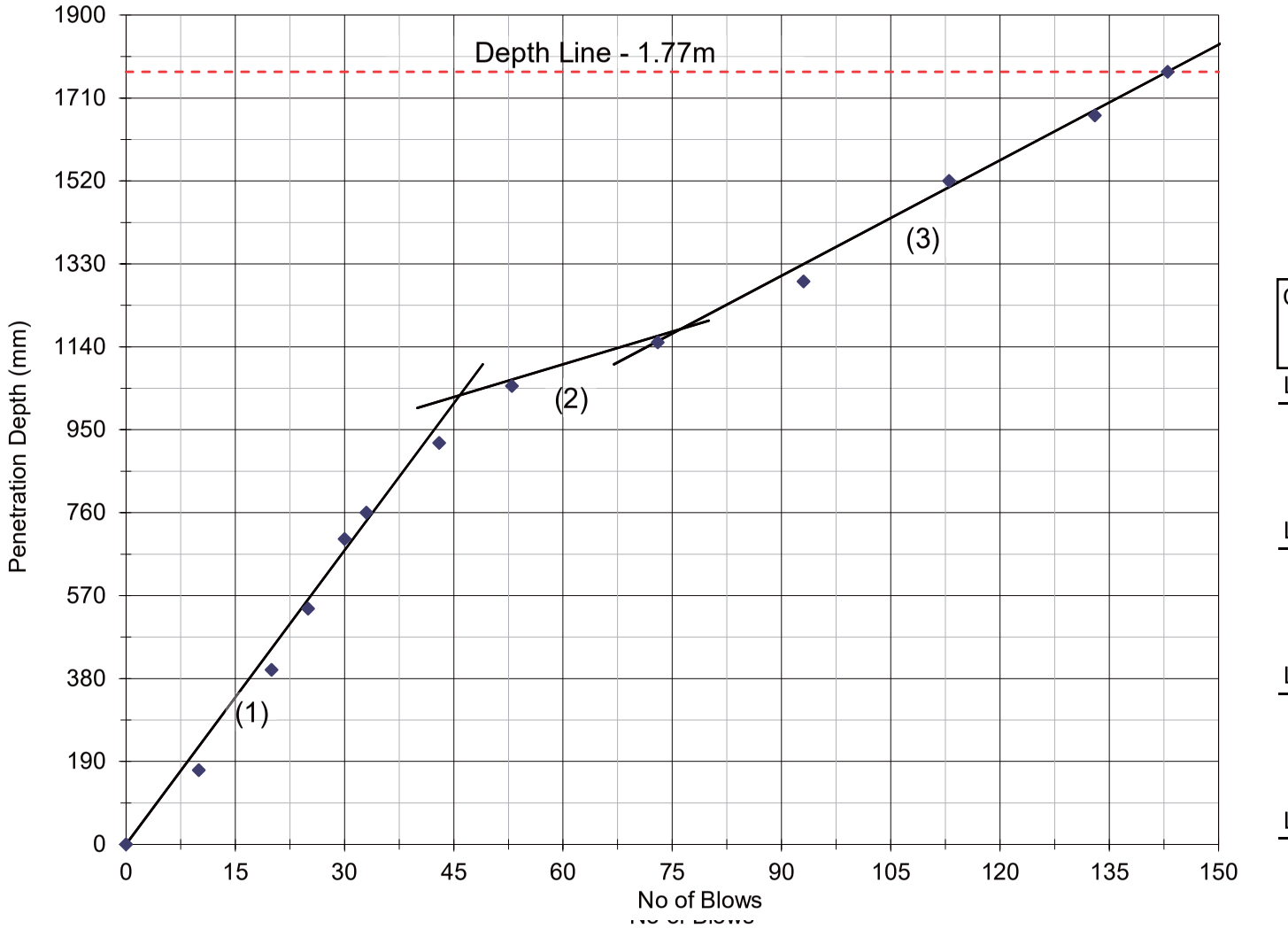
LINE 2
mm/blow = 5 Gradient
CBR = 57
kPa = 360

LINE 3
mm/blow = 16 Gradient
CBR = 18
kPa = 185

LINE 4
mm/blow = 5 Gradient
CBR = 57
kPa = 360

Site / Test No: **SP14**

Tinai Gordon & Associates Ltd
Scala Penetrometer Results



Project: **NUS GEOTECH**

Job No.: **1578-21**

Location: **NUS**

Tested By: AT & FL

Date: 27-Sep-21

Weather: Sunny / Dry

Comments: Refusal at a depth 1.77m.

LINE 1
mm/blow = 22 Gradient
CBR = 11
kPa = 145

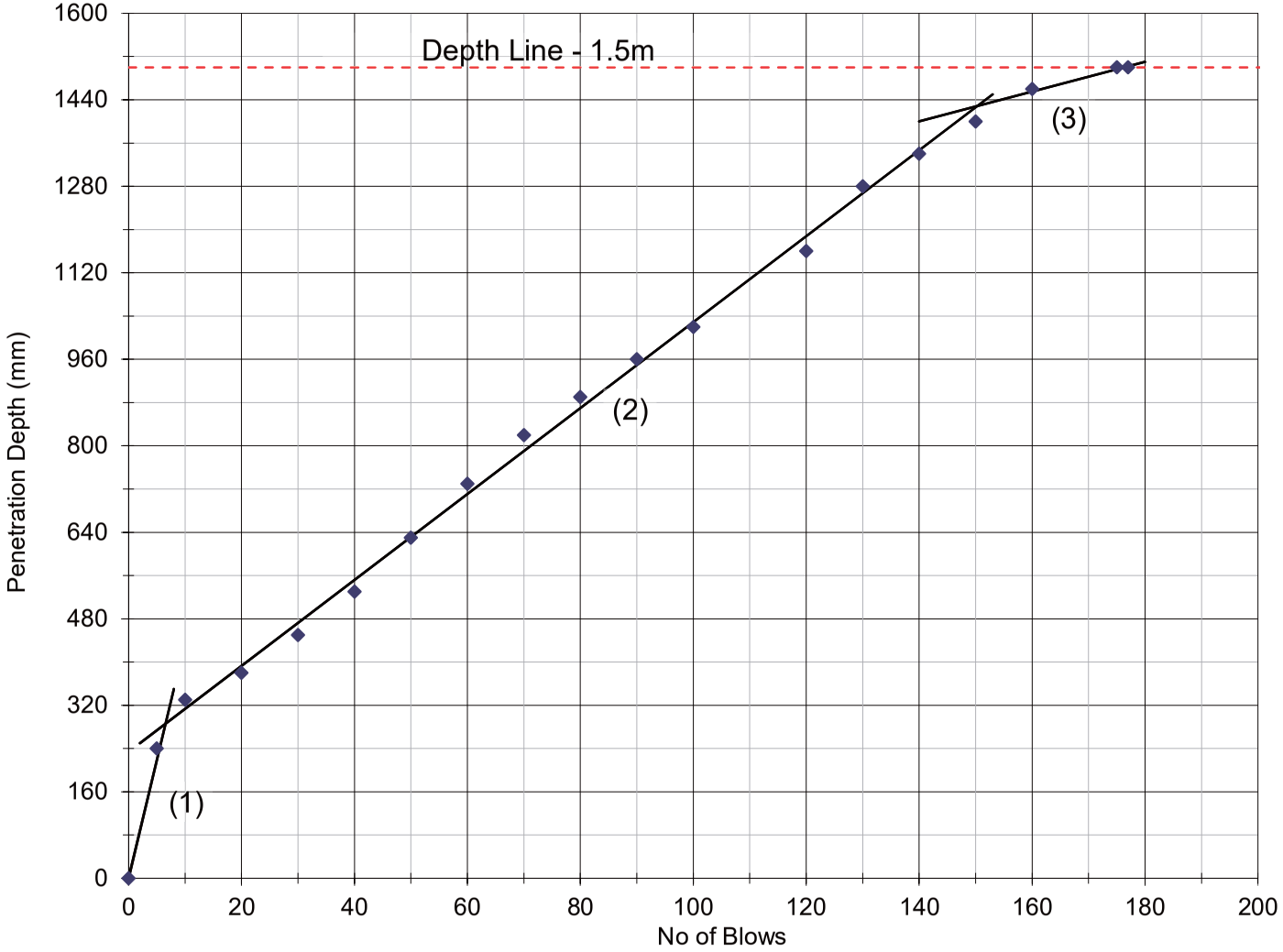
LINE 2
mm/blow = 5 Gradient
CBR = 57
kPa = 360

LINE 3
mm/blow = 9 Gradient
CBR = 29
kPa = 260

LINE 4
mm/blow = Gradient
CBR =
kPa =

Site / Test No: **SP15**

Tinai Gordon & Associates Ltd
Scala Penetrometer Results



Project: **NUS GEOTECH**

Job No.: **1578-21**

Location: **NUS**

Tested By: AT & FL

Date: 27-Sep-21

Weather: Sunny / Dry

Comments: Refusal at a depth of 1.5m

LINE 1
mm/blow = 44 Gradient
CBR = 5
kPa = 75

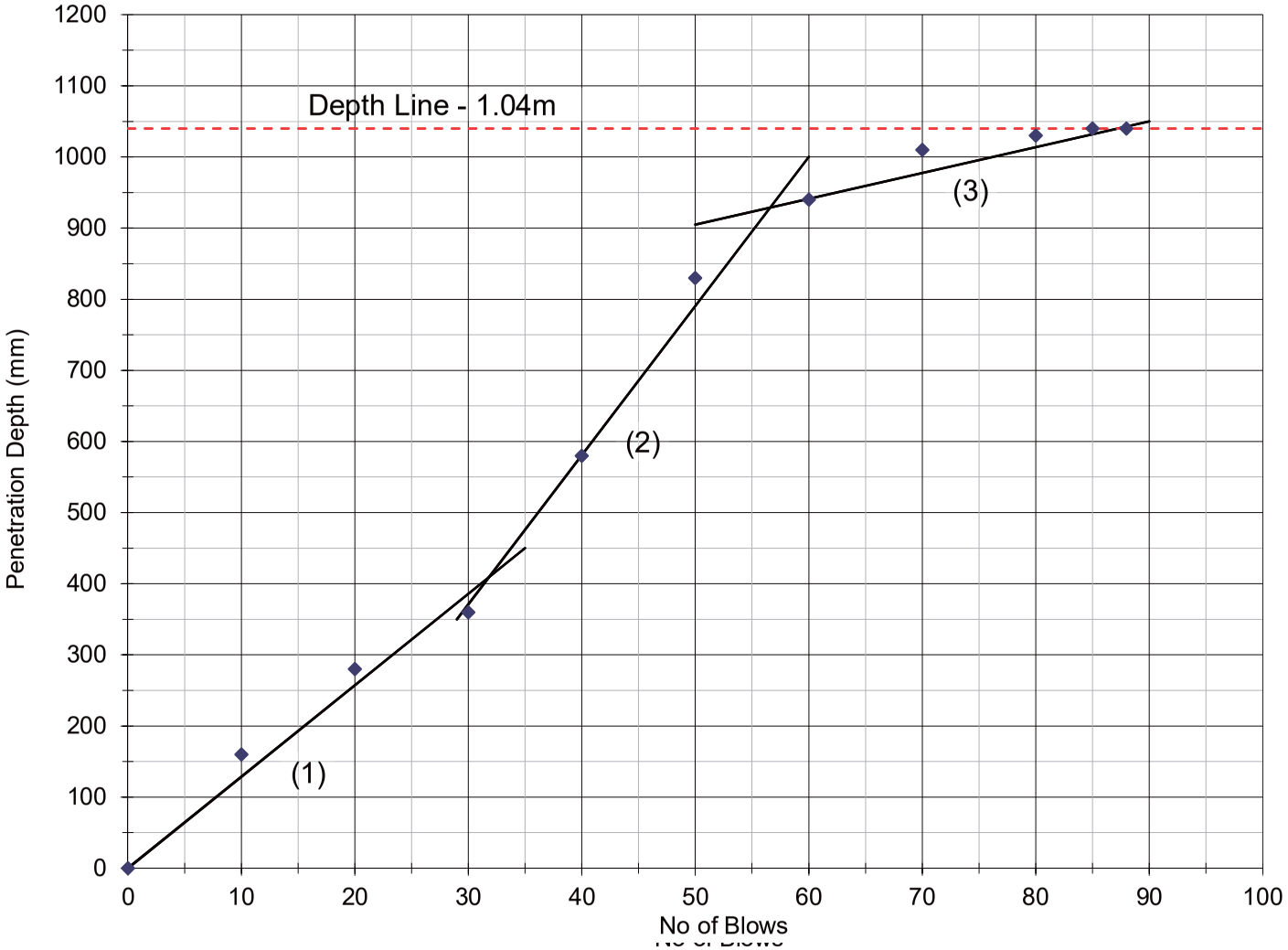
LINE 2
mm/blow = 8 Gradient
CBR = 35
kPa = 280

LINE 3
mm/blow = 3 Gradient
CBR = 100
kPa = 500

LINE 4
mm/blow = Gradient
CBR =
kPa =

Site / Test No: **SP16**

Tinai Gordon & Associates Ltd
Scala Penetrometer Results



Project: **NUS GEOTECH**

Job No.: **1578-21**

Location: **NUS**

Tested By: AT & FL

Date: 27-Sep-21

Weather: Sunny / Dry

Comments: Refusal at a depth of 1.04m

LINE 1
mm/blow = 13 Gradient
CBR = 22
kPa = 220

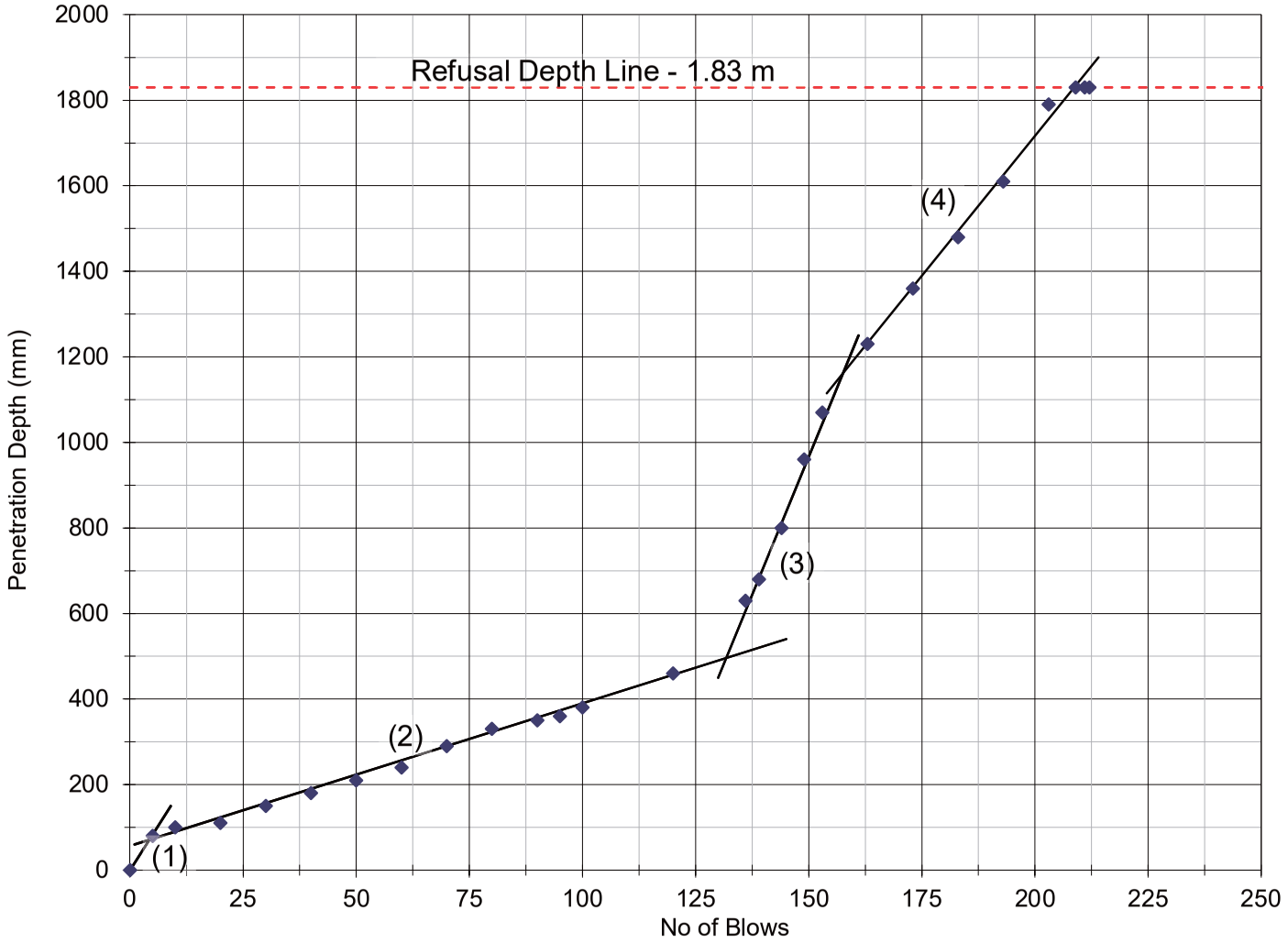
LINE 2
mm/blow = 21 Gradient
CBR = 12
kPa = 150

LINE 3
mm/blow = 4 Gradient
CBR = 75
kPa = 420

LINE 4
mm/blow = Gradient
CBR =
kPa =

Site / Test No: **SP01**

Tinai Gordon & Associates Ltd
Scala Penetrometer Results



Project: **MOTOOTUA GEOTECH**

Job No.: **1579-21**

Location: **MOTOOTUA**

Tested By: AT & FL

Date: 30-Sep-21

Weather: Sunny / Dry

Comments: Refusal at a depth of 1.83m

LINE 1
mm/blow = 17 Gradient
CBR = 17
kPa = 180

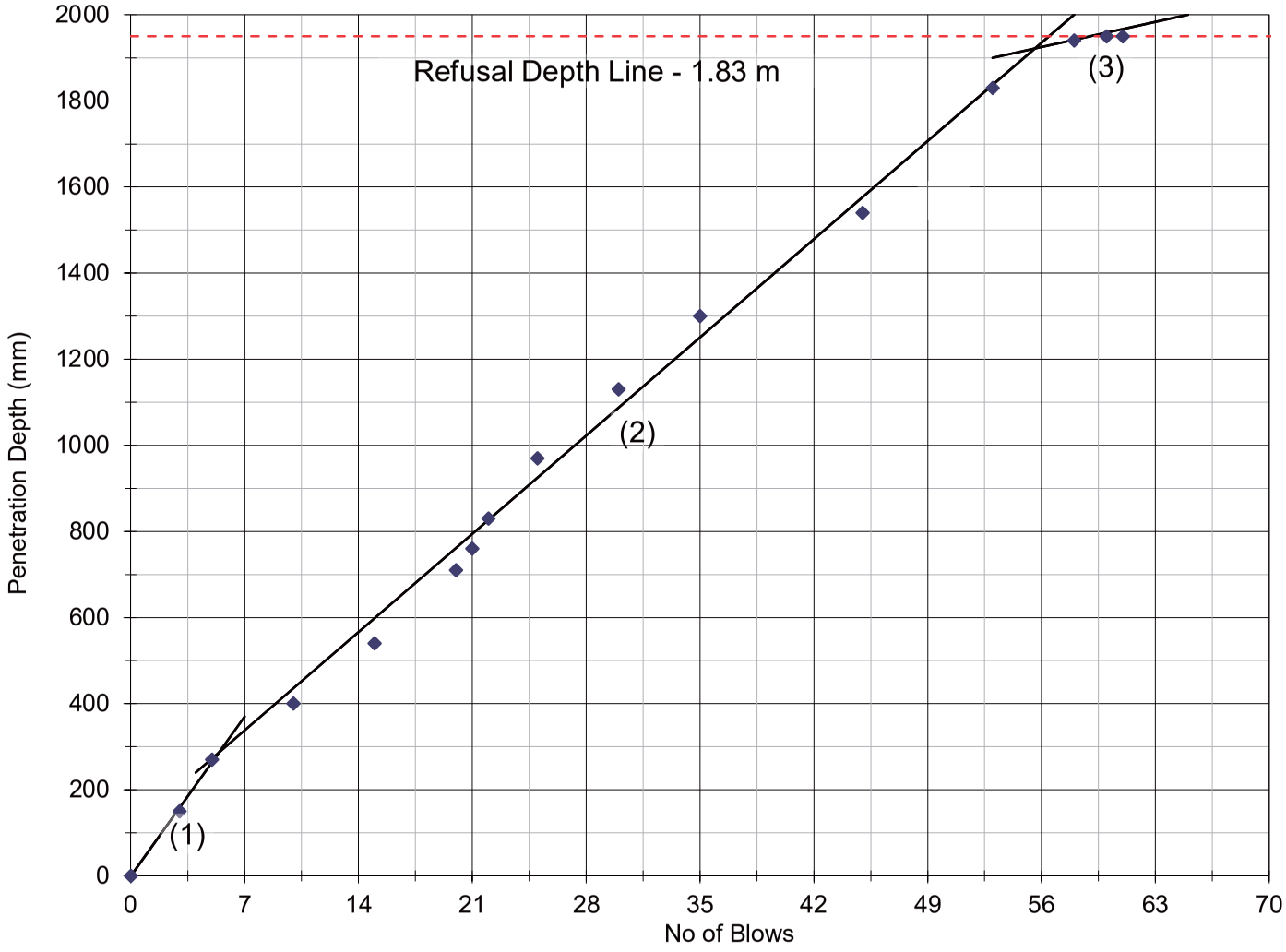
LINE 2
mm/blow = 3 Gradient
CBR = 100
kPa = 500

LINE 3
mm/blow = 26 Gradient
CBR = 9
kPa = 128

LINE 4
mm/blow = 13 Gradient
CBR = 22
kPa = 220

Site / Test No: **SP02**

Tinai Gordon & Associates Ltd
Scala Penetrometer Results



Project: **MOTOOTUA GEOTECH**

Job No.: **1579-21**

Location: **MOTOOTUA**

Tested By: AT & FL

Date: 30-Sep-21

Weather: Sunny / Dry

Comments: Refusal at a depth of 1.83m

LINE 1
mm/blow = 53 Gradient
CBR = 4
kPa = 62

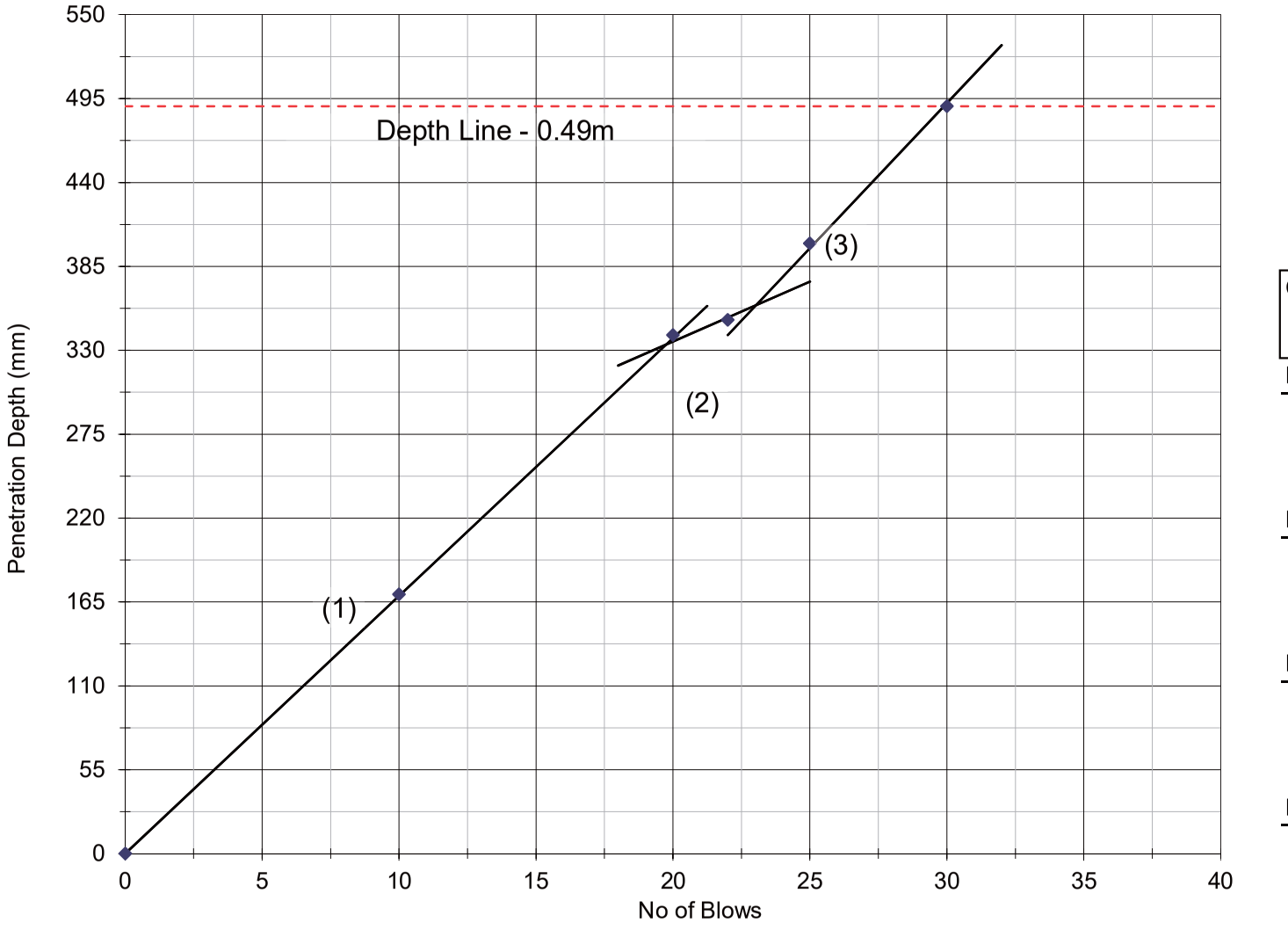
LINE 2
mm/blow = 33 Gradient
CBR = 7
kPa = 95

LINE 3
mm/blow = 8 Gradient
CBR = 35
kPa = 280

LINE 4
mm/blow = Gradient
CBR =
kPa =

Site / Test No: **SP03**

Tinai Gordon & Associates Ltd
Scala Penetrometer Results



Project: **MOTOOTUA GEOTECH**

Job No.: **1579-21**

Location: **MOTOOTUA**

Tested By: FL&AT

Date: 30-Sep-21

Weather: Sunny / Dry

Comments: Refusal at a depth of 1.47m

LINE 1
mm/blow = 17 Gradient
CBR = 17
kPa = 180

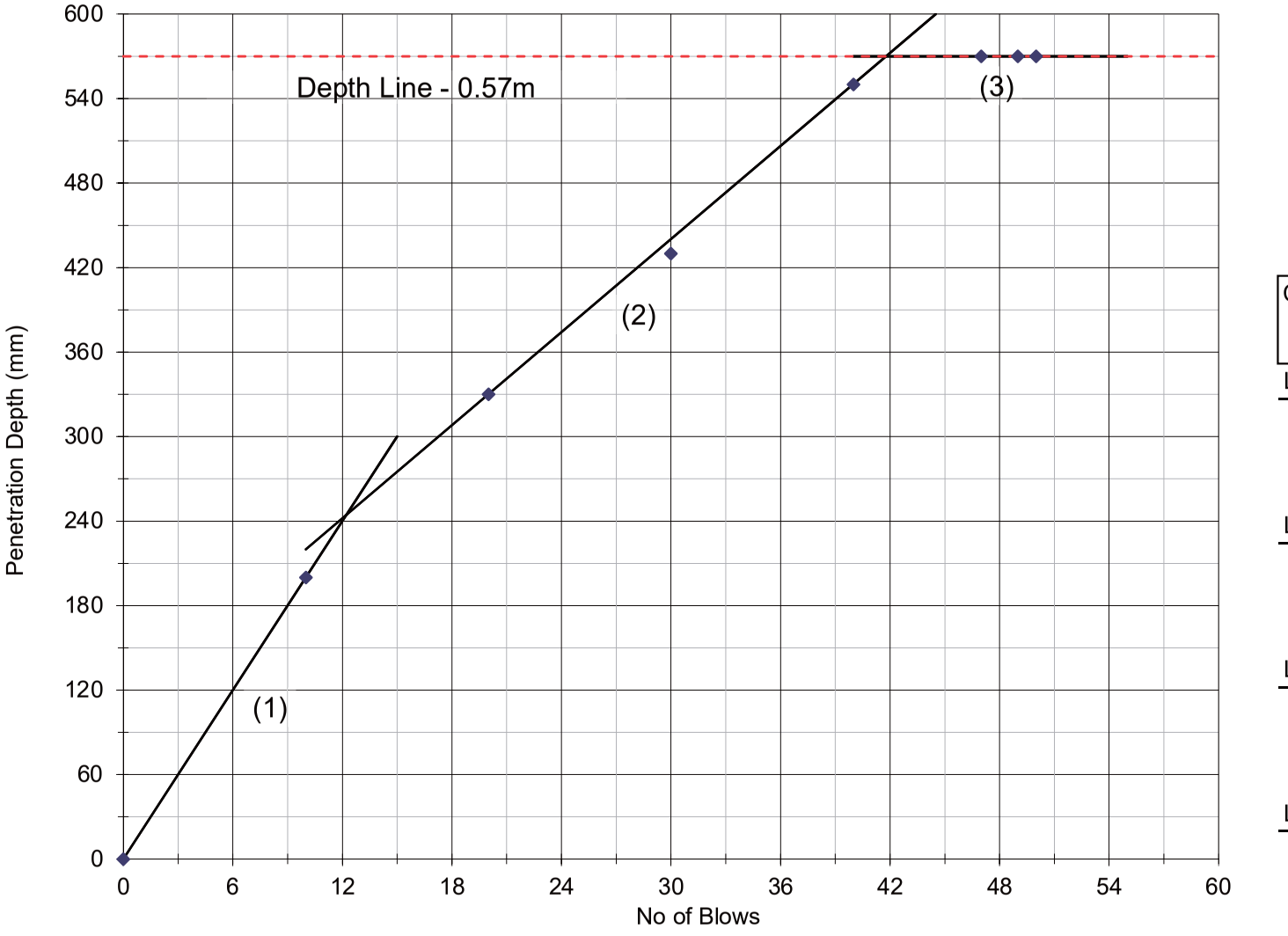
LINE 2
mm/blow = 8 Gradient
CBR = 35
kPa = 280

LINE 3
mm/blow = 19 Gradient
CBR = 13
kPa = 160

LINE 4
mm/blow = Gradient
CBR =
kPa =

Site / Test No: **SP04**

Tinai Gordon & Associates Ltd
Scala Penetrometer Results



Project: **MOTOOTUA GEOTECH**

Job No.: **1579-21**

Location: **MOTOOTUA**

Tested By: FL&AT

Date: 30-Sep-21

Weather: Sunny / Dry

Comments: Refusal at a depth of 0.75m

LINE 1
mm/blow = 20 Gradient
CBR = 13
kPa = 160

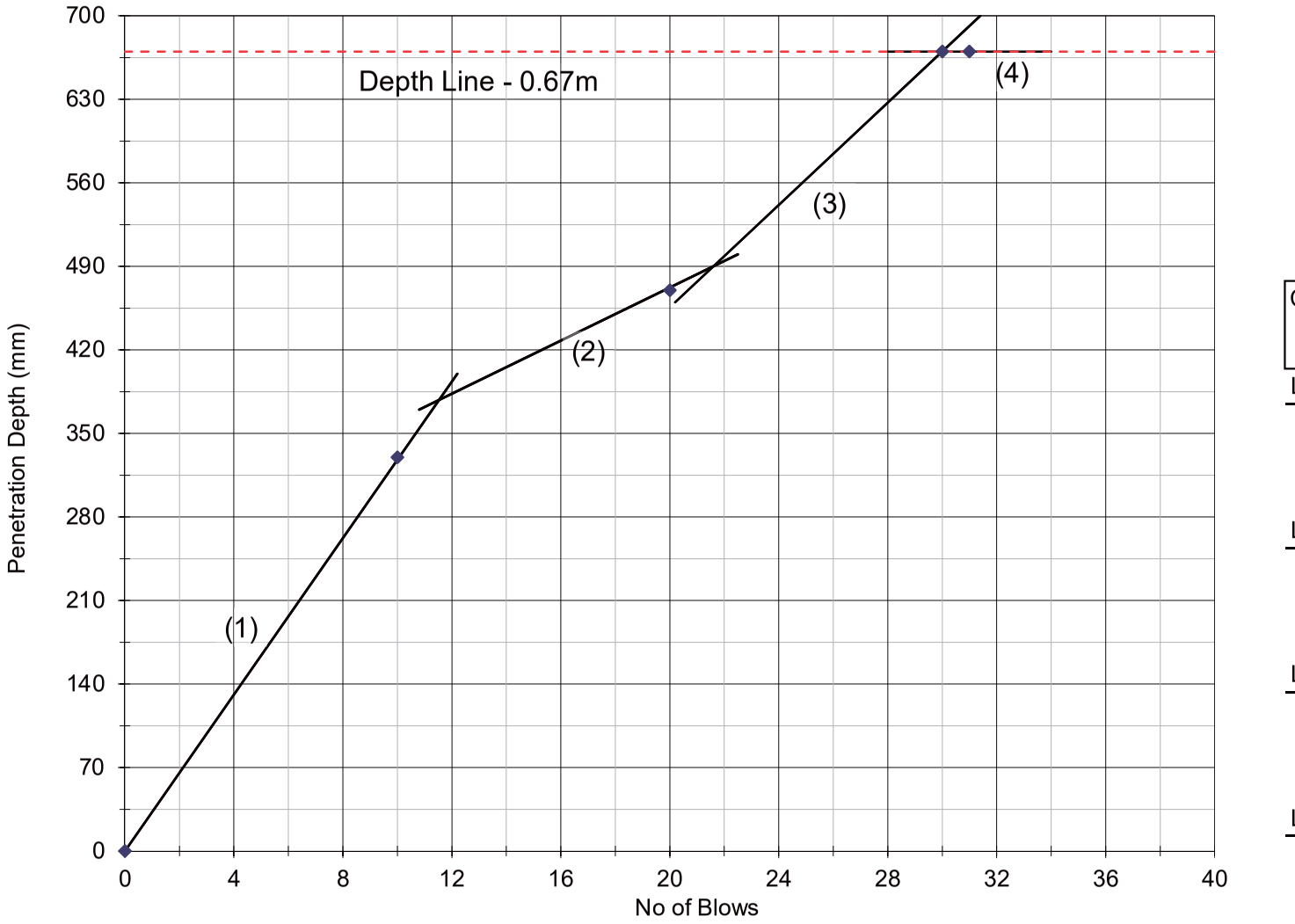
LINE 2
mm/blow = 11 Gradient
CBR = 26
kPa = 245

LINE 3
mm/blow = 0 Gradient
CBR = 100
kPa = 500

LINE 4
mm/blow = Gradient
CBR =
kPa =

Site / Test No: **SP05**

Tinai Gordon & Associates Ltd
Scala Penetrometer Results



Project: **MOTOOTUA GEOTECH**

Job No.: **1579-21**

Location: **MOTOOTUA**

Tested By: AT & FL

Date: 30-Sep-21

Weather: Sunny / Dry

Comments: Refusal at a depth of 0.67m.

LINE 1
mm/blow = 33 Gradient
CBR = 7
kPa = 95

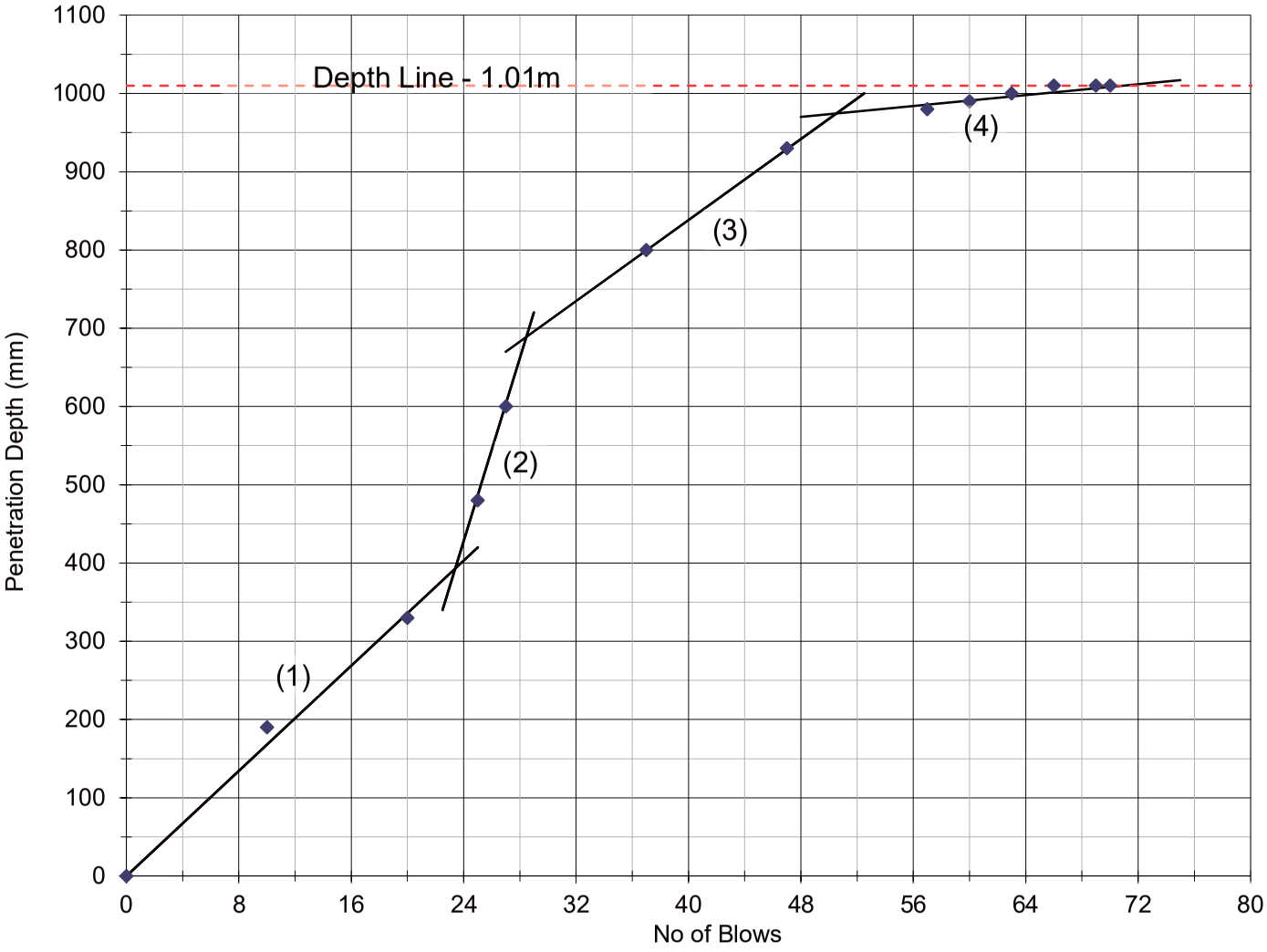
LINE 2
mm/blow = 11 Gradient
CBR = 26
kPa = 245

LINE 3
mm/blow = 21 Gradient
CBR = 12
kPa = 150

LINE 4
mm/blow = 0 Gradient
CBR = 100
kPa = 500

Site / Test No: **SP06**

Tinai Gordon & Associates Ltd
Scala Penetrometer Results



Project: **MOTOOTUA GEOTECH**

Job No.: **1579-21**

Location: **MOTOOTUA**

Tested By: AT & FL

Date: 30-Sep-21

Weather: Sunny / Dry

Comments: Refusal at a depth 1.01m.

LINE 1
mm/blow = 17 Gradient
CBR = 17
kPa = 180

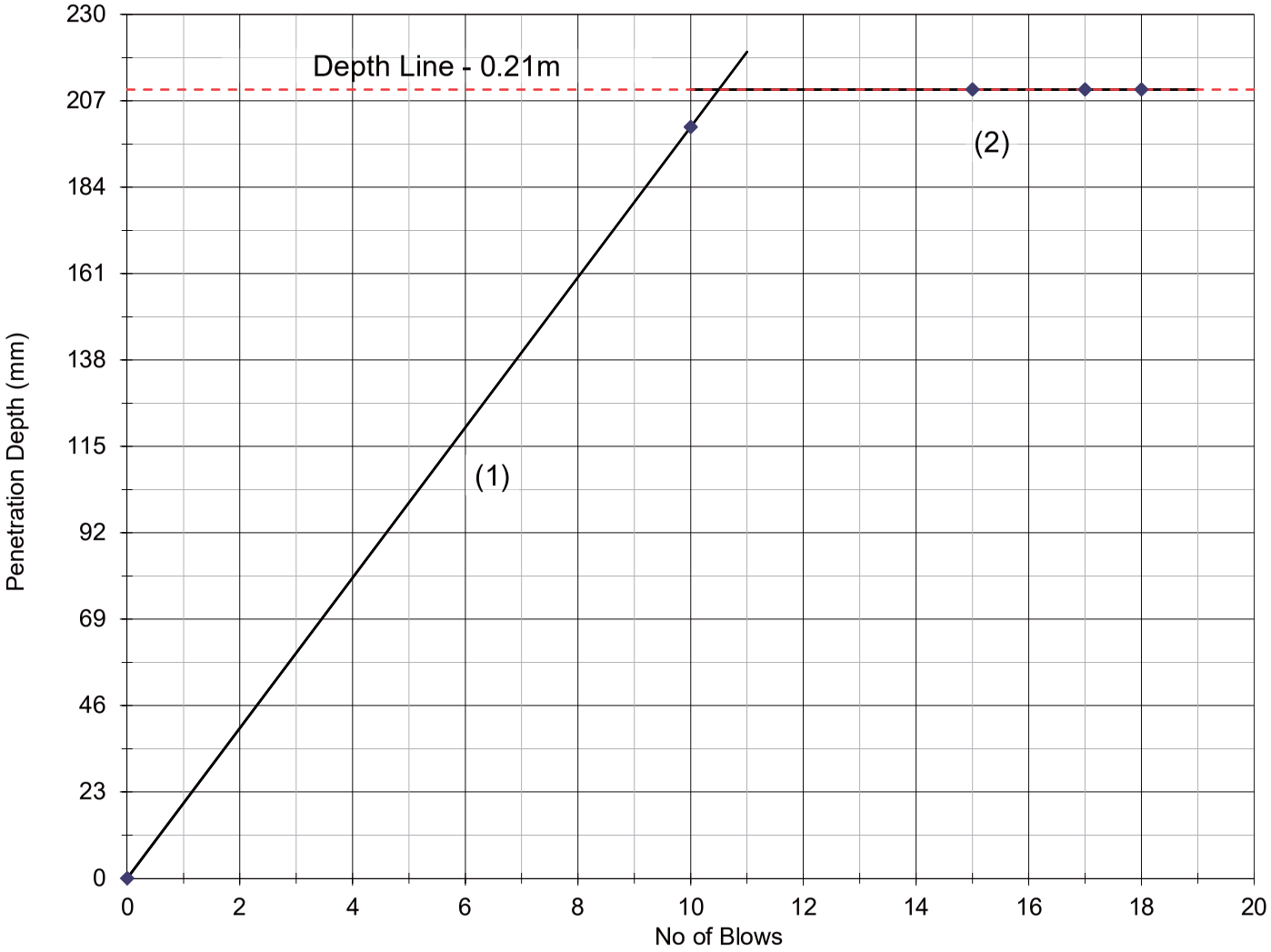
LINE 2
mm/blow = 58 Gradient
CBR = 4
kPa = 57

LINE 3
mm/blow = 13 Gradient
CBR = 22
kPa = 220

LINE 4
mm/blow = 2 Gradient
CBR = 100
kPa = 500

Site / Test No: **SP07**

Tinai Gordon & Associates Ltd
Scala Penetrometer Results



Project: **MOTOOTUA GEOTECH**

Job No.: **1579-21**

Location: **MOTOOTUA**

Tested By: AT & FL

Date: 30-Sep-21

Weather: Sunny / Dry

Comments: Refusal at a depth of 1.5m

LINE 1
mm/blow = 20 Gradient
CBR = 13
kPa = 160

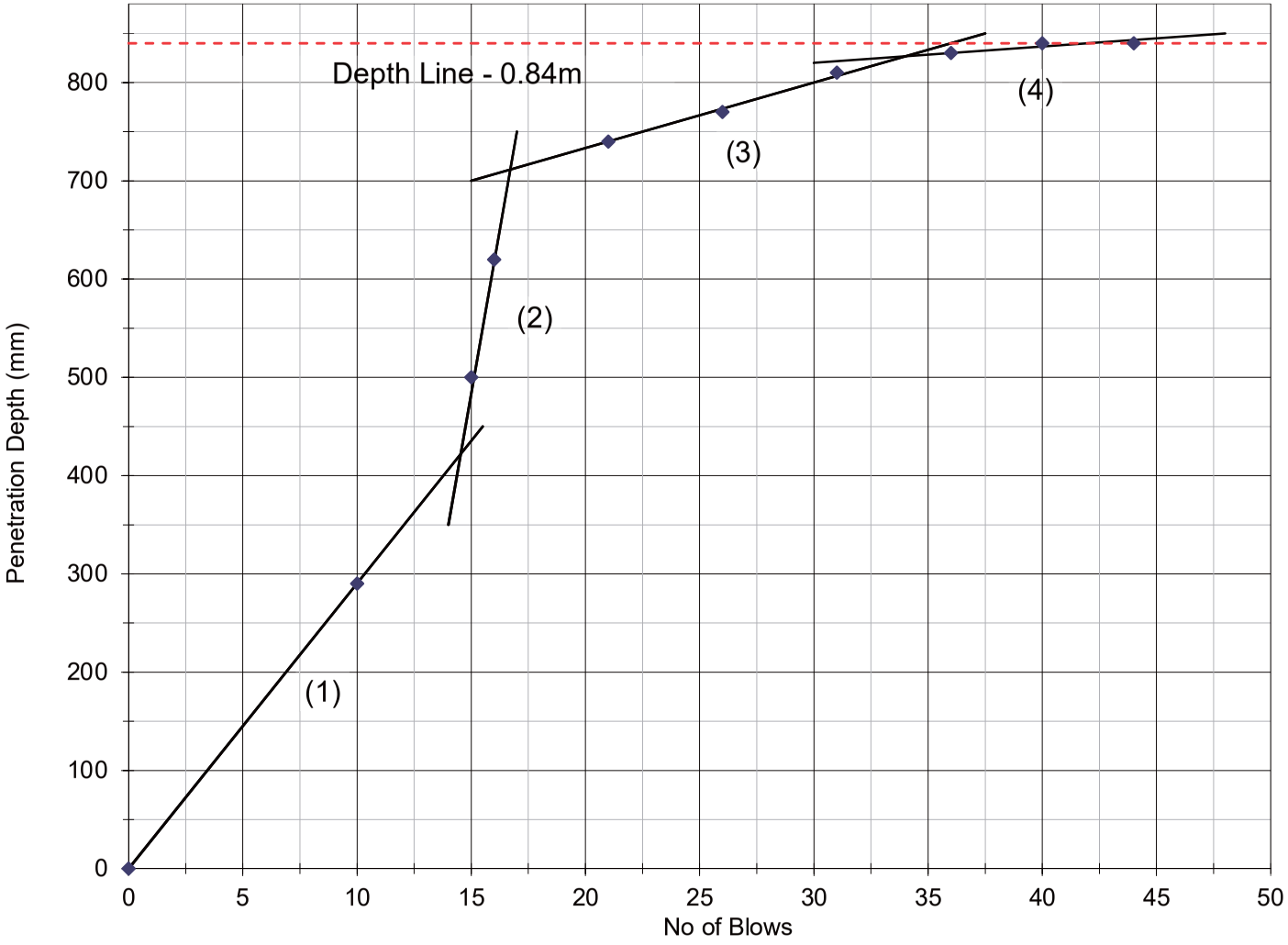
LINE 2
mm/blow = 0 Gradient
CBR = 100
kPa = 500

LINE 3
mm/blow = Gradient
CBR =
kPa =

LINE 4
mm/blow = Gradient
CBR =
kPa =

Site / Test No: **SP08**

Tinai Gordon & Associates Ltd
Scala Penetrometer Results



Project: **MOTOOTUA GEOTECH**

Job No.: **1579-21**

Location: **MOTOOTUA**

Tested By: AT & FL

Date: 30-Sep-21

Weather: Sunny / Dry

Comments: Refusal at a depth of 0.84m

LINE 1
mm/blow = 29 Gradient
CBR = 8
kPa = 120

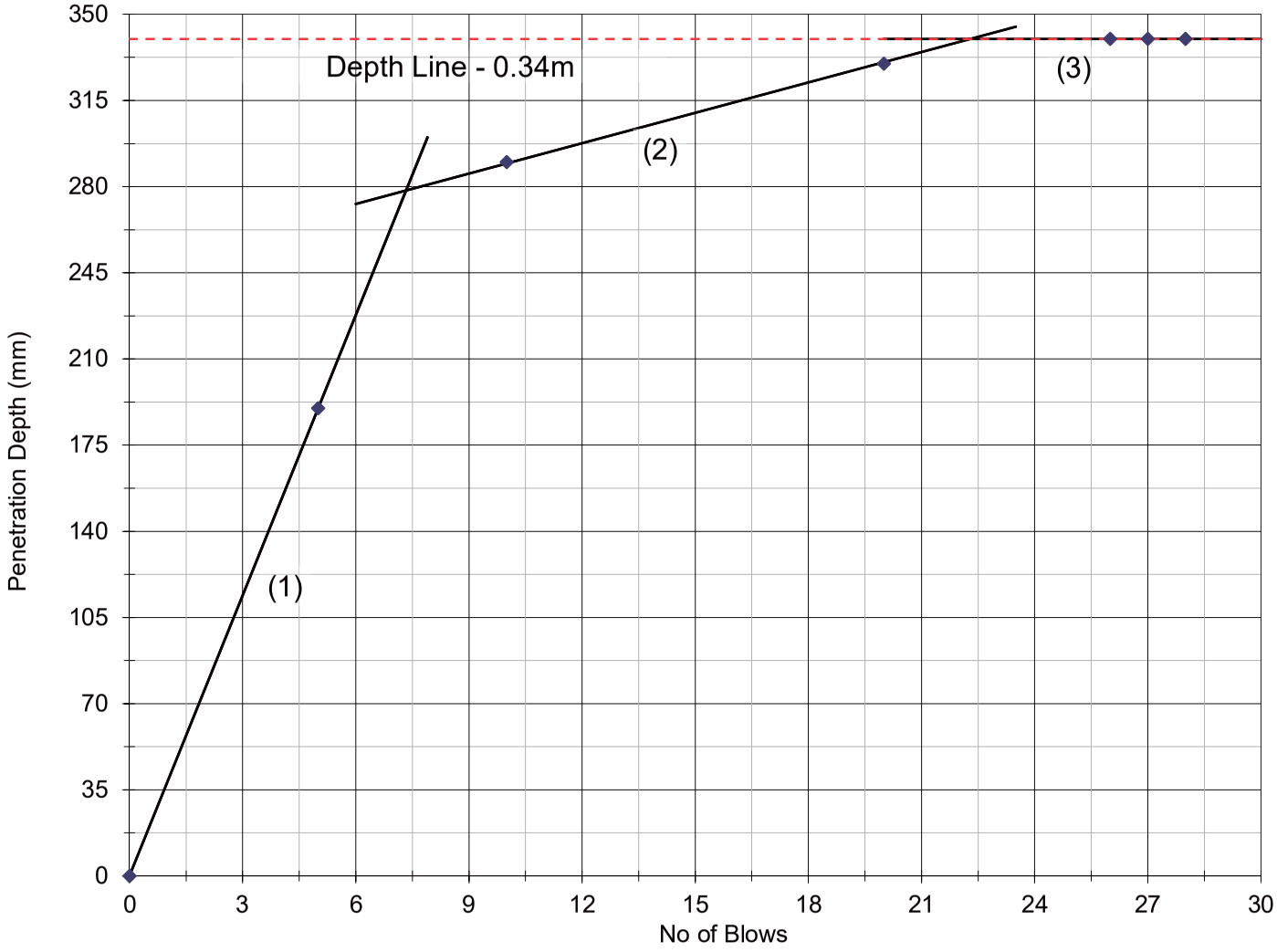
LINE 2
mm/blow = 133 Gradient
CBR = 2
kPa = 30

LINE 3
mm/blow = 7 Gradient
CBR = 38
kPa = 290

LINE 4
mm/blow = 2 Gradient
CBR = 100
kPa = 500

Site / Test No: **SP09**

Tinai Gordon & Associates Ltd
Scala Penetrometer Results



Project: **MOTOOTUA GEOTECH**

Job No.: **1579-21**

Location: **MOTOOTUA**

Tested By: AT & FL

Date: 30-Sep-21

Weather: Sunny / Dry

Comments: Refusal at a depth of 0.34m

LINE 1
mm/blow = 38 Gradient
CBR = 6
kPa = 87

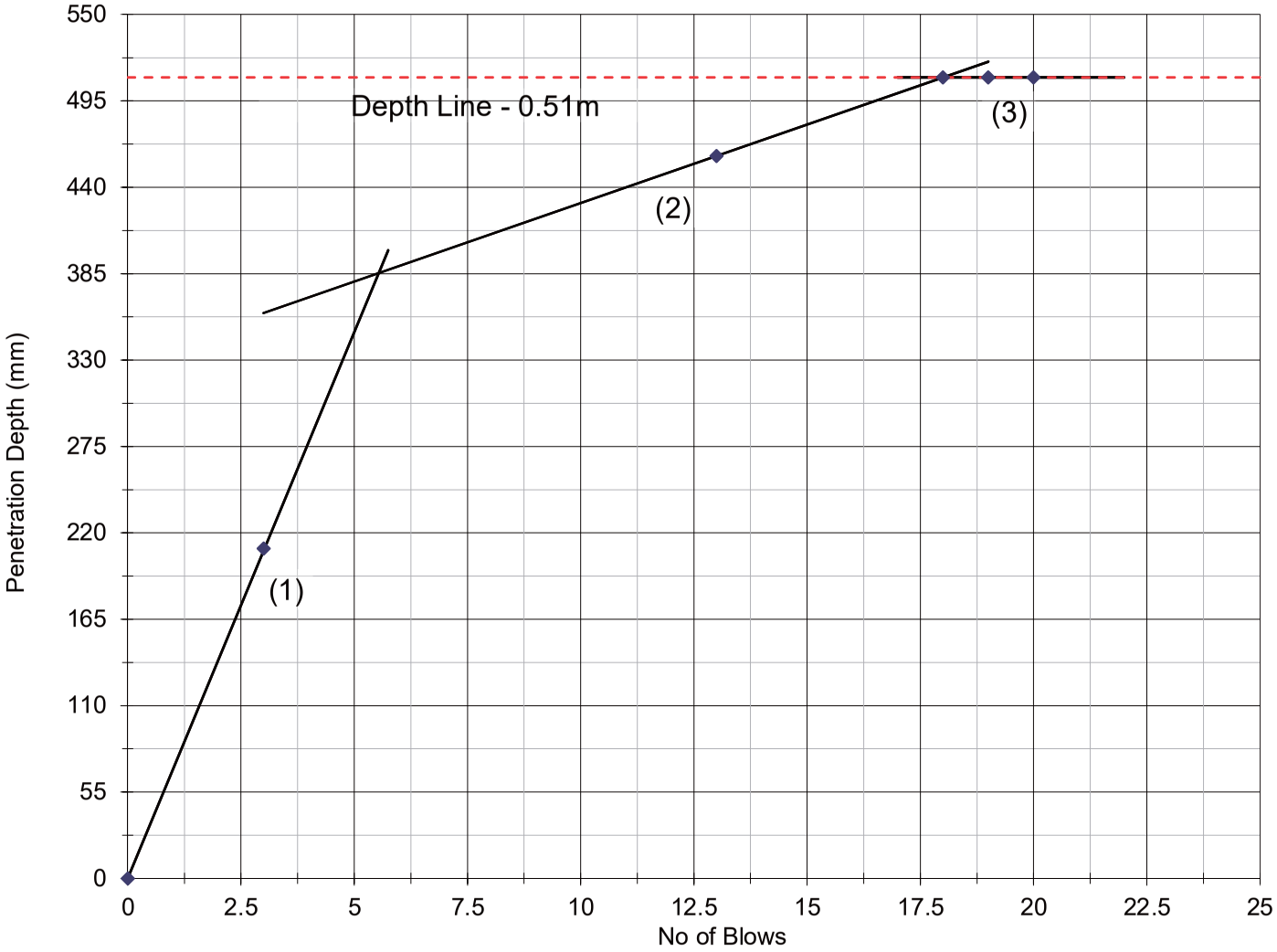
LINE 2
mm/blow = 4 Gradient
CBR = 75
kPa = 420

LINE 3
mm/blow = 0 Gradient
CBR = 100
kPa = 500

LINE 4
mm/blow = Gradient
CBR =
kPa =

Site / Test No: **SP10**

Tinai Gordon & Associates Ltd
Scala Penetrometer Results



Project: **MOTOOTUA GEOTECH**

Job No.: **1579-21**

Location: **MOTOOTUA**

Tested By: AT & FL

Date: 30-Sep-21

Weather: Sunny / Dry

Comments: Refusal at a depth of 0.51m

LINE 1
mm/blow = 70 Gradient
CBR = 3
kPa = 48

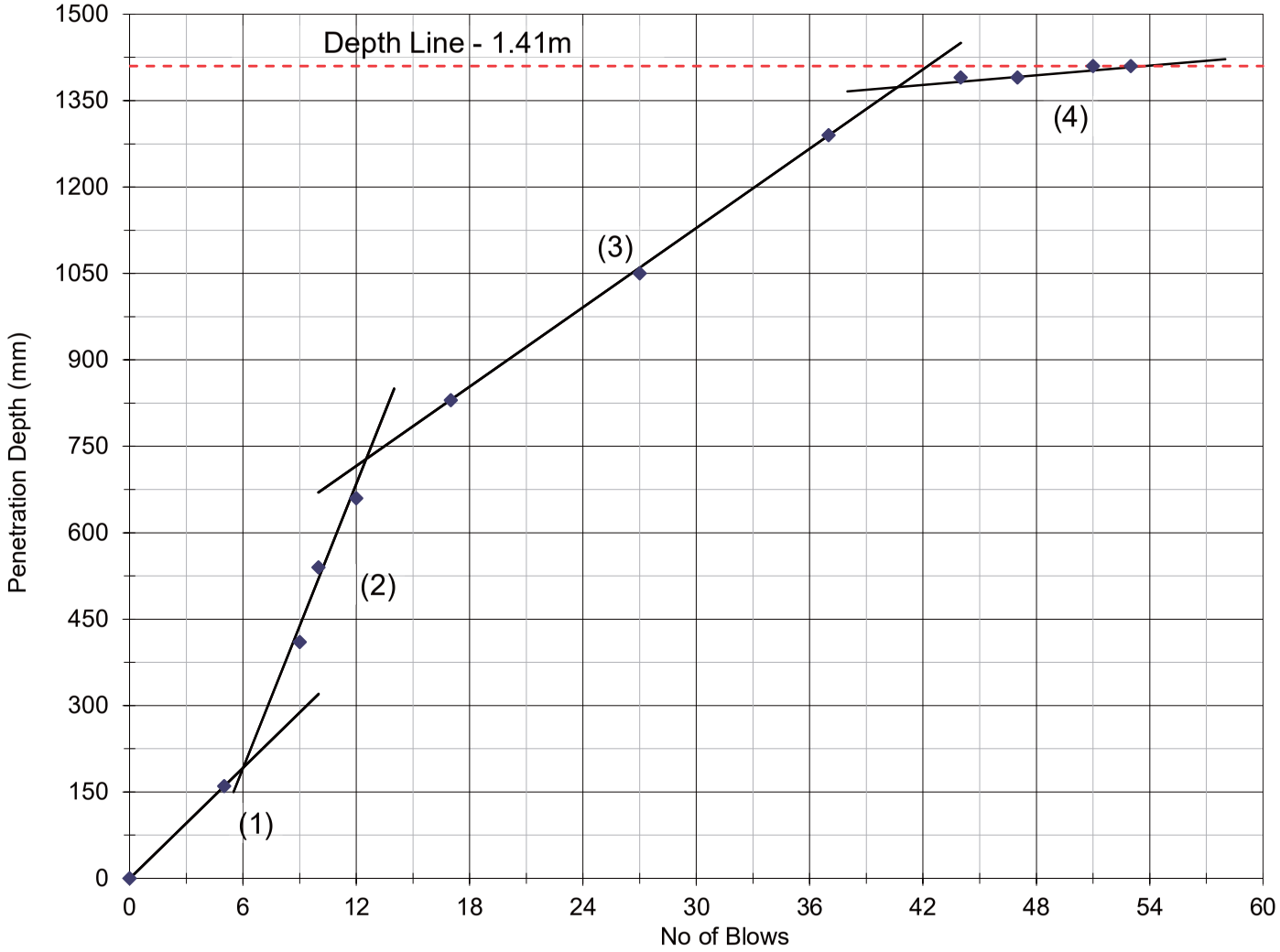
LINE 2
mm/blow = 10 Gradient
CBR = 27
kPa = 250

LINE 3
mm/blow = 0 Gradient
CBR = 100
kPa = 500

LINE 4
mm/blow = Gradient
CBR =
kPa =

Site / Test No: **SP11**

Tinai Gordon & Associates Ltd
Scala Penetrometer Results



Project: **MOTOOTUA GEOTECH**

Job No.: **1579-21**

Location: **MOTOOTUA**

Tested By: AT & FL

Date: 30-Sep-21

Weather: Sunny / Dry

Comments: Refusal at a depth of 0.51m

LINE 1
mm/blow = 32 Gradient
CBR = 7
kPa = 105

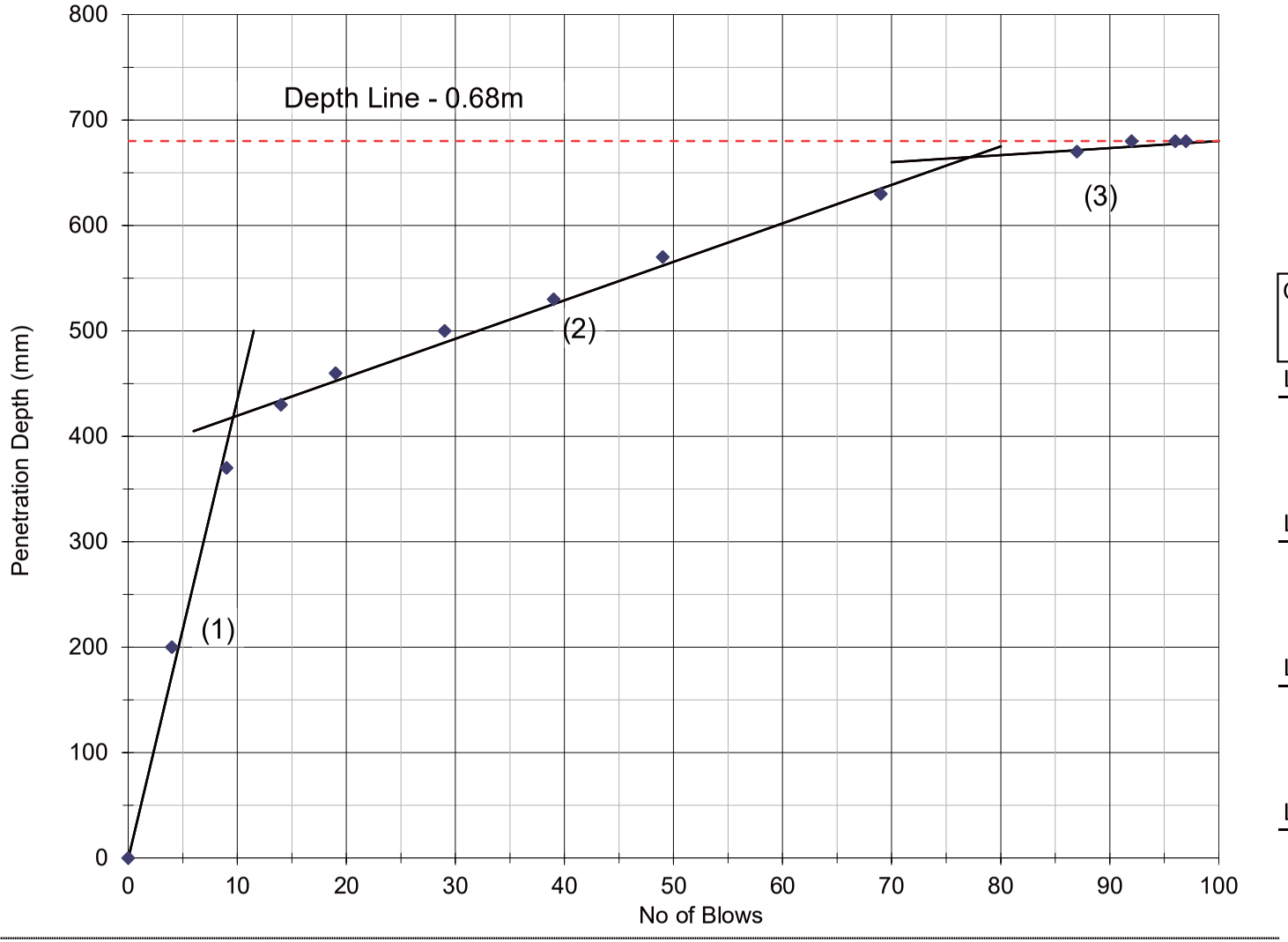
LINE 2
mm/blow = 82 Gradient
CBR = 3
kPa = 44

LINE 3
mm/blow = 23 Gradient
CBR = 11
kPa = 135

LINE 4
mm/blow = 3 Gradient
CBR = 100
kPa = 500

Site / Test No: **SP12**

Tinai Gordon & Associates Ltd
Scala Penetrometer Results



Project: **MOTOOTUA GEOTECH**

Job No.: **1579-21**

Location: **MOTOOTUA**

Tested By: AT & FL

Date: 30-Sep-21

Weather: Sunny / Dry

Comments: Refusal at a depth of 0.68m

LINE 1
mm/blow = 43 Gradient
CBR = 5
kPa = 78

LINE 2
mm/blow = 4 Gradient
CBR = 75
kPa = 420

LINE 3
mm/blow = 1 Gradient
CBR = 100
kPa = 500

LINE 4
mm/blow = Gradient
CBR =
kPa =

APPENDIX 3

Laboratory Tests Results

FIELD MOISTURE CONTENT

Project : JICA NUS

	Test Pit 1		Test Pit 2	
Tin + W/Soil gm	352.6	388.1	370	348.3
Tin + D/Soil(gm)	291.3	335	305.4	309.7
Tin grms	54	69.9	35.1	65.1
Moisture grm	61.3	53.1	52.6	52.6
Dry Soil	237.3	265.1	270.3	244.6
M/Content %	*25.83*	*20.03*	*19.46*	*21.50*
AV %	22.9		20.5	

Prepared by :
Q A Principal

Approved By:
Manager ROD

25/10/21

LAND TRANSPORT AUTHORITY

PROJECT : JICA NUS

MATERIALS TESTING - PARTICLE SIZE DISTRIBUTION

Date Sampled : 04.10.21

Location : NUS

Description

Sample No. 2 (Test Pit 1) 1

BEFORE / AFTER Compaction in the FIELD / LABORATORY

[X] [ ] [ ] [X]

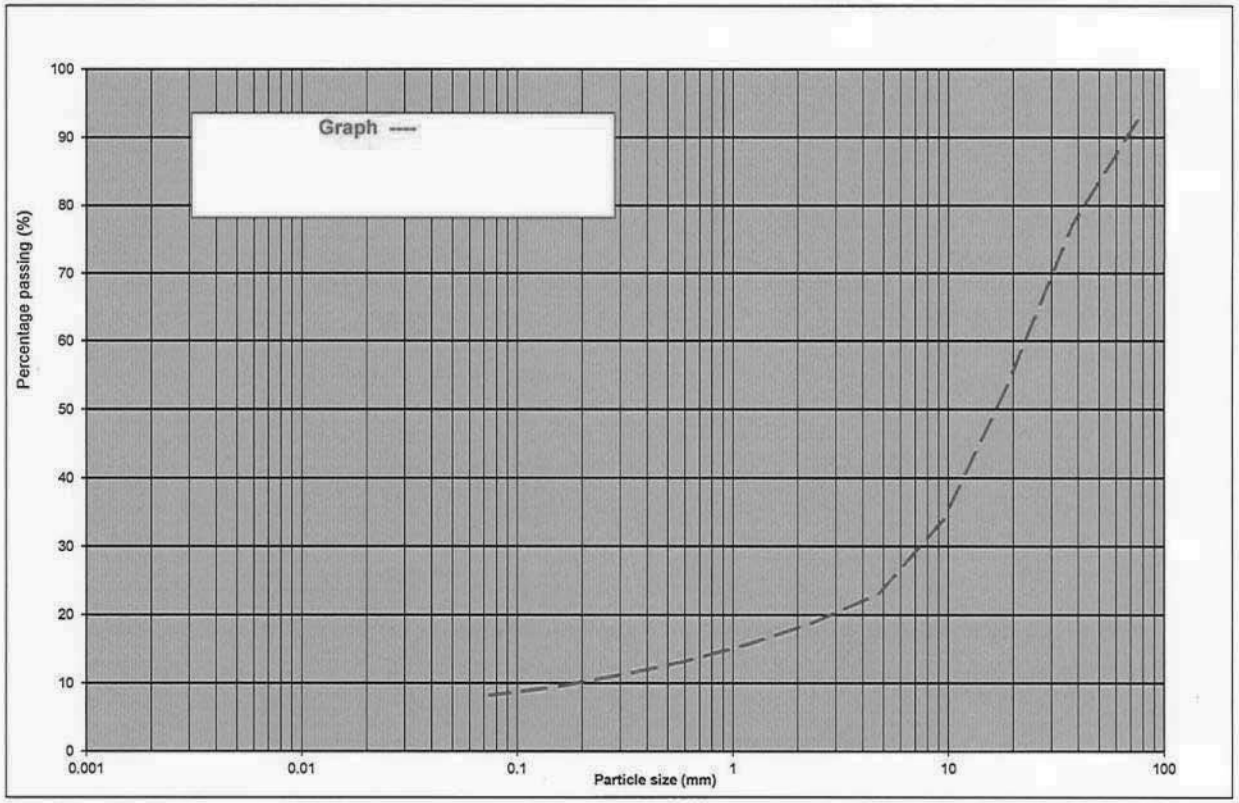
Client : Tinai & Gordon Associated Ltd

Sieve method Wet [ ] Dry [X]

TOTAL mass of dry sample 7899.6 g

Sieve size	Retained Mass (g)	Retained (%)	Passing (%)
75	595.1	7.5	92.5
37.5	1208.7	15.3	77.2
19	1841.4	23.3	53.9
9.5	1571.4	19.9	34.0
4.75	860.5	10.9	23.1
2.36	57.0	4.2	18.9
1.18	42.9	3.2	15.7
0.6	33.9	2.5	13.2
0.425	14.5	1.1	12.1
0.3	13.6	1.0	11.1
0.15	23.8	1.8	9.4
0.075	16.1	1.2	8.2
	0.9		

Fine : 313.2
Pan : 1823
Fine Fraction : 0.074



	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	
SILT		SAND			GRAVEL			COBBLES

Prepared by
Q A Principal
Date :

Approved By:
Manager ROD

25/10/21

LAND TRANSPORT AUTHORITY

PROJECT : JICA NUS

MATERIALS TESTING - PARTICLE SIZE DISTRIBUTION

Date Sampled : 04.10.21

Location : NUS

Description

Sample No. 2 (Test Pit 1) 2

BEFORE / AFTER Compaction in the FIELD / LABORATORY

[ ] [X] [ ] [X]

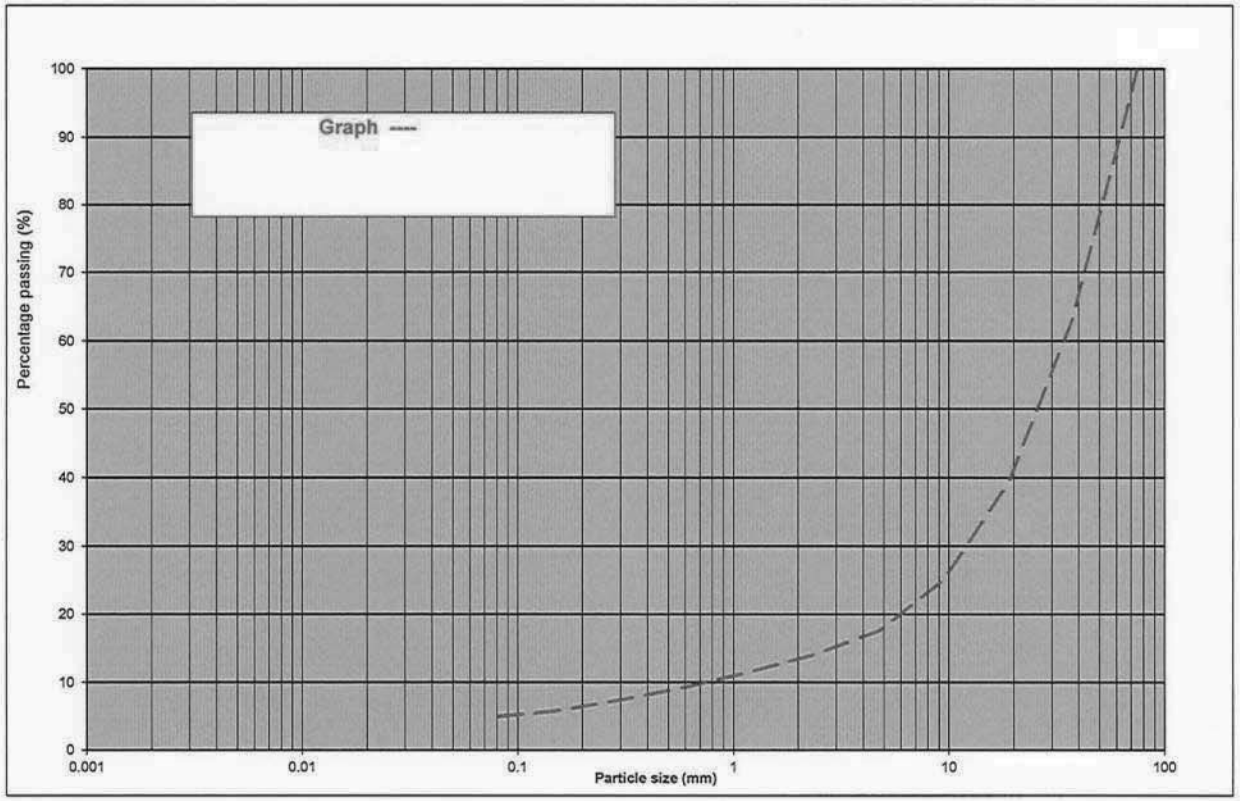
Client : Tinai & Gordan Associate

Sieve method Wet [ ] Dry [X]

TOTAL mass of dry sample 8421.0 g

Sieve size	Retained Mass (g)	Retained (%)	Passing (%)
75	0.0	0.0	100.0
37.5	3100.4	36.8	63.2
19	2004.1	23.8	39.4
9.5	1202.3	14.3	25.1
4.75	638.7	7.6	17.5
2.36	64.1	3.5	14.1
1.18	47.8	2.6	11.5
0.6	40.6	2.2	9.3
0.425	17.3	0.9	8.3
0.3	17.6	1.0	7.4
0.15	30.1	1.6	5.8
0.075	16.8	0.9	4.8

Fine : 323.9
Pan : 1476
Fine Fraction : 0.054



	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	
SILT		SAND			GRAVEL			COBBLES

Prepared by
Q A Principal
Date :

Approved By:
Manager ROD

25/10/21

LAND TRANSPORT AUTHORITY

PROJECT : JICA NUS

MATERIALS TESTING - PARTICLE SIZE DISTRIBUTION

Date Sampled : 04.10.21

Location : NUS

Description

Sample No. 2 (Test Pit 2) 1

BEFORE / AFTER Compaction in the FIELD / LABORATORY

	X		X

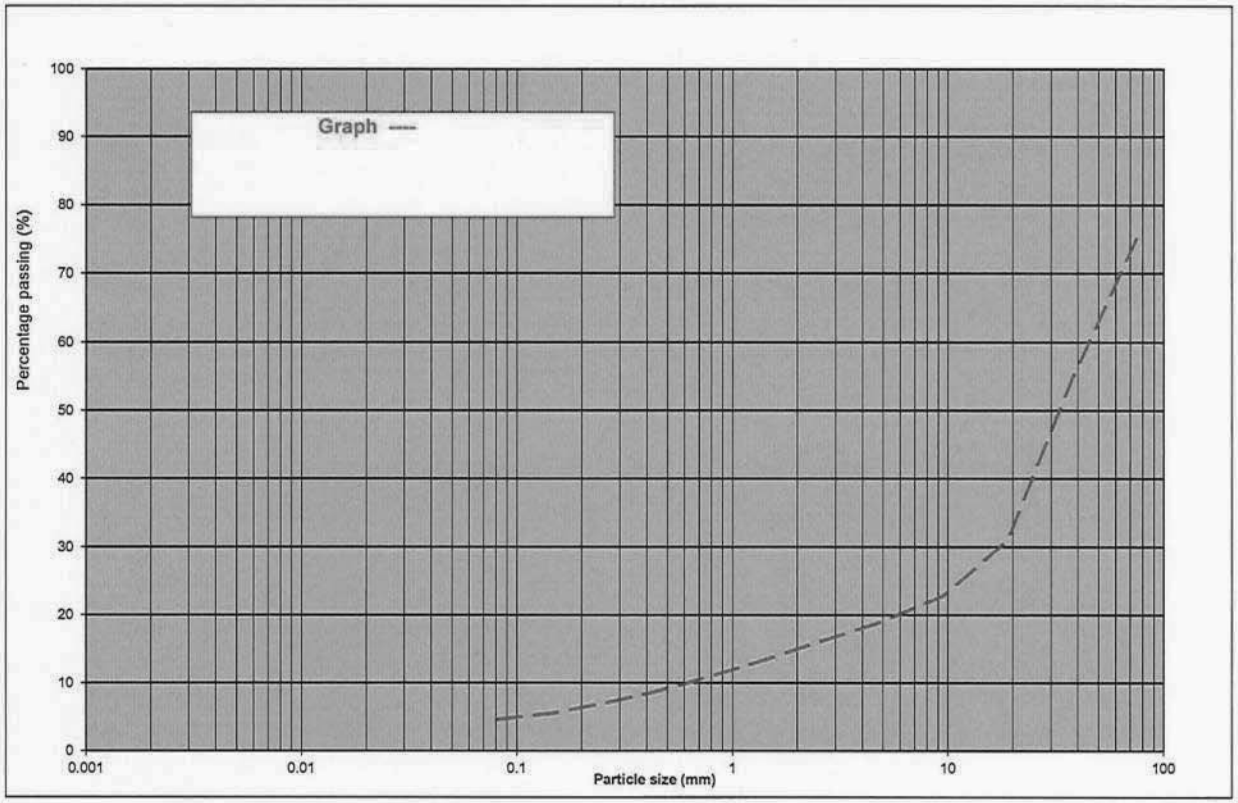
Client : Tinai & Gordan Associate

Sieve method Wet [ ] Dry [X]

TOTAL mass of dry sample 9459.0 g

Sieve size	Retained Mass (g)	Retained (%)	Passing (%)
75	2357.8	24.9	75.1
37.5	1943.6	20.5	54.5
19	2222.1	23.5	31.0
9.5	780.4	8.3	22.8
4.75	380.6	4.0	18.8
2.36	51.2	3.1	15.7
1.18	51.8	3.1	12.6
0.6	46.8	2.8	9.8
0.425	21.1	1.3	8.6
0.3	18.6	1.1	7.5
0.15	31.6	1.9	5.6
0.075	18.2	1.1	4.5

Fine : 314.4
Pan : 1775
Fine Fraction : 0.06



	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	
SILT		SAND			GRAVEL			COBBLES

Prepared by
Q A Principal
Date :

Approved By:
Manager ROD
25/10/21

LAND TRANSPORT AUTHORITY

PROJECT : JICA NUS

MATERIALS TESTING - PARTICLE SIZE DISTRIBUTION

Date Sampled : 04.10.21

Location : NUS

Description

Sample No. 2 (Test Pit 2) 2

BEFORE / AFTER Compaction in the FIELD / LABORATORY

[X]	[ ]	[ ]	[X]

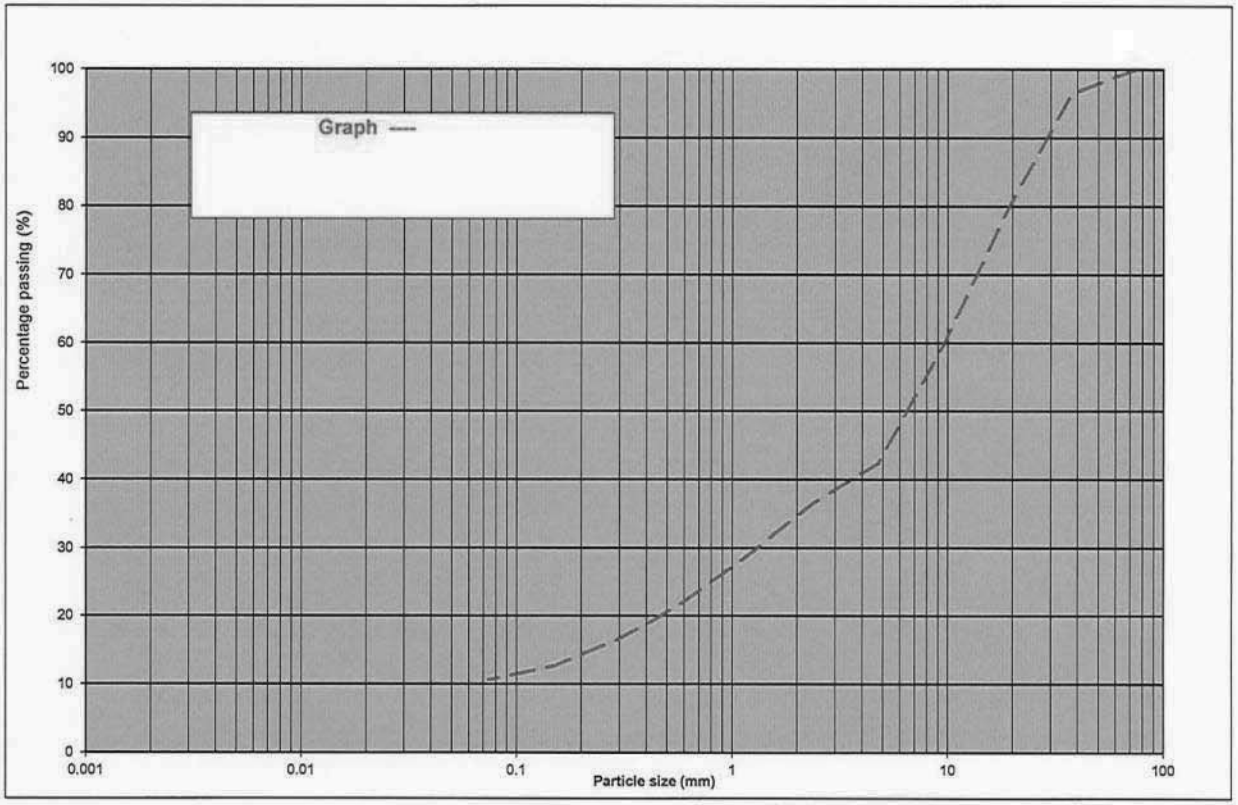
Client : Tinai & Gordan Associate

Sieve method Wet [ ] Dry [X]

TOTAL mass of dry sample 7801.3 g

Sieve size	Retained Mass (g)	Retained (%)	Passing (%)
75	0.0	0.0	100.0
37.5	281.4	3.6	96.4
19	1312.8	16.8	79.6
9.5	1557.2	20.0	59.6
4.75	1346.4	17.3	42.3
2.36	49.2	5.9	36.5
1.18	63.6	7.6	28.9
0.6	56.8	6.8	22.1
0.425	24.3	2.9	19.2
0.3	21.6	2.6	16.6
0.15	33.2	4.0	12.6
0.075	17.2	2.1	10.6

Fine : 354.4
Pan : 3304
Fine Fraction : 0.119



	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	
SILT		SAND			GRAVEL			COBBLES

Prepared by
Q A Principal
Date :

Approved By:
Manager ROD

25/10/21

LAND TRANSPORT AUTHORITY

PROJECT : JICA NUS

ALTERBERG LIMITS WORKSHEET-CONE PENETRATION

CLIENT : T & G Associate — **Sample No.** Test Pit 1
LOCATION : NUS — **Date Sampled.**
MATERIAL : — **Date Tested.** 08.10.21

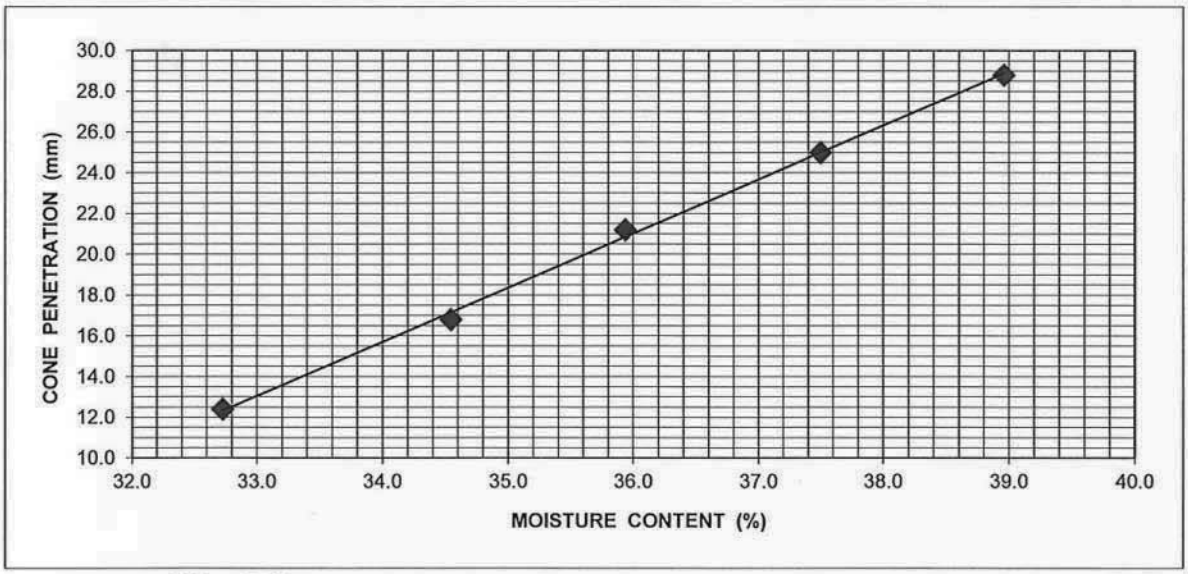
	LIQUID LIMIT					PLASTIC LIMIT	
Tin No.	P10	P11	P1	P9	B19	P4	TV
Mass Tin & Wet Soil	25.6	24.7	20.8	26.7	24.2	23.5	22.3
Mass Tin & Dry Soil	22.0	22.8	18.5	22.8	21.2	21.9	21.0
Mas Tin	11.0	17.3	12.1	12.4	13.5	14.1	14.6
Moisture Loss	3.6	1.9	2.3	3.9	3.0	1.6	1.3
Mass Dry Soil	11.0	5.5	6.4	10.4	7.7	7.8	6.4
Moisture Content	32.7	34.5	35.9	37.5	39.0	20.5	20.3
Penetration (mm)	12.4	16.8	21.2	25.0	28.8	20.4	

LIQUID LIMIT	35.60
PLASTIC LIMIT	20.41
PLASTIC INDEX	15.19

LINEAR SHRINKAGE TEST

MOULD NUMBER	12
LINEAR SHRINKAGE	0.16

MOULDS NUMBERS	124.5
LENGTH BEFORE	124.5
LENGTH AFTER	124.3
LENGTH LOSS	0.2
% LOSS	0.16



Prepared by :
Q A Principal
Date :

Approved By:
Manager ROD
Date : 25/10/21

LAND TRANSPORT AUTHORITY

PROJECT : JICA NUS

ALTERBERG LIMITS WORKSHEET-CONE PENETRATION

CLIENT : T & G Asssociate	Sample No. Test Pit 2
LOCATION : NUS	Date Sampled.
MATERIAL :	Date Tested.

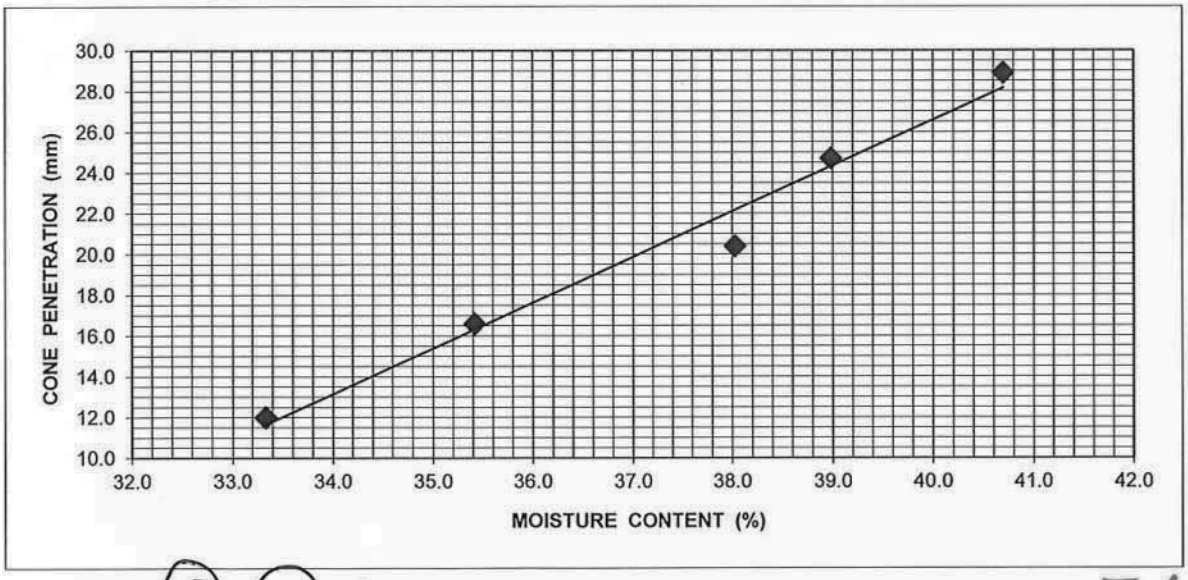
	LIQUID LIMIT					PLASTIC LIMIT	
Tin No.	P10	P11	P1	P9	B19	P4	TV
Mass Tin & Wet Soil	21.8	26.4	23.5	21.8	22.0	21.3	23.8
Mass Tin & Dry Soil	19.8	23.0	20.8	19.5	18.5	19.9	22.1
Mas Tin	13.8	13.4	13.7	13.6	9.9	14.2	14.8
Moisture Loss	2.0	3.4	2.7	2.3	3.5	1.4	1.7
Mass Dry Soil	6.0	9.6	7.1	5.9	8.6	5.7	7.3
Moisture Content	33.3	35.4	38.0	39.0	40.7	24.6	23.3
Penetration (mm)	12.0	16.6	20.4	24.7	28.9	23.9	

LIQUID LIMIT	37.00
PLASTIC LIMIT	23.92
PLASTIC INDEX	13.08

LINEAR SHRINKAGE TEST

MOULD NUMBER	# 12
LINEAR SHRINKAGE	0.08

MOULDS NUMBERS	# 12
LENGTH BEFORE	124.5
LENGTH AFTER	124.4
LENGTH LOSS	0.1
% LOSS	0.08



Prepared by :
Q A Principal
Date :

Approved By:
Manager ROD
Date : 25/10/21