

APPENDICES

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APPENDIX - 1 Member of the Survey Team

APPENDIX 1 Member List of Survey Team

The Project for Upgrading and Refurbishment for Viola Hospital in Kingdom of Tonga
(Basic Design Study from October 13 to November 10, 2003)

- 1 . **Mr. Masaya FUJIMOTO** Team Leader
Second Project Management Division
Grant Aid Management Department, JICA

- 2 . **Dr. Kaoruko KITAMURA** Technical Advisor
Office of International Cooperation,
Minister's Secretariat, Ministry of Health, Labour and Welfare

- 3 . **Ms. Akiko KAWATA** Project Coordinator
Second Project Management Division
Grant Aid Management Department, JICA

- 4 . **Mr. Shigeru ENOMOTO** Project Manager / Facility Planner
Kume Sekkei Co., Ltd.

- 5 . **Mr. Osamu HAMANO** Architectural Designer
Kume Sekkei Co., Ltd.

- 6 . **Mr. Takashi OGAWA** Medical Equipment Planner
BINKO Co., Ltd.

- 7 . **Mr. Masayuki ORIMA** Equipment Planner
Kume Sekkei Co., Ltd.

- 8 . **Mr. Motokazu SATO** Procurement Planner / Cost Estimator
Kume Sekkei Co., Ltd.

The Project for Upgrading and Refurbishment for Viola Hospital in Kingdom of Tonga
(Draft Explanation Study from February 2 to February 14, 2004)

- 1 . **Mr. Mitsuo ISHIKAWA** Team Leader
Resident Representative,
Tonga Office, JICA

- 2 . **Dr. Yusuke FUKUDA** Technical Advisor
Office of International Cooperation,
Minister's Secretariat, Ministry of Health, Labour and Welfare

- 3 . **Ms. Akiko KAWATA** Project Coordinator
Second Project Management Division
Grant Aid Management Department, JICA

- 4 . **Mr. Shigeru ENOMOTO** Chief Consultant / Building Design
Kume Sekkei Co., Ltd.

- 5 . **Mr. Osamu HAMANO** Architectural Designer
Kume Sekkei Co., Ltd.

- 6 . **Mr. Takashi OGAWA** Medical Equipment Planner
BINKO Co., Ltd.

APPENDIX - 2 Survey Schedule

APPENDIX 2 Survey Schedule (Basic Design)
November 10)

(from October 13 to

Date			Officials	Consultants					
			Team Leader Technical Adviser Project Coordinator	Project Manager/ Facility Planner	Architectural Designer	Medical Equipment Planner	Mechanical Planner	Procurement/ Cost Estimator	
				Shigeru ENOMOTO	Osamu HAMANO	Takashi OGAWA	Masayuki ORIMA	Motokazu SATO	
1	13-Oct	Mon		Narita (19:00) FJ303					
2	14	Tue		Nadi (06:55) Transfer to Suva by a car. Courtesy call to EOJ, JICA. Hearing from students at Fiji School of Medicine					
3	15	Wed		Suva (10:00) PC621 Tonga(12:35), Courtesy call and meeting with JICA					
4	16	Thu		MOH, V. Hospital, World Bank Consultant IR explanation and discussion, Site survey					
5	17	Fri		Meeting with WB Consultant	Cost Estimate of Site/Soil Survey	Same as PM			
6	18	Sat		Survey and Hearing of Existing Vaiola Hospital					
7	19	Sun		Internal Meting, Data Input					
8	20	Mon	Narita (19:00) FJ 303	Survey and Hearing of Existing Vaiola Hospital	Start Site/ Soil Survey	Survey and Hearing of Existing Vaiola Hospital			
9	21	Tue	Nadi (6:55) Transfer to Suva by a car. Courtesy call to EOJ, JICA	Survey and hearing of Existing Vaiola Hospital					
10	22	Wed	Suva(10:00) Tonga(12:35) PC621 Meeting w/JICA, consultant	Report to the Officials					
11	23	Thu	Meeting with V/Hospital, WB Consultant on Master Plan, Survey or Existing Facilities,						
12	24	Fri	Meeting with V/Hospital on Master Plan, Survey or Existing Facilities,			Survey of Medical Equipment			
13	25	Sat	Discussion of Master Plan						
14	26	Sun	Team Meeting, Data Input						
15	27	Mon	Discussion about M/D		Collection of Questionnaire	Collection of Questionnaire	Narita (19:00) FJ303		
16	28	Tue	Discussion of Master Plan and Minutes of Meeting					Nadi (06:55), Nadi FJ211(15:35) Tonga (18:00)	
17	29	Wed	Discussion of Minutes of Meeting		Survey of Building Code and regulation	Equipment Planning	Survey of Exlg. Infrastructure	Survey of Building Material	
18	30	Thu	Signing of Minutes of Meeting. Report to JICA					ditto	ditto
19	31	Fri	Tonga (11:45) Suva (12:20) PC622 Report to EOJ and JICA. transfer to Nadi by a car	Hearing at Vaiola Hospital	Hearing at Vaiola Hospital	Equipment Planning	Survey of City Infrastructure	ditto	
20	11/1	Sat	Nadi (10:30) Narita (17:00) FJ302	Hearing at Vaiola Hospital	Hearing at Vaiola Hospital	Cost Estimate of Operation and Maintenance	Market Survey on M/E	ditto	
21	2	Sun	Team Meeting, Data Input						
22	3	Mon		Plan of operation and Maintenance	Donor Survey	Tonga(12:00) Auckland (14:00) WR202	Estimation of Operation & Maintenance Cost		
23	4	Tue		Explanation of Facility Plan and Maintenance		Survey of Equipment Agent	Supplemental Survey	Supplementaly Survey	
24	5	Wed		Supplementaly Survey		Survey of Equipment Agent	Supplemental Survey	Supplemental Survey	
25	6	Thu		Report to JICA		Auckland Sydney	Tonga (06:15) NZ057 Auckland (09:05)		
26	7	Fri		Tonga (11:45) PC622 Suva (12:20) Report to EOJ & JICA		Survey of Equipment Agent	M/E Equipment Agent survey	Building Material Agent Survey	
27	8	Sat		Survey of Grant Aid Project in Suva		Survey of Equipment Agent	M/E Equipment Agent survey	Building Material Agent Survey	
28	9	Sun		Suva Nadi (Transfer by a car)		Sydney(10:15) JL772 Narita (17:55)	Auckland (09:00) NZ033	Narita (15:55)	
29	10	Mon		Nadi (10:30) FJ302 Narita (17:30)					

Survey Schedule (Draft Report Explanation Survey) (February 2 to 14, 2004)

No.	Date	Day	Officials			Consultants	
			Team Leader	Technical Adviser	Project Coordinator	Project Manager	Architectural Designer
			Mitsuo Ishikawa	Yusuke Fukuda	Akiko Kawata	Shigeru Enomoto	Osamu Hamano
1	2/2	Mon	/	/	Narita (19:00)		
2	3	Tue			Nadi (06:55), Transfer to Suva by call to JICA & EOJ		
3	4	Wed			Suva(10:00) Tonga(12:35), Cou meeting with JICA		
4	5	Thu			Explanation of D/R (Equipment) t Hospital Discussion with MOH, V		
5	6	Fri			Explanation of Operation, Maintenance Plan, Equipment Plan, Project Co Budget of Tonga		
6	7	Sat			Narita(18:30)NZ034		Supplemental Survey & Data
7	8	Sun	Auckland(Arrival, Departure)			Data Filling	
8	9	Mon	Tonga(2:15) Courtesy Call on MOH, MOFA, MOF & MOPW,				Supplemental Survey
9	10	Tue	Discussio of Minutes of Discussion				Confirmation of Building Services
10	11	Wed	Discussio of Minutes of Discussion				Supplemental Survey
11	12	Thu	Signing of Minutes of Discussion	Tonga(13:30) Sydney(18:30)	Signing of Minutes of Discussion		Supplemen
12	13	Fri	/	Narita (06:10)	Tonga (11 : 45) Suva (12:20), Report to EO Transfer to Nadi by a Car.		
13	14	Sat		Nadi (10:50) Narita (17:00)			

APPENDIX - 3 List of Persons Concerned

APPENDIX 3 List of Persons Concerned

1. Ministry of Health and Vaiola Hospital

Dr. Viliami T. Tangi	Minister of Health
Dr. Litili Ofanoa	Director of Health
Dr. Taniela T. Palu	Medical Superintendent
Mr. Taniela Sunia Soakai	Senior Health Planning Officer
Dr. Siale 'Akau'ola	Senior Medical Officer
Ms. Mafi Sikale	Health Planning Officer
Mr. Sione Vaoleti Fufanga	Health Statistic Officer
Dr. Malakai 'Ake	Chief Medical Officer
Dr. Amanaki H. Fakakovikaetau	Principal Dental Officer
Ms. Amelia Lata. Malu	Chief Nursing Officer
Ms. Mele Vainikolo	Acting Matron
Mr. Feleti Eke	Acting Hospital Engineer
Mr. Tuakoi. A'hio	Public Health Attendant (PHA)
Ms. Mele Firau	Nursing Sister - Medical Ward
Ms. Lesieli Halai	Senior Nurse Midwife - Ante Natal
Ms. Salote T. Schaumkle	Nurse - Surgical Ward
Ms. Mele Havecleki	Nurse - Pediatric Ward
Ms. Tufon Mapekilof	Nurse - Obstetrics (OBS)
Ms. Ana Lolottea	Nurse - Emergency Dep.
Mr. Naoki Hitomi	JICA Senior Volunteer
Mr. Memimeta Muma	Electric Technician

2. Ministry of Finance

Ms. Melesaimu Lomu	Acting Secretary of Finance
Ms. Elitis Kavaliku	Assistant Principal Revenue Officer, Tax Section

3. Ministry of Foreign Affairs

Mr. Va'inga Tone	Deputy Secretary & Chief Protocol
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4. Ministry of Public Works

Mr. Sione Taumoepean	Director of Works
Mr. Leveni Aho	Deputy Director of Works-Building

5. Central Planning Office

Ms. Caroline Tupoulahi Fusimalohi	Director of Planning
Mr. Viliami Liavaa'	Senior Economist
Mr. Sione Faeamani	Principal Economist

6. Ministry of Environment
Mr. Uilou Samani Director
7. Ministry of Labour and Commerce
Mr. Nafe Tufui Leak Detector Supervisor
8. Port Authority
Mr. Saia Puakahuhua Senior Assistant Deputy Commissioner, Revenue Dept.
9. Water Board
Mr. Richard Blomfield Chief Officer, Engineer
Mr. Talaiasi Suka Senior Assistant Secretary
10. Telephone Company (TCC)
Mr. Paula Mafi Customer Relation Officer
Mr. Mikaela Havea Engineer Ext Plant (CPE)
11. Power Company (Shoreline)
Mr. Shimote Ngalu Distribution Manager
12. Fire Department
Mr. Polutele Tuihalamaka Chief Fire Officer
13. Consultant
Mr. Tim Dobell Brown Alexander and Lloyd Australia Pty. Ltd.
Resident Consultant
14. Fiji School of Medicine
Mr. Jione Pifoleit MSSB – 5
Ms. Pita Pepa MBBS – 3
Mr. John Poulivaati Physio – 2
- < Embassy and Donors >**
15. Embassy of Australia
Mr. Rich Nicholls First Secretary
Dr. Taiawoni I'feleh Senior Programme Officer
Ms. Rachel Brownhill Team Leader/Management Advisor, AusAID

16. Embassy of New Zealand
Ms. Keasi Pongi Development Programme Assistance
17. WHO Tonga Office
Dr. Niklas Danielsson Country Liaison Officer
- < Other Organizations >**
18. Queensland Consulting Project Partners Pty. Ltd.
Mr. Rom Heaven MOH Site Construction Manager
19. Transam Shipping Tonga Ltd.
Ms. Fataki Finau Documentation Officer
20. Dateline Shipping and Travel
Mr. Christopher Ali Assistant Operation Manager
21. Oceantranz (Tonga) Ltd.
Mr. Pukahurhua Senior Assistant Deputy Manager
22. Fletcher Royco
Mr. David F.R. Cully Manager
23. Royco Amalgamated Co. Ltd.
Mr. Roy Tavakenisau Cocker Director
Mr. Mr. Kotoni Latu Ready mixed Concrete Manager
24. Kramer (Tonga) Ltd.
Mr. Taniela Amanaki Manager/Director
25. Jones Industry Ltd.
Mr. Vaiangina Tafea Branch Manager
26. Penta-Ocean Construction Co. Ltd.
Mr. K. Inoue Administration Manager
Mr. Akimitsu Ikegami Planning Manager

APPENDIX - 4.1 Minutes of Discussions (Basic Design Study)

**MINUTES OF DISCUSSIONS
ON THE BASIC DESIGN STUDY
ON THE PROJECT FOR UPGRADING AND REFURBISHMENT OF
VAIOLA HOSPITAL IN THE KINGDOM OF TONGA**

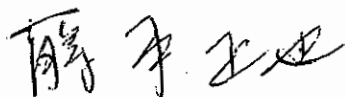
In response to a request from the Government of the Kingdom of Tonga (hereinafter referred to as "Tonga"), the Government of Japan decided to conduct a Basic Design Study on the Project for Upgrading and Refurbishment of Vaiola Hospital (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent the Basic Design Study Team (hereinafter referred to as "the Team") headed by Mr. Masaya FUJIMOTO, Deputy-Director, Second Project Management Division, Grant Aid Management Department, JICA, and is scheduled to stay in Tonga from October 21 to November 7, 2003.

The Team held discussions with the officials concerned of the Government of Tonga and conducted field survey at the study area.

In the course of discussions and the field survey, both parties confirmed the main items described on the attached sheets. The Team will proceed to further works and prepare the Basic Design Study Report.

Nuku'alofa, October 30, 2003



Mr. Masaya FUJIMOTO
Leader
Basic Design Study Team
Japan International Cooperation Agency



Dr. Litini OFANOVA
Director of Health
Ministry of Health
Kingdom of Tonga

ATTACHMENT

1. Objective of the Project

The Project aims at improving the level of health services for the people of Tonga by upgrading and refurbishing the facilities and equipment of Vaiola Hospital.

2. Project site

The site of the Project is Vaiola Hospital in Nuku'alofa, Tongatapu Island.

3. Responsible and Implementing Agency

The Responsible and Implementing Agency is the Ministry of Health.

4. Background of the Project

The Government of Tonga emphasized it submitted the application in 1999, and has afforded it the highest priority for the Japan Grant Aid since.

5. Master Plan

The Government of Tonga explained about the Master Plan as follows.

- The Master Plan was developed to guide redevelopment of Vaiola Hospital and the Project is a component of the Master Plan.
- The Master Plan will require multiple donors, thus the Government of Tonga will drive coordination efforts.
- The Government of Tonga considers the Government of Japan as the principal donor for the Master Plan.
- The Government of Japan's scope of cooperation will be incorporated in the Master Plan.

6. Components of the Project

6-1. The Government of Tonga informed the Team the priorities for the Project within the Master Plan are the Mental Health Building, all the wards (isolation, pediatrics, surgical, medical and obstetrics) and the Clinical Service Building ("CSB").

6-2. Both sides agreed the CSB and the sewage treatment plant are key components within the Master Plan for strengthening functions of Vaiola Hospital.

The CSB will be composed of the following functions in alphabetical order.

- Biomedical Maintenance Equipment Workshop
- Blood Bank
- Central Sterilizing Supply Department
- Inpatient Pharmacy
- Intensive Care Unit
- Laboratory
- Operation Theaters including Day Surgery
- Radiology and Ultrasound
- Staff Facilities

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6-3. After the discussions, the Government of Tonga submitted a strong request for the construction of a building for the obstetrics and surgical wards (the "Building") in addition to the CSB and the sewage treatment plant. The Team understands the necessity of constructing the Building, and will report this request to the Government of Japan. The Team explained the possibilities that this request might not be approved by the Government of Japan due to budgetary limitations.

6-4. The equipment described in Annex-1 was finally requested by the Government of Tonga. Both sides agreed that the equipment procured would be limited to the building(s) covered by the Project.

6-5. JICA will assess the appropriateness of the request and the final scope of the Project shall be decided after further analysis in Japan.

7. Japan Grant Aid Scheme

7-1. The Government of Tonga understands the Japan Grant Aid Scheme explained by the Team, as described in Annex-2.

7-2. The Government of Tonga will take necessary measures, as described in Annex-3 for smooth implementation of the Project, as a condition for the Japan Grant Aid to be implemented.

8. Schedule of the Study

8-1. The draft equipment list and drawings shall be submitted to the Government of Tonga by the end of January 2004. JICA will prepare the draft report in English and dispatch a mission in order to explain its contents by the end of February 2004.

8-2. In case that the contents of the report are accepted in principle by the Government of Tonga, JICA will prepare the Basic Design Study Report and send it to the Government of Tonga by the end of April 2004.

9. Other relevant issues

9-1. Environmental Impact Assessment (EIA)

Completion of the EIA based on the Master Plan is a precondition for an approval of the Project by the Government of Japan. The Government of Tonga shall implement the EIA and obtain the approval by the end of March 2004. The Government of Tonga will submit the schedule for conducting the EIA to the JICA Tonga office by the end of November 2003.

9-2. Coordination of Constructions

The Government of Tonga shall be responsible for coordinating the Project with other constructions.

9-3. Transfer of the Existing Equipment

The Government of Tonga shall be responsible for transfer of the existing equipment necessary for the new building(s) when the construction is completed.

9-4. Maintenance and Operation

The Government of Tonga shall secure enough budget and personnel necessary for proper and effective operation and maintenance of the building and equipment covered by the Project.

9

CSB

Room	Name of Equipment	Q'ty
X-Ray Room	X-Ray Unit	1
X-Ray Room	Mobile X-ray for OT / C-arm X-ray	1
X-Ray Room	X-Ray Protective Accessories	1
Dark Room	Automatic Film Processor	1
Dark Room	Cassette Pass Box	2
Dark Room	Darkroom Accessories	1
Records	X-Ray Film Viewer	1
Film Store	X-Ray Film Cassette, Screen	1
Ultrasound	Ultrasound Scanner	1
Ultrasound	Examination Table	3
Blood Bank	Blood Bank Refrigerator	1
Blood Bank	Balance for Blood Bank	1
Blood Bank	Donor's Bed	1
Blood Bank	Sphygmomanometer, Electric	1
Blood Bank	Blood Bank Centrifuge for Crossmatching	1
Haematology	Blood Cell Counter	1
Haematology	Haematocrit Cetrifuge	1
Haematology	Film Staining Machine	1
Haematology	Blood Coagulation Machine	1
Haematology	Table top Centrifuge for Haematology	1
Biochemistry	PH Meter	1
Biochemistry	Distilled Water Unit	1
Biochemistry	Blood Gas Analyzer (Small)	1
Biochemistry	Medical Refrigerator	1
Biochemistry	Water Bath	1
Biochemistry	Magnetic stairrer	1
Biochemistry	Electrical Balance	1
Pathology	Safety Cabinet	1
Microbiology	Safety Cabinet	1
Microbiology	Incubator	1
Microbiology	Dark Field Microscope	1
Microbiology	Autoclave for Laboratory	1
Microbiology	Hot Air Sterilizer	1
TB Laboratory	Safety Cabinet	1
TB Laboratory	Incubator	1
TB Laboratory	Table Top Autoclave (Portable)	1
General	Microscope	2
Biomedical Equipment Workshop	Maintenance Set	1
Inpatient's Pharmacy	Medical Refrigerator	1
Inpatient's Pharmacy	Distilled Water Unit	1
Inpatient's Pharmacy	Medicine Cabinet	1
Inpatient's Pharmacy	Labeling Machine	1
Inpatient's Pharmacy	Tablet counting machine / balance	1
ICU	Defibrillator	1
ICU	Laryngoscope (Adult & Infant)	2
ICU	Ventilator for Adult and Infant	1
ICU	Patient Monitor	3

CSB

Room	Name of Equipment	Q'ty
ICU	Resuscitation Bags & Masks (Adult & Infant)	2
ICU	Glucometer (Portable type)	1
ICU	Blood Bas Analyzer (Small type)	1
ICU	Suction unit (Medium Type)	2
ICU	Low Pressure Continuous Suction unit	1
ICU	IV Stand	4
ICU	Infusion Pump	4
ICU	Syringe pump	2
ICU	Mobile Oxygen Concentrator	1
ICU	Medical Refrigerator	1
ICU	Oxygen tent	1
ICU	X-Ray Film Viewer	1
ICU	Ultrasound Nebulizer	2
ICU	ICU Bed	3
ICU	Recovery bed	4
ICU	Instrument cabinet	1
ICU	Instrument table	2
ICU	Double basin stand	1
ICU	Medicine cabinet	1
ICU	Baby Resuscitation Trolley	1
Operating Theatre	Operating light	3
Operating Theatre	Operating Table	3
Operating Theatre	Traction Unit for Operating Table	1
Operating Theatre	Anaesthesia apparatus with ventilator	1
Operating Theatre	Electrosurgical unit, with standard accessories	1
Operating Theatre	X-Ray Film Viewer for Operating Theatre	3
Operating Theatre	Defibrillator	2
Operating Theatre	Patient Monitor	2
Operating Theatre	Suction unit (Large Size)	3
Operating Theatre	Suction unit (Small Size)	3
Operating Theatre	IV Stand	3
Operating Theatre	Infusion Pump	3
Operating Theatre	Syringe pump	2
Operating Theatre	Slide for Stretcher (Operatinng Theatre)	3
Operating Theatre	Stretcher (Ward)	2
Operating Theatre	Stretcher (A&E)	2
Operating Theatre	Mayo instrument table	3
Operating Theatre	Dressing Trolley	3
Operating Theatre	Anaesthesia Instrument Table Set	3
Operating Theatre	Laparotomy Instrument Set	3
Operating Theatre	Thoractomy Instrument Set	2
Operating Theatre	Urological Surgery Instrument Set	2
Operating Theatre	Orthopedic Surgery Instrumet Set	3
Operating Theatre	Plaster Instrument Set	1
Operating Theatre	Caesarean Section Instrument Set	3
Operating Theatre	Ophthalmology Surgery Instrumet Set	2
Operating Theatre	ENT Surgery Instrument Set	2
Operating Theatre	Surgical Scrub Station	2
Operating Theatre	Basin, S,M,L	6

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CSB

Room	Name of Equipment	Q'ty
Operating Theatre	Kick bucket	3
Operating Theatre	Plaster bandage table	1
Operating Theatre	Instrument Trolley	3
Operating Theatre	Surgeon Stool	1
Operating Theatre	Laryngoscope	3
Operating Theatre	Laryngoscope for Neonatal	1
Operating Theatre	Peak Flow Meter	1
Operating Theatre	Weighing Scale (Pediatric)	1
Operating Theatre	Esophageal Stethoscope	1
Operating Theatre	Praccordial Stethoscope	1
Operating Theatre	Glucometer (Portable Type)	1
Operating Theatre	Blood Warming Equipment	1
Operating Theatre	Flowmeter, Oxygen Regulator, Humidifier	3
Operating Theatre	Newborn Resuscitation Trolley	1
Operating Theatre	Operating Microscope for ENT, Ophthalmology	1
Operating Theatre	Pump Set for Eliminate Surplus Gas	1
Operating Theatre	IV Stand	2
Operating Theatre	Fetal Monitor (CTG)	1
Operating Theatre	Instrument Cabinet	2
Operating Theatre	Plastic Instrument	1
CSSD	High pressure steam sterilizer	2
CSSD	Table Top Ultrasonic Washer	1
CSSD	Drying Cabinet	1
Endoscopy	Endoscopy Washing Set	1
Endoscopy	Endoscopy Cabinet	1

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Surgical Ward

Department	Name of Equipment	Q'ty
Surgical Ward	Bedpan Sanitiser	1
Surgical Ward	Pulse Oxymeter	2
Surgical Ward	ECG (1ch)	1
Surgical Ward	Suction (Medium Size)	2
Surgical Ward	X-Ray Viewer (Large)	1
Surgical Ward	X-Ray Viewer, Portable (Small)	1
Surgical Ward	Traction Apparatus with Bed	2
Surgical Ward	Emergency Trolley	1
Surgical Ward	Medications Trolley	1
Surgical Ward	Dressing Trolley	2
Surgical Ward	Patients Chart Trolley	2
Surgical Ward	Defibrillator	1
Surgical Ward	Automatic BP Monitor with ECG function	1
Surgical Ward	Thermometer, Electric	1
Surgical Ward	Ice Maker	1
Surgical Ward	Ophthalmic Instrument Set	1
Surgical Ward	Infusion Pump	1
Surgical Ward	Flowmeter, Oxygen Regulator, Humidifier	1
Surgical Ward	Wheel Chair	1
Surgical Ward	Cart for Dressing Container	1
Surgical Ward	Oxygen Carrier	1
Surgical Ward	Stretcher	1

Obstetric Ward

Department	Name of Equipment	Q'ty
Obstetrics Ward	Flowmeter, Oxygen Regulator, Humidifier	2
Obstetrics Ward	Baby's Weighing Scale	1
Obstetrics Ward	Baby Resuscitation Trolley	1
Obstetrics Ward	Weighing Scale (Adult)	1
Obstetrics Ward	Pulse Oxymeter	1
Obstetrics Ward	Infusion Pump	2
Obstetrics Ward	Doppler Fetus Detector	1
Obstetrics Ward	Examination light	2
Obstetrics Ward	IV Stand	6
Obstetrics Ward	Blood Warmer	1
Obstetrics Ward	Sphygmomanometer	6
Obstetrics Ward	Colposcope	1
Obstetrics Ward	Suctions (Medium Size)	2
Obstetrics Ward	Autoclave (Table Top)	1
Obstetrics Ward	Dressing Trolley (Delivery Trolley)	3
Obstetrics Ward	Thermometer, Electric	2
Obstetrics Ward	Medical Refrigerator (Small)	1
Obstetrics Ward	Stethoscopes	3
Obstetrics Ward	Treatment Instrument Set (Obstetric)	2

Department	Name of Equipment	Q'ty
Obstetrics Ward	Kidney Dishes (L.M.S)	2
Obstetrics Ward	Bowls (L,M,S)	2
Obstetrics Ward	Resusitation bag (Infant)	1
Obstetrics Ward	Resusitation bag (Adult)	1
Obstetrics Ward	Infant Incubator	2
Obstetrics Ward	Baby Cot	20
Obstetrics Ward	Ice Maker	1
Obstetrics Ward	Bedpan Sanitiser (Manual)	2
Delivery Suite	Delivery Bed	6
Delivery Suite	Ultrasound Scanner (Portable)	1
Delivery Suite	Delivery Set	4
Delivery Suite	Medications Trolley	1
Delivery Suite	Delivery Light (Celling Type)	2
Delivery Suite	Delivery Light (Stand Type)	2
Delivery Suite	Medical Record Trolley	1

Medical Ward

Department	Name of Equipment	Q'ty
Medical Ward	Defibrillator	2
Medical Ward	Ophthalmoscope, Otoscope Set	2
Medical Ward	Ophthalmic Instruments Set	2
Medical Ward	Pulse Oxymeter	4
Medical Ward	ECG (1ch)	1
Medical Ward	Infusion Pump	3
Medical Ward	Flowmeter, Oxygen Regulator, Humidifier	10
Medical Ward	Medicine Trolleys	2
Medical Ward	Wheel Chair	6
Medical Ward	Cart for Dressing Container	2
Medical Ward	Oxygen Carrier / Oxygen Concentrator	4
Medical Ward	Patients Chart Trolley	2
Medical Ward	CPAP (Table Top)	2
Medical Ward	Thermometer, Electric	10
Medical Ward	Ice Maker	1
Medical Ward	Bedpan Sanitiser	2
Medical Ward	Nebulizer	10
Medical Ward	Dressing Trolley	6
Medical Ward	Patient Trolley	2
Medical Ward	Automatic BP Monitor (Dynamap)	2
Medical Ward	Stethoscope	10
Medical Ward	Patella Hammer	3
Medical Ward	Weighing Scale	2

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Isolation Ward

Department	Name of Equipment	Q'ty
Isolation Ward	Autoclave (Table Top)	1

Pediatric Ward

Department	Name of Equipment	Q'ty
Paediatric Ward	Patient Monitor (Pediatric)	2
Paediatric Ward	Recovery bed (Pediatric)	2
Paediatric Ward	Infusion Pump	4
Paediatric Ward	Syringe pump	2
Paediatric Ward	ECG (1ch)	1
Paediatric Ward	Otoscope, Funduscope Set	1
Paediatric Ward	Emergency Trolley	1
Paediatric Ward	Height Scale (Pediatric)	1
Paediatric Ward	Diagnostic Instrument Set (Pediatrics)	1
Paediatric Ward	Treatment Instrument Set (Pediatrics)	1
Paediatric Ward	Thermometer, Electric	1
Paediatric Ward	Stretcher (Pediatric)	1
Paediatric Ward	Medical Record Trolley	1
Paediatric Ward	Suction Unit (Medium Size)	1
Paediatric Ward	Weighing Scale (Pediatric)	1
Paediatric Ward	Sphygmomanometer (Pediatric)	1
Paediatric Ward	Stethoscopes	2
Paediatric Ward	Traction Apparatus with Bed (Pediatric)	2
Paediatric Ward	Bedpan Sanitiser	1
Paediatric Ward	Spacer for Pediatric	2
Paediatric Ward	Laryngoscope Set (Pediatric)	1
Paediatric Ward	Medical Trolley	1
Paediatric Ward	X-ray Illuminator	1

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Japan Grant Aid Program

1. Japan Grant Aid Procedures

(1) The Japan Grant Aid Program is executed by the following procedures.

Application	(request made by a recipient country)
Study	(Basic Design Study conducted by JICA)
Appraisal & Approval	(appraisal by the Government of Japan and approval by the Cabinet of Japan)
Determination of Implementation	(Exchange of Notes between both Governments)
Implementation	(implementation of the Project)

(2) Firstly, an application or a request for a Grant Aid project submitted by the recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Japan Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study), using (a) Japanese consulting firm(s).

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan Grant Aid Program, based on the Basic Design Study Report prepared by JICA and the results are then submitted to the cabinet for approval.

Fourth, the project approved by the cabinet becomes official with the Exchange of Notes signed by the Government of Japan and the recipient country.

Finally, for the implementation of the Project, JICA assists the recipient country in preparing contracts and so on.

2. Contents of the Study

(1) Contents of the Study

The purpose of the Basic Design Study conducted by JICA on a requested project is to provide a basic document necessary for appraisal of the project by the Japanese Government. The contents of the Study are as follows:

- a) confirmation of the background, objectives, benefits of the project and also institutional capacity of agencies concerned of the recipient country necessary for project implementation,
- b) evaluation of the appropriateness of the project for the Grant Aid Scheme from a technical, social and economical point of view,
- c) confirmation of items agreed on by the both parties concerning a basic concept of the project,
- d) preparation of a basic design of the project,
- e) estimation of cost of the project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the project is confirmed considering the guidelines of Japan Grant Aid Scheme.

Final project components are subject to approval by the Government of Japan and therefore may differ from an original request. Implementing the project, the Government of Japan requests the recipient country to take necessary measures involved which are itemized on Exchange of Notes.

(2) Selection of Consultants

For smooth implementation of the study, JICA uses (a) registered consulting firm(s). JICA selects (a) firm(s) based on the proposals submitted by the interested firms. The firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference set by JICA.

The consulting firm(s) used for the study is (are) recommended by JICA to a recipient country after Exchange of Notes, in order to maintain technical consistency and also to avoid any undue delay in implementation should the selection process be repeated.

3. Japan Grant Aid Scheme

(1) What is Grant Aid?

The Grant Aid Program provides a recipient country with non reimbursable funds to procure the equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials or such.

(2) Exchange of Notes (E/N)

Both Governments concerned extend Japan Grant Aid in accordance with the Exchange of Notes in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid etc., are confirmed.

(3) "The period of the Grant Aid" means one Japanese fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedure such as Exchange of Notes, concluding a contract with (a) consulting firm(s) and (a) contractor(s) and a final payment to them must be completed.

(4) Under the Grant, in principle, products and services of origins of Japan or the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant may be used for the purchase of products or services of a third country.

However the prime contractors, namely, consulting, contractor and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

(5) Necessity of the "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. The Government of Japan shall verify those contracts. The "Verification" is deemed necessary to secure accountability to Japanese tax payers.

(6) Undertakings Required to the Government of the Recipient Country

In the implementation of the Grant Aid project, the recipient country is required to undertake such necessary measures as the following:

- a) to secure land necessary for the sites of the project prior to the installation work in case the project is providing equipment,
- b) to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities in and around the sites,
- c) to secure buildings prior to the installation work in case the project is providing equipment,
- d) to ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid,
- e) to exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts,
- f) to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.

(7) Proper Use

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

(8) Re-export

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

Major Undertakings to be taken by Each Government (Construction)

NO	Items	To be covered by Grant Aid	To be covered by Recipient side
1	To secure land		•
2	To clear, level and reclaim the site when needed		•
3	To construct gates and fences in and around the site		•
4	To construct the parking lot	•	
5	To construct roads		
	1) Within the site	•	
	2) Outside the site		•
6	To construct the building	•	
7	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities		
	1) Electricity		
	a. The distributing line to the site		•
	b. The drop wiring and internal wiring within the site	•	
	c. The main circuit breaker and transformer		•
	2) Water Supply		
	a. The city water distribution main to the site		•
	b. The supply system within the site (receiving and/or elevated tanks)	•	
	3) Drainage		
	a. The city drainage main (for storm, sewer and others) to the site		•
	b. The drainage system (for toilet sewer, ordinary waste, storm drainage and others) within the site	•	
	4) Gas Supply		
	a. The city gas main to the site		•
	b. The gas supply system within the site	•	
	5) Telephone System		
	a. The telephone trunk line to the main distribution frame / panel (MDF) of the building		•
	b. (The MDF and)the extension after the frame / panel	•	
	6) Furniture and Equipment		
	a. General furniture		•
	b. Project equipment	•	
8	To bear the following commissions to a bank of Japan for the banking services based upon the B/A		
	1) Advising commission of A/P		•
	2) Payment commission		•
9	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country		
	1) Marine(Air) transportation of the products from Japan to the recipient country	•	
	2) Tax exemption and customs clearance of the products at the port of disembarkation		•
	3) Internal transportation from the port of disembarkation to the project site	•	

10	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		•
11	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract		•
12	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid		•
13	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities as well as for the transportation and installation of the equipment		•

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(9) Banking Arrangement (B/A)

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

b) The payments will be made when payment requests are presented by the bank to the Government of Japan under an Authorization to Pay issued by the Government of the recipient country or its designated authority.



APPENDIX - 4.2 Minutes of Discussions (Explanation on Draft Report)

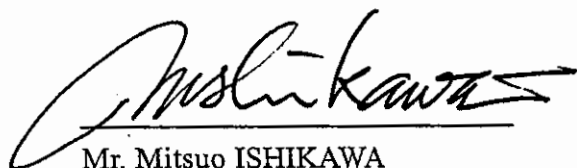
**MINUTES OF DISCUSSIONS ON THE BASIC DESIGN STUDY
ON THE PROJECT FOR UPGRADING AND REFURBISHMENT OF
VAIOLA HOSPITAL IN THE KINGDOM OF TONGA
(EXPLANATION ON DRAFT REPORT)**

In October 2003, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a Basic Design Study Team on the Project for Upgrading and Refurbishment of Vaiola Hospital (hereinafter referred to as "the Project") to the Kingdom of Tonga, and through discussion, field survey, and technical examination of the results in Japan, JICA prepared a draft report of the study.

In order to explain and to consult with the Kingdom of Tonga on the components of the draft report, JICA sent to the Kingdom of Tonga the Draft Report Explanation Team (hereinafter referred to as "the Team"), which is headed by Mr. Mitsuo Ishikawa, Resident Representative of the JICA Tonga office, from February 3 to February 13, 2004.

As a result of discussions, both parties confirmed the main items described on the attached sheets.

Nuku'alofa, February 12, 2004



Mr. Mitsuo ISHIKAWA
Leader
Draft Report Explanation Team
Japan International Cooperation Agency



Dr. Lifili OFANOA
Director of Health
Ministry of Health
Kingdom of Tonga

1. Components of the Draft Report

The Government of Tonga accepted in principle the components of the draft report explained by the Team. After discussions based on the draft report, both sides agreed the facilities plan and equipment list described in Annex 1 and Annex 2.

2. Japanese Grant Aid Scheme

The Government of Tonga understood the Japanese Grant Aid Scheme and the necessary measures to be taken by the Government of Tonga as explained by the Team, and described in Annex-2 and Annex-3 of the Minutes of Discussions signed by both parties on October 30, 2003.

3. Schedule of the Study

JICA will complete the final report in accordance with the confirmed item and send it to the Government of Tonga by the end of April 2004.

4. Other relevant issues

4-1. Undertakings by the Government of Tonga

Both sides confirmed the undertakings of each government, which is described in Annex 3, and agreed that the Government of Tonga shall implement its undertakings in accordance with the implementation schedule attached as Annex 4.

Both sides agreed that the oxygen condensing system is imperative for functions of clinical services and installation of the system will be included as a component of the Project.

4-2. Environmental Impact Assessment (EIA)

Both sides reconfirmed that completion of the EIA based on the Master Plan is a precondition for an approval of the Project by the Government of Japan. The Ministry of Health shall be responsible for implementation of the EIA and take necessary measures for an approval. The Ministry of Health shall obtain the EIA approval by the end of March 2004 and report it to the Tonga JICA office.

4-3. Coordination of Constructions

The Ministry of Health will establish and chair taskforce to manage and coordinate the implementation of the Master Plan and the Project. Membership of the taskforce shall include contractors for the Project and the Master Plan.

4-4. Transfer of the Existing Equipment

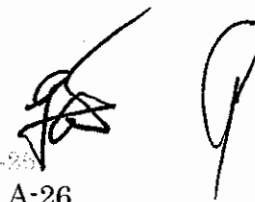
The Government of Tonga shall be responsible for transfer of the existing equipment necessary for the new building(s) when the construction is completed.

4-5. Maintenance and Operation

The Government of Tonga shall secure enough budgets for the proper and effective operation and maintenance of the facilities and equipment after completion of the Project.

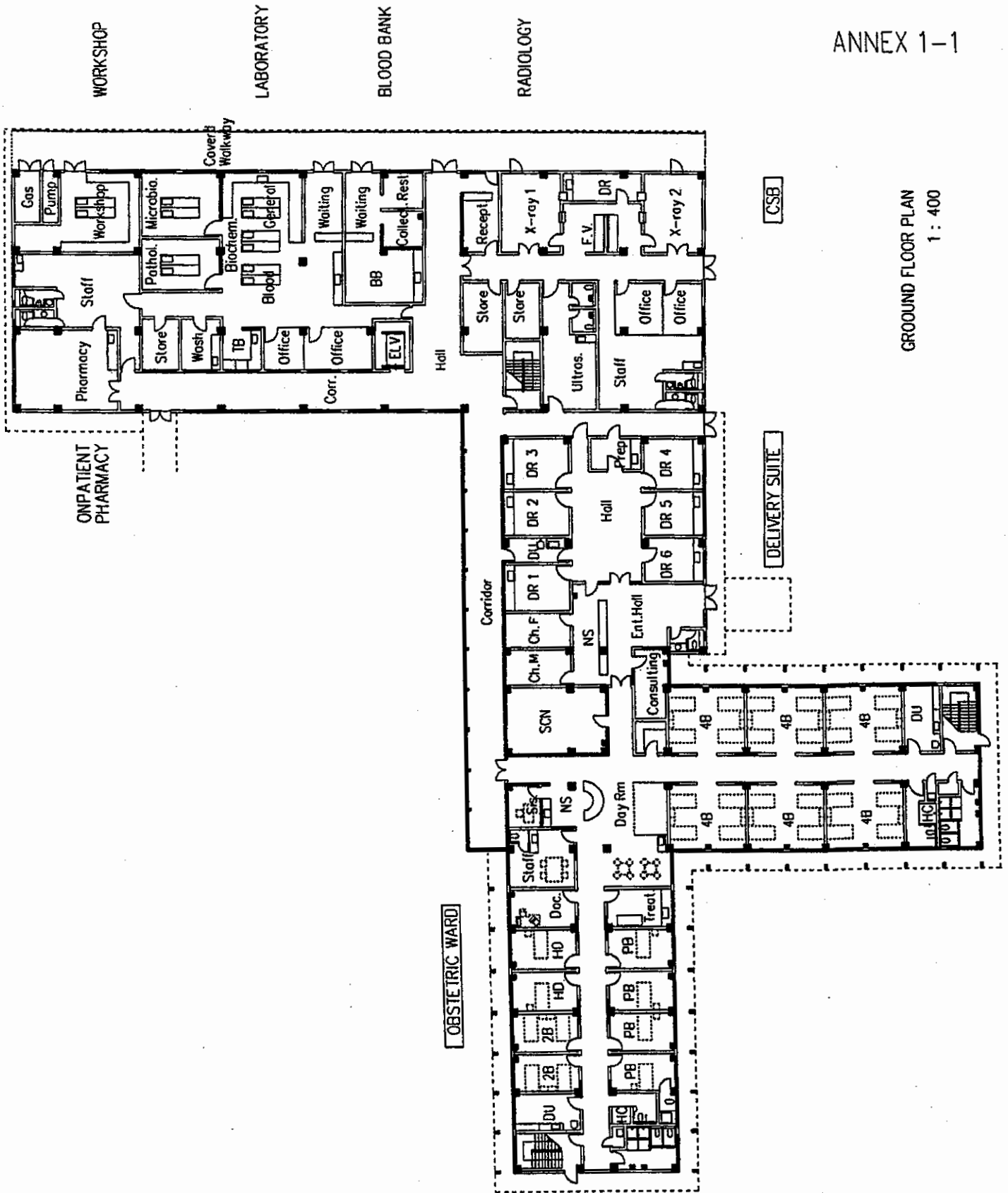
4-6. Ultrasound/Blood Bank Building

In the event the Ultrasound/Blood Bank is demolished, the Government of Tonga shall notify the Embassy of Japan in Fiji.



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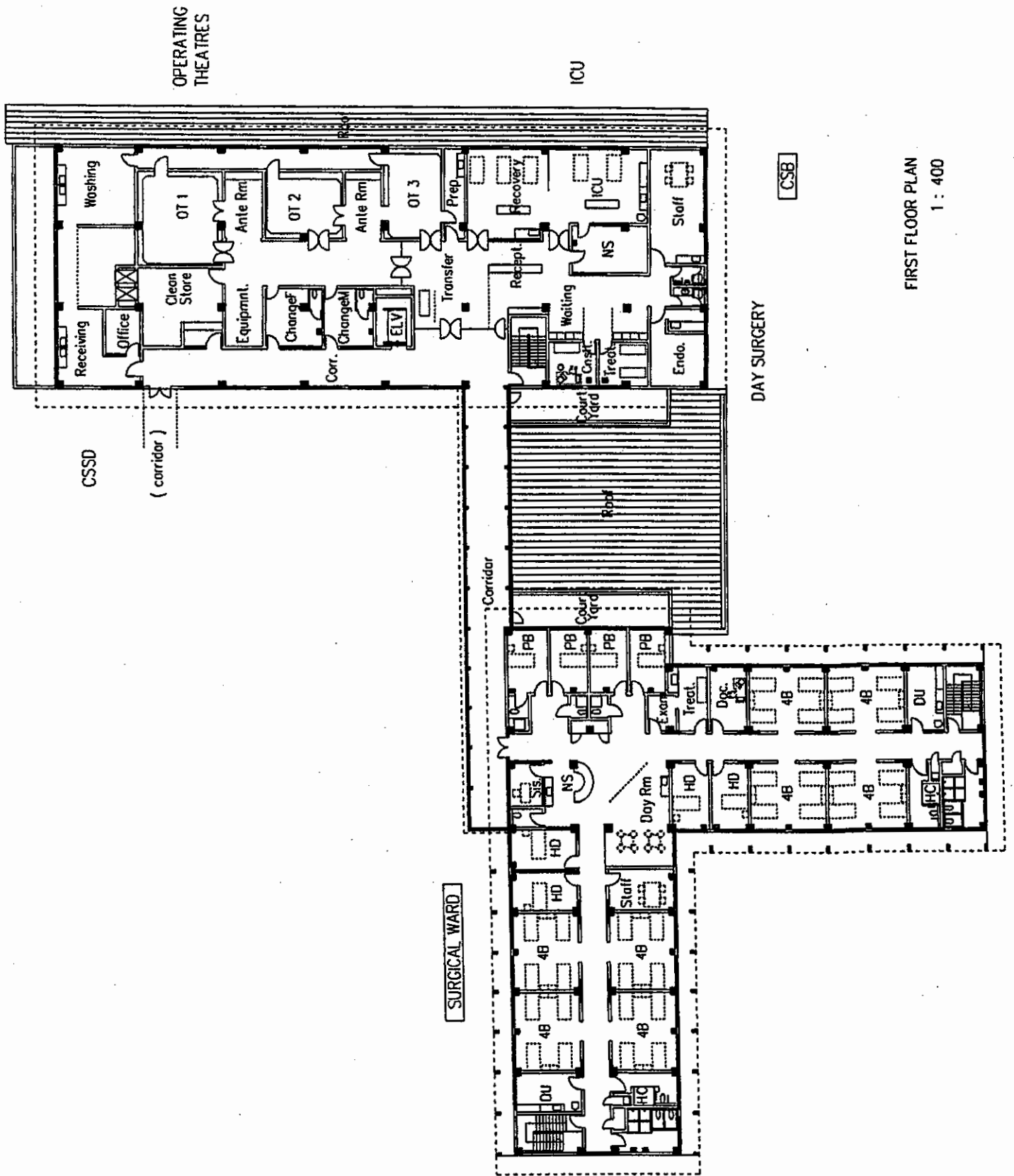
GROUND FLOOR PLAN
1 : 400



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FIRST FLOOR PLAN
1 : 400

SURGICAL WARD

CSB

DAY SURGERY

ICU

OPERATING THEATRES

CSSD

(corridor)

Equipment List

Operating theatre

Item No.	Name of Equipment	Quantity, planned	Quantity, will be moved	Total quantity
OT-1	Operating light for operating theatre	3	0	3
OT-2	Operating table	3	0	3
OT-3	Traction unit for operating table	1	0	1
OT-4	Anesthesia apparatus with ventilator	1	2	3
OT-5	Electrosurgical unit	1	2	3
OT-6	X-ray film viewer for operating theatre	3	0	3
OT-7	Defibrillator	1	1	2
OT-8	Patient monitor for operating theatre	2	1	3
OT-9	Suction unit, large size	3	0	3
OT-10	Suction unit, wall hanging type, small size	3	0	3
OT-11	Infusion pump	1	0	1
OT-12	Syringe pump	1	0	1
OT-13	Slide board for stretcher	2	0	2
OT-14	Stretcher	0	2	2
OT-15	Mayo instrument stand	3	0	3
OT-16	Dressing trolley, curved	3	0	3
OT-17	Anaesthesia instrument table set	1	0	1
OT-18	Laparotomy instrument set	1	4	5
OT-19	Orthopedic surgery instrument set	1	1	2
OT-20	Plaster instrument set	1	0	1
OT-21	Caesarean section instrument set	1	1	2
OT-22	Ophthalmology surgery instrument set	1	0	1
OT-23	ENT surgery instrument set	1	0	1
OT-24	Surgical scrub station	2	0	2
OT-25	Kick bucket	3	0	3
OT-26	Instrument trolley	3	0	3
OT-27	Surgeon and assistant's stool	3	0	3
OT-28	Laryngoscope for adult and pediatric	2	0	2
OT-29	Laryngoscope for neonatal	1	0	1
OT-30	Peak flow meter	1	0	1
OT-31	Weighing scale for pediatric	1	0	1
OT-32	Blood warming equipment	1	0	1
OT-33	Flowmeter, humidifier, wall hanging type	3	0	3
OT-34	Newborn resuscitation trolley	0	1	1
OT-35	Operating microscope for ENT	1	0	1
OT-36	Operating microscope for ophthalmology	0	1	1
OT-37	Pump set for eliminate surplus gas	1	0	1
OT-38	Instrument cabinet	1	1	2
OT-39	Plastic instrument set	1	0	1
OT-40	Examination light	2	0	2
OT-41	Mobile X-ray	1	0	1
OT-42	Weighing scale for adult	1	0	1
OT-43	IV Stand	2	0	2
OT-44	Basin S,M,L	0	6	6
OT-45	Plaster bandage table	1	0	1

Endoscopy room

EN-1	Endoscopic washing set	1	0	1
EN-2	Endoscopic storage cabinet	1	0	1
EN-3	Endoscopic table	0	1	1

Item No.	Name of Equipment	Quantity, planned	Quantity, will be moved	Total quantity
EN-4	Gastroscope with lightsource	1	0	1

CSSD

CS-1	High pressure steam sterilizer	2	0	2
CS-2	Table top ultrasonic washer	1	0	1
CS-3	Working table	0	2	2

ICU

IC-1	Defibrillator	0	1	1
IC-2	Laryngoscope for adult and pediatric	1	0	1
IC-3	Ventilator for adult and infant	1	0	1
IC-4	Patient monitor for ICU	2	0	2
IC-5	Resuscitation bags and masks for adult/pediatric	1	0	1
IC-6	Suction unit, medium size	2	1	3
IC-7	Infusion pump	1	0	1
IC-8	Syringe pump	1	0	1
IC-9	Medical refrigerator	1	0	1
IC-10	X-ray film viewer for ICU	1	0	1
IC-11	Nebulizer	1	0	1
IC-12	ICU bed	2	0	2
IC-13	Glucometer(Portable type)	1	0	1
IC-14	Instrument cabinet	1	0	1
IC-15	Instrument trolley	1	0	1
IC-16	Double basin stand	1	0	1
IC-17	Medicine cabinet	1	0	1
IC-18	Flowmeter, humidifier, wall hanging type	2	0	2
IC-19	Low pressure continuous suction unit	1	0	1
IC-20	IV Stand	2	0	2

Recovery

RE-1	Flowmeter, humidifier, wall hanging type	3	0	3
RE-2	IV Stand	3	0	3
RE-3	Double basin stand	1	0	1
RE-4	Stethoscope	1	0	1
RE-5	Recovery bed	3	0	3

Clinical laboratory

LB-1	PH meter	1	0	1
LB-2	Distilled water unit	1	0	1
LB-3	Medical refrigerator	0	1	1
LB-4	Water bath	1	0	1
LB-5	Magnetic stirrer	1	0	1
LB-6	Electrical balance	1	0	1
LB-7	Spectrophotometer	0	1	1
LB-8	Electrolyte analyzer	0	1	1
LB-9	Table top centrifuge	0	1	1
LB-10	Blood cell counter	1	0	1
LB-11	Haematocrit centrifuge	1	0	1
LB-12	Blood coagulation machine	1	0	1
LB-13	Microscope	0	2	2
LB-14	Autoclave for laboratory	1	0	1

TB corner

TB-1	Safety cabinet	1	0	1
TB-2	Incubator	0	1	1

Item No.	Name of Equipment	Quantity, planned	Quantity, will be moved	Total quantity
TB-3	Autoclave for laboratory	0	1	1

Microbiology laboratory

MB-1	Incubator	1	0	1
MB-2	Table top autoclave	1	0	1
MB-3	Safety cabinet	1	0	1
MB-4	Autoclave for laboratory	1	0	1
MB-5	Microscope	0	2	2

Phathology laboratory

PH-1	Safety cabinet	0	1	1
PH-2	Microscope	0	2	2

Blood bank

BB-1	Blood bank refrigerator	1	1	2
BB-2	Blood bank freezer	0	1	1
BB-3	Balance for blood bank, manual type	1	0	1
BB-4	Donor's bed	1	0	1
BB-5	Blood bank centrifuge	0	1	1
BB-6	Water bath	0	1	1

Inpatient's pharmacy

IP-1	Medical refrigerator	1	0	1
IP-2	Distilled water unit	1	0	1
IP-3	Medicine cabinet	1	0	1

Biomedical unit

BM-1	Maintenance set	1	0	1
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X-ray room

X-1	X-ray unit	1	0	1
X-2	X-ray fluolscopy	0	1	1
X-3	Mobile X-ray	0	1	1
X-4	X-ray protective accessories	1	0	1

Dark room

D-1	Automatic film processor	1	0	1
D-2	Cassette pass box	2	0	2
D-3	Darkroom accessories	1	0	1
D-4	X-ray film cassette and screen	1	0	1

Reading room

R-1	X-ray film viewer for reading room	1	0	1
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Ultrasound room

UL-1	Color doppler ultrasound scanner	0	1	1
UL-2	Ultrasound scanner, B/W	1	0	1
UL-3	Examination table	2	0	2

Obstetric ward

OW-1	Flowmeter, oxygen regulator, humidifier	2	0	2
OW-2	Doppler fetus detector	1	1	2
OW-3	Examination light	0	1	1
OW-4	Suction unit, medium size	2	1	3

Item No.	Name of Equipment	Quantity, planned	Quantity, will be moved	Total quantity
OW-5	Obstetric treatment instrument set	1	0	1
OW-6	Emergency cart with resusitation bag for adult	1	0	1
OW-7	Baby cot	19	15	34
OW-8	Bedpan sanitiser	1	0	1
OW-9	Bed	0	34	34
OW-10	Gynecology examination table with light	1	0	1
OW-11	Weighing scale (Adult)	1	0	1
OW-12	IV Stand	4	0	4
OW-13	Sphygmomanometer	3	0	3
OW-14	Dressing Trolley (Delivery Trolley)	2	0	2
OW-15	Thermometer, Electric	2	0	2

Delivery room

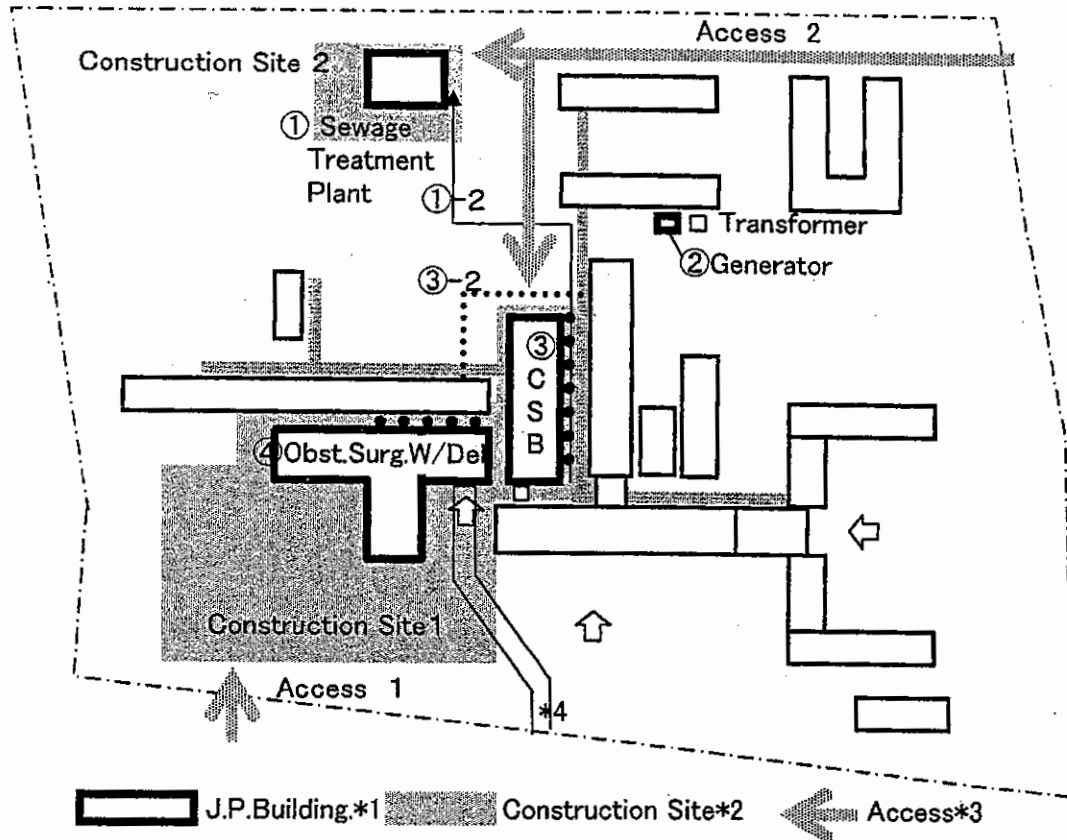
DE-1	Delivery bed	3	3	6
DE-2	Medications trolley	1	0	1
DE-3	Delivery light, stand type	6	0	6
DE-4	Fetal monitor (CTG)	1	1	2
DE-5	Delivery instrument set	2	4	6
DE-6	IV Stand	2	0	2
DE-7	Pulse oxymeter	1	0	1
DE-8	Baby's weighing scale	1	0	1

SCN (Special care nursery)

SC-1	Baby resuscitation trolley	2	2	4
SC-2	Baby's weighing scale	1	0	1
SC-3	Pulse oxymeter	1	1	2
SC-4	Infusion pump	1	1	2
SC-5	Syringe pump	1	1	2
SC-6	Resusitation bag for infant	2	0	2
SC-7	Infant incubator	1	1	2

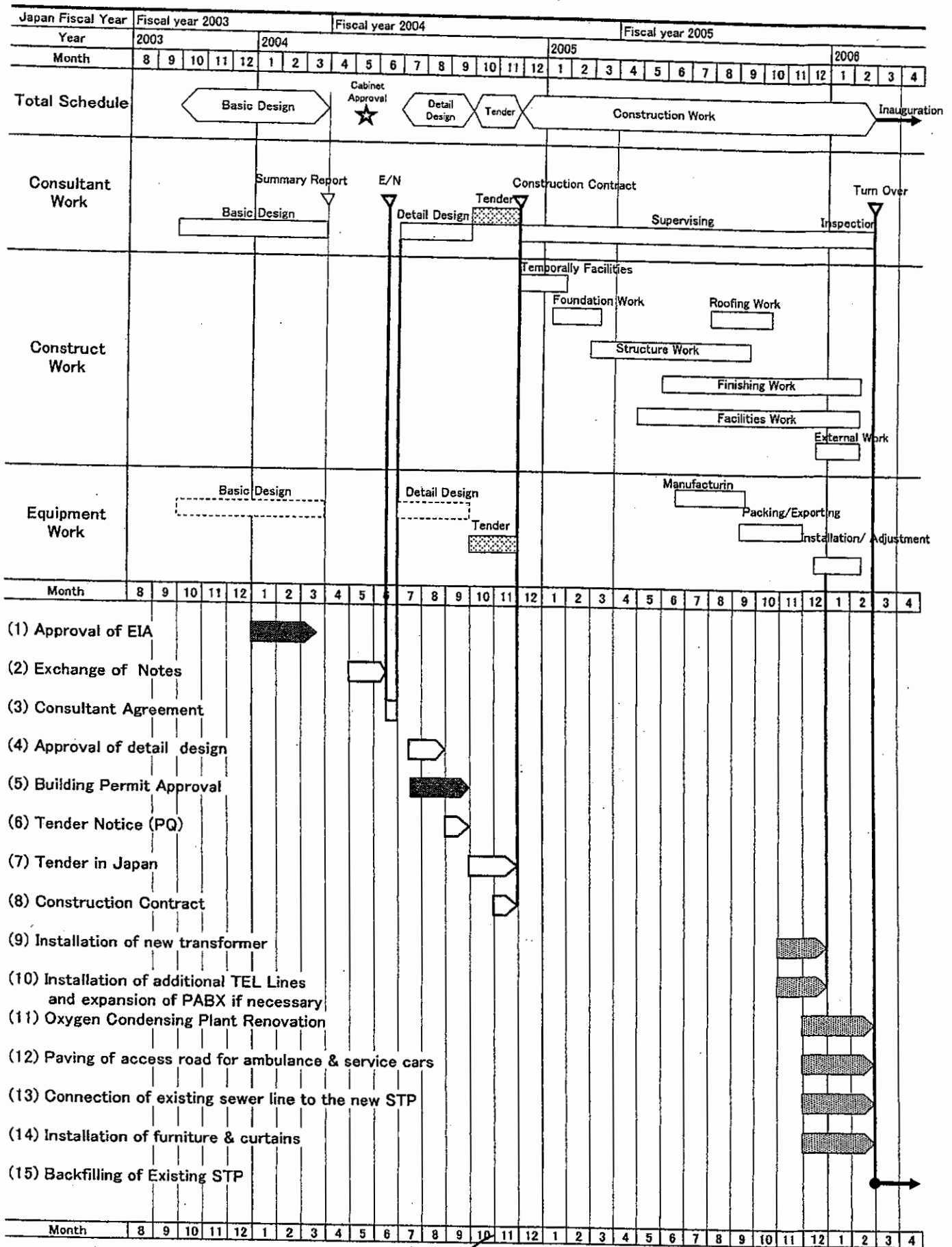
Surgical ward

SW-1	Bedpan sanitiser	2	0	2
SW-2	Pulse oxymeter	1	0	1
SW-3	Suction, medium size	0	1	1
SW-4	X-ray viewer (Large)	0	1	1
SW-5	Traction apparatus with bed	2	4	6
SW-6	Emergency trolley	0	1	1
SW-7	Medications trolley	0	1	1
SW-8	Dressing trolley	2	0	2
SW-9	Thermometer, Electric	1	0	1
SW-10	Ophthalmic instrument set	0	1	1
SW-11	Flowmeter, oxygen regulator, humidifier	1	0	1
SW-12	Wheel chair	1	0	1
SW-13	Automatic BP monitor	1	0	1
SW-14	Stretcher	0	1	1
SW-15	Bed	0	41	41
SW-16	Treatment table	0	1	1
SW-17	Examination light	1	0	1



Works to be done	Japanese Portion	Undertakings by the Tonga Govern.
① Sewer Treatment Plant	<ul style="list-style-type: none"> STP. Construction(3Units) as per Building Code Connection from J.P. Buildings Valves for connection to existing STP 	<ul style="list-style-type: none"> Connection from existing buildings Exist.STP. demolition, Site leveling
② Electricity	<ul style="list-style-type: none"> Connection from Transformer Generator installation, Connection to J.P.Buildings 	<ul style="list-style-type: none"> Main Trunk Line renewal, Transformer installation
③ CSB	<ul style="list-style-type: none"> Pipes/Line relocation at site CSB construction Coverd Walkway relocation 	<ul style="list-style-type: none"> Existing building demolition (as per requirement)
④ Obstetrics & Surgical Ward/Delivery Suite	<ul style="list-style-type: none"> Construction 	<ul style="list-style-type: none"> Access paving *4
○ Rainwater	<ul style="list-style-type: none"> Connection from highrised tank 	<ul style="list-style-type: none"> Reservoir tank, Pump renewal (as per requirement)
○ City Water (Fire Distinguisher)	<ul style="list-style-type: none"> Connection to Main Line Local reservoir tank installation Connection to J.P.Buildings 	<ul style="list-style-type: none"> Main Pipe Line, Measuring Meter renewal (as per requirement)
○ Telephone	<ul style="list-style-type: none"> Existing MDF-extension Telephone installation, connection 	<ul style="list-style-type: none"> Telephone line-PABX extension
○ Medical Gas	<ul style="list-style-type: none"> Medical Gas System installation Oxygen Condensing System renewal 	
○ Construction Site	<ul style="list-style-type: none"> Temporary fencing Site retrieval 	<ul style="list-style-type: none"> Land Use permission Installation of Furniture/Equipment

*1 Building done by the Japanese Portion.
 *2 Construction Site and Working area for the construction.
 *3 Temporary access road to the Construction Site; Access1 from main road, Access2 from existing service road.
 *4 Paving for access road from expecting Main Gate to the Delivery Suite.



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APPENDIX - 5 Cost Estimation Borne by the Recipient Country

APPENDIX-5 Costs to be Borne by the Government of Tonga

1. Cost for Construction Related Works

The Government of Tonga needs to provide following budget allocation for their works during the construction.

Table-1 Cost to be borne by the Government of Tonga

Cost Items	Cost(Tonga\$)		Cost (¥)
	2004/2005	2005/2006	
1) Construction-Related Items		1,923,280	105,761,000
Building Permit Application	0	-	0
Electricity connection and new transformer	-	71,000	3,904,000
Water supply connection	-	800	44,000
Additional telephone line connection	-	480	26,000
Construction site works including road works, car parking, klandxcaping, bus shelter, covered way sets. (M/P package, C)	-	1,514,000	83,255,000
Connection of sewer line to new STP (Approximately 50m)	-	27,500	1,512,000
Installation existing medical equipment		27,700	1,523,000
Gardening, tree plant (10 % of M/P)		60,000	3,167,000
Beds and curtain		224,700	12,330,000
Obligation of EIA	Under survey	Under survey	Under survey
2) BA.AP Commission (0.1% of E/N Amount)	18,200	-0	1,000,000
Sub-Total	18,200	1,923,280	106,761,000
Total		1,941,480	106,761,000

(1) Estimation Conditions

- 1) Date of Estimation : November, 2003
- 2) Foreign Exchange Rate : Aus\$:T\$0.6755
NZ\$: ¥70.22 (June, 2003 to end of November, 2003)
T \$:¥54.86 (June, 2003 to end of November, 2003)
- 3) Work Period : The detailed design and construction periods are as shown in the project implementation schedule
- 4) Others : The Project will be implemented in accordance with the grant aid scheme of the Government of Japan

(2) Breakdown of the cost

Followings are the cost breakdown of the work to be done by the Government of Tonga.

1) Building Permit Application Fee

There is no application fee for the building permit in Tonga.

2) Electricity Power Supply

- Connection construction fee : T\$60,000
(New transformer 500KVA and construction of new incoming line)
- Connection fee : T\$10,000
- Application fee : T\$1,000
- Total : T\$71,000

3) Water Supply

- Connection construction fee : T\$800
(New water flow meter and construction of new incoming upsize line;
Including connection fee and application fee)
- Total : T\$800

4) Additional telephone lines and expansion of PABX

- Connection construction fee : T\$480
(additional 4 telephone lines; Including connection fee and application fee)
- Expansion of MDF and PABX shall be done by construction of MoH Building by Aus AID, so there is no need for additional cost from this project.
- Total : T\$480

5) Paving of services road and others from M/P

Package C: Construct site works including road works, car parking, landscaping, bus shelters, covered way	Aus\$ 1,027,000
<u>Total</u>	<u>Aus\$ 1,027,000</u> (T\$1,514,000)

6) Connection of sewer line to new STP pipe

Distance to the new STP pipe is approximately 50m:
50(m) x T\$550/m =T\$27,500

7) Transfer of existing equipment

- X-Ray : 2 engineers from Australia visit to the site and transfer one existing X-Ray.
Cost is ¥1,500,000 .
- Safety Cabinet : Demolish, transfer, assembling work. Cost is ¥23,000.

8) Landscape, tree planting (Site cost of M/P)

Total landscaping cost was estimated as Aus\$ 400,000. (T\$590,000) in the M/P and we took 10% of its cost as for this project: T\$59,000

9) Installation of General Furniture and Accessories

Bed for the patient: ¥120,000 x 82(beds)	=¥9,840,000	(T\$ 179,300)
Curtain for beds: ¥15,000 x 82(beds)	=¥1,230,000	(T\$22,400)
<u>Curtain for the window: ¥2,000/m² x 420 m²</u>	<u>=¥1,260,000</u>	<u>(T\$23,000)</u>
Total	¥12,330,000	(T\$224,700)

10) Additional expenses by EIA Regulation

EIA Report is under preparation by MOH, and if there is additional requirement to change specification of sewage treatment, those additional expenses for design and construction are born by the MOH. This was agreed by MOH and Draft Basic Design Report Explanation Team in February 2004.

If there are other requirement in EIA, those additional expenses are also born by MOH.

(2) Banking arrangement

It is necessary about 0.1% of E/N amount for banking arrangement.

2. Maintenance Cost

(1) Maintenance Plan

1) Facilities

The key features of the maintenance of hospital facilities are ① daily cleaning, ② repair of any damage or deterioration and ③ the inspection and repair of the medical equipment. The implementation of daily cleaning is the best way of embodying the concept of hospital hygiene which has a good influence on hospital users, i.e. inpatients and outpatients, and which improves the trust of the public in the hospital. Cleaning can also make the early discovery of any damage or breakdown to facilitate preventive maintenance and prolongs facilities. The perceived repairs involve the interior and exterior finishing. Without such repair, the facilities eventually become inconvenient for not only the hospital staff but also for the patients.

The detailed items for periodic inspection and repair will be submitted in the form of a “maintenance manual” by the contractor at the time of the handing over of the facilities to the Tongan side. At the same time, the contractor will explain the inspection methods and regular cleaning methods. The required inspection and maintenance work is outlined in Table 5-1.

Table-2 Outline of Periodic Inspection of Facilities

	Description of Inspection	Frequency of Inspection
Exterior	<ul style="list-style-type: none"> • Repair and repainting of external walls • Inspection and repair of roofing materials • Periodic cleaning of gutters and drains • Inspection and repair of sealing of external windows and doors • Periodic inspection and cleaning of side ditches and manholes, etc. • Cleaning and sludge removal of septic tank 	Repair: once every five years Repainting: once every 15 years Inspection: once a year Repair: once every five years Once a month Once a year Once a year Several times a year
Interior	<ul style="list-style-type: none"> • Change of interior decoration • Repair and repainting of partition walls • Renewal of ceiling materials • Adjustment of windows and doors; replacement of metal ware for windows and doors 	As required As required As required Once a year and also as required

2) Building Service Equipment

In regard to building service equipment, routine “preventive maintenance” is very important to prevent breakdown repair and/or parts replacement as much as possible. The life of building service equipment is partly determined by the length of the operating hours but can certainly be prolonged by correct operation and routine inspection, lubrication, adjustment, cleaning and repair. Such routine inspection can possibly prevent breakdowns or accidents or the magnification of accidents. At the time of periodic inspection, the replacement of expendable parts and cleaning of the filters, etc. should be conducted in accordance with the maintenance manual.

What is crucial is the creation of a proper maintenance system where maintenance staff conduct routine inspection and maintenance and agents of the manufacturers are contracted to conduct periodic inspection if required. The common lives of the main equipment are shown in Table 3.

Table-3 Life of Building Service Equipment

	Type of Equipment	Expected Life
Electrical Installations	<ul style="list-style-type: none"> • Distribution panels • Fluorescent lamps • Incandescent lamps 	20 – 30 years 5,000 – 10,000 hours 1,000 – 1,500 hours
Water Supply and Drainage Systems	<ul style="list-style-type: none"> • Pumps, pipes and valves • Tanks • Sanitary ware 	15 years 20 years 25 – 30 years
Air-Conditioning System	<ul style="list-style-type: none"> • Pipes • Ventilation fans • Air-conditioning units 	15 years 20 years 8 years

3) Equipment

As for the maintenance management of the equipment to be procured, it is necessary to make "daily maintenance" that is a performance test before and after operating the equipment and "periodical maintenance" in which the inspection and the maintenance are mainly made once a year. Periodical maintenance is made in accordance with the instruction manuals. It is necessary to peruse the instruction manuals and be familiar with operation and maintenance of the equipment.

Table-4 Maintenance of the Equipment to be Procured

Classifications	Main Equipment	Daily Inspection and Maintenance
Equipment for General Treatment	Anaesthesia Apparatus and Ventilator	Confirmation of tube connection, and cleaning of each part
	Electrosurgical Unit	Cleaning of scalpel's edge and counter electrode plate
	Defibrillator	Check on battery
	Patient Monitor	Cleaning of probes, sensor, conducting wires and cables
	Suction Unit	Rinsing of suction bottle, and wiping the inside of rubber cap with dry cloth
	Infusion Pump and Syringe Pump	Performance test of sensor
	Baby Resuscitation Trolley	Performance test and cleaning of sensor
	Doppler Fetus Detector	Cleaning of probes
	Fetal Monitor	Cleaning of sensor
	Pulse Oxymeter	Cleaning of probes
Equipment for Clinical Examination	Blood Cell Counter	Cleaning and periodical calibration
	Blood Coagulation Machine	Cleaning and periodical calibration
	Haematocrit Centrifuge	Cleaning of rotor and confirmation of loosening of rotor
Equipment for Imaging Diagnostic	X-Ray Unit	Confirmation of whether there is a noise, and check on cables and socket
	Mobile X-ray	Cleaning, and check on cables and plug
	Ultrasound Scanner	Cleaning of probes

Optical Instrument	Operating Microscope for ENT & Ophthalmology	Cleaning of each part
	Gastroscope with Light Source	Disinfection of Gastroscope
Equipment for Washing and Sterilization	Table Top Ultrasonic Washer	Cleaning of inner parts
	Autoclave (for Laboratory)	Cleaning of inner parts when it is defiled with culture media and others
	Surgical Scrub Station	Periodic exchange of filter
	Bedpan Sanitizer	Cleaning of drainage fittings (once a month)
Other (Facilities)	Oxygen Condensing System	Inspection of oxymeter, and confirmation of oil level of suction pump

(2) Running and Maintenance Costs

The annual running and maintenance costs of the new facilities are estimated as described below. The running cost is estimated in terms of 1) the electricity cost, 2) the water cost and 3) the telephone/communication cost, 4) the fuel cost etc 5) LPG while the maintenance cost is estimated in terms of the 6) facility maintenance cost, 7) the building service equipment maintenance cost and 8) the equipment maintenance cost. The estimated running cost of the planned facilities is shown in Table 5-6.

Table-5 Breakdown of Estimated Running Cost for Project-Related Facilities

Cost Item	2002 Results (T\$/year)	Estimate After Completion of Japanese Grant Aid (T\$/year)	Remarks (Increase: T\$/year)	Rate of Increase (%) (b/a x 100)
(1) Operation Cost	466,800	610,200	143,400	-
1) Electricity Cost	225,000	344,000	+119,000	52.9
2) Water Cost	55,000	69,000	+14,000	25.5
3) Telephone and Communication Cost	104,000	104,000	0	0.0
4) Diesel Oil (Fuel Cost)	55,000	55,000	0	0.0
5) LPG (Fuel) Cost	800	800	0	0.0
6) Disposal of Chemical waste water	0	0	0	0.0
7) Equipment Spare Pars	27,000	37,400	10,400	40.7
8) Sewage Treatment Tank (EIA)	Under survey	Under Survey	Under Survey	-
(2) Maintenance Cost	119,000+a	132,600	13,300	-
1) Building	119,000	126,300	+7,000	5.9
2) Building Services	Under survey	6,300	+6,300	100.0
3) Elevator	0	0	0	0.0
Total	585,800	742,500	156,700	-

1) Electricity Cost

The current electricity tariff of the electricity company in Tonga (Shoreline Distribution) is given below.

Basic Charge : none
 Meter Rate : T\$ 0.455/kWh

The total installed capacity of the facilities after the completion of Japanese Grant Aid and the actual electricity demand are estimated to be approximately 700 kVA and 360 kVA respectively. The contract demand is, therefore, assumed to be 288 kW (360 kVA x

0.8).

Basic Charge : none
Meter Rate : 288 kW x 60% x 365 days/year x 12 hours/day x
T\$ 0.455/kWh = T\$ 344,373/year

Based on the above, the annual electricity cost will be approximately T\$ 344,000 (approximately ¥19 million) which is some 1.5 times higher than the figure for 2002 (T\$ 225,000), an increase of T\$ 119,000 (approximately ¥6.5 million) per year.

2) Water Cost

The current water tariff of the Tonga Water Board (TWB) is described below.

Basic Charge : none
Meter Rate : T\$ 1.51/m³
Other Charge (Fuel Cost) : 15%
Meter Rental Charge : T\$ 3/month

As the water consumption volume following the completion of the entire work envisaged by the M/P is expected to slightly increase due to the rehabilitation and new installation of equipment using water, it is assumed that the current consumption level (4,367.9 m³ in August, 2003 ÷ 31 days = 140.9 m³/day) will increase by 10% to approximately 155 m³/day.

Basic Charge : none
Meter Rate : 155 m³/day x 70% x 365 days/year x T\$ 1.51/m³
= T\$ 59,800/year
Other Charge : T\$ 59,800/year x 15% = T\$ 8,970/year
Meter Rental Charge : T\$ 3/month x 12 months/year = T\$ 36/year

Based on the above, the annual water cost will be approximately T\$ 69,000 (approximately ¥3.8 million) which is some 1.2 times higher than the figure for 2002 (T\$ 55,000), an increase of T\$ 14,000 (approximately ¥77,000) per year.

(3) Telephone and Communication Cost

The telephone cost in 2002 was T\$ 104,000 (approximately ¥5.7 million). The number of telephone lines has been increased to 13 (two exclusive FAX lines) as of November, 2003 and this is judged to be suitable for the scale of the hospital (the hospital side wants a further increase of four more lines). Unless the mode of telephone use dramatically changes, it is assumed that the telephone and communication cost will remain steady, i.e. approximately T\$ 104,000 (approximately ¥5.70 million) per year.

(4) Diesel Oil Cost (Fuel)

The payment slips for diesel oil indicate the following unit price.

Basic Charge : none
Meter Rate : T\$ 0.7596/litre

Following the completion of the Japanese Grant Aid work, steam will be used only kitchen and laundry only because hot water provide by the electric water heater and steam for sterilizer produce by the equipment. It is assumed that the diesel oil consumption at the hospital will be the same figure as for 2002.

6,000 litres/month x 1 x 12 months/year = 72,000 litres/year
 72,000 litres/year x T\$ 0.7597/litre = T\$ 54,698/year

Based on the above, the annual diesel cost will be approximately T\$ 55,000 (approximately ¥3.00 million) .

(5) LPG Cost (Fuel)

The payment slips for LPG indicate the following unit price

Basic Charge : none
 Meter Rate : T\$ 2.73/kg (approximately ¥150/kg)

LPG is mainly used in the kitchen. As the number of beds following the completion of the entire work envisaged by the M/P will not substantially change, the number of meals to be provided should not dramatically change. The LPG consumption will, therefore, remain practically the same.

50 kg/2 months x T\$ 2.73/kg x 6 = T\$ 819/year

The estimated LPG cost is, therefore, T\$ 800/year (approximately ¥44,000/year).

(6) Disposal of Chemical Waste Water

Chemical wastewater from Laboratory is discharged from the sink now. These chemicals will kill the bacteria in the septic tank and it wont work anymore. It needs to dispose by the container from the laboratories. There is no company to dispose these kinds of chemicals in Tonga, so this work shall be done by MOH staffs.

(7) Equipment Maintenance Cost

The expected increase of the equipment maintenance cost mainly arises due to the increased cost of consumables, reflecting the increase of the equipment in use. As the main focus of the Project is the replacement of old existing equipment, the increase of the maintenance cost is estimated to be approximately T\$10,500 (approximately J¥600,000/year).

Table - 6 Trial Calculation of Increment of the Maintenance Cost

Equipment	Contents			Annual Maintenance Cost per Unit (T\$)	Quantity of Equipment	Total of Annual Maintenance Cost (T\$)
	Consumables	Quantity	Cost (T\$)			
Anaesthesia apparatus with ventilator	soda absorbent	50kg	1,122.86	1,839.07	1	1,839.07
	Incubating tube	5 size×10 pcs	437.48			
	suction catheter	100 pcs	288.73			
Electrosurgical unit	hand piece	1 pc	291.65	656.21	1	656.21
	counter electrode plate	1 pc	364.56			
Operating light	bulb	1 pc	160.41	160.41	3	481.23
Bedside monitor	gel	400g×12	384.62	384.62	4	1,538.48

Equipment	Contents			Annual Maintenance Cost per Unit (T\$)	Quantity of Equipment	Total of Annual Maintenance Cost (T\$)
	Consumables	Quantity	Cost (T\$)			
		bottles				
Surgical scrub station	filter	4 pcs	262.49	437.48	2	874.96
	UV lamp	1 pc	174.99			
Endoscopic storage cabinet	UV lamp	1 pc	174.99	174.99	1	174.99
Baby resuscitation trolley	fluorescent lamp	1 pc	27.34	27.34	2	54.68
Infant Incubator	Access port iris cover	12pcs.	63.00	156.33	1	156.33
	Filter	4pcs.	93.33			
PH meter	standard solution (2 sorts)	500ml × 5 bottles (each sort)	437.48	583.31	1	583.31
	KCl solution	500ml×5 bottles	145.83			
Haematocrit centrifuge	hematocrit tube	1,000 pcs	260.22	260.22	1	260.22
Blood coagulation machine	various thrombo checks		1,079.11	1,516.59	1	1,516.59
	cuvette	1,000 pcs	291.65			
	steel ball	500 pcs	145.83			
Doppler fetus detector	echo-jelly	6,000ml	314.98	314.98	1	314.98
Bedpan sanitizer	detergent	500ml×7 bottles	204.16	204.16	3	612.48
Delivery light, stand type	halogen bulb	1 pc	160.41	160.41	4	641.64
Fetal monitor (CTG)	ultrasonic gel	6,000ml	314.98	723.29	1	723.29
	recording paper		408.31			
TOTAL						10,428.46

2) Maintenance Cost for Facilities

Facilities Maintenance Cost for Japanese Grant Aid Project

Even though the facilities maintenance cost considerably changes with the aging process, the necessity for major repair, etc. does not usually emerge for some 30 years after facilities completion. Actual examples of the maintenance cost for similar facilities suggest that the average annual repair cost (excluded labour cost) is approximately 0.07% of the direct construction cost.

$$\begin{aligned} \text{Direct Construction Cost } 572,000,000 \text{ J-Yen} \times 0.07\% &= 400,400 \text{ J-Yen/year} \\ 400,400 \text{ J-Yen} \times 54.99\text{T\$}/\text{J-Yen} &= \text{about } 7,300\text{T\$} \end{aligned}$$

Utilities Maintenance Cost for Japanese Grant Aid Project

The amount of this type of maintenance cost will remain small for some five years after completion but will begin to increase thereafter because of the need for the replacement of parts and the replacement of equipment due to aging. The average

annual repair cost over a 10 year span is estimated to be approximately 0.2% of the direct cost of utilities work.

$$\begin{aligned} \text{Direct Cost} \quad 174,000,000 \text{ J-Yen} \times 0.2\% &= 348,000 \text{ J-Yen/year} \\ 348,000 \text{ J-Yen} \times 54.99 \text{ T\$/J-Yen} &= \text{about } 6,300 \text{ T\$} \end{aligned}$$

Lift Maintenance Cost

The all amount of maintenance cost is a regular maintenance services cost by manufacture or his agent under a services contract but there is no elevator service company in Tonga. MOH staffs shall do periodic maintenance and change of spare parts by them self.

Annual Regular Maintenance Services Cost: 0 T\$/year

APPENDIX - 6 Land Acquisition Notes

Government of Tonga

SAVINGRAM

TO: Director of Health

FROM: Secretary of Lands, Survey & Natural Resources & Surveyor General

Saving No.: F3/5/5

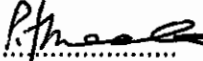
Date: 5th November 2003

Attention: T. S. Soakai

Site of Vaiola Hospital – Tofoa

1. I refer to your Saving MH:57.21 of 31st October 2003 requesting for confirmation of land ownership on the above-mentioned site.
2. Please be advised that the Hospital Site at Tofoa is Government Land and the authority for its disposal is the Hon. Minister of Lands (Estate Holder)

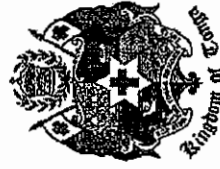
Mālō,


.....
Paula F. Moala
for Secretary of Lands
Natural Resources & Surveyor General



APPENDIX - 7 Master Plan for the Development
of Vaiola Hospital

- 1 MOH ADMINISTRATION BUILDING
- 2 PUBLIC HEALTH
- 3 DIABETES
- 4 OUTPATIENT PHARMACY
- 5 DENTAL HEALTH
- 6 ANTENATAL CLINIC
- 7 SHARED STAFF FACILITIES
- 8 SPECIALIST CLINICS
- 9 MAIN ENTRY/RECEPTION/ADMISSIONS
- 10 ACCIDENT & EMERGENCY
- 11 OUTPATIENTS DEPARTMENT
- 12 ACCOUNTS
- 13 MEDICAL RECORDS
- 14 CANTEEN
- 15 PHYSIOTHERAPY
- 16 RADIOLOGY & ULTRASOUND
- 17 BLOOD BANK
- 18 PATHOLOGY LABORATORY
- 19 BIOMEDICAL EQUIP. WORKSHOP
- 20 INPATIENT PHARMACY
- 21 STAFF DAY CARE CENTRE
- 22 PAEDIATRIC WARD
- 23 ISOLATION WARD
- 24 RAMP/WARD CIRCULATION
- 25 OBSTETRICS WARD
- 26 DELIVERY SUITE
- 27 MENTAL HEALTH WARD
- 28 KITCHEN
- 29 LAUNDRY
- 30 STORES
- 31 STAFF ACCOMMODATION
- 32 MOURNING AREA
- 33 MORTUARY
- 34 ENGINEERING WORKSHOP
- 35 WASTE TREATMENT BUILDING
- 36 EXISTING CARPORT



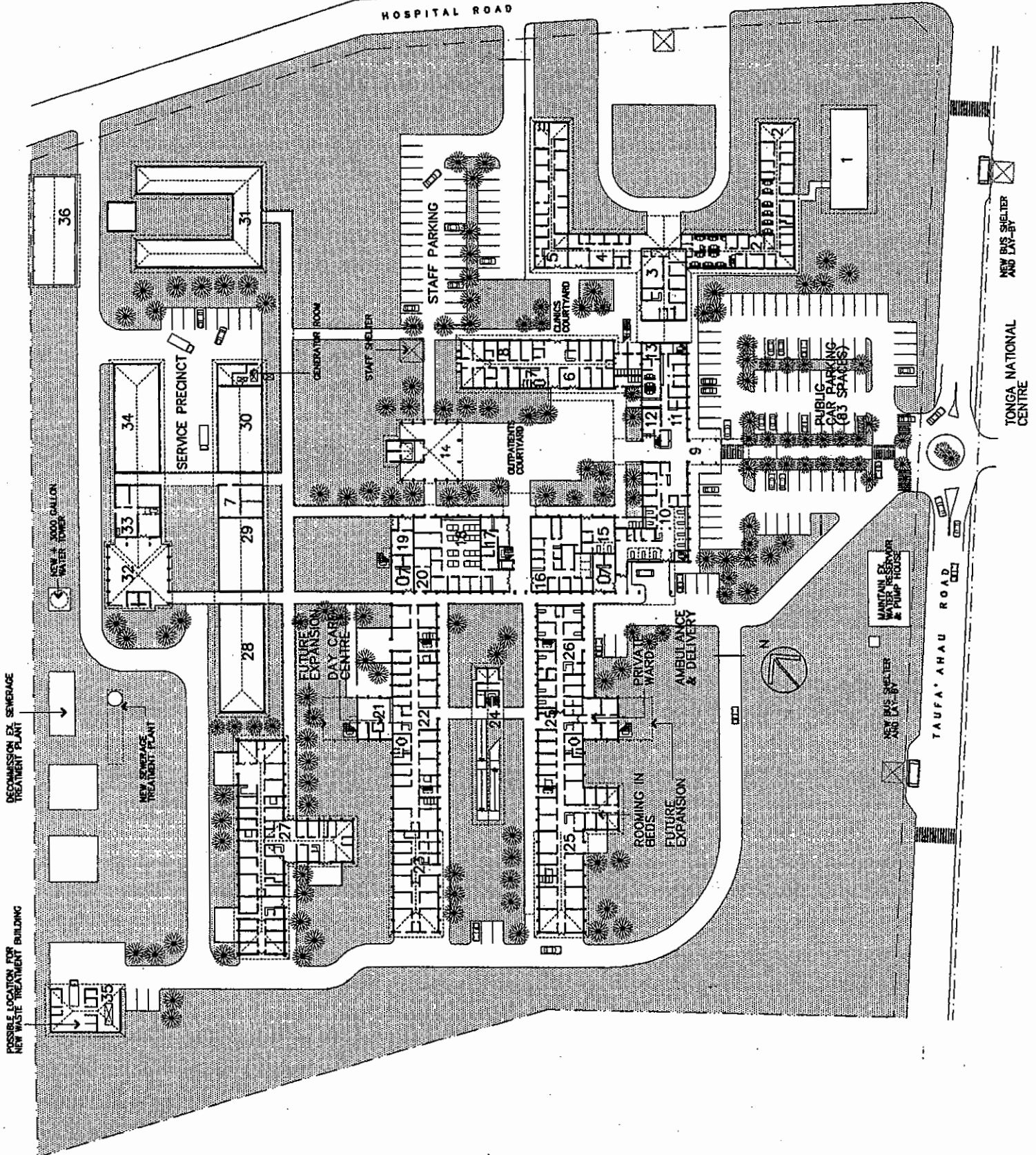
**MASTER PLAN for the
REDEVELOPMENT OF VAIOLOA
HOSPITAL in NUKU'ALOFA**

**FINAL MASTER PLAN
GROUND FLOOR PLAN**

date: October 2003
scale: 1:600

Alexander and Loyd
architects

Phone: +61 2 9936 7944 Fax: +61 2 9936 6932



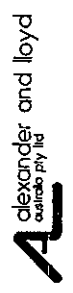
- 37 HOSPITAL ADMINISTRATION
- 38 CHAPEL
- 39 ICU
- 40 DAY SURGERY RECEPTION
- 41 OPERATING THEATRES
- 42 CSSD
- 43 SURGICAL WARD
- 44 RAMP / WARD CIRCULATION
- 45 MEDICAL WARD



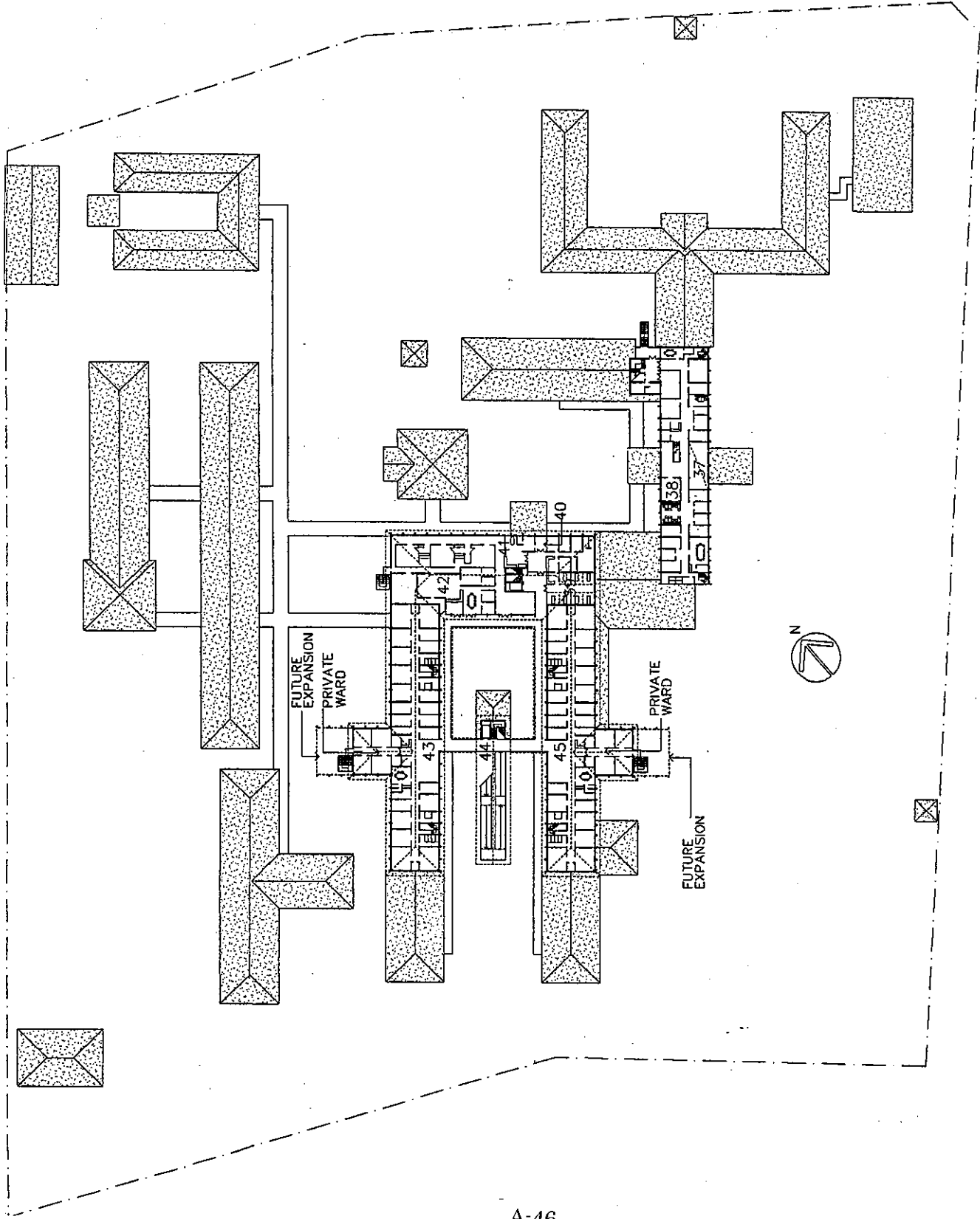
MASTER PLAN for the
REDEVELOPMENT OF VAIOLA
HOSPITAL in NUKU'ALOFA

FINAL MASTER PLAN
FIRST FLOOR PLAN

date: October 2003
scale: 1:600



Phone +61 2 9956 7544 Fax +61 2 9956 8750



46 EDUCATION CENTRE / PLANT ROOM
47 LIFT MOTOR ROOM / PLANT ROOM

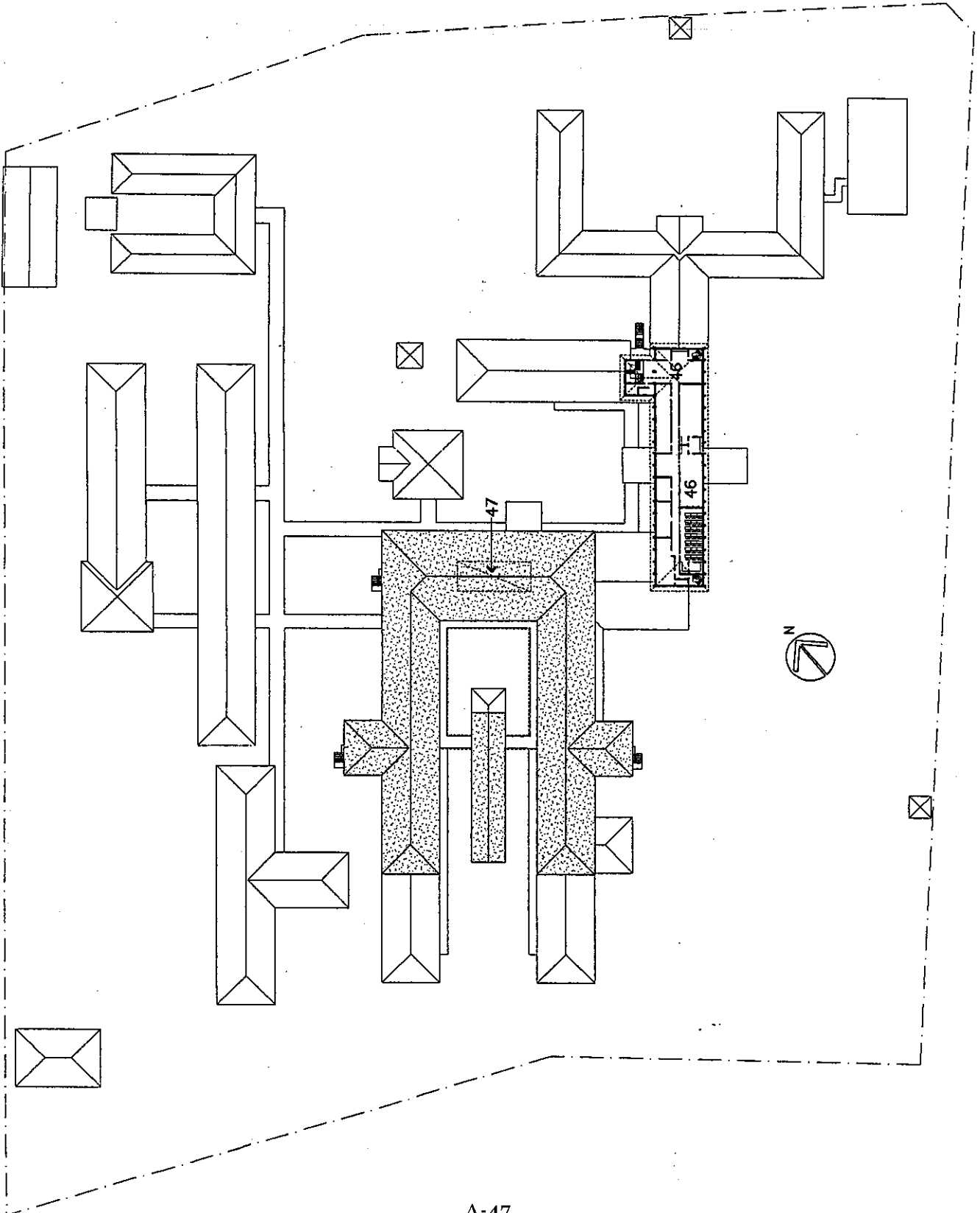


MASTER PLAN for the
REDEVELOPMENT OF VAIOLA
HOSPITAL in NUKU'ALOFA
FINAL MASTER PLAN
SECOND FLOOR PLAN

date: October 2003
scale: 1:600

Alexander and Boyd
architects pty ltd

Phone: +61 2 9958 7944 Fax: +61 2 9958 6658



APPENDIX - 8 Geotechnical Report

**KUME SEKKEI HEALTH PROJECT
JAPAN PHRD GRANT**

**VAIOLA HOSPITAL, TONGATAPU
KINGDOM OF TONGA**

GEOTECHNICAL REPORT

Prepared for:

Kume Sekkei Co., Ltd.

2-1-22 Shiomi Kotoku

Tokoyo, 135-8567, Japan

Telephone: 903) 5632-7802 / Facsimile: (03) 5632-7822

Prepared by:

Kramer (Tonga) Ltd

3rd Floor, Fakafanua Centre

Vuna Road, Nuku'alofa, TONGA

Telephone: (676) 25 212, Facsimile: (676) 23 191

November 2003

CONTENTS

Section

1 INTRODUCTION

- 1.1 General
- 1.2 The Site

2 INVESTIGATION

- 2.1 Fieldwork
- 2.2 Findings

3 ENGINEERING ASSESSMENT

- 3.1 Earthwork
- 3.2 Fill
- 3.3 Foundation

APPENDIX A: Site Plan

B: Test Pits Records

C: Penetrometer Test Results

D: Atterberg

E: CBR Test Results

Limitations Statement

The sole purpose of this report and the associated services performed is in accordance with the scope of services set out in the contract between Kramer (Tonga) Limited ('Kramer') and Yamashita Sekkei Inc. The scope of services is detailed in Kramer's letter to Kume Sekkei Co., Ltd dated 23 October 2003.

Kramer derived the data in this report primarily from visual inspections, examination of sub-surface explorations, and interviews of individuals with information of the site. The passage of time, manifestation of latent conditions or impacts of future events may require further exploration at the site and subsequent data analysis, and re-evaluation of the findings, observations and conclusions expressed in this report.

This report has been prepared on behalf of and for the exclusive use of the Kume Sekkei, and is subject to and issued concerning with the provisions of the agreement between Kramer and the Kume Sekkei Co., Ltd. Kramer accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report by any third party.

1 Introduction

1.1 GENERAL

Japanese Government has awarded Kume Sekkei Co. Ltd the head consultant undertaking out the design and project management of the next Japanese Grant Aid program to Government of Tonga. A 2 Storey hospital building development has been earmarked for the Aid program at the Vaiola Hospital site, Tofoa, Tonga.

The proposed development would include earthworks/civil works, demolition works and the construction of the new 2 Storey hospital building complex and minor associated supporting facilities.

The Project Manager, Mr. Osamu Hamano of Kume Sekkei Co., Ltd has commissioned Kramer as the project geotechnical consultant for the proposed development. The scope of geotechnical services as outlined in Kramer's letter dated 21st July 2003 and subsequent letter dated 23rd October 2003 was to carry out site investigation in order to:

- A. Ascertain the nature and characteristic of the sub strata including;
 - (i) Soil profiles to depths of 3m or to refusal;
 - (ii) CBR values for the clay sub-grade;
 - (iii) Atterberg Unit Plastic Limits of the clay sub-grade
- B. Present recommendation on suitable footing type; and
- C. Provide appropriate geotechnical footing design parameters;

The fieldwork was carried out between the 29th October 2003 and 4th November 2003. This report presents the results of the geotechnical investigation, including assessments of the findings and appropriate recommendation for the proposed 2 Storey redevelopment.

1.2 THE SITE

The proposed site for the development is in the southern part of the existing Vaiola Hospital building complex; refer to Appendix A: Site Plan.

The Vaiola Hospital is located on the main Taufu'ahau Road into Nuku'alofa at the village of Haveluloto. Haveluloto is approximately 3km southwest of Nuku'alofa Township and Vaiola Hospital is adjacent the Fanga'uta lagoon approximately 100m eastwards. This southwest part of the site around the lagoon area is surrounded by and low lying swampy land.

The existing hospital building complex is on a hill rising up from the lagoon and was constructed in the late 60s. The complex consists of the following facilities:

- Medical Administration Block – single storey steel/concrete composite building;
- General Wards – 3 Storey concrete building with block walls;

- Operating Theatre and Maternity Wing – 2 Storey concrete frame with block walls;
- Kitchen Block – separate single storey concrete/block building;
- Laundry Block – separate 2 Storey concrete frame with block walls;
- Nurses Home – 2 Storey concrete frame with block walls;
- Isolation Block – single storey block building.

2 Investigation

2.1 FIELDWORK

The field investigation was based on excavating five (5) excavated test pits (TP1 to TP5) using a backhoe. The test pits have been excavated at the locations of the proposed 2 Storey building as shown in the site plan - Appendix A. The actual test positions were confirmed in the field and recorded on the site survey plan by measuring from features identifiable on site such as the existing buildings. Test pit records are appended in Appendix B.

Twelve (12) Dynamic Cone Penetrometer tests (DC1 to DC12) were undertaken around the proposed building development down to a maximum depth of approximately 3.0 meters. The PCP used was a Standard Penetrometer complying with the AS1289.6.3.2. Analysis of the results obtained showed reasonably consistent results over the depths investigated. The results are appended in Appendix C

Samples were taken from the excavated test pits TP2 and TP4 for laboratory tests to determine the Atterberg Limits, California Bearing Ratio (CBR) and moisture content at the Ministry of Works Laboratory. The test results are appended in Appendix D and E.

2.2 FINDINGS

2.2.1 General Profile

The subsurface profiles at each of the test locations are described in detail on the individual test pit records in Appendix B.

The subsurface conditions encountered over the site appear to be relatively uniform, with minor variation, and can be summarized as follows

- Topsoil layer containing grass roots with humus to depths of 0.3m;
- Dark to light brown stiff to very stiff clay to depths of 0.9m;
- Reddish very stiff clay layer to depths of up to 2.7m;
- Coral rock found at variable depths between 0.6m (min) and 2.7m (max)

2.2.2 Groundwater

No groundwater was encountered in any of the excavated test pits.

2.3 LABORATORY TESTS

Soil samples were obtained from excavated test pits TP2 and TP4 and laboratory tests (liquid limit, atterberg, CBR) were performed at the Ministry of Works laboratory. The results are tabulated in Appendix D and E and are summarised s follows:

2.3.1 Atterberg Tests

	TP2:	TP4
• Liquid Limit	90.7%	78.6%
• Plastic Limit	61.9%	58.5%
• Plasticity Index	28.7%	20.1%

This would classify the soil as low plasticity (TP4) to medium plasticity (TP2) clay material.

2.3.2 CBR Values

	TP2	TP4
• CBR at 2.5mm penetration	8.3%	9.7%
• CBR at 5.0mm penetration	8.2%	8.1%0

2.3.3 Moisture Content

	TP2	TP4
• Field moisture content	43.7%	48.7%

3 Engineering Assessment

3.1 EARTHWORK

Based on the investigation findings, it is expected that excavations to the coral rock at depths of up to 2.7m at the proposed building locations can be carried out easily using conventional earthmoving plants and/ or by hand.

During the wet season, it is likely that the watertable would rise and seepage and it is expected to be very difficult to work or compact the clay material.

The 300mm top soil material, containing roots and humus should be stripped from the proposed building platform area should it required development. Topsoil can be used for landscaping activities. The sub-grade material should be proof-rolled and compacted prior to placement of any imported fill materials.

3.2 FILL

Any fill materials should be imported of high quality (free of organic) granular material from a coral quarry overburden. The fill should be placed in 200mm layers and compacted using mechanical vibrating rollers to achieve 95% relative dry density as determined by a Modified Compaction tests to AS1289.

The field moisture content should be carefully controlled closely to the optimum value as possible, in the range of $\pm 1.5\%$ for effective compaction effort and results.

3.3 FOUNDATION

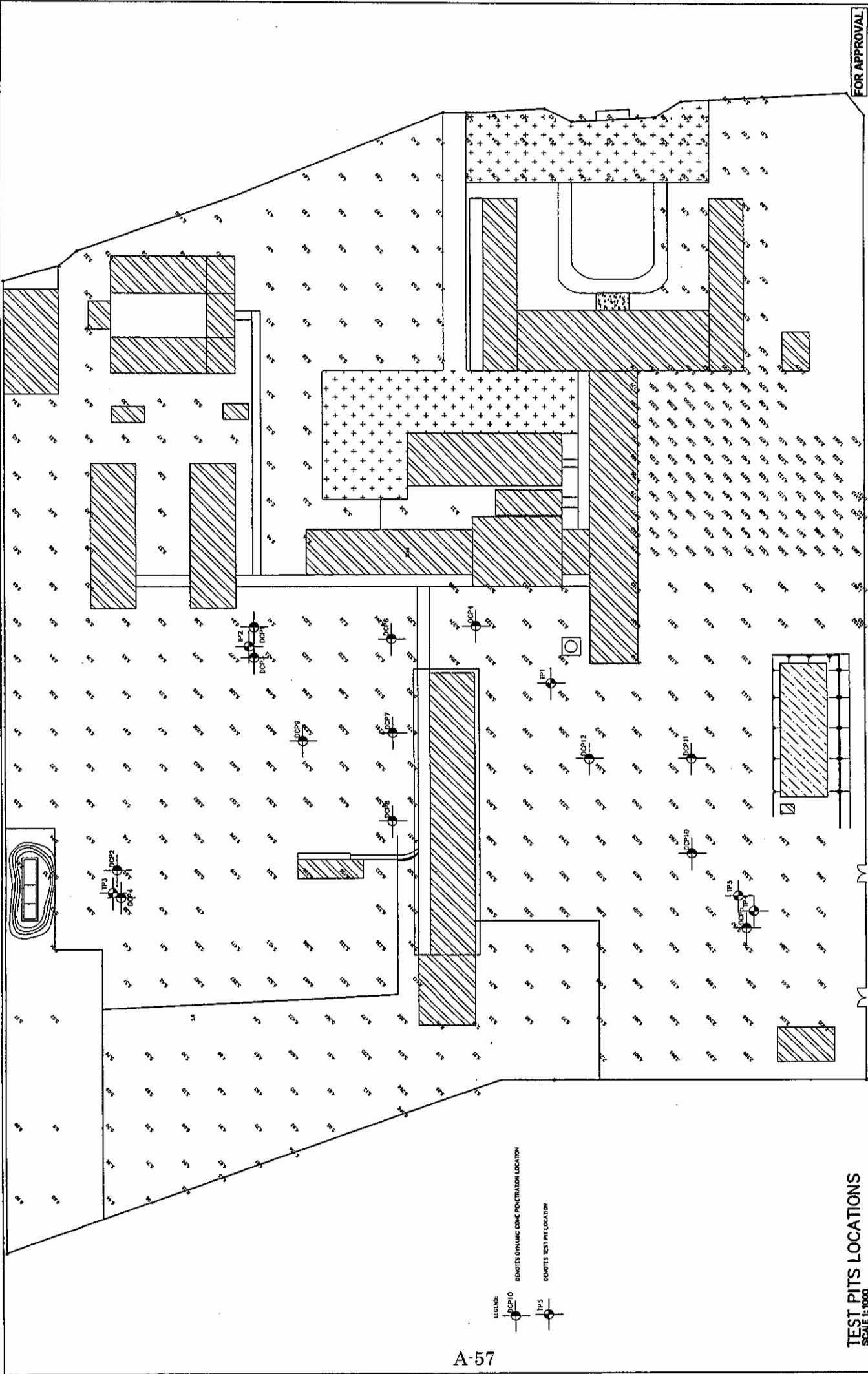
In view of the proposed 2 Storey structures, it is appropriate to adopt shallow pad and strip footings for their foundations. The footings should be founded into the stiff to very clay layer, typically at a depth of 600mm below ground level. Footings may be designed using a safe allowable bearing capacity of 170kPa.

Care should be taken to prevent the exposed founding material becoming softened by exposure to water during excavation and prior to construction of the footings. Softening of the founding material can reduce its bearing capacity and induce greater settlement.

Appendix A

TEST PITS LOCATIONS

Drawing Nos.	Title
2110T -01:	Site Plan showing Test Pits Locations



FOR APPROVAL

PROJECT NO. 2110T
 SHEET NO. A
 2110T-S05

PROJECT: VANOLA HOSPITAL MASTER PLAN
 LOCATION: Tonga

DATE: 2110T
 NO. OF SHEETS: 11
 DRAWING NO.: 2110T-S05

KRAMER GROUP
 Professional Project Managers
 Engineers - Surveyors
 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295, 297, 299, 301, 303, 305, 307, 309, 311, 313, 315, 317, 319, 321, 323, 325, 327, 329, 331, 333, 335, 337, 339, 341, 343, 345, 347, 349, 351, 353, 355, 357, 359, 361, 363, 365, 367, 369, 371, 373, 375, 377, 379, 381, 383, 385, 387, 389, 391, 393, 395, 397, 399, 401, 403, 405, 407, 409, 411, 413, 415, 417, 419, 421, 423, 425, 427, 429, 431, 433, 435, 437, 439, 441, 443, 445, 447, 449, 451, 453, 455, 457, 459, 461, 463, 465, 467, 469, 471, 473, 475, 477, 479, 481, 483, 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, 519, 521, 523, 525, 527, 529, 531, 533, 535, 537, 539, 541, 543, 545, 547, 549, 551, 553, 555, 557, 559, 561, 563, 565, 567, 569, 571, 573, 575, 577, 579, 581, 583, 585, 587, 589, 591, 593, 595, 597, 599, 601, 603, 605, 607, 609, 611, 613, 615, 617, 619, 621, 623, 625, 627, 629, 631, 633, 635, 637, 639, 641, 643, 645, 647, 649, 651, 653, 655, 657, 659, 661, 663, 665, 667, 669, 671, 673, 675, 677, 679, 681, 683, 685, 687, 689, 691, 693, 695, 697, 699, 701, 703, 705, 707, 709, 711, 713, 715, 717, 719, 721, 723, 725, 727, 729, 731, 733, 735, 737, 739, 741, 743, 745, 747, 749, 751, 753, 755, 757, 759, 761, 763, 765, 767, 769, 771, 773, 775, 777, 779, 781, 783, 785, 787, 789, 791, 793, 795, 797, 799, 801, 803, 805, 807, 809, 811, 813, 815, 817, 819, 821, 823, 825, 827, 829, 831, 833, 835, 837, 839, 841, 843, 845, 847, 849, 851, 853, 855, 857, 859, 861, 863, 865, 867, 869, 871, 873, 875, 877, 879, 881, 883, 885, 887, 889, 891, 893, 895, 897, 899, 901, 903, 905, 907, 909, 911, 913, 915, 917, 919, 921, 923, 925, 927, 929, 931, 933, 935, 937, 939, 941, 943, 945, 947, 949, 951, 953, 955, 957, 959, 961, 963, 965, 967, 969, 971, 973, 975, 977, 979, 981, 983, 985, 987, 989, 991, 993, 995, 997, 999, 1001, 1003, 1005, 1007, 1009, 1011, 1013, 1015, 1017, 1019, 1021, 1023, 1025, 1027, 1029, 1031, 1033, 1035, 1037, 1039, 1041, 1043, 1045, 1047, 1049, 1051, 1053, 1055, 1057, 1059, 1061, 1063, 1065, 1067, 1069, 1071, 1073, 1075, 1077, 1079, 1081, 1083, 1085, 1087, 1089, 1091, 1093, 1095, 1097, 1099, 1101, 1103, 1105, 1107, 1109, 1111, 1113, 1115, 1117, 1119, 1121, 1123, 1125, 1127, 1129, 1131, 1133, 1135, 1137, 1139, 1141, 1143, 1145, 1147, 1149, 1151, 1153, 1155, 1157, 1159, 1161, 1163, 1165, 1167, 1169, 1171, 1173, 1175, 1177, 1179, 1181, 1183, 1185, 1187, 1189, 1191, 1193, 1195, 1197, 1199, 1201, 1203, 1205, 1207, 1209, 1211, 1213, 1215, 1217, 1219, 1221, 1223, 1225, 1227, 1229, 1231, 1233, 1235, 1237, 1239, 1241, 1243, 1245, 1247, 1249, 1251, 1253, 1255, 1257, 1259, 1261, 1263, 1265, 1267, 1269, 1271, 1273, 1275, 1277, 1279, 1281, 1283, 1285, 1287, 1289, 1291, 1293, 1295, 1297, 1299, 1301, 1303, 1305, 1307, 1309, 1311, 1313, 1315, 1317, 1319, 1321, 1323, 1325, 1327, 1329, 1331, 1333, 1335, 1337, 1339, 1341, 1343, 1345, 1347, 1349, 1351, 1353, 1355, 1357, 1359, 1361, 1363, 1365, 1367, 1369, 1371, 1373, 1375, 1377, 1379, 1381, 1383, 1385, 1387, 1389, 1391, 1393, 1395, 1397, 1399, 1401, 1403, 1405, 1407, 1409, 1411, 1413, 1415, 1417, 1419, 1421, 1423, 1425, 1427, 1429, 1431, 1433, 1435, 1437, 1439, 1441, 1443, 1445, 1447, 1449, 1451, 1453, 1455, 1457, 1459, 1461, 1463, 1465, 1467, 1469, 1471, 1473, 1475, 1477, 1479, 1481, 1483, 1485, 1487, 1489, 1491, 1493, 1495, 1497, 1499, 1501, 1503, 1505, 1507, 1509, 1511, 1513, 1515, 1517, 1519, 1521, 1523, 1525, 1527, 1529, 1531, 1533, 1535, 1537, 1539, 1541, 1543, 1545, 1547, 1549, 1551, 1553, 1555, 1557, 1559, 1561, 1563, 1565, 1567, 1569, 1571, 1573, 1575, 1577, 1579, 1581, 1583, 1585, 1587, 1589, 1591, 1593, 1595, 1597, 1599, 1601, 1603, 1605, 1607, 1609, 1611, 1613, 1615, 1617, 1619, 1621, 1623, 1625, 1627, 1629, 1631, 1633, 1635, 1637, 1639, 1641, 1643, 1645, 1647, 1649, 1651, 1653, 1655, 1657, 1659, 1661, 1663, 1665, 1667, 1669, 1671, 1673, 1675, 1677, 1679, 1681, 1683, 1685, 1687, 1689, 1691, 1693, 1695, 1697, 1699, 1701, 1703, 1705, 1707, 1709, 1711, 1713, 1715, 1717, 1719, 1721, 1723, 1725, 1727, 1729, 1731, 1733, 1735, 1737, 1739, 1741, 1743, 1745, 1747, 1749, 1751, 1753, 1755, 1757, 1759, 1761, 1763, 1765, 1767, 1769, 1771, 1773, 1775, 1777, 1779, 1781, 1783, 1785, 1787, 1789, 1791, 1793, 1795, 1797, 1799, 1801, 1803, 1805, 1807, 1809, 1811, 1813, 1815, 1817, 1819, 1821, 1823, 1825, 1827, 1829, 1831, 1833, 1835, 1837, 1839, 1841, 1843, 1845, 1847, 1849, 1851, 1853, 1855, 1857, 1859, 1861, 1863, 1865, 1867, 1869, 1871, 1873, 1875, 1877, 1879, 1881, 1883, 1885, 1887, 1889, 1891, 1893, 1895, 1897, 1899, 1901, 1903, 1905, 1907, 1909, 1911, 1913, 1915, 1917, 1919, 1921, 1923, 1925, 1927, 1929, 1931, 1933, 1935, 1937, 1939, 1941, 1943, 1945, 1947, 1949, 1951, 1953, 1955, 1957, 1959, 1961, 1963, 1965, 1967, 1969, 1971, 1973, 1975, 1977, 1979, 1981, 1983, 1985, 1987, 1989, 1991, 1993, 1995, 1997, 1999, 2001, 2003, 2005, 2007, 2009, 2011, 2013, 2015, 2017, 2019, 2021, 2023, 2025, 2027, 2029, 2031, 2033, 2035, 2037, 2039, 2041, 2043, 2045, 2047, 2049, 2051, 2053, 2055, 2057, 2059, 2061, 2063, 2065, 2067, 2069, 2071, 2073, 2075, 2077, 2079, 2081, 2083, 2085, 2087, 2089, 2091, 2093, 2095, 2097, 2099, 2101, 2103, 2105, 2107, 2109, 2111, 2113, 2115, 2117, 2119, 2121, 2123, 2125, 2127, 2129, 2131, 2133, 2135, 2137, 2139, 2141, 2143, 2145, 2147, 2149, 2151, 2153, 2155, 2157, 2159, 2161, 2163, 2165, 2167, 2169, 2171, 2173, 2175, 2177, 2179, 2181, 2183, 2185, 2187, 2189, 2191, 2193, 2195, 2197, 2199, 2201, 2203, 2205, 2207, 2209, 2211, 2213, 2215, 2217, 2219, 2221, 2223, 2225, 2227, 2229, 2231, 2233, 2235, 2237, 2239, 2241, 2243, 2245, 2247, 2249, 2251, 2253, 2255, 2257, 2259, 2261, 2263, 2265, 2267, 2269, 2271, 2273, 2275, 2277, 2279, 2281, 2283, 2285, 2287, 2289, 2291, 2293, 2295, 2297, 2299, 2301, 2303, 2305, 2307, 2309, 2311, 2313, 2315, 2317, 2319, 2321, 2323, 2325, 2327, 2329, 2331, 2333, 2335, 2337, 2339, 2341, 2343, 2345, 2347, 2349, 2351, 2353, 2355, 2357, 2359, 2361, 2363, 2365, 2367, 2369, 2371, 2373, 2375, 2377, 2379, 2381, 2383, 2385, 2387, 2389, 2391, 2393, 2395, 2397, 2399, 2401, 2403, 2405, 2407, 2409, 2411, 2413, 2415, 2417, 2419, 2421, 2423, 2425, 2427, 2429, 2431, 2433, 2435, 2437, 2439, 2441, 2443, 2445, 2447, 2449, 2451, 2453, 2455, 2457, 2459, 2461, 2463, 2465, 2467, 2469, 2471, 2473, 2475, 2477, 2479, 2481, 2483, 2485, 2487, 2489, 2491, 2493, 2495, 2497, 2499, 2501, 2503, 2505, 2507, 2509, 2511, 2513, 2515, 2517, 2519, 2521, 2523, 2525, 2527, 2529, 2531, 2533, 2535, 2537, 2539, 2541, 2543, 2545, 2547, 2549, 2551, 2553, 2555, 2557, 2559, 2561, 2563, 2565, 2567, 2569, 2571, 2573, 2575, 2577, 2579, 2581, 2583, 2585, 2587, 2589, 2591, 2593, 2595, 2597, 2599, 2601, 2603, 2605, 2607, 2609, 2611, 2613, 2615, 2617, 2619, 2621, 2623, 2625, 2627, 2629, 2631, 2633, 2635, 2637, 2639, 2641, 2643, 2645, 2647, 2649, 2651, 2653, 2655, 2657, 2659, 2661, 2663, 2665, 2667, 2669, 2671, 2673, 2675, 2677, 2679, 2681, 2683, 2685, 2687, 2689, 2691, 2693, 2695, 2697, 2699, 2701, 2703, 2705, 2707, 2709, 2711, 2713, 2715, 2717, 2719, 2721, 2723, 2725, 2727, 2729, 2731, 2733, 2735, 2737, 2739, 2741, 2743, 2745, 2747, 2749, 2751, 2753, 2755, 2757, 2759, 2761, 2763, 2765, 2767, 2769, 2771, 2773, 2775, 2777, 2779, 2781, 2783, 2785, 2787, 2789, 2791, 2793, 2795, 2797, 2799, 2801, 2803, 2805, 2807, 2809, 2811, 2813, 2815, 2817, 2819, 2821, 2823, 2825, 2827, 2829, 2831, 2833, 2835, 2837, 2839, 2841, 2843, 2845, 2847, 2849, 2851, 2853, 2855, 2857, 2859, 2861, 2863, 2865, 2867, 2869, 2871, 2873, 2875, 2877, 2879, 2881, 2883, 2885, 2887, 2889, 2891, 2893, 2895, 2897, 2899, 2901, 2903, 2905, 2907, 2909, 2911, 2913, 2915, 2917, 2919, 2921, 2923, 2925, 2927, 2929, 2931, 2933, 2935, 2937, 2939, 2941, 2943, 2945, 2947, 2949, 2951, 2953, 2955, 2957, 2959, 2961, 2963, 2965, 2967, 2969, 2971, 2973, 2975, 2977, 2979, 2981, 2983, 2985, 2987, 2989, 2991, 2993, 2995, 2997, 2999, 3001, 3003, 3005, 3007, 3009, 3011, 3013, 3015, 3017, 3019, 3021, 3023, 3025, 3027, 3029, 3031, 3033, 3035, 3037, 3039, 3041, 3043, 3045, 3047, 3049, 3051, 3053, 3055, 3057, 3059, 3061, 3063, 3065, 3067, 3069, 3071, 3073, 3075, 3077, 3079, 3081, 3083, 3085, 3087, 3089, 3091, 3093, 3095, 3097, 3099, 3101, 3103, 3105, 3107, 3109, 3111, 3113, 3115, 3117, 3119, 3121, 3123, 3125, 3127, 3129, 3131, 3133, 3135, 3137, 3139, 3141, 3143, 3145, 3147, 3149, 3151, 3153, 3155, 3157, 3159, 3161, 3163, 3165, 3167, 3169, 3171, 3173, 3175, 3177, 3179, 3181, 3183, 3185, 3187, 3189, 3191, 3193, 3195, 3197, 3199, 3201, 3203, 3205, 3207, 3209, 3211, 3213, 3215, 3217, 3219, 3221, 3223, 3225, 3227, 3229, 3231, 3233, 3235, 3237, 3239, 3241, 3243, 3245, 3247, 3249, 3251, 3253, 3255, 3257, 3259, 3261, 3263, 3265, 3267, 3269, 3271, 3273, 3275, 3277, 3279, 3281, 3283, 3285, 3287, 3289, 3291, 3293, 3295, 3297, 3299, 3301, 3303, 3305, 3307, 3309, 3311, 3313, 3315, 3317, 3319, 3321, 3323, 3325, 3327, 3329, 3331, 3333, 3335, 3337, 3339, 3341, 3343, 3345, 3347, 3349, 3351, 3353, 3355, 3357, 3359, 3361, 3363, 3365, 3367, 3369, 3371, 3373, 3375, 3377, 3379, 3381, 3383, 3385, 3387, 3389, 3391, 3393, 3395, 3397, 3399, 3401, 3403, 3405, 3407, 3409, 3411, 3413, 3415, 3417, 3419, 3421, 3423, 3425, 3427, 3429, 3431, 3433, 3435, 3437, 3439, 3441, 3443, 3445, 3447, 3449, 3451, 3453, 3455, 3457, 3459, 3461, 3463, 3465, 3467, 3469, 3471, 3473, 3475, 3477, 3479, 3481, 3483, 3485, 3487, 3489, 3491, 3493, 3495, 3497, 3499, 3501, 3503, 3505, 3507, 3509, 3511, 3513, 3515, 3517, 3519, 3521, 3523, 3525, 3527, 3529, 3531, 3533, 3535, 3537, 3539, 3541, 3543, 3545, 3547, 3549, 3551, 3553, 3555, 3557, 3559, 3561, 3563, 3565, 3567, 3569, 3571, 3573, 3575, 3577, 3579, 3581, 3583, 3585, 3587, 3589, 3591, 3593, 3595, 3597, 3599, 3601, 3603, 3605, 3607, 3609, 3611, 3613, 3615, 3617, 3619, 3621, 3623, 3625, 3627, 3629, 3631, 3633, 3635, 3637, 3639, 3641, 3643, 3645, 3647, 3649, 3651, 3653, 3655, 3657, 3659, 3661, 3663, 3665, 3667, 3669, 3671, 3673, 3675, 3677, 3679, 3681, 3683, 3685, 3687, 3689, 3691, 3693, 3695, 3697, 3699, 3701, 3703, 3705, 3707, 3709, 3711, 3713, 3715, 3717, 3719, 3721, 3723, 3725, 3727, 3729, 3731, 3733, 3735, 3737, 3739, 3741, 3743, 3745, 3747, 3749, 3751, 3753, 3755, 3757, 3759, 3761, 3763, 3765, 3767, 3769, 3771, 3773, 3775, 3777, 3779, 3781, 3783, 3785, 3787, 3789, 3791, 3793, 3795, 3797, 3799, 3801, 3803, 3805, 3807, 3809, 3811, 3813, 3815, 3817, 3819, 3821, 3823, 3825, 3827, 3829, 3831, 3833, 3835, 3837, 3839, 3841, 3843, 3845, 3847, 3849, 3851, 3853, 3855, 3857, 3859, 3861, 3863, 3865, 3867, 3869, 3871, 3873, 3875, 3877, 3879, 3881, 3883, 3885, 3887, 3889, 3891, 3893, 3895, 3897, 3899, 3901, 3903, 3905, 3907, 3909, 3911, 3913, 3915, 3917, 3919, 3921, 3923, 3925, 3927, 3929, 3931, 3933, 3935, 3937, 3939, 3941, 3943, 3945, 3947, 3949, 3951, 3953, 3955, 3957, 3959, 3961, 3963, 3965, 3967, 3969, 3971, 3973, 3975, 3977, 3979, 3981, 3983, 3985, 3987, 3989, 3991, 3993, 3995, 3997, 3999, 4001, 4003, 4005, 4007, 4009, 4011, 4013, 4015, 4017, 4019, 4021, 4023, 4025, 4027, 4029, 4031, 4033, 4035, 4037, 4039, 4041, 4043, 4045, 4047, 4049, 4051, 4053, 4055, 4057, 4059, 4061, 4063, 4065, 4067, 4069, 4071, 4073, 4075, 4077, 4079, 4081, 4083, 4085, 4087, 4089, 4091, 4093, 4095, 4097, 4099, 4101, 4103, 4105, 4107, 4109, 4111, 4113, 4115, 4117, 4119, 4121, 4123, 4125, 4127, 4129, 4131, 4133, 4135, 4137, 4139, 4141, 4143, 4145, 4147, 4149, 4151, 4153, 4155, 4157, 4159, 4161, 4163, 4165, 4167, 4169, 4171, 4173, 4175, 4177, 4179, 4181, 4183, 4185, 4187, 4189, 4191, 4193, 4195, 4197, 4199, 4201, 4203, 4205, 4207, 4209, 4211, 4213, 4215, 4217, 4219, 4221, 4223, 4225, 4227, 4229, 4231, 4233, 4235, 4237, 4239,

Appendix B

TEST PIT RECORDS

FIGURES Nos: TP1 to TP5



TEST PIT RECORD

PIT: TP - 1

SHEET 1 OF 5

PROJECT: Vaiola Hospital		LOCATION: SITE PLAN, APPENDIX A	
Yet to be done		GROUND LEVEL: NATURAL GROUND	
CONTRACTOR:	N/A	EXCAVATION SIZE	LOGGED BY: FL
EQUIPMENT TYPE:	SPADE	LENGTH: 0.3M	DATE: 29/10/03
MODEL:	N/A	WIDTH: 0.3M	

EXCAVATION	STRATA		MATERIAL DESCRIPTION	CONDITION	OBSERVATIONS
	SOIL TYPE	SOIL ORIGIN			
SAMPLE, TEST SUPPORT, ETC	RL	DEPTH	SOIL TYPE Colour, Plasticity, Grain Size, Minor Components	WATERMOISTURE	CONSISTENCY COHESIVE NON COHESIVE
		m			
			Dark brown clay topsoil containing humus layers		
		0.5	Light brown clay soil		
		1			
		1.5			
		2.0			
		2.5	END OF TEST PIT (rock was found)		
		3			
		3.5			
		4			

NOTES: No groundwater found

FIGURE 2110T



TEST PIT RECORD

PIT: TP - 2

SHEET 2 OF 6

PROJECT: VAIOLA HOSPITAL

LOCATION: SITE PLAN, APPENDIX A
GROUND LEVEL: NATURAL GROUND

CONTRACTOR:	N/A	EXCAVATION SIZE	
EQUIPMENT TYPE:	SPADE	LENGTH:	0.3M
MODEL:	N/A	WIDTH:	0.3M

LOGGED BY: FL
DATE: 29/10/03

EXCAVATION	STRATA		MATERIAL DESCRIPTION	CONDITION	OBSERVATIONS																																								
	R.L.	DEPTH																																											
SAMPLE, TEST SUPPORT, ETC	GROUP SYMBOL	LEGEND	SOIL TYPE <small>Colour, Plasticity, Grain Size, Minor Components</small>	WATERMOISTURE	SOIL ORIGIN STRUCTURE, ETC																																								
						CONSISTENCY																																							
				<table border="1"> <tr> <td>VS</td> <td>ST</td> <td>VS</td> <td>ST</td> <td>VS</td> <td>ST</td> <td>VS</td> <td>ST</td> <td>VS</td> <td>ST</td> <td>VS</td> <td>ST</td> <td>VS</td> <td>ST</td> <td>VS</td> <td>ST</td> <td>VS</td> <td>ST</td> <td>VS</td> <td>ST</td> </tr> <tr> <td>60</td> <td>50</td> <td>40</td> <td>30</td> <td>20</td> <td>10</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> </table>	VS	ST	VS	ST	VS	ST	VS	ST	VS	ST	VS	ST	VS	ST	VS	ST	VS	ST	VS	ST	60	50	40	30	20	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
VS	ST	VS	ST	VS	ST	VS	ST	VS	ST	VS	ST	VS	ST	VS	ST	VS	ST	VS	ST																										
60	50	40	30	20	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0																										
			Brown clay of top soil containg grass roots intermixed with 10mm coral frament																																										
			Dark brown clay																																										
	0.5																																												
			Reddish clay layer																																										
	1																																												
			Light brown clay																																										
	1.5																																												
			END OF TEST PIT (rock was found)																																										
	2.0																																												
	2.5																																												
	3																																												
	3.5																																												
	4																																												

NOTES: No groundwater found

FIGURE

2110T



TEST PIT RECORD

PIT: TP - 3

SHEET 3 OF 5

PROJECT: Valola Hospital

LOCATION: SITE PLAN, APPENDIX A
GROUND LEVEL: NATURAL GROUND

CONTRACTOR: N/A
EQUIPMENT TYPE: SPADE
MODEL: N/A
EXCAVATION SIZE
LENGTH: 0.3M
WIDTH: 0.3M

LOGGED BY: FL
DATE: 29/10/03

EXCAVATION	STRATA		MATERIAL DESCRIPTION	CONDITION		OBSERVATIONS
	R.L.	DEPTH		WATERMOISTURE	CONSISTENCY	
SAMPLE, TEST SUPPORT, ETC	GROUP SYMBOL	LEGEND	SOIL TYPE Colour, Plasticity, Grain Size, Minor Components	COHESIVE	NON COHESIVE	SOIL ORIGIN STRUCTURE, ETC
			Top soil layer containing humus and grass roots			
	0.5		Clay: dark brown clay layer			
	1.5		Reddish clay layer			
	2.0		END OF TEST PIT (rock was found)			
	2.5					
	3					
	3.5					
	4					

NOTES: No groundwater found.

FIGURE

2110T



TEST PIT RECORD

PIT: TP -4

SHEET 4 OF 5

PROJECT: Vaiola Hospital

LOCATION: SITE PLAN, APPENDIX A

GROUND LEVEL: NATURAL GROUND

CONTRACTOR: N/A

EXCAVATION SIZE

LOGGED BY: FL

EQUIPMENT TYPE: SPADE

LENGTH: 0.3M

DATE: 29/10/03

MODEL: N/A

WIDTH: 0.3M

EXCAVATION	STRATA				MATERIAL DESCRIPTION SOIL TYPE Colour, Plasticity, Grain Size, Minor Components	CONDITION				OBSERVATIONS SOIL ORIGIN STRUCTURE, ETC
	SAMPLE, TEST SUPPORT, ETC	R.L.	DEPTH	GROUP SYMBOL		LEGEND	WATERMOISTURE	CONSISTENCY		
			m					COHESIVE	NON COHESIVE	
					Top soil: Thin layer of humus (dark brown clay soil)					
			0.5		Clay: Light brown clay very stiff					
			1		END OF TEST PIT (rock was found)					
			1.5							
			2.0							
			2.5							
			3							
			3.5							
			4							

NOTES: No groundwater found

FIGURE

2110T



TEST PIT RECORD

PIT: TP -5

SHEET 5 OF 6

PROJECT: Vaiola Hospital

LOCATION: SITE PLAN, APPENDIX A
GROUND LEVEL: NATURAL GROUND

CONTRACTOR: N/A
EQUIPMENT TYPE: SPADE
MODEL: N/A
EXCAVATION SIZE
LENGTH: 0.3M
WIDTH: 0.3M

LOGGED BY: FL
DATE: 03/07/03

EXCAVATION	STRATA		MATERIAL DESCRIPTION	CONDITION		OBSERVATIONS
	R.L.	DEPTH		WATERMOISTURE	CONSISTENCY	
SAMPLE, TEST SUPPORT, ETC	GROUP SYMBOL	LEGEND	SOIL TYPE Colour, Plasticity, Grain Size, Minor Components	COHESIVE	NON COHESIVE	SOIL ORIGIN STRUCTURE, ETC
		m	Top soil: Thin layer of humus (dark brown clay soil)	VS	ST	
		0.5	Clay: Light brown clay loam very stiff	VS	ST	
		1	END OF TEST PIT (rock was found)			
		1.5				
		2.0				
		2.5				
		3				
		3.5				
		4				

NOTES: No groundwater found

FIGURE

2110T

PENETROMETER TEST RESULTS

DYNAMIC CONE PENETROMETER TEST RESULTS: DC1 to DC12



PROJECT: Vaiola Hospital
31/10/2003

DEPTHS (mm)	DYNAMIC CONE PENETROMETER TESTS											
	DCP1	DCP2	DCP3 at TP2	DCP4 at TP3	DCP5 at TP4	DCP6	DCP7	DCP8	DCP9	DCP10	DCP11	DCP12
0-300	5	15	-	-	-	9	12	7	21	35	25	24
300-600	11	17	-	-	-	15	16	11	16	19	19	20
600-900	18	22	-	-	62R	21	19	18	18	15	20	18
900-1200	27	27	-	-		17	22	20	15	20R	21	16
1200-1500	18	21	-	-		18	19	26	19		23R	19
1500-1800	29	38	-	-		17	28	31	15			17
1800-2100	37	39R	-	-		25	34	38	21			21
2100-2400	30R		-	71R		31	36	52R	20R			25R
2400-2700			76R			38	58R					
2700-3000						62R						

NOTE: STANDARD DYNAMIC PENETROMETER CONFORMING WITH AS 1289 Part 6.3.2

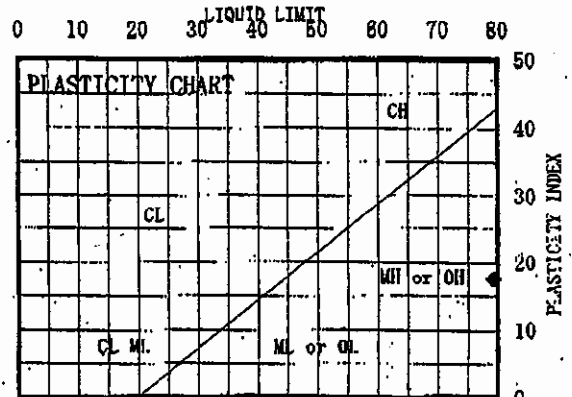
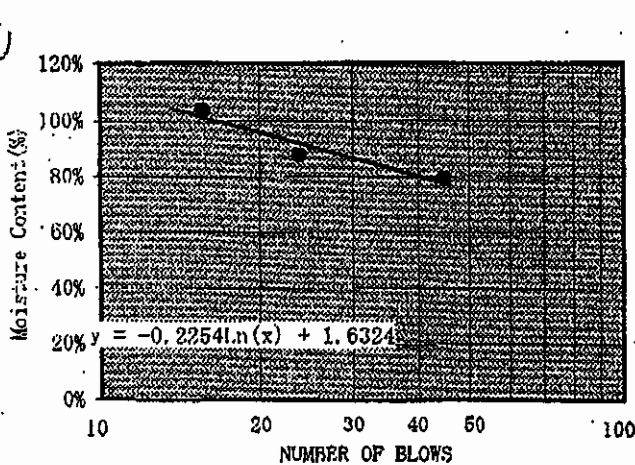
- *Hammer mass - 9.0 kg
- *Drop HT - 510mm
- *Shaft diameter - 20mm
- *Cone diameter - 30 degrees angle

ATTERBERG TEST RESULTS

ATTERBERG TEST RESULTS: TP2 & TP4

Liquid Limit and Plastic limit Test

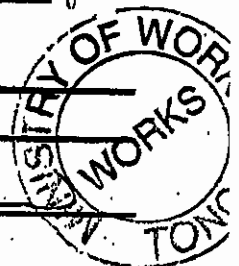
Date Sampled:		Client: KRAMER Group		Lab Sample No:											
Date Tested: 31-Oct-03		Project: Rehabilitation and upgrading Valola Hospital		Client Sample No:											
Tested by: <i>H. Shibuya</i>		Sample Origin:		Job Number:											
Sample Description:		Method of Preparation													
		FIELD MOISTURE CONTENT													
LINEAR SHRINKAGE		Dish Number		#											
Mould Number		Mass wet soil and dish		151 g											
Shrinkage distance mm		Mass dry soil and dish		120 g											
Length of mould mm		Mass of Moisture		31 g											
Percent shrinkage %		Mass of dish		49 g											
Crumbling		Mass of dry soil		71 g											
Curling		Moisture Content		43.7 %											
PLASTIC LIMIT		TP#2(1)		TP#2(2)		TP#2(3)		Number of blows		Factor		Number of blows		Factor	
Dish Number		72 g		74 g		72 g		15		0.93		26		1.00	
Mass wet soil and dish		63 g		65 g		64 g		16		0.96		27		1.01	
Mass dry soil and dish		9 g		9 g		8 g		17		0.96		28		1.01	
Mass of Moisture		49 g		50 g		51 g		18		0.97		29		1.02	
Mass of dish		14 g		15 g		13 g		19		0.97		30		1.02	
Mass of dry soil		64%		60%		62%		20		0.98		31		1.02	
Moisture Content		49 g		50 g		51 g		21		0.98		32		1.03	
		14 g		15 g		13 g		22		0.99		33		1.03	
		64%		60%		62%		23		0.99		34		1.03	
		64%		60%		62%		24		1.00		35		1.03	
		64%		60%		62%		25		1.00		35		1.03	
LIQUID LIMIT		A		B		C									
Dish Number		16		24		45									
Number of blows		104 g		111 g		93 g									
Mass wet soil and dish		77 g		83 g		74 g									
Mass dry soil and dish		27 g		28 g		19 g									
Mass of Moisture		51 g		51 g		50 g									
Mass of dish		26 g		32 g		24 g									
Mass of dry soil		104%		88%		79%									
Moisture Content		104%		88%		79%									



LL	90.7	PL	61.9	PI	28.7	LS	USC
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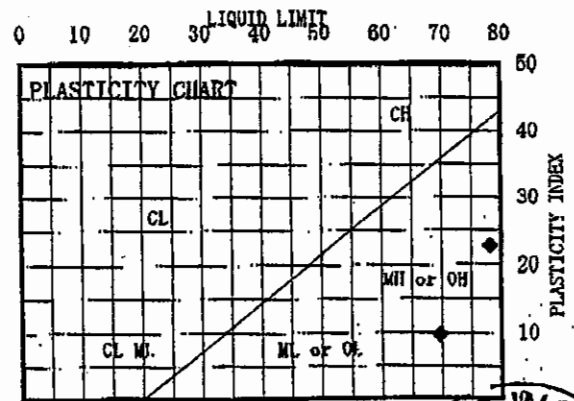
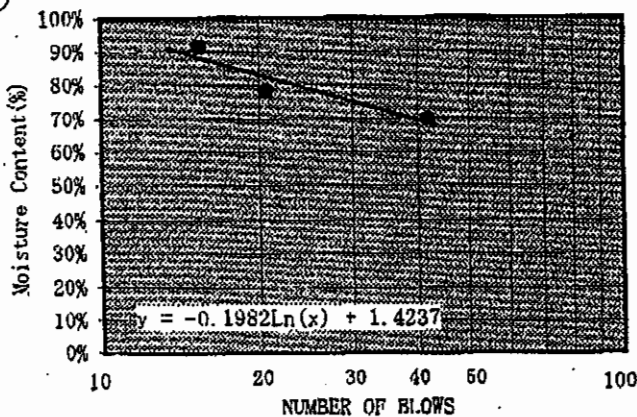
CALCS by *H. Shibuya*

CHECKED by *[Signature]*



Liquid Limit and Plastic limit Test

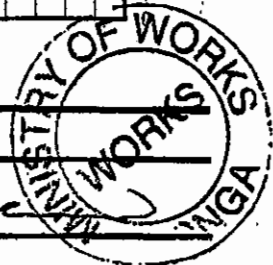
Date Sampled:		Client: KRAMER Group		Lab Sample No:											
Date Tested: 31-Oct-03		Project: Rehabilitation and upgrading Valola Hospital		Client Sample No:											
Tested by: <i>H. Hibuya</i>		Sample Origin:		Job Number:											
Sample Description:		Method of Preparation													
<u>LINEAR SHRINKAGE</u>		<u>FIELD MOISTURE CONTENT</u>													
Mould Number		Dish Number		#											
Shrinkage distance	mm	Mass wet soil and dish	165	g											
Length of mould	mm	Mass dry soil and dish	127	g											
Percent shrinkage	%	Mass of Moisture	38	g											
Crumbling		Mass of dish	49	g											
Curling		Mass of dry soil	78	g											
		Moisture Content	48.7	%											
<u>PLASTIC LIMIT</u>		TP4#(1)		TP4#(2)		TP4#(3)		Number of blows		Factor		Number of blows		Factor	
Dish Number															
Mass wet soil and dish	73	g	78	g	74	g	15	0.95	26	1.00					
Mass dry soil and dish	61	g	68	g	65	g	16	0.96	27	1.01					
Mass of Moisture	9	g	10	g	9	g	17	0.96	28	1.01					
Mass of dish	49	g	50	g	50	g	18	0.97	29	1.02					
Mass of dry soil	15	g	18	g	15	g	19	0.97	30	1.02					
Moisture Content	60%		56%		60%		20	0.98	31	1.02					
							21	0.98	32	1.03					
							22	0.99	33	1.03					
							23	0.99	34	1.03					
							24	1.00	35	1.03					
							25	1.00							
<u>LIQUID LIMIT</u>		A		B		C									
Dish Number															
Number of blows	15		21		42										
Mass wet soil and dish	93	g	106	g	89	g									
Mass dry soil and dish	72	g	81	g	73	g									
Mass of Moisture	21	g	25	g	16	g									
Mass of dish	49	g	49	g	50	g									
Mass of dry soil	23	g	32	g	23	g									
Moisture Content	91%		78%		70%										



LL	78.6	PL	58.5	PI	20.1	LS	USC
----	------	----	------	----	------	----	-----

CALCS by *H. Hibuya*

CHECKED by *[Signature]*



Appendix E

CBR TEST RESULTS

CBR TEST RESULTS: TP2 & TP4

CALIFORNIA BEARING RATIO LABORATORY WORK SHEET

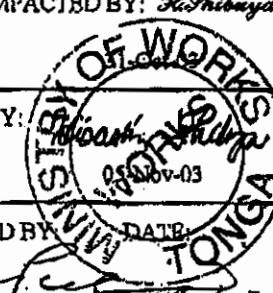
LOT No:	PROJECT: Rehabilitation and upgrading Vavala Hospital	PROJECT No:
SAMPLE No: TP2#	LOCATION:	DEPTH SAMPLED:
TEST METHOD: AS 1289 F1.1/RTA T117,T117a		

DATE MOULDED: 31-Oct-03 DATE INTO WATER: 31-Oct-03 DATE OUT OF WATER: 04-Nov-03
 TARGET COMPACTION: % (g) STD/MOD MOD SURCHARGE: 4.5 kg

MOULD No:	MDD 0 t/m ³ (g)	OMC 0 % (d)	FUNCTIONS CHECKED	Y/N
-----------	----------------------------	-------------	-------------------	-----

BALANCE No:	SWELL GUAGE:	BEFORE	AFTER
MASS MOULD +WET SOIL.	(g)	11,501	11,640
MASS MOULD	(g) (i)	8,005	8,005
MASS WET SOIL	(g)	3,496	3,635
VOLUME OF THE MOULD	(cm ³) (f)	2,178	2,178
WET DENSITY	(t/m ³)	1.605	1.665
MOISTURE CONTENT (AVERAGE)	(%)	45.1	57.2
DRY DENSITY	(t/m ³)	1.106	1.104
DENSITY RATIO	(%)		

MOISTURE CONTENT (%)	BEFORE		AFTER (TOP 30 mm)	AFTER (WHOLE)
TIN No:	1	2	M	P
MASS WET SOIL & TIN (g)	151	154	93	106
MASS DRY SOIL & TIN (g)	120	121	78	86
MASS TIN (g)	49	50	51	52
MASS WATER (g)	31	33	15	20
MASS DRY SOIL (g)	71	71	27	34
MOISTURE CONTENT (%)	43.7	46.5	55.6	58.8

INITIAL HEIGHT OF SPECIMEN (h)	125	mm	CBR COMPACTED BY: <i>H. Shibuya</i> DATE _____ CALCS BY: _____ DATE: 05/06/03 CHECKED BY: _____ DATE: _____ 
INITIAL GUARGE READING	0	mm	
FINAL GUARGE READING	0.33	mm	
HEIGHT INCREASE (i)	0.33	mm	
SWELL ((i) x 100 / h)	0.264	%	

REFER TO FORM S25BT FOR PENETRATION & LOADING CHART

CBR Penetration / Load (As 1289 F.1.1, F.1.3 / RTA T117, T117A)

Project: Rehabilitation and upgrading Vaiola Hospital			Project No:		
Lot No:			Date: 05-Nov-03		
Proving Ring / Load Cell No: 26/N55-S-18308			Sample No TP2#		
Penetration(mm)	Top Test Guage Reading	Load(KN)	Moisture Adjustment of CBR Specimen		
0.5	0.8	0.12	Wet Mass of Sample (g) (a)	3.496	
1.0	1.4	0.21	MC of sample (%) (b)	45.1	
1.5	2.8	0.41	Dry Mass of CBR sample (c) = $\frac{a}{1 + \frac{b}{100}}$	2409.9	
2.0	4.5	0.66	OMC (%) (d)	0.0	
2.5	6.0	0.88	Moisture Adjustment Required = $c \times \left(1 + \frac{d}{100}\right) - a$	-1086.1	
3.0	7.2	1.06	If + Add Water / If - Dry Back		
3.5	8.3	1.22	Calculation of Required Soil Mass for CBR specimen		
4.0	9.1	1.34	MDD (t/m ³) (e)	0.000	
4.5	10.2	1.50	Volume of Mould (cm ³) (f)	2.178	
5.0	10.8	1.59	Target Compaction (%) (g)		
7.5	12.0	1.76	Required Total Mass of Sa (k) = $c \times \left(1 + \frac{d}{100}\right) \times r \times \frac{g}{100}$	#VALUE!	
10.0	12.6	1.85	Required Mass per Lay / No. of Layers		
12.5	13.8	2.03	Total Target Mass (g) = k + j	#VALUE!	

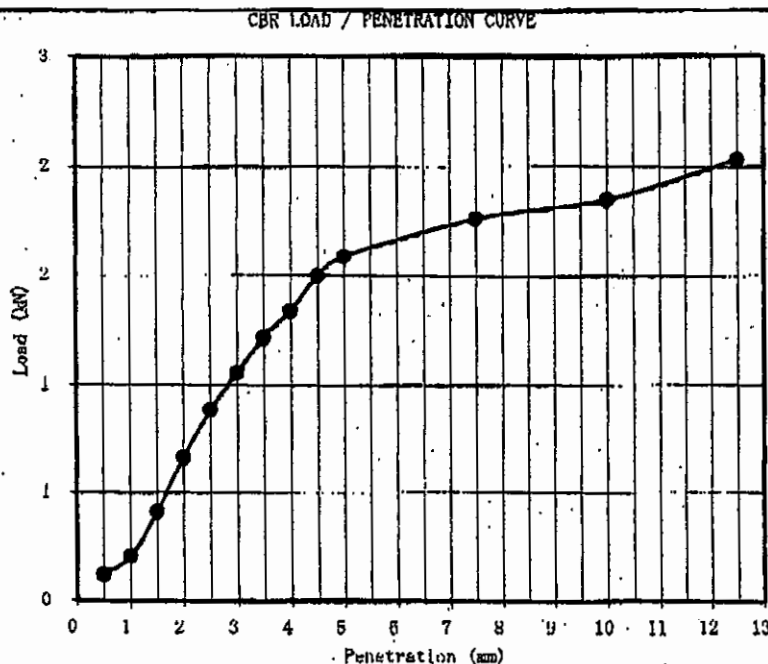
Load Correction: $F = (D \times A) + B$

A= 0.1468

B= 0

D= Dial Guage Reading

A & B= Factors From Proving Ring Calibration



	2.5	5
Load (kN)	1.1	1.6
Standard Load (kN)	13.2	19.8

CBR @ 2.5mm	8.3	%
CBR @ 5.0mm	8.2	%

correction origin: 0.6

Proving Ring, Timer & Dial Guage Checked for function Y/N

Tested By: *J. Shibuya*
 Date: 5-Nov-03
 Calcs By: *J. Shibuya*
 Date: 5-Nov-03
 Checked By: *[Signature]*
 Date: 6/11/03

KINGDOM OF TONGA

MINISTRY OF WORKS

CALIFORNIA BEARING RATIO LABORATORY WORK SHEET

LOT No:	PROJECT: Rehabilitation and upgrading Valala Hospital	PROJECT No:
	LOCATION:	DEPTH SAMPLED:
SAMPLE No: TP4#	TEST METHOD: AS 1289 F1.1/RTA T117,T117a	
DATE MOULDED: 31-Oct-03	DATE INTO WATER: 31-Oct-03	DATE OUT OF WATER: 04-Nov-03
TARGET COMPACTION:	% (g) STD/MOD MOD	SURCHARGE: 4.5 kg
MOULD No:	MDD 0 t/m ³ (a) OMC 0 % (d)	FUNCTIONS CHECKED Y/N
BALANCE No:	SWELL GIJAGE:	
		BEFORE AFTER
MASS MOULD +WET SOIL (g)		11,791 11,886
MASS MOULD (g) (i)		8,408 8,408
MASS WET SOIL (g)		3,383 3,478
VOLUME OF THE MOULD (cm ³) (f)		2,186 2,186
WET DENSITY (t/m ³)		1.548 1.581
MOISTURE CONTENT (AVERAGE) (%)		47.5 59.7
DRY DENSITY (t/m ³)		1.049 1.042
DENSITY RATIO (%)		
MOISTURE CONTENT (%)	BEFORE	AFTER (TOP 30 mm) AFTER (WHOLE)
TIN No:	1 2	R3 R
MASS WET SOIL & TIN (g)	165 151	111 93
MASS DRY SOIL & TIN (g)	127 119	89 77
MASS TIN (g)	49 50	51 51
MASS WATER (g)	38 32	22 16
MASS DRY SOIL (g)	78 69	38 26
MOISTURE CONTENT (%)	48.7 46.4	57.9 61.5
INITIAL HEIGHT OF SPESIMEN (h)	125 mm	CBR COMPACTED BY: <i>H. Mubuya</i> DATE: 31-Oct-03 CALC BY: <i>[Signature]</i> DATE: 05-Nov-03 CHECKED BY: <i>[Signature]</i> DATE:
INITIAL GUARGE READING	0 mm	
FINAL GUARGE READING	0.82 mm	
HEIGHT INCREASE (i)	0.82 mm	
SWELL (i) x 100 / h	0.656 %	
REFER TO FORM S25BT FOR PENETRATION & LOADING CHART		

CDR Penetration / Load (As 1289 F.1.1, F.1.3 / RTA T117, T117A)

Project: Rehabilitation and upgrading Vaiola Hospital			Project No:		
Lot No:			Date: 05-Nov-03		
Proving Ring / Load Cell No: 26/N55-5-18308			Sample No TP4#		
Penetration(mm)	Top Test Gauge Reading	Load(KN)	Moisture Adjustment of CBR Specimen		
0.5	0.8	0.12	Wet Mass of Sample (g) (a)		3.383
1.0	4.4	0.65	MC of sample (%) (b)		47.5
1.5	6.5	0.95	Dry Mass of CBR sample (c) = $\frac{a}{1 + \frac{b}{100}}$		2292.8
2.0	7.5	1.10	OMC (%) (d)		0.0
2.5	8.2	1.20	Moisture Adjustment Required = $0 \times \left(1 + \frac{d}{100}\right) - a$		-1090.2
3.0	8.8	1.29	<i>If + Add Water / If - Dry Back</i>		
3.5	9.3	1.37	Calculation of Required Soil Mass for CBR specimen		
4.0	9.8	1.44	MDD (t/m ³) (e)		0.000
4.5	10.2	1.50	Volume of Mould (cm ³) (f)		2,186
5.0	10.6	1.56	Target Compaction (%) (g)		
7.5	12.6	1.85	Required Total Mass of Sa (k) = $ex \left(1 + \frac{d}{100}\right) \times f \times \frac{g}{100}$		#VALUE!
10.0	13.6	2.00	Required Mass per Lay / No. of Layers		
12.5	15.1	2.22	Total Target Mass (g) = k + j		#VALUE!

Load Correction, $F = (D \times A) + D$

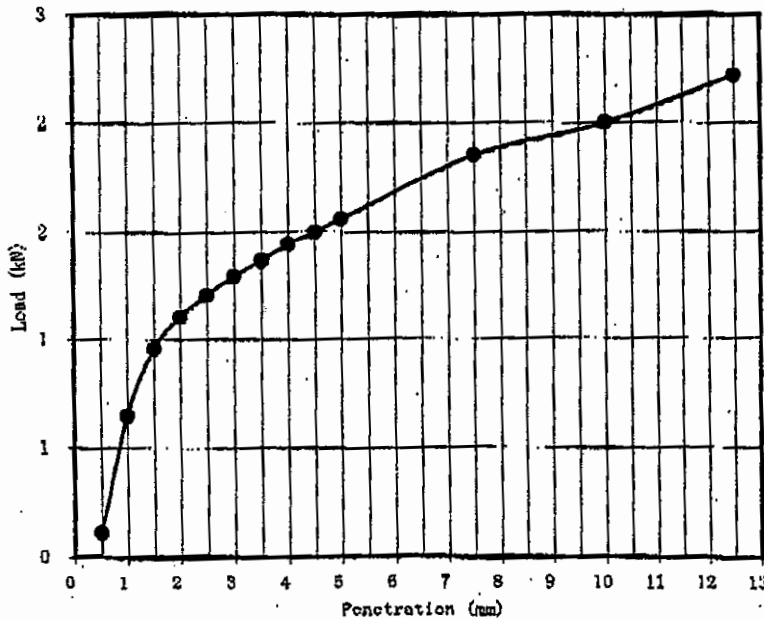
A = 0.1468

B = 0

D = Dial Gauge Reading

A & B = Factors From Proving Ring Calibration

CBR LOAD / PENETRATION CURVE



	2.5	5
Load (kN)	1.3	1.6
Standard Load (kN)	13.2	19.8

CBR @ 2.5mm	9.7	%
CBR @ 5.0mm	8.1	%

correction origin : 0.4

Proving Ring, Timmer & Dial Gauge Checked For Function Y / N

Tested By: *H. Thibuya*
 Date: 05-Nov-03
 Calcs By: *Sasha Silita*
 Date: 05-Nov-03
 Checked By: *[Signature]*
 Date: 05/11/03

APPENDIX - 9 Land Survey Map

APPENDIX - 10 Utility Layout Schedule

**Project for Refurbishment of Vaiola Hospital
Utility Layout Schedule**

Consultated on Feb.10, 2004

Division, Room Name	HVAC			Plumbing			Medical Gas			Electric Work							Note
	Cooling	Ceiling Fan	Ventilation	City Water	Rain Water	Hot Water	O	V	A	Generator	Emergency light	Power point	Interphone	Tel	Detector	Nurse Call	
Radiology																	
X-Lay Screening Room-1	x			x													
Dark Room		x	x	x	x					x	x	x		x	x		
Radiologist Area / Viewing Area		x									x	x		xT	x		
X-Lay Screening Room-2	x			x							x	x			x		
Reception / Waiting Area		x									x	x		xT	x		x
Ultrasound Room	x										x	x			x		
Toilet/Changing Room (x2)			x	x							x						
General Store											x				x		
Film Storage											x				x		
Office-1		x									x	x		xT	x		x
Office-2		x									x	x		xT	x		x
Staff Common Room		x									x	x		xT	x		
Corridor											x				x		
Hall											x				x		
Blood Bank																	
Blood Collection Room	x			x	x	x					x	x			x		
Resting Room			x	x							x	x			x		
Blood Bank	x									x	x	x		xT	x		x
Pathology Laboratory																	
Office-1		x									x	x		xT	x		x
Office-2		x									x	x		xT	x		x
TB Lab.	x		x	x	x	x					x	x		x	x		
Microbiology Lab.	x		x	x	x	x					x	x		x	x		
General Lab.	x			x	x	x				x	x	x		x	x		
Pathology Lab.	x		x	x	x						x	x		x	x		
Inpatient Pharmacy																	
Inpatient Pharmacy		x								x	x	x		xT	x		x
Corridor											x				x		
Staff Room-1 inc. Toilet		x		x							x	x		xT	x		
Biomedical Engineering Workshop																	
Engineering Workshop		x		x	x					x	x	x		xT	x		x
Gas cylinder Storage										x	x	x			x		
Delivery Suite																	
Delivery Room (x6)	x			x	x	x	1	1		x	x	x	x		x	x	
Delivery Suite Hall		x								x	x	x		xT	x		
Dirty Utility / Laundry			x	x	x						x	x			x		
Nurse Station		x								x	x	x	x	xT	x	x	x
Preparation Room			x	x	x						x	x			x		
Consulting Room										x	x	x		xT	x		x
Nurse changing room (x2)											x	x			x		
Storage															x		
Toilet				x							x					x	
Entrance Hall		x									x	x			x		

Obstetrics Ward																	
Sister's Office											x	x		x	x		x
Nurse Station		x							x	x	x		xT	x	x		x
Staff Room		x								x	x		xT	x			x
Day Room		x								x	x			x			
Doctor's Office		x								x	x		x	x			x
Treatment Room					x					x	x			x			
Special Care Nurse	x				x	x		6	6	6	x	x	x		x	x	
High Dependency Room (x2)		x						1	2	1	x	x	x		x	x	x
1 Bed Ward (x4)	x				x						x	x	x		x	x	
2 Bed Ward (x2)					x						x	x	x		x	x	
4 Bed Ward (x6)					x						x	x	x		x	x	
Dirty Utility (x2)					x	x					x	x			x		
Hadicated Toilet/Shower (West)					x	x	x				x						x
Toilet/Shower (West)					x	x	x				x						x
Hadicated Toilet/Shower (South)					x	x					x						x
Toilet/Shower (South)					x	x					x						x
Corridor											x				x		
ICU - Operation Div.																	
Operation theater - 1	x							2	3	2	x	x	x	x		x	
Operation Theater - 2	x							2	3	2	x	x	x	x		x	
Operation Theater - 3	x							2	3	2	x	x	x	x		x	
Operating Theatre Suite											x	x	x			x	
Transfer Area												x	x			x	
Office												x	x		xT	x	x
Changing Room with Toilet (x2)												x	x			x	
Dirty Corridor												x				x	
ICU Room	x				x			2	2	2	x	x	x		x	x2	
Recovery Room					x			3	3	3	x	x	x		xT	x	x3
Nurse Station -1					x						x	x	x	x	xT	x	x
Nurse Station -2					x						x	x	x		xT	x	x
Preparation Room											x	x	x			x	
Endoscope Room	x				x	x					x	x	x			x	
Waiting Room					x							x				x	
Treatment Room					x	x						x	x			x	
Consulting Room					x							x	x			x	
Staff Room												x	x		xT	x	x
WC (Staff Rm)												x					
Scrub Room						x	x				x	x	x			x	
CSSD																	
Washing Area					x	x	x	x				x	x		x	x	
Clean Room/Store	x				x							x	x			x	
Office												x	x		xT	x	
Corridor												x				x	

Surgical Ward																	
Sister's Office																	
Nurse Station		x								x	x	x		x	x		x
Staff Room		x									x	x		xT	x	x	x
Day Room		x									x	x			x		
Toilet/Shower (West x2)			x	x	x	x					x					x	
Linen, Storage (x2)																	
Doctor's Office		x		x							x	x		x	x		x
Treatment Room				x						x	x	x			x		
1High Dependency Room (x4)		x					1	1	1	x	x	x		x	x	x	
1 Bed Ward (x4)	x			x						x	x	x			x	x	
4 Bed Ward (x8)		x		x						x	x	x			x	x	
Dirty Utility (x2)				x							x	x			x		
Hadicapped Toilet/Shower (West)				x	x	x					x					x	
Toilet/Shower (West)				x	x	x					x					x	
Hadicapped Toilet/Shower (South)				x	x						x					x	
Toilet/Shower (South)				x	x						x					x	
Corridor											x				x		
Elevator											x						
Fire Pump											x						
Sewage Treatment Plant											x						
Water pump											x						
Spare											x						

Aircondition Same as existing condition. Sprit typaircondition. Operation theater Floor mount packaged aircondition
Ceiling Fan: Those rooms where always peole are in and no natural ventilation
Exhaust Fan: No window and odor
City water: toilet and backup for rain water
Rain water: Hotwatwer supply and medical equipment
Hot water: Rain water for Electric water heater and water treatment by magent type installed individually

APPENDIX - 11 Sample of Hospital Expenses in Japan

APPENDIX - 11 Sample of Hospital Expenses in Japan

Table: Sample of Hospital Expenses in Japan

(Unit :Yen)

Items	Contents	Yokohama City Harvor Hospital (300beds)		Yokohama City Hospital (624 Beds)		Average
		Amount	Ratio	Amount	Ratoi	
. Cost for Medical Treatment		6,861,475,877	99.1%	13,719,982,885	96.4%	97.8%
(1) Salaiy		3,514,102,111	50.8%	7,357,757,926	51.7%	51.2%
(2) Materials		2,028,172,081	29.3%	3,019,431,773	21.2%	25.3%
	Medicine	1,394,927,019	20.2%	1,893,155,569	13.3%	
	Diagonostic Material	542,900,295	7.8%	978,076,657	6.9%	
	Material for food service	69,838,962	1.0%	137,496,498	1.0%	
	Consumable for medical and	20,505,805	0.3%	10,703,049	0.1%	
(3) Management		786,935,422	11.4%	1,788,091,856	12.6%	12.0%
(4) Consumable and accessories		40,928,916	0.6%	56,417,668	0.4%	0.5%
(5) Elec, Water, Fuel Cost		147,307,296	2.1%	367,273,922	2.6%	2.4%
(6) Repair		47,021,831	0.7%	101,256,082	0.7%	0.7%
(7) Communication and Transportation		8,818,865	0.1%	13,993,139	0.1%	0.1%
(8) Depreciation		259,368,866	3.7%	968,205,709	6.8%	5.3%
(9) Capital reduction		3,389,095	0.0%	14,679,348	0.1%	0.1%
(10) Research and Training		25,431,394	0.4%	32,875,462	0.2%	0.3%
. Other Expences		60,103,766	0.9%	505,656,171	3.6%	2.2%
Total Cost		6,921,579,643	100.0%	14,225,639,056	100.0%	100.0%

Source: Website

APPENDIX - 12 References

APPENDIX 12. References

The Project for Upgrading and Refurbishment for Viola Hospital in Kingdom of Tonga

No.	Title	Issued from	Year
1	Vaiola Hospital admission, Transfer and separation policies and procedure manual	AusHealth International	Jan. 2003
2	Report of the Ministry of Health 2002	Office of the Minister of Health	Jun. 2003
3	Draft Master Plan Report	World Bank	Oct. 2003
4	Explanatory comments on building control and standard regulation 2002		2002
5	Explanatory comments on building control and standard bill 2002		2002
6	Building control and standard bill 2002		2002
7	Building control and standard act 2002 (Section 15)		
8	Fletcher Royco Joint Venture		Apr.6, 2000
9	Summary guide to the Environmental Impact Assessment Bill	Ministry of Environment	2001
10	Health Sector Reform Project Hospital Recurrent Cost - Final Field Report	World Bank	Nov.15, 2002
11	Tonga Health Project Health Care Waste Management Feasibility Study	World Bank	Mar. 3, 2002
12	Tonga Health Care Project Asbestos Survey Report	World Bank	Nov.31, 2002
13	Tonga Government Gazette Supplement Extraordinary	Government of Tonga	Oct.16, 2000
14	Ministry of Health Plan	AusAID	Jul. 29, 2003
15	Tonga Civil Service Civil Service List	Government of Tonga	30,Jun. 2002
16	Mental Health Act 2001	Government of Tonga	2001
17	The Public Health Act – 29 of 1992	Government of Tonga	1992
18	To Appropriate Moneys to the Services of the Government	Government of Tonga	Jul.1, 2003
19	Tonga- Australia Preliminary Strategy 2002-2006	AusAID	Aug.21, 2002
20	Shipping Schedule		Oct.29, 2003
21	Visa Application Form	Immigration	
22	Tongan Immigration Medical Form	Immigration	
23	Vaiola Hospital 3 Stories Complex- Review	Kramer Tonga Ltd.	Oct. 2003