DETAILED DESIGN REPORT
ON
CENTRAL TELECOMMUNICATION RESEARCH LABORATORIES
ISLAMABAD
CONSTRUCTION PROJECT
IN
THE ISLAMIC REPUBLIC OF PAKISTAN

(BUILDINGS)

I DESIGN REPORT

JANUARY, 1977

JAPAN INTERNATIONAL COOPERATION AGENCY

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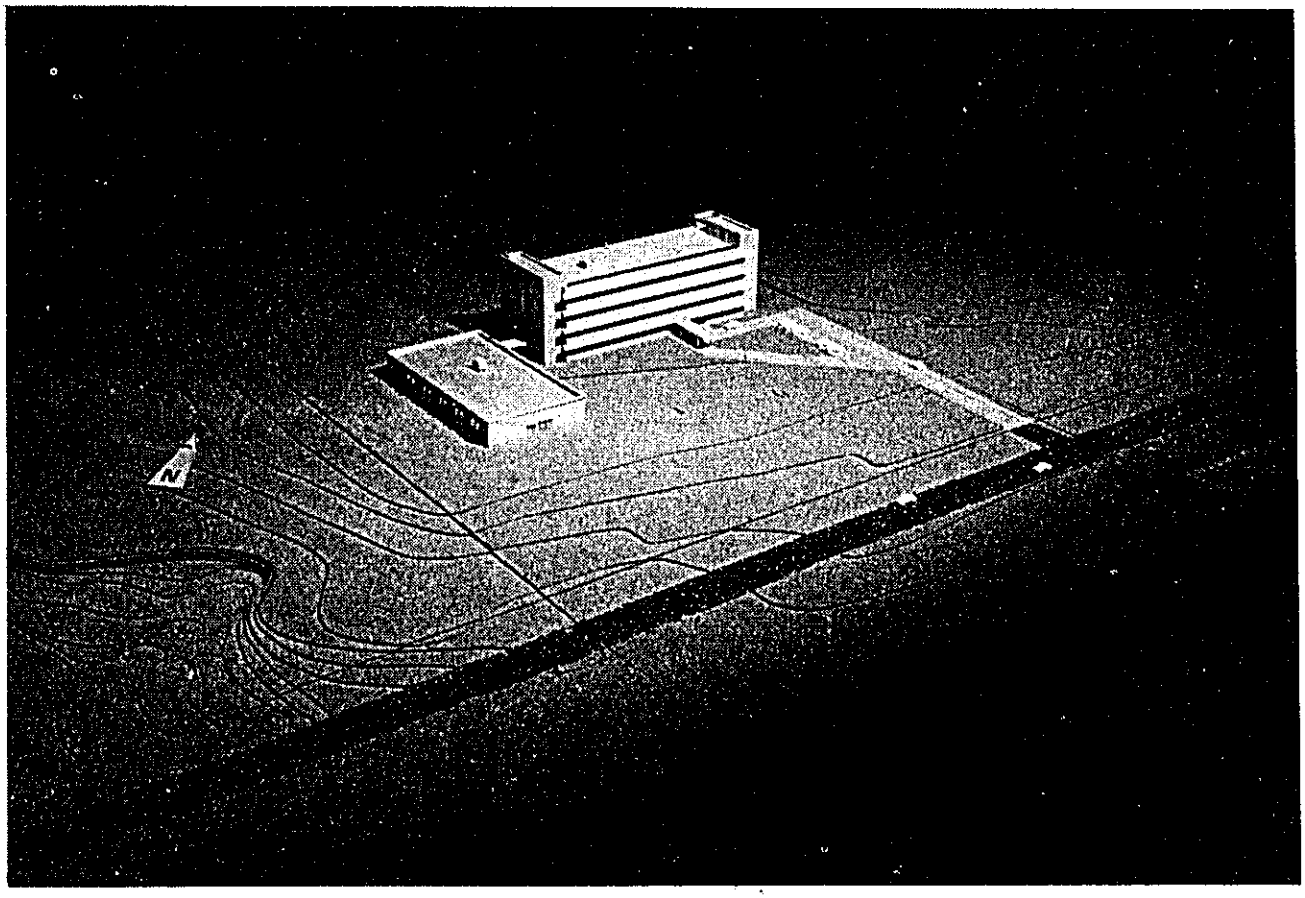
PICTURE OF THE MODEL

FOR

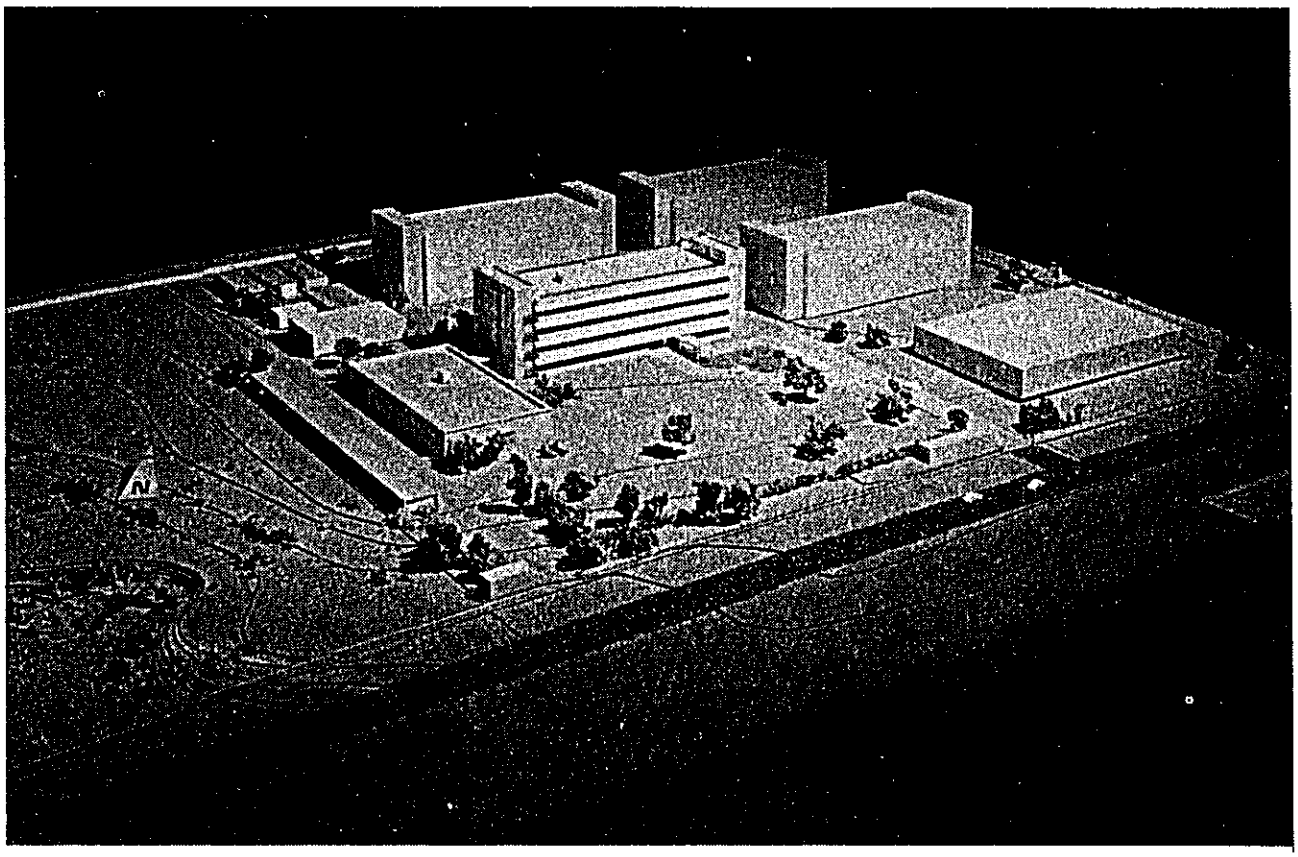
THE PROJECT

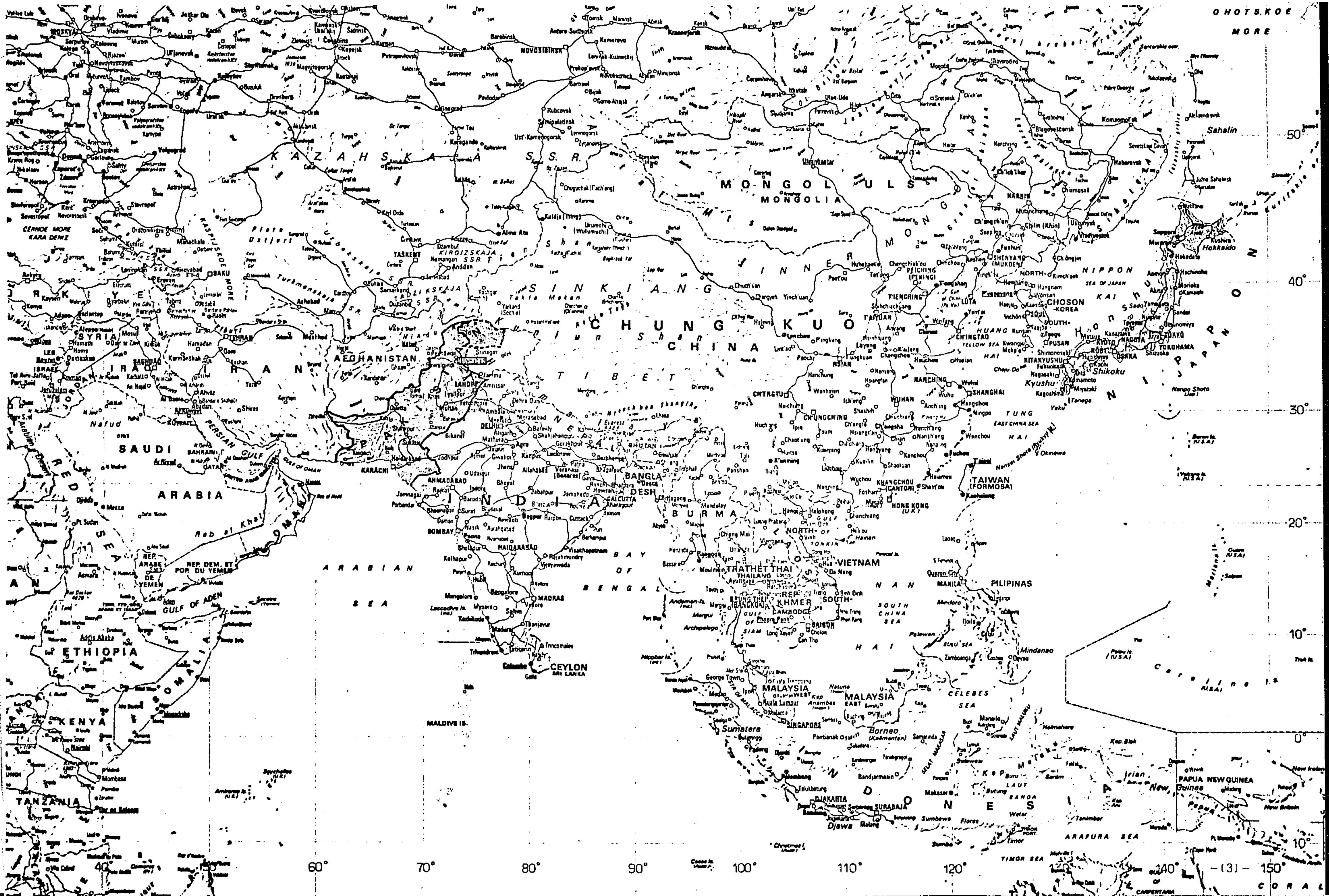


PICTURE OF THE MODEL

FOR

FUTURE EXTENSION





OHOTSKOE MORE
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KUWAIT
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GULF OF OMAN
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REP. ARABE DU YEMEN
REP. DEM. ET POP. DU YEMEN
GULF OF ADEN
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SOMALIA
KENYA
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ARABIAN SEA
INDIA
BOMBAY
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CALCUTTA
MADRAS
KARACHI
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MALDIVE IS.
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TRATHET THAI
THAILAND
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SOUTH-VIETNAM
MALAYSIA
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INDONESIA
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Borneo
Djawa
DJAKARTA
NAN HAI
SOUTH CHINA SEA
PILIPINAS
MANILA
TAIWAN (FORMOSA)
HONG KONG
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TUNG HAI
EAST CHINA SEA
CHOSON
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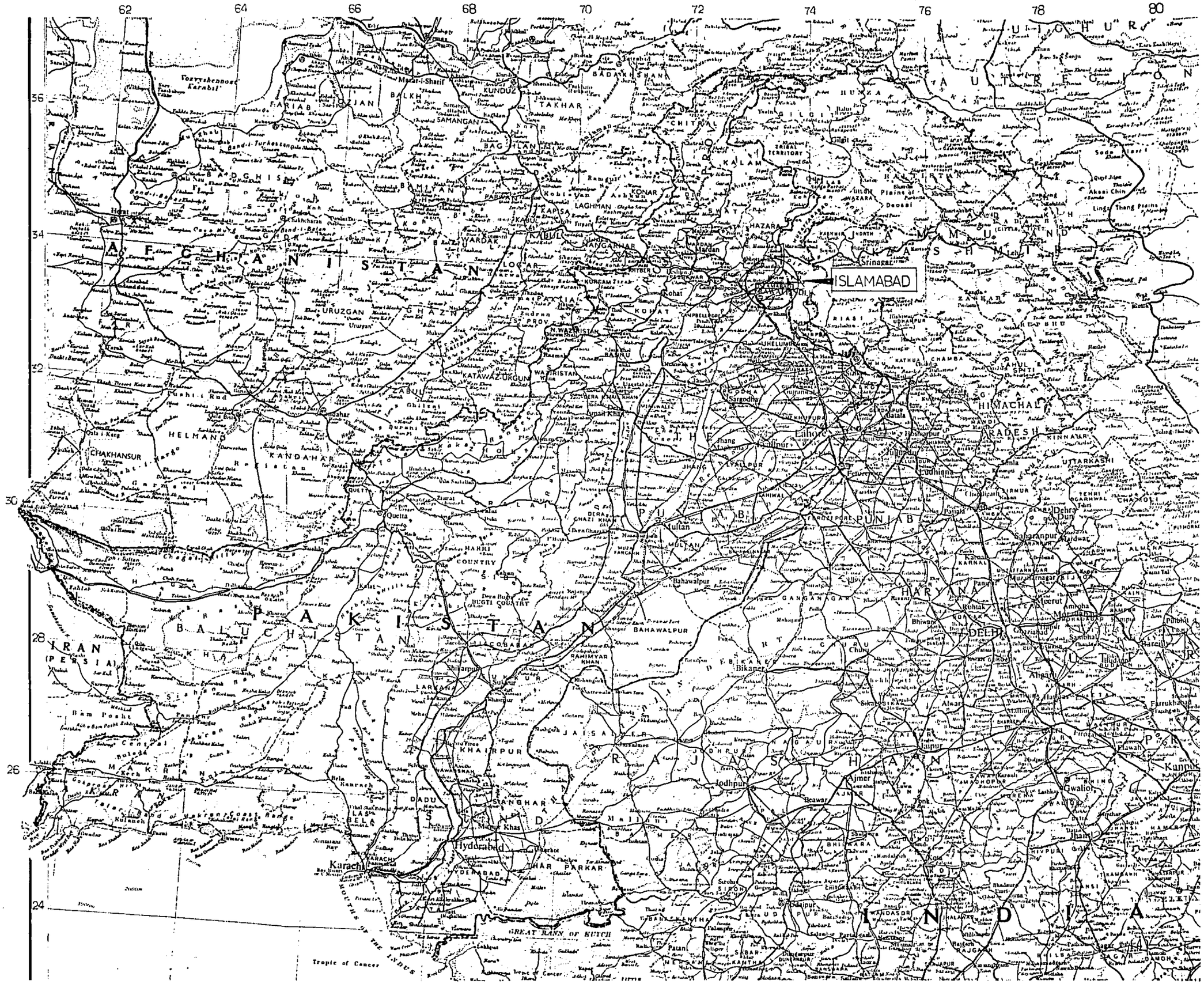
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72
74
76
78
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36
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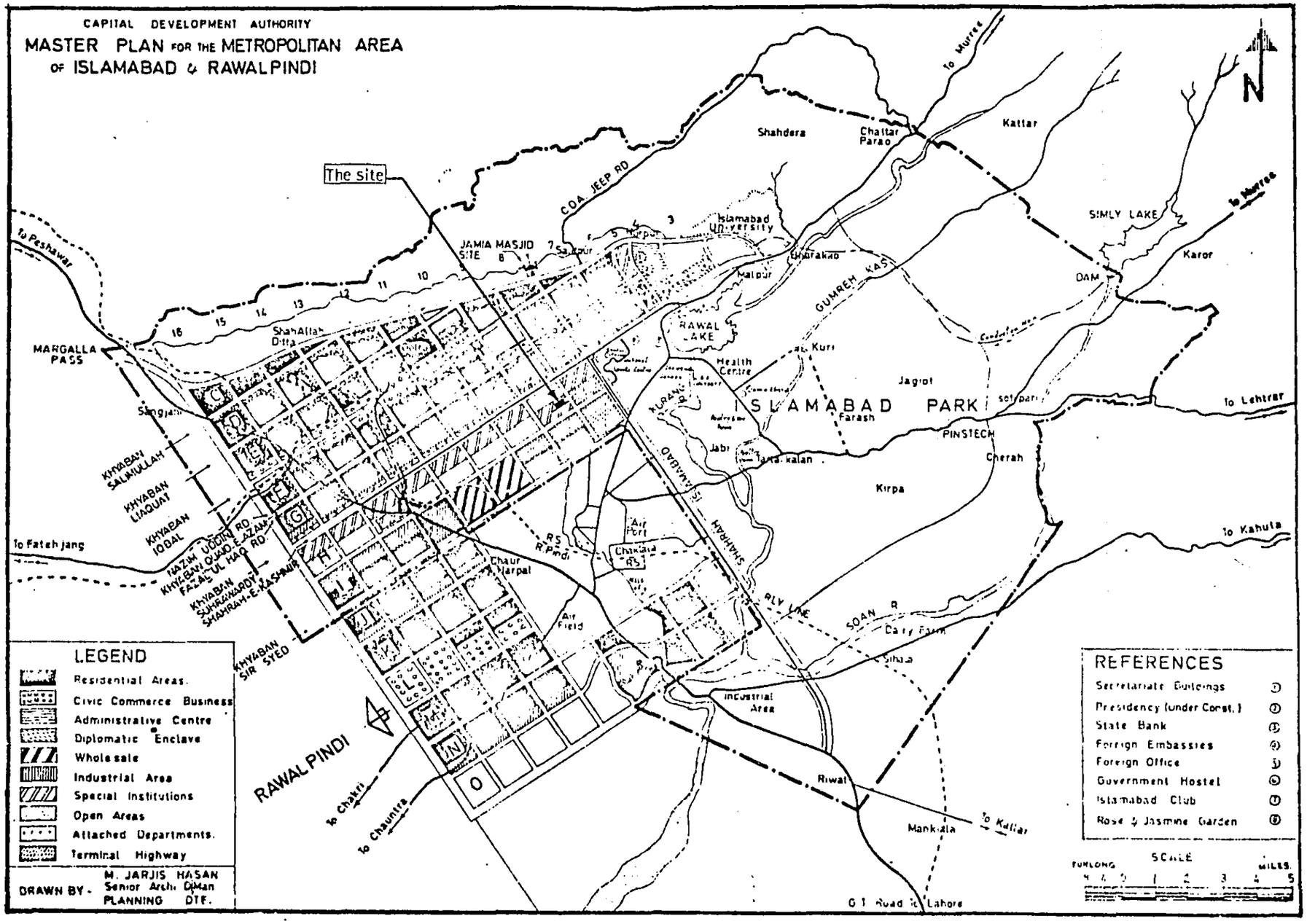
AFGHANISTAN
PAKISTAN
INDIA
IRAN (PERSIA)
ISLAMABAD
Mazar-i-Sharif
Herat
Kabul
Kandahar
Quetta
Karachi
Hyderabad
Lahore
Amritsar
Ludhiana
Jullundur
Ferozepore
Multan
Bahawalpur
Jodhpur
Jaipur
Ajmer
Bikaner
Delhi
Meerut
Agra
Kanpur
Gwalior
Jhansi
Dehra Dun
Saharanpur
Srinagar
Gilgit
Peshawar
Tropic of Cancer
GREAT RANN OF KUTCH
MOUTHS OF THE INDUS

CAPITAL DEVELOPMENT AUTHORITY

MASTER PLAN FOR THE METROPOLITAN AREA OF ISLAMABAD & RAWALPINDI



LEGEND

- Residential Areas.
- Civic Commerce Business
- Administrative Centre
- Diplomatic Enclave
- Whole sale
- Industrial Area
- Special Institutions
- Open Areas
- Attached Departments.
- Terminal Highway

DRAWN BY - M. JARJIS HASAN Senior Archi. Urban PLANNING DTE.

REFERENCES

1. Secretariate Buildings
2. Presidency (under Const.)
3. State Bank
4. Foreign Embassies
5. Foreign Office
6. Government Hostel
7. Islamabad Club
8. Rose & Jasmine Garden

SCALE

FURLONG 4 2 0 1 2 3 4 5 MILES

6

TABLE OF CONTENTS

I. DESIGN REPORT

CHAPTER 1 INTRODUCTION

The present Telecommunication Research Center which was established under the technical assistance program of the Japanese Government in 1964 at Haripur has been playing a significant role in the development of telecommunication system in Pakistan, since it is the only comprehensive research center in the field of telecommunications in that country.

However, having passed more than 10 years now since its establishment, we are beginning to observe superannuation and staleness of the research equipments, and at the same time, it has also become necessary to improve facilities for the fields of research which could respond to new technologies. And, in order to maintain a function as a research center, it has become indispensable to further improve the present facilities.

On the other hand, a plan has been considered to establish newly, the Central Telecommunication Research Laboratories in the capital of Pakistan, based on the idea that the improvement of equipments and facilities of the present Institute in Haripur would not be suffice and could not expect much result, and also that the T and T has recently moved from Karachi to the capital of Pakistan, Islambad.

Under such circumstances, a survey was conducted with two visits to the actual spot. After this preliminary survey, we have again conducted another survey necessary for the detailed designing, collecting data and visiting the actual spot from July 5 to August 9, 1976, taking as long as 36 days.

On the basis of such surveys, Nippon Sōgō Architects' and Engineers' Office, respectfully submits the report on the detailed design concerning the construction which is prepared in accordance with the contract for an execution of the work agreed upon with Japan International Co-operation Agency. This report consists of three parts, i.e., DESIGN REPORT, TECHNICAL SPECIFICATIONS and DRAWINGS.

Furthermore, the survey team conducted by Mr. T. Watanabe, was sent to Pakistan in order to submit the draft final report to the Government of Pakistan from November 15 to 29, 1976. Therefore, the agreement, in which the result of discussion between the Government of Pakistan and the team was stated, was signed by both representatives. The agreement is attached herein as APPENDIX-3 of DESIGN REPORT. TECHNICAL SPECIFICATIONS and DRAWINGS are amended and finalized in accordance with the agreement.

CHAPTER 2 CONDITIONS FOR DESIGN

2-1 ISLAMABAD

In accordance with the new and drastic city planning, construction of the city of Islamabad, the capital of Pakistan, was started to take place in 1961. 15 years has past since then, and we now see a remarkable development of this new city, both in terms of its content as well as its character; the city is now fulfilling the role that had been expected.

The population of Islamabad is now over 230 thousands, the city area is 419.83 km^2, and the area of Islamabad Park is 489.25 km^2, all together constituting 909.08 km^2.

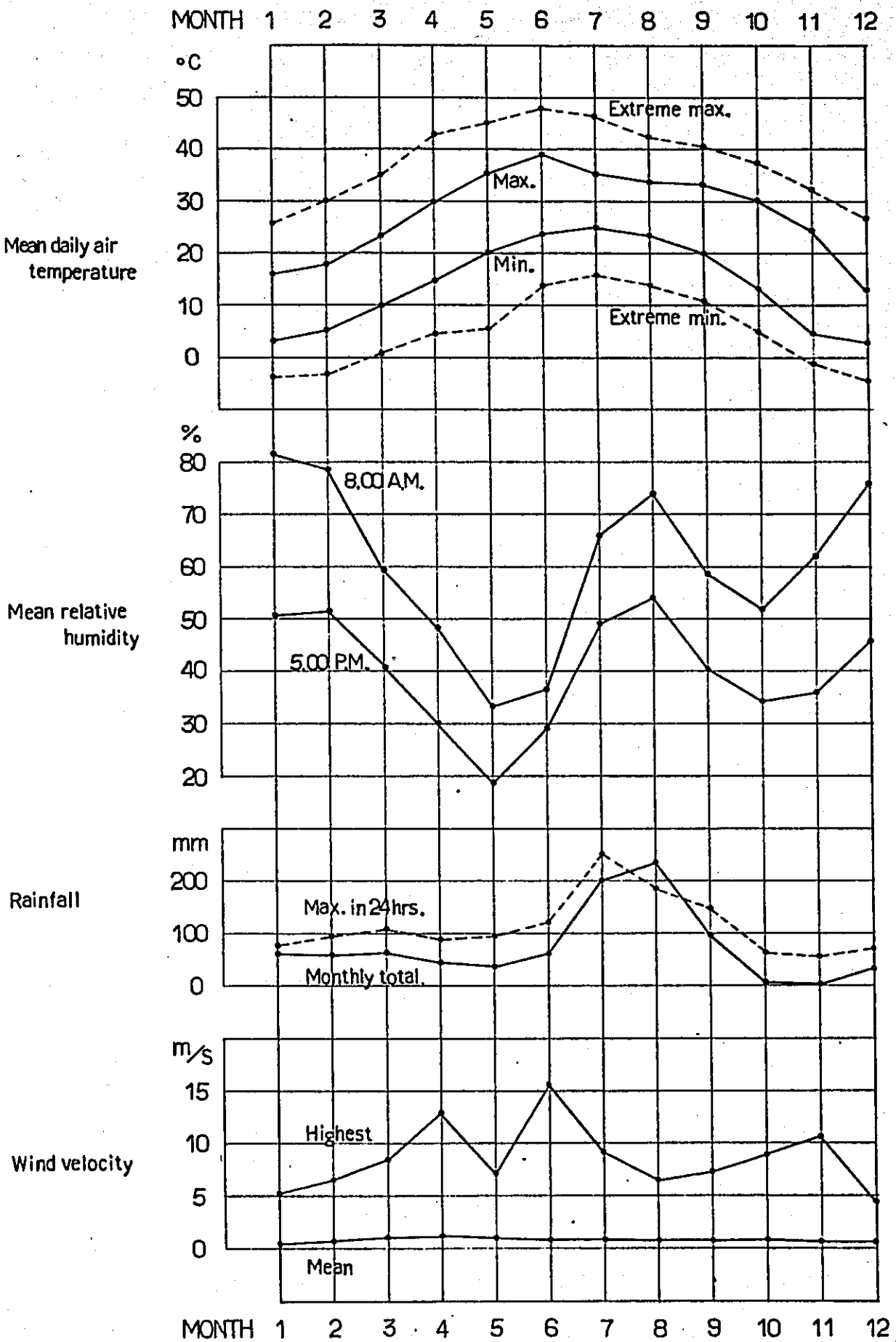
Islamabad is located at the foot of the Murree Hills, north east proximity of Rawalpindi. It is at 503 - 610 meters above the sea level, forming a mild slope, and situating 33°36' - 33°49' North Latitude, 72°50' - 73°24' East Longitude.

2-2 CLIMATE

Pakistan is under a very severe climatic condition, compared with other part of Indian sub-continent, that it occupies the hottest spot for the summer and coldest spot for the winter and furthermore, rain is most scarce. But within the country, compared with other areas, Islamabad is said to have more rain fall and the temperature is comparatively low and the trees are growing well.

However, the heat during May, June and July is severe, and the temperature during the daytime could get as high as 45°C. August to September is a monsoon season but the rainfall is comparatively small and the sand storm could occasionally hit. When November comes, the temperature suddenly goes down and it becomes the most comfortable season of the year. In winter, it seldom gets below 0°C, however, it is said to be very severe. The Fig.-1 shows the climatic data in Rawalpindi area.

FIG-1 CLIMATIC DATA IN RAWALPINDI



2-3 THE SITE

The location of the site is at No. 31, 32, 33, H 9/4, Islamabad. This area is within the Special Institution Zone in the city planning, and it is considered to be an appropriate site.

The site forms a moderate slope from north to south, and in the proximity of the southern boundary, the land suddenly goes down forming a depression. The details of the site may be referred to Fig.-2, site survey map.

It is noted that at the time of the site survey, it was recognized that the following points would cause certain difficulties in the course of planning and construction.

(1) Water supply tank within the site and the pump house which is on the front road both situate where the approach is planned for the new construction.

(2) The electric poles also interferes the plan.

(3) We observed farmers tilling the site where we propose the main building. Since the water which is used for plants will be absorbed in the ground and lower its loading capacity, the tilling should be stopped immediately.

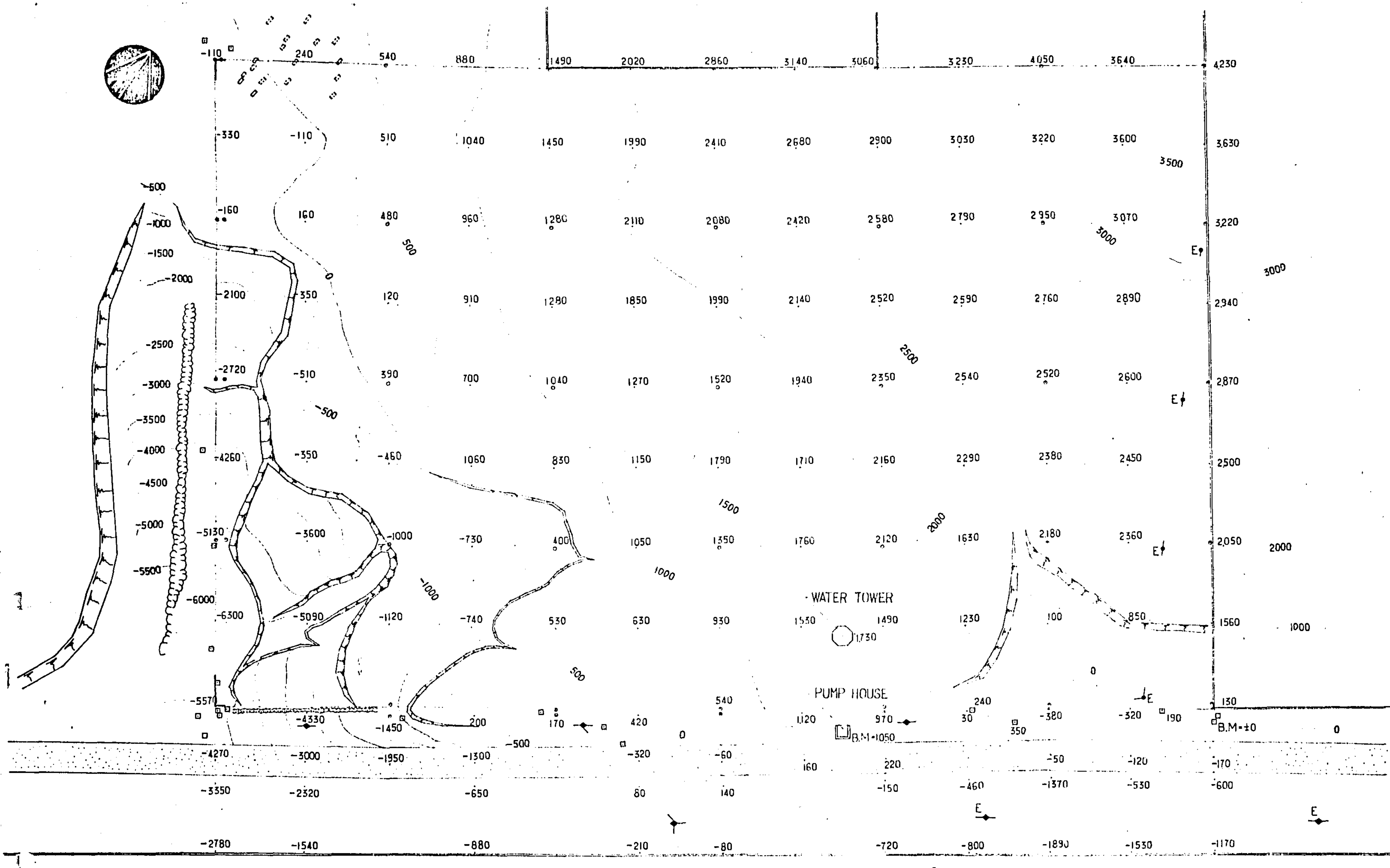


FIG-2

SITE SURVEY MAP 1:1000

CTRL ISLAMABAD

2-4 SUBSOIL INVESTIGATION

The subsoil at Islamabad generally consists of clay up to the depth of 10m - 20m from the ground surface and boulders mixed with sand and gravel in lower strata.

The boring and the standard penetration tests were executed to confirm the subsoil condition in the CTRL site. Drillings were carried out at five points of No. 1 - No. 5. No. 1, No. 2 and No. 3 points were at the site of the main building, and No. 4 and No. 5 points were at the site of the annex. Boring was executed up to the depth of 20m from the ground surface respectively. Standard penetration tests were executed at 1.5m intervals.

The result of boring made clear that the subsoil up to the explored depth are laid silt and boulders mixed with sand and gravel cannot be found out.

The depth of investigation is shown in Appendix-1.

As the result of the standard penetration test, the bearing capacity of the subsoil can be considered 15 t/sq.m for the foundation of the main building at the depth of 2m and for the annex at the depth of 1m from the ground surface. CDA has adopted 1.5 t/sq.f. as the value of the authorized bearing capacity of the subsoil at Islamabad area.

In case of the above value, it is desirable to design continuous footings under main frames and mat foundations under cores and pile foundation is not required for the main building of four stories. Individual footings for the annex of single story.

However, it is necessary to execute a plate loading test of soil for confirmation of the bearing capacity of soil.

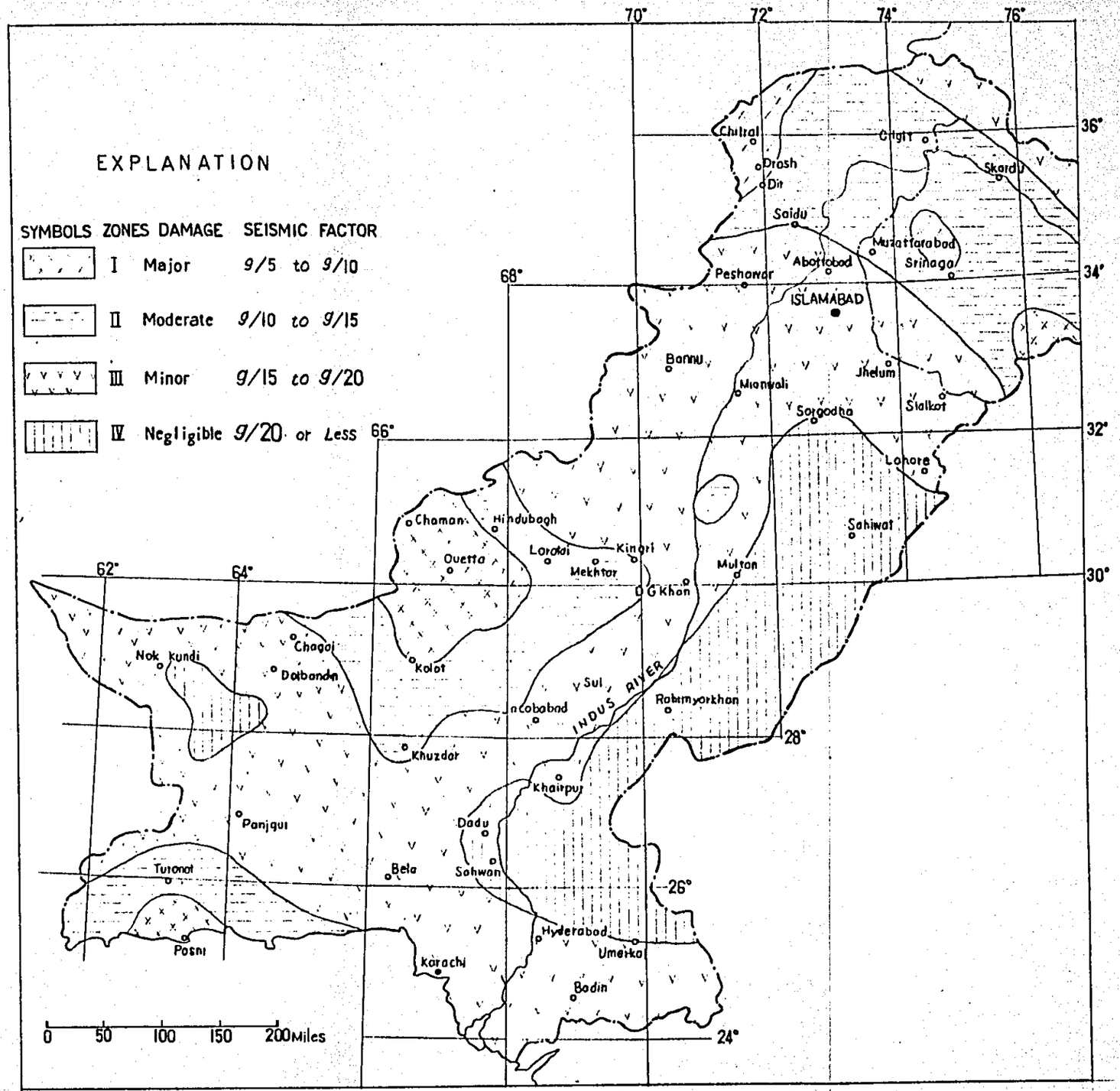
Ground water table was encountered in No. 4 at the depth of 18.58m and in No. 5 at 18.30m below the B.M., but in other points it was not encountered.

2-5 EARTHQUAKE

According to "SEISMIC ZONES OF PAKISTAN" which is shown in Fig. 3 Islamabad lies in the zone No. III of the seismic range. The seismic factor of this range are the low values of g/]5 - g/20 and the degree of damages caused by earthquake is minor.

FIG-3

SEISMIC ZONES OF PAKISTAN



2-6 URBAN FACILITIES TO THE SITE

We have obtained the drawings of the related facilities around the site from CDA, but we found some discrepancies between the CDA drawings and the result of our survey, and it is still necessary to re-confirm the CDA drawings. As for the water supply system, the plumbing is broken and some part of it is left open within the manhole and shows no sign of water ever got through.

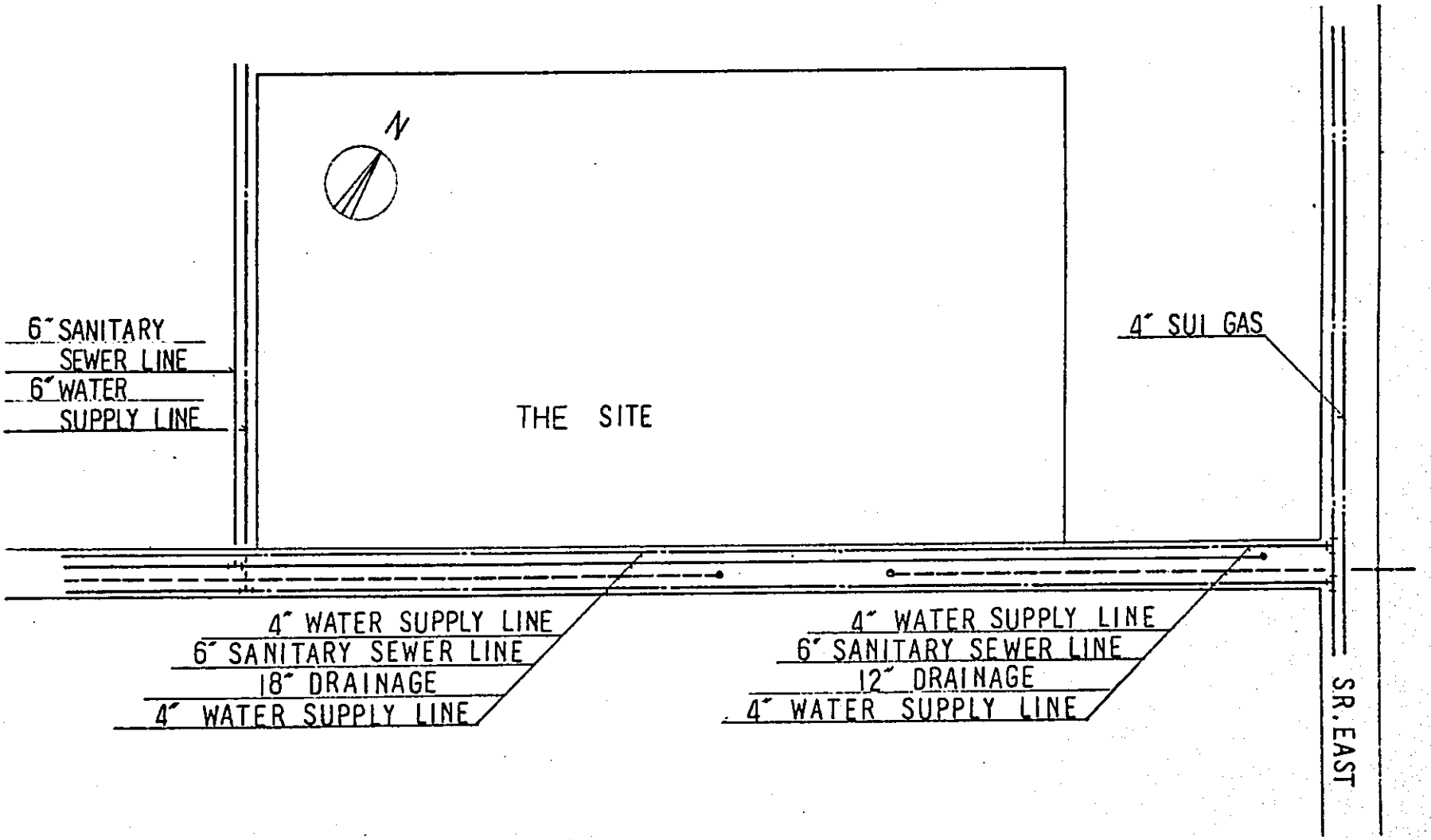
As for the survey of Sui Gas, there is no main pipeline along the front road, and 4" major pipe is laid down along the east main road, and from there 2" pipe will have to be laid down under the ground along the front road.

It was directed to us that the gas pipes of the building should be the ones which would be exposed outside the building and at the each of the virtical pipe, control valve should be attached. It is understood that before using the gas, a sum of security money shall be deposited, the amount of which is based upon the assumption of the gas used in the three months ahead. Furthermore, in accordance with the situation, a certain share shall be imposed. The installation of the fense around the gas meter will be made by Sui Gas, but the maintenance will be the responsibility of the user.

According to the survey of the WAPDA, Grid Station will be constructed at about 1.5 miles from the site in 1977, but the demand of our project would not be satisfied unless the construction of the Grid Station is completed. The cost necessary for the wiring from the Grid Station to the site will have to be shared, the amount of which is estimated to be about 100,000 Rupees.

The Fig.-4 shows outline of the urban facilities to the site.

FIG-4 MAP OF URBAN FACILITIES



2-7 BUILDING REGULATIONS

We were told that the Islamabad Building Regulations; 1963 applies to all the constructions of buildings in Islamabad, and that there is no other regulations applicable to our project.

There is no criteria set for the facilities of fire prevention, but we were recommended to provide the following facilities.

(1) Automatic fire alarm system with push button break glass system

(2) Fire resistance/smoke resistance doors (with self closing devices)

(3) Emergency lighting in the staircase

(4) Hose reel on each floor in both the staircase

(5) Dry riser with outlet on each floor in both the stair cases.

(6) Fire hydrants at two places outside the main building

(7) Fire extinguishers

(8) Fire alarm system for notification to the fire stations

(9) Illumination and marking of the exit route and the final exit

2-8 CONSTRUCTION MATERIALS AND LABOUR

The major construction materials produced in Pakistan are, cement, aggregates, reinforcing bar and bricks. Glass is produced domestically, but the quality is not good enough, and the good quality glasses are the imported ones. There is Karachi produced aluminum shash, but they are also in lower quality and the good quality shashes are those imported. As for the interior finishing materials, the materials other than plaster finish are all depended upon importation. It is said that the nearest place from where importation is made is Singapore.

Skilled laborers are said to be scarce since construction has been quite active in Pakistan. Ordinary laborers could easily be recruited but we were told that during the harvesting season (from April to July), labour is scarce, and generally speaking, the efficiency is low.

As for the cost of construction, the only literature publicly announced is the "Schedule of Rates for Building and Road Works, 1973" published by PWD. The actual current unit cost compared with this "Schedule of Rates, 1973", according to PWD, is 150% to 170% higher. CDA is presently using the 1968 edition of "Schedule of Rates", and therefore the actual rates are 225% to 250% higher compared with it, they say. It was noted that in case of the PWD's work, cement, reinforcing bar and water proof material of asphalt are the supplied materials.

CHAPTER 3 GENERAL PLANNING

3-1 PRELIMINARY BUILDING DESIGN

1. BASIC IDEA

Progress in technical innovations in the field of telecommunications has been quite fast for the last decades and will continue to be so for the coming years. Proposed Central Telecommunication Research Laboratories at Islamabad is expected to make a great contribution to this end.

The whole scheme is worked out to provide ideal environment for the research work of scientists and engineers. It is not good enough for this kind of building to satisfy the present need. Flexibility is the most important consideration. It should be able to cope with the unknown functional requirements of tomorrow. It should also be able to expand without decreasing efficiency or disturbing research personnel.

It goes without saying that architectural integrity should be achieved at each stage of expansion.

What is presented here materializes these basic ideas for the central telecommunication laboratories.

2. OUTLINE OF BUILDINGS

Main Building

Reinforced Concrete Structure, Four Stories

Total Floor Area	5,747 m^2
Ground Floor	1,394 m^2
First Floor	1,394 m^2
Second Floor	1,394 m^2
Third Floor	1,394 m^2
Penthouse	171 m^2

Annex

Reinforced Concrete Structure, Single Story

Total Floor Area 1,118 m^2

Open Corridor

Reinforced Concrete Structure, Single Story

Total Floor Area 28 m^2

3. SITE DEVELOPMENT

CTRL, Islamabad site consists of the area of 60,000 m^2 with the access road on the southern border. Two principal structures are proposed. The main building is located parallel to the access road and the annex at right angles to it. The garage (optional) and the gate (optional) together with the landscaped garden at the center complete the scheme. Expansion in several stages up to three times as large as the proposed plan is expected. It is accommodated in separate buildings to the north and east of the proposed buildings. Each stage is designed in such a way that the architectural integrity is kept on its own right.

A third of the site will be reserved for the field experiments and other like purposes even after the completion of the final stage.

4. MAIN BUILDING

The main building, which is four stories high in view of efficient planning and site use, is of reinforced concrete structure and has the total floor area of 5,747 m^2. Basic grid of 1.2m is chosen as the optimum module.

The central corridor is joined by two building cores at both ends to make vertical traffic easy and to secure two-way emergency exit. Core walls as well as several walls on the ground floor and on the first floor serve as earthquake resistant walls. The laboratories are lined on the north of the central corridor and corresponding offices on the south of it. The ceiling height of the offices and the central corridor is 2.7m. The laboratories have no false ceiling for the sake of free planning where the height of the beam underside from the floor is 3.3m.

All inhabited rooms are air-conditioned. It secures comfortable room atmosphere together with the outdoor sun control device which is an indispensable part of the building. In case more capacity is required such as in the computer room and in the electrical switching machine room, extra air-conditioning machine could be installed nearby.

Flexibility in terms of planning and electrical and mechanical arrangement is the most important consideration for this kind of building. Movable partition is adopted, where it is possible, to permit future room change.

The laboratories allow design superimposed floor slab load of 500 kg/m^2 and the corridor and offices 300 kg/m^2 respectively. However, all the third floor is designed to allow 500 kg/m^2 so that the entire floor can be used as laboratories. The ground floor slab could be reinforced to allow more than 500 kg/m^2, if necessary. Foundations for microwave antennas are provided on the penthouse roof.

All the horizontal wirings and pipings as well as plumbings for the laboratories run through under-the-floor-trench on the ground floor, which extends to the annex on one end. On the other end, they branch out vertically at every column line in the laboratories by the corridor wall. It is only at this Laboratory Service Space where they go through the floor slab up to the third floor. In principle, they are uncovered and can be added or removed as need may be at any time to suit each function of the laboratory. In the laboratories, they run under the floor slab and come down where the equipment is located except the drain which should run on the floor slab and go up. Water supply and drain as well as natural gas pipe could be installed in the laboratories between column line X_2 and X_7. The exhaust can also be installed in the same laboratories, in which case the fan should be put on the roof.

5. ANNEX

Annex, which is of reinforced concrete structure, is a single storied building of 1,118 m^2 and houses electrical and mechanical facilities for the main building as well as the workshop and other small rooms.

Its low profile contrasts with the main building to make an architectural unity together with the open corridor in between.
In case the laboratories are expanded, the workshop shall be moved to a separate building to allow electrical and mechanical facilities expand accordingly. The relocation loss will be minimal in this way.
The height of the beam underside from the floor is 3.6m. The workshop and mechanical and electrical equipment rooms are ventilated together with other small rooms.

6. AIR-CONDITIONING SYSTEM

1) The air-conditioning system for the main building is composed of self-contained air-conditioners, cooling towers, condenser water pumps, control panels, instruments for automatic control, piping work, ducting work and electrical wiring. The self-contained air-conditioner is installed in the machine room located in the building cores at each floor, and the conditioned air is supplied to individual rooms through the duct. The cooling tower and the condenser water pump are installed on the roof. Outdoor air for each air-conditioned room is supplied by using outdoor air fans installed in the penthouse.
This system produces heated air as well as cooled air. The heating system is composed of electric heaters and water spray humidifiers equipped in the self-contained air conditioner.
In laboratories such as Data Communication Lab., Circuit Component Lab. and Switching System Lab., an additional self-contained air-conditioner could be installed either in the laboratory itself or in a nearby room as the case may be.

The rooms to be air-conditioned in the main building are offices, laboratories (except the anechoic room) and the library, etc. Design temperature is 27°C in summer and 20°C in winter. Design relative humidity is 50%.

2) The rooms to be ventilated mechanically in the main building are lavatories, kettle rooms, the lift machine room, etc. Laboratories between column line X_2 and X_7 of the main building could be equipped with the exhaust if required.
In the annex, the rooms to be ventilated are the workshop, mechanical and electrical equipment rooms, storages, the lavatory and the painting room, etc.

7. ELECTRICAL INSTALLATIONS

1) Primary electric service is as follows. The permanent electrical supply is received from primary service connections. Current characteristics are 11,000V, 3-phase, 3-wire, 50 Hz, A.C. Conduit work in the site is to be done by Japan. Conduit work out of the site as well as all primary cable work up to the primary switchgear shall be performed by Pakistan.

2) The indoor type incoming transformer and switchgears are to be installed in the electrical equipment room (sub station) in the annex. The transformation is from the primary (11,000V, 3-phase, 3-wire, 50 Hz) to the secondary (400/230V, 3-phase, 4-wire, 50 Hz).

3) Feeders are to be laid from the low voltage switchgear in the sub station to final distribution boards or to control panels fixed in the main building. Current characteristics are as follows:

For lighting	400/230V,	3-phase, 4-wire, 50 Hz
For power	230V,	3-phase, 3-wire, 50 Hz
For laboratories	100V,	3-phase, 3-wire, 50 Hz
	230V,	3-phase, 3-wire, 50 Hz

4) Lighting fitting installation, mainly fluorescent lamp, is designed to secure adequate luminous intensity depending on the function of the room. Its location allows alteration of room partitions in future.
Socket outlets for general use is to be installed for each room.

5) The laying of telephone conduits as well as the installation of telephone outlet plates is to be carried out by Japan. The rest shall be done by Pakistan.

6) Provision of complete earthing system for electrical installations is considered. It includes earthings from earth electrodes up to electrical equipments, telephone exchangers, etc. The resistance between the earthing systems and the related earth electrodes shall not exceed the value required by regulations.

7) Lightning protection system shall be installed in a manner a-proved by regulations.

8) A lift is to be installed in the main building which has the weight capacity of 750 kg (1,650 lb). Its speed is 60 m/min. (200 ft/min.) and the number of floors to be served is four.

8. PLUMBING AND SANITARY EQUIPMENT

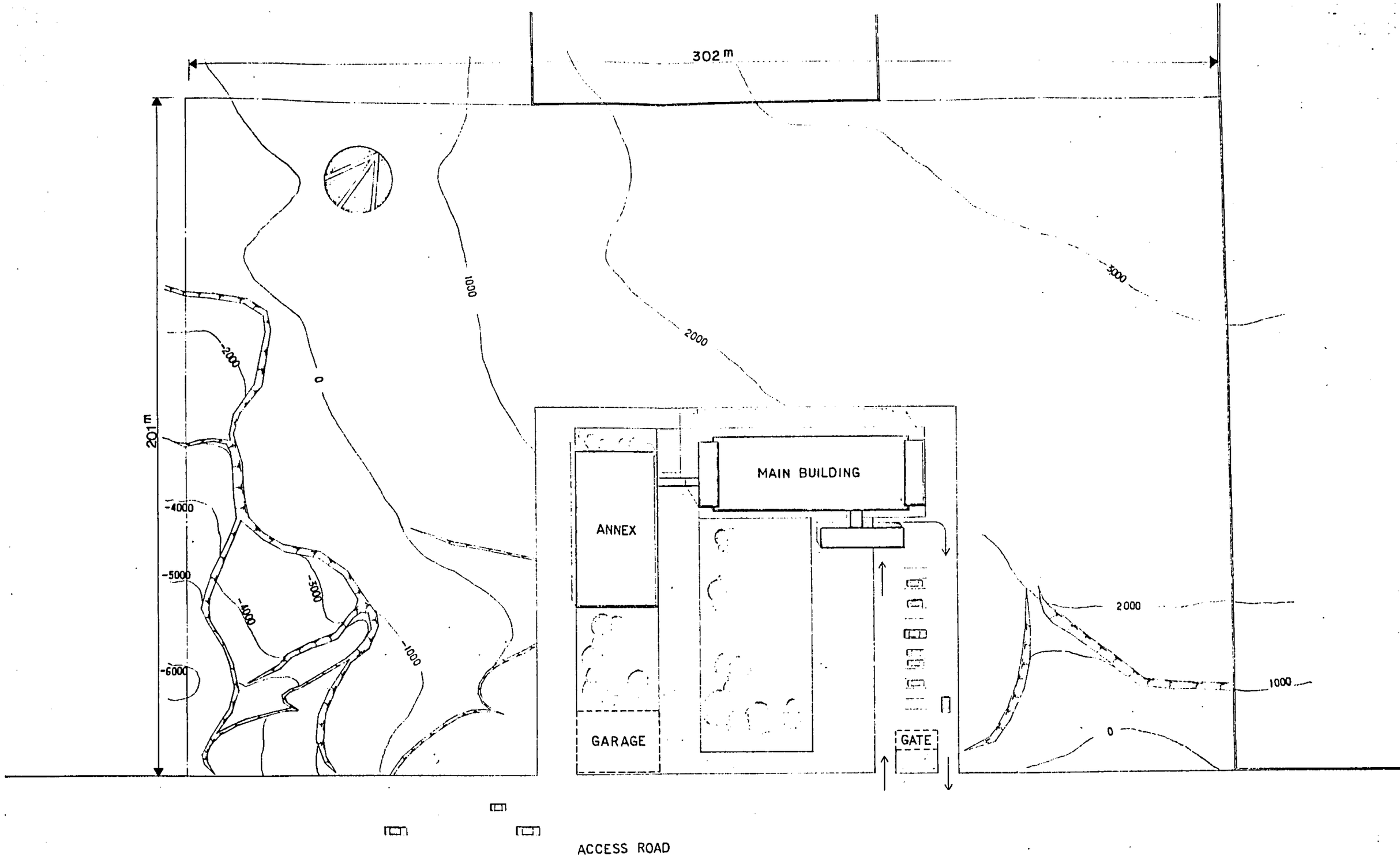
1) Water supply installations are as follows.
A suction tank connected with municipal water supply main is installed in the annex. The water is piped to the main building and raised to the water tank in the penthouse, then supplied to fixtures in the lavatories, kettle rooms, etc. by downfeed system. Water supply to fixtures in the annex is by direct water supply system.
In order to supply water to laboratories between column line X_2 and X_7 of the main building, horizontal piping is to be installed under the roof slab. Vertical pipings could be connected with the horizontal piping as required. For Outside Laboratory on the second floor and for Circuit Component Laboratory on the third floor, the branch pipings are to be installed, but they are closed with plugs at the end for the moment.
Plumbing work from the municipal water supply main up to the water meter and the water meter itself shall be installed by Pakistan.

2) Sanitary fixtures to be installed in the lavatories are closets, urinals, wash basins and slopsinks. A stainless steel sink is to be installed in the kettle room. For the closets and urinals, flush valve water system is used on the ground floor through second floor of the main building and in the annex. Low tank water closets and high tank water urinals are used on the third floor of the main building.

3) Drainage installations are as follows.
The soil and waste sanitary pipings from lavatories, kettle rooms, etc. are to be connected with

municipal sanitary sewer main. The storm water is to be piped to municipal drainage main. Plumbing between terminal catch basins, which are to be installed by Japan, and the main shall be installed by Pakistan.
In order to drain from laboratories between column line X_2 and X_7, capacity of horizontal main pipe which runs through under-the-floor-trench on the ground floor is designed to have adequate margin.
For Outside Laboratory and Circuit Component Laboratory, the vertical branch pipings are to be installed with plugs at the end.
As vent pipe systems, both circuit vent and branch vent are used.

4) Natural gas (Sui Gas) installations are as follows.
It is planned that the gas water heater is to be installed in the kettle room. It is also planned that the main gas pipe is to have adequate capacity margin to supply gas for laboratories between column line X_2 and X_7, if need be.
Piping work between the municipal gas main and the governor as well as the governor itself in the annex shall be done by Pakistan.



SITE PLAN 1:1000

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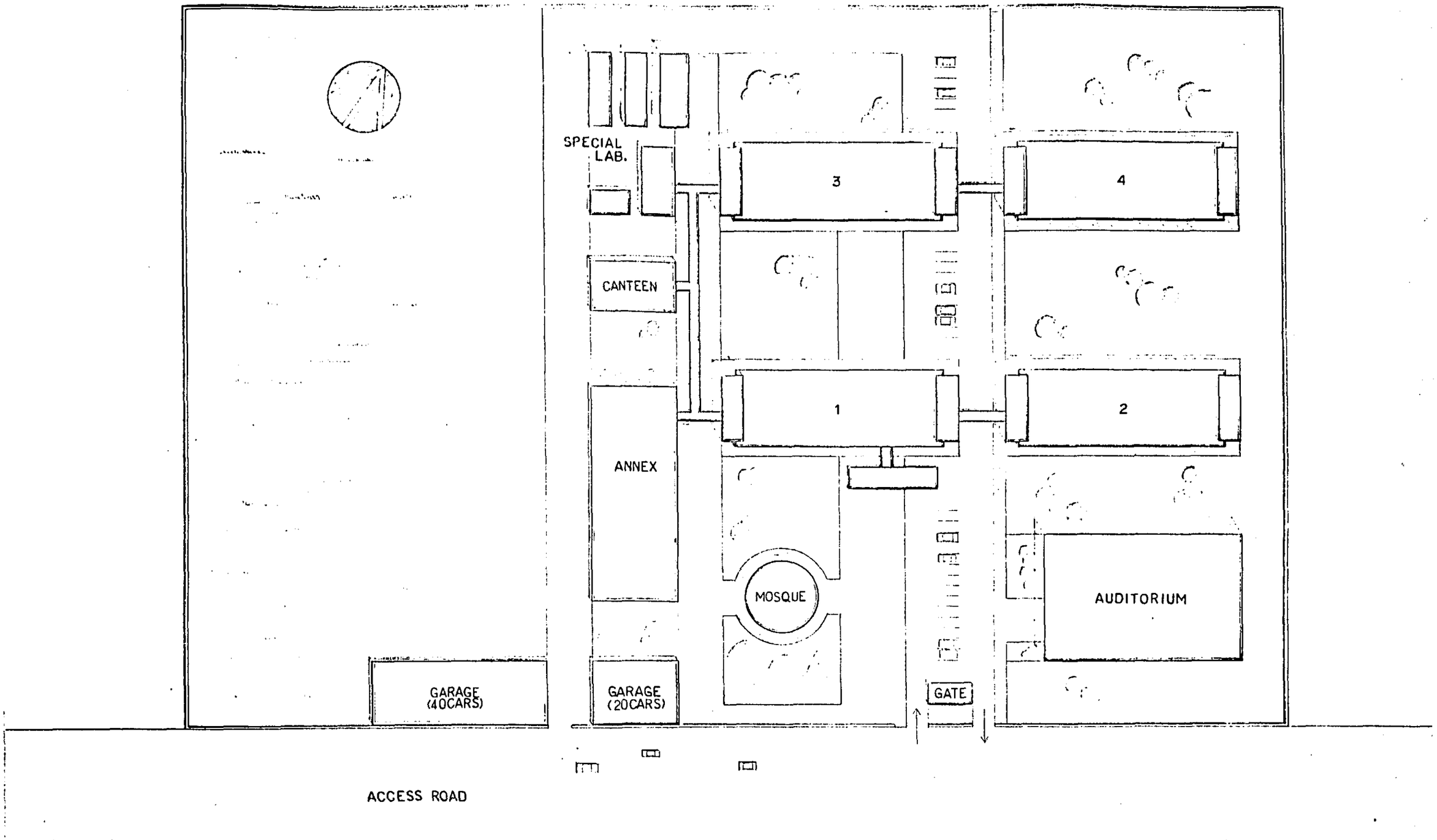

EXTENSION PLAN 1:1000

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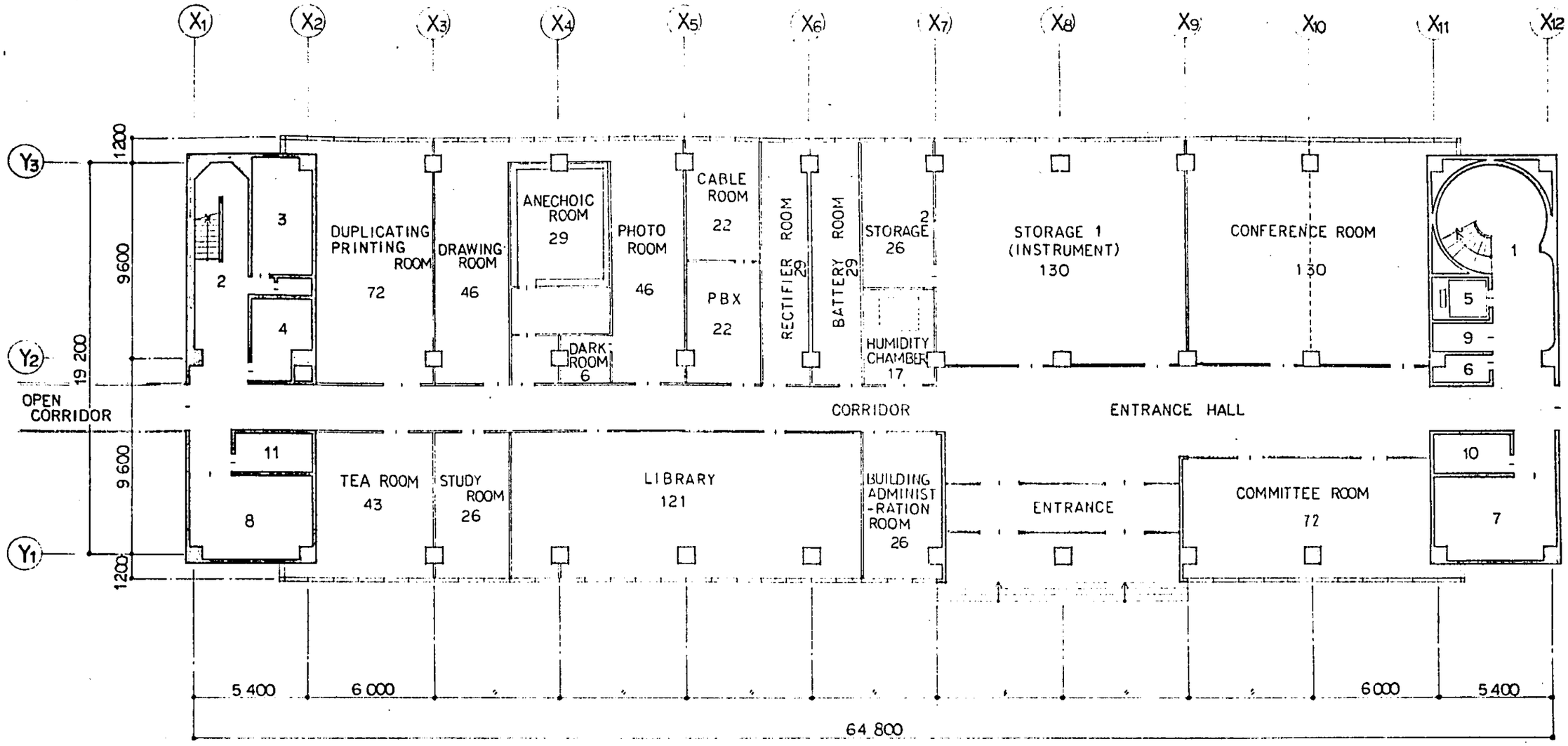
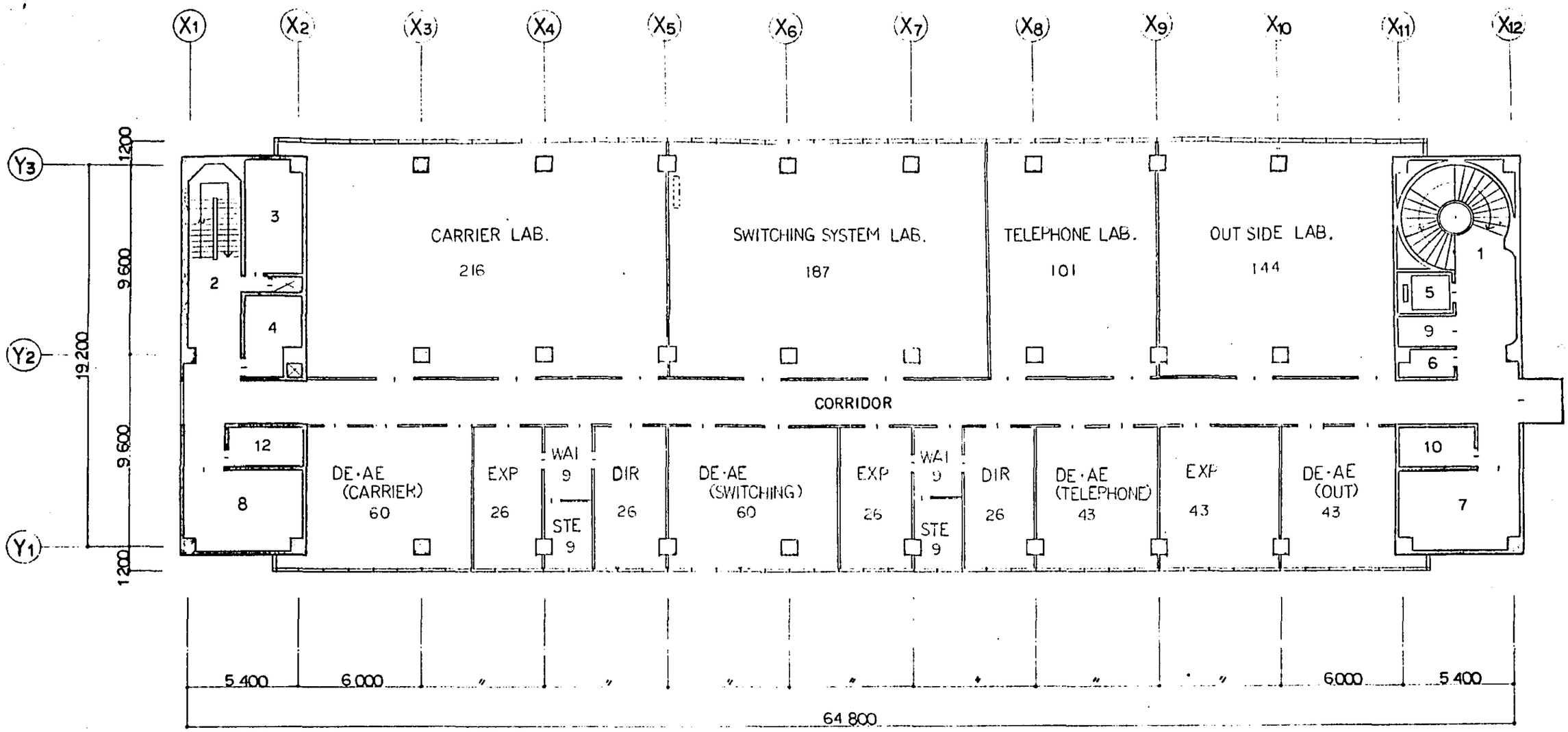


1 STAIRCASE 1
2 STAIRCASE 2
3 LAVATORY (MEN)
4 LAVATORY (OFFICER)
5 LIFT
6 ELECTRIC SPACE
7 AIR CONDITIONING MACHINE ROOM 1
8 AIR CONDITIONING MACHINE ROOM 2
9 STORAGE 3
10 STORAGE 4
11 LAVATORY (WOMEN)

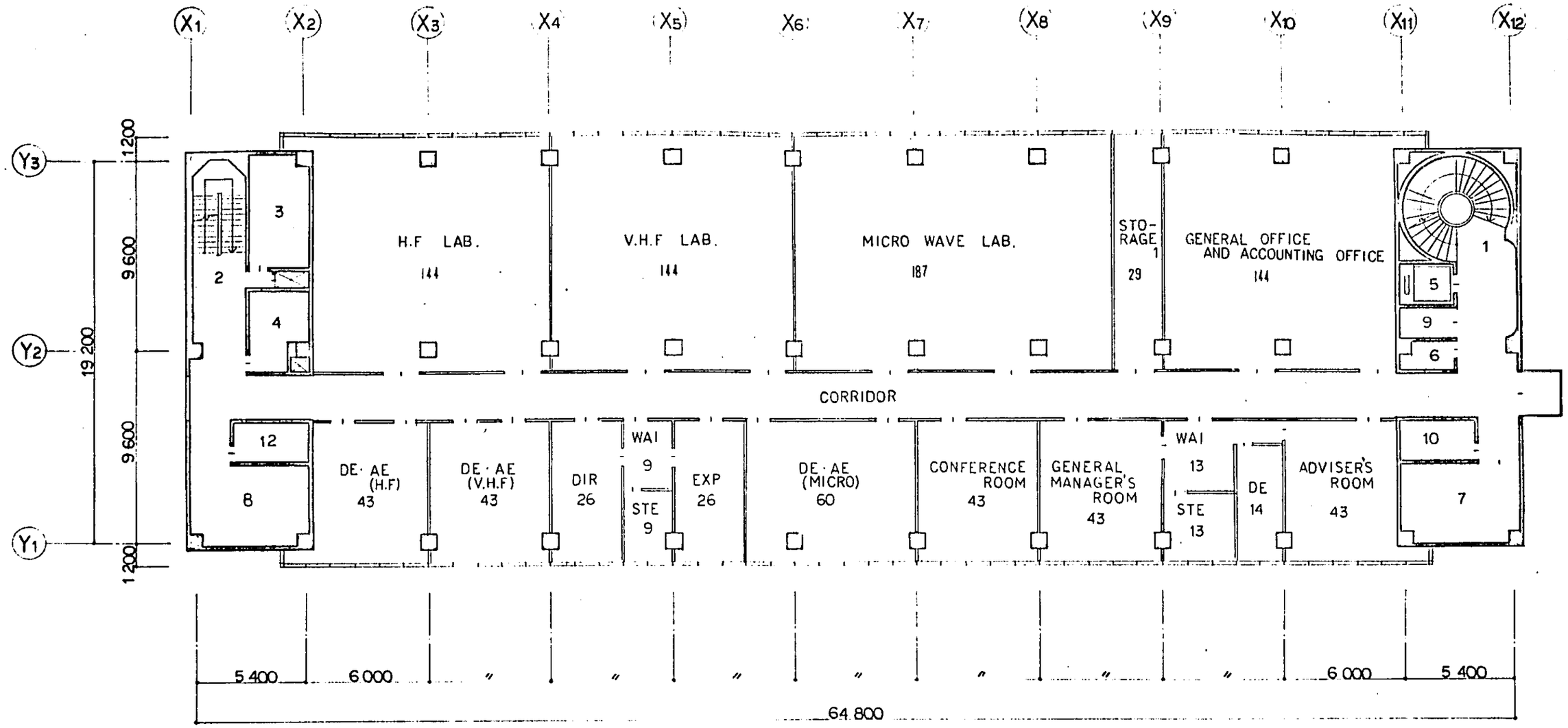
MB GROUND FLOOR PLAN 1:200
CTRL ISLAMABAD 3



1 STAIRCASE 1
2 STAIRCASE 2
3 LAVATORY (MEN)
4 LAVATORY (OFFICER)
5 LIFT
6 ELECTRIC SPACE
7 AIR CONDITIONING MACHINE ROOM 1
8 AIR CONDITIONING MACHINE ROOM 2
9 STORAGE 1
10 STORAGE 2
12 KETTLE ROOM

DE DIVISIONAL ENGINEER'S ROOM
AE ASSISTANT ENGINEER'S ROOM
DIR DIRECTOR'S ROOM
WAI WAITING ROOM
STE STENOGRAPHER'S ROOM
EXP EXPERT'S ROOM

MB FIRST FLOOR PLAN 1:200
CTRL ISLAMABAD 4

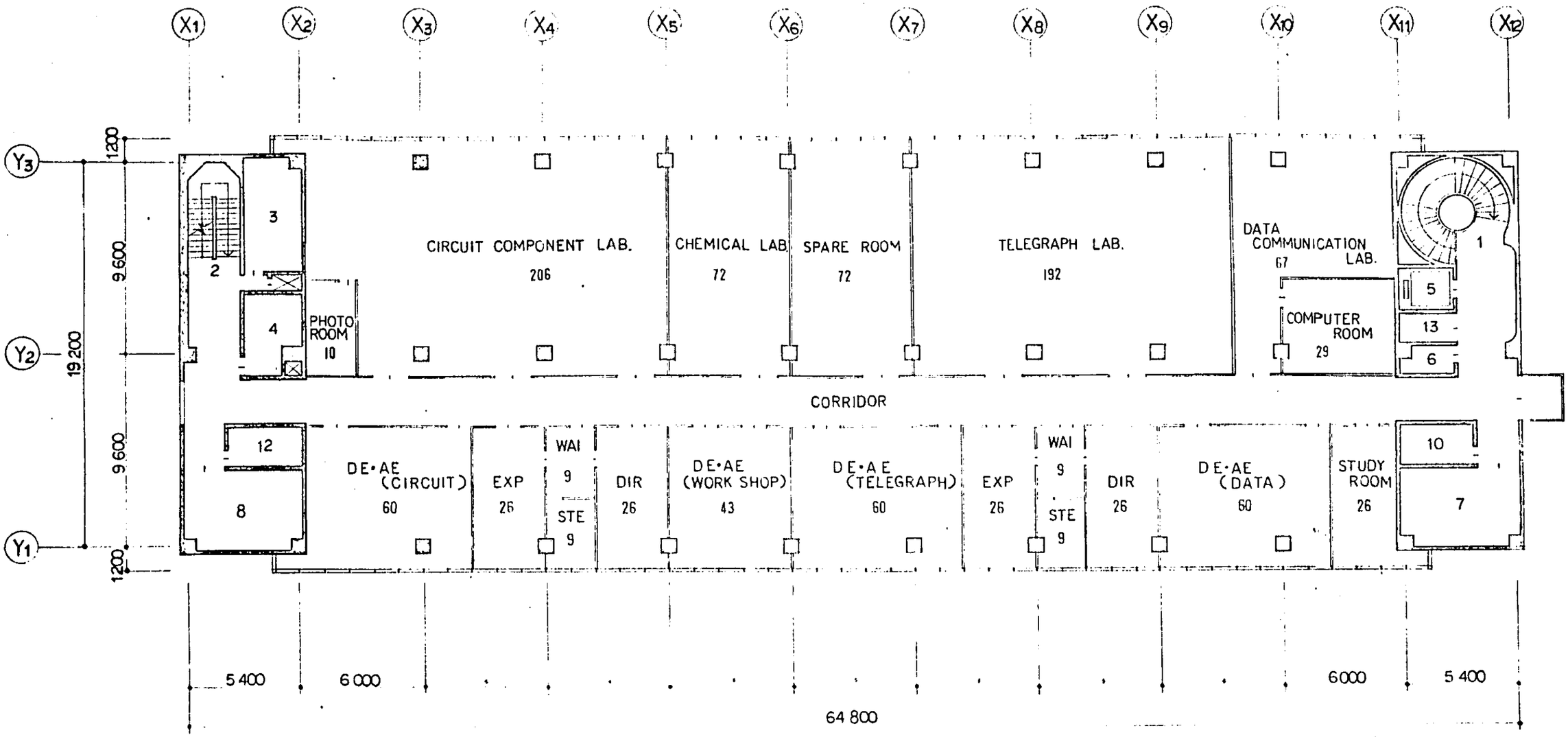


1 STAIRCASE 1
2 STAIRCASE 2
3 LAVATORY (MEN)
4 LAVATORY (OFFICER)
5 LIFT
6 ELECTRIC SPACE
7 AIR CONDITIONING MACHINE ROOM 1
8 AIR CONDITIONING MACHINE ROOM 2
9 STORAGE 2
10 STORAGE 3
12 KETTLE ROOM

D E DIVISIONAL ENGINEER'S ROOM
A E ASSISTANT ENGINEER'S ROOM
DIR DIRECTOR'S ROOM
WAI WAITING ROOM
STE STENOGRAPHER'S ROOM
EXP EXPERT'S ROOM

MB SECOND FLOOR PLAN 1:200
CTRL ISLAMABAD 5

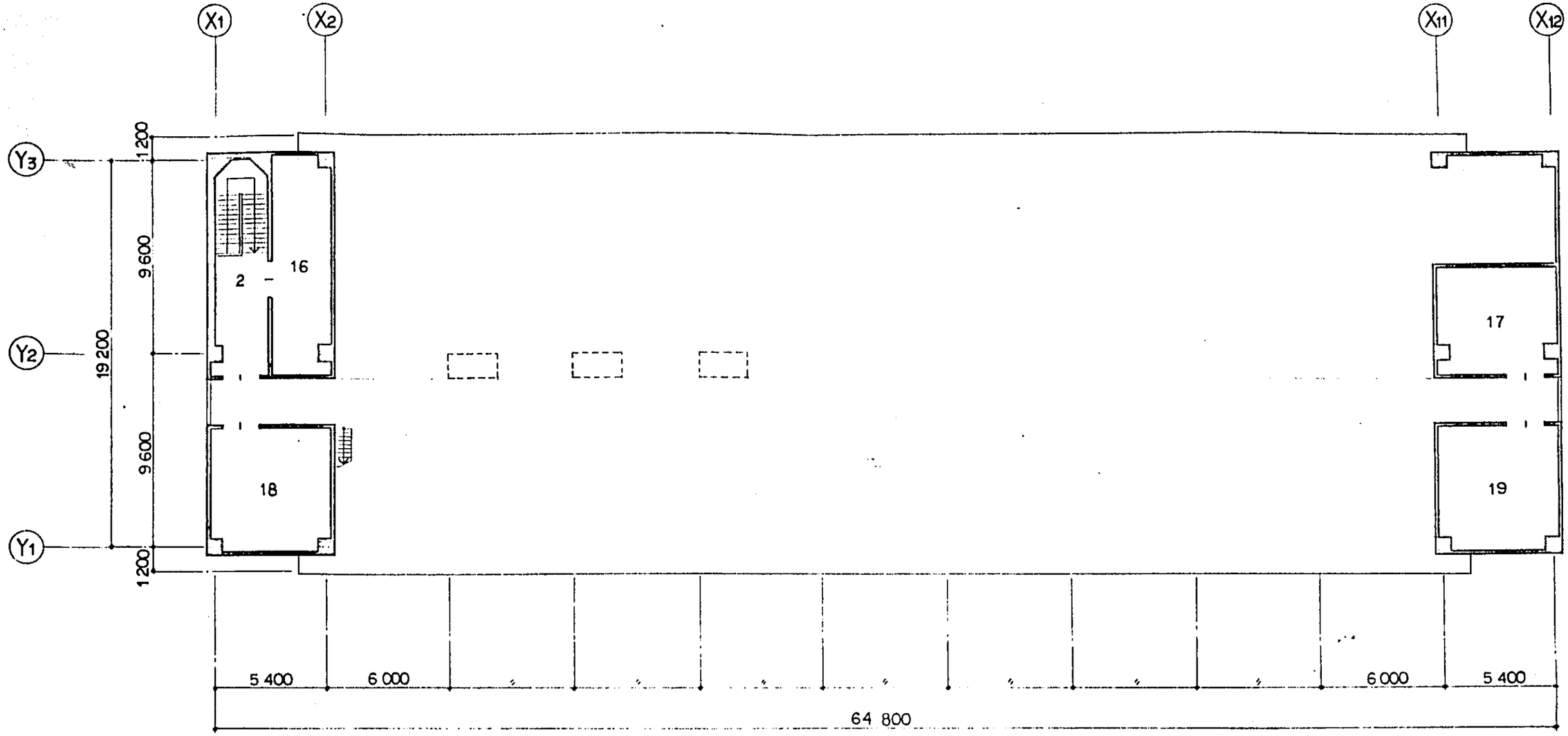
36



1 STAIRCASE 1
2 STAIRCASE 2
3 LAVATORY (MEN)
4 LAVATORY (OFFICER)
5 LIFT
6 ELECTRIC SPACE
7 AIR CONDITIONING MACHINE ROOM 1
8 AIR CONDITIONING MACHINE ROOM 2
10 STORAGE
12 KETTLE ROOM
13 AIR CONDITIONING MACHINE ROOM 3

DE DIVISIONAL ENGINEER'S ROOM
AE ASSISTANT ENGINEER'S ROOM
DIR DIRECTOR'S ROOM
WAI WAITING ROOM
STE STENOGRAPHER'S ROOM
EXP EXPERT'S ROOM

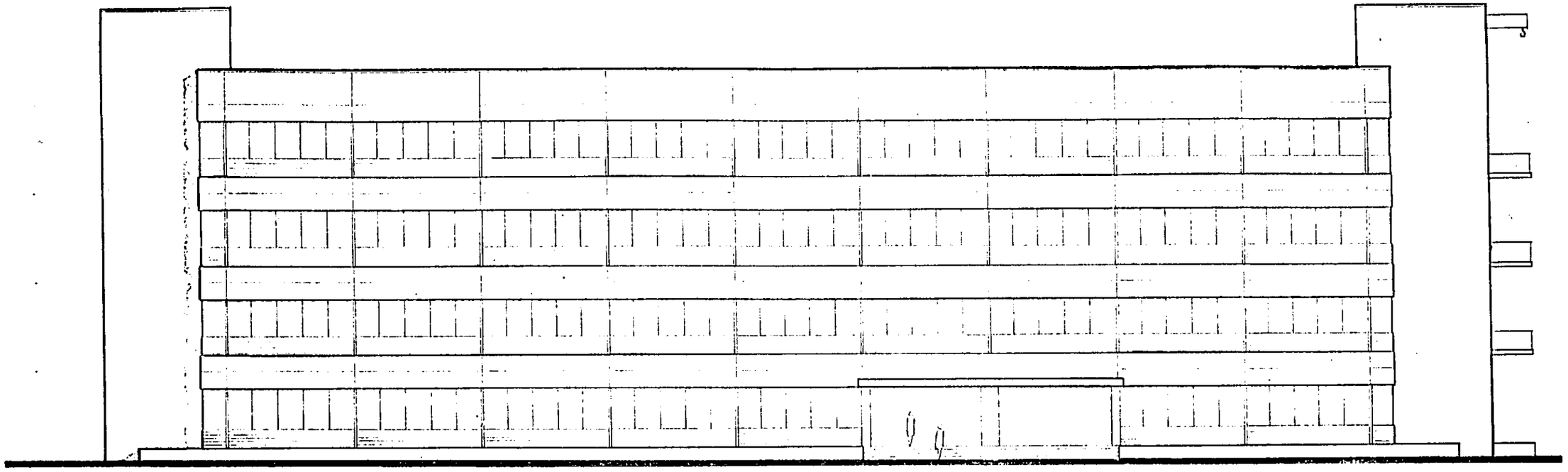
MB THIRD FLOOR PLAN 1:200
CTRL ISLAMABAD 6



2 STAIRCASE 2
16 WATER TANK & FAN ROOM
17 LIFT MACHINE ROOM
18 FAN ROOM 1
19 FAN ROOM 2

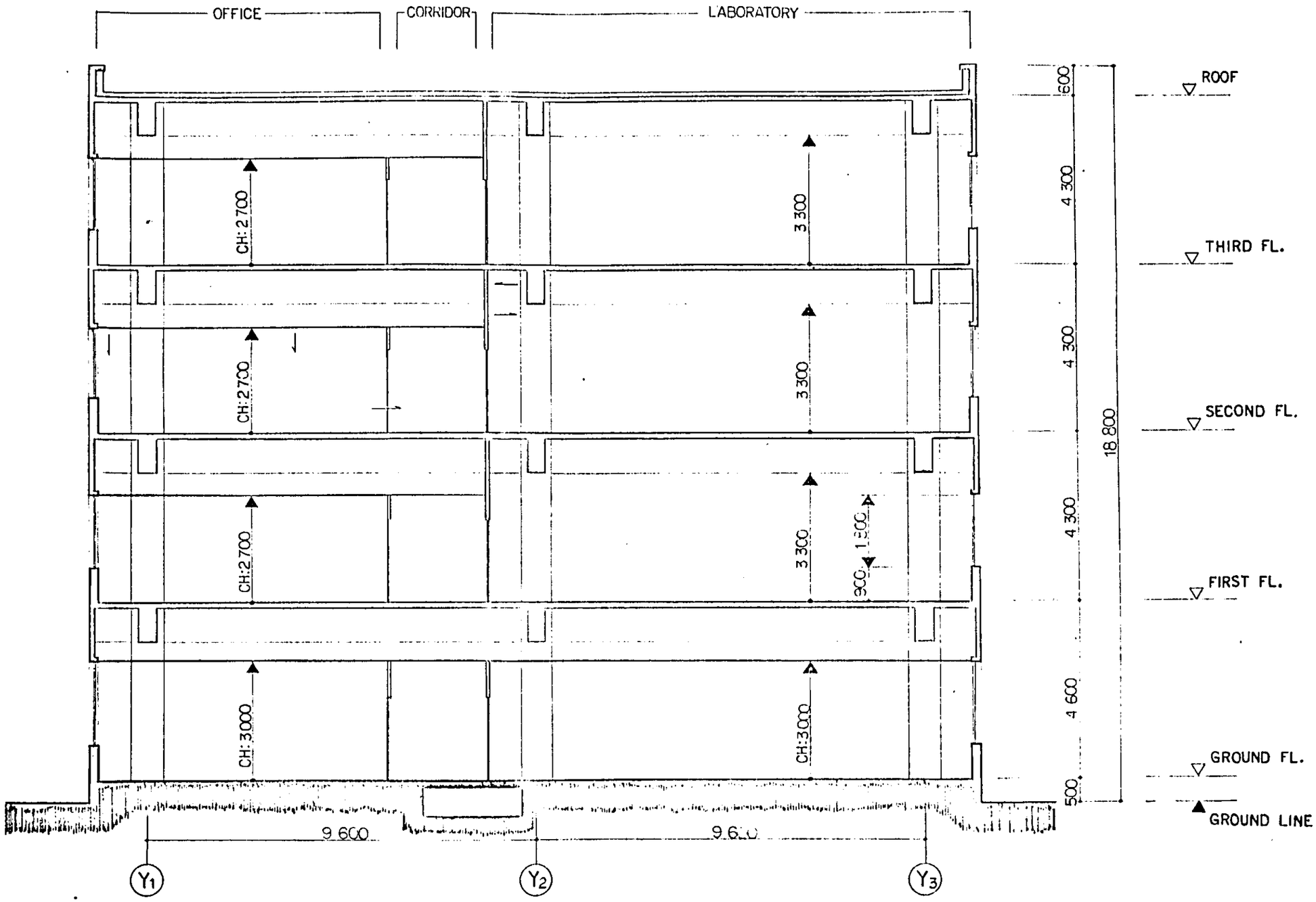
MB ROOF PLAN 1:200

CTRL ISLAMABAD 7



MB SOUTH ELEVATION 1:200

CTRL ISLAMABAD 8

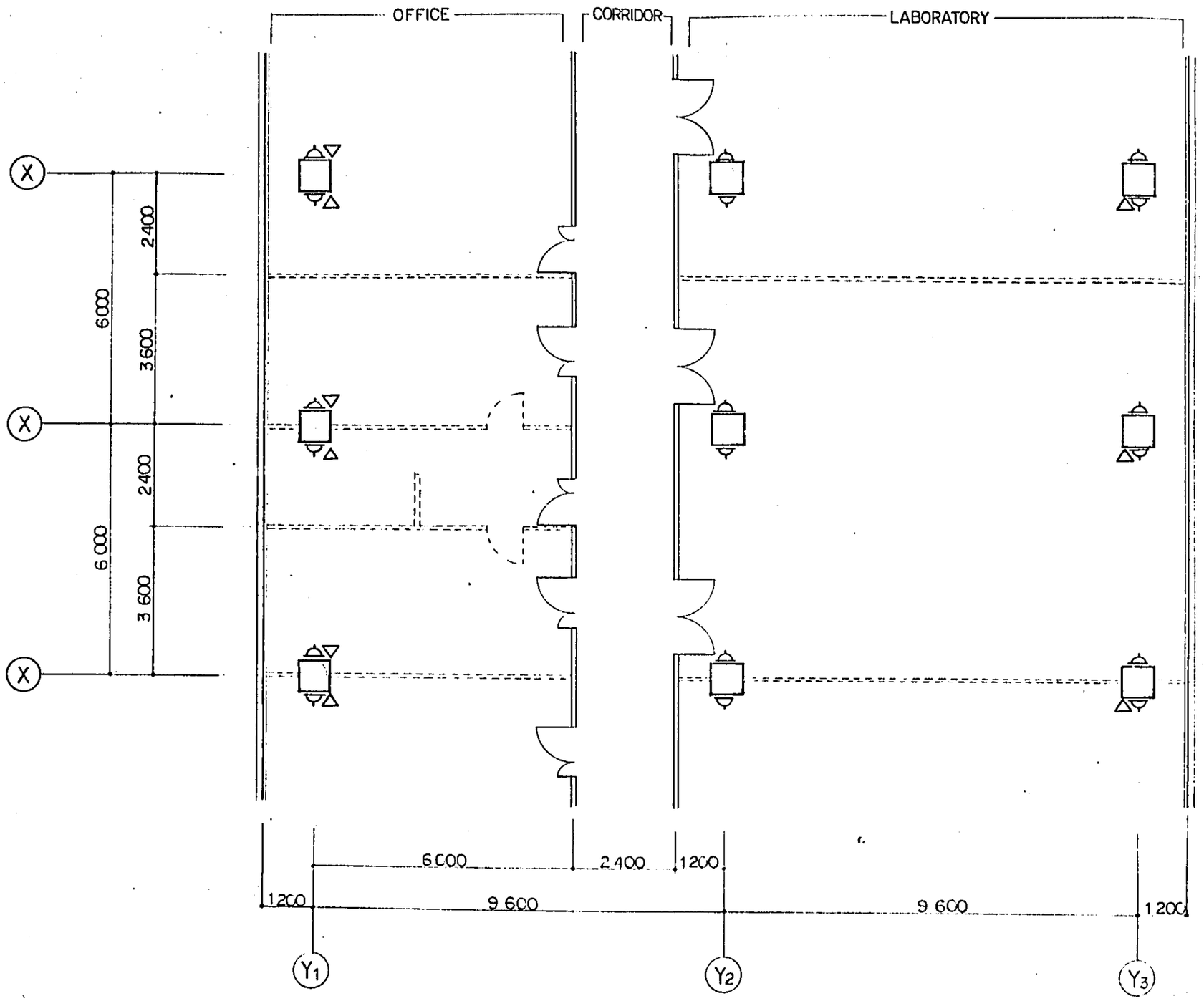


MB DETAILED SECTION 1:100

CTRL ISLAMABAD 9

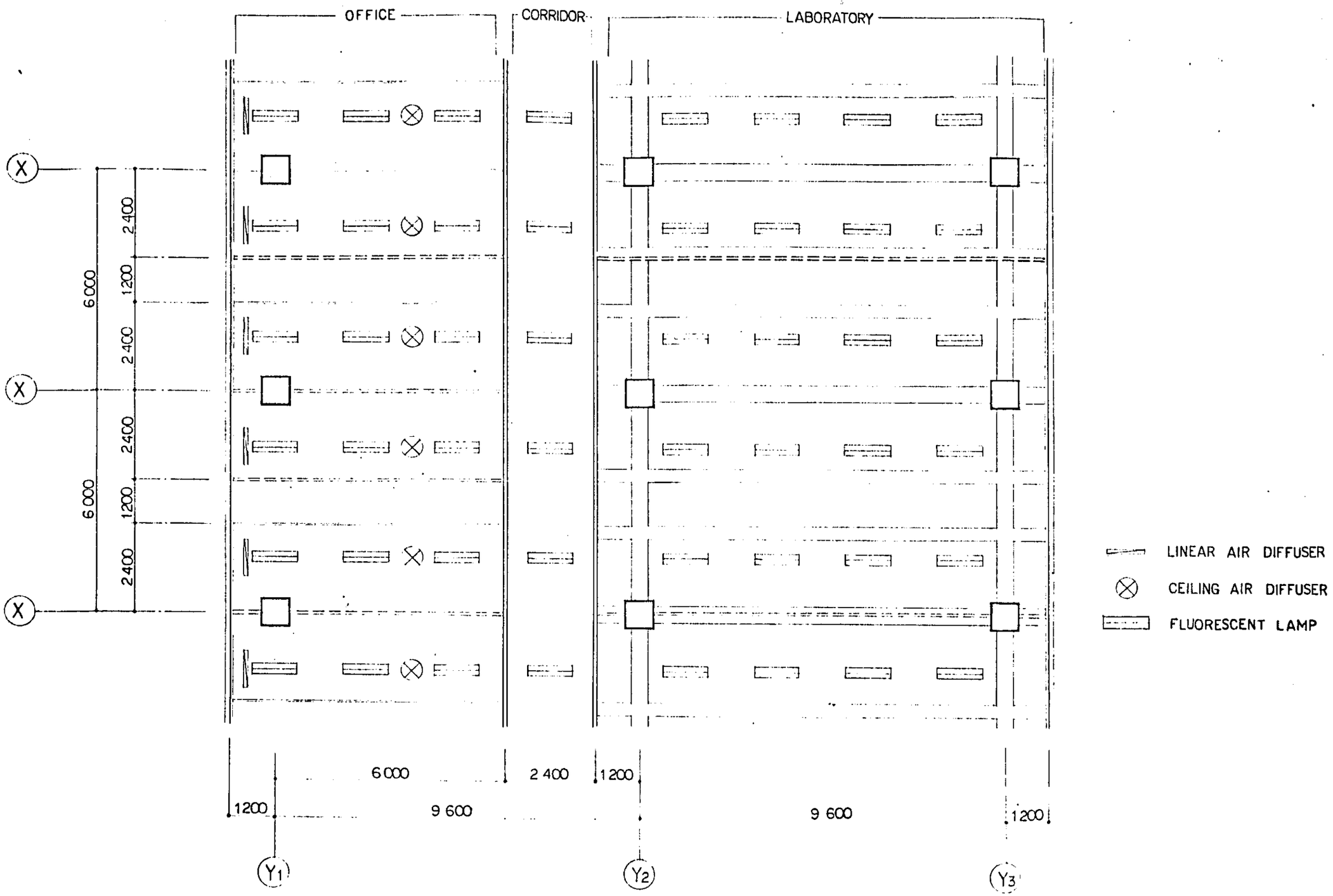
KO

国際協力事業団蔵書



MB DETAILED PLAN 1:100

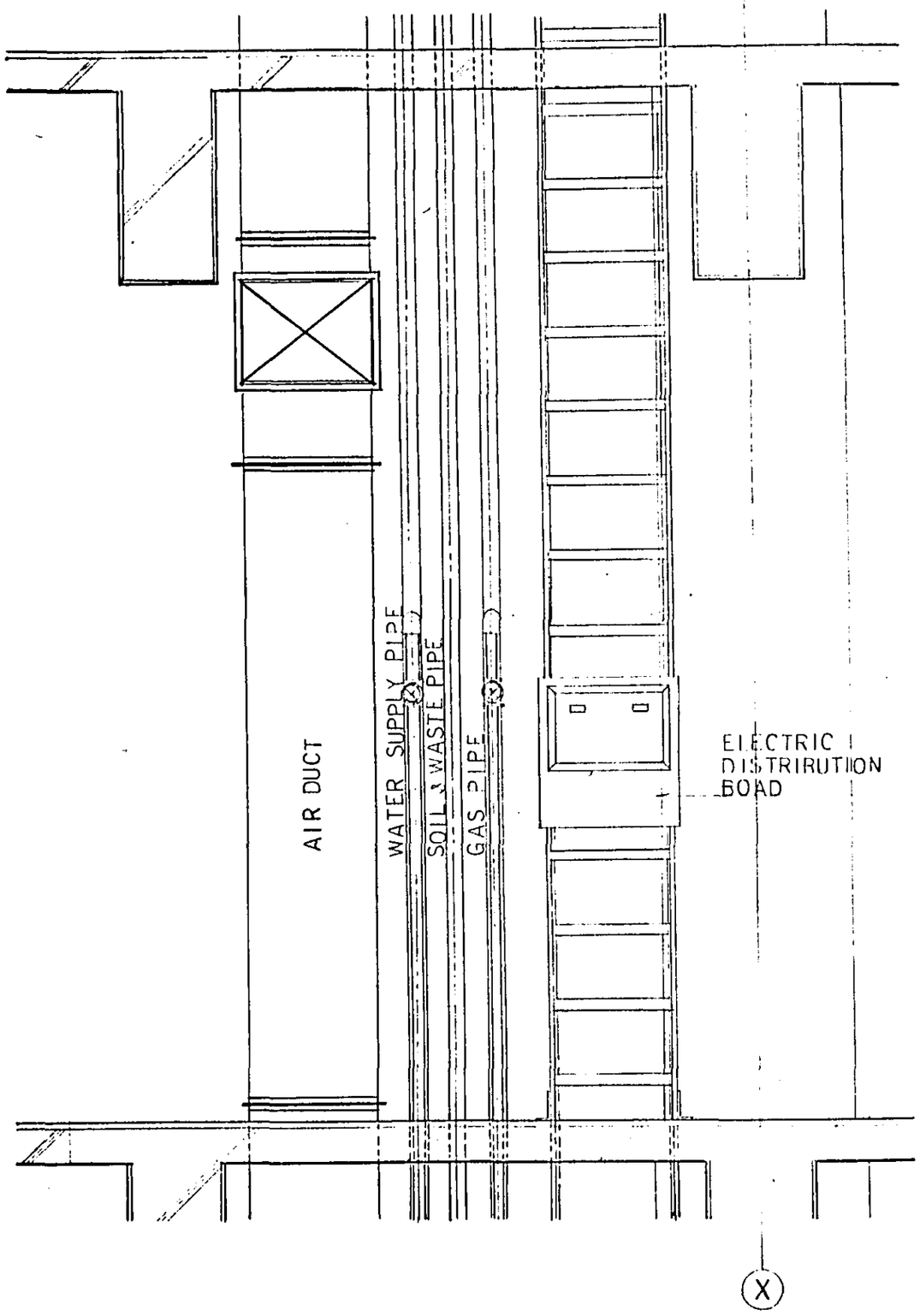
CTRL ISLAMABAD 10

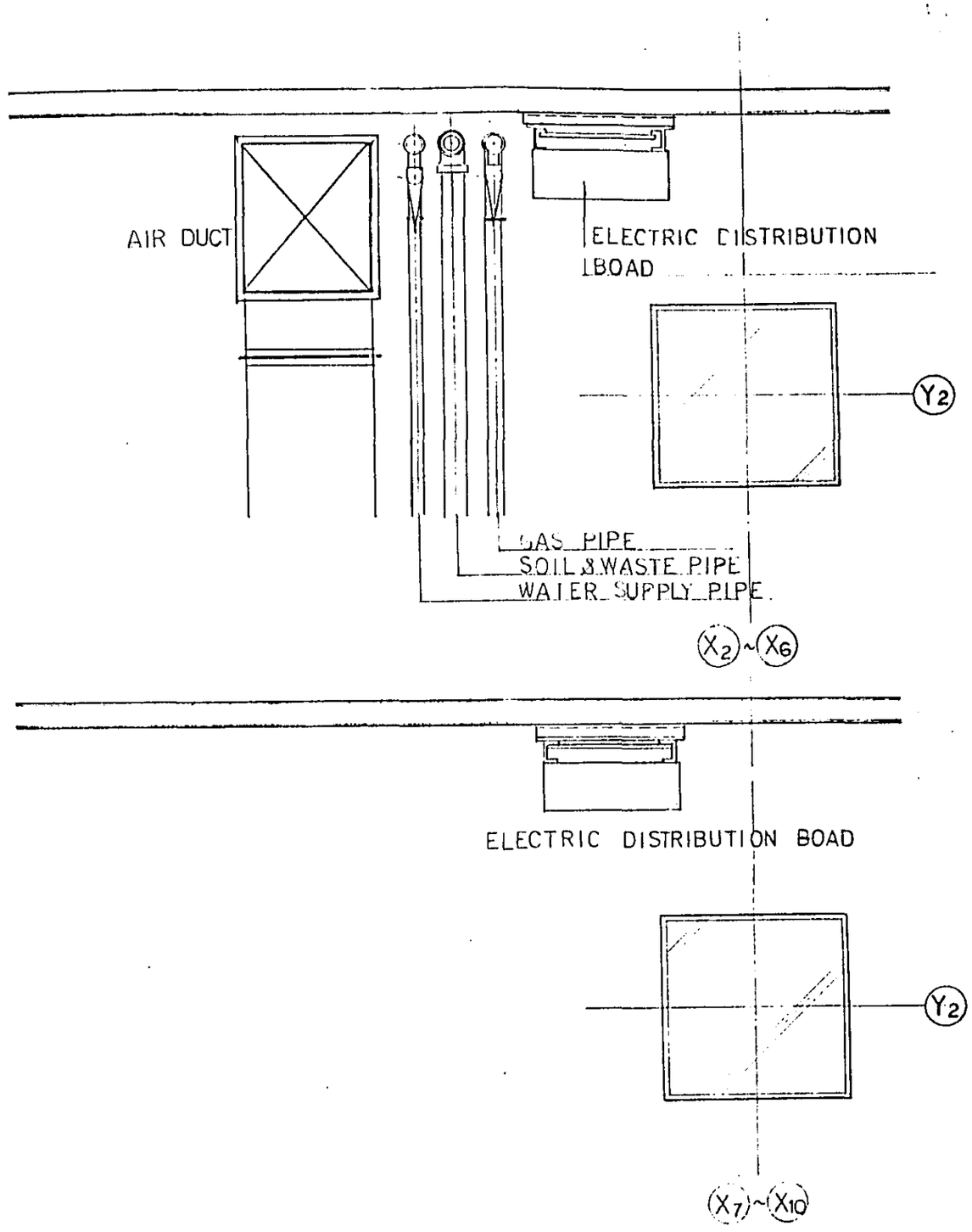


MB DETAILED REFLECTED CEILING PLAN 1:100

CTRL ISLAMABAD 11

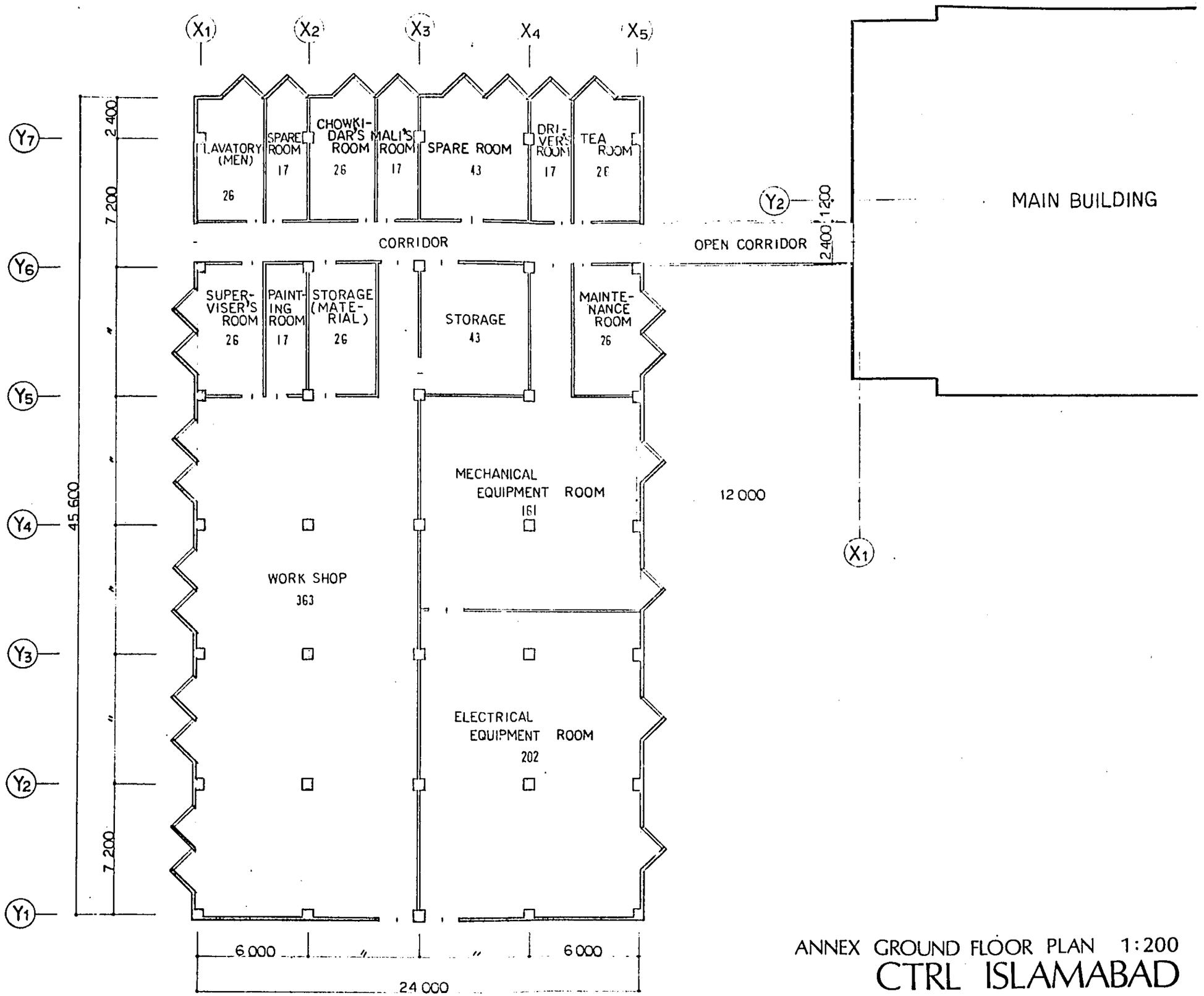
42





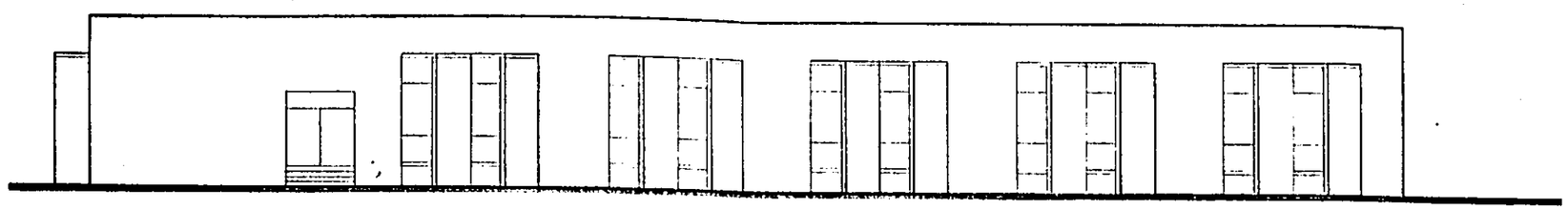
LABORATORY SERVICE SPACE DETAIL 1:20

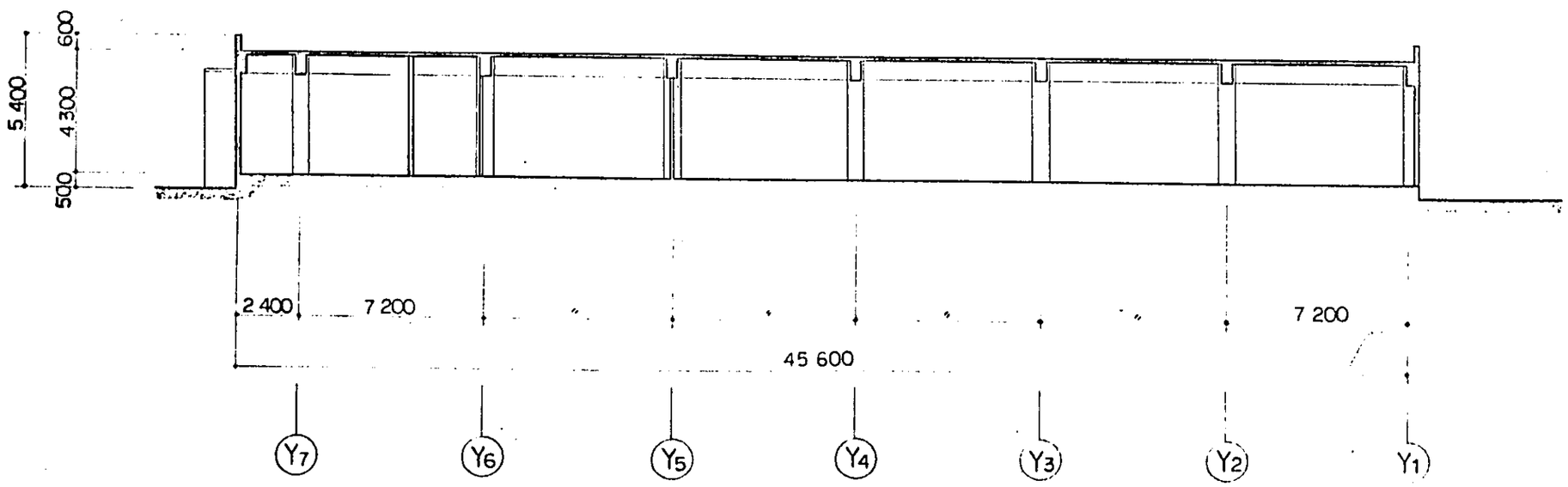
CTRL ISLAMABAD 12



ANNEX GROUND FLOOR PLAN 1:200

CTRL ISLAMABAD 13





ANNEX WEST ELEVATION & SECTION 1:200

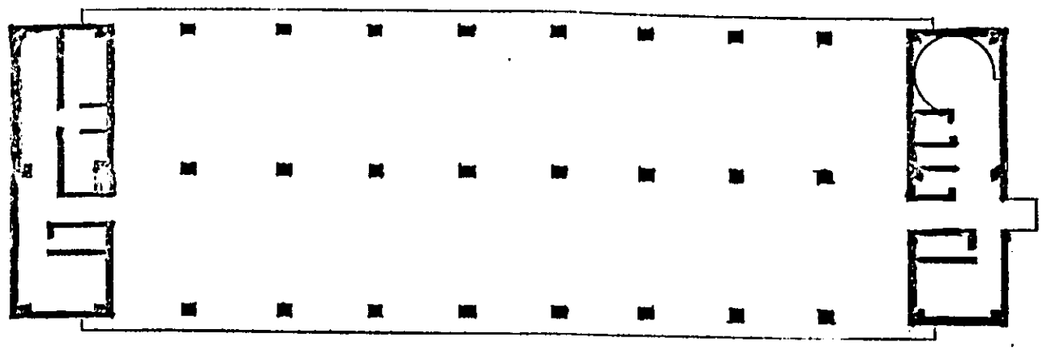
CTRL ISLAMABAD 14

	SYMBOLS	FOR SLABS	FOR BEAMS	FOR GIRDERS	FOR SEISMIC FORCES
OFFICE		300	300	180	80
LABORATORY		500	400	300	150
MACHINE ROOM		1000	850	700	550
LIBRARY		550	500	450	400
ROOF		180	180	130	60
ANNEX		1000	850	700	550

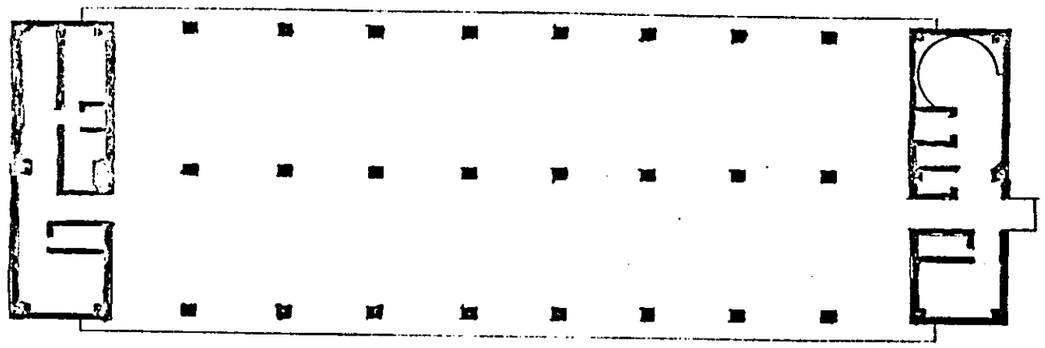
TABLE OF DESIGN SUPERIMPOSED LOAD

NOTES;

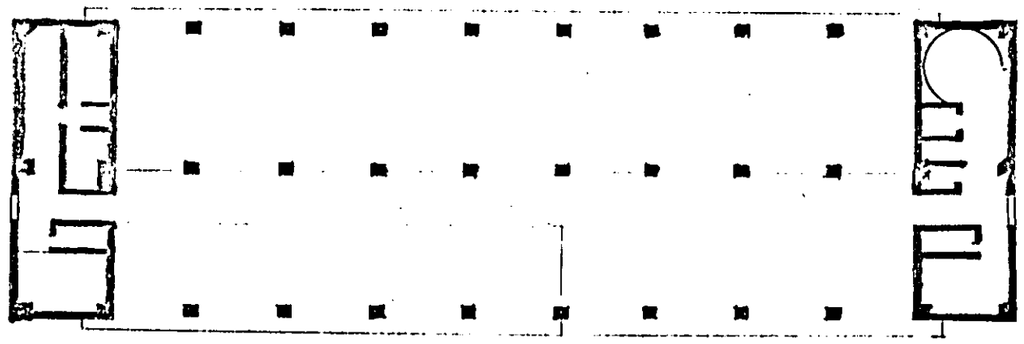
1) UNIT OF SUPERIMPOSED LOAD IS KG PER SQ M.
2) SUPERIMPOSED LOAD DUE TO WATER TANK AND COOLING TOWER ON THE MAIN BUILDING ROOF SHALL BE CONSIDERED SEPARATELY.
3) FOUNDATIONS FOR MICROWAVE ANTENNAS ARE PROVIDED ON THE PENT HOUSE ROOF.
4) CORE WALLS AS WELL AS SEVERAL WALLS ON THE GROUND FLOOR AND ON THE FIRST FLOOR SERVE AS EARTHQUAKE RESISTANT WALLS.



3RD FL.



1ST, 2ND FL.

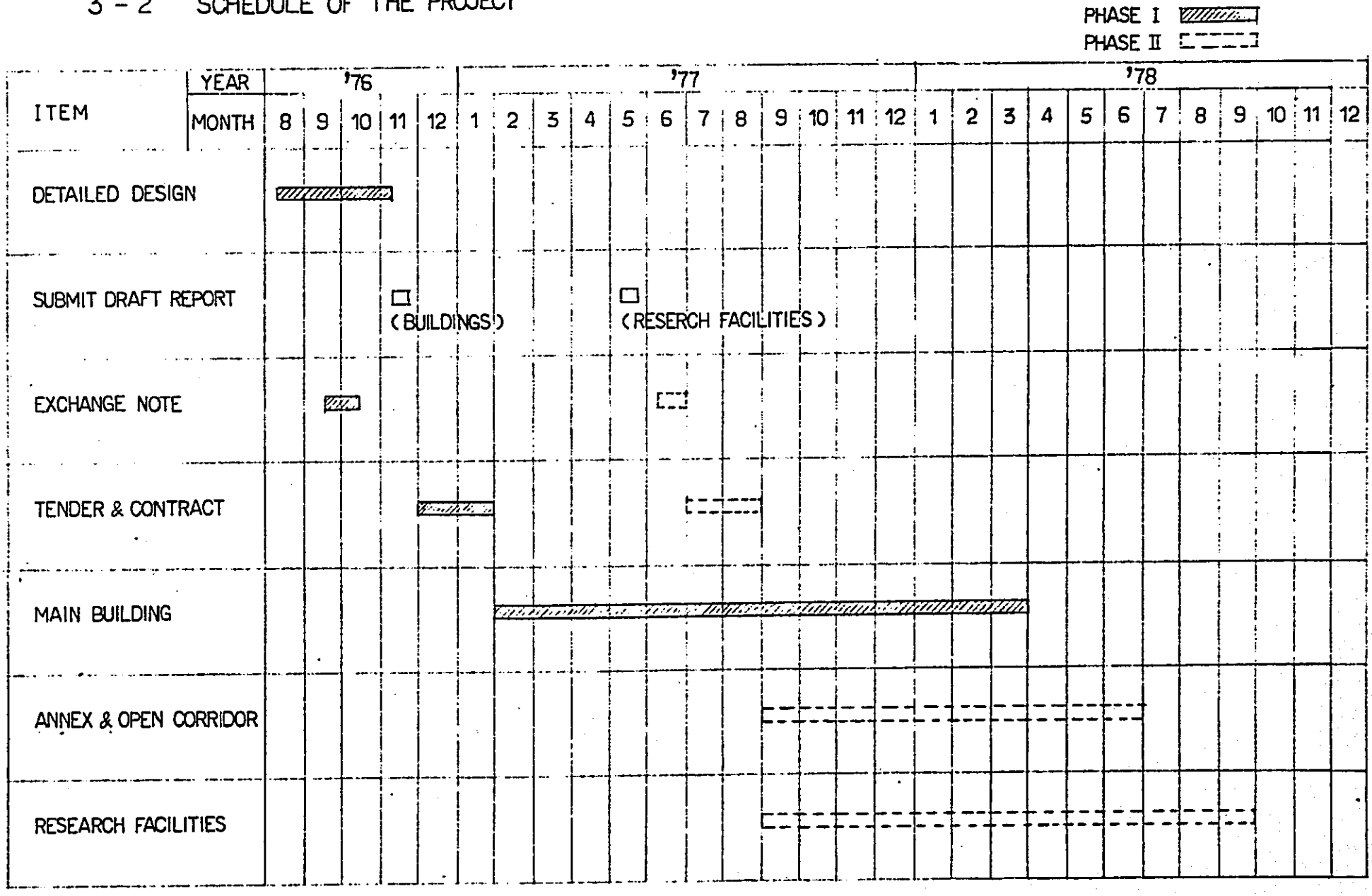


GROUND FL.

STRUCTURAL DIAGRAM 1:400
CTRL ISLAMABAD 15

46

3 - 2 SCHEDULE OF THE PROJECT



3-3 THE DISTRIBUTION OF WORK

1) Phase I is for the main building and Phase II is for the annex and open corridor as well as for the research facilities. The site development, the garage, the gate and the fence shall be executed by Japan only when the budget allows it.

2) Emergency engine generator, if deemed necessary, shall be installed by Pakistan at its own expense.

3) All obstacles in the building site shall be removed and the access road shall be pave by Pakistan, at its own expense, before the initiation of the construction work.

4) The office and Laboratory furnishings such as desks, chairs, lockers, cabinets, bookcases, etc., shall be supplied by Pakistan at its own expense.

5) Pakistan shall install temporary electricity, water supply, gas, drainage, telephone, etc. The expense incurred on it during the construction job shall also be paid by Pakistan.

6) The proposed distribution of work between Pakistan and Japan in regard to permanent electricity, water supply, sanitary sewer, gas, telephone, etc. is included in the preliminary design. The share of Pakistan shall be executed at the expense of Pakistan.

7) It is the responsibility of the Government of Pakistan to complete all legal procedures necessary for the execution of the construction work.

CHAPTER 4 DETAILED PLANNING

4-1 OUTLINE OF DETAILED DESIGN

1. TITLE OF CONSTRUCTION

CENTRAL TELECOMMUNICATION RESEARCH LABORATORIES
(CTRL) ISLAMABAD
CONSTRUCTION PROJECT

2. THE SITE

1) Address: Plot No. 31, 32, 33, H9/4, Islamabad
2) Area : 60, 700 m^2 (990' x 660')

3. OUTLINE OF BUILDINGS

1) Main Building

Reinforced Concrete Structure, Four Stories

Floor Area:	Ground Floor	1,389.01 m^2
	First Floor	1,389.01 m^2
	Second Floor	1,389.01 m^2
	Third Floor	1,389.01 m^2
	Penthouse	169.27 m^2
	Sub-total	5,725.31 m^2
	Entrance Canopy	48.00 m^2
	Total	5,773.31 m^2

2) Annex

Reinforced Concrete Structure, Single Story

Floor Area:	Annex	1,153.90 m^2
	Open Corridor	29.66 m^2
	Total	1,183.56 m^2

Grand Total Floor Area: 6,956.87 m^2

4. OUTLINE OF DESIGN

1) Site Plan

The site plan is almost same as the preliminary design.

2) Main Building

Plan: The plan is almost same as the preliminary design except that both side cores is slightly changed. The entrance plan is reformed to make reception services better. The kettle room at the ground floor is located near the committee room in consideration of its services. The electric space is shifted to the west core, to make better connection of cables between the main building and the annex. As the result of the shifting, the lavatory for women is shifted to the east core. The lavatory is provided between General Manager's Room and Adviser's Room. Automatic-closing-type fire doors are provided at the staircases of each floors.

Exterior Walls: In order to enlarge effectiveness of heat-insulation, the exterior walls except the cores are made up of the double walls which are composed of the inside reinforced concrete wall, the outside brick wall and the middle cavity space. The brick wall is fair faced. The walls of the cores are finished with scratching finish of artificial stone.

Roof: Under the same consideration as in case of the exterior walls, the roof is composed of the double slabs, to make the cavity space

between the roof covering of brick tiles and the common waterproof treatment of the reinforced concrete slab.

Windows: Aluminum sashes are adopted to expect air-tightness.

Sunshades: The horizontal sunshades of reinforced concrete are provided above the south windows.

Interior Partitions: The light-weight partitions such as the metal framing plastered hollow walls and the movable steel partitions are adopted as much as possible. Both side partitions of the central corridor and the partitions between laboratories are the metal framing plastered hollow walls. The walls between offices are the movable steel partitions.

Interior Finish Outline:

Laboratories:

Floor	Vinyl Asbestos Tiles
	Terrazzo (only for Ground Floor)
Skirting	Vinyl
Wall	Plaster E. P.
Ceiling	Plaster E. P.

Office Zone:

Floor	Vinyl Asbestos Tiles
Skirting	Vinyl
Wall	Plaster E. P.
	Movable Steel Partition
Ceiling	Mineral Acoustical Tiles

Corridor:

Floor ..... Vinyl Asbestos Tiles
Terrazzo (Only for Ground Floor)
Skirting ..... Vinyl
Wall ..... Plaster E. P.
Ceiling ..... Mineral Acoustical Tiles

Entrance Hall and Committee Room:

Floor ..... Marble (For Entrance Hall)
Carpet (For Committee Room)
Wall ..... Marble
Ceiling ..... Mineral Acoustical Tiles

General Manager's Room and Adviser's Room:

Floor ..... Carpet
Skirting ..... Vinyl
Wall ..... Vinyl Cloth
Ceiling ..... Mineral Acoustical Tiles

Note: E.P.: Emulsion Paint

3) Annex

Plan: This plan is almost same as the preliminary design except that work shop and its surroundings are a little changed to correspond with the changed layout of the research facilities. Plating Room and Wood Work Room are newly provided.

Exterior Wall: Double brick wall system is adopted.

Roof: The roof is same as the main building.

Windows: Aluminum sashes are adopted.

Interior Partitions: Brick walls are adopted except the load-bearing walls.

Interior Finish Outline:

Work Shop and Corridor:

Floor ..... Terrazzo
Skirting ..... Portland Cement Finish V.E.
Wall ..... Portland Cement Finish E.P.
Ceiling ..... Plaster E.P.

Mechanical and Electrical Equipment Rooms:

Floor ..... Terrazzo
Skirting ..... Terrazzo
Wall ..... Portland Cement Finish
Ceiling ..... Plaster

Note: V.E.: Vinyl Chloride Enamel

5. OUTLINE OF STRUCTURAL DESIGN

1) Main Building

Main structure of the building is reinforced concrete construction. The building is composed of four-stories and penthouses on the fourth floor in section. In other view, that is composed of 9 spans by 2 spans frame and structural cores in both side in plan.

Adopted types of foundations are as follows:
Under main frames: Continuous footing foundation
Under structural cores: Mat foundation

2) Annex

Main structure of the building is reinforced concrete construction. The building has only one story and individual footing foundations.

3) Regulations, Standards or Methods in structural calculation

The moment distribution method is used in calculation of stresses caused by vertical load. In calculation of stresses caused by lateral force, a deflection method is used, which is a library program of "DEMOS-E" system (Nippon Telegraph and Telephone Public Corporation's scientific technology calculation system).
In general, "Structural Standard" of A.I.J. Architectural Institute of Japan) is applied.

4) Design Load

As permanent loads, self weights of buildings and weights of superimposed things are considered. Superimposed loads are shown on drawings. As temporary loads, seismic load is considered. For micro-wave test antenna, wind force is exceptionally considered. Seismic load is treated as static lateral forces acting to each floor.

5) Design Strength of Material

After consideration of B.S. (British Standard), J.I.S. (Japan Industrial Standard) and the result of the preliminary investigation, design strengths of materials are determined as shown on drawings.

6) Aseismic Design

Aseismic design in this project has been carried out with a method to provide aseismic elements of rigid frames and earthquake resistant walls, which has been put to a practical method in Japan.

Walls around cores and some internal walls on the ground and first floor of the main building are treated as earthquake resistant walls, and some internal walls of the annex as well.

As the result, the security against the seismic factor mentioned before in 2-5 of this report was ensured, moreover, the economical design has been executed.

6. OUTLINE OF ELECTRICAL INSTALLATION

1) Main Building

a. Feeder Installation

Feeder installation is provided in the main building for lighting fitting and socket outlet, air conditioning, and lift, etc.
Feeder is used sheathed PVC insulated cable and mounted on the cable tray. Feeder installation is also, completed with central operation panel, control panel, relay panel, etc., for air-conditioner, ventilator, and experimental distribution boards.
The electric system of feeder is as follows:

For Lighting and Socket Outlet	400/230V, 3-phase 4-wire, 50 Hz
For Power	400V, 3-phase 3-wire, 50 Hz
For Research Laboratory	400/230V, 3-phase 4-wire, 50 Hz
	230V, 3-phase 3-wire, 50 Hz
	100V, 3-phase 3-wire, 50 Hz

b. Lighting and Socket Outlet Installation

The luminous intensity of each room shall be better than the value indicated below:

Room name	Luminous intensity (Lux)
Laboratory Room	300
Director's Room	300
Office and welfare accommodation	300
Tea Room	100
Entrance Hall	100
Corridor and Staircase	50

Socket outlet for research laboratory use is, also, to be installed in each laboratory and director's room, etc.

c. Fire Alarm System

The fire alarm system is installed circuit alarm push-button and alarm bell in order to make it possible for personnel to operate the fire alarm.

d. Telephone Conduit System, Earthing, and Lightning Protection System

Each item is designed as same as manner of the preliminary design.

2) Annex

a. Sub-station Equipment

The sub-station equipment is designed as same as manner of the preliminary design.

b. Feeder Installation

The feeder is draw out from the medium voltage switchgear and continuously installed with sheathed PVC insulated cable and cable tray to the main building.

c. Lighting Fitting and Socket Outlet Installation

The lighting fitting and socket outlet installation is designed to secure adequate luminous intensity depend on the function of the room as same as manner of the main building.

d. Fire Alarm System

The fire alarm system is designed as same as manner of the main building design.

e. Telephone Conduit System and Earthing

Each item is designed as same as manner of the preliminary design.

7. OUTLINE OF PLUMBING, GAS INSTALLATION

The outline is same as described in Preliminary Design, except followings.

1) Water Supply, Drainage and Sanitary Fixtures

An underground water receiving tank in Annex and an elevated water supply tank in the penthouse on Main Building are installed to supply water to each fixtures. Vertical water supply pipe for Dark Room and Humidity Chamber end with plug near the floor surface. In Annex, water supply and

drainage system are provided for Plating Room, and slop sink for Work-Shop.
Both of the eastern type and western type water closet are installed in each Lavatory, but western type in Lavatory for Waiting Room on 2nd floor.
In Annex, water closets are in low tank type and urinal in high tank type.
Stainless steel sinks and water boilers for tea service are provided for Tea Rooms in Main Building and Annex.
For Laboratories, vertical drain pipes are provided between column X_2 and X_7, and connected to horizontal main drain pipe installed in under-floor-trench.

2) Fire-Fighting Equipment

Portable fire-extinguishers, hydrants and siamese-connection hydrant are installed.
Hydrant pump is provided in Annex to supply pressurized water to each hydrant.

3) Gas-Installation

Gas cocks are installed in Spare Room (1) and (2), Chowkidar's Rm, Mail's Rm, Driver's Rm, Tea Rm. and Maintenance Rm. in Annex. Gas pipe for Work-Shop ends with plug.
Gas Pipes for Duplicating Printing Rm, Carrier Lab., HF Lab. and Circuit Component Lab., end with plug. Vertical gas pipes for said rooms as well as for water boiler are exposed outside of the external wall.

8. OUTLINE OF AIR CONDITIONING SYSTEM

1) In additional to the rooms indicated on the Preliminary Design, rooms to be air conditioned are Duplicating Printing Room, Drawing Room, Dark Room, Photo Room, Humidity Chamber, PBX., Storage -1 (instrument) and a part of Entrance Hall, etc.

Air conditioning system make self-contained air conditioners install in Air Conditioning Machine Rooms on each floor according to Preliminary Design.

Return air from conditioned rooms on the ground floor and on south side of corridor on each floors is past through the door grills to corridor, and returned to Air Conditioning Machine Room. In the case of laboratories on north side of corridor, return air is past through the return duct up to the self-contained air conditioner.

Air conditioning of Switching System Lab. is independent system, and particular self-contained air conditioner is installed in the room.

Air conditioning system for Computer Room is as same, and particular self-contained air conditioner is installed in adjacent Air Conditioning Machine Room.

Condenser water pumps are installed in the penthouses.

Operation for each equipments of air conditioning system is to be controlled by central operation panel installed in Administration Room.

2) Exhaust from each Lavatories and Kettle Rooms on every floors in Main Building is carried out by fans installed in penthouses respectively.

Exhaust from draft chamber in Circuit Component Lab. is carried out by fan installed on roof floor.

In Battery Room, Rectifier Room, Telegraph Lab. and Lift Machine Room, propeller fans are installed for exhaust respectively.

Exhaust from Dark Room and Photo Room is carried out by particular fan installed in the Photo Room through the common exhaust duct.

3) Ventilation for Work Shop, Electrical Equipment Room, Mechanical Equipment Room and Storage in Annex is carried out by supply fan and exhaust fan installed in the Mechanical Equipment Room.

Particular propeller fans for exhaust are installed in Wood Work Room, Painting Room and Tea Room respectively.

Exhaust fan and duct made of polyvinyl chloride are installed in Plating Room for exhaust.

9. OUTLINE OF LIFT

Lift is to be installed in the Main Building according to the Preliminary Design which has the weight capacity of 750 kg (1,650 lbs). Its speed is 60 m/min. (200 ft/min.) and the number of floors to be served is four.

4-2 CONSTRUCTION COST

1. Estimated construction cost is shown on the tables.

2. In estimation of the construction cost, quantities have been surveied on the drawings and unit prices have been based on followings.

   1) For unit prices of materials and products purchased in Japan. (The items have been selected in consideration of cost unless prescribed in the Specification.)

      i) Prime cost is quoted from current prices stated on monthly magazines or prices offered by relevant makers.

      ii) Prices include costs for temporary works, overhead charge and profit of local contractor.

   2) For labour cost for installation of items stated in 1) above.

      i) Prime cost is quoted from schedule of rate issued by P.W.D.

      ii) Prices include overhead charge and profit of local contractor.

   3) For local works including materials and labour

      Prices are quoted from schedule of rate issued by P.W.D.

3. Assumptions

   1) On the grounds of results of the survey, 260% has been generally applied for each prices stated in

the schedule of rate issued by P.W.D. in 1973 as rising ratio in price.

2) The items stated in above 2 1) will be transported by ship from Japan to Karachi and by motor track from Karachi to the site.

3) Local subcontractors will execute the work under the subcontract with Japanese construction contractors represented by Japanese trading company.

4. Basic Conditions

1) Japanese consultant shall contract with the Government of Pakistan for consulting survies as assistance in award and conclusion of contract for construction and supervising the work. Fee for the services shall be included in the present Japanese grant.

2) The construction work shall be contracted by the Government of Pakistan, exclusively with Japanese construction contractor or Japanese trading company.

3) Contract shall be on Lump-Sum contract basis in Japanese Yen.

4) Phase II of the work will be executed in accordance with intended program under private contract with the contractor executing the work of Phase I, no matter what the grant for Phase II is not concluded yet.

5) Whole of payment shall be in Japanese Yen and done in Tokyo.

6) The contractor may exchange Japanese Yen into Pakistani Rupee as occasion requires to pay in Pakistan at any time without any restrictions.

7) Materials, equipment and tools brought into Pakistan from Japan for execution of the work shall be exempted from custom duties and other import or export taxes. After completion of relevant work, contractor may deal them in Pakistan when he desires.

8) Clause 7) above shall be applied correspondingly to them brought from other countries than Japan.

9) Japanese person and Japanese corporation working for the project shall be exempted from all duties and taxes.

10) Work period stipulated in the contracts shall be 14 months for Phase I and 10 months for Phase II, in accordance with intended program.

11) Scope of the construction work shall be in accordance with "The distribution of work" already submitted to the Government of Pakistan by relevant Japanese mission.

12) Payment terms shall be as follows:

30% of the contract price as advance payment
20% and 25% as interim payment in two times
Remainder, 25% as final payment.

13) Guarantee period shall be in 12 months.

14) Removal of all obstacles in the site and pavement

and maintenance of the access road shall be excluded from the work.

15) Electric power, city water, city gas, drainage and telephone for temporaly use shall be available at the site free of charge for the contractor.

16) All legal procedure necessary for execution of the work shall be excluded from the work.

17) Tender, negotiation, award and conclusion of the contract shall be made in Tokyo.

5. Consultant Fee

1) Consultant services shall be performed by:

- Management; Senior director
- Assistance in award and conclusion of the contract for construction; One senior engineer and two engineers
- Supervisory services; Two resident engineer and several part-time engineer.

2) The fee have been based on man-months basis, in accordance with personnel described in above 1) and time schedules attached herewith. The fee includes expenses for air transportation and staying in Pakistan.

Table 1. Construction Cost of Phase I

(Unit: 1,000 yen)

Item	Building Work	Electric Work	Plumbing Work	Air Conditional Work	Lift	Total
Main Building (included Entrance Canopy)	608,698	120,615	32,484	142,669	29,310	933,776
Total	608,698	120,615	32,484	142,669	29,310	933,776
Consultant's Fee						66,224
Grand Total						1,000,000

Table 2. Construction Cost of Phase II

(Unit: 1,000 yen)

Item	Building Work	Electric Work	Plumbing Work	Air Conditional Work	Total
Annex (included Open Corridor)					
Exterior Work					
Total					
Consultant's Fee					
Grand Total					

APPENDIX-1

REPORT ON SUBSOIL INVESTIGATION

INTRODUCTION

M/S PAC BORING CORPORATION Ltd. was entrusted by Japan International Cooperation Agency with the execution of the Subsoil Investigation for the Central Telecommunication Research Laboratories at Islamabad.

The purpose of this investigation was to ascertain the subsoil condition of the site and ultimately to establish physical and mechanical properties of the subsoil with a view to recommend the safe and economic foundation design for the superstructure.

The investigation was done as per the specification. Boring points were appointed by the client's representative at the site.

SUBSOIL INVESTIGATION PROGRAMME

The subsoil exploration programme comprised of the following item of works.

(a) Execution of Drillings by a Hand Auger or a Bailer:
Five-(5)-borings were executed at the site and each borehole was explored up to 20m.

(b) Execution of Standard Penetration Test:
Standard penetration tests were executed at a regular interval of 1.5m in depth from the existing ground level with a split spoon sampler of 1-3/8" internal dia. and hammer of 140 lbs which will fall freely from a constant height of 30 inches. N-values thus obtained from one foot penetration of the sampler were recorded and were shown on boring logs at the respective intervals of tests. These tests provide fair knowledges about the density/compaction of the

tested soil layers. In addition, yield disturbed/ semidisturbed soil samples were gotten from within the split spoon sampler. These soil samples were classified roughly in order to reconstruct a depth-wise stratification chart for each borehole.

(c) Ground water table was encountered at No. 4 and No. 5 boreholes.

GENERAL DESCRIPTION OF THE SUBSOIL

The general condition of the subsoil of the investigated area is, as revealed in boring logs appended to this report, almost regular and is almost homogeneous except borehole No. 3. The subsoil of the area up to the final depth is mainly comprised of silt and is cohesive.

The subsoil up to the explored depth are silty clay or clayey silt which are brown, prastic and very stiff. According to one of Jerzaghi-Peck's proposals, relative consistency of clay with N-values of 15 to 30 are classified as "very stiff' one.

An area about 50 by 50 meters square around borehole No. 3 which have been a ploughed paddy is not regular geologically to about 2 meters depth under the ground surface, where N-values are 7 and 4 classified as "medium", and the soil of a ploughed paddy has a high consistency of water.

BEARING CAPACITY OF THE SUBSOIL

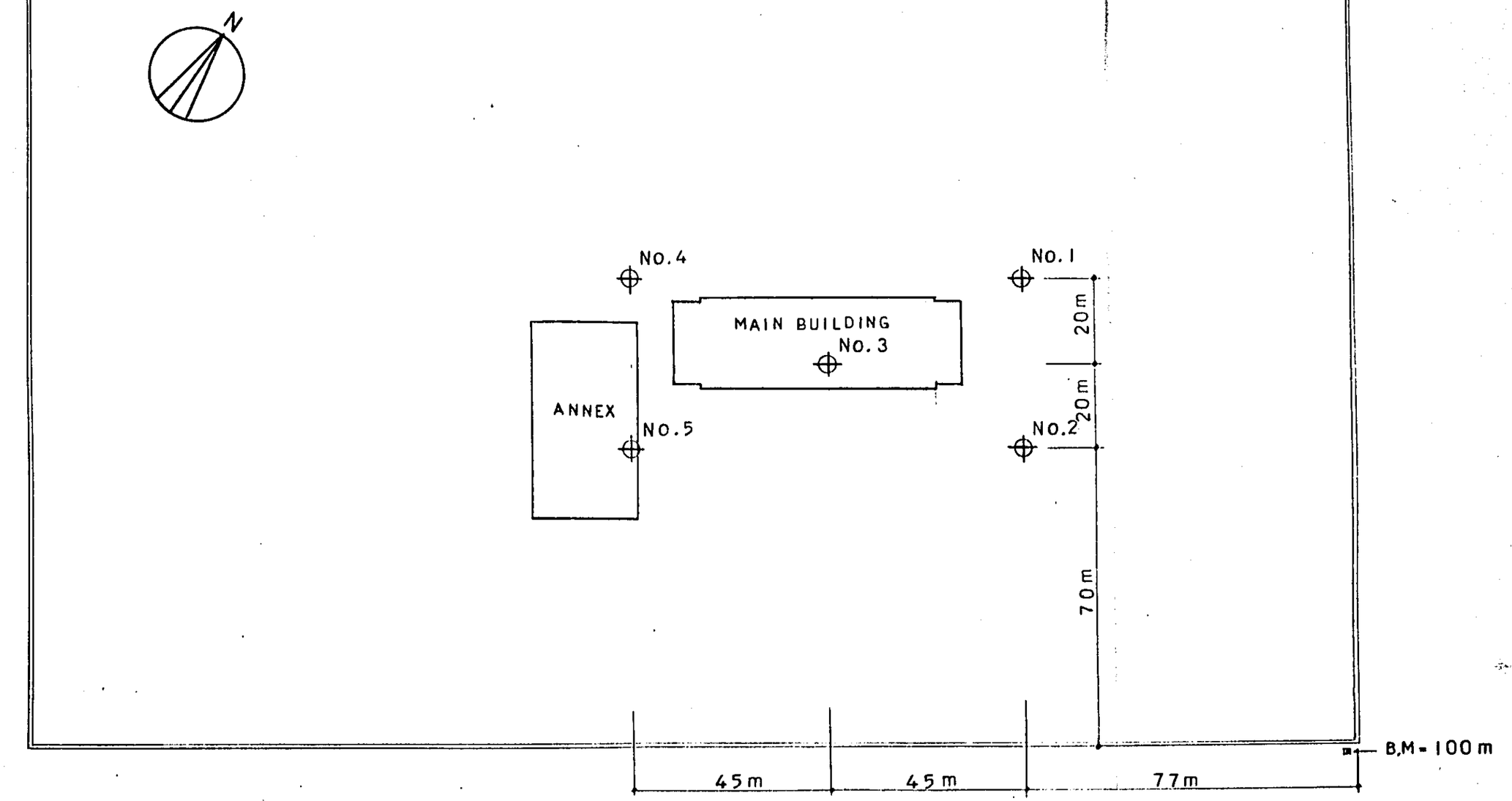
The bearing capacity of the subsoil at different depths can be obtained by a field test as well as a laboratory test. In case of cohesive soil the reliable values of bearing capacities can be obtained only by a laboratory test. But, in case of non-cohesive soil, the N-values are used for estimates. But, when no laboratory tests of soil samples have been executed, the bearing capacities of the cohesive soil can be estimated using N-values.

The allowable bearing capacities of the subsoil for square and continuous footings at a depth of 2 meters from the existing ground level can be considered as 15 t/sq.m. However, owing to that N-values of the borehole No. 3 has lower one than other boreholes, a plate loading test of soil is required to confirm the allowable bearing capacities.

CONCLUSIONS AND RECOMMENDATIONS

It is evident from the foregoing discussions that the subsoil up to the final depth of boring is mainly comprised of hard clay or silt except the area of a ploughed paddy. Hence, 2.0m depth or deeper from the existing ground surface is recommended as the soffit level of foundations for the main building, and 1.0m for the annex.

The type of foundations may be continuous footings for main frames of the main building, mat foundations for cores of the main building and individual rectangular footings for the annex.



Mark ⊕ is a location of boring

CTRL, ISLAMABD

LOCATION OF BORING TEST 1:1000

NSK

PROJECT C T R L LOCATION ISLAMABAD

CONTRACTOR PAK BORING CORP LTD

BORE HOLE NO 1 DATUM 102.44 DATE JULY, 76

ELEVATION	DEPTH	LOG	STRATA ENCOUNTERED	REMARKS
	1		SILTY CLAY	
100.92				
100.31	2		CLAYEY SILT	
99.39	3		SILTY CLAY	
	4		CLAYEY SILT	
	5			
	6			
95.43	7			
	8		SILTY CLAY + KANKER	
93.60	9			
	10		CLAYEY SILT + KANKER	
	11			
90.55	12			
			SILTY CLAY	
89.33	13			
	14		CLAYEY SILT + KANKER	
87.81	15			
	16		SILTY CLAY	
	17			
84.76	18			
	19		CLAYEY SILT	
82.44	20			

STANDARD PENETRATION TESTS

blows/ft.

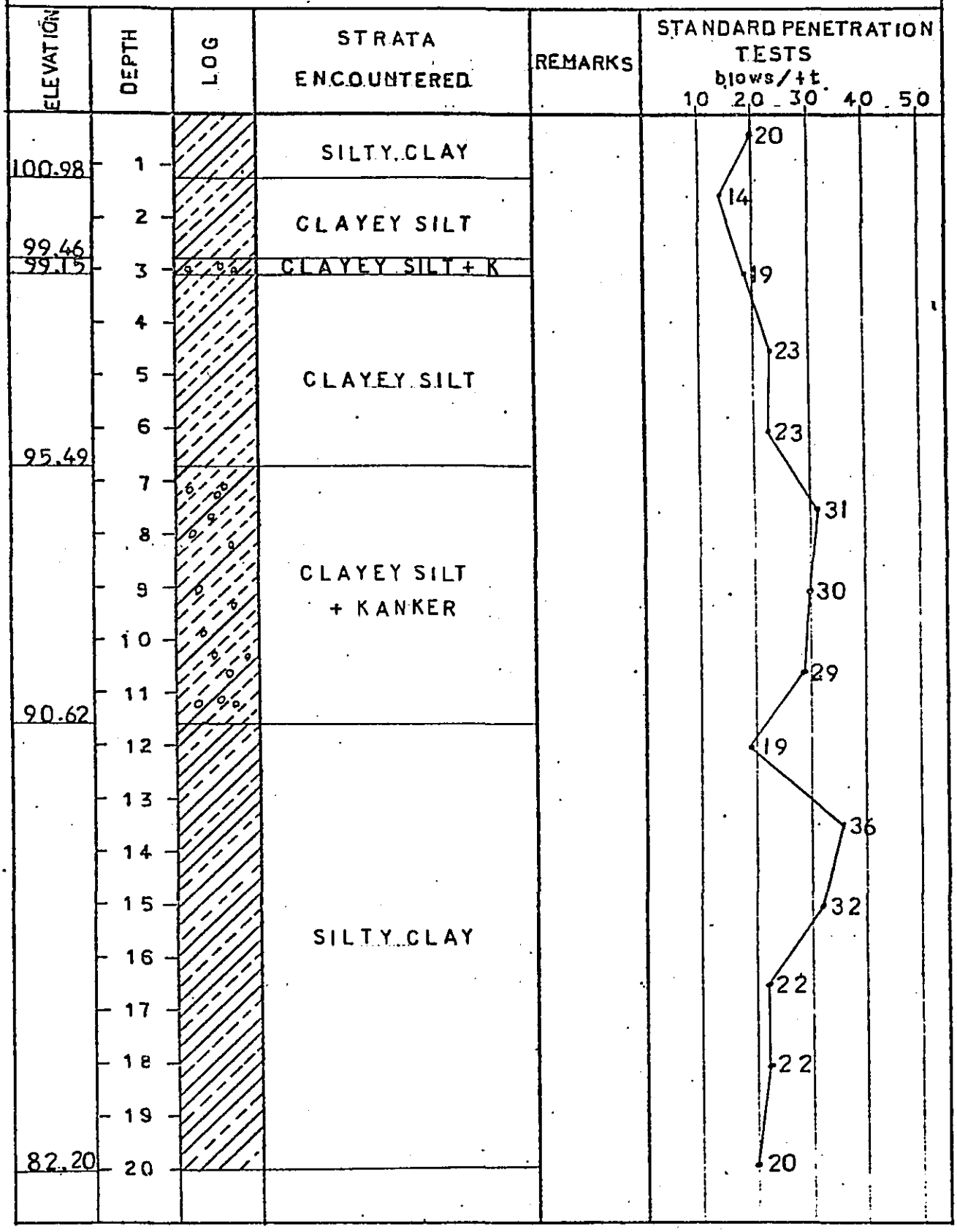
10 20 30 40 50

25, 28, 24, 17, 15, 17, 23, 21, 21, 27, 36, 35, 18, 15

PROJECT C T R L LOCATION ISLAMABAD

CONTRACTOR PAK BORING CORP LTD

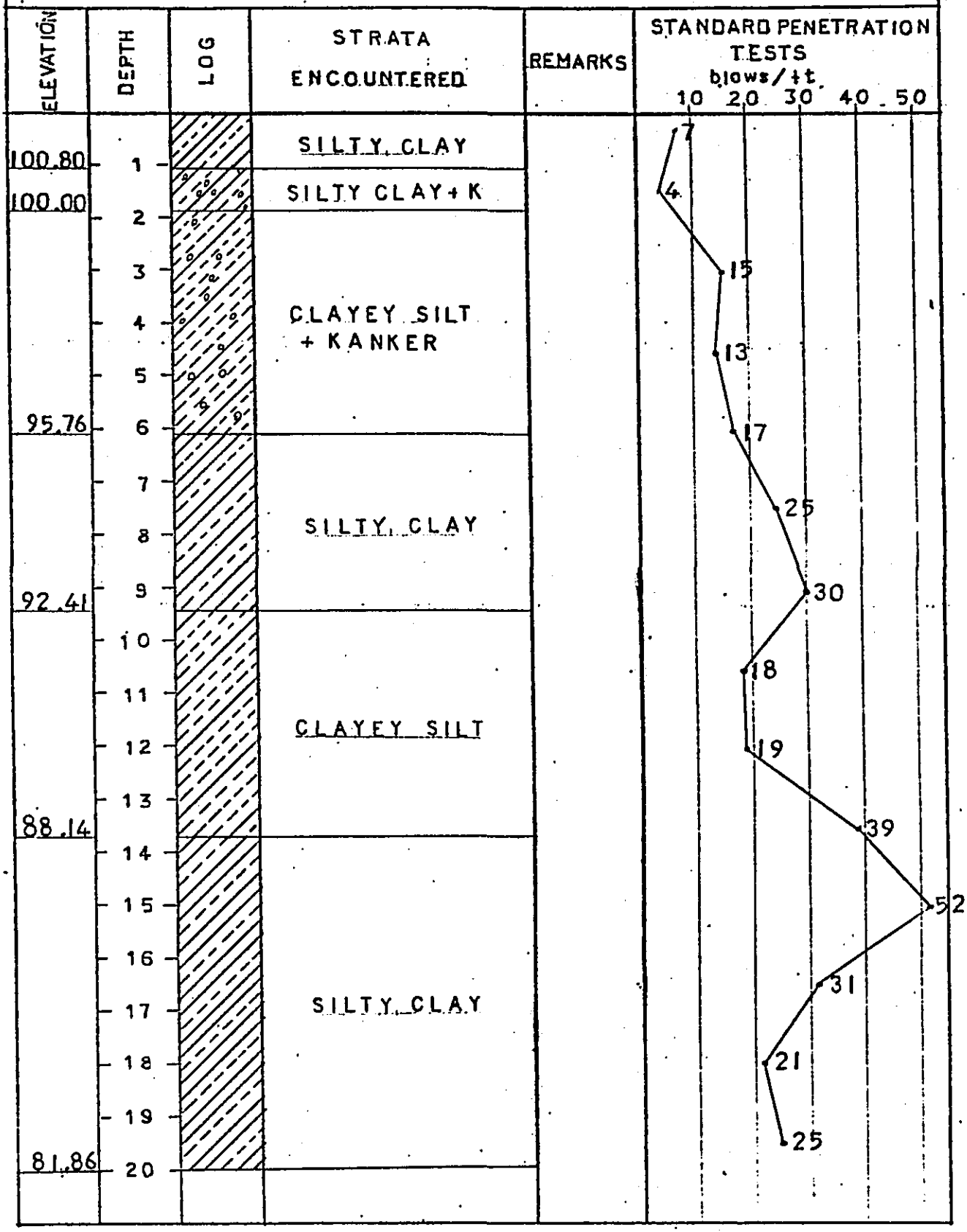
BORE HOLE NO 2 DATUM 102.20 DATE JULY, 76



PROJECT C.T.R.L LOCATION ISLAMABAD

CONTRACTOR PAK BORING CORP LTD

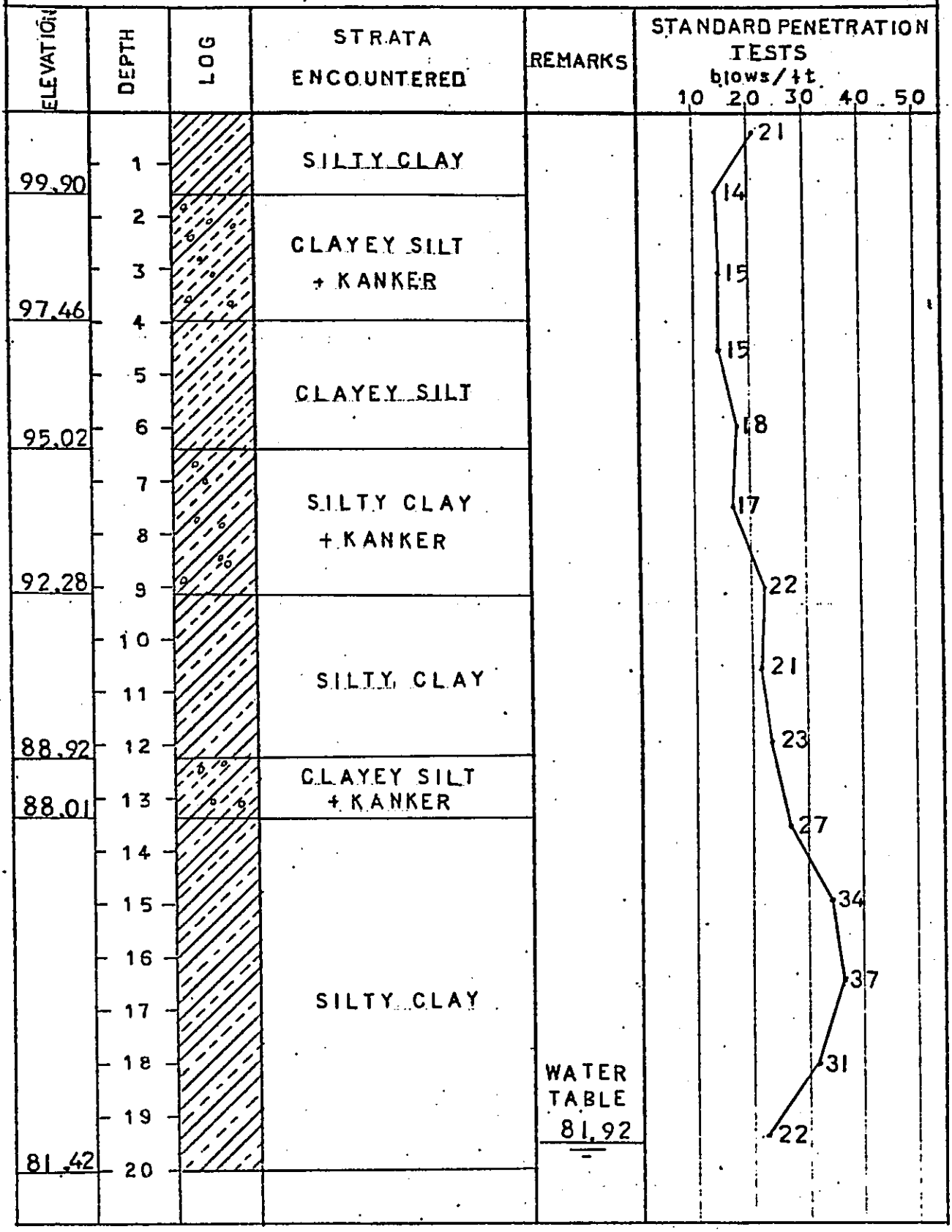
BORE HOLE NO 3 DATUM 101.86 DATE JULY, 76



PROJECT CTRL LOCATION ISLAMABAD

CONTRACTOR PAK BORING CORP LTD

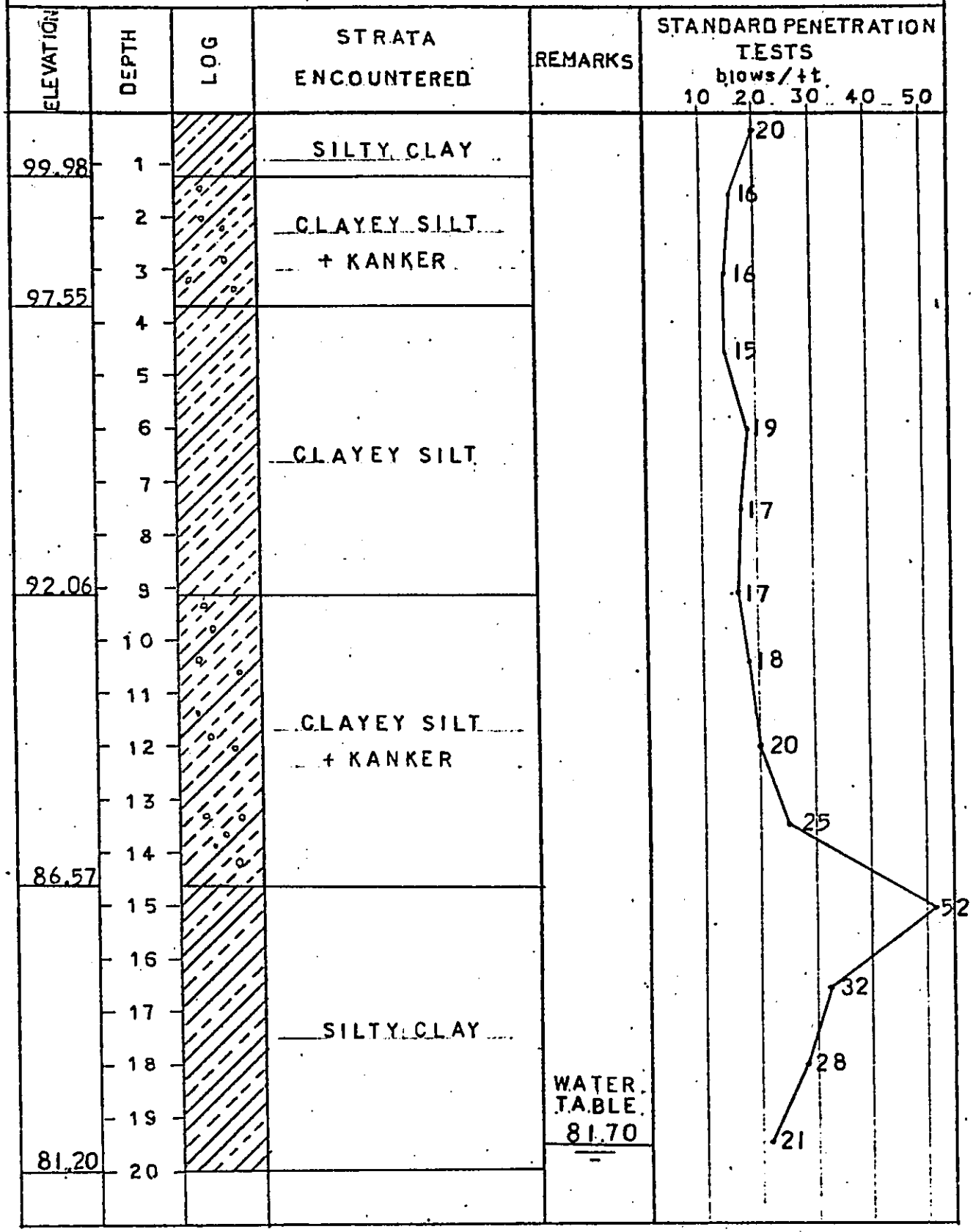
BORE HOLE NO 4 DATUM 101.42 DATE JULY, 76



PROJECT C.T.R.L LOCATION ISLAMABAD

CONTRACTOR PAK BORING CORP LTD

BORE HOLE NO 5 DATUM 101.20 DATE JULY, 76



APPENDIX-2

DRAFT ON CONSULTING SERVICES

The purpose of the consulting services is to assist the Government of Pakistan (hereinafter called "Client") in the effective implementation of the CTRL, Islamabad Construction Project (hereinafter called "Project").

ARTICLE 1. Scope of Services

1. Consultant shall act on behalf of Client with respect to matters delegated by Client with regard to the tender, contract and execution of the Project. These matters are hereinafter called "Services".

2. The scope of Services to be rendered by Consultant shall be as follows:

   a) Assistance in the award and the conclusion of the contract for construction, including:

      (1) Preparation of tender documents

      (2) Answer to tenderers' inquiries

      (3) Evaluation of tender proposals and negotiation with successful tenderers.

   b) Assistance in change of the contract for construction, if necessary, including such as stated above a).

   c) Interpretation of drawings and specifications.

   d) Checking and approval of shop drawings and samples.

   e) Periodical examination of materials, workmanship and measures employed in execution of the construction work.

   f) Suggestion and instruction, if necessary for the execution of the construction work.

g) Attendance and confirmation of tests and inspections prescribed in the specifications.

h) Receipt and approval of documents furnished by the construction contractor in accordance with the provisions of the contract for construction.

i) Issuance of certificates and other documents to the construction constractor, according to the provisions of the contract for construction.

j) Assistance in settling of disputes or difference that may arise among the related organizations, as may be required by Client.

ARTICLE 2. Duties of Consultant

1. Consultant shall effectively provide Services prescribed in above ARTICLE 1, in accordance with the implementation time schedule and the contract documents for construction, which will have been prepared by Consultant and approved by Client.

2. Consultant shall report to Client on all Services provided by himself. Unless specifically authorized, all documents, certificates, etc. prepared in writing and issued by Consultant shall be duly effective after approval of Client. If necessary, they shall be discussed by Client and Consultant before preparation.

3. Consultant shall station resident engineers at the site and dispatch part-time engineers to execute Services during executing of the construction work. Services as assistance in awarding and conclusion of the contract for construction may be executed in Consultant's office in Tokyo, in close communication with Client.

4. Consultant does not have the authority to relieve construction contractor or Client of their any obligations to each other under the contract for construction. Consultant is not responsible for any obligations to construction contractor or Client undertaken by each other under the contract for construction.

5. Services to be executed by Consultant, as set forth in Article 1, shall commence upon the date of this Agreement takes effect and shall be completed on the date of issuance of the certificate for final payment for the construction work.

ARTICLE 3. Duties of Client

1. Client shall provide all available information, documents, drawings, maps, statistics, data and other things deemed necessary for execution of Services.

2. Client shall provide opportunities for discussion between Consultant and Client or other organizations, and provide Consultant convenient entry onto the site of the work and other places, whenever Consultant deems necessary, for execution of Services.

3. Client will obtain, on behalf of Consultant, or assist consultant to obtain to the best of Client's ability, permission, approval, licence, admission, sanction and any other authorization required in Pakistan to execute Services, for Consultant and his personnel. For this purpose, if necessary, Consultant shall submit to Client necessary applications together with relevant documents.

4. Client will furnish assistant resident engineer(s) who assist Consultant and cooperate with Japanese resident engineers, during execution period of Service, at Client's own expense.

ARTICLE 4. Tariffs, Duties and Taxes

In conformity with the measures applicable to the present Japanese Grant, Consultant and his Japanese personnel shall be authorized:

a) to be exempted from custom duties and other import taxes on equipment, materials and personal effects which will be brought into Pakistan only for execution of Services.

b) to be exempted from all taxes, duties and charges to be levied upon Client and his Japanese personnel working only for Services.

In case the above-mentioned taxes, duties or charges are not exempted, the Client will pay them on behalf of Consultant or compensate the Consultant for them.

ARTICLE 5. Payment

1. Client shall pay net sum of _____ _____ Yen (¥) to Consultant, as fee for Services, in accordance with the payment schedule mentioned below, through the account opened by the Government of Pakistan with _____ (Bank) _____ in Tokyo.

1) Advance Payment
Twenty five percent (25%) of the net sum shall be paid within thirty (30) days after this agreement is verified by Government of Japan.

2) Interim Payment
Twenty five percent (25%) of the net sum shall be paid within thirty (30) days after the conclusion of the contract for construction.

3) Final Payment
Remainder, fifty percent (50%) of the net sum shall be paid within thirty (30) days after all Services are entirely completed.

2. When each payment falls due, Consultant shall claim payment from Client. Client will issue Authorization to Pay (A/P), without delay, to the bank and the bank will notify Consultant of the receipt of the A/P. Consultant shall submit the Payment Request to the bank immediately after receiving the notice.

3. When the certificate for final payment for the construction work is issued by Consultant, all Services shall be deemed to be entirely completed. Final payment shall accordingly become due and Consultant shall be relieved from all obligations under this Agreement. The final payment shall be claimed on or before _____ _____, as referred to Exchange Note.

APPENDIX-3

AGREEMENT

AGREEMENT November 27, 1976

The Japanese Survey Team for Central Telecommunication Research Laboratories (CTRL) Construction Project in the Islamic Republic of Pakistan presented the draft of Final Report (thereinafter referred to as "the draft") on the CTRL Construction Project which consists of:

I. Design Report
   Appendix-1 Report of subsoil Investigation Report.
   Appendix-2 Draft on Consulting Services.

II. Technical Specifications
   Part I Civil and Building Works.
   Part II Electrical Installation, Plumbing, Gas Installation, Air-Conditioning and Lift.

III. Drawings
   Part I Civil and Building Works.
   Part II Electrical Installation, Plumbing, Gas Installation, Air-Conditioning and Lift.

to the Telegraph & Telephone Department (T&T), Ministry of Communications, the Islamic Republic of Pakistan. The T & T studied the draft and discussed with Survey Team until November 26, 1976. And the T & T and Survey Team agreed that the Formal Final Report to be presented by Japan International Co-operation Agency (JICA) after incorporating the modifications and requirements as discussed and agreed mutually and appended herewith shall be accepted and approved by the T & T subject to authorization by Capital Development Authority (CDA) of the draft of above Drawings.

Nos of documents
attached: 1. Drawings 4 sheets
2. Confirmation.

S.A. Siddiqi,
Director-General,
Telegraph & Telephone
Department.

T. Watanabe

Takehiko Watanabe,
Leader,
Japanese Survey Team.

CONFIRMATION

GROUND FLOOR:

1. Anechoic Room:

   a) The foundation of Anechoic room will be isolated from rest of the structure. This modification as agreed and provided in the drawings will be incorporated in the final drawings.

   b) 15 cm cement concrete wall has been proposed. Before a final decision is taken, consultation will be held in Japan if required degree of sound proofing will be achieved, with this wall. Consideration will be made as to how terminals will be casted during the construction for future use between the inside and the outside.

2. Tea Room:

   a) A gas water boiler and exhaust provided in the team room.

   b) A service counter will be provided.

FIRST FLOOR:

1. Switching Laboratory:

   a) A partition wall along column X-7 as shown in the drawing attached. An ante room will be provided as shown in the drawing.

2. Gas connection to storage and kettle room needs modification to fall within CDA regulations.

3. In the Outside Plant Laboratory and Telephone Section no provision exists, for water supply and gas connections which may be looked into.

SECOND FLOOR:

1. Microwave Lab. and HF Lab.:

   a) Microwave laboratory and HF laboratory have been interchanged, and shown in the drawing. The modification will be carried out in the final drawings accordingly.

   b) The cable hole will be shifted to Microwave laboratory from the present position.

2. Chemical Laboratory:

   a) Layout of the laboratory will be considered by the team in Japan in consultation with the specialists. Additional space added will be utilized for providing facilities of material testing, chemical analysis and plastic testing. Additional re-inforcement if necessary, will be taken into consideration at this stage.

   b) Water supply, gas connection and Exhaust will be provided in the laboratory.

3. Wherever water is used in any laboratory, water proofing arrangement will be made over the conduite junction boxes on the floor to safeguard against entry of water. This arrangement will be followed in all laboratories wherever water is provided.

THIRD FLOOR:

1. Circuit Component Laboratory:

   a) Partition across column X-3 will be provided to separate dust-free room from the rest of the lab. Entry to the dust-free room will be through the ante-room only. The proposed arrangement is available in the drawings and will be incorporated in the main body of the drawing.

   b) Economic of electrostatic filters or electric boosters with changeable filters will be considered. Accordingly specifications will be amended and design of ducting will be modified.

   c) An independent temperature controlled cabinet for prolonged storage of components will be provided - space of socket outlet, etc.

Electrification:

According to rules sagregation of services is required between medium and extra low voltage. Due note of the rules on the subject will be taken and amendment if so required, will be made before the release of the final drawings.

Call Bell Service:

Decision was made that peons will be accommodated in the room at the entrance of the air-conditioning room at both ends in 1st, 2nd, and 3rd floor; but on the ground floor space will be made available below the staircase at the two ends.

The equipment will be designed in TRC like indication boards but provision of conduite will be made during the construction after taking into consideration the number of wires to be taken through this conduite to the indication board.

Telephone Service:

For working with Stenophone inter-connection between the Secretary's room and the Officer's will be taken into consideration. Since the telephone wiring will be done by the T&T side necessary provision for conduits will be considered before releasing the final drawings.

WORKSHOP:

a) Workshop layout will be discussed and modification if so required will be incorporated before the final drawings are prepared.

b) The team will decide after going back to Japan if the rectifier in the electroplating room is technically in order without a partition.

LAYOUT PLAN:

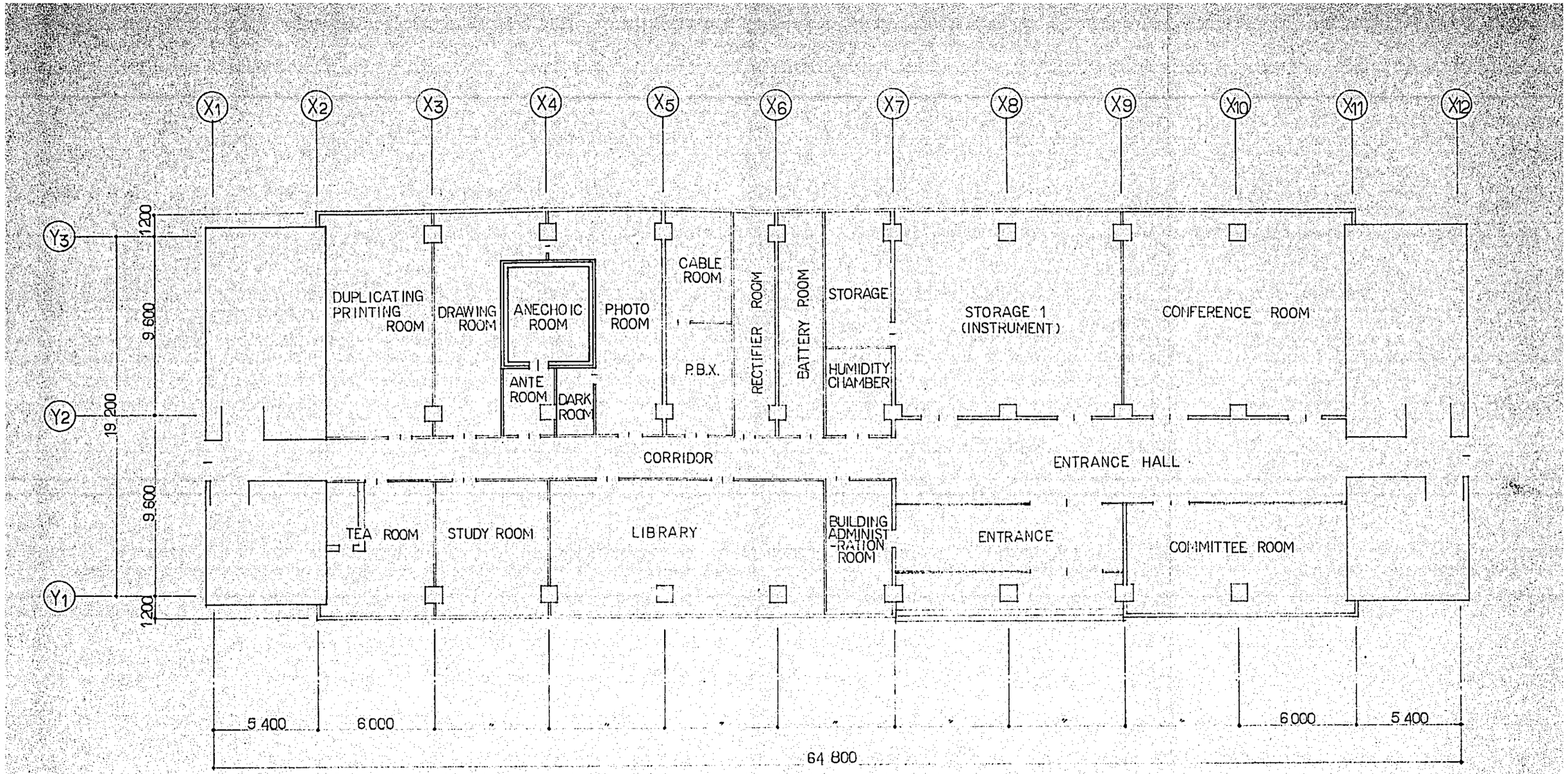
The architect will make a Master Plan taking into consideration the future expansion and accordingly service lines, for example, gas, water, sewerage, electricity, etc., will be modified accordingly; or a proposal will be made how in future, they are to be upgraded.

ROOF ANTENNA:

It was given to understand that the present foundation was designed to carry antenna with 5 meter height and 2 dishes of 3.3 meters each. The architect will, however, indicate the maximum height of antenna for which the present foundation is considered safe.

EARTHING:

Building earths for protection against leakage as required under regulations will be provided as per IEE regulations (copy already provided). The draft will be amended accordingly.



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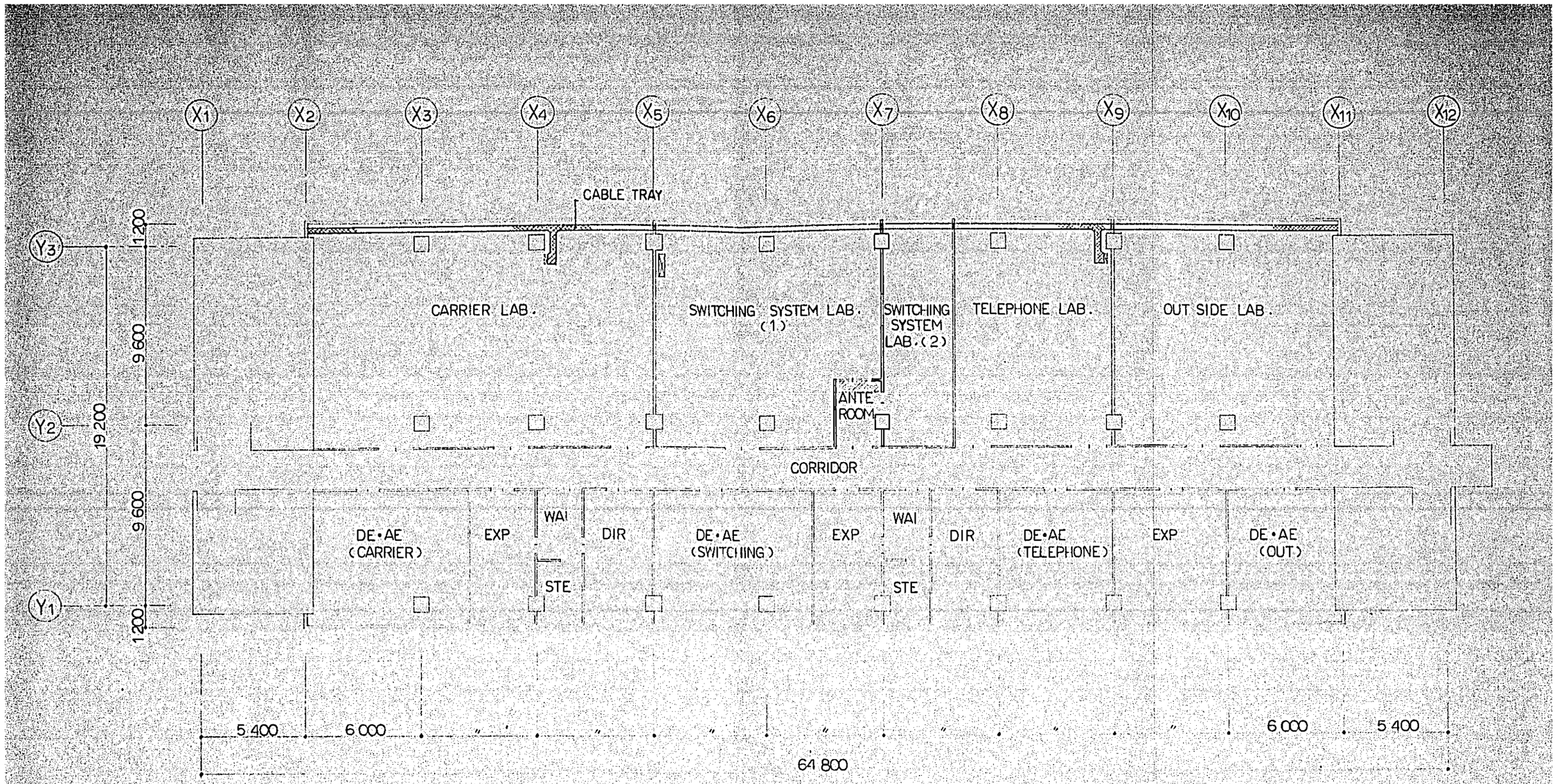
M.B GROUND FLOOR PLAN

(ATTACHED DRAWING Nov. 27 1976)



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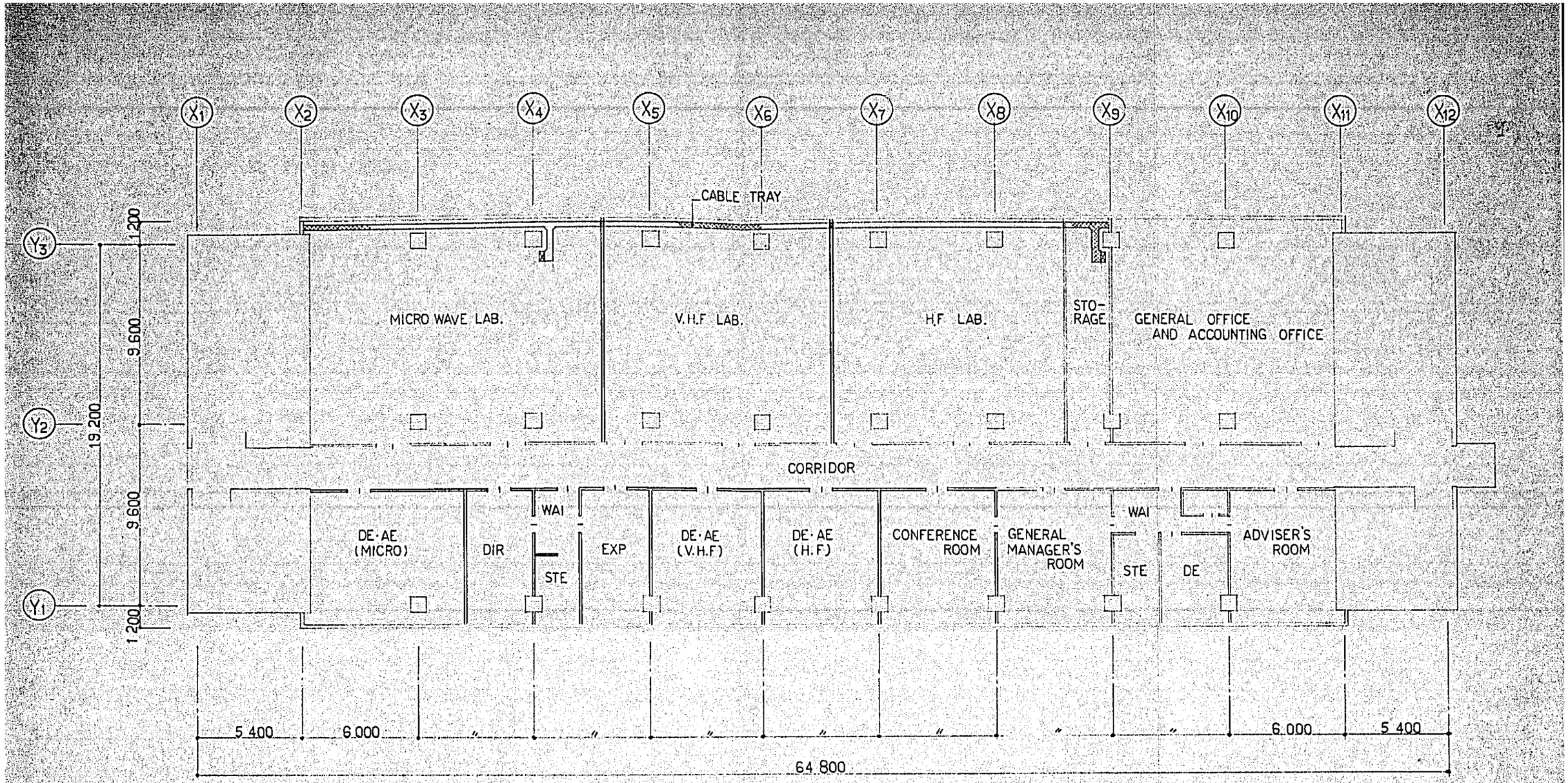
M.B FIRST FLOOR PLAN

(ATTACHED DRAWING Nov. 27 1976)



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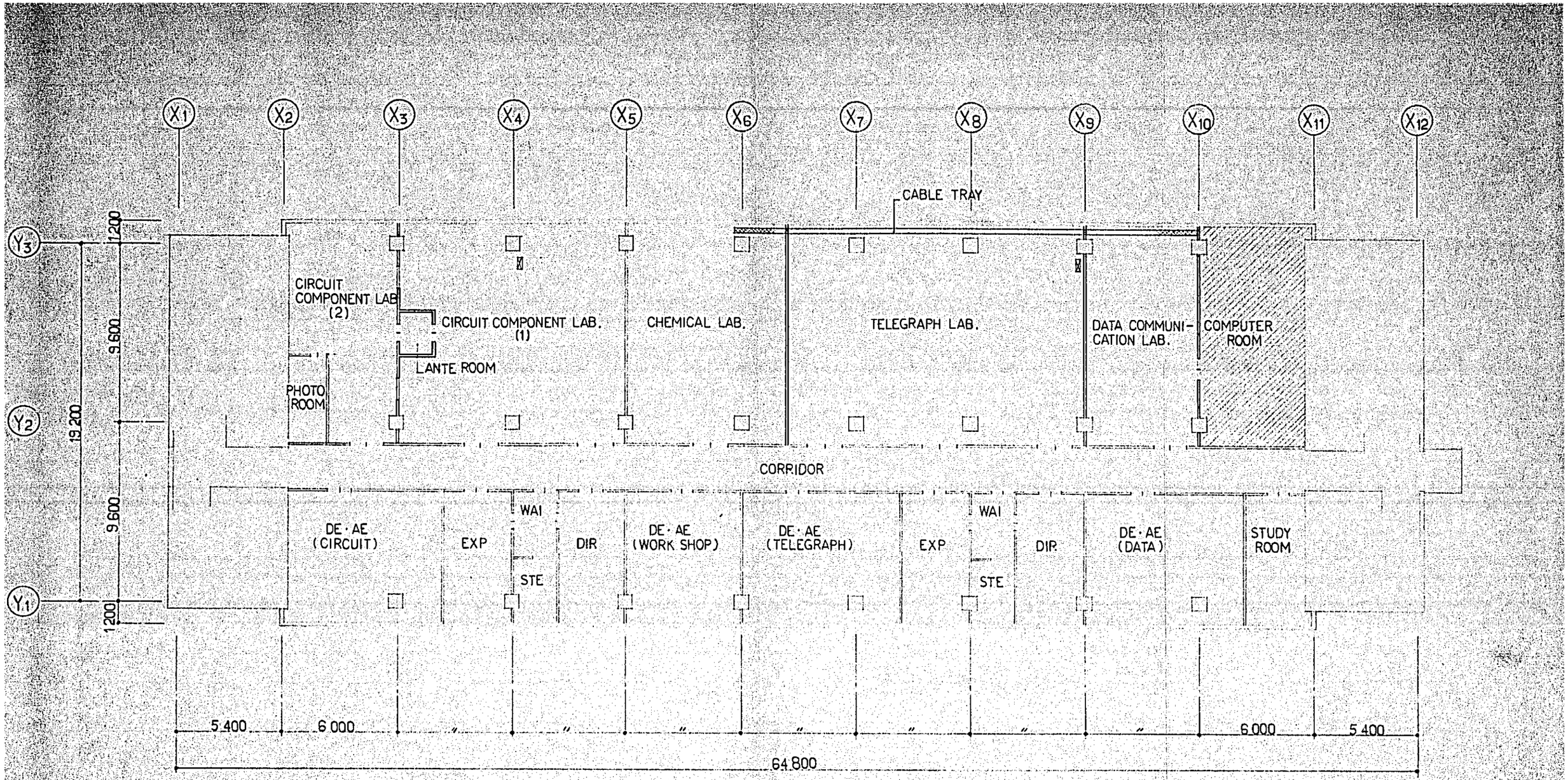
M.B SECOND FLOOR PLAN

(ATTACHED DRAWING Nov. 27 1976)



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M.B THIRD FLOOR PLAN

(ATTACHED DRAWING Nov. 27 1976)