4-8 Consideration on Future Multi-audio Broadcasting, Teletext Broadcasting and Satellite Broadcasting

4-8-1 Multi-audio broadcasting

ERTU has no specific plan to start stereophonic broadcasting. However, it is supposed that the needs of multi-lingual broadcasting will become higher in the near future. Therefore, pre-consideration and planning shall be necessary from the beginning regarding the following equipment.

* Audio matrix
* Audio circuit

4-8-2 Teletext broadcasting

Foreseeing the future development of broadcasting, space for the installation of teletext broadcasting facilities is necessary to be secured adjacent to the master control room.

4-8-3 Satellite broadcasting

Since the New TV Center is a program production center, satellite broadcasting is not necessary to be put into consideration for the moment. However, foreseeing future development of the broadcasting, consideration of suitable location to settle the up-link antenna will be needed on the roof of the building.

4-8-4 Introduction of the computer system into the New TV Center

Here is an example of utilization of the computer system. In case of NHK, for example, every program producer makes input of various information for the program production into the computer. The program production work starts from this stage. The inform-ation is conveyed to all the production supporting sections through the terminal sets located in those sections' rooms.
Based on the information, each section arrange necessary personnel and facilities at the appointed time on the appointed day.
Studio and other related resources are also assigned by the computer, and necessary resources for example VTRs are connected to the studio automatically during the recording time.

On the other hand, broadcasting side, program "On-Air" time tables of five media including Radio, TV and FM are memorized in the computer.

From the start of the daily broadcasting, early in the morning, to the end at midnight, broadcasting of five media are automatically controlled in line with the time tables stored in the computer. The programs are switched just on time one after another, for example, from VTR playback program to live program and next, to local station ... and so forth.

VTR tapes for telecasting are retrieved before the on-the-air time and picked out from the automatic storing house, and after the broadcasting these tapes are returned to the storing house automatically. In NHK, this computerized sytem is called "TOPICS (Total On-Line Program and Information Control System), and

nowadays it is too difficult to imagine the broadcasting operation without this system. NHK spent more than seven years to develop and introduce the system from the planning stage, system design, program design and personnel training until the start of the actual operation on 1968.

As mentioned above, in order to introduce and utilize such a large scale of computer control system like NHK, enough preparation period is required, and the most important thing is how to train all of the staff members concerned.

Such computer system on a large scale will not be necessary at the New TV Center because of the followings;

(1) It is not a broadcasting center, but a center in order to produce programs exclusively. Therefore, switching of the equipment on real time will not be needed.
(2) Since the each TV studio has its own VTRs exclusively, most of the case the connection of other equipment and resources by using computer will not be necessary.
(3) Large-scale computer will not be suitable for the management and processing of the production information of only 13 studios.

However, if modernization and rationalization are planned, it is desirable to computerize step by step in the field where the computerization can take advantage such as simple and repeating handwork, information management and retrieval etc. in the light of the fact that nowadays word-processor and office automation such as being used for salary calculation and stock management are already familiar in the business world.

Even in case of the small scale computer system, a sufficient preparation in advance is necessary to examine the scale of the computer, the purpose of the utilization and the training course of the operators....

At the New TV Center, gradual introduction of computer in the following order will be necessary.

(1) VTR editing
(2) Retrieval and management of the stored programs and materials
(3) Management of personnel documents, salary calculation
(4) Management of the program production cost
(5) Allocation and management of the resources such as studios, rehearsal rooms and VTRs etc.

The summarized table for principal equipment of each studio and room is shown in the end of this part as Table 4-2.

* Annex

Summary schedule of the facilities to be required in the New TV Center, and the video and audio signal block diagrams are in the Annex 4-1 & 2.

SUMMARIZED TABLE FOR PRINCIPAL EQUIPMENT OF EACH STUDIO AND ROOM

Table 4 - 2

STUDIO / ROOM	VIDEO										AUDIO					MICRO WAVE LINK
	Standard Camera	Handy Camera	1 inch VTR	U-matic VCR	Beam VCR (component)	VHS VCR	V Mix (MK)	DVE	Sys. Conv /Transcode	TC(35/16) Equip.	Mixer	Tape Rec/Rep	Disc	Cassette	Multi Tape	
* Studio No.1 - 13, Continuity and Utility Studio No.1 - 3	Detail Figures on *each Studio are Shown in Table 4 - 1															
Sub Total	42	12	38	-	-	7	2MK x 1 3MK x 16	6	-	-	36CH x 1 24CH x 10 16CH x 6	34	17	17	-	-
Master Control	-	-	-	-	-	-	-	-	Transcoder 2	-	-	-	-	-	-	-
VTR Operation Center	-	-	13 NTSC x 2	NTSC 2	-	2	-	-	1	-	-	-	-	-	-	-
Marketing Video Copy	-	-	10 8 from x 4	(H) 2 (L) 2	-	2	-	-	Transcoder 1	-	-	-	-	-	-	-
VTR Editing center: Work Tape Copy Chain	-	-	12	-	9	12	-	-	-	-	-	-	-	-	-	-
VTR Editing center: PD Editing	-	-	-	-	-	80	-	-	-	-	-	-	-	-	-	-
VTR Editing center: Editing I/R Auto Sys	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-
VTR Editing center: ECS VTR Editing	-	-	24	-	-	-	-	-	-	-	-	-	-	-	-	-
VTR Editing center: Audio Copy/Copy back	-	-	2	(H) 2	-	-	-	-	-	-	-	-	-	-	8CH x 2	-
TC Center	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-
EFP: EFP Camera	-	with 8 cam VCR 40	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EFP: 2 - EFP Vans	-	6	-	-	4	-	-	-	-	-	-	-	-	-	-	-
Sound Rec Sutdio NO. 1, 2	-	-	-	-	-	-	-	-	-	-	36CH x 2	4	-	-	24CH x 2	-
Sound Rec Studio NO. 3	-	-	-	-	-	-	-	-	-	-	24CH x 1	2	-	-	16CH x 1	-
Audio Dubbing No. 1 - 5	-	-	-	(H) 5	-	-	-	-	-	-	16CH x5	3x5	1x5	1x5	8CH x 5	-
Vewing Booth NO. 1 - 5	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-
Computer Graphic	-	-	Still Frame 1	-	-	-	-	-	-	-	-	-	-	-	-	-
Microwave Link	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	PAL x 4 SECAM x 3
Total	42	58	106	13	13	110	2MK x 1 3Mk x 16	6	4	3	36CH x 3 24CH x 11 16CH x 11	55	22	22	8CH x 7 16CH x 1 24CH x 2	7

A N N E X

SUMMARY SCHEDULE OF BROADCASTING EQUIPMENT

1. Production Studio Facilities

1-1 Studio No. 1 (900 m^2)

4 sets of	Standard Studio Color Camera
2 sets of	Handy Color Camera
1 set of	Camera Crane
1 set of	Vision Mixer (Input Channel: 16 3MK Amp)
2 sets of	PAL System C format 1" Video Tape Recorder/Reproducer with Simple Editing Functions
1 set of	Video Typewriter (Arabic)
1 set of	Video Monitoring Equipment
1 set of	PAL Synchronizing Pulse Generator of Dual type
1 set of	Microphones and Accessories
1 set of	36CH Audio Mixer (Input level selectable: MIC, LINE 1, 2)
2 sets of	Audio Tape Recorder/Reproducer
1 set of	Disc Reproducer
1 set of	Audio Cassette Tape Recorder/Reproducer
1 set of	Audio Monitoring Equipment
1 set of	Studio Intercommunication System
1 set of	Studio Lighting System (capacity 900 kW)

1-2 Studio No. 2 - No. 6 (600 m^2)

Each Studio consisting of:

3 sets of	Standard Studio Color Camera
1 set of	Handy Color Camera
1 set of	Camera Crane
1 set of	Vision Mixer (Input Channel: 16 3MK Amp)
2 sets of	PAL System C format 1" Video Tape Recorder/Reproducer with Simple Editing Function
1 set of	Video Typewriter (Arabic)
1 set of	Video Monitoring Equipment
1 set of	PAL Synchronizing Pulse Generator of Dual Type
1 set of	Microphones and Accessories
1 set of	24CH Audio Mixer (Input Level selectable: MIC, LINE 1, 2)
2 sets of	Audio Tape Recorder/Reproducer
1 set of	Disc Reproducer
1 set of	Audio Cassette Tape Recorder/Reproducer
1 set of	Audio Monitoring Equipment
1 set of	Studio Intercommunication System
1 set of	Studio Lighting System (capacity 450 kW)

1-3 Studio No. 7 - No. 11 (300 m^2)

Each Studio consisting of:

3 sets of	Standard Studio Color Camera
1 set of	Handy Color Camera
1 set of	Vision Mixer (Input Channel: 16 3MK Amp)
2 sets of	PAL System C format 1" Video Tape Recorder/Reproducer with Simple Editing Functions
1 set of	Consumable type VHS Video Cassette Recorder/Reproducer
1 set of	Video Typewriter (Arabic)
1 set of	Video Monitoring Equipment
1 set of	PAL Synchronizing Pulse Generator of Dual type
1 set of	Microphones and Accessories
1 set of	24CH Audio Mixer (Input level selectable: MIC, LINE 1, 2)
2 sets of	Audio Tape Recorder/Reproducer
1 set of	Disc Reproducer
1 set of	Audio Cassette Tape Recorder/Reproducer
1 set of	Audio Monitoring Equipment
1 set of	Studio Intercommunication System
1 set of	Studio Lighting System (Capacity: St. No. 7 300 kW St. No. 8-11 250 kW)

1-4 Studio No. 12, 13 (300 m^2)

Each Studio consisting of:

3 sets of	Standard Studio Color Camera
1 set of	Vision Mixer (Input Channel: 16 3MK Amp)
1 set of	Digital Video Effects (DVE)
2 sets of	PAL System C format 1" Video Tape Recorder/Reproducer with Simple Editing Functions
1 set of	Consumable type VHS Video Cassette Recorder/Reproducer
1 set of	Video Typewriter (Arabic)
1 set of	Video Monitoring Equipment
1 set of	PAL Synchronizing Pulse Generator of Dual type
1 set of	Microphones and Accessories
1 set of	16CH Audio Mixer (Input level selectable: MIC, LINE 1, 2)
2 sets of	Audio Tape Recorder/Reproducer
1 set of	Disc Reproducer
1 set of	Audio Cassette Tape Recorder/Reproducer
1 set of	Audio Monitoring Equipment
1 set of	Studio Intercommunication System
1 set of	Studio Lighting System (capacity: 250 kW)

2. Continuity Studio Facilities

2 sets of	Standard Studio Color Camera
1 set of	Vision Mixer (Input Channel: 16 2 MK Amp)
1 set of	Digital Video Effects (DVE)
3 sets of	PAL System C format 1" Video Tape Recorder/Reproducer with Simple Editing Functions
1 set of	Video Typewriter (Arabic)
1 set of	Video Monitoring Equipment
1 set of	PAL Synchronizing Pulse Generator of Dual type
1 set of	Microphones and Accessories
1 set of	16CH Audio Mixer (Input level selectable: MIC, LINE 1, 2)
2 sets of	Audio Tape Recorder/Reproducer
1 set of	Disc Reproducer
1 set of	Audio Cassette Tape Recorder/Reproducer
1 set of	Audio Monitoring Equipment
1 set of	Studio Intercommunication System
1 set of	Studio Lighting System (capacity: 50 kW)

3. Utility Studio (No. 1 - No. 3) Facilities

Each Studio consisting of:

1 set of	Vision Mixer (Input Channel: 16 3MK Amp)
1 set of	Digital Video Effects (DVE)
1 set of	Caption Scanner
1 set of	Video Typewriter (Arabic)
3 sets of	PAL System C format 1" Video Tape Recorder/Reproducer with Simple Editing Function
1 set of	Video Monitoring Equipments
1 set of	PAL Synchronizing Pulse Generator of Dual type
1 set of	16CH Audio Mixer (Input level selectable: MIC, LINE 1, 2)
2 sets of	Audio Tape Recorder/Reproducer
1 set of	Disc Reproducer
1 set of	Audio Cassette Tape Recorder/Reproducer
1 set of	Audio Monitoring Equipment

4. VTR Operation Center Facilities

13 sets of	PAL/SECAM System C format 1" Video Tape Recorder/Reproducer (3 sets of above quantity are for recorder in Cairo Center)
2 sets of	NTSC System C format 1" Video Tape Recorder/Reproducer
2 sets of	NTSC System U-matic Video Cassette Recorder/Reproducer
1 set of	System Converter for NTSC/PAL/SECAM
2 sets of	Consumable type VHS Video Cassette Recorder/Reproducer
1 set of	PAL Synchronizing Pulse Generator of Dual type
1 set of	Video and Audio Ancillary Equipment

5. Telecine Center Facilities

3 sets of	16/35 mm Telecine Equipment
1 set of	PAL Synchronizing Pulse Generator of Dual type
1 set of	Video and Audio Monitoring Equipment

6. Master Control Room Facilities

1 set of	Video/Audio Output Switcher
1 set of	VTR Assignment Switcher (Video/Audio/Control)
1 set of	Telecine Chain Assignment Switcher (Video/Audio/Control)
3 sets of	Processing Amplifiers
2 sets of	Frame Synchronizers
2 sets of	Transcoders for PAL/SECAM
1 set of	Video Distributors
1 set of	Audio Distributors
1 set of	Control Console for Output, VTR Assignment and Telecine Assignment Switcher
1 set of	Video and Audio Monitoring Equipment
1 set of	PAL Synchronizing Pulse Generator of Dual type
1 set of	Pulse Distributor
1 set of	Communication System between New TV Center and ERTU Cairo Headquater

7. Microwave Link Room Facilities

4 sets of Microwave Link of PAL System
(To and from Cairo Center)

3 sets of Microwave Link of SECAM System
(To and from Moqattam TX Station)

1 set of Ancillary Equipment

1 set of Microwave Link Tower
(Height: 20 m)

8. Marketing Video Copy Room Facilities

8-1 Video Recorder/Reproducer Equipment

2 sets of PAL/SECAM System C format 1" Video Tape Recorder/Reproducer

8 sets of PAL/SECAM System C format 1" Video Tape Recorder

4 sets of PAL/SECAM System B format 1" Video Tape Recorder

2 sets of PAL System U-matic High-band Video Cassette Recorder

2 sets of PAL System U-matic Low-band Video Cassette Recorder

2 sets of Multiple System Consumable type VHS Video Cassette Recorder/Reproducer

8-2 Ancillary Equipment

1 set of Transcoder for PAL/SECAM

1 set of Video Distributor

1 set of PAL Synchronizing Pulse Generator of Dual type

1 set of Pulse Distributor

1 set of Audio Distributor

9. VTR Editing Center Facilities (Off Line Editing System)

9-1 Work Tape Copy Chain

12 sets of PAL System C format 1" Video Tape Recorder/Reproducer

9 sets of PAL System Component System 1/2"-Beta Video Cassette Recorder/Reproducer

12 sets of Consumable type VHS Video Cassette Recorder/Reproducer

12 sets of Time Code Generator

1 set of Ancillary Equipment

9-2 PD Editing

80 sets of Consumable type VHS Video Cassette Recorder/Reproducer

40 sets of Editing Units

9-3 Editing Information Retrieval Automation System

2 sets of Consumable type VHS Video Cassette Recorder/Reproducer

2 sets of Time Code Reader

2 sets of Mini Computer System (Hard and Soft Ware)

9-4 ECS VTR Editing Chain (12 chain)

24 sets of PAL System C format 1" Video Tape Recorder/Reproducer

12 sets of Automatic Editing System

12 sets of Video Compensation Units (Color Corrector, Noise Reducer)

9-5 Audio Copy/Copy Back Section

2 sets of PAL System C format 1" Video Tape Recorder/Reproducer

2 sets of U-matic High-band Video Cassette Recorder/Reproducer

2 sets of 8CH Multi Audio Tape Recorder/Reproducer

2 sets of Time Code Synchronizer

1 set of Ancillary Equipment

9-6 Pulse System

1 set of PAL Synchronizing Pulse Generator of Dual type

1 set of Pulse Distributor

10. Audio Dubbing (ST1 - 5) Facilities

Each consisting of:

1 set of	U-matic High-band Video Cassette Recorder/Reproducer
1 set of	16CH Audio Mixer with Sound Effect Equipment (Input level selectable: MIC, LINE 1, 2)
1 set of	8CH Multi Audio Tape Recorder/Reproducer
3 sets of	Tape Recorder/Reproducer
1 set of	Audio Cassette Tape Recorder/Reproducer
1 set of	Disc Reproducer
1 set of	Tape Lock Machine
1 set of	PAL Synchronizing Pulse Generator of Dual type
1 set of	Video and Audio Monitoring Equipment
1 set of	Microphone and Accessory for Commentator's Booth

11. EFP Facilities

11-1 EFP Camera

40 sets of	Component System 1/2"-Beta Video Cassette Recorder in 3-Tube Shoulder type Camera
40 sets of	Accessories

11-2 EFP Van

2 sets of EFP Van each including
3-Shoulder Cameras, VTR, Video/Audio Equipments, Air-conditioner and one AC Power Generator

12. Sound Recording Studio Facilities

12-1 Studio No. 1, No. 2 (160 m^2)

Each Studio consisting of:

1 set of Microphones and Accessories

1 set of 36CH Audio Mixer (Input level selectable: MIC, LINE 1, 2)

1 set of 24CH Multi Audio Tape Recorder/Reproducer

2 sets of Tape Recorder/Reproducer

1 set of Reverberation Unit (Electronic type)

1 set of Audio Monitoring Equipment

12-2 Studio No. 3 (120 m^2)

1 set of Microphones and Accessories

1 set of 24CH Audio Mixer (Input level selectable: MIC, LINE 1, 2)

1 set of 16CH Multi Audio Tape Recorder/Reproducer

2 sets of Tape Recorder/Reproducer

1 set of Reverberation Unit (Electronic type)

1 set of Audio Monitoring Equipment

13. Others

13-1 Viewing Booth (No. 1 - 5) Facilities

Each Booth consisting of:

1 set of Consumable type VHS Video Cassette Recorder/Reproducer

1 set of Video Monitor with Loud Speaker

13-2 Audition Room (No. 1, 2) Facilities

Each Room consisting of:

1 set of Video Projector with Screen

1 set of Audio Monitor

13-3 Computer Graphic/Animation Room

1 set of Computer Graphic/Animation System

1 set of PAL System C format 1" Still Frame Video Tape Recorder/Reproducer with Slow Motion Controller and Time Base Corrector

1 set of PAL Synchronizing Pulse Generator of Dual type

13-4 Off-Air Monitor System

1 set of SECAM Modulator

1 set of Head End

1 set of Distributors

100 sets of SECAM TV Receivers

13-5 Room to Room Loudspeaking Intercommunication System

1 set of Central Matrix/Amplifier Unit

100 sets of Communication Terminals with Key, Microphone and Speaker

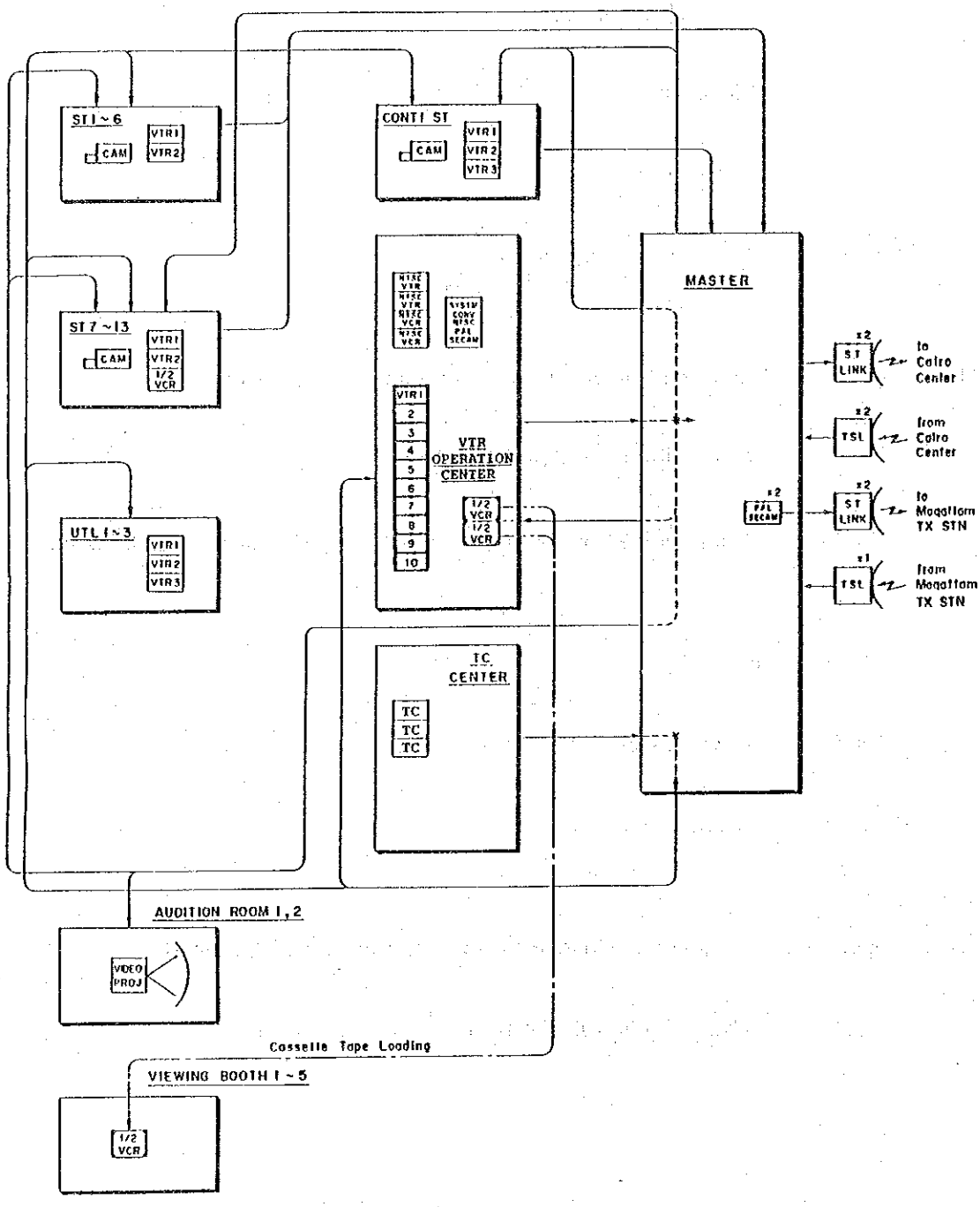
13-6 Clock System

1 set of Crystal Controlled Master Clock Facility

200 sets of Slave Clock

13-7 System for Management and Retrieval of the Stored Materials

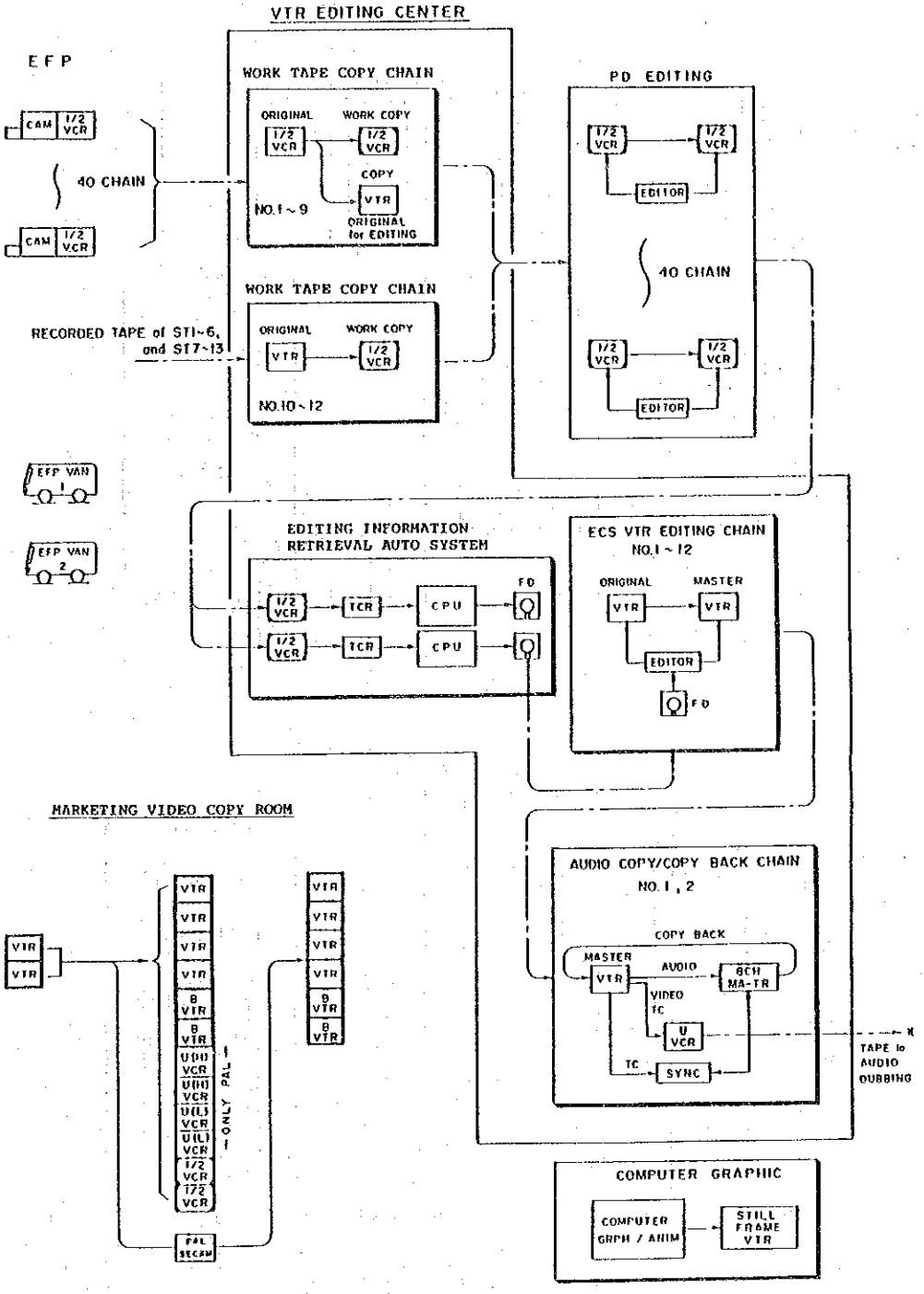
1 set of Micro Computer System



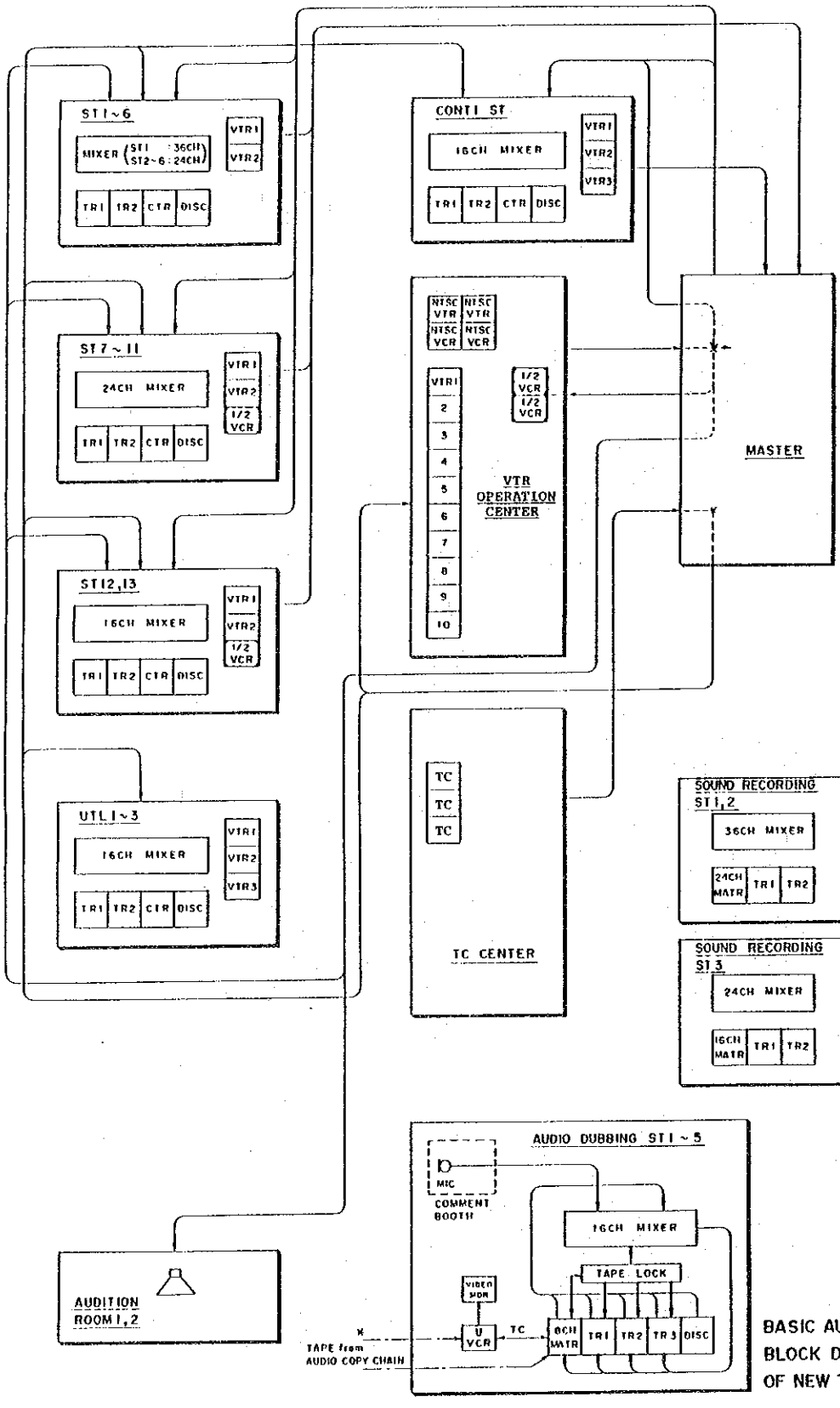
1/2 VCR : CONSUMABLE TYPE VIDEO CASSETTE TAPE RECORDER/REPRODUCER

VTR : 1" VTR OF PAL/SECAM COMMON USE

BASIC VIDEO SIGNAL BLOCK DIAGRAM OF NEW TV CENTER (1/2)



BASIC VIDEO SIGNAL BLOCK DIAGRAM
OF NEW TV CENTER (2/2)



BASIC AUDIO SIGNAL BLOCK DIAGRAM OF NEW TV CENTER

PART 5

ARCHITECTURAL PLANNING

5. ARCHITECTURAL PLANNING

5-1 BASIC PHILOSOPHY AND CONCEPT

5-1-1 Basic Philosophy

The following design philosophy has been proposed for the architectural design of this project.

(1) Respect for function and pragmatism

In general, the broadcasting production facility is complex in its activities and management. The zoning, layout and floor plans of buildings and facilities of this project shall be as simple and functional as possible for efficient operation and good management of the center. Since the works involved are of a huge magnitude, this project must be carried out in several phases. Therefore the basic design and its implementation program shall be pragmatic and suit such conditions.

(2) Expression of modern technology and awareness

The broadcasting production center is one of the main pillars of the "information industry", the vanguard of our time, making full use of facilities and equipment offered by modern technology.
This project will be the center for broadcasting production in Egypt for a long period in the future and shall function as a core of broadcasting media for the countries in the middle east region.
The design of the facilities and buildings shall, therefore, be modern, satisfying the needs of today and tomorrow, with a touch of modern islamic design.

(3) Flexibility for the future

Considering the constant progress of technology applied to the broadcasting center, the layout and design of buildings and facilities shall have sufficient flexibility and expansibility to cope with possible future changes in the system and organization.

5-1-2 Basic Concept

The following shall be considered for the basic design concept of the project.

(1) To produce programs of higher quality

(2) To create programs in quantity

(3) To create programs more efficiently

(4) To provide ideal and comfortable working conditions

(5) To perform management more efficiently

(6) To keep enough pace for the progress in technology, electrnics and program production

(7) To cope with the conditions and situations in Egypt

(8) To take into account functional inter-dependences of the facilities.

(9) To permit easy orientation with short internal circuit.

(10) To separate pedestrian routes from those of equipment or decor transportation.

(11) To ensure best soundproofing for studio areas.

(12) To adopt suitable structural design to cope with the various uses of the building.

(13) To adopt partition grid method for easy construction and easy change.

(14) To permit excellent thermal insulation and sun protection by using compact structure with minimum exterior surface.

(15) To adopt decentralized air conditioning system to cope with the expansion of the complex.

(16) To use daylight as illumination of as many rooms as possible.

(17) To ensure good future expasibility without disturbance to the daily operation of existing building.

5-2 SITE AND ITS ENVIRONMENT

5-2-1 Site

(1) Location

a. Location

The project site for the New TV Center is located in 6th October City, 33km southwest of the center of Cairo, having an area of approximately 2 sq.km (200ha). North side of the site faces the highway "Wahat Bahria Road" which connects Cairo and 6th October City, and others are surrounded by desert. At present there is no definite future plan for the surroundings. Administratively the site belongs to 6th October City.

b. Development plan in 6th October City

To cope with the overpopulation of Cairo City, the Government has organized a New Urban Community under the Ministry of Housing and started to built 7 or 8 new towns around the Cairo suburbs, such as "10th of Ramadan City", "Sadat City", "El Salam City", "El Ameriah City" etc. 6th October City is one of those new towns and comes under the administration of the New Urban Community.

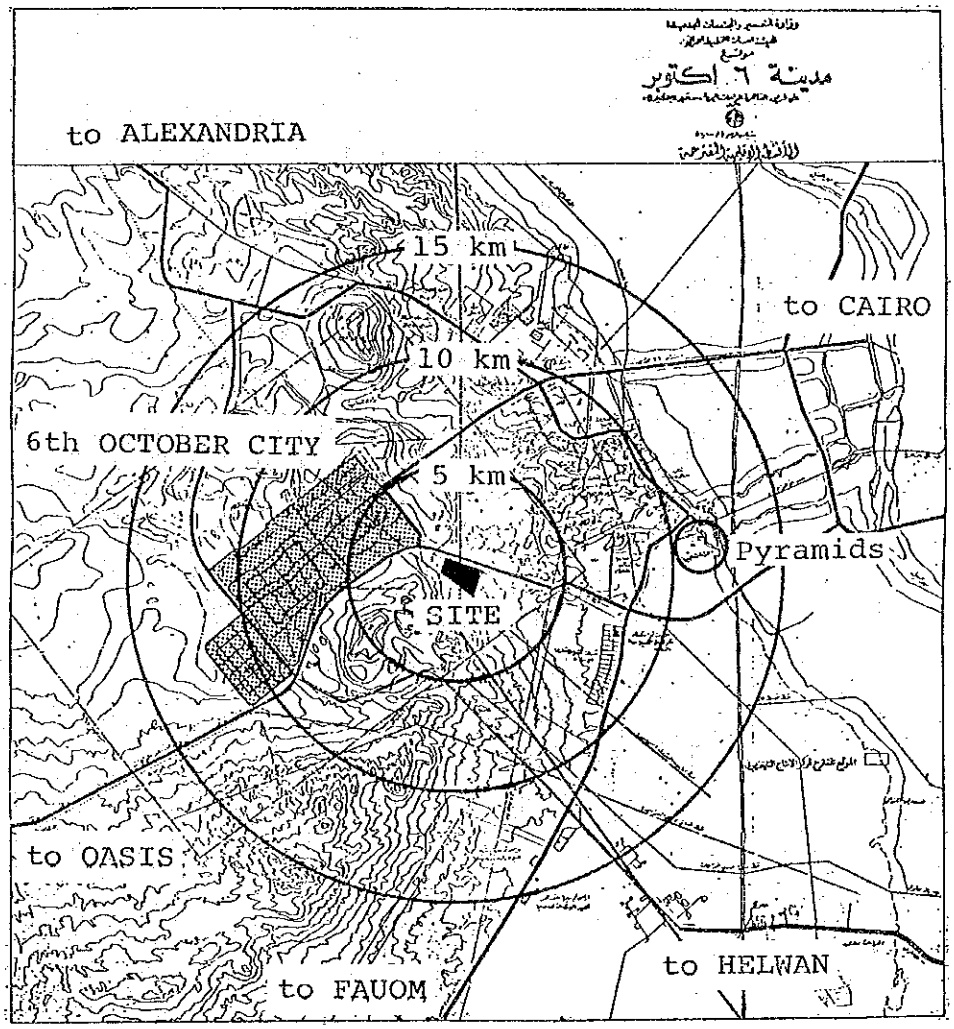
Two (2) highways pass through the city, one connecting Cairo and Oasis Area, and the other from Alexandria to Helwan which is one of the largest industrial cities in Egypt. Furthermore, a new highway is now under construction which will connect the city to the center of Cairo directly.

According to the city development plan, the west area of the city is to be developed as an industrial zone with the above transportation advantage.

The east area is to be developed as a 500,000-population residential area and tourist area of Cairo City. In the future the above residential area will spread toward Cairo and it will cover a vast area of 22.5 (km) x 16.5 (km).

The project site is located in this east area of the City close to the tourist area.

Fig. 5-1 SITE LOCATION



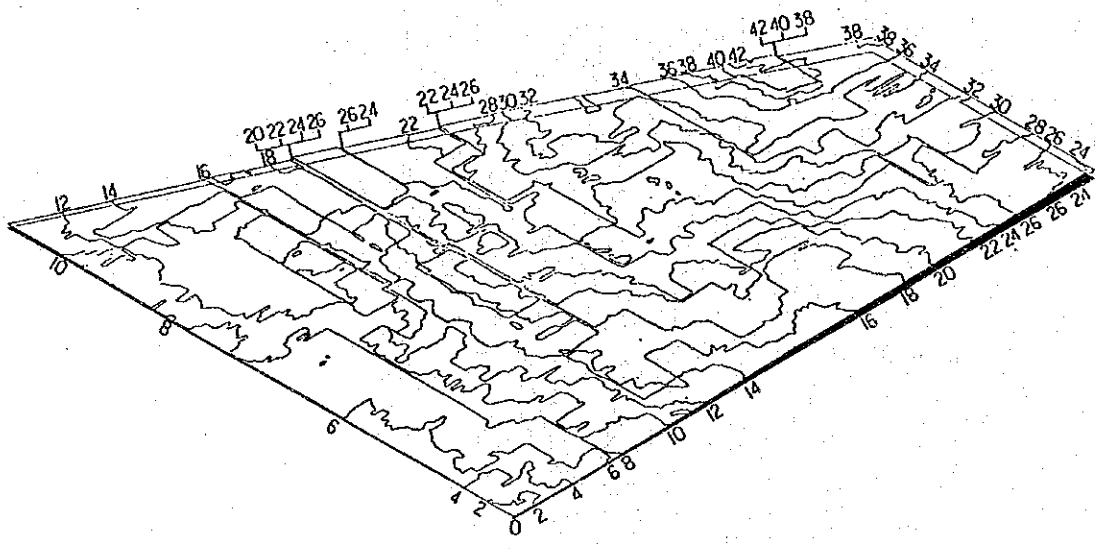
(2) Topographic Analysis

According to the result of topographic survey carried out by ERTU, the site has the following level difference.

- north to south	+ 10 m
- east to west	+ 26 m
- highest point	+ 42 m (from lowest point)

The following are the computor analysis on the topographic data.

Fig. 5-2 TOPOGRAPHIC ANALYSIS



(3) Soil Conditions

Soil investigation report was submitted to the Team by ERTU. According to the report, the soil formation encountered in this boring can be summarized as follows;

1. From the natural ground surface to depth of about 2.0 meters a dark brown flakey sandstone layer appears

2. From a depth of 2.00 to 4.00 m, a dark reddish grey cemented fine sand and traces of silt and gypsum.

3. From a depth of 4.00 to 16.00 m, successive layers of slightly cemented fine to medium sand or sandly silt.

4. From a depth of 16.00 to 19.00 m, medium sand.

5. In borehole No.2, two thin layers of quartizite rock with thickness of 10 cm, appear at a depth of about 12.50 m, and also at about 19.0

(4) Infrastructure
(Utility Supply Route)

At present, planning for infrastructure in 6th October City is now under design by Authority of Development New Town of 6th October City and its fundamental construction has been started.

a. City power supply to the site

- Supply voltage to the site is 20kV.
- Number of incoming power line to the site will be four lines.
- Incoming power lines to the site which are provided by 6th October City will be underground cables.

- 20kV city power to the site will be available three years from now (1989), therefore, temporary power for construction will be taken from existing 11kV line.

b. Telephone line (COL)

- Telephone line to the site will be available three years from now (1989).
- One temporary telephone line for construction will be available after one year (1987).

c. City water supply

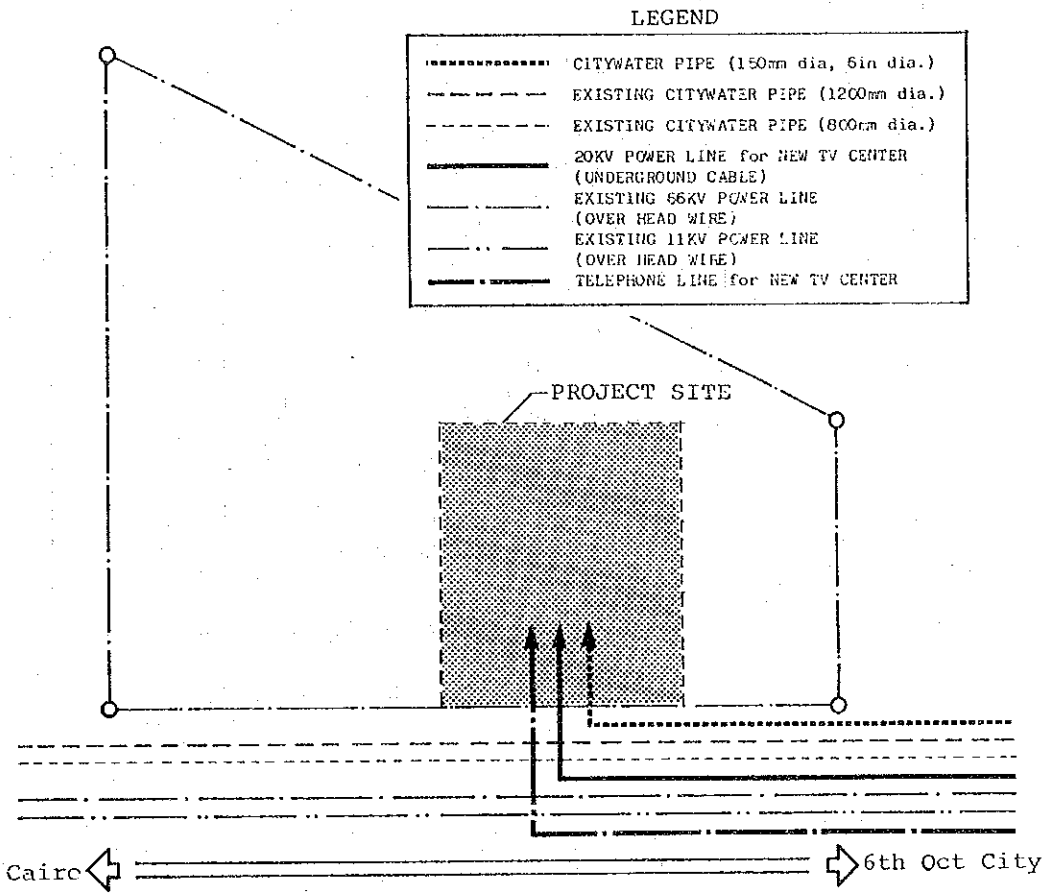
- Situation of water supply
  800 mm dia. and 1,200 mm dia. city water main pipes are laid underground near the northwest road of the site.
  These pipes are for water delivery from water source to the pump station of 6th October City.
  Piping work of 800 mm dia. is already finished, and 1,200 mm dia. piping work is 98% completed.

- City water supply for the site
  After treatment in 6th October City, city water shall be supplied through 6" dia. pipe to the site by the reponsibility of 6th October City.
  Supply of city raw water will be decided after the decision of drainage system.
  Temporary water supply piping shall be branched from 800 mm dia. underground pipe.

d. City drainage

At present, 6th October City has no plan to install city drainage for the site.

Fig. 5-3 INFRASTRUCTURE



(5) Meteorological Conditions

Meteorological conditions of West Cairo is as follows. This data is adapted to 6th October City.

Table 5-1 METEOROLOGICAL DATA

WEST CAIRO

ITEM \ MONTH		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DURATION
AIR TEMP. (C)	Mean Max. Air Temperature	18.2	19.9	12.2	27.6	30.8	33.8	34.1	33.9	31.6	28.8	23.8	19.8	1957 - 1980
	Mean Min. Air Temperature	7.4	8.4	10.4	13.2	16.2	19.2	20.3	20.6	19.3	17.1	13.0	9.0	"
	Highest Max. Air Temperature	30.2	33.9	39.0	42.1	46.5	45.7	42.0	42.0	42.8	39.9	36.3	31.6	"
	Lowest Min. Air Temperature	1.0	2.9	4.3	6.4	10.3	14.1	17.2	17.2	14.5	10.0	5.9	3.5	"
Mean Relative Humidity (%)		59	55	49	44	44	45	54	57	58	59	64	60	"
RAINFALL (mm)	Mean Total Rainfall	4.0	3.2	2.5	0.8	1.2	0	0	0	0	1.7	4.7	3.8	"
	Highest Rainfall in one day	11.2	15.7	15.3	4.4	19.8	0	0	0	0.4	23.3	43.7	7.9	"
WIND VELOCITY (meter/sec)	Average surface Wind Velocity	3.8	4.2	4.8	5.0	4.9	4.8	4.9	3.7	4.0	4.0	4.1	3.6	"
	Max. Surface Wind Velocity	24.2	26.3	27.8	27.3	25.7	23.2	20.6	20.1	19.6	23.7	22.1	26.3	"
Surface Wind Direction		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	"
Mean Sunshine (hours)		7.3	8.1	8.8	9.8	10.7	12.1	12.0	11.4	10.5	9.3	8.2	7.2	1957 - 1980

EGYPT ARAB REPUBLIC
THE GENERAL AUTHORITY FOR
METEOROLOGICAL OBSERVATIONS

5-2-2 Site Utilization Planning

(1) Composition Facilities of the New TV Center.

In addition to the basic design of the studio complex, the layout planning of the whole site is to be conducted by the Study Team. The following are the composition facilities of the New TV Center.

- Studio Complex
  TV program production facility with 13 studios.

- Housing for directors
  For 2 or 3 families of directors.
  One of them may be used as a guest house.

- Flat for engineer and staff
  Design occupants are tentatively to be 50.

- Open Garden for residential area
  For the residents of housing and flat, open garden may be provided with sports facilities such as tennis court and football ground.
  Sophisticated fence may be provided along the boundary between Studio Complex and residential area.

- Store and Garage for ERTU
  Vacant area is to be reserved on the southwest corner of the site for ERTU use.

- Film Laboratory
  Vacant area is to be reserved adjacent to the studio complex for film laboratory.

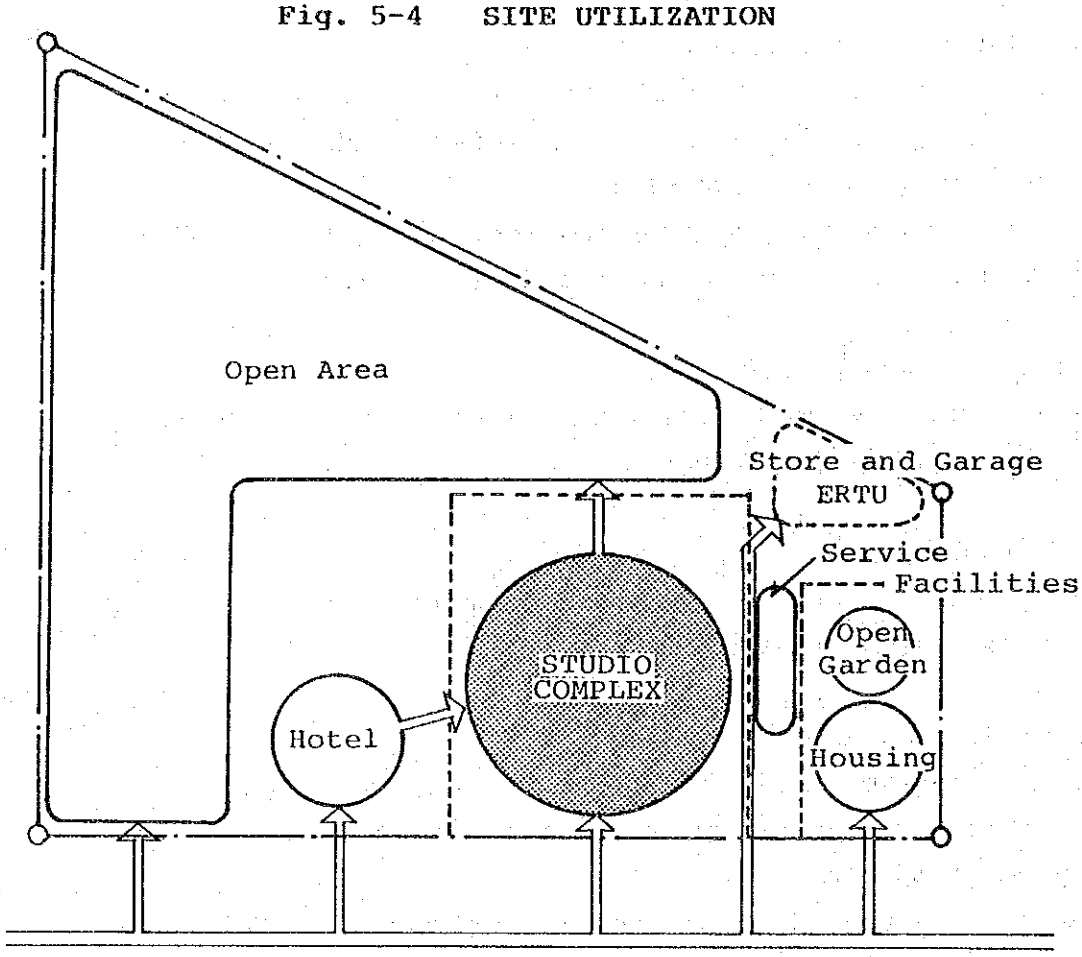
- Hotel for artists
  To accomodate artists near the studio complex for stays of a few days, hotel with approximately 200 beds may be provided.
  Besides that, certain number of cottages will be attached to the hotel for the use of distinguished artists and their staff.

- Open Area
  In this area open sets for TV camera shooting will be arranged such as ancient buildings, a natural scenery, street scene, etc.
  Furthermore, those open sets may be open to the general public with admission charge thus bringing in some revenue to the New TV Center.

(2) Basic Concept of Site Utilization

The following diagram shows the basic concept of site utilization.

Fig. 5-4 SITE UTILIZATION



5-3 ARCHITECTURAL DESIGN

5-3-1 Space Program and Design Occupants

The space program attached herein (ANNEX 5-1) is a compilation of the projected requirement and information obtained through interviews and meetings with the various section personnel concerned of ERTU in the Study. Furthermore the technical analysis and judgements of the Study Team are added to the above requirements and information to establish the harmonized space program corresponding to the organization and function of the New TV Center.

In the space program herein presented, common spaces such as machinery rooms, toilets and corridors are not listed, since they are naturally required for the function of buildings and considered to be included in the area of 35 percent (%) of net room area which is included in total floor area.

The Master Plan is to be basically prepared in accordance with this space program.
The following is the summary of the Space Program.

Table 5-2 SPACE PROGRAM

BLOCK	I	II	TOTAL
ADMINISTRATION	6,220	360	6,580
STUDIO	12,700	11,370	24,070
DECOR	28,220	4,890	33,110
TECHNICAL	12,080	3,830	15,910
TOC	5,410	1,130	6,540
PD. OFFICE	2,080	2,050	4,130
PROGRAM PRODUCTION	4,590	650	5,240
ARTIST	9,860	950	10,810
POWER HOUSE	4,140	---	4,140
TOTAL	73,220	21,400	94,620

NOTE: w/o SERVICE BLOCK (12,000m^2)
VISITORS' CORRIDOR
PARKING

5-3-2 Design Concept

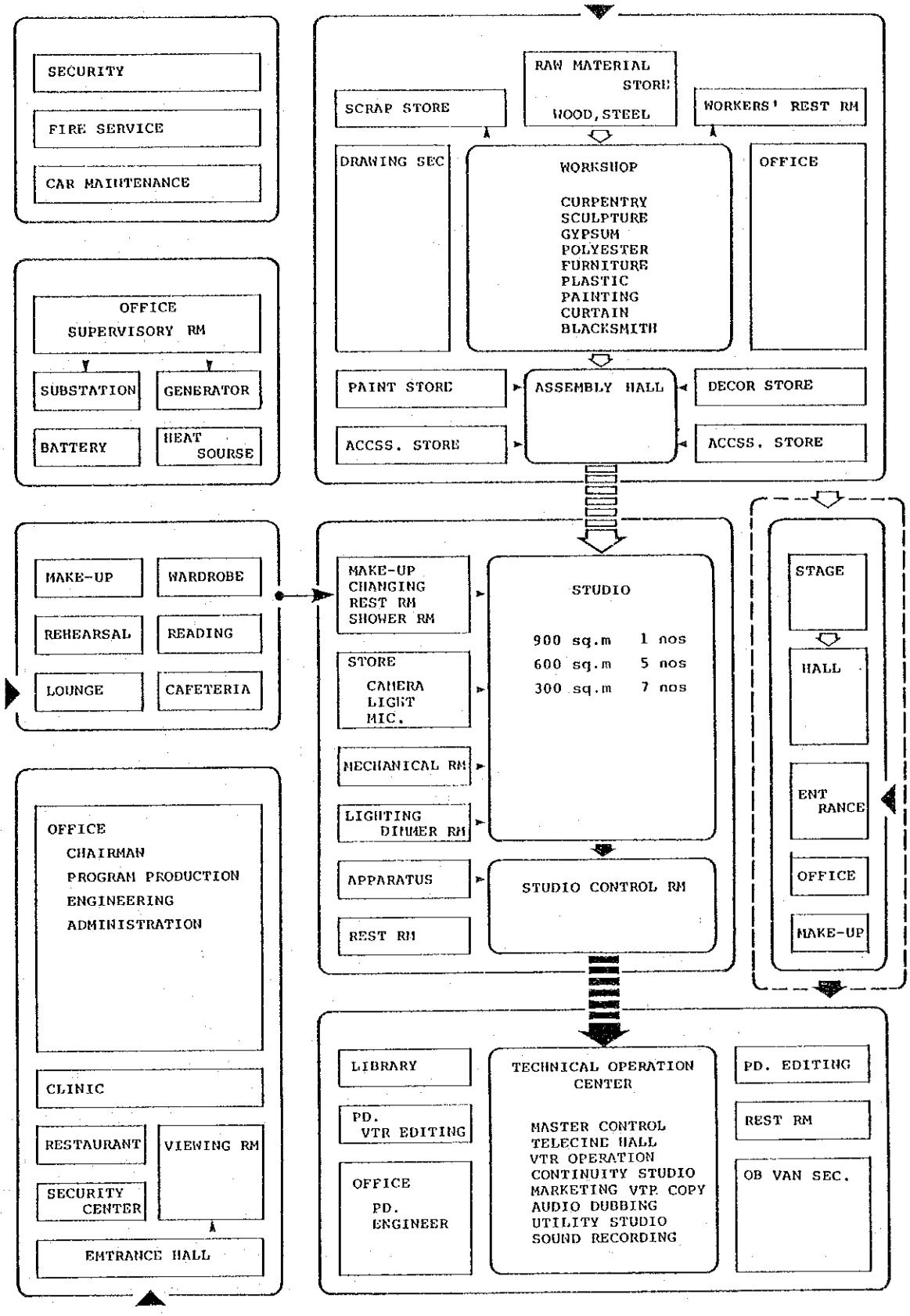
(1) Block Diagram

The New TV Center will involve various sorts of activities such as TV program production, decor production and administration which are different substantially in kind or scale.
Therefore in order to acheive easier operation and control, such complicated activities in New TV Center shall be classified into separate blocks according to their nature. The separation of activities into blocks will generally result in simpler circulation and easier future expansion.

Based on the TV program production procedure, the activities in New TV Center may broadly be divided into six (6) categories such as Decor block, Studio block, TOC (Technical Operation Center) block, Artist block, Administration block, and Service block.
And each block is further divided into several groups as shown in the figure attached herewith.

By grouping the facilities in this way, it will be possible to confine their respective activities, traffic and future expansion within their territories. Furthermore, this will ensure easier operation of the facilities with better security and possibility for orderly future expansion.

Fig. 5-5 BLOCK DIAGRAM



(2) Circulation

The mejor traffics in the New TV Center are considered to be as follows;

- Pedestrians consisting mainly of officials and engineers of New TV Center and artists including others who are allowed to walk within the facilities.

- Vehicles which belong to the New TV Center or its staff and/or similar status.

- Service Behicles, whether belonging to the New TV Center or not, which are mainly used for tranceportation of materials.

- Public visitors either by car or on foot, such as audiance and observation visitor.

The main circulation for pedestrians is generally separated from all other traffic once security is cleared at the entrance. In this project three (3) types of entrance are to be prepared for the pedestrians such as;

- main entrance
  for VIP or special use

- side-entrance
  for daily use by officials and engineers.

- sub-entrance
  mainly for artists and technicians

Vehicles are planned to have access to their respective parking from front road through main gate. Only limited number of vehicles or those of guests may be allowed to proceed to the entrance of the facilities.

Service Vehicles shall be permitted access to their respective place in the facilities through the service gates. There will be no mixing of service vehicles and other vehicles.

Public visitors by car may pass through the visitor's gate and leave their cars in a parking place specialy provided for that purpose. Together with them, visitors on foot can be channeled to the entrance of Visitor's Hall without severe security check. But their circulation route is to be limited so as to avoid mixing with other traffic.

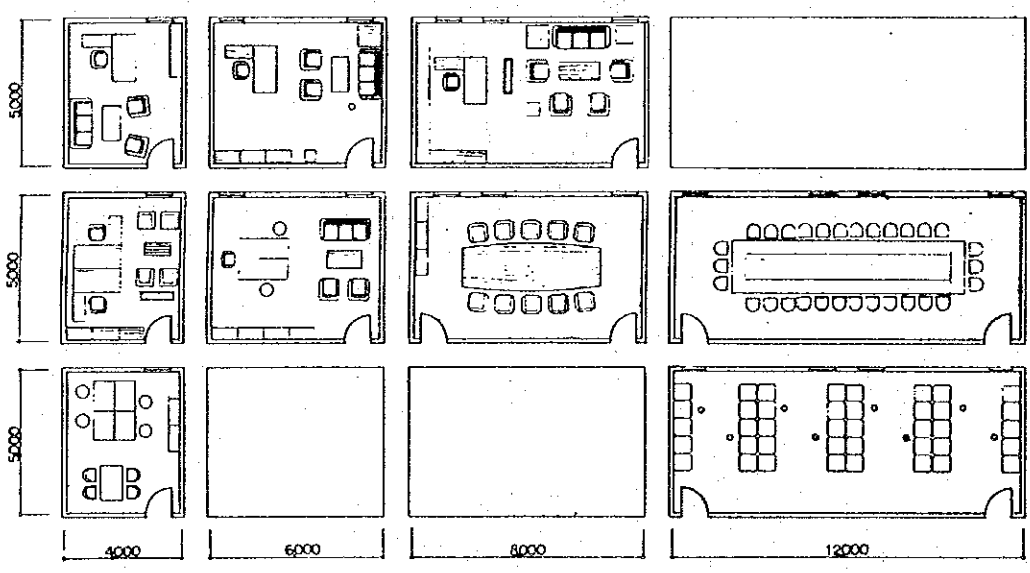
5-3-3 Design Consideration

(1) Administration Block

a. Basic concept

Administrative activities, though not directly connected with those of program production, are essential for running and managing the New TV Center.
However, when compared with studio activities and technical requirements of the production block, the administration block will not require spaces as varied in size and form.
Consequently, it would be possible to adopt a standard modular unit floor system which may suit the average size of administrative activities.
Below is an office layout model by standard modular unit system which may be adopted for the New TV Center.

Fig. 5-6 OFFICE LAYOUT MODEL



b. Floor area requirement

The following list presents the required floor area for offices which would be located in the administration block. This space requirement is prepared mainly based on the organization chart which is proposed by the Study Team.

Table 5-3 FLOOR AREA OF ADMI. BLOCK

NAME OF DIRECTORATE	REQUIRED AREA	
	Phase I	Phase II
Chairman	160	
Program Production division		
Division Office	80	
Production Coordinate	380	80
Drama Production	60	
General Program Production	60	
Production Support (Tech)	60	
Production support (Artist)	60	
Engineering Division		
Division office	80	
Engineering Planning	420	
Building Operation and Maintenance	310	90
Administration Division		
Division office	80	
Secretarial Office	120	
Finance Managing	120	
Program marketing	180	
Open Area	140	
General Affairs	160	
Others (Meeting room, clinic)	2,140	100
Common space	1,610	90
Grand Total	6,220	360

(2) Studio Block

a. Composition of studio block

The functional breakdown of the major room in Studio Block will be roughly considered to be as follows.

1. studios for production activities
   - studio 900m2 class 1
   - studio 600m2 class 5
   - studio 300m2 class 7

2. technical sectors for studios
   - studio control rooms
   - apparatus rooms
   - lighting dimmer rooms

3. supporting sectors for studio performers
   - make-up room w/shower room, WC
   - changing room
   - rest room for performers

4. necessary stores and preparation rooms attached to each studio
   - camera store
   - microphone store
   - lighting fixture store
   - small accessory store
   - paint material store
   - doll store *
   - preparation room for cooking program *
   - preparation room for school education program *

   (*attached to one of 300m2 class studios)

Among these, almost all rooms will be located around the studios on the same floor. Therefore, these facilities are to be designed carefully in such a way as to allow for operational efficiency based on the functional linkage.

b. Studio Control Room

. Location

In the New TV Center, the studio control room attached to each studio is designed to be located on the same level as the studio with consideration of importance as easy access to studio from control room.
In this case, necessary arrengements for dustproofing are to be required, such as higher floor level and higher air pressure in the control room.
The table shown below presents the merit and demerit given by the defference in floor level of control room.

Table 5-4 LOCATION OF STUDIO CONTROL ROOM

ITEM	▽ STUDIO ▼ CONTROL RM	▼ CONTROL RM ▽ STUDIO
MERIT	1. easy access to studio from control room	1. visible observation of studio 2. to get dustproof environment 3. no confusion of various circulation
DEMERIT	1. crowding of various rooms around the studio floor 2. necessity of special arrangement for dust-proofing	1. lack of access to studio

. Plan

The Control Room is generally composed of the following three sections

Production Control
Video and Lighting Control
Audio Control

ERTU employs the so-called utility room type, placing emphasis on communication among three sections in the Control Room. This type of control room is different from the independent type in which three sections are separated by partitions. This Project employs the utility type Control Room, which is designed to a wide one-room.

(3) Decor Block

a. Composition of decor block

In New TV Center, almost all decors are to be produced in their own workshops and to be stored in their own facilities. Taking into consideration the daily operation of TV program production, it will be essential to maintain sufficient space for decor production and storage in order to ensure the effective management of studios.
Based on the production procedure of decor, Decor Block is further divided into the following categories.

1. raw material store
   for wood, steel, fabric, glass, and paint

2. workshop and office

3. assembly hall
   Room area shall be as follows;
   - for drama studios : 2 times of studio floor area
   - for general studio: 1.5 times of studio floor area

4. finished decor store
   Finished decor shall be stored behind the workshops area or assembly hall area in the shape of panels.

5. accessory store
   Various kind of accessories shall be stored in good order as in a library.

b. Circulation

In decor block, various kind of materials, which are substantially different in shape and volume, will be carried by many means of transportation.
Therefore decor area would be designed so as to ensure the following traffic measures.

1. Vehicles
   raw materials:
      store ⟷ workshop
   decor:
      workshop ⟷ assembly hall ⟷ studio
   finished (used) decor
      studio ⟷ assembly hall ⟷ panel store

2. Wagon
   In every places of decor block, hand operated wagon will be used for the transportation of light weight decor.

3. Lift

Big lifts which have a capacity to carry vehicles are to be provided in order to connect different floor level in decor block if necessary.

(4) Others

The following items concern the present situation of ERTU and which are to be adopted in New TV Center.

a. Male and female compostion

Male : Female = 70 : 30

Among females, the ratio of married staff is about 80 percent (%) and 10 or 20 percent (%) of married females are expected to bring their children to the nursing facility in ERTU.

b. Prayer room

Prayer Times; 5 times a day

Worship is to be made 5 times a day but time for worship is not fixed in a day. This is subject to daily change according to the Islamic calendar.
Attendance ratio for worship during working hours in ERTU is approx. 50 percent (%).
Required space for praying will be 0.6m x 1.2m per person and special prayer room must be prepared individually for females.

example: prayer hours on Oct. 24 '85

1st	4:36
2nd	11:39
3rd	14:51
4th	17:16
5th	18:34

5-3-4 Construction Planning

Each compornent of the Building is planned on the basis of integrated review on the necessary function of facilities, meteorlogical conditions, and local construction situation. In particular, various rooms associated the studio are so designed as to have the specified acoustic characteristics. Then special consideration should be given to sound absorption, sound insulation, and vibrationproofing.

(1) Structural Material

The structural materials are basically a combination of the skeleton of reinforced construction and masonly as is most commonly used in Egypt.

- Cement

The national plant produces cement in an annual production of 3 million tons, but this amount is still unable to meet domestic demand. Imported cement from East European countries, Italy, Greek, etc. is widely marketed in Egypt.
In this project, locally available cement will be used irrespective of the country of origin.

- Brick

Prevailing in the market is sand-lime brick by factory production. So this type of brick will be used in this project because of its acceptable quality, shape, and market conditions.

- Reinforcing bar

Reinforcing bars are produced in Egypt mainly in the form of round steel bars. The market condition of deformed steel bars is poor and unstable. The scale of the Project requires the structural design depending upon imported steel bars.

(2) Building Material

The Building Material Plan shall be established according to the following conditions.

1. Materials locally produced or locally procured are used in this project as a principle.

2. Building materials are selected on the basis of integrated review on quality, price, performance, the grade of the building, etc.

3. Market condition is taken into account.

The quality and market condition of the building material proposed for the Project are shown in ANNEX 5-2 attached herewith.
The market condition of main building materials are summarized below.

a. Locally available materials

1. Aggregated (sand, gravel)	:	digged in the desert near Cairo. Sand should be checked for salt and mud mixed.
2. Cement	:	locally produced Portland cement will be used.
3. Brick	:	sand-lime brick will be used.
4. Terrazzo tile	:	reliable both in quality and in supply.
5. PVC floor tile	:	local PVC floor tile is recommended because of easy maintenance.
6. Stone, marble	:	excellent in quality.
7. Glass	:	available in 3mm and 6mm thicknesses.

b. Imported materials

1. Steel bar	:	Deformed bars are in local production, but the price is higher than imported ones.
2. Aluminum sash	:	Local products are subject to unstable market condition.
3. Steel soundproof door	:	locally inavailable in desired quality and supply.
4. Glass wool	:	as above.

(3) Proposed Finished Materials

a. Exterior finish materials

Roof : cement tile w/ heat insulation material
asphalt waterproofing

Parapet : precast concrete coping w/ sprayed tile

Wall : sprayed tile on cement mortar steel trowel

Doors &
Windows : aluminium sash, steel door
steel grill

Floor : marble or cement mortar steel trowel

b. Internal finish materials

Table 5-5 FINISH SCHEDULE

ROOM NAME	FINISH		
	FLOOR	WALL	CEILING
1. OFFICE, REHEASAL, MAKE-UP, SITTING RM	PVC TILE	AEP ON CEMENT MORTAR	AEP ON FAIR FACED CONCRETE
DIRECTOR	CARPET	AEP ON CEMENT MORTAR	ROCKWOOL BOARD
2. ENTRANCE HALL	MARBLE	MARBLE	ALUMINIUM PANEL
3. LOBBY	CARPET	MARBLE	ALUMINIUM PANEL
4. STUDIO	LINOLEUM SHEET ON CONCRETE W/RUBBER SHEET	STEEL MESH ON GLASS WOOL	GLASS WOOL
5. T.O.C.	PVC TILE ON FREE ACCESS FLOOR PANEL	PERFORATED PLYWOOD PANEL ON GLASSWOOL	ROCKWOOL BOARD
6. DECOR	CEMENT MORTAR	AEP ON CEMENT MORTAR	SPRAYED CEMENT MORTAR
7. CAFETERIA	TERRAZZO TILE	AEP ON CEMENT MORTAR	ROCKWOOL BOARD
8. KITCHEN	CLINKER TILE W/ASPHALT WATERPROOFING	CERAMIC TILE	VP ON ASBESTOS CEMENT BOARD
9. MECHANICAL ROOM	DUST PROOF FINISH ON CEMENT MORTAR	CEMENT MORTAR	GLASSWOOL
10. CORRIDOR	PVC TILE	AEP ON CEMENT MORTAR	AEP ON ASBESTOS CEMENT BOARD
11. TOILET	MOSAIC TILE W/ASPHALT WATERPROOFING	CERAMIC TILE	VP ON ASBESTOS CEMENT BOARD

5-3-5 Acoustical Design

(1) General

In this TV complex there will be various kinds of TV studios, rehearsal rooms, viewing rooms and other rooms. All of these facilities shall be suited to the particular acoustical condition in which they are to be used. The technology for such acoustic design is already well established and is quite adequate for practical application to the acoustical requirement of the studios and other facilities. The following three items roughly cover the acoustical design of the above mentioned facilities, which have such proven technology and abundant experience.

a. Sound insulation and prevention of vibration

The rooms subject to such acoustical design are to be provided with the necessary structure for reduction of air and solid-propagated noise to the extent necessary to ensure that the indoor noise level is within the tolerance limit, the extent of reduction depending on the level of outdoor noise in each noise.

b. Adjustment of indoor acoustical conditions

The rooms subject to such acoustical design are to be given shapes, interior finishes, etc. that will make it possible to realize the required conditions with respect to the state of indoor acoustics as affected mainly by reverberation features and solid vibration distribution.

c. Prevention of noise and vibration from equipment

In the room where acoustical design are required, noise and vibration from air conditioning and broadcasting equipment are to be mitigated by means of sound arresters for air ducts, vibration prevention racks for machinery and equipment, and other measures.

(2) Quantitative goals of acoustical design

The main physical quantities taken into consideration in acoustical design are reverberation time, or the average sound absorptivity which is directly related to reverberation time, and the frequency features of such average sound absorptivity and the allowable indoor noise level.

a. Average sound absorptivity and the frequency features

The target values for average sound absorptivity at 500Hz and for the frequency features thereof have been set as follows with respect to different room uses.

Room	Absorptivity Ratio (at 500Hz)	Frequency Feature Average Absorptivity
TV Studio	No particular regulation but as great as possible for the entire sound range	
Sound Recording Studio	0.25 - 0.35	about the same for all sound range
Control Room	about the same or a little greater than for the studios covered by the control room	about the same for all sound range

The target values for reverberation time, T (sec), are calculated on the basis of the following formula, where;

a : acoustical absorptivity
V(m3): volume of the room
S(m2): total surface of the room
m : rate of compensation due to air absorption in the high frequency range

$$T = 0.161\ V/-2.30S \log (1-a) + 4mV$$

b. Noise tolerance

The target tolerance have been set as follows on the basis of ASHRAE standard.

Room	NC
announce booth sound recording studio	20 - 25
hall	25 - 30

According to ASHRAE standards, there is no regulation for TV studios, rehearsal rooms and the like, but maximum values of NC 25 - 30 for TV studios, audition rooms and control rooms, and NC 35 for rehearsal rooms and the like have been set for this noise tolerance.

c. Vibration prevention target

Prevention of vibration with respect to floating-structure studios, equipment and machinery, etc. is to be accomplished by means of elastic support and the minimum natural frequency having been set at approximately 12 Hz. For TV studios and other necessary areas, shock noise is to be prevented with shock absorption materials.

d. Sound insulation target

With the proposed building structures, the sound insulation problem will not be occured on the wall at the studio where the target values are to be naturally attained by the double wall construction. In this case doors and windows are essential for sound insulation. For sound insulation of doors and windows, therefore, two types for each will be planned, one light and one heavy material, for application as the individual case requires.

(3) Acoustical planning for architectural design

Since the structure of the buildings are to be composed of reinforced concrete columns and beams, and brick or concrete block walls, generally necessary sound insulation performance can be attained by applying a 20mm layer of cement mortar finishing to the wall surfaces.

Accordingly, there is no special need to improve the sound insulation for control rooms, audition rooms, and rehearsal rooms.

In the case of recording studios, however, the strict acoustical requirements make it advisable to form the studio space within the space surrounded by the structure of the building by means of a floating structure that gives high sound isolation. As for TV studios, the floors are to have an anti-vibration structure, using shock absorption material, and if necessary, the ceilings are to be suspended for reduction of propagation of sound.

5-3-6 Alternatives Study

The process up to the Master Plan may be classified into the following design stage.

1. Plemininaly design
   Discussions and review performed in Cairo from September 3 to November 1, 1985.

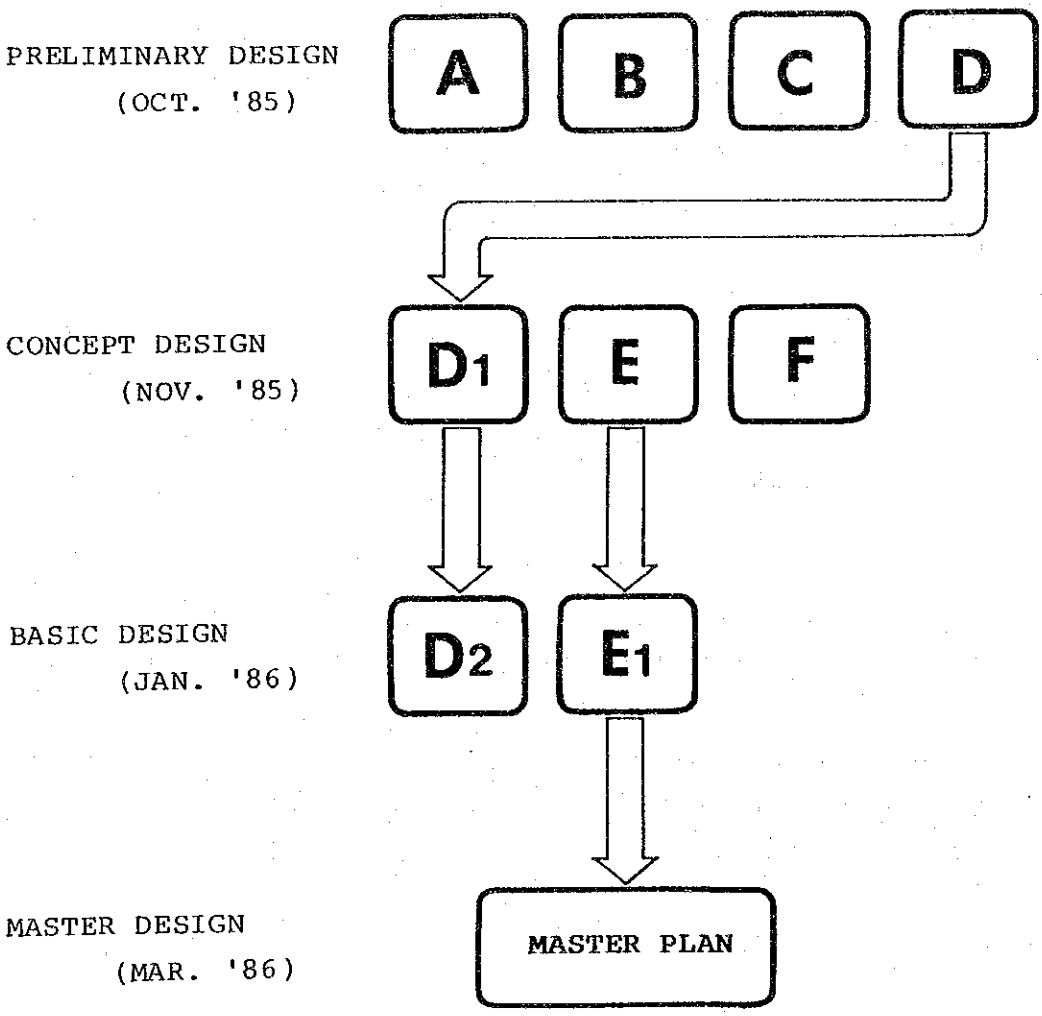
2. Concept design
   Discussions and review performed in Tokyo while Egyptian counterparts stayed in Japan Nov. 17 to Dec. 10, 1985.

3. Basic design
   Discussions and review performed in Cairo during explanations for the Interim Report from Jan. 14 to Jan. 26, 1986.

4. Master design
   Review for the Master Plan (Draft) proposed in the Draft Final Report (Draft).

In each design stage several alternatives were proposed in various viewpoints. The flow to Master Plan (Draft) is as shown below.

Fig. 5-7 FLOW OF ALTERNATIVE STUDY



(1) Preliminary Design (Study in Cairo, Oct. 1985)

On the basis of the study on space program and block diagram, four (4) alternatives, A; B; C and D, were proposed by the study team for the study of block composition in studio complex.

Alternative A

PD office, make-up room, rehearsal room and sitting room are attached to each studio as one group, so that each studio can be operated individually.

Alternative B

Studio complex consists of 3 building blocks; Studio Block (including decor and TOC section), Administration Block and Hall Block.

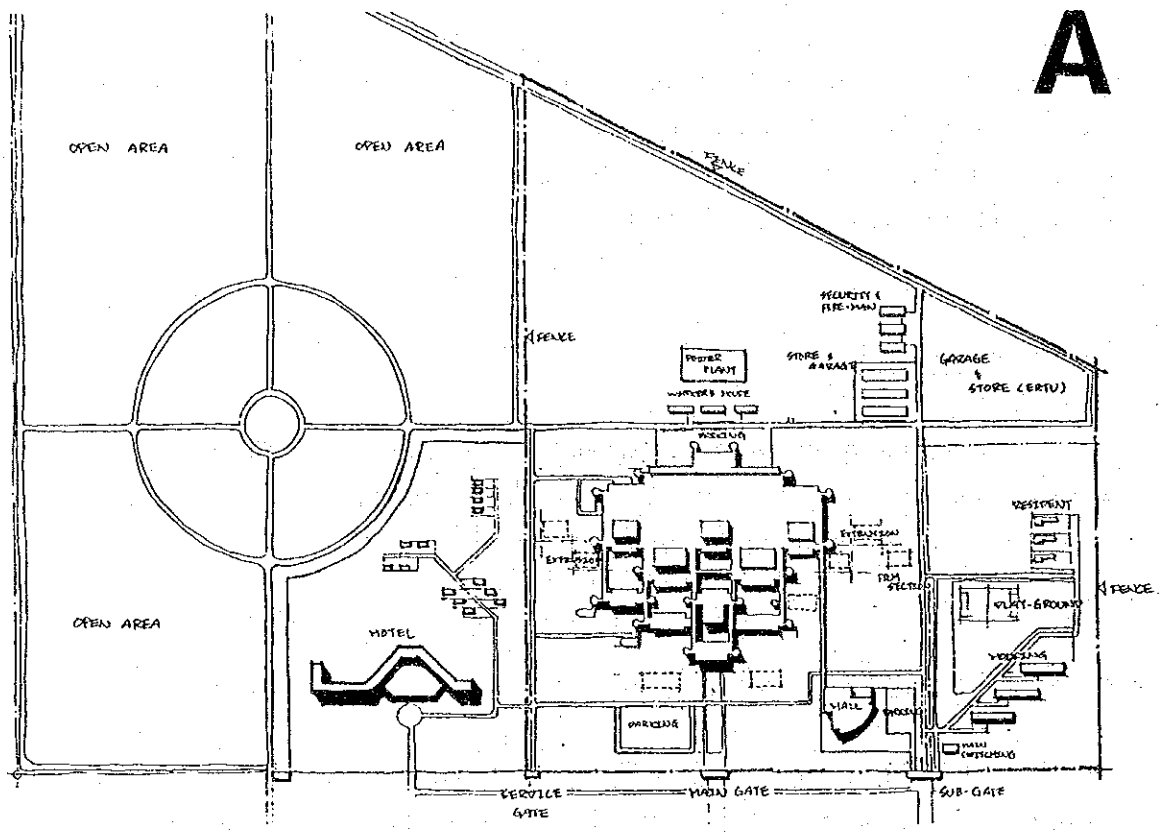
Alternative C

All functions are contained in one building

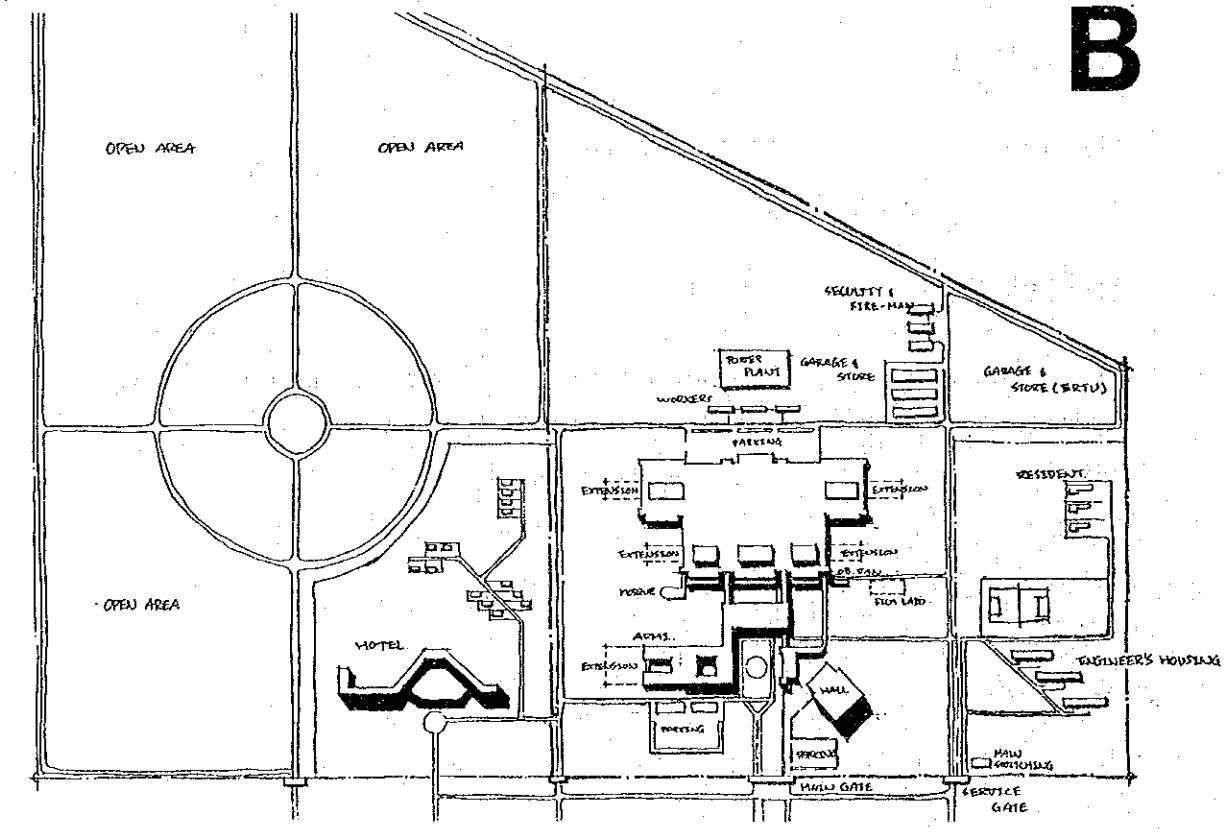
Alterntive D

All functions are contained in one building with symmetrical architectural balance at the time of phase I and II.

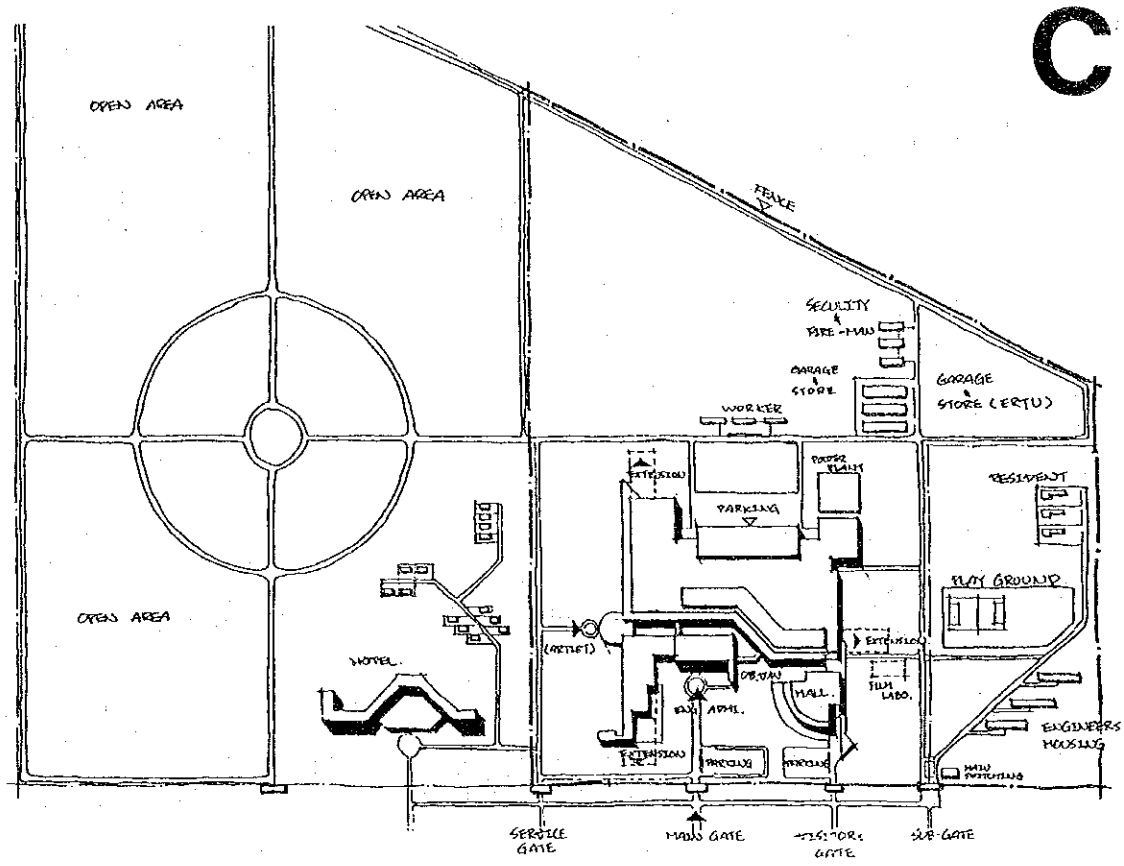
ALTERNATIVE A



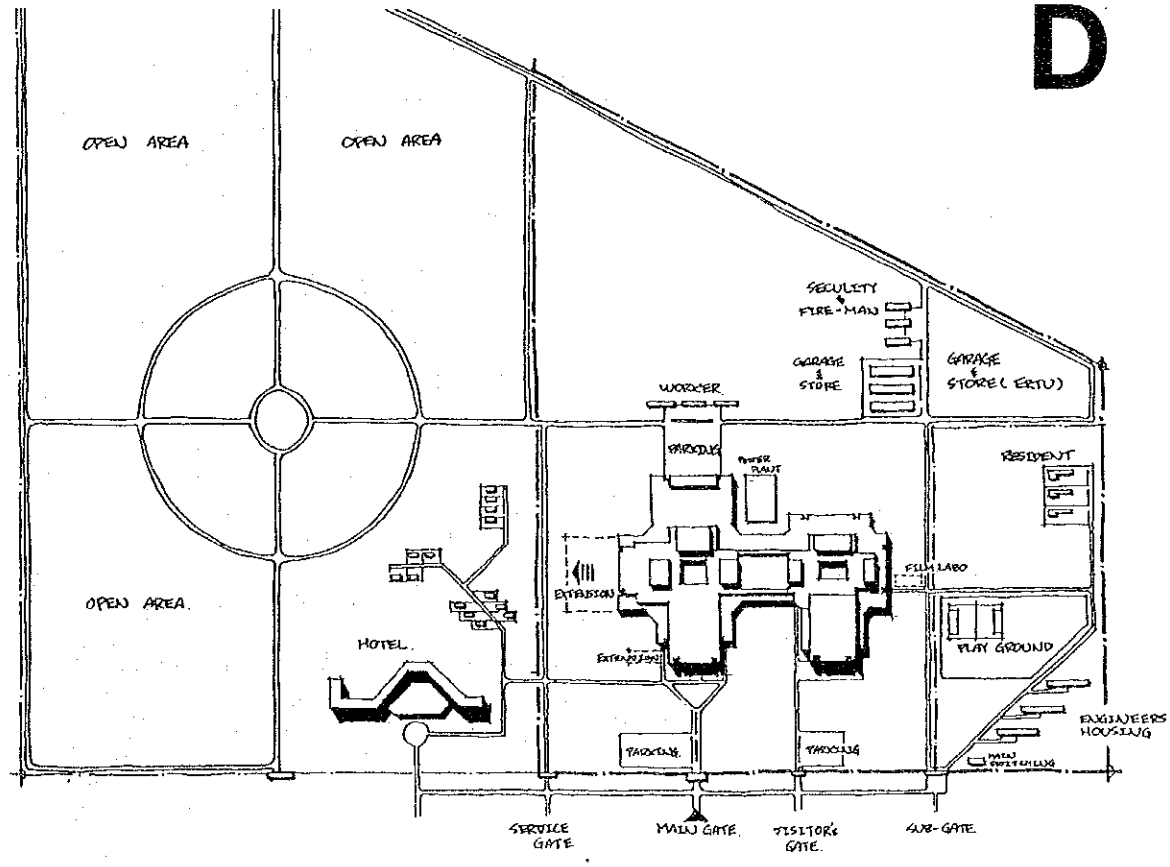
ALTERNATIVE B



ALTERNATIVE C



ALTERNATIVE D



(2) Concept Design (Study in Tokyo, Nov., 1985)

Based on the result of further appraisal of the Preliminary Design, three (3) alternatives for architectural planning, namely D1, E and F, are proposed by the Study Team.
Consequently detail study on each alternative was made with respect to the TV program production system, room layout, circulation and future expnsibility.

Alternative D1

- Alternative D1 is designed on the basis of Alternative D which was proposed in the preliminary design.

- Block composition and main circulation are not changed from Alternative D but detail studies are made on the room layout and scale corresponding to the space program.

- TOC and administration block are located on the big studio group side.

- Good architectural balance will be obtained in Phase I.

- Construction site for Phase II is on west side of Phase I only.

Alternative E

- TOC and administration block are located exactly at the center of studio block.

- In Phase I, suitable number and scale of studios are to be obtained corresponding to the TV program production demarcation schedule.

- Construction site in Phase II is divied into two (2) places.

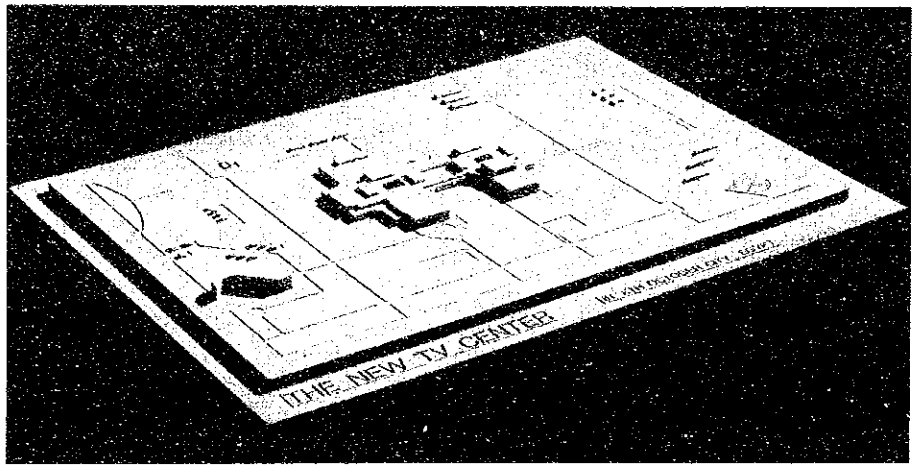
Alternative F

- Two (2) studio groups such as big studios and small studios are laid-out simply in a straight line so as to ensure clear independence of assembly hall attached to each studio.

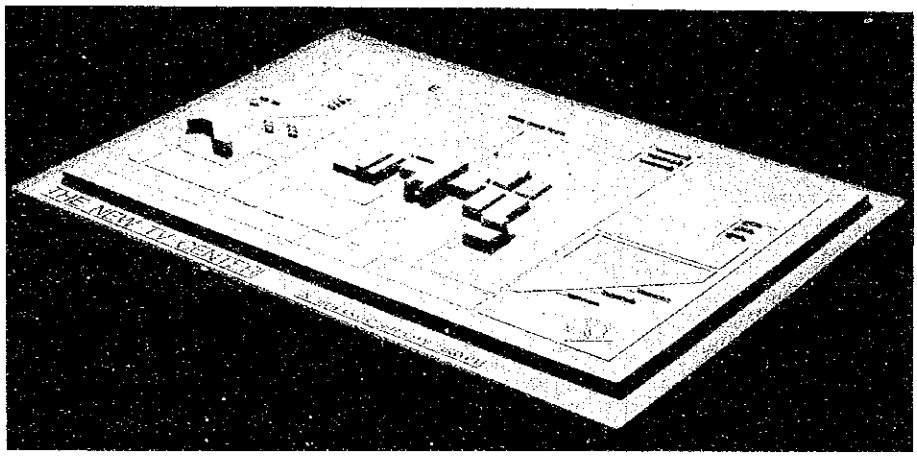
- TOC and administration block are located in the middle of two (2) studio groups.

- Alternative F is designed in unsymmetrical form but good architectural balance is obtained even in Phase I.

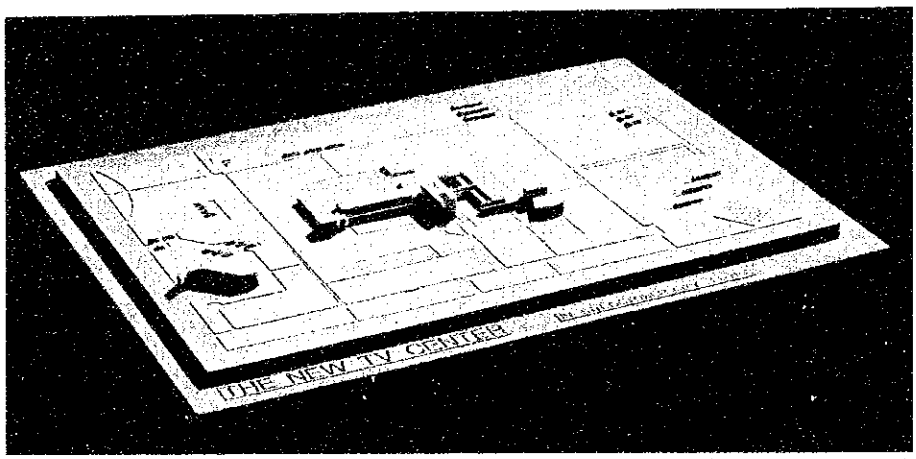
Concept Design



D1



E



F

(3) Basic Design (Study in Cairo, Jan. 1986)

Upon receipt of the basic consept of ERTU on the alternatives D1 and E of Concept Design, further studies have been conducted by the Study Team and hereby two (2) alternatives D2 and E1 were proposed so as to elaborate the Master Plan with respect to the building facilities including architectural, structural, mechanical and electrical works. In these alternatives the whole system for building and TV production facilities are to be well organized to satisfy the requirements and functions of the New TV Center.

a. Basic Consideration

Two (2) alternatives for the preparation of Master Plan have different concepts of room layout, construction phasing and planning efficiency, however, the following basic considerations have been given to both alternatives generally.

Basic Considerations

- to locate technical operation center (TOC) at the center part of studio block so as to permit close access to each studio

- to obtain fine architectural balance even after the completion of construction Phase I

- to ensure good future expansibility for Phase III without disturbance to the daily operation of Phase I and II buildings.

- to design properly following three (3) major accesses from outside to studio complex so as to achieve easy and efficient activities.

1. access to main entrance of studio complex
2. access to service areas such as workshops, stores, power house.
3. access for observation visitors

- to produce a unified form of building design

- to maintain clear access from workshop to studio

- to identify assembly halls for each studio.

b. Outline of Alternties

Alternative D2

- Revised plan of D1

- to place TOC between big studio and small studio group.

- Not to destroy the form of plan D1 in order to maintain the good architectural balance even after Phase I.

- to clearly separate the big studio group and small studio group

- to ensure greater independence of assembly hall

Alternative E1

- Revised plan of E

- to construct facilities including big studio group in Phase I, and at phase II, place small studio group in both sides of phase I, 2 in one side and 4 in other side

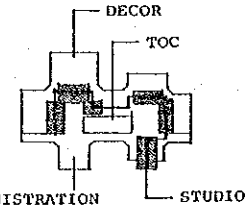
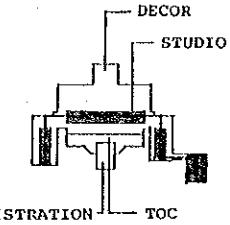
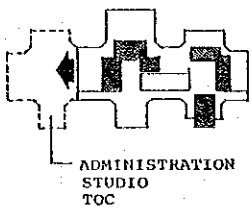
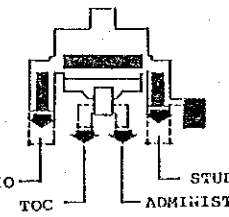
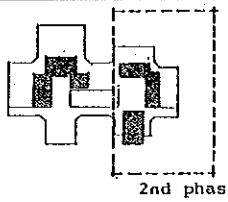
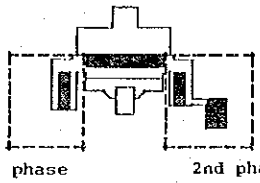
- to make good use of basement floor by using site configuration and locate make-up center, wardrobe section, decor store, etc.

- to ensure the service circulation by making it possible for vehicles to approach from the front and back of the building at the basement floor

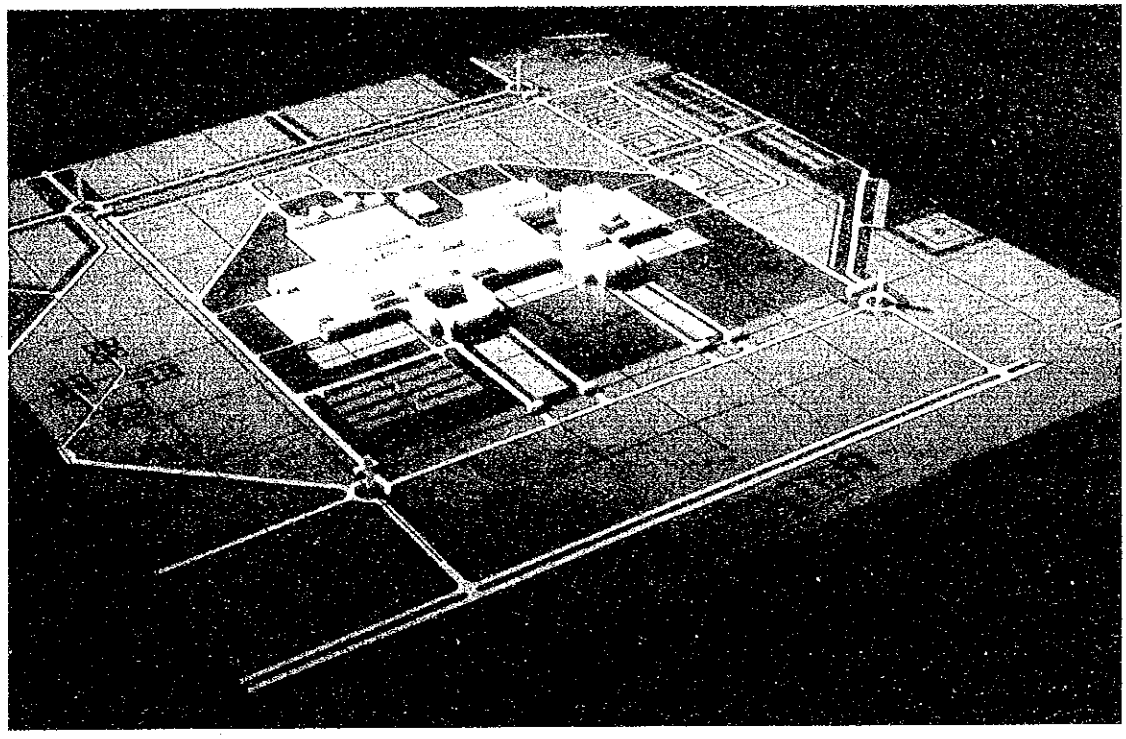
- to ensure greater independence of assembly hall

c. Comparison Table

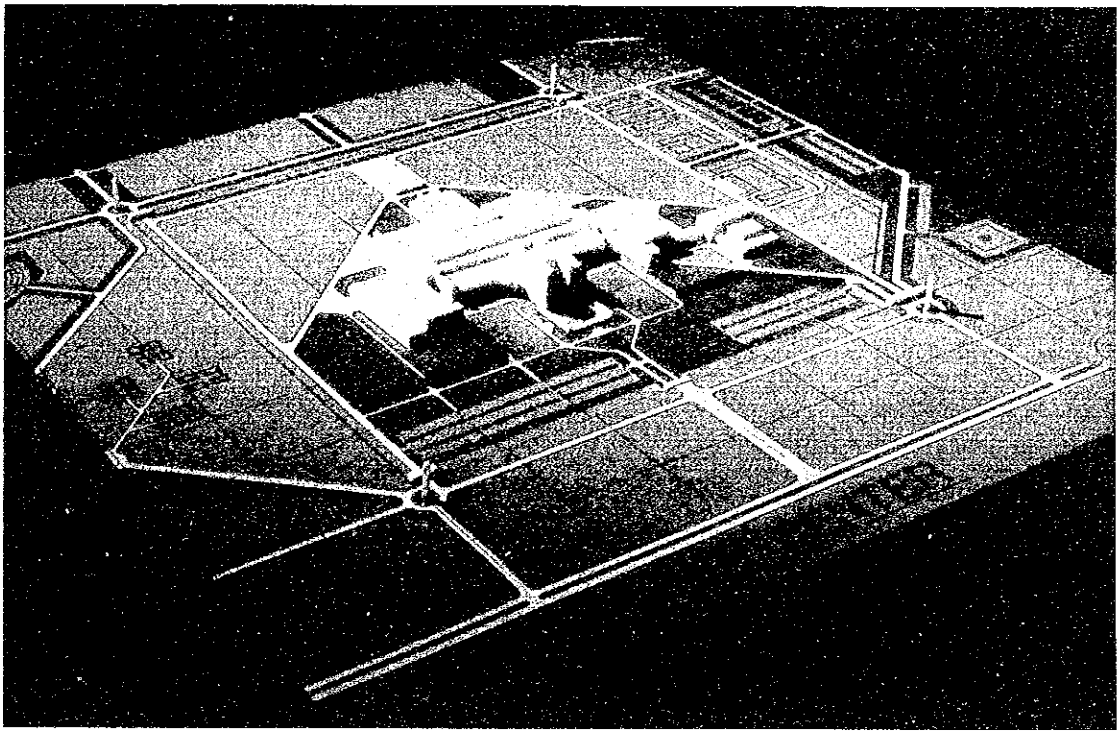
Table 5-6 COMPARISON TABLE OF D-2 AND E-1

ITEM	ALTERNATIVE D2	ALTERNATIVE E1
ZONING		
EXPANSION		
CONSTRUCTION PHASE	 construction site is on 1 places	 construction site is on 2 places.
LOCATION OF TOC	center of the studio complex.	center of the studio complex,
LOCATION OF ADMINISTRATION	center of drama studio block	center of the studio complex.
GROUPING OF STUDIO	general studios are in 1 group	general studios are separated into 2 groups
TOTAL FLOOR AREA	140,000 sq.m	120,000 sq.m

D2



E1



5-3-7 Master Design

The Master Plan here proposed has been agreed on by ERTU in the conditions of that the Master Plan is most appropriate to implement the Project.
Basically, the Master Plan satisfies the conditions that have so far been set. It should be noted that the Master Plan contains particulars as described below.

(1) Planning

a. Studio

. Arrangement of studios

The Project includes three types of studios in floor area: 900m2, 600m2, and 300m2. The large-size studios of 900m2 and 600m2 are used for recording large-scale programs such as dramatized educational programs and children's program. This will involve large scale decor, therefore, the Master Plan places emphasis on a relationship between these large-size studios and the decor workshops more particularly. The studios and the decor workshops must be arranged so that the circulation line between them is kept short. On the other hand, the studios of 300m2 are mainly alloted small-scale programs which require many panels of decor. This means that the small-size studios may be less closely related with the decor workshops than the large-size studios.

In consideration of the above requirements, the Master Plan arranges the group of large-size studios of 900m2 and 600m2 in the center of the facilities with the decor workshops arranged rearward in parallel to the large-size studio group. The small-size studios of 300m2 are scattered and located on both sides of the large-size studio group.

. Demarcation of construction for studios

The Master Plan divides the whole construction term into Phase 1 and Phase 2. Phase 1 covers the large-size studios of 900m2 and 600m2 while Phase 2 covers the small size studios. The reason is that the large studio has versatility or flexibility for a variety of programs with different scales. The Master Plan thus meets the requirement that the large-scale studio completed in Phase 1 permits producing programs in a wide range of fields immediately after Phase 1 has been completed.

b. TOC Block

The TOC is located in the middle of the studio group in order to shorten the circulation between the TOC and each studio for better communication. Careful consideration should be taken in optimizing all circulations, with no studio left spaced excessively long.

c. Decor Block

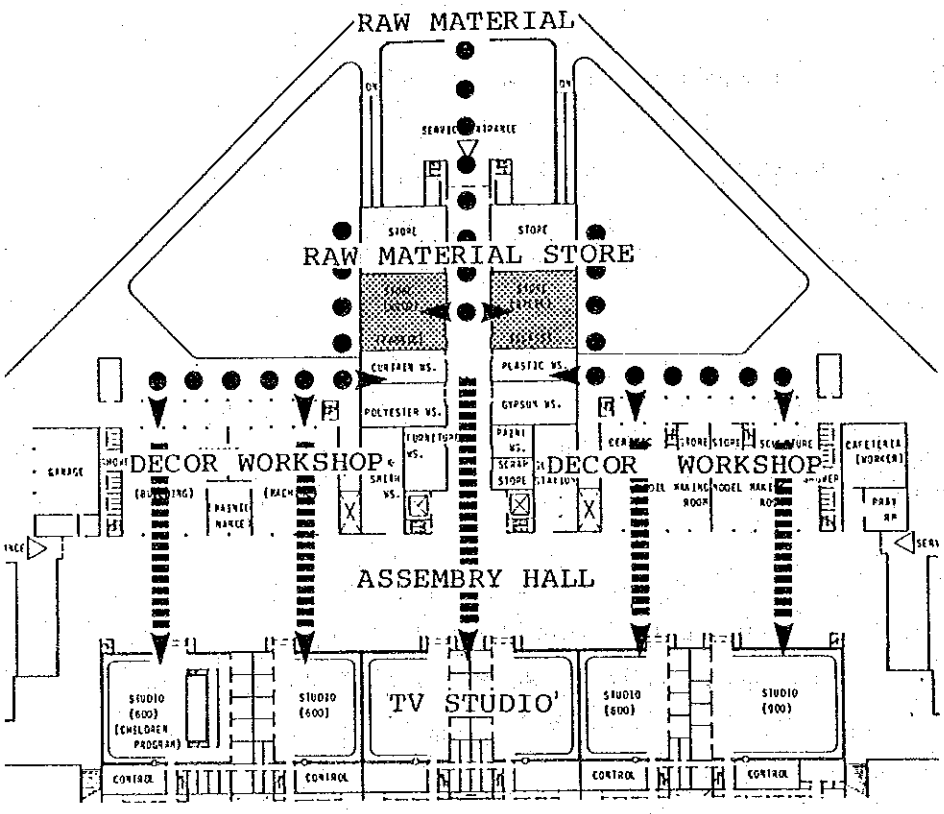
. Decor Workshop

The Master Plan specifies the same floor level of all decor workshops as that of the studio.
In particular, three workshops (carpentry, sculpture, and seramic) are located near the studio, since they produce decor scaled up increasingly within a wide floor area, and require convenience of bringing heavy decor into and out of studios.
The raw material store is located so that materials are conveniently brought into the decor workshop through the rear of the workshop. As a result, this circulation does not cross the passage of decor from the decor workshop to any of studios.

. Decor and Accessory Store

The Master Plan arranges the decor and accessory stone mainly in an underground storey, that is, the storey immediately under the floor of the studio. the store is connected with the studio by a large-size lift, which reduces a distance to transport materials between the store and the decor workshop or among studios.

Fig. 5-8 CIRCULATION IN DECOR BLOCK

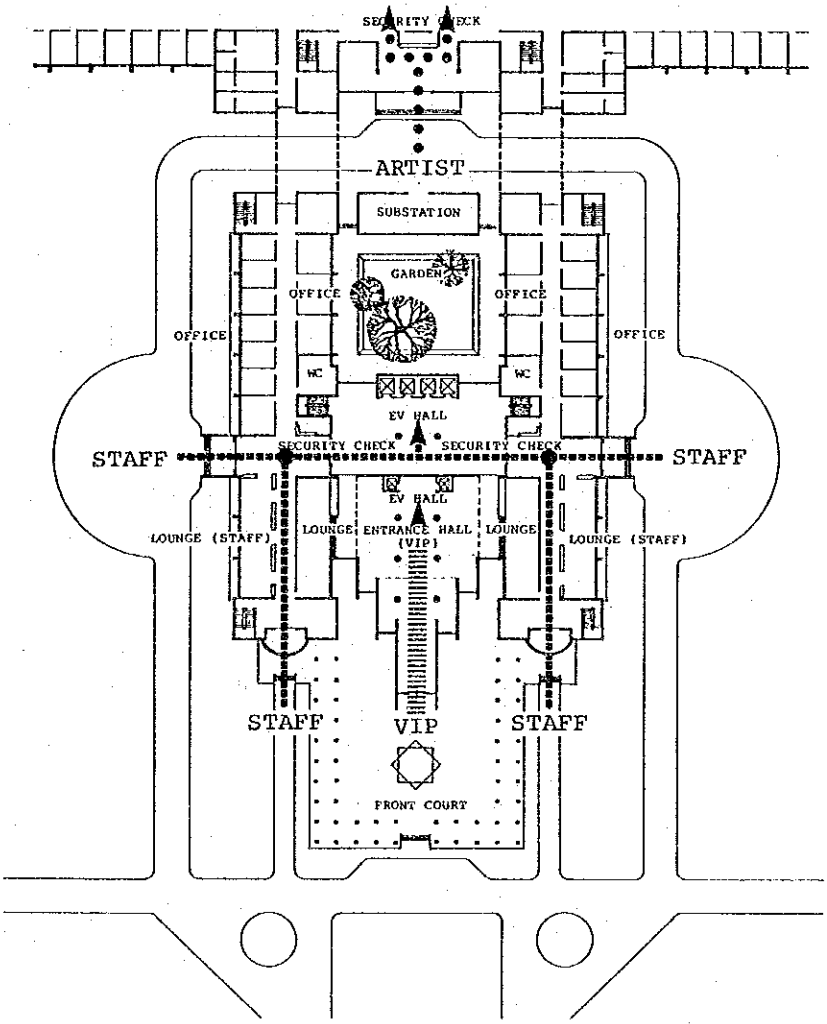


d. Administration block

. Entrance

Three entrances are provided: VIP entrance, staff entrance and performer entrance. The VIP entrance is provided with a special hall so that the circulation of the VIP at entrance may not cross any other circulation.

Fig. 5-9 CIRCULATION AT ENTRANCE



. Configuration of storeis

The Administration Block consists of 5 storeis on the ground and one storey under the ground. The administration office is of small-room system, and the number of rooms is calculated according to the following rule and on the basis of the organization list.

Rank	Floor area	Seat per room	Remarks
President	80	1	Secretary
Head of Department	60	1	room and
Head of Division	40	1	meeting
Head of Section	20	1	Secretary
Manager	20	2	room
Staff	20	4	attached
Technician	30	20	- ditto -
PD (Large-size program)	30	6	
PD (Educational program)	20	3	

. Welfare Facilities

The Administration Block includes the following welfare facilities.

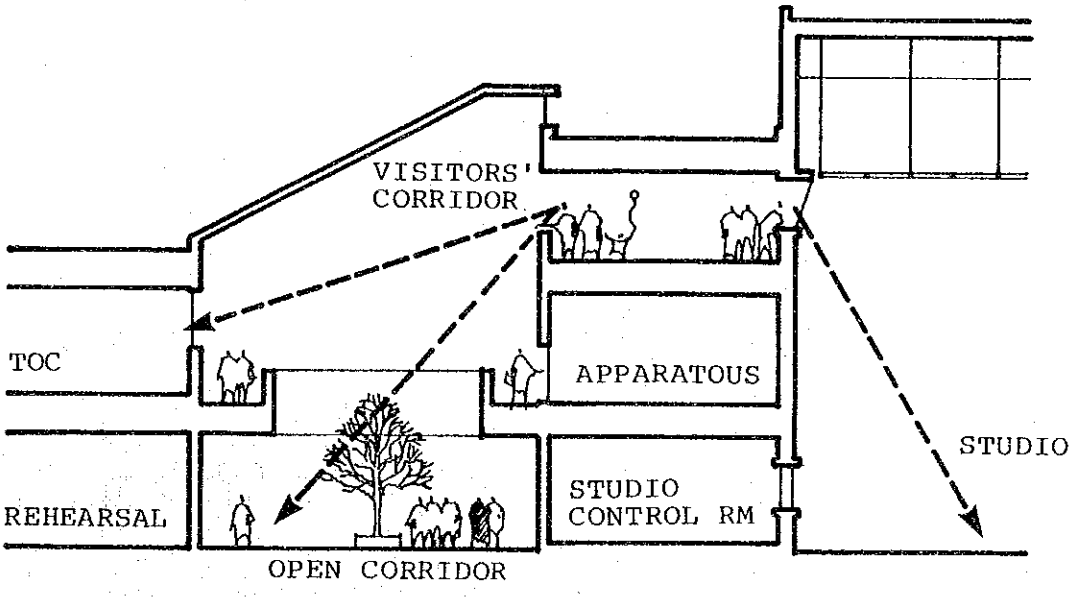
1. Clinic
   A clinic is provided mainly for administration staff. The clinic is designed to a floor space almost equal to two consultation rooms, and two doctors are assigned.

2. Prayer corner
   Prayer corner is ensured in each storey for worship 5 times per day.

e. Visitors' Corridor

A visitors' corridor is provided on the second floor level. The corridor is so designed as to allow observers to see recording scenes in all studios, as a rule. Further consideration is taken to allow them to watch the activity in TOC as well as that of artist over the open corridor.

Fig. 5-10 SECTION OF VISITORS' CORRIDOR

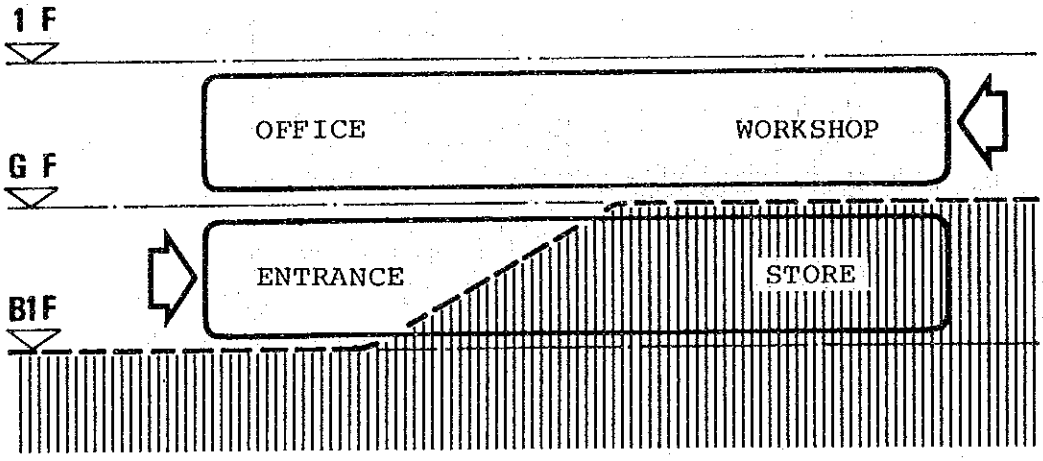


(2) Section Planning

The studio group is arranged on the ground floor level where the south ground level is 4 - 6m higher than the north ground.

In the Master Plan, the section plan is designed by possitively utilizing the height difference between both ground level to take in daylight at the basement floor. More particularly, the north side of the basement floor is set as the ground floor level; the north side is alloted to administration offices which require daylight while the south side is located completely under the ground and is utilized as the store of decor and accessory.

Fig. 5-11 SECTION



The section plan also utilizes the height difference, so that the entrance is located on the basement floor.

(3) Floor Area

The floor area of Master Plan is summarized as follows.

Table 5-7 SCHEDULE OF FLOOR AREA

STORY	PHASE I	PHASE 2	TOTAL
Bl FL	24,470 m^2	770 m^2	25,240 m^2
G FL	38,680	17,180	55,860
1st FL	15,650	7,180	22,990
2nd FL	6,180	3,550	9,730
3rd FL	2,120	-	2,120
4th FL	2,120	-	2,120
Total	88,220	28,840	118,060
			(118,000)

5-4 STRUCTURAL DESIGN

5-4-1 General

The site is divided roughly into four zones, open area zone, hotel zone, residential zone and TV complex zone. The project covers only the TV complex zone and the remainder shall be taken care of by the Egyptian side.
The project site area is approximately 2.0 km^2 having a level difference from east to west of approximately 25 meters.
Considering its vast site area and configuration, most of the project building is planned to be low-rise structure of one to three stories above ground and partially single level basement floor. As for the administration block, the core of the TV complex, it is planned to be six storied to minimize the circulation distance to each block.
One or two stories of virtical extension for administration block and horizontal extension for other blocks should be considered for the future expansion of the TV center.

5-4-2 Design Conditions

(1) External force and working load

a.	Seismic force	K=0
b.	Wind velocity	Calculate according to BS CP3, Chapter V, Part 2
c.	Dead load	Calculate according to the actual weight of building materials (BS CP3, Chapter V, Part 1)

d.	Live load	Calculate according to BS CP3, Chapter V, Part 1
e.	Bearing capacity of soil	To be calcultaed from the soil test result

(2) Materials

a.	Concrete	Cube compressive strength at 28th day shall be Fc=275 Kg/cm2
b.	Reinforcing bar	Deformed bar having tensile strength more than 3,500 Kg/cm^2
c.	Structural steel	Tensile strength, compressive strength, bending strength; more than 1,600 Kg/cm^2

5-4-3 Substructure

The soil investigation report was submitted to the Team by ERTU. Judging from the report, the type of building foundation is likely to be direct foundation and there is no need to go for pile foundation.
Bearing capacity of soil can be assumed as follows;

a. Basement floor (GL-8.0M) 25t/m2
b. Ground floor (GL-2.0M) 15t/m2

The load test of soil should be carried out in the early stage of forthcoming detail design to confirm the bearing capacity of soil.

5-4-4 Superstructure

As mentioned in the previous section, all the buildings for the project shall be low-rise buildings. Furthermore, since no earthquakes have occured in the past which affected buildings, no consideration on seismic force shall be taken.

Considering the above facts, reinforced concrete rigid frame structure with brick or block wall shall be recommended.

5-4-5 Summary of Structural Consideration

The basic ideas to be introduced in the structural design of sub- and superstructure of this project have been explained in the previous sections. But particular attention is required for the substructure from the nature of the soil which has many unclear and unknown factors due to the vast project area and lack of soil investigation data. It is recommended therefore, to perform sufficient soil investigation in the early stage of forthcoming detail design according to the actual site plan.

From this, final decision must be made for the bearing capacity of soil and the other soil characteristics to be used for the design of sub-structure.

5-5 ELECTRICAL FACILITIES DESIGN

5-5-1 General

(1) Design condition

Ratings of electrical equipment are to be decided on the basis of the following climatic conditions and inside air design conditions, unless otherwise specified.

a. Climatic conditions (outside air condition)
- Maximum ambient temperature: 45 deg.C
- Minimum ambient temperature: 4 deg.C
- Maximum relative humidity : 90%

b. Inside air design conditions
- Refer to Mechanical Facilities Design

(2) Items of electrical facilities

The electrical facilities which are involved in this project are itemized as follows.

1. Power supply system (including generator power supply system, CVCF and UPS)
2. Power control system (air-conditioning and plumbing equipment control)
3. Lighting system
4. Socket outlet system
5. Telephone system
6. Intercom system
7. Public address system
8. Fire alarm system
9. Monitor TV system for security check
10. Central supervising system
11. Cable tray and piping for studio facilities cable
12. Lightning protection system

5-5-2 Power Supply system

(1) Power supply system will include following items.

- 20kV power receiving
- 20kV/6kV main switching station
- 6kV main distribution line
- 6kV/380V-220V substation
- 380V-220V main distribution line
- 6kV generator
- Battery and charger

(2) Prospect of city power supply condition to the site

One of the necessary conditions for planning of power supply system is to prospect the city power supply condition to the site.
Generally, such prospect is to be assessed through study and analysis of following two items.

1. Past records of city power supply conditions of similar facilities in the same area.

2. Scheduled city power supply system which is provided by 6th Oct. City to the site.

However, regarding item (1), it is impossible to obtain such data, because infrastructure of 6th October City is now under design, and its fundamental construction has been started.
Therefore, only item 2 is available for assessing prospect of city power supply condition.
Result of prospect of city power supply condition which was studied and analyzed on the basis of item 2 is as follows.

- Frequency of city power failure is estimated at 10 times a year for items 1, 2, 3 and 4.

. Duration of city power failure is mostly estimated as within one hour, but one or two times will be over 6 hours.
. Voltage regulation will be over -10% of rating voltage.

From the above result of prospect, in consideration of the special characteristics as a TV program production center, power supply system for this project requires to take countermeasures against city power failure and voltage regulation, and also requires to take countermeasure against surge voltage from the present situation of ERTU building.
Note: Refer to the ATTACHMENT.

(3) Load classification

The New TV Center will have the following loads.

1. General lighting
   - This means normal house lighting.

2. Emergency lighting
   - Emergency lighting is to be supplied DC (direct current) power and generator power when city power failure occurs.

3. Socket outlet

4. Air-conditioning equipment
   - Heat source equipment such as refrigerating machines, pumps, etc., AHU, supply fans, exhaust fans and ventilation fans will be included.

5. Plumbing equipment
   - Water supply pumps, drainage pumps, fire hydrant pumps, etc. will be included.

6. Studio equipment
   - Master control equipment, VTR, T/C, studio control equipment, editing equipment, etc. will be included.

7. Studio lighting
   - Studio lightings for $900m^2$, $600m^2$, $300m^2$ studios and continuity studios will be included.

8. Others
   - Lifts, decor workshop equipment, etc. will be included.

The above load items are further classified into the following categories;

1. Uninterruptable (UPS) load
   - Such loads which require stabilized and continuous supply of power in case of failure of city power source.
   - Studio equipment of master control, VTR center, T/C center, and continuity studios are to be included.

2. Constant voltage, constant frequency (CVCF) load
   - Such loads which require stabilized power
   - Studio equipment of studio control, VTR editing room, audio dubbing room, etc. are to be included.

Note: At present, most of studio equipment do not require power of constant frequency, however, CVCF equipment shall be applied instead of AVR (automatic voltage regulator) equipment as countermeasure against surge voltage.

3. Generator load
   - Such loads which require city power supply and generator power supply

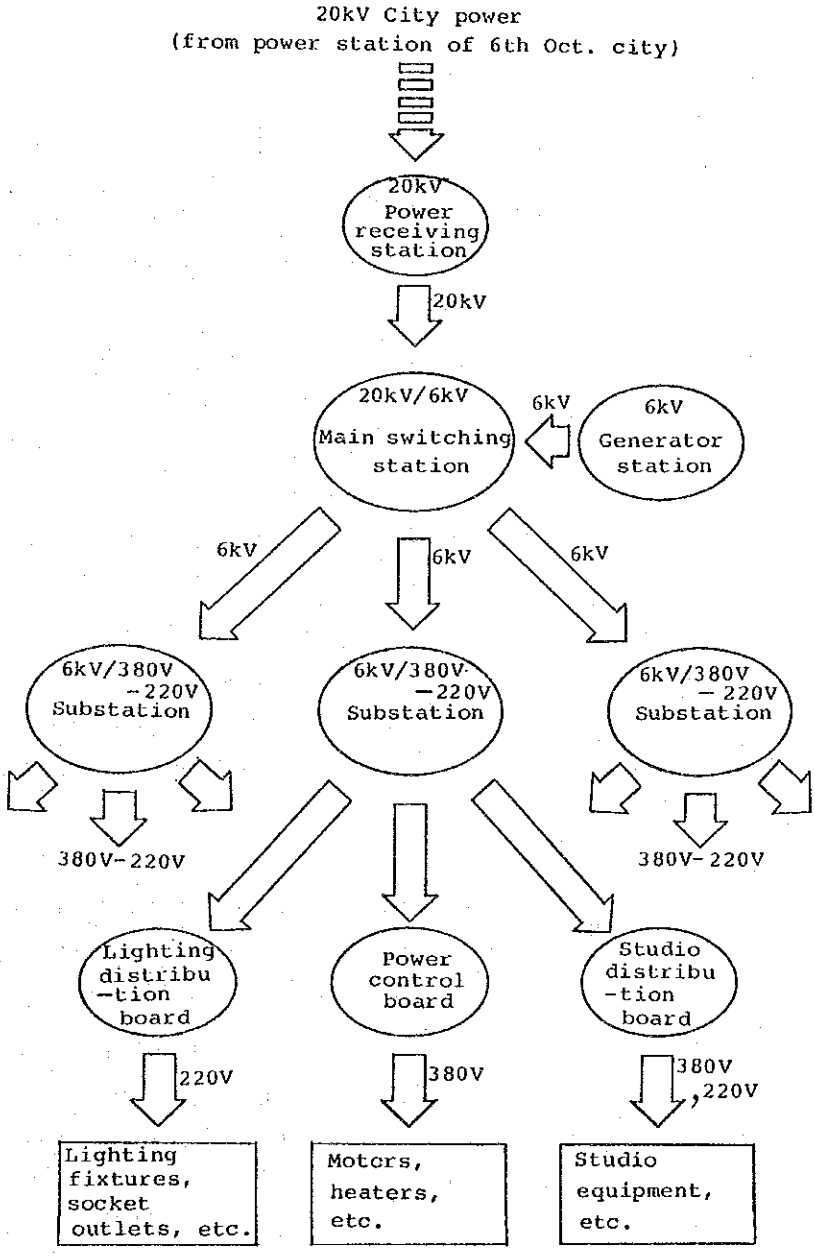
4. Ordinary load

- Such loads which will not require UPS power, CVCF power and generator power, in other words, such loads are supplied city power only.

(4) Outline of power supply system

The outline of power supply system is shown in the following block diagram.

Fig. 5-12 BLOCK DIAGRAM OF POWER SUPPLY SYSTEM



(5) Location of power supply facilities

Locations of power receiving station, main switching station, generator station and substations are shown in Fig 5-13.

- Power receiving station is to be located near the gate of north side boundary of the site.
- Main switching station and generator station are to be located in the power house.
- Substations are to be located at suitable places so that distance between substation and each load is within about 150 meters.

(6) 20kV power receiving station

20kV power (4 lines) which is supplied by 6th Oct. City is received by divisional isolators which are installed near the boundary of the site.
Divisional isolator should be disconnecting switch (DS), and installed in outdoor type cubicle.
From 20kV power receiving station to main switching station, underground cables (18kV/30kV, XLPE-Al 3 x 1 core - 400 mmsq. x 4 lines) are to be installed.

(7) Main switching station

Facilities which transform from 20kV power to 6kV power and distribute 6kV power to each susbtation are to be provided.
Three (3) 7.5MVA transformers (one of the three transformers to be used as stand-by) are to be provided.
Two (2) 6kV feeder circuit breakers shall be provided for each substation unit, and 6kV feeder switching system which can choose transformer that sends power to the substation according to load capacity condition is to be applied in order to avoid the load capacity being one-sided to either transformer.

Transformers shall have automatic on-load tap changer as countermeasure of voltage regulation, and capacity of one (1) 6kV feeder shall be scheduled within about 2000kVA.

Note: 1. Regarding distribution voltage from main switching station to substation, the reason for adopting 6kV distribution system is shown in the ATTACHMENT.

2. Outline of main switching station is shown in Fig. 5-14.

(8) Substation

Facilities which transform from 6kV power to 380V-220V power and distribute 380V-220V power to lighting distribution board, power control board, studio distribution board, etc. are to be provided.
6kV power receiving system for substation is to be chosen from following two (2) systems.

1. Two (2) lines (including one (1) stand-by line) power receiving system.
   --- Such system is to be applied to substations which have important loads such as TOC equipment and continuity studios.

2. One (1) line power receiving system.
   --- Such system is to be applied to substations which do not have such important loads, in other words, such loads can accept short-term power failure for repairing and maintenance of 6kV distribution line.

Each substation unit shall have one (1) stand-by transformer in order to minimize power outage time during maintenance or trouble of transformer.

Other than the above, main distribution board (380V-220V), battery and charger (for equipment operation and emergency lighting), CVCF and UPS equipment which are required in accordance with load classification are to be installed in substations.
Outline of substation system is shown in Fig.5-14, and rough estimation of load capacity is shown in table 5-8.

Table 5-8 ROUGH ESTIMATION OF LOAD CAPACITY

Unit : kVA

Items / Substation (total)	General lighting	Socket outlet	A/C equip.	Plumbing equip.	Studio equip.	Studio lighting
S/S-1 (5,860)	50	10	5,500	300	——	——
S/S-2 (1,640)	500	150	950	10	30	——
S/S-3 (3,310)	400	100	1050	10	250	1,500
S/S-4 (4,170)	350	90	1,850	10	70	1,800
S/S-5 (1,880)	400	120	1,350	10	——	——
S/S-6 (2,290)	300	60	1,000	10	20	900
S/S-7 (2,010)	250	60	900	10	40	750
Total 21,160	2,250	590	12,600	360	410	4,950

Note: Capacity of stand-by equipment is not included in above table.

(9) Generator system

a. Priority of load

All loads are to be divided into three priorities according to their functions and operation conditions.

. 1st priority load
  - Such load which is required to be supplied generator power without any restriction in case of city power failure.
. 2nd priority load
  - Such load which can be supplied generator power with restriction in case of city power failure.
. 3rd priority load (ordinary load)
  - Such load which can accept no power supply in case of city power failure.

Following load items will be included in the 1st priority load.

- General lighting
  . Master control room
  . VTR center
  . T/C center
  . Continuity studio and control room
  . Central supervising room
  . Security center
  . Fire center
  . Telephone exchange room
- Emergency lighting
  . All emergency lightings
- Socket outlet
  . Same rooms as general lighting
- Air-conditioning
  . Same rooms as general lighting
  . Heat source equipment for above rooms
- Plumbing
  . Booster pump for drinking water

  . Fire hydrant pump
  . Sprinkler pump
  . Drain pump
- Studio equipment
  . Master control equipment including microwave
  . Equipment, etc.
  . VTR center equipment
  . T/C center equipment
  . Continuity studio equipment
- Studio lighting
  . Continuity studio

Following load items will be included in the 2nd priority load.

- General lighting
  . TV studios
  . TV studio control rooms and related rooms.
  . Utility studios, audio dubbing studio, sound recording studio, VTR editing, etc.
- Socket outlet
  . Same rooms as general lighting
- Air-conditioning
  . Same rooms as general lighting
- Studio equipment
  . Same rooms as general lighting
- Studio lighting
  . TV studios

Loads which are excluded from 1st priority and 2nd priority load are included in 3rd priority.

Note: Regarding 2nd priority loads, rooms and equipment which require to be used in case of city power failure shall be selected on the basis of the situation of such rooms and equipment in order not to exceed generator capacity.

b. Generator capacity

Provision of three sets of 1250kVA generator for New TV Center will be required. (3750 kVA in total capacity)
This capacity will be sufficient for 1st priority load (approximately 1600kVA) and two (2) 600m^2 studios or three (3) 300m^2 studios which are of 2nd priority load.
Moreover, if one of three generator sets is in trouble or under maintenance, 900kVA (1250kVA x 2sets - 1600kVA) can be supplied to the 2nd priority load. In this case, it is expected that one studio can be operated by adjusting other loads in order not to exceed the capacity of the generator.

c. Generator power supply system

1. Voltage of generator is to be 6kV to meet distribution voltage from main switching station to substation.

2. Generator power is to be supplied to each substation by using 6kV feeders of main switching station.

3. Regarding generator power supply at each substation.
   - When the city power fails, at first, circuit breakers for 1st priority load remain closed, and circuit breakers for 2nd priority open automatically.
   - After that, circuit breakers for some of 2nd priority load which are selected according to order of priority are closed by remote operation from central supervising console.
   - During city power failure, ordinary loads are not supplied with generator power.

(10) CVCF system

CVCF equipment is to be installed in substation as power source for TV studio equipment, and the system shall consist of two CVCF sets (one for stand-by).

(11) UPS system

UPS equipment is to be installed in substation as power source for studio equipment such as master control, VTR center, T/C center, continuity studio, etc. that require uninterruptable power.
UPS system shall consist of two UPS sets (required capacity x 2 sets), and they are to be operated parallel.

(12) Power supply equipment schedule

Following equipment is to be scheduled for power supply system.

1. Circuit breaker for high voltage
   . 20kV ..... VCB
   . 6kV ..... VCB
2. Circuit breaker for Low voltage
   . Secondary CB of transformer ..... ACB
   . Other CB ..... MCB
3. Transformer
   . Receiving transformer (20kV/6kV)
      .... Oil immersion type with on-load tap changer.
   . Substation transformer (6kV/380V-220V)
      .... Oil immersion type
4. Batteries
   . For emergency lighting and UPS equipment
      .... Lead acid battery
   . For power supply equipment control
      .... Alkaline battery
5. Generator
   . Engine ..... Diesel engine
   . Generator ..... Insulation class F
   . Cooling system ..... Radiator cooling
   . Automatic parallel operation
6. CVCF
   . Static type
7. UPS

. Static type

8. Power supply equipment except transformers and generator sets are installed in the cubicle (metal enclosed switchgear type).

9. Rating capacity of transformer, CVCF and UPS equipment are to be decided including following allowance after considering demand factor to total load capacity.
   . Transformer ..... 10% (substaion)
   . CVCF 15%
   . UPS 15%

(13) Construction phasing

a. Phase-1

. 20kV power receiving station
. Main switching station(excluding 6kV feeder CB for phase-2 substation)
. Substation (S/S-1, S/S-2, S/S-3, S/S-4 and S/S-5)
. Generator (3 sets)
. Other related equipment and materials

b. Phase-2

. 6kV feeder CB of main switching station for phase-2 substations .
. Substation (S/S-6, S/S-7)
. Other related equipment and materials

(14) Required city power capacity for New TV Center

Peak demand capacity of each load item is estimated from table 5-8 as follows.

Load item	Load capacity (KVA)		Peak demand factor (assumed)		Peak demand capacity(kVA)
General lighting	2,250	x	0.7	=	1,575
Socket outlet	590	x	0.3	=	177
A/C equip.	12,600	x	0.65	=	8,190
Plumbing equip.	360	x	0.5	=	180
Studio equip.	410	x	0.6	=	246
Studio lighting	4,950	x	0.6	=	2,970
Total	21,160 kVA				13,338 kVA

However, it is expected that not all loads will be operated under peak demand capacity at the same time. Therefore, it can be assumed that 20% of total peak demand capacity will be reduced as maximum demand capacity.

13,338 kVA x (1-0.2) = 10,670 kVA

In consideration of safety factor 10%,

10,670 kVA x 1.1 = 11,737 kVA

Required capacity at maximum demand will be approximately 12MVA.

Fig. 5-13 LOCATION OF POWER SUPPLY FACILITIES

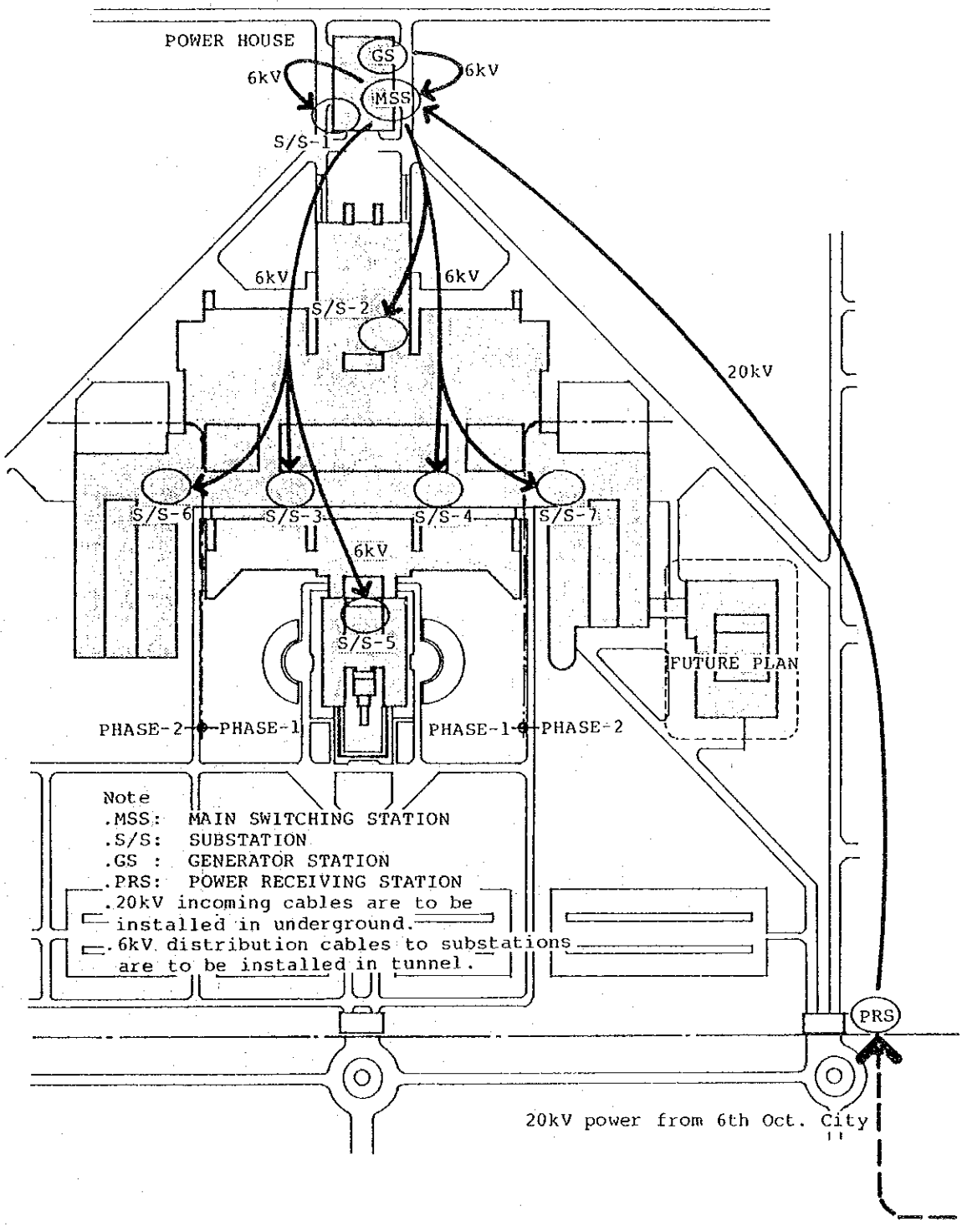
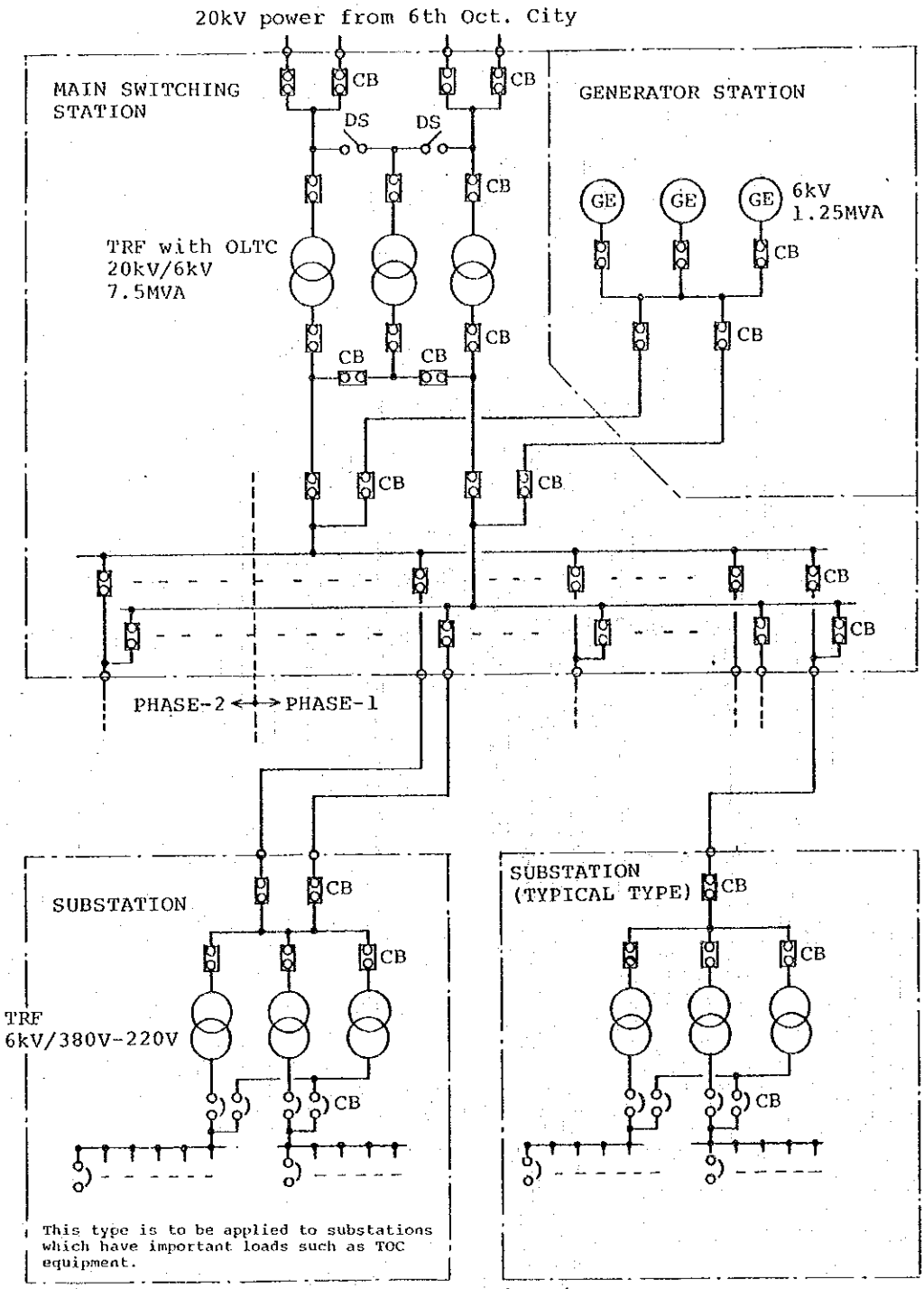


Fig. 5-14 OUTLINE DIAGRAM OF MAIN SWITCHING STATION AND SUBSTATION



Note. OLTC : On-load tap changer
CB : Circuit breaker
DS : Disconnection switch
TRF : Transformer

5-5-3 Wire, Cable and Bus-duct

Wire, cable and bus-duct which are mainly used for this project shall meet the following specifications.

1. For high-voltage power distribution
   - 20kV line
     . 18kV/30kV XLPE insulated and PVC sheathed cable.
   - 6kV line
     . 6kV/10kV XLPE insulated and PVC sheathed cable.

2. For low-voltage power distribution
   - 380V/220V line
     . 0.6kV/1kV XLPE insulated and PVC sheathed cable
     . 0.6kV/1kV PVC insulated wire
     . 0.6kV insulated bus-duct

3. Copper conductor is applied to cables and wires, and aluminum conductor is applied to bus-duct.

5-5-4 Power Control System

The power control system is for power supply to motors and heaters which are used for mechanical and plumbing facilities, and for their operation and control.
Power control boards which will consist of circuit breakers, magnetic contractors, starters, on-off switches, indication lamps, ammeters, relays and related apparatus shall be installed in mechanical rooms or suitable location for operation and maintenance.
Star-delta starter devices shall be provided to motors over 18.5kW, and line starter devices to motors under or equal to 18.5kW.

5-5-5 Lighting System (house lighting)

Lighting system shall comprise two systems: general lighting and emergency lighting.

(1) General lighting system

a. The most suitable type of lamp for each kind of room is to be chosen from the following lamps.

- Incandescent lamp (IL) ..... mainly used for decorative lighting and control console lighting
- Fluorescent lamp (FL) ..... general use
- Metal halide lamp (ML) ... high ceiling rooms such as TV studios, assembly hall, etc.
- Halogen lamp (HL) ... mainly used for high ceiling area such as main entrance hall, audience sheat of hall.

b. Type of lighting fixture and illumination level for each room shall be decided on the basis of room's function, purpose and architectural design.
Following table shows typical schedule for illumination level.

Table 5-9 TYPICAL SCHEDULE FOR ILLUMINATION LEVEL

Room	Average level of illumination (Lux)
. TV studio (900, 600,300m2)	
TV studio	250 - 350
Studio control rm	300 - 450
Apparatus rm	300 - 400
Lighting dimmer rm	200 - 300
Maintenance rm	300 - 400
Store (Camera)	250 - 350
" (Lighting equip.)	250 - 350
" (Microphone)	250 - 350
" (Accessory)	250 - 350
" (Paint)	250 - 350
Make-up rm	300 - 450
Changing rm	300 - 450
Waiting rm (Artist)	300 - 400
" (Technician)	300 - 400
. Decor workshop	
Carpentry	250 - 350
Black smith	250 - 350
Gypsum	250 - 350
Polyester	300 - 400
Furniture	300 - 400
Plastic	300 - 400
Painting	300 - 400
Curtain	300 - 400

Sculpture & Ceramic (Design rm)	400 - 500
" (Model making)	400 - 500
" (furnace)	400 - 500
" (sculpture workshop)	400 - 500
. Decor store	
Raw material	100 - 200
Scrap material	100 - 200
. Accessories store	250 - 350
. Assembly hall	250 - 350
. Scenery design	
Drawing rm	400 - 500
Caption & lettering rm	400 - 500
Stained glass	400 - 500
Wall drawing	400 - 500
Execution rm	400 - 500
. Technical operation center	
VTR center	300 - 450
Telecine center	300 - 450
Master control	300 - 450
Continuity studio	250 - 350
VTR copy rm	300 - 400
VTR editing rm	300 - 400
Utility studio	300 - 400
Audio dubbing studio	300 - 400
Sound recording studio	150 - 250
Library (basement)	250 - 350
Store (spare parts)	250 - 350
" (Raw tape)	250 - 350
. Program production	
Reading rm	350 - 450
Monitering booth	300 - 400
. Wardrobe	
Design rm	400 - 500
Workshop	350 - 450
Store (cloth, leather, hat)	200 - 350
. Rehearsal	
Rehearsal rm	350 - 450
Reading rm	350 - 450
. Common	
Office	400 - 500
Secretary's rm	400 - 500
Meeting rm	300 - 500
General store	50 - 150
Other store	according to their purpose and function
Corridor	50 - 100

Note: 1. Actual illumination level of working area in the rooms will increase by 10% from average level.

2. Special lightings such as mirror light for make-up room and spotlight for control console will be added.

c. Fluorescent lighting fixture shall be high power factor and glow start type.

d. Explosion-proof type lighting fixture shall be provided in paint store, painting room, etc. which will store or use flammable materials such as thinner.

e. Moisture-proof type lighting fixture shall be provided in kitchen, etc.

(2) Emergency lighting

Emergency lighting fixture is to be installed in general rooms (except stores, toilet, etc.), studios, control rooms, rehearsal rooms, make-up rooms, corridors, etc.
Illumination level of emergency lighting is to the extent that walking is possible.
Light source of emergency lighting is to be incandescent lamp, and its power source is to be battery and generator.
Battery is used as power source from city power failure to starting generator.

5-5-6 Socket Outlet System

Socket outlets shall be provided at necessary locations as the power source for small electric apparatus.
Two pin type socket outlet which is generally used in Egypt shall be applied.

5-5-7 Telephone System

The telephone system will consist of PABX, attendant consoles, power unit, main distribution frame (MDF), trunk terminal board (TTB), local terminal boards telephone sets, cabling and other related equipment and materials.

The city line cables from the city exchange station to the New TV center will be installed and connected to the primary terminals of TTB by the telephone office of 6th Oct. City, however, the conduit pipes for the city line cables between site boundary and TTB shall be provided by this project.

For the exchange system equipment, two rooms shall be provided near the security station on the ground floor of Administration block, one is for PABX equipment including TTB, MDF and power unit, and another for attendant consoles.

Note: 1. Location of E-PABX and attendant console are shown in Fig. 5-15.

2. System diagram is shown Fig. 5-16.

(1) Telephone layout schedule

The extension telephones shall be provided according to the following standard schedule which was made on the basis of the space program.

Table 5-10 TYPICAL SCHEDULE OF EXTENSION TELEPHONES

Room	Floor area (M2)	No. of occupant	No.of telephone outlet	No. of extension telephone
Office (Chairman)	80	1	4	1
" (Div. head)	60	1	4	1
" (Dept. head)	40	1	3	1
" (Sec. head)	20	1	2	1
" (Manager)	20	1	2	1
" (Manager)	20	2	2	2
" (Staff, asst.eng.)	20	3	2	2
" (Staff, asst.eng.)	20	4	2	2
" (Staff, asst.eng.)	20	5	2	3
Secretary's rm	20	1	2	1
"	20	2	2	2
Sitting rm (Worker)	20	5-9	2	1
" (Worker)	30	10-14	2	1
" (Driver)	30	14	2	2
TV studio control rm	150		6	3
Apparatus rm	150		4	1
Maintenance rm	40		2	1
Waiting rm (Artist)	20		2	1
" (Technician)	20		2	1

Note: 1. Number of extension line telephones and number of outlets for other rooms which are not mentioned above will be decided in consideration of above schedule, space program and each room's function.

2. Besides the above mentioned extension telephones, direct line telephones (not through PABX) for chairman's office, division head office, department head office, etc. will be provided.

(2) Telephone exchange equipment

Electronic PABX (E-PABX) system is to be applied for exchange system, and its capacity will be 1500 extension lines and 100 central office lines (COL) including allowance of approximately 15% for future.
About ten (10) attendant consoles will be required.
Power unit for the system shall have storage batteries capacity of which is sufficient for five hours operation of whole system without any charging power. Generator power with 1st priority shall be supplied to power unit.

(3) Construction phasing

a. Phase-1
- 1000 extension line E-PABX with basic function units is to be provided.
- Seven attendant consoles are to be provided.
- Necessary number of telephones for phase-1 are to be provided.

b. Phase-2
- 500 extension line E-PABX is to be added.
- Three attendant consoles are to be added.
- Necessary number of telephones for phase-2 are to be provided.

Note: After completion of phase-2, telephone exchange system can be used as one system.

5-5-8 Intercom system

(1) Maintenance intercom.

The purpose of maintenance intercom is for maintenance and test operation of power supply system, air-conditioning system and plumbing system.
Master-intercom is installed in the central supervising room, and sub-intercoms are installed in main-switching, substation, generator station, mechanical rooms, etc.
Note: 1. Location of master intercom is shown in Fig. 5-15.
2. System block diagram is shown in Fig. 5-17.

(2) Secretary call intercom

Secretary call intercoms are installed in the following rooms.

- Chairman's office...Secretary's room..meeting room
- Division head office .... Secretary's room
- Department head office ..... Secretary's room

Note: System block diagram is shown in Fig. 5-17.

(3) Security check intercom

The purpose of security check intercom is for communication between each security checkpoint and security center.
Master-intercom is installed in the security station and sub-intercom is installed at each important security checkpoint such as gate, entrance, etc.
Note: 1. Location of master intercom is shown in Fig. 5-15.
2. System block diagram is shown in Fig. 5-17.

(4) Construction phasing

Construction phasing of intercom system is to be done according to building construction phasing.
However, number of circuits of master intercom shall include phase-1 and phase-2.

5-5-9 Public Address System

Public address system will consist of amplifier with group selector switch, microphone and BGM player, speakers, etc.
The amplifier is located in the telephone exchange room (where attendant consoles are installed).
The system is to have normal mode for general announcement and emergency mode for emergency announcement.
Emergency announcement shall be able to be broadcast to each room when speaker line is off by attenuator which is installed in each room.
Note: 1. Location of amplifire is shown in Fig. 5-15.
2. System block diagram is shown in Fig. 5-18.

(1) Grouping of announcement

Following table shows grouping of announcement.

Table 5-11 GROUPING OF ANNOUNCEMENT

Group	Area
Group-1	Admin. Block (front bldg.) Phase-1
Group-2	Admin. Block (right side of center bldg.) ... Phase-1
Group-3	Admin. block (left side of center bldg.) Phase-2
Group-4	Admin. Block (right wing bldg.) ... Phase-2

Group-5	Admin. Block (left wing bldg.) ... Phase-2
Group-6	TOC Block ... Phase-1
Group-7	Studio block ... Phase-1
Group-8	Studio block (right wing bldg.) Phase-2
Group-9	Studio block (left wing bldg.) ... Phase-1
Group-10	Decor block (right side) ... Phase-1
Group-11	Decor block (left side) Phase-1
Group-12	Decor block (right wing) ... Phase-2
Group-13	Decor block (left wing) Phase-2

(2) Location of speakers

Speakers are to be located in all rooms (normally occupied by people), corridors and in entrance hall, etc. except studios.

(3) Construction phasing

a. Phase-1

- Amplifier units for group-1, 2, 3, 6, 7, 10 and 11 and basic function units are to be provided.
- Speakers located in phase-1 buildings are to be provided.

b. Phase-2

- Amplifier units for group-4, 5, 8, 9, 12 and 13 are to be provided.
- Speakers located in phase-2 buildings are to be provided.

5-5-10 Fire Alarm System

The fire alarm system will consist of main-receiving panel, sub-receiving panel, power unit, fire detectors, combination panels and other related equipment and materials. Main-receiving panel is located in the fire station on the ground floor of Administration block and sub-receiving panel is located in the central supervising room.

Power unit for the system shall have batteries, and generator power with 1st priority shall be supplied to power unit.

Combination panels which consists of alarm bell, pilot lamp and manual alarm box are to be installed at places where fire hydrant boxes are installed.

Note: Location of main-receiving panel and subreceiving panel are shown in Fig. 5-15.

(1) Fire detector for each room or place is to be selected from the following types.

- Heat detector, rate of rise type
- Heat detector, fixed temperature type
- Smoke detector

(2) Number of fire detectors

The number of fire detectors are to be determined on the basis of the following criteria.

Table 5-12 DETECTING AREA

Type of detector / Ceiling height(m)	Rate of temperature rise, heat detector	Fixed temperature, heat detector	Smoke detector
Less than 4 m	70 m^2	60 m^2	150 m^2
4 m to 8 m	35 m^2	30 m^2	75 m^2
8 m to 20 m	-	-	75 m^2

(3) Zoning of protection area

Each zone (protection area) is to be less than 600m^2, and shall cover only one floor.

(4) Construction phasing

Whole fire alarm system is to be divided into phase-1 and phase-2 according to building construction phasing, therefore main-receiving panel and sub-receiving panel for phase-2 are to be provided at phase-2.

5-5-11 Monitor TV System for Security Check

Monitor TV system will consist of monitor TV, camera VTR and control console, etc.
Monitor televisions are to be installed at security center, and cameras are to be installed at each entrance which is normally opened.
Note: Location of monitor TV and control console are shown in Fig. 5-15.

(1) Construction phasing

a. Phase-1
. Monitor TV, VTR, control consol and camera which is installed in phase-1 building.
. Other related equipment and materials.

b. Phase-2
. Cameras for phase-2 building.
. Other related equipment and materials.

5-5-12 Central Supervising system

Central supervising system will include equipment for monitoring, operations, measurements and recordings related to power supply system, air conditioning system, plumbing system and lifts.

Each system above-mentioned will have individual supervising system in order to prevent them affecting each other in the event of trouble.

In consideration of maintenance, central supervising system shall not be fully computerized, however, microcomputers will be applied partially in order to satisfy important functions such as demand control of generator loads.

Central supervising equipment is installed in the central supervising room in the power house.

Note: 1. Location of central supervising equipment is shown in Fig. 5-15.

2. Outline of central supervising system is shown in Fig. 5-19.

(1) Construction phasing

Supervising system is to be divided into phase-1 and phase-2 according to building construction phasing, and basic function will be included in phase-1.

5-5-13 Cable Tray and Piping for Studio Facilities Cable

Routs and installation method shall be decided in accordance with studio equipment and studio lighting planning.

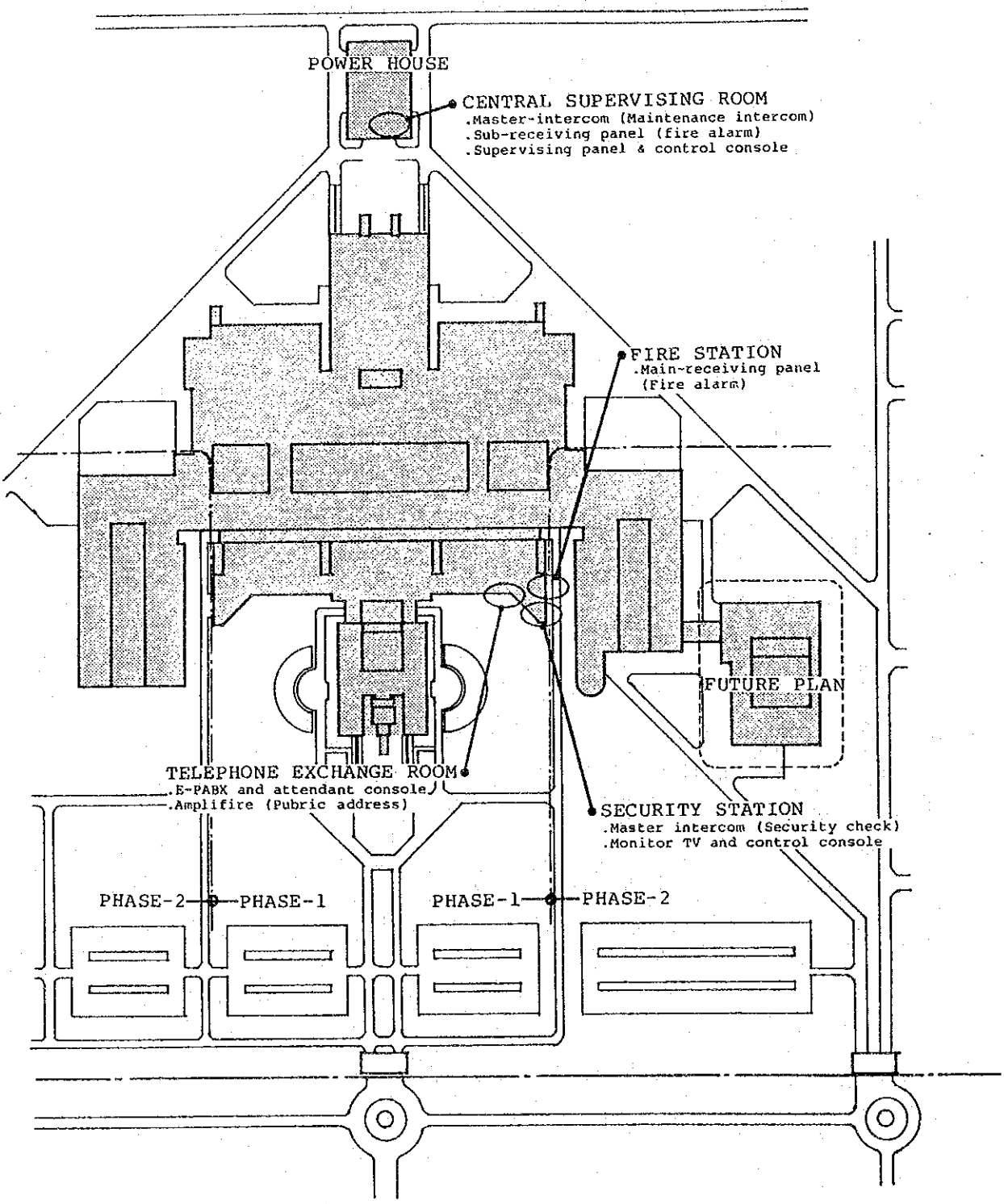
(1) Construction phasing

Construction phasing is to be divided into phase-1 and phase-2 according to building construction phasing.

5-5-14 Lightning Protection System

Lightning protection system is to be provided in order to protect the buildings against lightning.

Fig. 5-15 LOCATION OF COMMUNICATION SYSTEM EQUIPMENT



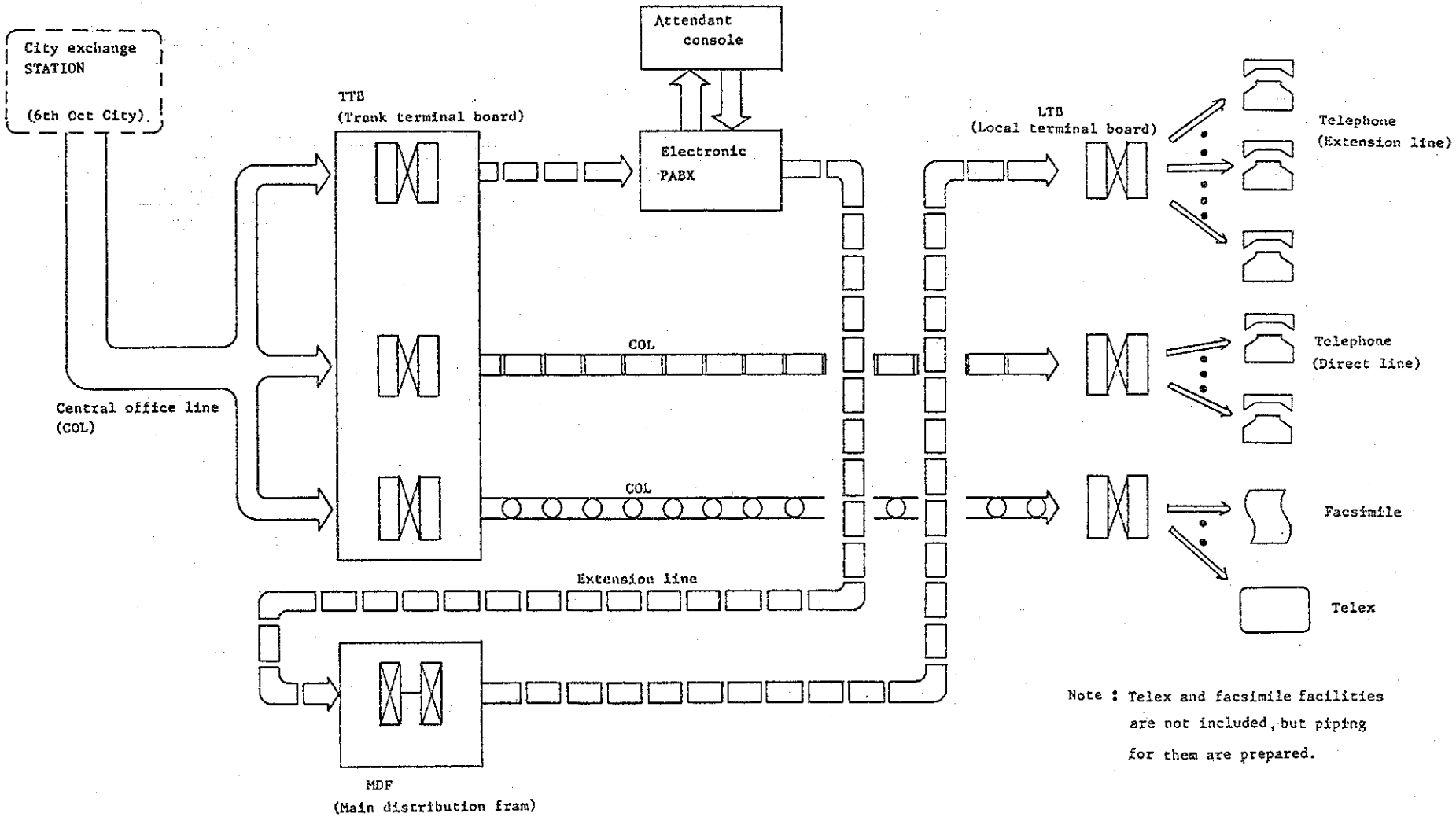


Fig. 5-16 BLOCK DIAGRAM OF TELEPHONE SYSTEM

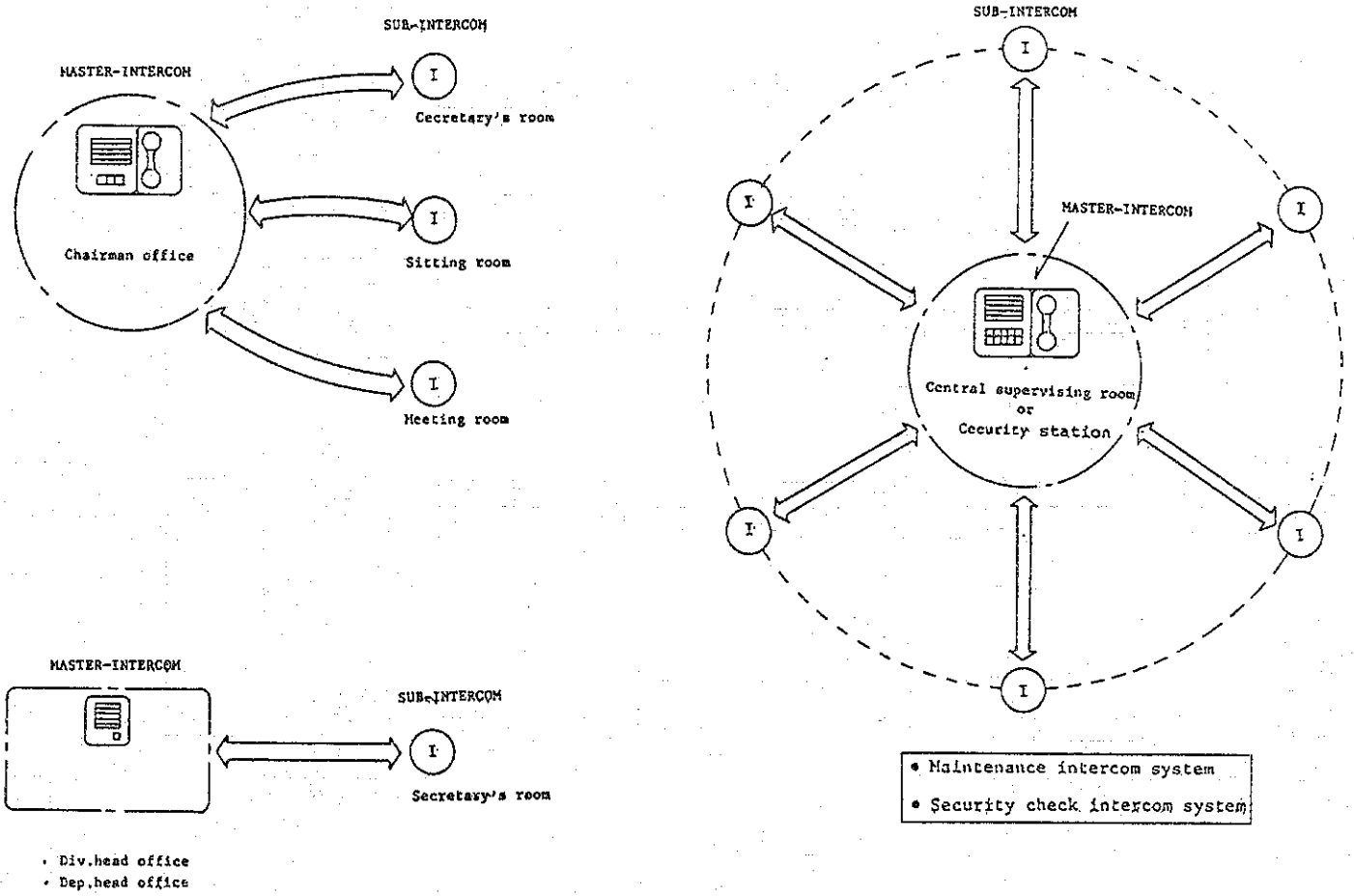


Fig. 5-17 BLOCK DIAGRAM OF INTERCOM SYSTEM

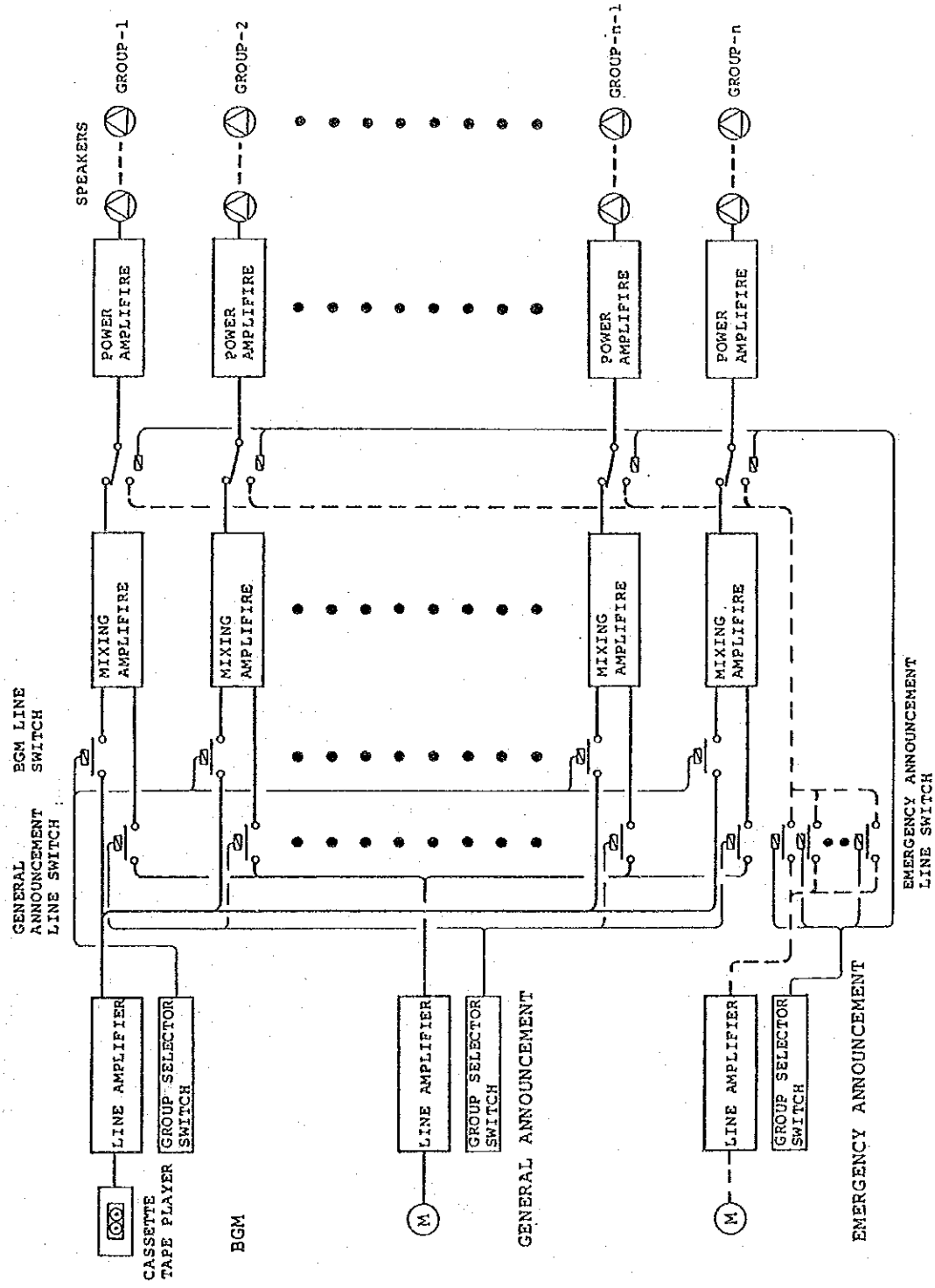
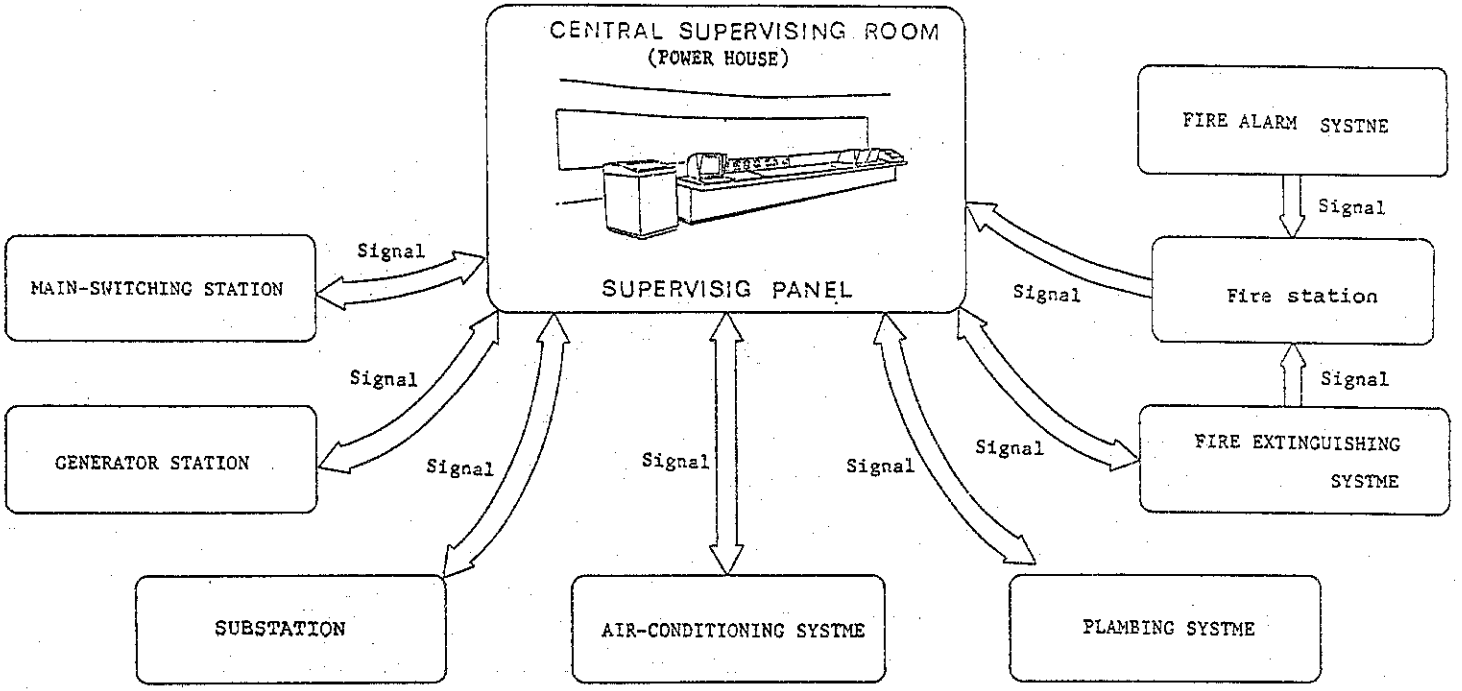


Fig. 5-18 BLOCK DIAGRAM OF PUBLIC ADDRESS SYSTEM



FUNCTION
STATE INDICATION
ALARM
REMOTE OPERATION
MEASURING
RECORDING

Fig. 5-19 OUTLINE OF CENTRAL SUPERVISING SYSTEM

ATTACHMENT FOR ELECTRICAL FACILITIES DESIGN

E-1 Prospect of city power supply condition

E-2 Distribution voltage from main switching station to each substation

E-1 Prospect of city power supply condition

One of the necessary conditions for planning of power supply system is to prospect the city power supply condition.
Generally, such prospect is to be assessed through study and analysis of following two items.

1. Past records of city power supply conditions of similar facilities in the same area.

2. Scheduled power supply system which is provided by 6th Oct. City to the site.

However, regarding item 1, it is impossible to obtain such data, because infrastructure of 6th October City is now under design, and its fundamental construction has been started.
Therefore, only item 2 is availavle for assessing prospect of city power supply condition.

(1) City power failure

a. Cause of city power failure
Following items will be considered as the cause of city power failure.

1. Insufficiency of power source
2. Insufficiency of power transmission network facilities.
3. Accident
4. Maintenance and construction for power transmission network.
5. Switching of transmission lines

Regarding items 1 and 2, 220kV power will be transmitted from Aswan to the power station of 6th October City, and four exclusive 20kV power lines from the power station to the site after transforming voltage at the power station.
It is not thought that the construction planning of a new city such as 6th October City will be carried out without planning for adequate power supply.
In view of the above, it is assumed that items 1 and 2 will not become the cause of city power failure.
If item 1 and/or 2 become the cause of city pwoer failure, ERTU should explain the importance of New TV Center to the Authority of Development New Town of 6th October city, and should request that sufficient power be supplied continuously to the site.

Regarding item 3, such a situation is obviously impossible to forecast.
However, it is assumed that number of power lines from Aswan to power station of 6th October City will not be just one line, and that several lines will be constructed and countermeasures against accident taken in order to recover power transmission.
Moreover, it is thought highly unlikely that all four 20kV power lines from power station to the site will be damaged simultaneously.

Regarding item 5, it poses no problem for operating New TV Center. Interval of switching will be very short, and important loads such as master control equipment, VTR center equipment, etc. can be covered by UPS system.

b. Frequency and interval of city power failure.

Regarding items 1 and 2, no possibility of power failure is expected.

Regarding item 3, it is expected that city power will generally be recovered within one hour. The other hand, in case of big accident, it will be over one hour. Frequency of city power failure can not be estimated.

Regarding item 4, interval of city power failure is expected to be minimum one hour and maximum 24 hours. Frequency is estimated to be approximately 5 to 6 times a year.

(2) Quality of city power

From the present condition of Cairo Broadcasting Center, it is supposed that quality of city power of 6th October City will also not be good, especially regarding voltage regulation.

(3) Conclusion of prospect of city power supply condition

From the above study and analysis, the following prospect will be possible;

- Frequency of city power failure is estimated at 10 times a year for items 1, 2, 3 and 4.
- Duration of city power failure is mostly estimated as within one hour, but one or two times of over 6 hours.
- Voltage regulation will be over -10% of rating voltage.

E-2 Distribution Voltage from Main Switching Station to Each Substation.

Two plans can be considered for this project as follows.

- PLAN-DA ..... 20kV power distribution system
- PLAN-DB ..... 6kV power distribution system

Note: Refer to Fig. 5-20.

a. Comparison of PLAN-DA and PLAN-DB

1. Countermeasure of voltage regulation and surge voltage.

. PLAN-DB is possible to take countermeasure of voltage regulation. This is because, PLAN-DB provides for receiving transformers with automatic on-load tap changer (OLTC) and power supply circuit is isolated by primary coil (20kV) and secondary coil (20kV). These provisions will be effective measures against voltage regulation and surge voltage.

2. Expansibility for future plan

. Both plans will be almost same if the generator system is not considered.
Taking into consideration additional generator set in the future, PLAN-DB is more advantageous than PLAN-DB from the viewpoint of economical and technical aspects.

3. Number of distribution circuits

. In case of 20kV distribution system (PLAN-DA), maximum supply capacity per one (1) circuit will be approximately 6,000kVA.

. In case of 6kV distribution system (PLAN-DB), maximum supply capacity per one (1) circuit will be approximately 2,000kVA.

4. Easy maintenance and operation

. Both plans will be almost same.

5. Availability of spare parts in Egypt (from the point of view of present situation in Egypt).

. Both plans will be almost same, because most of power supply equipment for 20kV and 6kV are imported from overseas countries at present.

6. Reliability of system

. Both plans will be same from the point of view of power supply equipment trouble.

7. Standard voltage

. Standard voltage in 6th Oct. City is 20kV, however, this voltage is not standard voltage which is used commonly in Egypt, the same as 6kV.

8. Cost

. Cost will be approximately the same in consideration of all power supply systems including generator system.

b. Conclusion

PLAN-DB is recommended.

Reasons: From the required functions of New TV Center, item 1 is more important than other items.

Fig. 5-20 COMPARISON OF PLAN-DA AND PLAN-DB