MINISTRY OF PUBLIC HEALTH
THE REPUBLIC OF YEMEN

No.

BASIC DESIGN STUDY REPORT
ON
THE PROJECT FOR THE EXPANSION OF TUBERCULOSIS CONTROL IN THE SOUTHERN AND EASTERN GOVERNORATES
OF
THE REPUBLIC OF YEMEN

NOVEMBER, 2000

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
KUME SEKKEI CO., LTD.
INTERNATIONAL TECHNO CENTER CO., LTD.

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PREFACE

In response to a request from the Government of the Republic of Yemen, the Government of Japan decided to conduct a basic design study on the Project for Expansion of Tuberculosis Control in the Southern and Eastern Governorates of the Republic of Yemen and the Japan International Cooperation Agency (JICA) sent to Yemen a study team from April 15 to May 19, 2000.

The team held discussions with the officials concerned of the Government of Yemen, and conducted a field study at the study area. After the team returned to Japan, further studies were made and as this result, the Basic Design Study Report was finalized.

The Exchange of Notes was signed between the both governments on November 14, 2000. However, the consultants were unable to enter the country of Yemen for a prolonged period, the Project as an undertaking for fiscal year 2000 became impossible due to the fact that risk level 3 (travel postponement advisory). Therefore, the Ministry of Foreign Affairs decided to temporarily suspended the Project proceedings in 2000.

Upon relieving to red-signal level 2 on November 2001, the Project was recommended as an undertaking for fiscal 2002. JICA sent to Yemen an implementation review study team from March 1 to March 9, 2002 to designed to survey any changes in conditions since the basic design and to re-estimate the Project cost.

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

I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of Yemen for their close cooperation extended to the teams.

March, 2002

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Takao Kawakami
President
Japan International Cooperation Agency

March, 2002

Letter of Transmittal

We are pleased to submit to you the implementation review study report on the Project for Expansion of Tuberculosis Control in the Southern and Eastern Governorates of the Republic of Yemen.

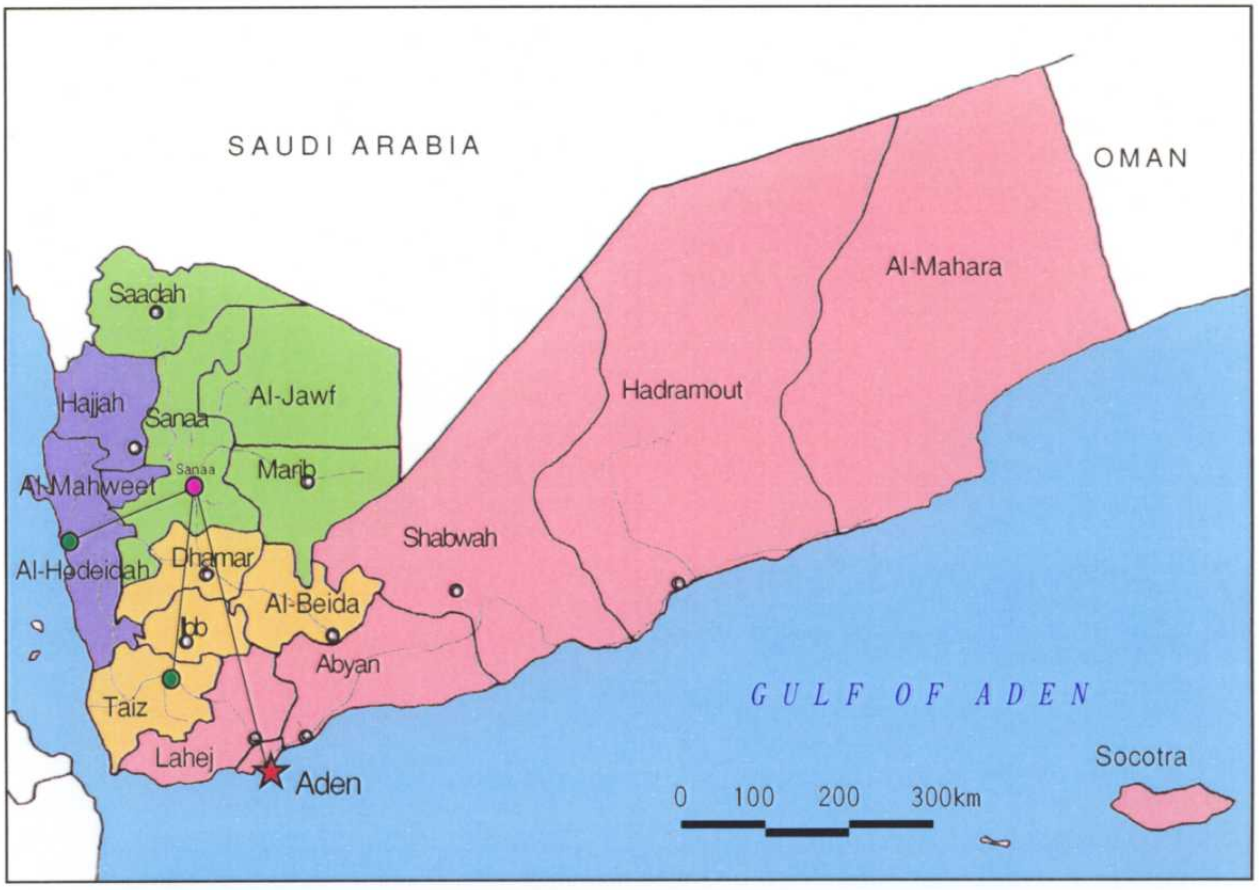
This study was conducted by Kume Sekkei Co., Ltd., and International Techno Center Co., Ltd. Consortium, under a contract to JICA, during the period from March 1 to March 9, 2002. In conducting the study, we have examined the feasibility and rational of the project with due consideration to the present situation of Yemen and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,

Tetsuro Nishimura
Project Manager,
Implementation Review Study Team on
The Project for Expansion of Tuberculosis Control in
the Southern and Eastern Governorates of the Republic of Yemen
Kume Sekkei Co., Ltd. - International Techno Center Co., Ltd.
Consortium

☐ Map of Yemen



☐ Map of Aden: Location of Site and Related Health Facilities

NOTES: ● : Polyclinic ● : Health Unit ★ : Primary Health Care Office
● : Hospital ■ : Related Office


THE PROJECT FOR THE EXPANSION OF TUBERCULOSIS CONTROL IN THE SOUTHERN AND EASTERN GOVERNORATES OF THE REPUBLIC OF YEMEN

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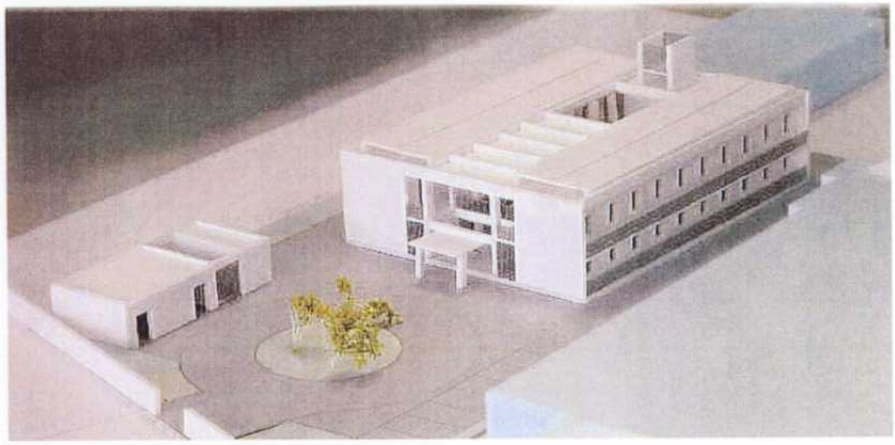

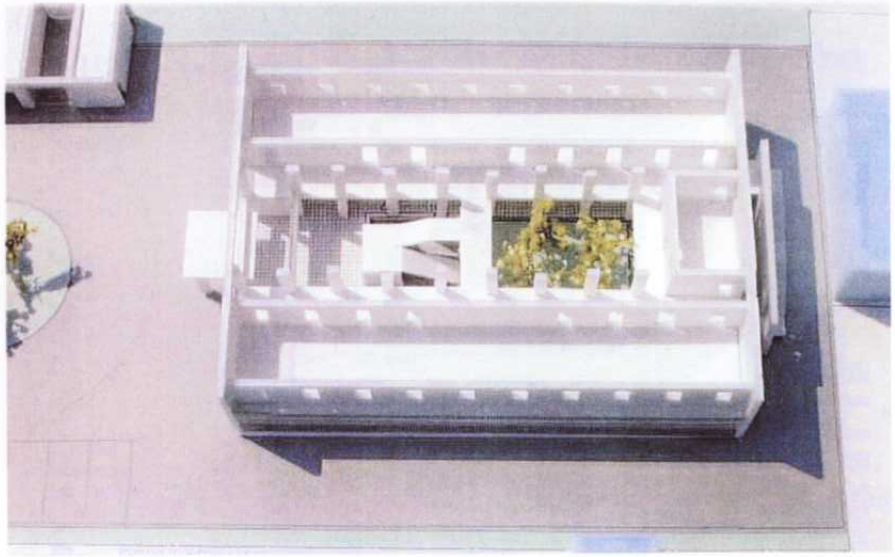

THE PROJECT FOR THE EXPANSION OF TUBERCULOSIS CONTROL IN THE SOUTHERN AND EASTERN GOVERNORATES OF THE REPUBLIC OF YEMEN

The Project for Expansion of Tuberculosis Control in the Southern and Eastern Governorates of the Republic of Yemen

Abbriviations

ATCC	Aden Tuberculosis Control Center
AV	Audio Visual
BOD	Biochemical Oxygen Demand
CB	Concrete Block
CMS	Central Medical Supply
COD	Chemical Oxygen Demand
DOTS	Direclty Observed Treatment, Short Course
DTC	District Tuberculosis Coordinater
E/N	Exchange of Notes
GTC	Governarate Tuberculosis Coordinater
HC	Health Center
HTC	Hodeida Tuberculosis Center
HU	Health Unit
LNG	Liquid Natural Gas
MDF	Main Distribution Frame
MLT	Medical Laboratory Technician
MOPD	Ministry of Planning and Development
MOPH	Ministry of Public Health
NTI	National Tuberculosis Center
NTP	National Tuberculosis Control Programm
PABX	Private Automatic Branch Exchange
PC	Polycrinic
PC	Precast Concrete
PHC	Primary Health Care
PTTC	Project Type Technical Cooperation
RC	Reinforced Concrete
TB	Tuberculosis
TTC	Taiz Tuberculosis Centrer
WB	World Bank
WFP	World Food Program
WHO	World Health Organization
YATA	Yemen Anti-Tuberculosis Association
YR	Yemen Rial

CONTENTS

APPENDICES

CHAPTER 1 BACKGROUND OF THE PROJECT

CHAPTER 1 BACKGROUND OF THE PROJECT

1.1 Background of the Request

The Republic of Yemen (hereinafter referred to as "Yemen") was born in May, 1990 through the unification of South Yemen and North Yemen. The unstable political and economic conditions, however, persisted even after unification. Despite increased oil production, all productive activities other than oil remained sluggish and such problems as an expanding fiscal imbalance and accelerating inflation increased the foreign debt to an unsustainable level. Coupled with a high population growth rate of approximately 3%, the country's development was stalled. The civil war which started in May, 1994 ended in July and Yemen made a fresh start with the New Constitution which was promulgated in October.

For post-unification socioeconomic development, a development plan consisting of readjustment of the macroeconomy and structural readjustment programmes, assisted by the World Bank and the IMF, was announced in 1995 after the end of the civil war. In addition, the First Five Year (National Development) Plan was formulated to supplement these programmes. At the initial stage of the implementation of this National Development Plan, the level of the current fiscal deficit temporarily dropped and the annual rate of inflation stabilised due to increased revenue from oil exports. The rapid fall of the oil price since 1997, however, has made the management of the macroeconomy difficult, resulting in an increased balance of foreign debt again. Even though the Government of Yemen has tried to deal with the situation by reducing subsidies and development expenditure, etc., the fiscal deficit reached some 6% of the GNP in 1998 with an average annual rate of inflation of 11%, causing fresh fiscal management difficulties. Many problems still remain unsolved today and the situation is making Yemen rely on the assistance of the international community. Since September, 1996, Yemen has been designated as a country for which debt reduction measures are applicable by the Government of Japan.

(1) Situation of Health Sector in Yemen

The Government of Yemen has adopted "the expansion and improvement of educational and public health services to meet the increasing demand" as a major socioeconomic development objective of its First Five Year Plan (FFYP) 1996 - 2000. The concrete development targets in the health sector are improved health and medical care services (29 projects relating to mother and child health, malnutrition, malaria/TB/schistosome, the environment and health at work, etc.) and the establishment of medical facilities (facilities of 674 PHC units, 168 health centres and 34 district hospitals, etc.) Meanwhile, the Five Year Health Development Plan based on this FFYP adopts the following development strategy to achieve such objectives as improved public health in urban (particularly slum) and rural areas, rectification of the regional gap in access to health facilities and strengthening of the

PHC network (improved mother and child health, infectious diseases control measures, improved nutrition, supply of safe water and health education).

Table 1-1 Development Strategy for Health Sector

Objective	Description
Improved Mother and Child Health (MCH)	Substantial lowering of the contraction and outbreak rates of infectious and parasitic diseases which severely affect infants and mothers
Improved Nutrition	Improvement of the state of nutrition among the public in general and the socially weak in particular
Improved PHCs	Qualitative improvement of PHCs to substantially reduce the risk for mothers and children posed by pregnancy and childbirth among young girls and repeated childbirth at short intervals
Development of Diagnostic and Treatment Facilities	Development and improvement of diagnostic and treatment facilities, including those for emergency medical services (EMSs), to improve measures to deal with damage and impediments caused by the continuation of unhealthy conditions
Collaboration with Other Sectors	Improvement of negative environmental factors which expand the disease in collaboration with other sectors

As in the case of many other developing countries, the health sector is characterised by the common occurrence of preventable infectious diseases and diarrhoea among infants, etc. and the general level of nutrition among the public is low. There is a shortage of such medical staff as doctors and nurses and a shortage of facilities and it cannot be said that the health and medical care service system is functioning well. Moreover, the qualitative aspects of medical facilities and staff are also insufficient.

The HDI (Human Development Index) announced by the UNDP in 1998 puts most Middle Eastern and North African countries, including the United Arab Emirates, in the middle ranking between 65th and 130th. Only Yemen and Sudan were ranked below 130th.

Table 3 compares the health and medical care indices for Yemen with five low ranking Arab countries (Jordan, Egypt, Morocco, Iraq and Sudan) and the two neighbouring countries of Saudi Arabia and Oman. The rates of completed preventive vaccinations among one year olds against measles and TB show that while most countries maintain approximately 90% for both diseases, the figures for Yemen are as low as 59% for TB and 51% for measles. Even though the rate of TB patients appears to be high in Iraq, Morocco and Yemen compared to the other five countries shown in this table, some countries lack information on the rate of malaria patients and others. In the case of Jordan and Oman, the rate of TB patients does not appear to be accurate. In short, the general situation is inferred to be that the national statistics on these very important resurgent infectious diseases are not totally reliable because of the absence of rigorous diagnostic work.

Table 1-2 Health and Medical Care Indices for Yemen and Nearby Countries

	Saudi Arabia	Oman	Jordan	Egypt	Moro-cco	Iraq	Yemen	Sudan
HDI Ranking	70	71	87	112	125	127	151	157
Public Health - Ratio in GNP (%) Expenditure - Rato in GDP (%)	0.6 3.1		0.6 1.8	0.6 1.0	1.0 0.9	1.0	1.5	1.0 0.5
Calory Intake/person/day (kcal)	2,736		2,726	3,315	3,140	2,266	2,013	2,310
Infant Mortality Rate (IMR): in every 1,000	25	15	21	57	64	94	78	73
Under 5 Mortality Rate (U5MR): in every 1,000	30	18	25	78	74	122	105	
ORT Use Rate (%)	58	85	41	95	29		92	
Maternity Mortality Rate (MMR) in every 100,000 childbirths Average Life Expectancy at Birth (years)	130 70.7	190 70.3	150 68.9	170 64.8	610 65.7	310 58.5	1,400 56.7	 52.2
Rate of Under 5 Under-Weight Children (%)	-	23.0	9.0	15.0	9.0	12.0	39.0	34.0
Preventive Vaccination - TB (%) Rate for One Year Olds - Measles (%)	91 92	96 98	 98	91 85	96 93	99 97	59 51	96 75
TB Patients: in every 100,000		10.2	9.4	37.8	112.5	134.1	96	41.5
Malaria Patients: in every 100,000	56	341			1	500	260	
Doctors: in every 100,000	166	120	158	202	34	51	26	10
Nurses: in every 100,000	348	290	224	222	94	64	51	70

Notes:

1. HDI: development index centering on human aspects, calculated using the average life expectancy, education and GDP of each country
2. ORT: treatment to orally supply saline solution to infants suffering from dehydration due to diarrhoea and others

Source: UNDP Human Development Report 1998 (covering 175 countries)

(2) TB Control Measures in Yemen

TB control measures were first introduced in Yemen in the 1970's and the Ministry of Health upheld TB control as the most important issue for public health and medical care in its Second Five Year Health Plan which commenced in 1982. At the same time, a request was made to the Government of Japan for the provision of technical cooperation and the JICA commenced the TB Control Project (I), project-type technical cooperation, in 1983. TB control activities at the National Tuberculosis Institute (NTI) and TB Sub-Centres in Taiz and Hodeidah, all of which were

constructed with Japanese grant aid in 1985 and 1986, have been continually supported by fresh project-type technical cooperation (Phase II) which commenced in 1993.

Prior to the commencement of the TB Control Project in 1983, no concrete TB control measures had been implemented in Yemen. The registered number of new TB patients in 1980 was as high as 27,000 or 336 in every 100,000 (WHO data for 1999). In January, 1990, the NTP was set up in the Ministry of Health, marking the start of full-scale control activities separately from those of the NTI. A GTC (Governorate Tuberculosis Coordinator) was appointed for each governorate to start to establish a nationwide system for TB control. Unification in the same year made it necessary to extend the activities of the NTP Office to former South Yemen and the subject area and population of such services were increased by three times and one and a half times respectively. The DOTS Strategy was introduced with the assistance of the WHO in 1996, further accelerating the extension of the National Tuberculosis Control Programme (NTP) nationwide. In 1997, the number of newly registered TB patients totalled 12,013 or 74 in every 100,000 (WHO data for 1999).

Under the NTP, TB control activities have been in progress to achieve two targets proposed by the WHO: (1) curing of 85% of patients declared positive by sputum smear examination and (2) discovery of 70% of undiscovered patients. Particular emphasis has been placed on the nationwide expansion of the DOTS Strategy (discovery of patients by sputum smear examination and treatment with anti-TB drugs under direct observation). To be more precise, the appointment of a GTC for each of the country's 20 governorates is planned in addition to the deployment of one district tuberculosis coordinator, one doctor, one MLT (medical laboratory technician) and two public health workers in each of 226 districts (said to have increased to approximately 300 by now).

The TB Control Project (III) in Yemen, project-type technical cooperation which is currently in progress, is expanding the area of application of the DOTS Strategy to southern Yemen using the facilities established under the NTP. In March, 1993, the JICA dispatched a preliminary study team to Yemen and the report of this study team stated that while the NTP had made remarkable progress with great efforts by the Government of Yemen, in turn assisted by the WHO and other international aid organizations, the following problems still existed.

1) Need for Extension of NTP

The extension of the NTP has reached only some facilities and major cities for the effective implementation of TB control measures. There is a tendency for patients to concentrate on specific facilities as the examination network has not yet been fully extended. Extension of the NTP to rural areas and re-arrangement of the patient referral system in urban areas are particularly required.

2) Need for Qualitative Improvement

The cure ratio of patients having undergone the DOTS is 75%, failing to achieve the target 85%. The ratio of patients recording a negative smear examination 2 - 3 months after the commencement of treatment is as high as more than 85%, suggesting patient drop-outs during the follow-up treatment process. This figure indicates such problem areas as patient education during the initial intensive treatment period and subsequent follow-up. The strengthening of travelling guidance and the re-education of people engaged in TB control must be conducted to improve the situation.

3) Need for Review of NTP

The definition of a TB patient and the quarterly reporting items vary depending on the NTP Manual, patient card or teaching materials (WHO modules). It is necessary to re-consider the introduction of TB basic units which consistently conduct the discovery of patients to evaluation of the treatment results, assisted by the establishment of a standards laboratory as well as a patient register. Under a large system, the patient referral system is not clear cut. Re-arrangement of the NTP Manual is, therefore, necessary to improve practical dealings with patients, training contents and training materials in addition to review of the extension strategy.

(3) Activities Under Project-Type Technical Cooperation (Phase Ⅲ)

Prior to the Project, project-type technical cooperation (Phase I) has been implemented in North Yemen since 1983. Following suspension due to the unification of the country and the civil war, Phase Ⅲ has been in progress since August, 1999.

Table 1-3 Activities Under Project-Type Technical Cooperation (Phase Ⅲ): August, 1999 - August, 2004

(1) Extension of the DOTS Strategy
  1) Training of health personnel implementing DOTS :
     Subject persons: doctors, medical laboratory technicians and primary health workers
  2) Travelling guidance in areas where the DOTS is newly implemented
  3) Travelling guidance to improve and evaluate the TB control measures in each governorate
(2) Extension and qualitative improvement of the laboratory network
  1) Travelling guidance for laboratories
  2) Establishment and improvement of the accuracy control system
(3) Improvement of the medicine and equipment supply and distribution systems
(4) Improvement of the data control and evaluation system
(5) Extension to and improvement of the health education for local residents and patients
(6) Study to evaluate the scale and quality of the problem of TB in Yemen
(7) Holding of GTC and JCC (Joint Coordinating Committee) meetings, etc.

Source: Summary of the TB Control Project in Yemen (Phase Ⅲ), April, 2000

As described so far, the objective of the Project is to extend the NTP promoted by the Ministry of Health of the Government of Japan to the southern and eastern governorates in Yemen to qualitatively improve TB control through the establishment of the Aden Tuberculosis Control Centre and the provision of medical equipment for related health facilities in the Aden Governorate.

1.2 Contents of the Request

The request made by the Government of Yemen consisted of components to achieve the targets described in Table 1-4 based on the activities of the three existing TB control centres and the contents of the assistance provided under project-type technical cooperation. The Study Team held a series of discussions to confirm the contents of the request and to determine the appropriate scale of the Project.

Table 1-4 Outline of the Request

Higher Target	Lowering of the tuberculosis contraction and death rates in southern Yemen
Project Target	Effective management of TB control measures in southern Yemen
Expected Effect	Development of TB control centres responsible for southern Yemen
Activities and Input Plan (1) Request to Japanese Side	A. Construction of the Aden Tuberculosis Control Centre Facilities: administration rooms, training rooms, meeting room and laboratory, etc. Equipment: office equipment, laboratory equipment and vehicles, etc. B. Nine Health Facilities in Aden Equipment: X-ray equipment, ultrasonic diagnosis unit, refrigerators and air-conditioning units, etc.
(2) Work Plan for Yemeni Side	Management of the TB control programme in southern Yemen using the Aden Centre as a base
Responsible Agency	TB Control Section, Directorate General of the PHC, Ministry of Health
Subject Area	Southern and eastern governorates in Yemen
Beneficiaries	Some 2.3 million people (1996) in six governorates in the subject area

The requested total floor area for the Aden Tuberculosis Control Centre was 2,600 m^2 which was the same as that for the existing NTI in Sana'a. Through discussions with the Yemeni side, rooms of which the purpose of use was not clearly defined and of which the function overlapped with that of another room were eliminated while examining the necessary staffing strength for each department. In the case of equipment, streamlining of the rooms and staffing strength led to the elimination of duplicated equipment. The requested equipment was classified as office equipment and laboratory equipment as it was decided to examine the equipment to be installed under the building work or building service work as part of the relevant work items.

In regard to the nine health facilities in Aden, X-ray equipment and an ultrasonic diagnosis unit, etc. were requested for PCs (poly-clinics) which are believed to form the basic units (acting as the basic units for patient discovery and treatment with a smear examination room and a patient register, etc.) for the NTP in Yemen. The view expressed by the Yemeni side was that as the NTP is integrated to PHC activities, the strengthening of PHCs is essential for the effective implementation of the NTP. Accordingly, input to PCs will also be essential. In response, the Study Team expressed the following opinions.

1) The emphasis of the NTP in Yemen in placed on the discovery of positive patients by means of sputum smear examination and the provision of many (five) X-ray units could lead to misunderstanding of the basic policy of the NTP.

2) While the strengthening of PCs is necessary, they are basic units. From the viewpoint of TB control, sputum smear examinations should be given the highest priority at PCs.

3) There are few precedences in other countries for the active installation of X-ray units at basic medical facilities for TB control.

4) The excessive input of equipment will constitute a heavy burden for the TB control administration because of the high maintenance cost, etc.

5) Excessive input to PCs will result in a heavy patient flow to these PCs from other governorates and will conflict with the basic policy of the NTP.

In response to the above opinions of the Japanese side, the Yemeni side argued that at least one X-ray unit will be required in Aden for TB control. Both sides agreed that one X-ray unit will be installed at the Aden Tuberculosis Control Centre to deal with referred patients.

In regard to other types of equipment, their examination in Japan involving organizations related to Japanese ODA concluded that such equipment lacks a direct link with TB control (nationwide extension of the DOTS) and that such equipment should be dealt with under the project-type technical cooperation scheme or the grassroots grant aid scheme. Consequently, it was finally decided to drop such equipment from the scope of the present grant aid project.

CHAPTER 2 CONTENTS OF THE PROJECT

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2.1 Objective of the Project

The objective of the Project is to expand and improve the National Tuberculosis Control Programme (NTP) in the Southern and Eastern Governorates in Yemen through the construction of the Aden Tuberculosis Control Centre (ATCC) and the provision of medical equipment for related health facilities in Aden, thereby improving the quality of tuberculosis control in Yemen.

The planned ATCC will be engaged in tuberculosis (TB) control measures in collaboration with the National Tuberculosis Institute (NTI) constructed in 1985 with Japanese grant aid acting as the headquarters also with the Hodeida Tuberculosis Centre (HTC) and the Taiz Tuberculosis Centre (TTC), both of which were constructed as branch offices in 1986 with Japanese grant aid. The TB Control Project has been in progress in Yemen since 1983 under JICA's technical cooperation scheme and the present Project aims at supporting Phase III (commencing in August, 1998) of the TB Control Project.

2.2 Basic Concept of the Project

2.2.1 Proposed Functions and Activities

(1) Aden Tuberculosis Control Centre (ATCC)

1) Functions

The ATCC will have sufficient facilities to act as the base for TB control activities [particularly the discovery of patients by means of sputum smear examination (scraping and DOTS strategy)] in the six districts of the Southern and Eastern Governorates in Yemen. The following four functions of the ATCC have been confirmed through consultations with the Yemeni side.

① Training of health personnel for TB control
② Supervision of TB control activities at related health facilities
③ Reference for the quality assurance of sputum smear examination and X-ray examination
④ Operation research

2) Activities
① Training

- Training as well as the re-training of important personnel (doctors, DTCs, technicians and public health workers) for expansion of the DOTS (directly observed treatment, short course) strategy
- Training on TB control for staff members working in the field of public health, medical students and students in special schools
- Sponsoring of seminars and meetings regarding TB-related PHCs, health education and control of infectious diseases, etc.

② Supervision/Guidance

- Supervision of the activities of health facilities which conduct DOTS by a governorate tuberculosis coordinator (GTC) accompanied by a district tuberculosis coordinator(s) (DTC) in his area of supervision
- Guidance for staff members of TB centres to replace the TB control work currently directly conducted by staff members of the NTP at the Ministry of Public Health (MOPH) and of the NTI
- Gathering and analysis of epidemiological data, including the TB patient ratio and the cure ratio, with a view to feeding back the findings to the evaluation of TB control measures

③ Reference Testing

- Double-checking of the results of sputum smear examinations conducted by health facilities to control the accuracy of such examinations
- Implementation of culture tests as well as sensitivity tests
- Implementation of referral tests by means of X-ray filming for persons with negative sputum smear examination results

④ Research/Evaluation

- Implementation of operation research in selected model areas and surveillance of drug-resistant tubercle bacillus
- Collaboration with other organizations on epidemiological research on other infectious diseases

(2) Provision of Equipment for Eight Health Facilities in Aden District

1) Functions

- The existing NTI and HTC/TTC have experienced a rush of outpatients for medical examinations as well as X-ray testing. The explained purpose of the request for the provision of equipment for related health facilities is to prevent a rush of outpatients at the ATCC by means of strengthening the function related to TB control at these health facilities.

- Because of the above-described reason, the provision of medical equipment for PHC-level health facilities (i.e. five polyclinics (PCs), two health centres (HCs), one primary health care (PHC) office and one government office) was requested.

- Although the integration of TB control work to PHCs is necessary, it is judged that strengthening of the PHC functions should be conducted under a separate project in view of the main objective of the Project, i.e. the functional consolidation of TB control, particularly the DOTS strategy.

2) Activities and Selection of Equipment

- The field survey found that seven facilities are PHC-level health facilities and a DOTS room with a permanent patient register. However, sputum examinations, which are the key component of the DOTS strategy, are only conducted at two facilities because of concern in regard to TB infection and suspension of the payment of the risk allowance according to the explanation given.

- In regard to the selection of equipment, priority was given to that equipment required for enforcement of the DOTS strategy among the various TB control activities. In addition, the range of equipment which can properly be maintained in view of the operating situation of existing equipment was discussed and a list of the requested equipment with priority ranking was attached to the Minutes of Discussions.

2.2.2 Examination of the Request and Field Survey

(1) Facility Plan

The originally requested size of the ATCC was a floor area of some 2,600 m^2 which is almost equivalent to that of the existing NTI. Through discussions with the Yemeni side, rooms of which the purpose of use was not clearly identified were omitted, taking the configuration of the departments to perform the proposed functions and the required number of staff members into consideration. The finally agreed list of rooms, each of which will perform a clearly defined function, was attached to the Minutes of Discussions.

Table 2-1 List of Requested Rooms

Departments	Rooms
1) ADMINISTRATION DEPT.	Director's Office
	Administration Room
	Meeting Room
	Storage
	Worker's Room
	Guard Room
	Maintenance Room
	Machine Room
2) EXAMINATION DEPT.	Laboratory
	Preparation Room
	X-ray Room
	Dark Room
	Control Room
	Labo staff Room
	X-ray staff Room
	Waiting Lobby
3) SUPERVISING DEPT.	Supervisor's Room
	Statistics Room
4) TRAINING DEPT.	Lecture Room
	Seminar Room
	Training Laboratory
	Training Material Room
	Library
	Trainer's Room
5) DORMITORY DEPT.	Reception
	Single Bed Room x 3 rooms
	Twin Bed Room x 7 rooms
	Multi-purpose Room
	Dining Room
	Laundry
6) COMMON SPACE	Entrance Hall
	Corridor
	Restroom
	Kitchenette

(2) Equipment Plan

1) Equipment for ATCC

The originally requested equipment included many pieces of equipment which should be installed as part of the building or building services work. By examining the equipment list by different types of work, the requested equipment was classified into testing equipment, office equipment and vehicles. The streamlining of rooms and staff members removed overlapping equipment. Following the decision to add more sputum examination equipment, the number of which in Yemen is insufficient, and discussions on the composition of the X-ray units to be installed for reference purposes, the list of requested equipment was attached to the Minutes of Discussions.

Table 2-2 List of Requested Equipment

Room	Equipment	Qty	Priority
1) ADMINISTRATION. DEPT.			
Director's Office	Desktop Computer	2	A
	Printer	2	A
	Typewriter	1	A
	Facsimile	1	B
Administrative Room	Desktop Computer	1	A
	Printer	1	A
Meeting Room	Overhead Projector	1	A
	Screen	1	A
Storage	Medical Refrigerator	1	A
Maintenance Room	Floor Cleaner	2	A
	Maintenance Tools	1	A
2) EXAMINATION. DEPT.			
Reference Laboratory	Biological Microscope	4	A
	Safety Cabinet	1	A
	Bunsen Burner	3	A
	Autoclave	1	A
	Reagent Cabinet	1	A
	Instrument Cabinet	1	B
	Medical Refrigerator	1	A
	Incubator	1	A
	Centrifuge	1	A
Preparation Room	Hot-Air Oven	1	A
	Coagulator	1	A
	Pipette Washer(ultra-sound)	1	A
	Water Distiller	1	A
	Analytical Balance	2	A
	Water Bath	1	A
	Glassware	1	A
	Reagent Cabinet	1	A
	Instrument Cabinet	1	B
	Glassware Dryer	1	A
	Refrigerator	1	A
X-ray Room	X-ray unit with accessory	1	A
Dark Room	Automatic Film Developer(Roll)	1	A
	Manual Film Developer	1	A
	Dark Room Equipment	1	A
	Instrument Cabinet	1	B
	Refrigerator	1	A
	Pass Box	1	A
Control Room	Film Illuminator	1	A
	RP Film Illuminator	1	A
3) SUPERVISING DEPT.			
Supervisor's Office	Desktop Computer	1	A
	Printer	1	A
Statistics Room	Desktop Computer	1	A
	Printer	1	A

2) Equipment for Nine Health Facilities in Aden

While it was believed that much of the originally requested equipment aimed at expanding the functions of PHCs, that equipment not directly related to TB control (national extension of the DOTS strategy) was removed from the list. That medical equipment which would cause maintenance problems given the confirmed usage of the existing buildings and equipment at these facilities was also removed. The finalised list of equipment for these facilities was attached to the Minutes of Discussions.

Table 2-3 List of Requested Equipment for Related Health Facilities in Aden

	Name of Equipment	Qty	Name of Health Facilities															
			Md		Ml		Ma		SO		Br		Tw		Kh		JH	
1	Microscope	2													1	B	1	B
2	Motorbike	4	1	A	1	A			1	A	1	A						
3	TeleVideo	5	1	B	1	B	1	B	1	B	1	B						
4	Suction Pump	2															2	A
5	Ventilator	4															4	A
6	Refrigerator	8	1	B	1	B	1	B	1	B	1	B	1	B			2	B
7	Air conditioner	7	1	B	1	B	1	B	1	B	1	B	1	B	1	B		

Note: Md : Medan(Crater)PC
Ml : Mualla PC
Ma : Mansoura PC
SO : Sheikh Othman PC
Br : Boreiqa PC
Tw : Tawahi HU
Kh : Khormaksar HU
JH : Jumhuriyah Hospital

Following examination involving related organizations in Japan, it was then decided that it would be more appropriate for equipment for related health facilities in Aden to be provided under either the project-type technical cooperation scheme or the “grassroots grant aid” scheme and that this equipment would not be included in the present grant aid project.

2.3 Basic Design

2.3.1 Design Concept

(1) Natural Conditions

1) Temperature and Solar Radiation

Aden's climate is characterized by high temperatures and high humidity throughout the year with an annual mean temperature and annual mean humidity of 28.9°C (mean maximum temperature of around 50°C) and approximately 70% respectively. The rainfall of some 50 mm a year is extremely low and solar radiation is particularly strong in the dry season.

The building plan for the ATCC incorporates energy conservation features in view of such high temperatures and high humidity. Firstly, openings will be kept to the minimum requirements to prevent an increase of the temperature inside the building and sufficiently wide eaves will be introduced to prevent the penetration of direct sunlight into the building. The common local measure of installing Persian blinds will be adopted for the windows while concrete block wall structure and stone finish with a high heat insulation performance will be considered for the outer walls. Heat insulation panels will be installed on the roof to create an air layer so that the radiant heat from the sun can be dispersed to prevent overheating of the roof slabs. The main rooms will be provided with independent air-conditioning units as well as ceiling fans to improve the air-conditioning efficiency.

2) Salt Damage

Salt damage control vis-a-vis wind from the Arabian Sea and salty groundwater is quite important in Aden. For concrete work, the use of locally popular anti-sulphate cement and rust-proof admixture will be considered. The external face of the concrete foundations will be coated with asphalt to prevent the degradation of the concrete by salt contained in the soil. In regard to metalware, steel will not be used outdoors and anti-rust treatment by means of painting will be considered.

3) Earthquakes

The concept of aseismatic design does not generally exist in Yemen as there are no building standards or guidelines. Earthquake damage was recorded in Dhamar to the south of Sana'a in 1982. While Aden is located some 250 km south of Dhamar, the occurrence of an earthquake in the future cannot be entirely ruled out. The Japan Architectural Standard specifications will be used for the building structure under the Project in preparation for any future earthquake at the site.

4) Harmony with Landscape

The planned construction site is situated in the Mansoura area of Aden and faces Mansoura Road, the area's trunk road. The surrounding area is a residential area with buildings of medium height and is relatively busy with a school and a market situated along the trunk road. The Al Mansoura Polyclinic (PC) lies to the north of the site and plants along the fence are merged together.

Under the Project, the external appearance of the building will be in harmony with the nearby facilities as part of the overall consideration of the surrounding landscape. Such consideration includes clear indication of the plantable area on the premises by the Yemeni side after the handing over of the new building.

(2) Social Conditions

1) Safe and Functional Facilities Plan

As the planned facilities are training and research facilities dealing with tubercle bacillus, the principal consideration is given to the prevention of in-house infection as well as the spread of infectious bacillus in the surrounding area. In addition, lines of flow for outpatients visiting the ATCC for referral testing and trainees will be established while preventing any interference with the training, testing and research functions of the ATCC. Steel doors and window grilles will be introduced to prevent the theft of medical equipment and drugs, etc.

2) Environmental Consideration

As no routine testing will be conducted at the ATCC, the amount of testing waste will not be particularly large. Solid waste will include glass slides and resin containers used for sputum examinations and landfill disposal after their sterilisation or incineration will be considered. Liquid waste will include testing agents and X-ray film developing solution. The collection and storage of this waste in PVC tanks for eventual bulk disposal at a district disposal site will be considered.

(3) Maintenance

1) Reduction of Operation and Maintenance Cost

The selection priority for building service equipment, including that for the electric control system, will be given to equipment which is widely used in Yemen and which is easy to operate. Materials with high durability as well as weatherability will primarily be selected to reduce the maintenance cost. In the case of the air-conditioning system for example, the installation of identical separate-type air-conditioning units to cover half a span each will be considered to simplify the maintenance work, including the replacement of parts due to the use of common

parts. Natural light from the courtyard will be guided into the building in an appropriate manner to reduce the overall requirement for lighting equipment and to reduce the power consumption. In addition, planting will be conducted to lower the ambient temperature and to prevent a temperature increase due to the reflection of sunlight.

2) Use of Local Materials and Local Construction Methods

The building material market in Yemen has an ample supply of relatively high quality building materials imported from neighbouring Saudi Arabia, etc. and also from such semi-industrialised countries as Spain and Turkey. Procurement priority will be given to locally available materials which are easy to maintain and repair by comparing their prices, available quantities and delivery promptness, etc.

An RC frame with concrete block or brick walls is the most common construction method in Yemen. The flat slab method which omits the need for reinforcing work and form work at the crossbeam section is also popular. The use of these methods which can be easily employed by a local construction company and workers will be considered in order to shorten the construction period.

3) Local Procurement of Testing Equipment

The local procurement of testing equipment will not be considered for the Project as there is no locally manufactured equipment which meets the required quality. Meanwhile, the planned equipment includes X-ray equipment, safety cabinets and a copying machine, etc. which require regular checks. The procurement priority will be given to the equipment of manufacturers with a local agent not least from the viewpoint of PL law. A recommendation will be made to the Health Office of the Aden Governorate to conclude maintenance contracts with the local agents of the original manufacturers.

(4) Construction Schedule

Given the planned scale of the facilities, the construction work can be completed in approximately 12 months if the ATCC building is constructed with the priority use of locally available materials. As it is judged that the procurement and installation of equipment can be conducted within the same period, the implementation of the Project will be planned in a single fiscal year.

(5) Selection of Equipment

Priority shall be given to the testing equipment using for dissemination of Anti-TB activities in Southern and eastern regions of Yemen, especially necessary equipment for implementation of DOTS Strategy. In order to examine the specification of equipment, there shall be similar grade with existing equipment and equipment

supplied by Technical Cooperation. And with Consideration of maintenance condition on existing equipment, there shall be selected maintenance-free equipment in able to use continuously.

2.3.2 Examination of Design Conditions

(1) Basic Principles for Determination of Room Sizes

The planned ATCC will function in collaboration with the existing NTI and TB centres (HTC and TTC). Accordingly, the size and actual situation of use of the rooms of these existing facilities are taken into consideration to determine the room sizes of the ATCC although the details and size of each room will principally be determined based on the envisaged function as well as activities. The fact that the room size is a major factor of not only the functionality of a room but also the construction, operation and maintenance costs are also taken into consideration. The basic principles adopted to determine the room size are explained below.

1) The rational as well as wasteless components and scale of the ATCC will be determined in accordance with the contents of the Minutes of Discussions agreed upon with the Yemeni side during the field survey.

2) The rational size will be determined for each room in view of the envisaged usage and equipment layout. The situation of similar rooms at existing facilities will also be taken into consideration.

3) In regard to laboratories and classrooms, planning based on a unit grid, taking the number of users into consideration, should prove to be the most economical. Here, a basic unit grid of 6 m x 7 m is established and a 7 m span will be employed for the window side.

4) The neighbouring PHC Office provides training courses and seminars for those working in the field of public health and medical students on the control of infectious diseases and public health. These activities will be taken into consideration when determining the size of the training and accommodation areas.

(2) Examination of Each Room

A detailed examination of the required rooms listed in the Minutes of Discussions has been conducted in Japan, taking the likely number of users and the furniture and equipment layout in each room into consideration. Some rooms have been integrated into larger rooms and the resulting rooms and their functions are described below.

1) Administration Department

① Administration Room

An administration room which will combine the director's office and rooms for the director's secretary and administrative staff members (4) is planned. A simple partition wall will be used to create a private office area for the director. The administration room will have a window-type counter for the collection of testing fees.

② Staff Rooms

- Supervisory Unit Room

  The supervisor (1) who will also act as the deputy director of the ATCC and public health workers (3) will work in this room. It will be their job to travel around the basic health units in the area of jurisdiction to provide supervision and guidance for patient registration and treatment records, etc.

- Statistics and Evaluation Room

  Two statisticians will work in these room to analyse and evaluate the gathered data, to report their findings to the central government and the NTI and to use them for the formulation of various plans/programmes. Two computers will be shared.

- Medical Laboratory Technicians' Room

  This room will be shared by medical laboratory technicians (4) who will conduct sputum examinations and culture tests and who will also act as instructors on laboratory techniques for the training courses.

③ Meeting Room

This room will have 18 seating spaces with tables and will be used for internal meetings, joint meetings with the PHC Office and local meetings on TB control work, etc. Some 10 additional seats may be added if the chairs are arranged along the window side.

④ Storage

Pharmacists (2) will work in this room where re-agents, anti-TB drugs and consumables, etc. will be stored for distribution to health facilities equipped with a testing laboratory in Aden. The equipment and spare parts provided under the Project will also be controlled by these pharmacists. This will be a large room for common use.

⑤ Workers' Room

This room will act as a rest room for the two drivers, two cleaners and one cook.

⑥ Reception

This space will act as a reception of patient who are going to be examined by X-ray or sending sputum samples. It also act as reception of visitors such as trainees. Administration staff will be a receptionist.

⑦ Guards' Room

Two guards will work in this room to check entry to the building in the daytime. At night, security work will be conducted by guards working at the neighbouring PHC Office.

2) Examination Department

① X-Ray Room

An X-ray room, control room and dark room are planned to enable direct and indirect chest X-ray filming for the referral testing of those with negative sputum examination results. There will be a separate room for X-ray technicians to examine developed X-ray films and to conduct other work.

② Reference Laboratory

Here, cross-checking, culture testing and sensitivity testing will be conducted on sputum specimens referred from health facilities conducting TB tests. Routine tests will not be conducted here as it is assumed that these will be conducted at other health facilities and at the Mansoura PC, etc. The planned number of technicians working in the reference laboratory is four (4).

③ Media Preparation Room

This room will be used for the preparation of media and for the arrangement of re-agents, both of which are required for culture testing.

④ Sterilisation Room

Used glassware and testing tools, etc. will be washed and sterilised in this room. An ante-room will be provided for changing to white overalls and other clothing and footwear.

⑤ Training Laboratory

Practical training for medical laboratory technicians (MLTs) and medical students on such sputum examination techniques as the preparation and colouring of sputum slides and microscopic examination, etc. will be conducted in this laboratory. The training unit will consist of six members.

⑥ Material Room

This room will be used for the preparation of training (teaching) materials, the printing of WHO modules and the preparation of pamphlets for travelling guidance and health education. The room will also be used for the temporary storage of equipment and office furniture.

3) Training Department

① Trainers' Room

Four full-time medical assistants working as trainers will be stationed in this room. External trainers (lecturers) from the TB Control Division (engaged in the NTP) of the MOPH and the NTI will also use this room. A window-type counter will be provided to control checking-in and checking-out of the dormitory.

② Library

The library is planned to house technical materials for staff members and reference materials for trainees. Either the secretary or the supervisor will be responsible for the lending of books.

③ Lecture Room

A classroom with a seating capacity of some 30 will be introduced for use for the TB control training of public health workers and for seminars on health education and PHC activities. The room can be partitioned into two smaller rooms, i.e. a small classroom with a seating capacity of 6 - 12 and a medium-size classroom with a seating capacity of 20. The room can accommodate some 60 chairs when the desks are removed.

④ Seminar Room

This room will have a seating capacity of 6 - 12 and will be used for small-scale training and self-study courses using WHO modules.

4) Dormitory

① Multi-Purpose Room

This room will be used for self-study and leisure activities by those staying overnight at the ATCC.

② Kitchen/Dining Room

This space will have a seating capacity of some 16 persons and will be equipped with a kitchenette for the preparation of simple breakfast and lunch, etc. by those staying at the ATCC.

③ Trainees' Rooms

There will be a total of seven twin-bedded rooms. Trainers will also use these rooms if necessary.

5) Others

① Maintenance Room

A full-time maintenance engineer will use this room as a workshop for the maintenance of facilities and equipment. The work of the maintenance engineer

will include daily checking of the air-conditioning, sanitary and electrical installations and regular cleaning of the filters.

② Machine Room

The water supply pump and tank, power receiving and transforming equipment, panelboard and generator unit, etc. will be located in this room in an appropriate manner. The machine room is planned as a separate building at the side of the main gate in view of the location of the substation near Mansoura Road and the noise as well as vibration caused by the generating unit.

③ Common WCs

Common WCs will be introduced for use by staff members working outside and for outpatients.

(3) Required Rooms and Their Floor Areas

The sizes of the administration room and staff room, etc. have been calculated based on the planned number of desks for staff members and the layout of meeting tables, etc. In the case of the classroom and seminar room in the Training Department, the room sizes have been calculated with reference to the sizes of past training courses and meetings, particularly the number of participants of seminars organized by the PHC Office on public health and mother and child health.

Table 2-4 Room Sizes at the ATCC

	Room Name	Function/personnel	Area Calculation	Room Area (m^2)
Main Bldg. 1F	Administration Room	Admin. Staff(4),Secretary (1)	5.0m^2×5psn＋17m^2 (working space)	43.20
	Director's Room	Director(GTC,1)	21m^2	21.00
	Staff Room	Supervisor(Dty Dir.,1), PHC Worker(3)	5.0m^2×10psn＋31m^2 (working, meeting space)	81.20
		Statistician(2)		
		Labo. Technician(4)		
	Material Storage	Print, copy and store of training materials.	-	21.00
	Medical Storage	Pharmacist(2), and storage for Drug, Test Resolution, Spare parts	5.0m^2×2psn＋23m^2 (Store space)	43.20
	X-ray Room	X-ray examination	Layout of necessary Equipment	26.70
	Dark Room	Film Development		98.44
	Control Room	X-ray control, material stock		16.07
	X-ray Technician's Room	X-ray Technician(2), Confirmation of film development and management of record		12.00
	Reference Lab.	Smear Test, Culture Test for reference (4 labo technicians)	One central Labo table and equipment	39.20
	Preparation Room	Media and Reagent preparation	Layout of equipment	21.00
	Sterilization Room	Wash and sterile of glassware/ tools	Layout of equipment	14.70
	Ante Room	Change costume, wash hands	-	6.30
	Training Lab.	Smear and microscopic training for 6 trainees. 2 trainers	One central Labo table(for 6psn)	42.00
	Worker's Room	Driver(2), Sweeper(2), Janitor(1)	4.0m^2×5psn	22.20
	Reception	Receiving visitors	5.0m^2×2psn	9.10
	Waiting Lobby	Waiting space for out-patient	-	12.00
	WC/Pantry /Storage	-	-	37.50
	Corridor / Stairs	-	-	245.21
	1st Floor total			729.82
Main Bldg. 2F	Meeting Room	Middle size for meeting / seminar	2.1m^2×18psn	43.20
	Library	Reference for stuff and trainees.	-	21.00
	Trainer's Room	For trainer(4) & visiting moderator Reception for check in/ out of trainees	8m^2×4psn＋10m^2 (working space)	42.00
	Kitchen/Dining	Self-contain kitchen and dining for 16	1.5m^2×16psn＋15m^2 (kitchen)	39.20
	Trainee's Bedroom	2 bedroom x 7 rooms (14 beds)	21m^2 x 7rooms	149.40
	Classroom	20 trainees and staff (30 psn), and 60 sheets without table.	2.0m^2×30psn 1.0m^2×60psn	64.20
	Seminar Room	6 to 12 psn	2.1m^2×(6 to 12)psn	21.00
	Multi-purpose Room	Study and recreation lounge	3.0m^2×14psn	39.20
	WC/Laundry /Shower room	Laundry for Trainees	-	44.30
	Corridor / Stairs	-	-	240.09
	2nd Floor total			703.59
	Main Bldg. total			1,433.41
Servi -ce Bldg.	Electrical Room	Transformer Elec Panel,	Layout of equipment	48.40
	Generator Room	Generator, Oil Tank, Air Chamber	Layout of equipment	36.80
	Guard Room	Guard(2)	-	7.66
	Maintenance Room	Maintenance Engineer(1)	5.0m^2 + work space	14.24
	WC	For staff and Out-patients	-	7.30
	Service Building			114.40
	Total			1,547.81

(4) Equipment Plan

The planned equipment for the ATCC is selected based on the following basic principles in accordance with the basic concept of the Project.

1) Scope of Equipment for the ATCC

① Equipment required for sputum smear examinations (laboratory equipment)

② Equipment required for technical training for sputum smear examinations (training laboratory equipment)

③ Equipment required for seminars and classroom teaching (seminar/meeting room equipment)

④ Equipment required for the preparation of statistical data and teaching materials (computers and copying machine)

⑤ Vehicles required for travelling guidance

2) Grades

① Similar grades to equipment currently used by the existing TB centres

② Grades of which the maintenance cost can be borne by the Government of Yemen

3) Basis for Planned Quantities

① Sufficient number of equipment corresponding to the planned staff strength and room sizes at the ATCC

② Sufficient number of equipment corresponding to the project-type technical cooperation to be provided by Japan

2.3.3 Basic Design

(1) Site Layout Plan

The proposed construction site is located in the Mansoura area in Aden and is located on the premises of the PHC Office of the Aden Governorate Health Office. The site lies to the north of the existing PHC Office building and has an area of some 3,000 m^2. The site is adjoined by the Mansoura Polyclinic (PC) to the north. The topography of the surrounding area is flat and the area has been relatively developed recently with rows of low and medium height housing, retail shops and warehouses, etc.

There is a single story empty building which was an office for a UN project, located at the eastern side of the site. While an overhead telephone line runs through the site, neither underground structures nor trees to be preserved exist on the site.

The layout plan takes the following conditions into consideration.

- Exclusive access to the ATCC will be established through a new gate to be introduced along Mansoura Road (16 m wide, paved dual carriageway) to the west of the site.
- The main building will be located to the northeastern side of the site to secure a car park in front of the building and a service road to the existing PHC Office.
- Because of the existence of a substation inside the Mansoura PC to the north, a service building will be constructed in the northwestern part of the site to allow easy extension of the power line, etc. The generator room will be housed in this building to minimise the adverse impacts of noise, vibration and emission gas to the main building.
- A courtyard, which is a common feature in southern part of Yemen, will be created for suitable lighting and ventilation in the main building.

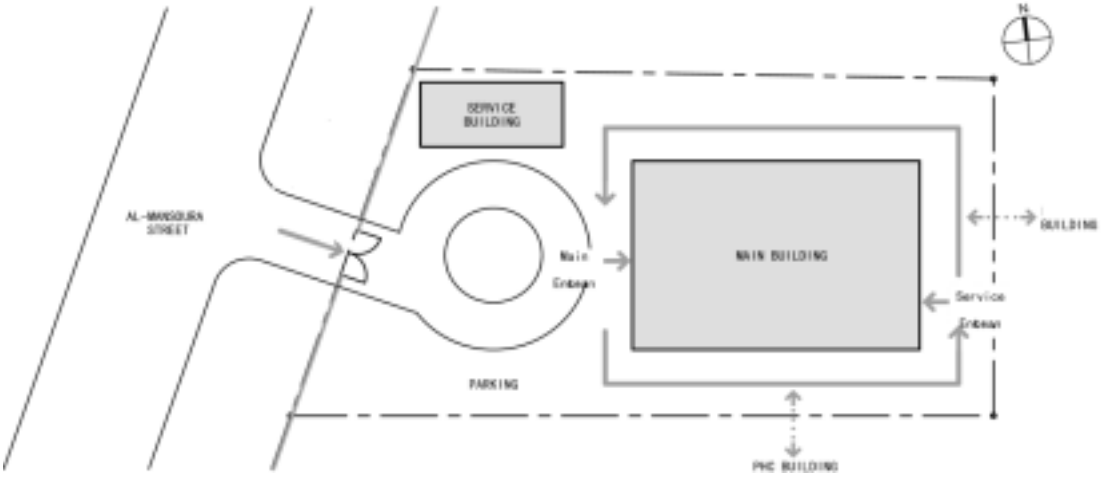


Fig. 2-1 Zoning of the Site

(2) Building Plan

1) Plan Layout

① Zoning

The function of each department shall be clearly planned. The Administration Department and the Examination Department will be located on the ground floor while training rooms and the dormitory will be located on the first floor so that minimize a management work on these facilities. Toilets and showers will be situated on the east side and good ventilation is planned to prevent residual odour.

② Courtyard

A central courtyard, which is a popular feature of local design in Aden, will be introduced so that natural lighting can be used for the corridors to create a healthy and open environment. In the courtyard, planting will be conducted to create space with a natural feel and shade of trees to prevent the reflection of sunlight, resulting in an environment which appears cool from the psychological point of view.

③ Entrance

The main entrance for outpatients will be located on the west side of the building. On the opposite east side, a service entrance will be introduced to provide a link with the existing PHC Office building, an entrance for trainees at night and access by service providers to the building. The guards' room is planned to be located in the main entrance hall to function as a reception as well as monitoring office for visitors.

④ Visitors

The X-ray room will be located near the main entrance to complete the flow line for visitors without stretching deep inside the building. WC facilities for visitors are planned to be located in the separate machine room building.

⑤ Dormitory

The components of the dormitory section, i.e. bedrooms, multi-purpose room, toilets, showers and laundry, will be located on the first floor. A lockable internal door will be introduced to separate the dormitory area from other parts of the building so that this area can be independently used at night and on holidays. A reception desk will be provided in the trainers' room on the first floor and night access will be provided by an external staircase on the east side.

⑥ Module

Rooms are arranged on the structural module of 6m×7m. By using this simple module it will realize the saving of construction cost and construction period.

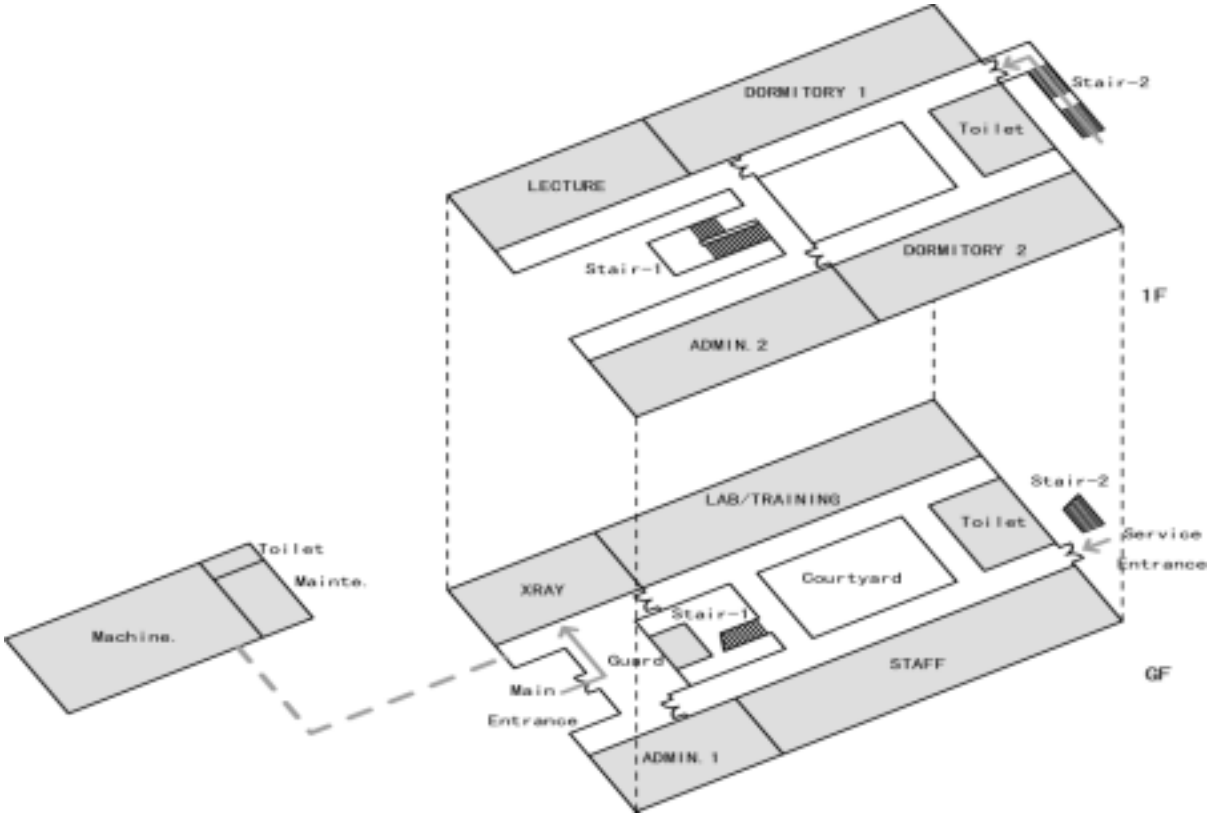


Fig. 2-2 Zoning of the Plan

2) Sectional Plan

- The ATCC building will be a two story building in view of the efficient use of the available land and also in view of a harmonious effect with the existing PHC Office building.

- A flat roof, which is common in Aden, is planned. Precast panels will also be used to create a double roof in order to protect the roof slabs from direct sunlight and to prevent a temperature rise of the roof slabs by facilitating ventilation in the mid-air layer.

- The planned floor slabs are flat slabs using the joist method which is commonly used in Aden. Because of the absence of beams, reinforcing and forming work can be omitted and the floor height of the building can be kept low.

- Balconies will be introduced around the building to prevent the penetration of direct sunlight through the openings. At the same time, the outdoor units of the air-conditioning system will be placed on the balconies to reduce the distance of the coolant piping for the indoor units.

- 150 mm hollow bricks will be used for the external walls and locally produced stone will be lined on the external face to improve the heat insulation performance. This stone veneer method is easier to maintain than a mortar painting finish.

- Iron grilles will be attached to the ground floor openings, including the windows, for security purposes.

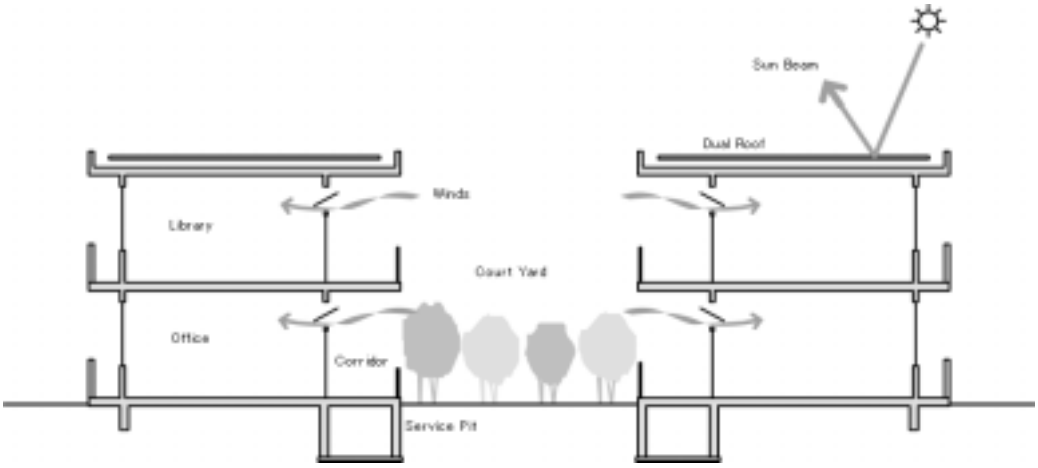


Fig. 2-3 Conceptual Drawing of Sectional Plan

(3) Structural Plan

Structural forms and sections to meet the required structural performance in regard to the safety, functionality and durability of the building will be employed while taking their economy and workability in Yemen into consideration. Even though there is no record of a major earthquake in Aden, earthquake damage was reported in the Dhamar Governorate in 1982. As Aden is situated some 250 km south of Dhamar, the possibility of earthquake damage cannot be totally denied. Accordingly, Japanese aseismatic standards will be used for the structural design to ensure that the building has a safe and aseismatic structure.

1) Design Principles

Laws and standards, etc. to be referred to for structural design have yet to be introduced in Yemen. In Aden, BS (British Standards) are applied as Britain was formerly the suzerain country for Aden. However, the facilities constructed with the ODA of donor countries have been designed using the standards of these countries. Accordingly, the following Japanese standards will be used for the design of the Project.

- Building Standards Law and its Enforcement Regulations

- Rules for Building Structures (Japan Architectural Centre)
- RC Structure Calculation Standards and Guidebook (Japan Architectural Society)
- Guidelines for Structural Design of Building Foundations (Japan Architectural Society)

2) Ground Conditions and Foundation Plan

The ground survey found top soil of silty sand to a depth of approximately GL -0.3 m at the planned construction site. Below this layer lies a silt layer to a depth of approximately GL -1.6 m with a silty clay layer beneath. The groundwater table is observed at around GL -2.9 m.

The type of foundations selected for the planned RC buildings are spread foundations using the silt layer at around GL -0.9 m with an approximate N value of 11 as the foundation bed. The allowable bearing strength of the ground is estimated to be around 12 tons/m^2. The plate bearing test will be conducted at the time of construction to confirm the estimated allowable bearing capacity.

3) Structural Plan

- An reinforced concrete (RC) structure and joist slabs using hollow bricks which is the most commonly used type of structure will be adopted.

- Minimum concrete aseismatic walls using partition walls will be introduced between the beams of the building. The general partition walls will be made of concrete blocks to preserve flexibility in view of future changes of the partition locations.

- A rigid structure using columns and beams will be adopted along the ridge direction to ensure an aseismatic performance and also to make the introduction of windows, doorways and transoms easy.

- While the module of 6 m x 7 m used for planning will be adopted, the structural span will be half the size at 6 m x 3.5 m to allow an efficient floor layout.

The design live load is shown in Table 2-5 below.

Table 2-5 Design Live Load

Room Name		Live Load		N/mm^2
		Floor Slab･Beam	Frame	Seismic
Roof	Roof	1,000	600	400
2 Floor	Bedroom	1,800	1,300	600
	Classroom, Meeting	3,000	1,800	800
	Corridor	3,000	1,800	800
1 Floor	Laboratory	3,000	1,800	800
	Store	5,000	4,000	3,000
	WC, Laundry	1,800	1,300	600
	Machine, Elec Room	6,000	5,000	4,000

4) Structural Materials

The structural materials to be used will, in principle, be those which can be locally procured. In the case of concrete work, careful checking of the salt content of the admixture water and aggregate will be conducted to prevent salt damage.

Table 2-6 Materials for Reinforced Concrete

Design Standard Strength of Concrete	24 N/mm^2
Cement	Sulphate resisting cement (made in Saudi Arabia)
Admixture	AE agent (equivalent to a Japanese product) Anti-rust agent (equivalent to a Japanese product)
Rough Aggregate	Crushed stone
Fine Aggregate	River sand
Reinforcing Bars	Deformed reinforcing bars (JIS SD295, SD345 equivalent)

(4) Building Services Plan

1) Air-Conditioning System

The planned building of the ATCC is composed of various administrative rooms, examination rooms/laboratories, statistics room, various training-related rooms and a dormitory for trainees, etc. The planning of an air-conditioning system is based on the following principles, taking the characteristics of the ATCC building into consideration.

- A separate air-conditioning unit will be installed in each room to reduce the overall running cost.
- These separate air-conditioning units will be installed at a rate of one unit per module (3.5 m x 6 m) and the openings will be kept to the minimum requirement to improve the air-conditioning efficiency.
- In principle, general-purpose air-conditioning equipment which can be locally procured will be selected so that any need to deal with a breakdown or replacement can be quickly met.
- Floor standing-type outdoor units will be used in view of easy maintenance and will be installed on the balconies on the south and north sides.

The design outside air conditions at the site and the design room temperature are as follows.

Fig. 2-7 Air Temperature Conditions

External Air Temperature	Summer: dry bulb temperature: 39°C; wet bulb temperature: 28°C (source: Ashrae Handbook Fundamentals 1993)
Room Temperature	25°C

All indoor air-conditioning units will be wall-mounted separate units which are commonly used in Yemen.

- Applied room :Administration room, reference laboratory, X-ray room, classroom, training laboratory, library and dormitory, etc.
- Installation :Each of the subject rooms will have a separate air-conditioning unit in view of efficient air-conditioning during different hours of use and reduction of the running cost. Natural ventilation will be used for ordinary staff rooms while laboratories, etc. will have a ventilating fan. A ceiling fan will also be installed to improve the air-conditioning effect.

2) Ventilation System

- A wall-mounted ventilating fan will be used for the reference laboratory, training laboratory, media preparation room and sterilisation room.

- An exhauster (fan) will be used for the toilets and storage.

- A wall-mounted ventilating fan (pressure fan) will be used for the machine room.
- A ventilation duct will be introduced to safety cabinets in view of ventilation by the roof top ventilating fan.

3) Plumbing

① Water Supply System

The existing water supply pipe branches from a 200 mm water main buried under the road to the south of the PHC Office premises to supply water to the existing facilities. A new 50 mm extension will branch out from this existing pipe to supply water to the new building. While the water pressure for the water main is normally 9 m - 18 m, it is reduced during the dry season. The water supply system for the new building will, therefore, be a gravity water supply system which combines a receiving tank (7 tons) and an elevated water tank (2 tons).

< Water Usage Volume >

Staff	20 persons x 80 L/day-person	=	1,600 L/day
Technicians	12 persons x 300 L/day-person	=	3,600 L/day
Lodging	14 persons x 150 L/day-person	=	2,100 L/day
		Total =	7,200 L/day → 7㎥/day

< Receiving Tank >

One day equivalent = 7 tons

(For water shortage at dry season, instead of normal half day volume)

< Elevated Water Tank >

7 tons x 1/5 = 1.4 tons → 2 tons

(For water shortage at dry season, instead of 1/10 of one day equivalent)

< Water Pumps >

Maximum instantaneous volume of water supply (usage: 5 hours / day);

7 tons / day ÷ 5 hours/day x 3 = 4.2 tons/hour → 70 L/min

Capacity of Pump : 70 litters per minute x 2 (Auto-reciprocal operation)

② Hot Water Supply System

Electric instantaneous water heaters will be installed for the dining and pantries.

③ Drainage System

Indoor drainage pipes will be classified into those for sewage and those for miscellaneous waste water. As the waste water from laboratory tables may be contaminated with few tubercle bacillus, it will be discharge directly without neutralize or sterilize. The drainage pipe of the existing building is connected to a sewer main under Mansoura Road to the west of the site. The 150 mm drainage pipe for the new building will be connected to this sewer main for direct discharge.

④ Sanitation System

Both the water closets and urinals will use the cistern system. Washbasins and a cleaning sink will be installed in the toilet facilities. A sink will also be installed in the kitchenette.

⑤ Fire-Fighting System

Dry chemical fire extinguishers will be placed in suitable locations, including corridors.

⑥ Gas Supply System

Pipes for propane gas supply will be extended to the laboratory tables and safety cabinet. A gas cylinder yard will be set up outdoors.

4) Electrical Installations

① Power Receiving and Transforming System

A special high voltage distribution line (11 kV) will be extended from the adjacent substation at the northwest side of the site to the power room of the machine room building. A transformer and a distribution panel will be installed inside the power room to supply electricity to the main building. The work to connect this high voltage distribution line to the primary side of the high voltage air break switch will be conducted by the Yemeni side (by the power company) while the remaining work will be conducted under the Project.

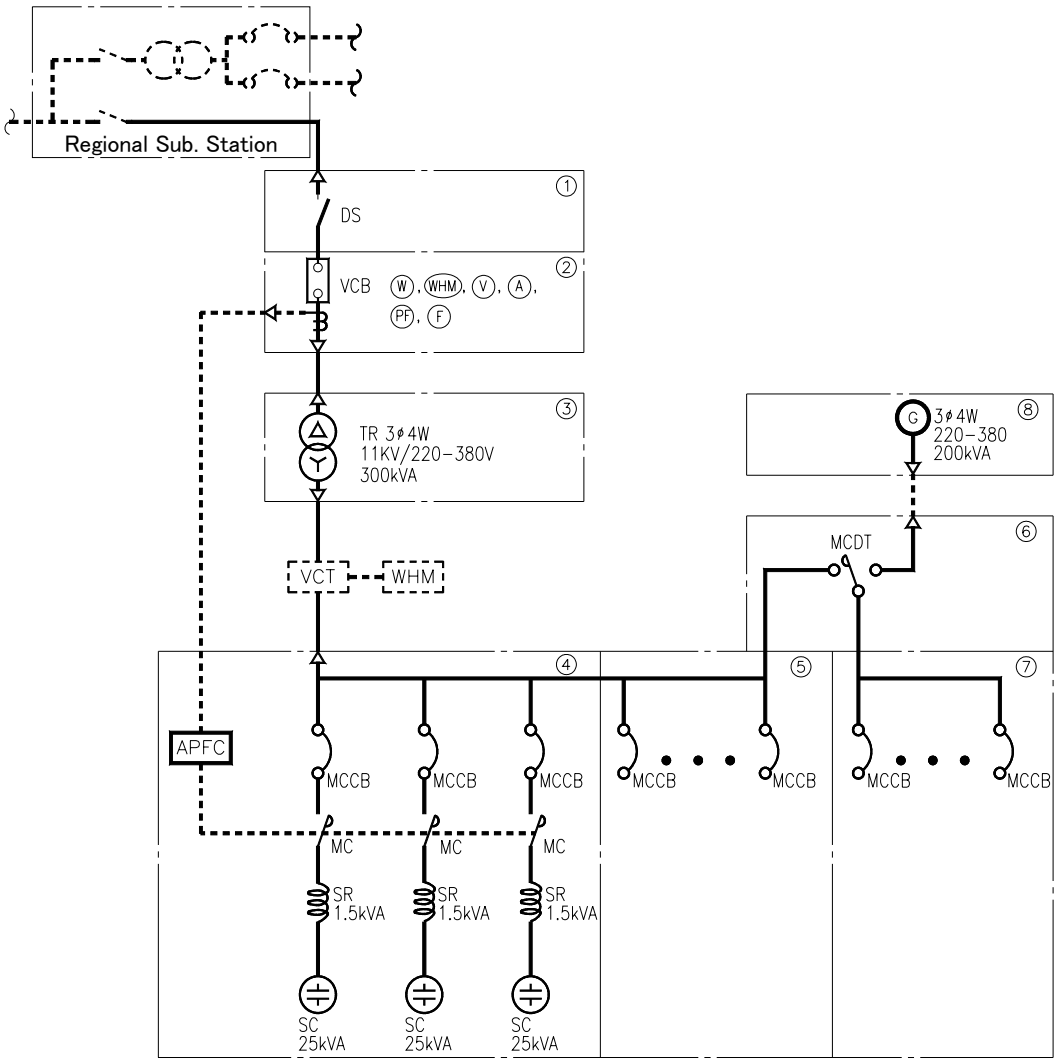
- Transformer: roof-top cubicle type: 300 kVA

< Voltage Fluctuation >

Voltage fluctuation over a period of 24 hours was checked during the field survey at the adjacent PHC Office using a self-recording voltmeter. The fluctuation range was between -2% and +8% which is within the tolerable range for the general input voltage at the load side. Automatic voltage regulator (AVR) will not be installed under the Project at the transformer side in view of easy maintenance by the Yemeni side in the future. In regard to that equipment for which the designated power input is within the above voltage fluctuation range, the necessary arrangements to prevent excess voltage fluctuation will be made for individual equipment.

Table. 2-8 Power System Specifications

Power Receiving & Distribution Panel	To be newly installed in the power room
Protective Relays	Voltage sensors will be installed for three phases. The commercial power supply will be cut at the time of a voltage fluctuation of over ±10% or missing phase for automatic switching over to supply from the on-site generator.



Equipment List	
①	Receiving Panel of Commercial Power
②	Measuring Panel
③	Transformer Panel
④	Static Condenser Panel
⑤	Distribution Panel of Low Voltage Power
⑥	Change Over Switching Panel
⑦	Distribution Panel of Low Voltage Power
⑧	Emergency Power Generator

Legend	
DS	Disconnecting Switch
VCB	Vacuum Circuit Breaker
TR	Transformer
MCCB	Molded Case Circuit Breaker
MC	Magnetic Contactor
SR	Series Reactor
SC	Static Condenser
VCT	Voltage and Current Transducer
APFC	Automatic Power Factor Controller
MCDT	Magnetic Contactive Double Through Switch
G	Electrical Power Generator
W	Watt Meter
WHM	Watt Hour Meter
V	Voltmeter
A	Ammeter
PF	Power Factor Meter
F	Frequency Meter

Fig. 2-4 Power Circuit Diagramme

② Power Generating System

Short power cuts occur once or twice every day in Aden while power cuts lasting for several hours occur approximately once a week. Accordingly, the installation of a power generator is planned. Power supply from the emergency power source will be made to laboratory equipment, the refrigerator for drugs, security lighting, water supply and drainage pumps and air-conditioning units in key rooms. The capacity of the power generator is designed to be 100 kVA.

Table 2-9 Specifications of Generator

Type	Package-type air-cooling diesel generator (for long operation)
Power Supply	Three phase four wire; 380/220 V; 50 Hz
Capacity	100 kVA
Fuel	Gas oil
Oil Tank	490 litres (for an assumed operating length of 10 hours)

③ Main Power Supply System

The main power supply will be made from a low voltage distribution panel in the power room to the lighting distribution panels and the power control panel in the main building. Cabling from the machine building to the main building will be made through a trench pit and power conduits will be used for subsequent power supply lines. An alarm panel will be installed in the guards' room so that the alarm for any abnormality of the power receiving and transforming system, power generation system and plumbing system can be sounded as well as displayed.

Table 2-10 Power System for Trunk and Branch Circuits

Trunk Lighting and Power Circuits	Three phase four wire; 380/220 V
Receptacles for Lighting	Single phase two wire; 220 V
Power for Air-Conditioning and Ventilation	As above
Power for Plumbing System	Three phase three wire; 380 V
X-Ray Filming Unit	Single phase two wire; 220 V

④ Wiring for Lighting

Independent switching operation is planned for most of the lighting fixtures to ensure energy conservation and, in principle, switching will be conducted on-the-spot (within the same room). Arrangements will be made to enable the switching on/off of lighting along the corridors, etc. The outdoor and security lighting will be cell-automatic operated. Extra receptacles are planned in accordance with the layout and capacity of the OA equipment and laboratory equipment in addition to the standard receptacles. Some of the lighting fixtures in the key rooms will be connected to the emergency power generator to ensure continual lighting at the time of a power cut.

Table 2-11 Planned Luminous Intensity for Key Rooms

Administration Room and Others	500 lux
Classroom and Others	500 lux
Dormitory, Ante-Room and Others	200 lux
Corridor, Lavatories and Others	100 lux

⑤ Lighting Fixtures

The planned light sources for lighting are mainly fluorescent lamps of the sizes available in Yemen to reduce the maintenance burden of lighting.

⑥ Telephone System

The telephone line to the new building will be extended from the overhead telephone line of the PTC (Public Telecommunications Corporation) along Mansoura Road to the west of the planned construction site. An overhead cable will be used up to the telephone post on the premises and an underground cable will be used thereafter up to the incoming terminal in the main building. A telephone exchange will be installed in the administration room and internal wiring will be conducted to each extension telephone in the key rooms. The connection of the PTC telephone line up to the primary side of the incoming terminal board in the main building will be conducted by the Yemeni side (by the PTC) while extension work from that point will be conducted under the Project.

⑦ Common Antenna TV System

Necessary wiring will be arranged for a groundwave antenna and a satellite antenna. They can be installed on the roof top to allow TV viewing in the dining area, multi-purpose room and classroom. Antena and tuner will be installed by the Owner.

⑧ Fire Warning System

Fire alarm push buttons to inform of the occurrence of a fire will be installed in the necessary locations for fire warning. A fire bell will be sounded to enable safe evacuation through the early detection and warning of a fire.

5) Waste Disposal

The waste disposal site in Aden is located in a suburban area some 15 minutes' drive north from the urban area. There is a total of 28 garbage collectors in the city which make two garbage collection trips a day. As the collection points are not clearly established in suburban areas, residents place their garbage at suitable roadside locations at an appropriate time. There is no garbage classification system and medical waste from the PHC Office and local hospitals, etc. is dumped at the disposal site together with other types of garbage.

The NTI and existing TB centres have their own incinerators which were made in Japan. All types of medical waste, including plastic containers and glass slides used for sputum examinations, syringes and viral bottles, is incinerated together with empty cans and bottles. The incineration ash is not collected for burial and is simple dispersed around the incinerator.

Waste yards and a simple incinerator are planned under the Project. Two types of waste yards will be introduced, i.e. a yard for waste awaiting collection and a yard for waste awaiting incineration. It is assumed that waste from medical examinations and testing will only be disposed of after sterilisation using an autoclave. The incinerator will only be used for the sterilisation of glassware in view of the possible problem of the production of dioxide from the incineration of general waste.

Table 2-12 Planned Facility Equipment

Room Name	AC/Vent Wpork			Water/Drainage /Gas Work				Electric Works				Notes
	AC	Ceiling Fan	Ventilation	Water	Drainage	Fire Exter	Gas	Gen Outlet	Lux	TEL	TV	
1. ADMINISTRATION Dept.												
Director and Admin. Room	○	○	-	○	○	-	-	○	500	○	-	Telephone Main
Meeting Room	○	○	-	-	-	-	-	○	500	○	○	
Storage	○	-	○	-	-	○	-	○	100	-	-	
Worker's Room	○	○	-	-	-	-	-	-	200	○	-	
Guard Room	○	○	-	-	-	-	-	-	200	○	-	Fire Alarm System
Maintenance Room	○	○	-	○	○	-	-	-	200	○	-	
Elec. Panel Room	-	-	○	-	-	○	-	○	150	○	-	Transformer, Main Panel
Generator Room	-	-	○	-	-	○	-	○	150	○	-	Engine Generator
Mechjanical Room	-	-	○	○	○	-	-	○	150	○	-	Water Pump, Water Tank
2. EXAMINATION Dept.												
Reference Laboratory	○	○	-	○	○	-	○	○	500	○	-	Exhaust fan for Saftey Cabinet
Prepareation Room	○	○	-	○	○	-	-	○	500	○	-	
Sterilization Room	○	○	-	○	○	-	-	○	200	○	-	
X-ray Room	○	-	-	-	-	-	-	○	150	-	-	
Dark Room	○	-	○	○	○	-	-	○	100	○	-	
Control Room	○	○	-	-	-	-	-	○	150	○	-	
X-ray Technician's Room	○	○	-	-	-	-	-	○	500	○	-	
Waiting Lobby	-	○	-	-	-	-	-	-	200	-	○	
3. SUPERVISION Dept.												
Supevisors & Statistics Room	○	○	-	-	-	-	-	-	500	○	-	
4. TRAINING Dept.												
Classroom	○	○	-	-	-	-	-	○	500	○	○	
Seminar Room	○	○	-	-	-	-	-	○	500	○	-	
Training Laboratory	○	○	-	○	○	-	○	○	500	○	-	Exhaust fan for Saftey Cabinet
Teaching Material room	○	○	-	-	-	-	-	○	100	-	-	
Library	○	○	-	-	-	-	-	○	500	○	-	
Trainer's Room	○	○	-	-	-	-	-	-	500	○	-	
5. DORMITORY												
Reception	-	-	-	-	-	-	-	-	300	○	-	
Trainee's Bedroom	○	○	-	-	-	-	-	-	200	○	-	
Multi-purpose Room	○	○	-	-	-	-	-	-	500	○	-	
Kitchen/Dining	○	○	○	○	○	○	-	○	300	○	○	Sink, Renge,Frege,Water Heater
Laundry	-	○	○	○	○	-	-	-	150	-	-	Elec. Washing Machine(2)
6. COMMON SPACE												
Corridor	-	-	-	-	-	○	-	-	—	-	-	
Stair	-	-	-	-	-	-	-	-	—	-	-	
Pantry	-	-	○	○	○	-	-	-	150	-	-	Sink, Water Heater
Toilet	-	-	○	○	○	-	-	-	150	-	-	

(5) Building Materials Plan

The basic principles for the selection of the building materials is the use of locally long-established materials and finishing methods due to their suitability vis-a-vis the local climate in order to achieve facilities which are easy to maintain. The local procurement of building materials where ever possible will also facilitate local repair and maintenance.

Table 2-13 Comparison Between Local and Selected Methods for the Project

	Local method	Selected method	Reason for Selection
Exterior:			
Roof	RC flat slab + waterproof.	RC flat slab + waterproof + PC panels (dual roof)	Dual roof for weather proof and heat absorption.
Wall	Brick/Concrete block + Local stone laying.	Same as left.	Commonly use in local. Easy maintenance. Heat absorption.
Fittings	Aluminum, Wooden.	Aluminum(exterior). Steel/wooden(interior).	Commonly use in local and weather proof.
Interior:			
Floor	Terrazzo tile Mortar trowel.	Terrazzo tiles, Mortar trowel harder fin.	Commonly use in local. Easy maintenance.
Wall	Mortar paint fin.	Mortal paint fin.	Commonly use in local.
Ceiling	Rock-wool acoustic board. Mortal paint fin.	Rock-wool acoustic board. CSA board.	Sound absorption. Commonly use in local. CSA board used in utility for moisture proof.

Notes; RC: Reinforced Concrete, PC: Precast Concrete, CB: Concrete Block, CSA: Calcium Silicate Acid

The major construction materials to be used are described below.

① Exterior Finishing Materials

Roofing Materials

The common roofing method in Yemen is an RC flat roof covered by a waterproof layer. Under the Project, pre-cast panels will be placed above asphalt waterproofing to create a fairly wide cavity (air layer) to improve the weatherability and heat insulation of the roof structure and also to prevent a temperature rise of the roof surface due to solar radiation. Ventilation blocks will be placed at the central part of this cavity to facilitate an air current.

② External Walls

The external walls will use 150 mm hollow bricks pitched by local stone for an improved heat insulation performance and a maintenance-free surface. The total thickness of the external walls will be 250 mm and the internal face will have a painted mortar finish.

③ Windows and Doors

The windows will be horizontal sliding windows with an aluminium frame which are commonly used in Yemen. For security reasons, all aluminium windows on the ground floor will be fitted with anti-burglar iron grilles. The internal doors will be made of steel. A minimum window size is necessary and the windows will be fitted with internal louvres to prevent a rise of the room temperature due to solar radiation.

2) Interior Finishing Materials

① Floors

RC slabs will be used for the floors in view of durability and the soil properties at the planned construction site. Terrazzo blocks, which are popular in Yemen, will be used to finish the floors. PVC sheets will be used for those rooms which are required to give the impression of a high level of hygiene.

② Walls

Mortar with a paint finish which is common in Yemen will be adopted. Ceramic tiling up to a wall height of approximately 2 m will be used for those rooms where water is used and the rooms of which the floor will require washing.

③ Ceilings

For the ceilings of the general staff rooms, a T bar-type suspended ceiling which is commonly used for office buildings in Yemen will be used and will be lined with acoustic boards. In the case of those rooms where water is used or which have a high humidity, highly water-resistant CSA boards will be used with a paint finish.

The main finishing materials planned on the basis of the methods and materials to be used described above are summarised in the table below.

Table 2-14 Main Finishing Materials Plan

Room Name	Floor	Wall	Ceiling	Reason to Select
Director's & Admin Room	Terrazzo tile	Mortar VP	RAB	Easy to clean, Durability, Sound absorption.
Medical Storage	Ditto to above	Ditto to above	CSA board, AEP	Durability, Moisture proof.
X-ray Room	PVC sheet	Ditto to above	RAB	Cleanliness, Easy to maintenance.
Lobby	Terrazzo tile	Mortar VP, Wainscot: stone.	Exposed concrete	Durability, Easy to clean
Laboratory	Terrazzo tile	Mortar VP	RAB	Durability, Easy to clean, Sound absorption.
Seminar Room	Terrazzo tile	Mortar VP	RAB	
Kitchen/Dinning	Terrazzo tile	Mortar VP	RAB	
Bedroom	Terrazzo tile	Mortar VP	RAB	
WC	Mosaic tile.	Semi-porcelain tile	CSA board, AEP	Durability, Easy to clean
Corridor	Terrazzo tile	Mortar VP Wainscot: stone	Exposed concrete	Easy to maintenance

Note; RAB: Rockwool Acoustic Board, AEP: Acrylic Emulsion Paint, PVC: Poly-Vinyl Chloride.

(6) Equipment Plan

1) Basic Principles for Equipment Plan

The following basic principles are adopted for the equipment plan.

① Coordination with the aid activities under the project-type technical cooperation (Phase III) will be facilitated.

② The equipment required for the technical training of laboratory technicians engaged in TB control work in southern Yemen following the establishment of the ATCC will be provided.

③ Requested equipment for related health facilities in Aden was decided that it would be more appropriate to provide under either “the project type technical cooperation” scheme or “the grassroots grant aid” scheme. This equipment would not be included in the scope of this grant aid project.

2) Examination of Requested Equipment for ATCC

In the original list of requested equipment, medical equipment was listed alongside furniture and building service equipment, such as air-conditioning units, etc. This equipment was, therefore, sorted into the respective categories. During the field survey, the requested range of medical equipment was re-arranged, combined and added to through discussions with Yemeni officials and those involved in the project-type technical cooperation and the finalised list of requested equipment based on the planned activities and the scale of the planned facilities was attached to the Minutes of Discussions.

After returning to Japan, further analysis was conducted through a series of meetings and the withdrawal as well as the addition of some equipment was conducted together with some changes of the equipment installation locations.

3) Planned Equipment

As described above, the planned equipment to be provided under the Project is restricted to that required for the activities of the ATCC. The types of equipment which are considered necessary and suitable through the analysis in Japan are described below. The specifications, grades and composition of the equipment were determined with reference to the equipment currently in use at the NTI and TTC in Taiz and HTC in Hodeida. Because of the need for collaboration with the project-type technical cooperation, the planning of equipment was conducted with the cooperation and advice of the NTI.

i) Administration Department

① Administration Room (one director, one secretary and four staff members)

Desktop computers (2) and printers (2) are planned as equipment for administrative work, documentation and the arrangement of statistical data. A typewriter is omitted because of the unclear purpose of its use.

② Meeting Room

An overhead projector to project printed sheets and a mobile screen are planned for use for presentations during meetings.

③ Storage

A medical refrigerator is planned to preserve reagents and others.

④ Maintenance Room

A floor polisher and a vacuum cleaner for cleaning and a maintenance tool set for the maintenance and repair of medical equipment are planned.

ii) Examination Department

① Reference Laboratory

The planned items include a centrifuge, a safety cabinet and three Bunsen burners for sputum smear examinations, an incubator for culture, four biological microscopes for clinical judgement, an autoclave for tool sterilisation and a cabinet for the storage of reagents. In addition, a distilled water maker is planned as such water will be required for the preparation of reagent solution.

② Preparation Room

The planned items include an ultrasonic pipette washer, a glassware dryer and a hot air steriliser for the washing and sterilisation of glassware, an inspissator (coagulator) for culture tests and a reagent cabinet and a refrigerator for the storage of reagents and others. Two analytical balances and a glassware set for common use will also be kept in the preparation room.

③ X-Ray Room

Such X-ray equipment as a Bucky's stand and a Bucky's table for direct chest X-rays, a mirror camera for indirect chest X-rays and protective aprons are planned.

④ Dark Room

The planned items include a pass box, an automatic film developer, a RF (16 mm roll film) developer, a manual film development tank, a film development tool set and a refrigerator.

⑤ Control Room

The planned items include a film illuminator and a RP (16 mm roll film) illuminator for film reading.

iii) Supervision Department

① Staff Room (two statisticians, four mobile unit members and four trainers)
Desktop computers (with a printer) and other equipment are planned for the preparation of statistical data.

iv) Training Department

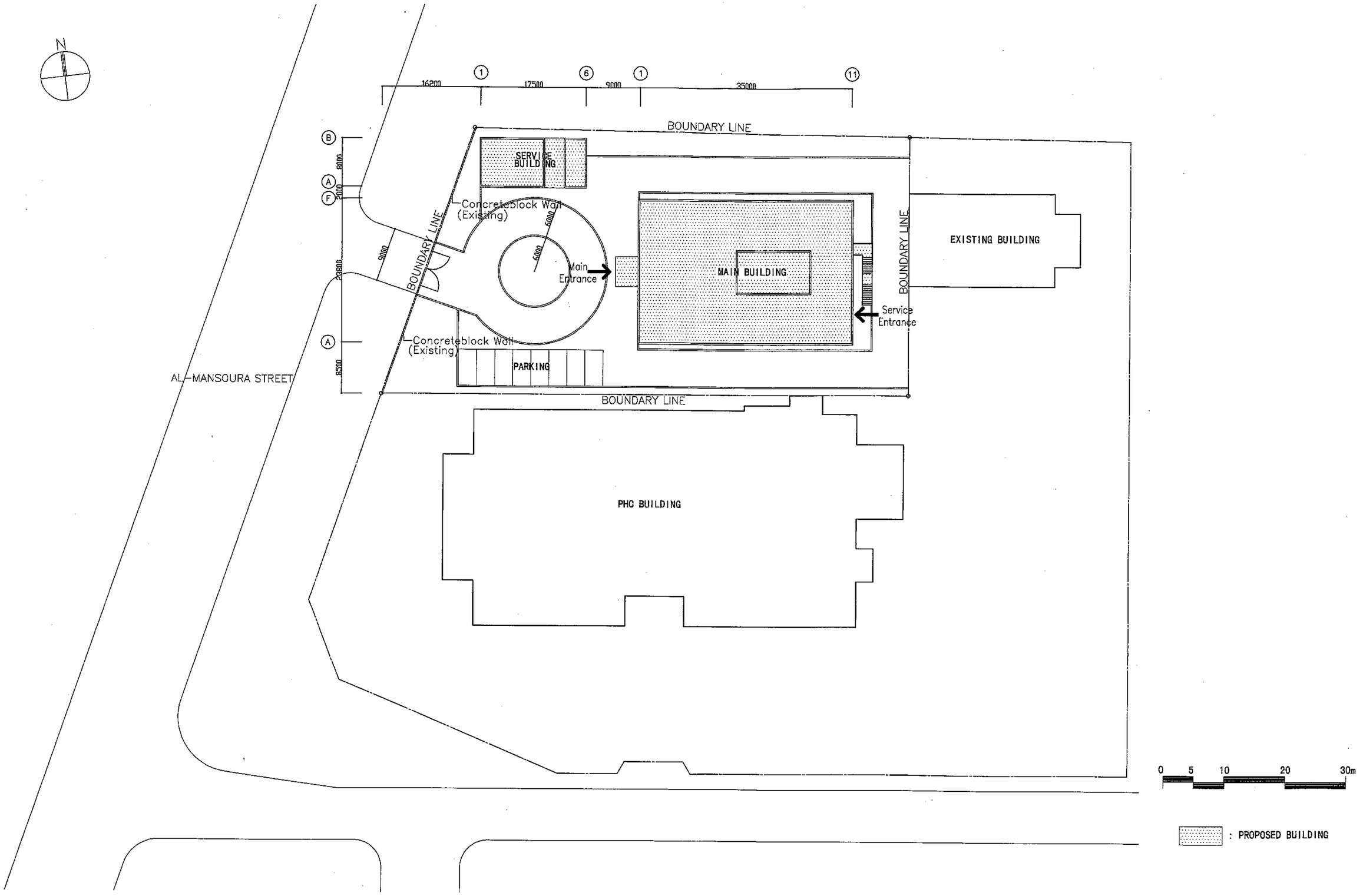
① Classroom (for 20 trainees + staffs)
The planned items for lectures/presentations include an overhead projector capable of directly projecting printed sheets, a screen, a sound system (moveable), a TV with a console box and a VTR.

② Training Laboratory (for six trainees + staffs)
The planned items Include eight biological microscopes (two for trainers and six for trainees), a microscope with a teaching head, a safety cabinet, four Bunsen burners, an autoclave and a reagent cabinet.

③ Training Material Room
A copying machine (with a sorter) is planned for the preparation of training textbooks and reference materials, etc. A film illuminator for X-ray film reading is required for the classroom. One film illuminator will be placed in the training material room for common use.

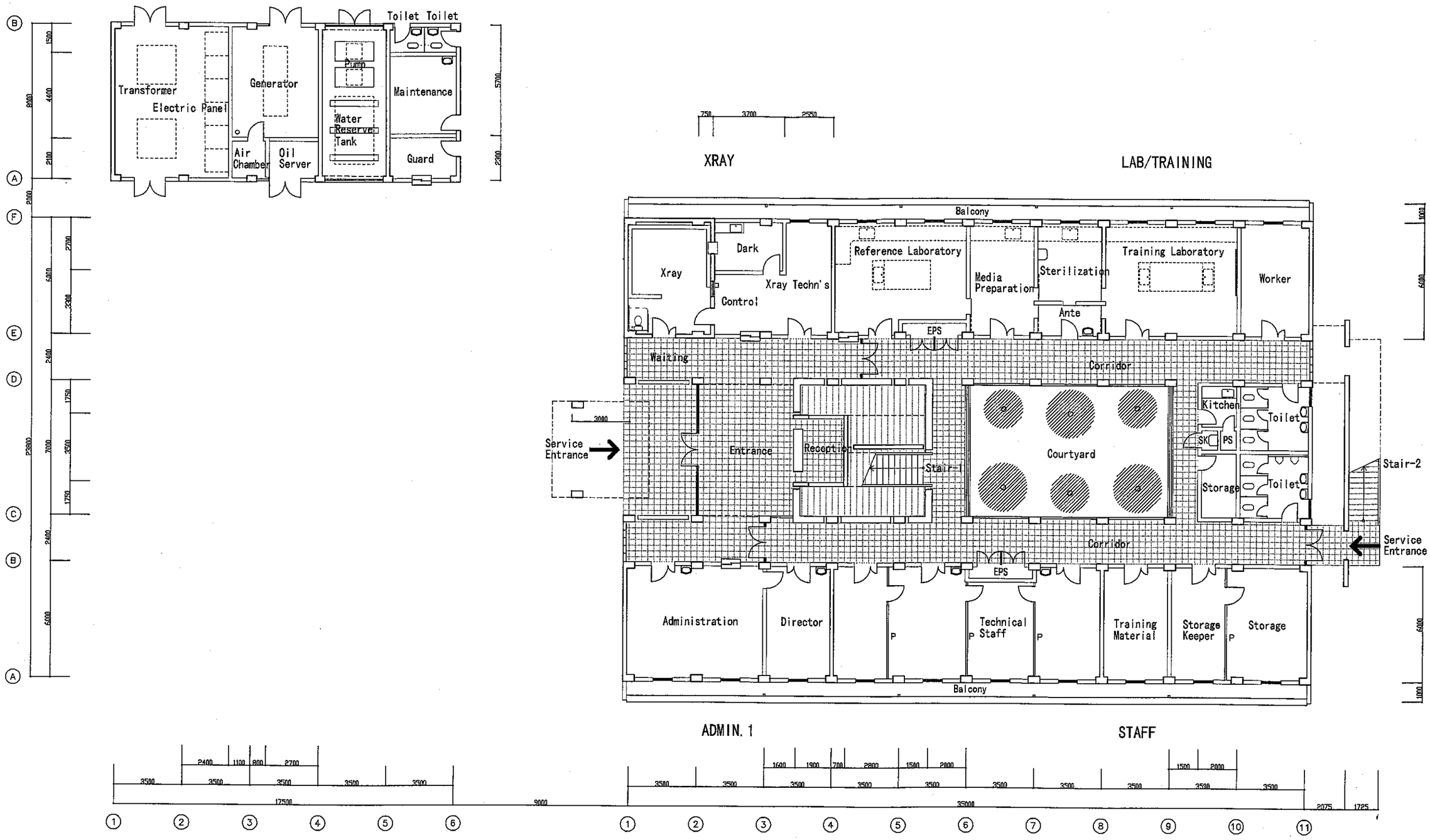
BASIC DESIGN DRAWINGS

No.	Drawing:	Scale:
1.	Site Plan	1/600
2.	Ground Floor Plan	1/200
3.	First Floor Plan	1/200
4.	Roof Plan	1/200
5.	Elevation	1/200
6.	Section	1/200
7.	Layout of Equipment (GF Plan)	1/200
8.	Layout of Equipment (1F Plan)	1/200
9.	Layout of Equipment (Laboratory)	
10.	Infrastructure Connection	1/600



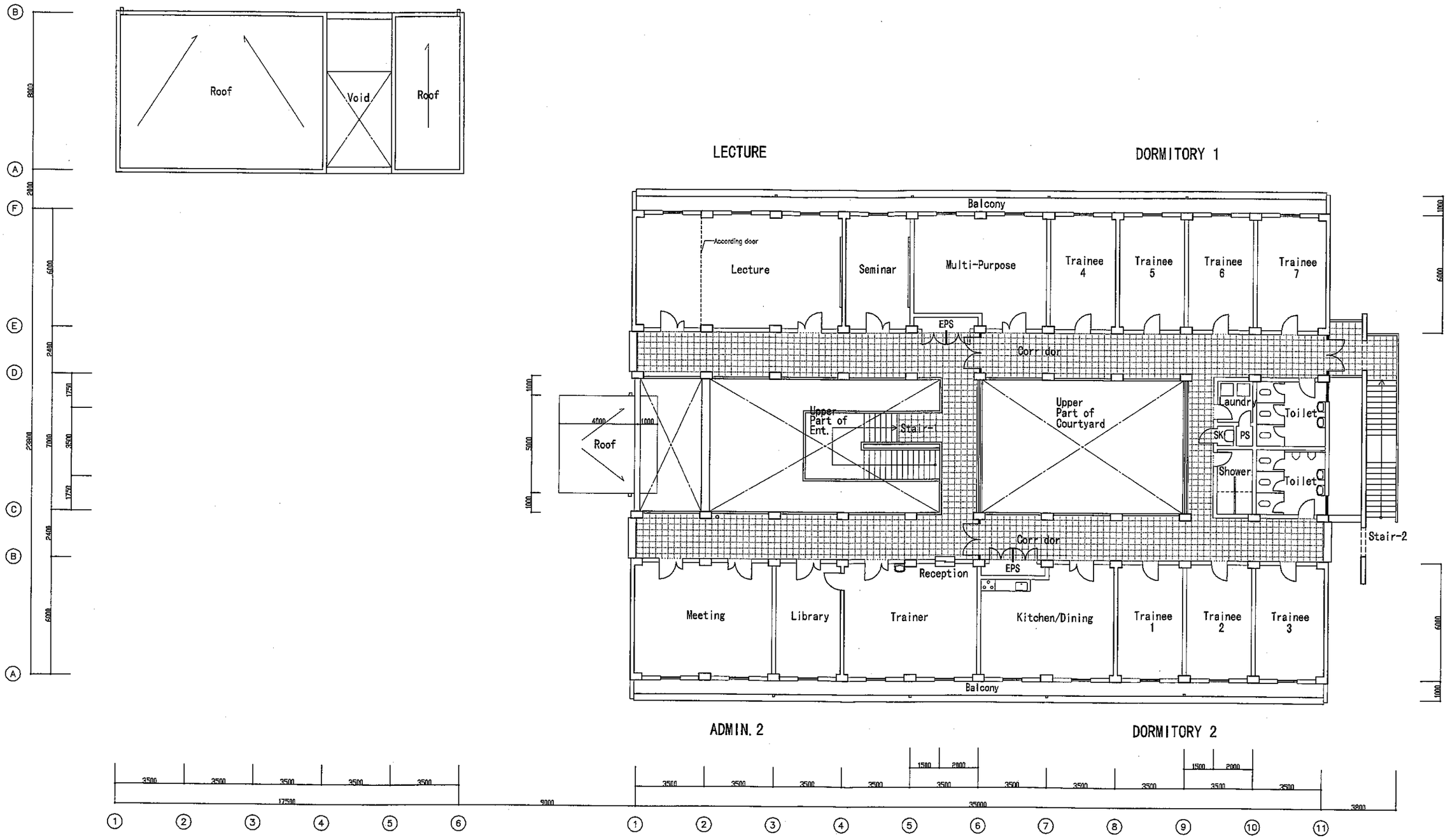
SITE PLAN 1:600 1

THE PROJECT FOR THE EXPANSION OF TUBERCULOSIS CONTROL
IN THE SOUTHERN AND EASTERN GOVERNORATES OF THE REPUBLIC OF YEMEN



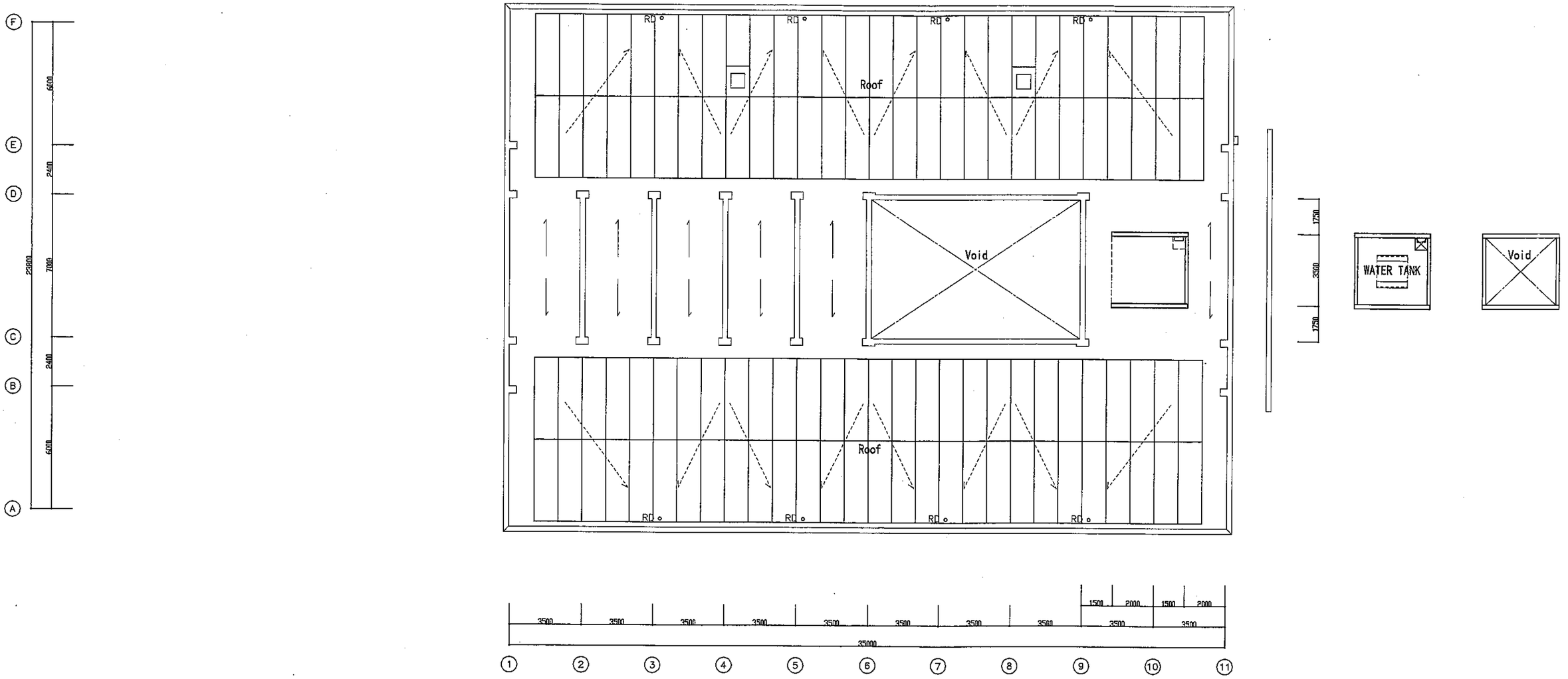
GROUND FLOOR PLAN 1:200 2

THE PROJECT FOR THE EXPANSION OF TUBERCULOSIS CONTROL
IN THE SOUTHERN AND EASTERN GOVERNORATES OF THE REPUBLIC OF YEMEN



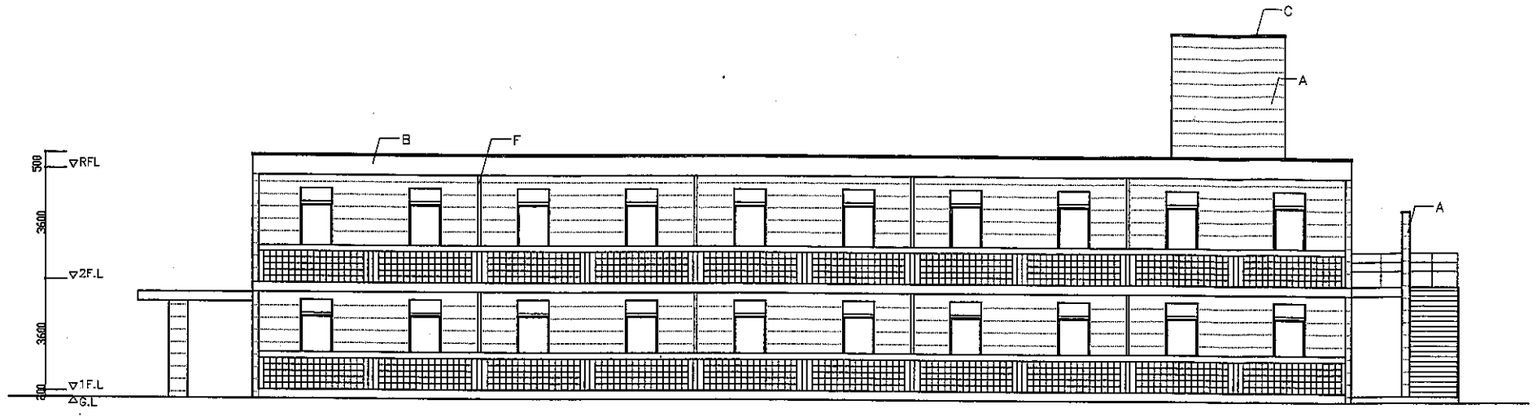
1ST FLOOR PLAN 1:200 3

THE PROJECT FOR THE EXPANSION OF TUBERCULOSIS CONTROL
IN THE SOUTHERN AND EASTERN GOVERNORATES OF THE REPUBLIC OF YEMEN

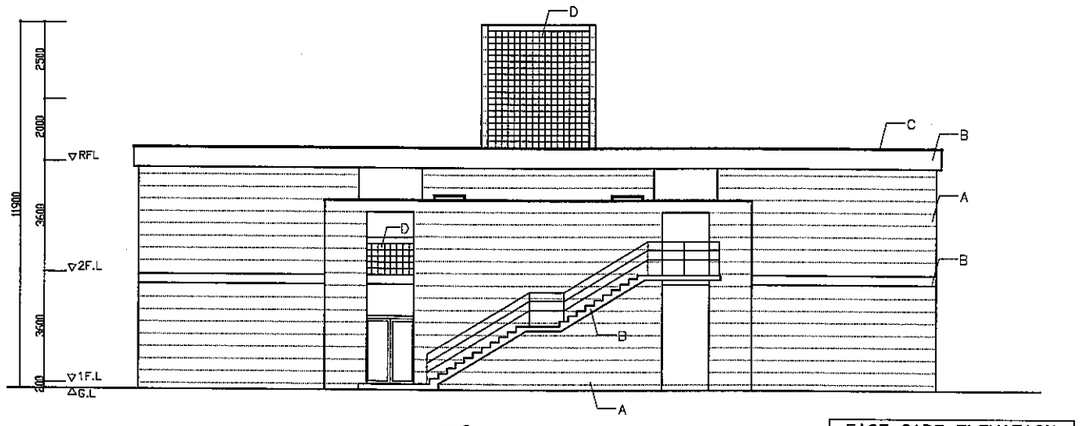


ROOF FLOOR PLAN 1:200 4

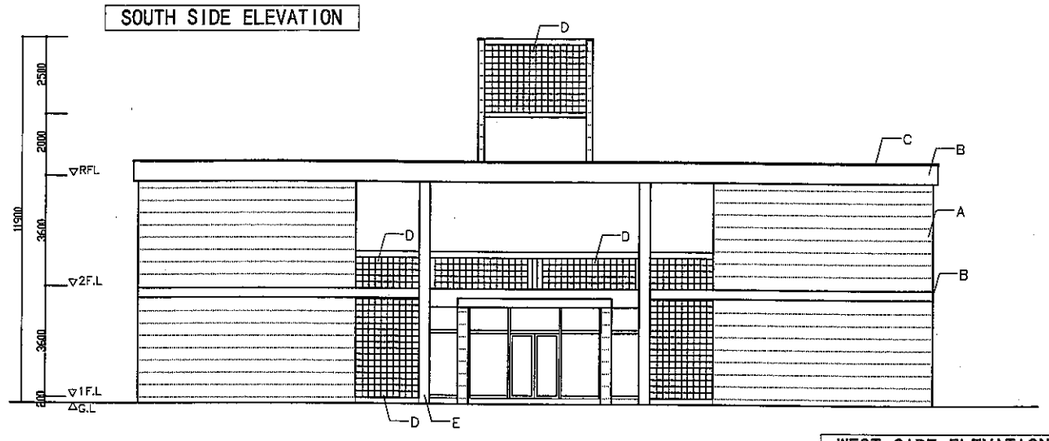
THE PROJECT FOR THE EXPANSION OF TUBERCULOSIS CONTROL
IN THE SOUTHERN AND EASTERN GOVERNORATES OF THE REPUBLIC OF YEMEN



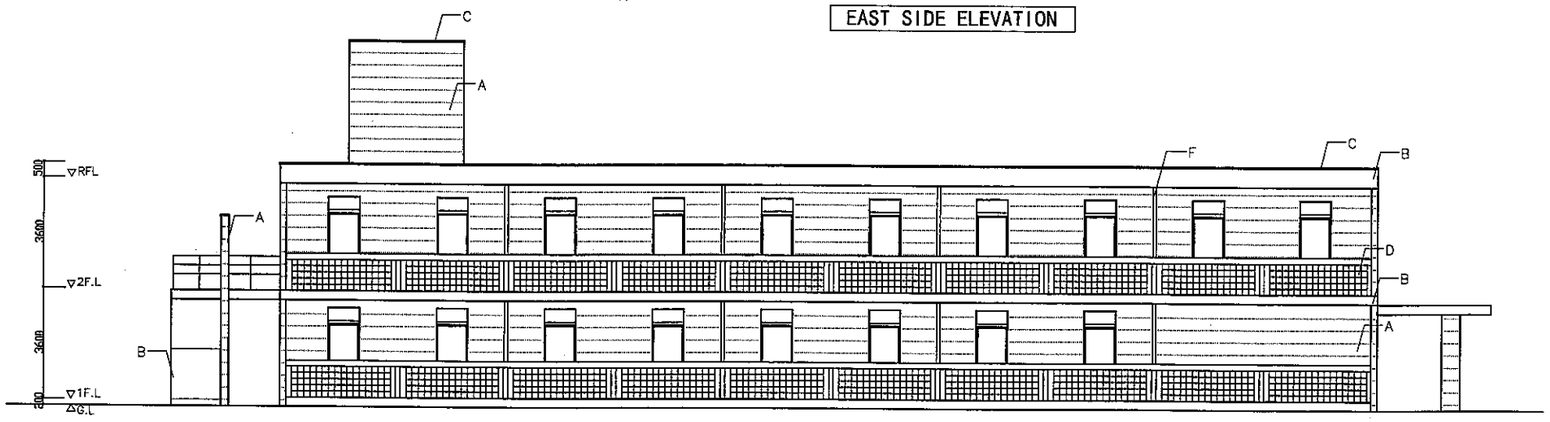
SOUTH SIDE ELEVATION



EAST SIDE ELEVATION

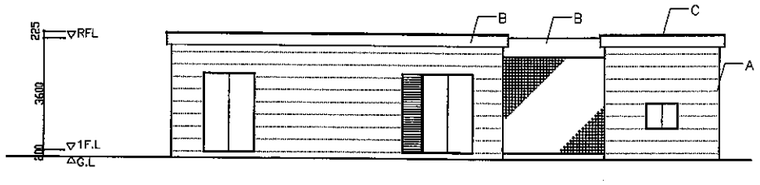


WEST SIDE ELEVATION

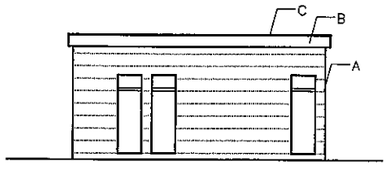


NORTH SIDE ELEVATION

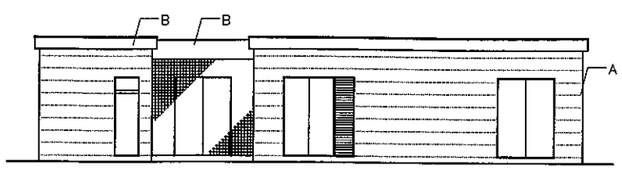
A	LOCAL STONE
B	FAIRFACED CONCRETE
C	STONE COPING t30
D	CONCRETE BLOCK t150 200X200
E	MORTAR TROW VP
F	SUS □-100x100



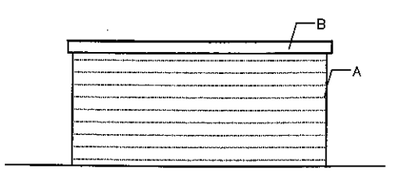
SOUTH SIDE ELEVATION



EAST SIDE ELEVATION



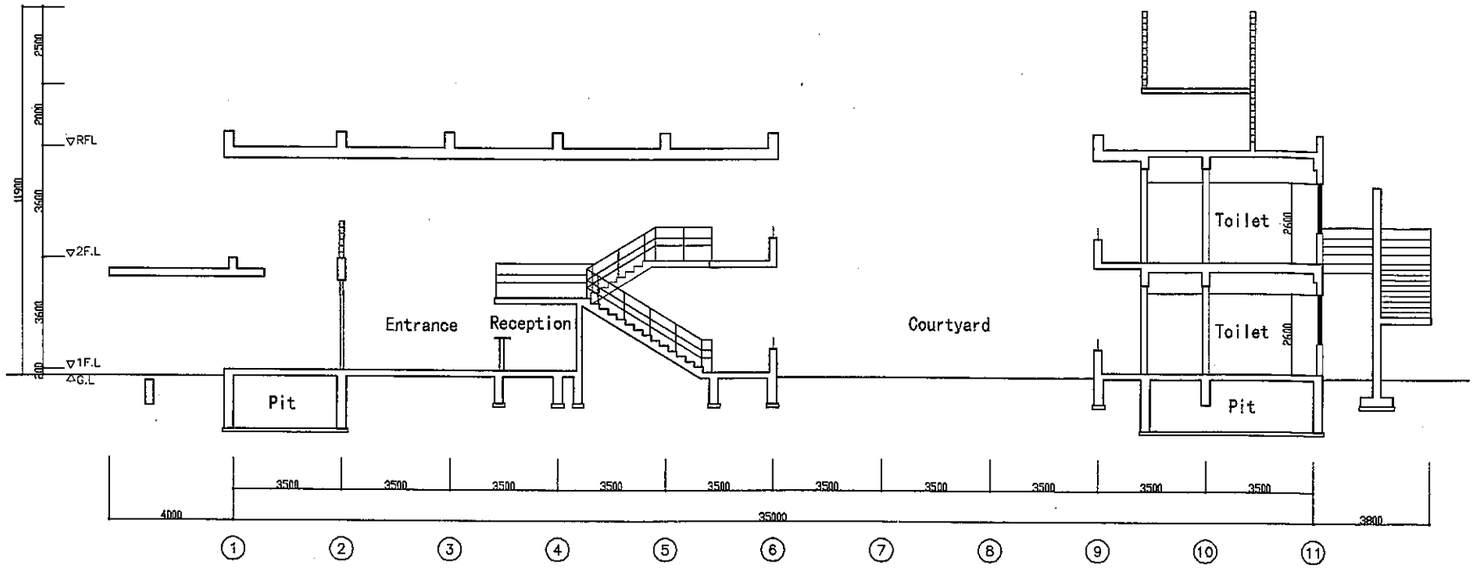
NORTH SIDE ELEVATION

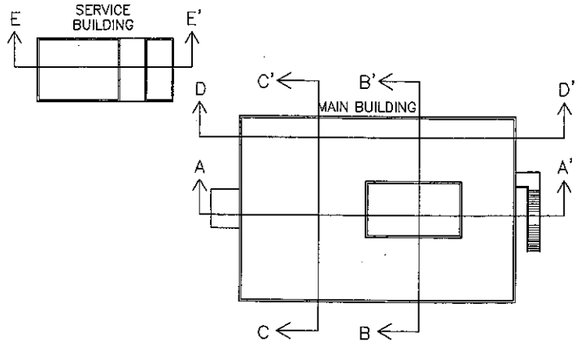


WEST SIDE ELEVATION

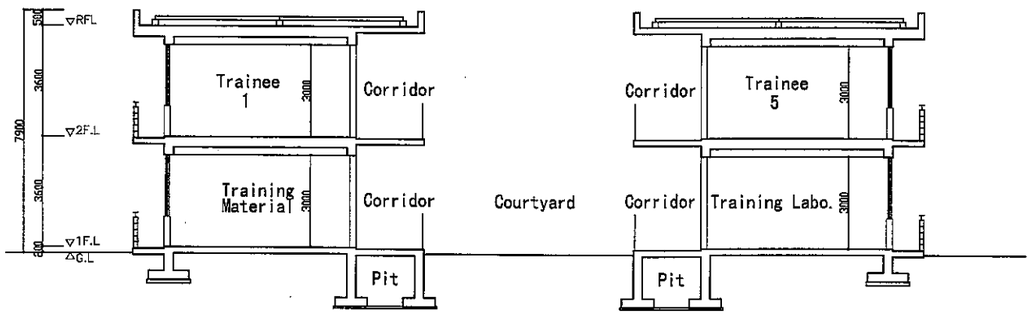
ELEVATION 1:200 5

THE PROJECT FOR THE EXPANSION OF TUBERCULOSIS CONTROL
IN THE SOUTHERN AND EASTERN GOVERNORATES OF THE REPUBLIC OF YEMEN





A-A' SECTION



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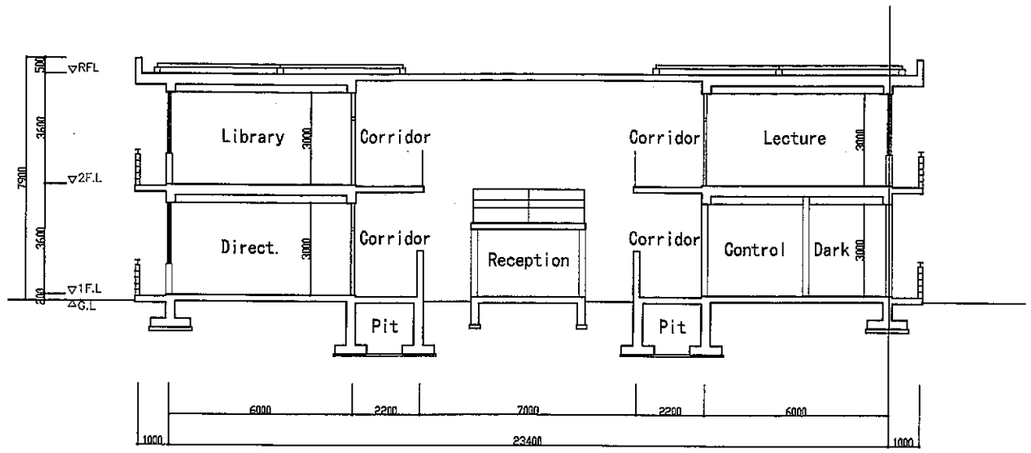
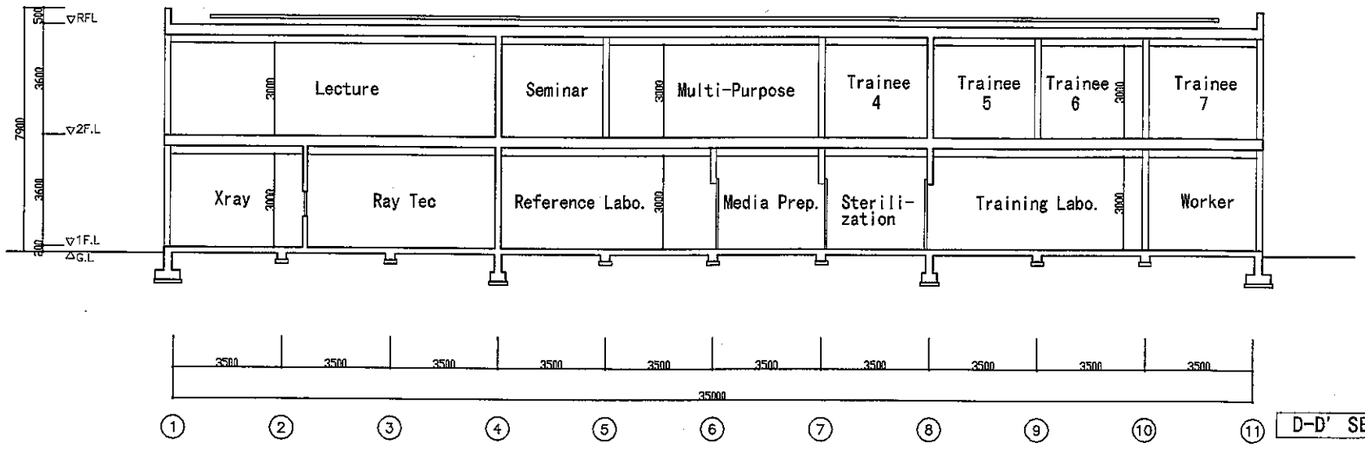
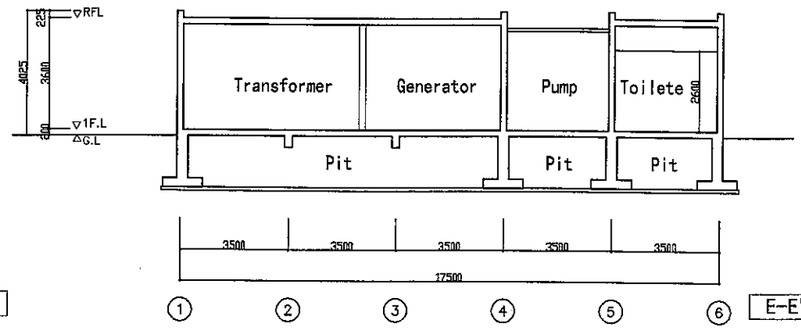


C-C' SECTION



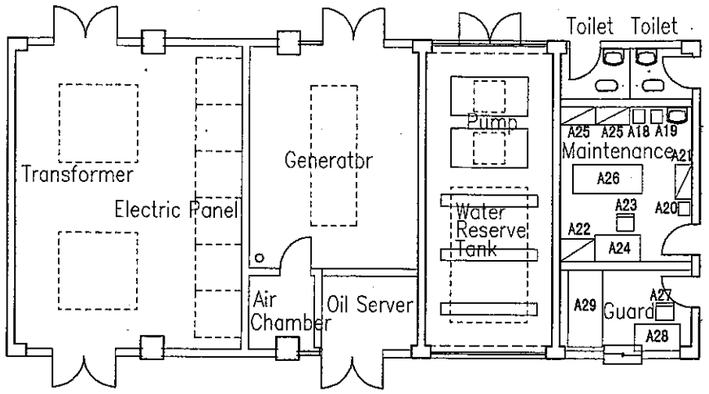
D-D' SECTION

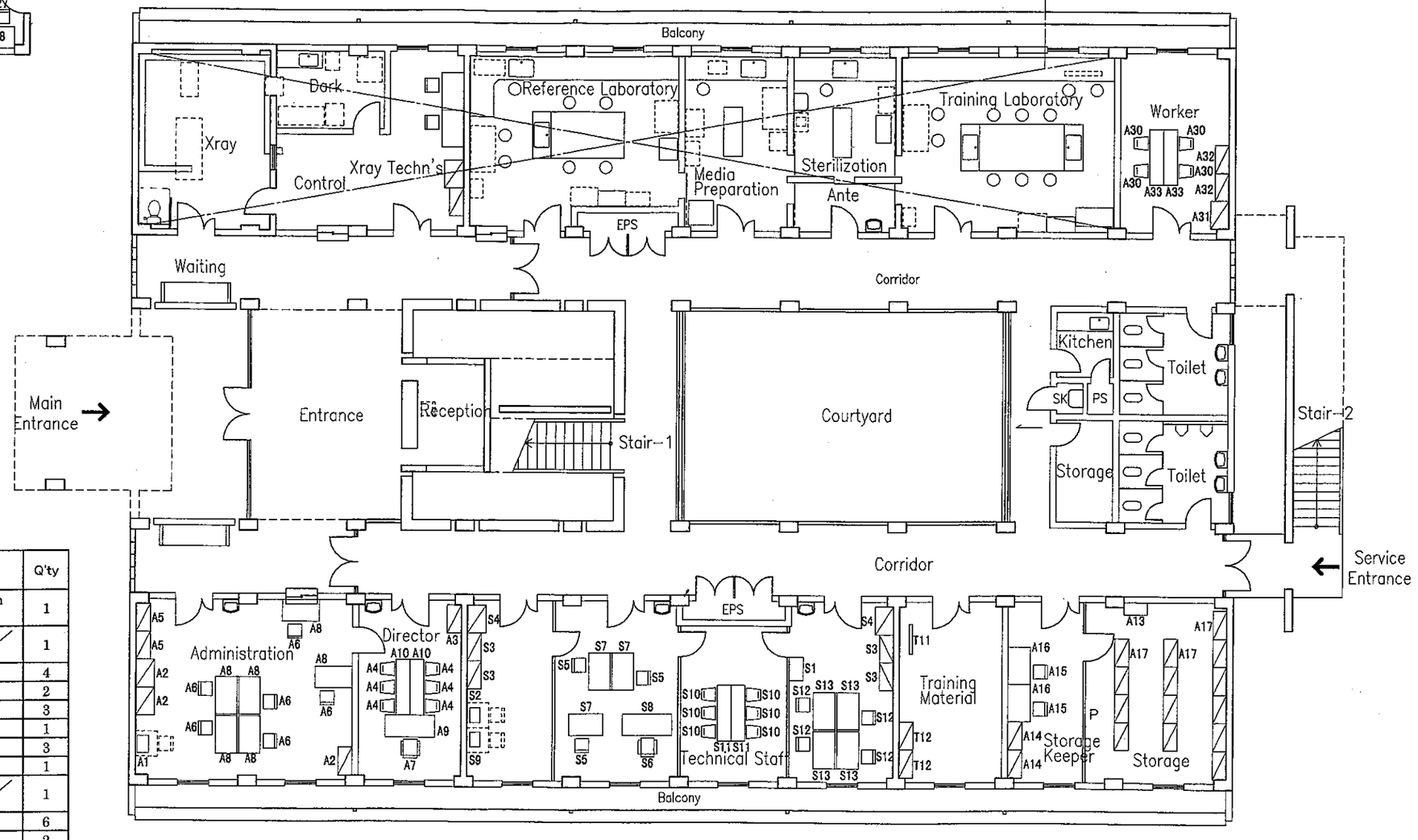


E-E' SECTION

SECTION 1:200 6

THE PROJECT FOR THE EXPANSION OF TUBERCULOSIS CONTROL
IN THE SOUTHERN AND EASTERN GOVERNORATES OF THE REPUBLIC OF YEMEN





Administrative

Code No.	Equipment Name	Q'ty
A1	Desktop Computer/ Printer	1
A2	Cabinet	3
A3	Cabinet	1
A4	Chair	6
A5	Locker	2
A6	Office Chair A	6
A7	Office Chair B	1
A8	Office Desk A	6
A9	Office Desk B	1
A10	Table	2
A11	Overhead Projector	1
A12	Screen	1
A13	Medical Refrigerator	1
A14	Cabinet	2
A15	Office Chair A	2
A16	Office Desk A	2
A17	Shelf	14
A18	Floor Cleaner	1
A19	Floor Polisher	1
A20	Maintenance Tools	1
A21	Cabinet	1
A22	Locker	1
A23	Office Chair A	3
A24	Office Desk A	1
A25	Shelf	2
A26	Work Table	1
A27	Chair	2
A28	Flat Table	1
A29	Bed	1
A30	Chair	4
A31	Locker	1
A32	Shelf	2
A33	Table	2
E44	Chair	2

Supervisory

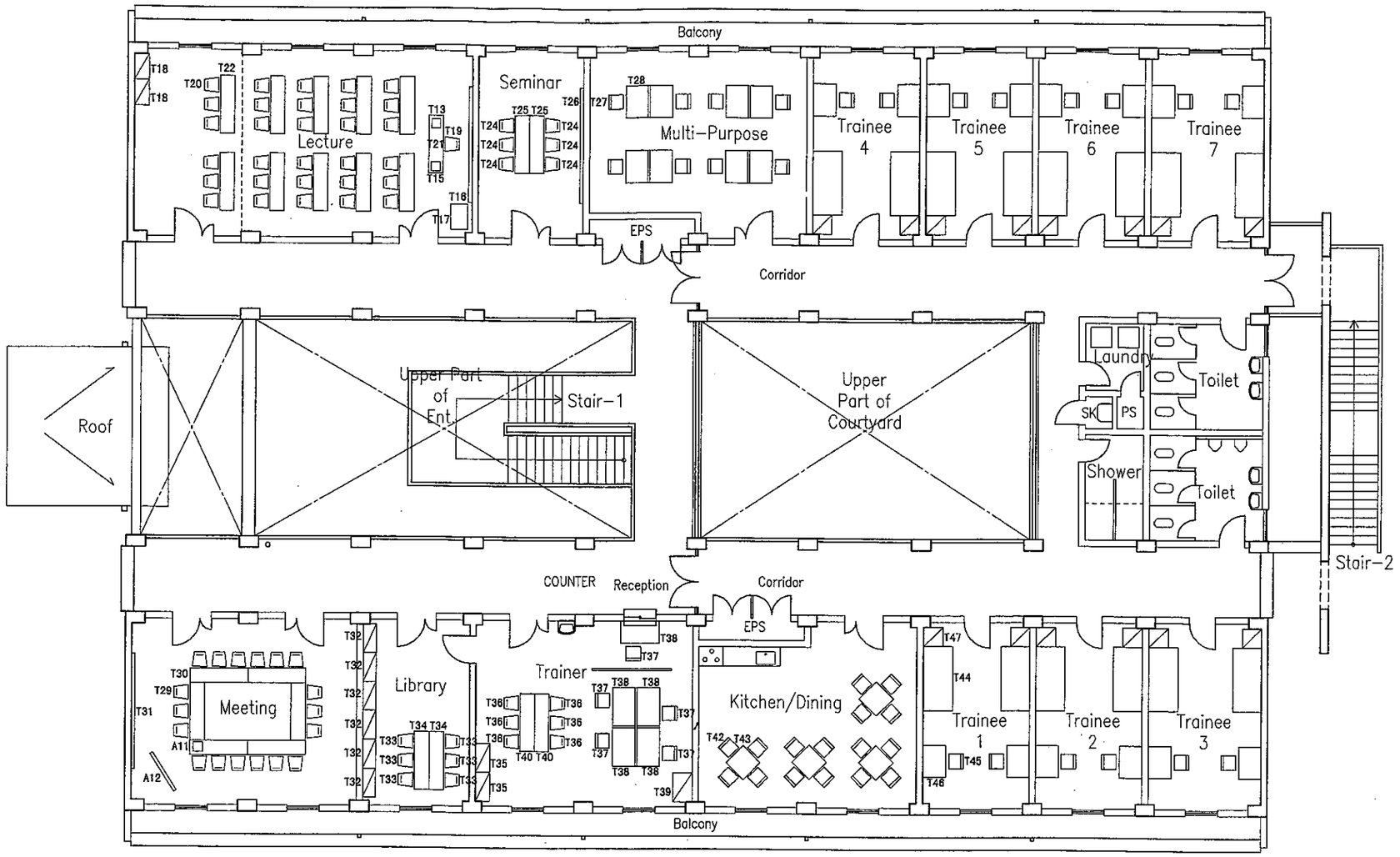
Code No.	Equipment Name	Q'ty
S1	Copy Machine with Sorter	1
S2	Desktop Computer/ Printer	1
S3	Cabinet	4
S4	Locker	2
S5	Office Chair A	3
S6	Office Chair B	1
S7	Office Desk A	3
S8	Office Desk B	1
S9	Desktop Computer/ Printer	1
S10	Chair	6
S11	Table	2
S12	Office Chair A	4
S13	Office Desk A	4

LAYOUT OF EQUIPMENT (G.F PLAN)

THE PROJECT FOR THE EXPANSION OF TUBERCULOSIS CONTROL
IN THE SOUTHERN AND EASTERN GOVERNORATES OF THE REPUBLIC OF YEMEN

Training

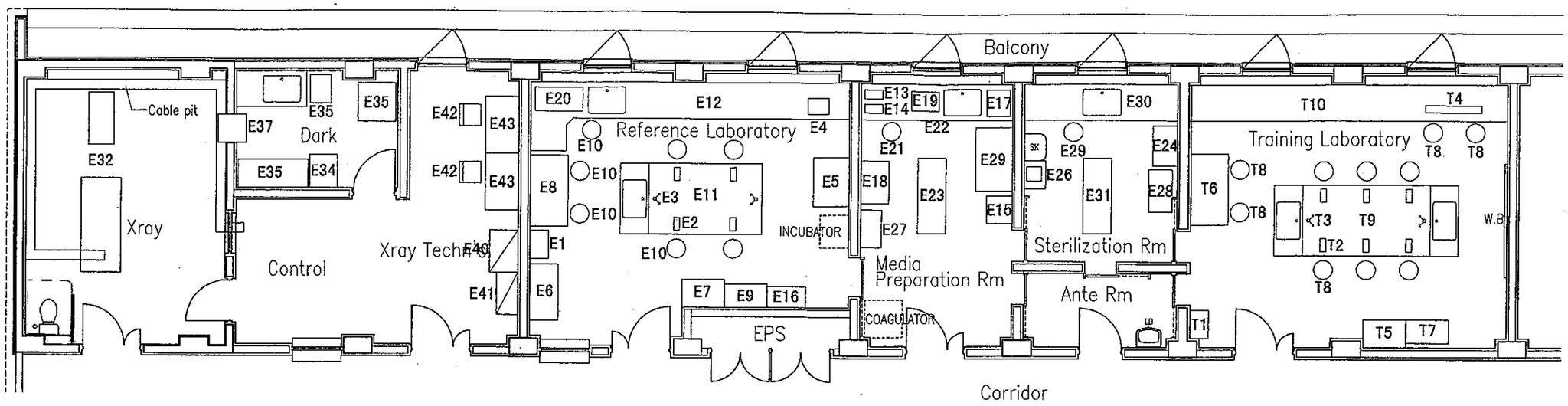
Code No.	Equipment Name	Q'ty
T11	Film Illuminator (movable)	1
T12	Cabinet	2
T13	Object Projector	1
T14	Screen	1
T15	Sound System (movable)	1
T16	TV with Console Box	1
T17	Video Recorder /Player	1
T18	Cabinet	2
T19	Chair	1
T20	Chair	30
T21	Table	1
T22	Table	10
T23	White Board	1
T24	Chair	6
T25	Table	2
T26	White Board	1
T27	Chair	8
T28	Flat Table	8
T29	Chair	18
T30	Table	6
T31	White Board	1
T32	Book Shelf	6
T33	Chair	6
T34	Table	2
T35	Cabinet	2
T36	Chair	6
T37	Office Chair A	5
T38	Office Desk A	5
T39	Locker	1
T40	Table	2
T41	Cupboard	1
T42	Dining Chair	16
T43	Dining Table	4
T44	Bed	14
T45	Chair	14
T46	Flat Table	14
T47	Locker	14



LAYOUT OF EQUIPMENT (1.F PLAN)

8

THE PROJECT FOR THE EXPANSION OF TUBERCULOSIS CONTROL IN THE SOUTHERN AND EASTERN GOVERNORATES OF THE REPUBLIC OF YEMEN



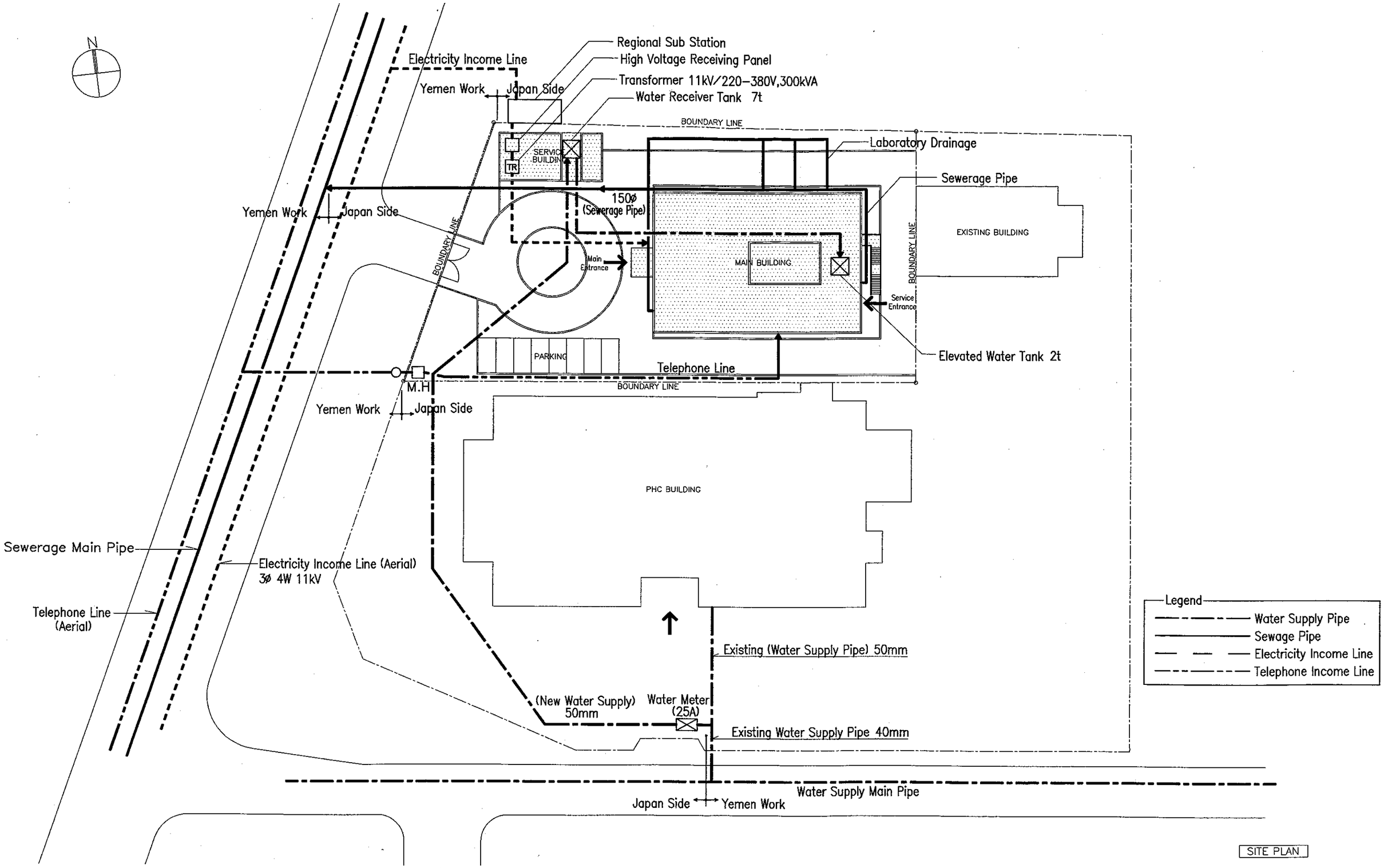
Laboratory

Code No.	Room	Equipment Name	Q'ty
E1	Refarence Labo.	Autoclave	1
E2	Refarence Labo.	Biological Microscope	4
E3	Refarence Labo.	Bunsen Burner	1
E4	Refarence Labo.	Centrifuge	1
E5	Refarence Labo.	Incubator	1
E6	Refarence Labo.	Medical Refrigerator	1
E7	Refarence Labo.	Reagent Cabinet	1
E8	Refarence Labo.	Safety Cabinet	1
E9	Refarence Labo.	Instrument Cabinet	1
E10	Refarence Labo.	Laboratory Chair	7
E11	Refarence Labo.	Laboratory Table A	1
E12	Refarence Labo.	Laboratory Table B	1
E13	Preparation	Analytical Balance A	1
E14	Preparation	Analytical Balance B	1
E15	Preparation	Coagulator	1
E16	Refarence Labo.	Freezeer	1
E17	Preparation	Glassware	1
E18	Preparation	Reagent Cabinet	1
E19	Preparation	Water Bath	1
E20	Refarence Labo.	Water Distiller	1
E21	Preparation	Laboratory Chair	1
E22	Preparation	Laboratory Table C	1
E23	Preparation	Laboratory Table G	1
E24	Sterilization	Glassware Dryer	1
E25	Sterilization	Hot-Air Oven	1
E26	Sterilization	Pipette Washer (Ultra-Sound)	1
E27	Preparation	Refrigerator	1
E28	Sterilization	Instrument Cabinet	1
E29	Sterilization	Laboratory Chair	1
E30	Sterilization	Laboratory Table D	1
E31	Sterilization	Laboratory Table G	1
E32	X-ray	X-ray Unit with Accessory	1
E34	Dark	Automatic Film Developer (Roll)	1
E35	Dark	Dark Room Equipment	1
E37	Control	Pass Box	1
E38	X-ray technician's	Film Illuminator	1
E39	X-ray technician's	RF Film Illuminator	1
E40	X-ray technician's	Cabinet	1
E41	X-ray technician's	Locker	1
E42	X-ray technician's	Office Chair A	2
E43	X-ray technician's	Office Desk A	2

Training

Code No.	Room	Equipment Name	Q'ty
T1	Training Labo.	Autoclave	1
T2	Training Labo.	Biological Microscope	8
T3	Training Labo.	Bunsen Burner	2
T4	Training Labo.	Microscope with Teaching Head	1
T5	Training Labo.	Reagent Cabinet	1
T6	Training Labo.	Safety Cabinet	1
T7	Training Labo.	Instrument Cabinet	1
T8	Training Labo.	Laboratory Chair	10
T9	Training Labo.	Laboratory Table E	1
T10	Training Labo.	Laboratory Table F	1

LAYOUT OF EQUIPMENT (LABORATORY)



SITE PLAN

INFRASTRUCTURE CONNECTION 1:600 10

THE PROJECT FOR THE EXPANSION OF TUBERCULOSIS CONTROL
IN THE SOUTHERN AND EASTERN GOVERNORATES OF THE REPUBLIC OF YEMEN

Planned Equipment List

Administrative

Code No.	Item No.	Room	Equipment Name	Major Specification	Q'ty
A1	18	Administrative	Desktop Computer／Printer	CPU：more than 500MHz, Memory：more than 16MB, Hard Disk：more than 1.0GB, Floppy／CD－ROM, Monitor Size：15"/SVGA, Pre-Installed Soft ware, English ／Arabid Version, Rack／Chair, UPS Printer：Bubble Jet／Ink Jet／A4	1
A2	10	Administrative	Cabinet	800 x 450 x 1800mm	3
A3	10	Director	Cabinet	800 x 450 x 1800mm	1
A4	12	Director	Chair	Leg：Steel／Stainless, Seat：Synthetic Fiber, Cushion：Polyethylene／Urethane	6
A5	40	Administrative	Locker	900 x 500 x 1800mm	2
A6	46	Administrative	Office Chair A	Lowback, 5Legs, Height Adjustable, Locking Function	6
A7	47	Director	Office Chair B	Lowback, 5Legs, Arm Rest,Height Adjustable, Locking Function	1
A8	48	Administrative	Office Desk A	Single Wing,1200 x 700 x 700mm	6
A9	49	Director	Office Desk B	Double Wing、1600 x 700 x 700mm	1
A10	60	Director	Table	1800 x 450 x 700mm	2
A11	50	Meeting	Overhead Projector	Magnification：3.5～10.5, Halogen	1
A12	57	Meeting	Screen	Size：1800×1800mm, Tripod, Roll Screen Type	1
A13	43	Storage	Medical Refrigerator	Capacity：200～300L、Tem.：＋3.3℃～＋14℃, Glass Door／Hinged Type, W=800mm	1
A14	10	Storage	Cabinet	900 x 450 x 1800mm	2
A15	46	Storage	Office Chair A	Lowback, 5Legs, Height Adjustable, Locking Function	2
A16	48	Storage	Office Desk A	Single Wing,1200 x 700 x 700mm	2
A17	58	Storage	Shelf	800 x 500 x 1800mm	14
A18	24	Maintenance	Floor Cleaner	Vacume Type, Capacity：10L	1
A19	25	Maintenance	Floor Polisher	Electric Floor Polisher	1
A20	42	Maintenance	Maintenance Tools	General Maintenance Tool set：Each Size of Screw Driber／Wrench／Spanner／Plyer／File、Soldering Tool, Electric Tester、Total 43Item	1
A21	10	Maintenance	Cabinet	800 x 450 x 1800mm	1
A22	40	Maintenance	Locker	900 x 500 x 1800mm,4division	1
A23	46	Maintenance	Office Chair A	Lowback, 5Legs, Height Adjustable, Locking Function	3
A24	48	Maintenance	Office Desk A	Single Wing, 1200 x 700 x 700mm	1
A25	58	Maintenance	Shelf	900 x 500 x 1800mm	2
A26	67	Maintenance	Work Table	1800 x 750mm	1
A27	13	Guard	Chair	Lowback, 5Legs, Height Adjustable, Locking Function	2
A28	23	Guard	Flat Table	1000 x 700mm	1
A29	6	Guard	Bed	900 x 2000mm	1
A30	12	Worker	Chair	Leg：Steel／Stainless, Seat：Synthetic Fiber, Cushion：Polyethylene／Urethane	4
A31	40	Worker	Locker	900 x 500 x 1800mm,4division	1
A32	58	Worker	Shelf	900 x 500 x 1800mm	2
A33	60	Worker	Table	1800 x 450 x 700mm	2
E44	67	Reception	Chair	Lowback, 5Legs, Height Adjustable, Locking Function	2

Laboratory

Code No.	Item No.	Room	Equipment Name	Major Specification	Q'ty
E1	4	Refarence Laboratory	Autoclave	Vertical type、capacity；Approx, 60L、	1
E2	7	Refarence Laboratory	Biological Microscope	Objective Lense；4×、10×、100×、Halogen Light	4
E3	9	Refarence Laboratory	Bunsen Burner	For LPG、with Controll Cook/Connecting Horse	1
E4	11	Refarence Laboratory	Centrifuge	5000rpm, Max Centfugal：more than 4500G, Swing Bucket Type	1
E5	30	Refarence Laboratory	Incubator	Capacity：Approx Medium Glass Tube 1000 pcs, Temperature：Room Tem.+50℃	1
E6	43	Refarence Laboratory	Medical Refrigerator	Capacity;400L、Tepreture setting;-4c to -10c degree, Glass Sliding Door	1
E7	53	Refarence Laboratory	Reagent Cabinet	Type；2part Combination Type、Upper part：Glass Sliding Door／Shelf;2pcs, Lower part；hinged Door or Sliding Door, W=900	1
E8	56	Refarence Laboratory	Safety Cabinet	Class II, with burner, 2 person Use w=（Inner size）1900	1
E9	31	Refarence Laboratory	Instrument Cabinet	Type；2part Combination Type, Upper part：Glass Sliding Door／Shelf;2pcs, Lower part；hinged Door or Sliding Door, W=900	1
E10	32	Refarence Laboratory	Laboratory Chair	Stool, 5Legs, with Caster, Seat：Vinyl Cover, Height Adjustable Function	7
E11	33	Refarence Laboratory	Laboratory Table A	3000 x 1500 x 800mm、Side Sink	1
E12	34	Refarence Laboratory	Laboratory Table B	(6800 + 1950) x 750 x800mm	1
E13	2	Preparation	Analytical Balance A	Accuracy：0.1mg, Capacity：100g	1
E14	3	Preparation	Analytical Balance B	Accuracy：1.0mg, Capacity：200g	1
E15	14	Preparation	Coagulator	Capacity 75L, No. of Shelf：9, Setting Temperature：＋50℃～＋90℃	1
E16	26	Refarence Laboratory	Freezeer	Freezing Capacity：-35℃, Capacity：400L, Vertical Type	1
E17	27	Preparation	Glassware	Each Size ofFlusk / Beaker / Test Tube / Preparate	1
E18	53	Preparation	Reagent Cabinet	Type；2part Combination Type, Upper part：Glass Sliding Door／Shelf;2pcs, Lower part；hinged Door or Sliding Door, W=900	1
E19	64	Preparation	Water Bath	Stainless Tub, Apporox. 20L, Heater / Steering Mechanism	1
E20	65	Refarence Laboratory	Water Distiller	Capacity；5L／hr, Burnsted type, Sigle Distill, Stainles made	1
E21	32	Preparation	Laboratory Chair	Stool, 5Legs, with Caster, Seat：Vinyl Cover, Height Adjustable Function	1
E22	35	Preparation	Laboratory Table C	3300 x 750 x800mm、with Sink	1
E23	39	Preparation	Laboratory Table G	1500 x 600 x 800mm	1
E24	28	Sterilization	Glassware Dryer	Shelf type, Soround with Vinyel curtain, with Dryer 850（W）×520（D）×1600（H）, Approx.0.7kw	1
E25	29	Sterilization	Hot-Air Oven	Capacity；150L, Floor setting Type, Temp.：+40c～200c	1
E26	52	Sterilization	Pipette Washer(ultra-sound)	Ultrasound Type, Capacity：more than 100W, Timer	1
E27	54	Preparation	Refrigerator	170L, Freeze Room 50L, Vertical、Auto-Deflost、Single Door	1

E28	31	Sterilization	Instrument Cabinet	Type；2part Combination Type, Upper part：Glass Sliding Door／Shelf;2pcs, Lower part；hinged Door or Sliding Door, W=900	1
E29	32	Sterilization	Laboratory Chair	Stool, 5Legs, with Caster, Seat：Vinyl Cover, Height Adjustable Function	1
E30	36	Sterilization	Laboratory Table D	3300 x 750 x 800mm, with Sink	1
E31	39	Sterilization	Laboratory Table G	1500 x 600 x 800mm	1
E32	68	X-ray	X-ray unit with accessory	Componet；Bucky Stand（8:1）, Bucky Table（12:1）, Mirror camera、X-ray generator、Xray-Tube（Ceiling Type）, Controller, hand switch, Xray capacity：500mA	1
E34	5	Dark	Automatic Film Developer(Roll)	Processing Speed：60Films／hr, Roll Film can be Develop Rool Film,Floor type	1
E35	17	Dark	Dark Room Equipment	Work table、Film Hanger, Film casette, Manual Film Developper（Plastic made、Combined developper／Fixcer／Linse tank、Water/Drain machanism）, Manual RF Film Developper, Termometer, Timer, Darkroom Lamp	1
E37	51	Control	Pass Box	Wood made, Hinged Lid, Lead Equibarent：1.5mmpb	1
E38	21	X-ray technician's	Film Illuminator	Size：can be put 2 pcs of 14"×17" Film, Wall Mount Type	1
E39	55	X-ray technician's	RF Film Illuminator	for Roll Film, Table top type, with Magnification Lens, auto-Roll up Mechanism	1
E40	10	X-ray technician's	Cabinet	800 x 450 x 1800mm	1
E41	40	X-ray technician's	Locker	900 x 500 x 1800mm, 4division	1
E42	46	X-ray technician's	Office Chair A	Lowback, 5Legs, Height Adjustable, Locking Function	2
E43	48	X-ray technician's	Office Desk A	Single Wing, 1200 x 700 x 700mm	2

Supervisory

Code No.	Item No.	Room	Equipment Name	Major Specification	Q'ty
S1	15	Supervisor's Office	Copy Machine with sorter	Copy Size; up to A3 paper, with Zoom / Sorter	1
S2	18	Supervisor's Office	Desktop Computer／Printer	CPU：more than 500MHz, Memory：more than 16MB, Hard Disk：more than 1.0GB, Floppy／CD－ROM, Monitor Size：15"/SVGA, Pre-Installed Soft ware, English ／Arabid Version, Rack／Chair, UPS Printer：Bubble Jet／Ink Jet／A4	1
S3	10	Supervisor's Office	Cabinet	800 x 450 x 1800mm	4
S4	40	Supervisor's Office	Locker	900 x 500 x 1800mm, 4division	2
S5	46	Supervisor's Office	Office Chair A	Lowback, 5Legs, Height Adjustable, Locking Function	3
S6	47	Supervisor's Office	Office Chair B	Lowback, 5Legs, Arm Rest,Height Adjustable, Locking Function	1

S7	48	Supervisor's Office	Office Desk A	Single Wing, 1200 x 700 x700mm	3
S8	49	Supervisor's Office	Office Desk B	Double Wing, 1600 x 700 x 700mm	1
S9	18	Statistics	Desktop Computer／Printer	CPU：more than 500MHz, Memory：more than 16MB, Hard Disk：more than 1.0GB, Floppy／CD－ROM, Monitor Size：15"/SVGA, Pre-Installed Soft ware, English ／Arabid Version, Rack／Chair, UPS Printer：Bubble Jet／Ink Jet／A4	1
S10	12	Statistics	Chair	Leg：Steel／Stainless, Seat：Synthetic Fiber, Cushion：Polyethylene／Urethane	6
S11	60	Statistics	Table	1800 x 450 x 700mm	2
S12	46	Laboratory staff	Office Chair A	Lowback, 5Legs, Height Adjustable, Locking Function	4
S13	48	Laboratory staff	Office Desk A	Single Wing, 1200 x 700 x700mm	4

Training

Code No.	Item No.	Room	Equipment Name	Major Specification	Q'ty
T1	4	Training Laboratory	Autoclave	Vertical Type, Capacity：Approx.60L	1
T2	7	Training Laboratory	Biological Microscope	Objective Lense；4×, 10×, 100×, Halogen Light	8
T3	9	Training Laboratory	Bunsen Burner	For LPG、with Controll Cook / Connecting Horse	2
T4	44	Training Laboratory	Microscope with Teaching Head	for 2 person,Obserbing same side, Objective Lense：4×,10×,40×,100×, Halogen Light	1
T5	53	Training Laboratory	Reagent Cabinet	Type；2part Combination Type、Upper part：Glass Sliding Door／Shelf;2pcs, Lower part；hinged Door or Sliding Door, W=900	1
T6	56	Training Laboratory	Safety Cabinet	Class II, with burner, 2 person Use w=（Inner size）1900	1
T7	31	Training Laboratory	Instrument Cabinet	Type；2part Combination Type、Upper part：Glass Sliding Door／Shelf;2pcs, Lower part；hinged Door or Sliding Door, W=900	1
T8	32	Training Laboratory	Laboratory Chair	Stool, 5Legs, with Caster, Seat：Vinyl Cover, Height Adjustable Function	10
T9	37	Training Laboratory	Laboratory Table E	3900 x 1500 x 800mm, Double Side Sink	1
T10	38	Training Laboratory	Laboratory Table F	6800 x 750 x 800mm	1
T11	22	Training Material	Film Illuminator (movable)	Size：can be put 2 pcs of 14"×17" Film	1
T12	10	Training Material	Cabinet	900 x 450 x 1800mm	2
T13	45	Lecture	Object Projector	Magnification：3～8, Halogen	1
T14	57	Lecture	Screen	Size：1800×1800mm, Tripod, Roll Screen Type	1
T15	59	Lecture	Sound System (movable)	Out put：50W, with Wirelees Microphone / Casette Player	1
T16	62	Lecture	TV with Console Box	Size：21 inch,Multi System,Color Monitor, Cart：2 Shelf Type with Caster Hight：1200mm	1
T17	63	Lecture	Video Recorder/Player	VHS, Multi System	1
T18	10	Lecture	Cabinet	800 x 450 x 1800mm	2
T19	12	Lecture	Chair	Leg：Steel／Stainless, Seat：Synthetic Fiber, Cushion：Polyethylene／Urethane	1

T20	12	Lecture	Chair	Leg：Steel／Stainless, Seat：Synthetic Fiber, Cushion：Polyethylene／Urethane	30
T21	61	Lecture	Table	1800 x 450 x 700mm, with Front Poanel	1
T22	60	Lecture	Table	1800 x 450 x 700mm	10
T23	66	Lecture	White Board	3600 x 900mm	1
T24	12	Seminar	Chair	Leg：Steel／Stainless, Seat：Synthetic Fiber, Cushion：Polyethylene／Urethane	6
T25	60	Seminar	Table	1800 x 450mm	2
T26	66	Seminar	White Board	3600 x 900mm	1
T27	13	Multi Purpose	Chair	Lowback, 5Legs, Height Adjustable, Locking Function	8
T28	23	Multi Purpose	Flat Table	1000 x 700mm, without Wing	8
T29	12	Meeting	Chair	Leg：Steel／Stainless, Seat：Synthetic Fiber, Cushion：Polyethylene／Urethane	18
T30	60	Meeting	Table	1800 x 450 x 700mm	6
T31	66	Meeting	White Board	3600 x 900mm	1
T32	8	Library	Book Shelf	1800 x 400 x 2000mm	6
T33	12	Library	Chair	Leg：Steel／Stainless, Seat：Synthetic Fiber, Cushion：Polyethylene／Urethane	6
T34	60	Library	Table	1800 x 450 x 700mm	2
T35	10	Trainer	Cabinet	800 x 450 x 1800mm	2
T36	12	Trainer	Chair	Leg：Steel／Stainless, Seat：Synthetic Fiber, Cushion：Polyethylene／Urethane	6
T37	46	Trainer	Office Chair A	Lowback, 5Legs, Height Adjustable, Locking Function	5
T38	48	Trainer	Office Desk A	Single Wing, 1200 x 700 x 700mm	5
T39	40	Trainer	Locker	900 x 500 x 2000mm, 4division	1
T40	60	Trainer	Table	1800 x 450 x 700mm	2
T41	16	kitchen/Dining	Cupboard	900 x 450 x 1790mm	1
T42	19	kitchen/Dining	Dining Chair	Leg：Steel／Stainless, Seat：Synthetic Fiber, Cushion：Polyethylene／Urethane	16
T43	20	kitchen/Dining	Dining Table	800 x 800mm	4
T44	6	Bed Room	Bed	900 x 2000mm	14
T45	13	Bed Room	Chair	Lowback, 5Legs, Height Adjustable, Locking Function	14
T46	23	Bed Room	Flat Table	1000 x 700mm, without Wing	14
T47	41	Bed Room	Locker	600 x 500 x 1900 / 2000mm	14

Others

Code No.	Item No.	Room	Equipment Name	Major Specification	Q'ty
O1	1	Others	4WD Vehicle	Engine：Approx. 5,000cc, 7person max, 5 Door, Rear Station	1